

MGA94, ZONE 55

Approved Development Plan  
Planning and Environment Act 1987  
East Gippsland Planning Scheme

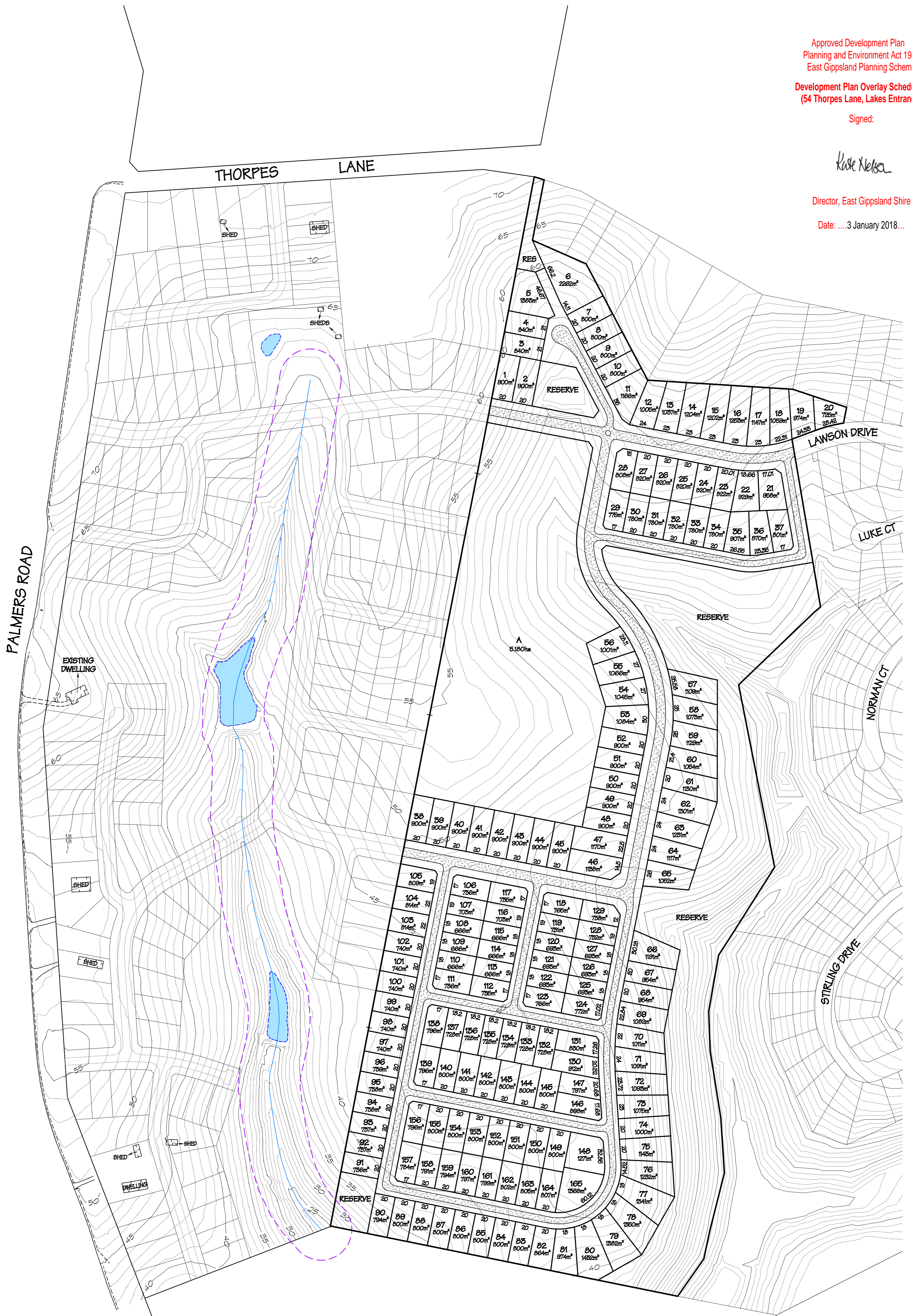
Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)

Signed:

*Kate Nelson*

Director, East Gippsland Shire

Date: .....3 January 2018...



NOT FOR ENDORSEMENT

MERRANGBAUR HEIGHTS P/L

54 THORPES LANE, LAKES ENTRANCE

**Crowthor & Sadler** Pty. Ltd.

LICENSED SURVEYORS & TOWN PLANNERS  
162 MACLEOD STREET, BAINSDALE, VIC., 3875  
P. (03) 6162 5011 E. contact@crowthorand Sadler.com.au

SCALE (SHEET SIZE A1)

1 : 2000

SCALE (SHEET SIZE A3)

1 : 4000

SURVEYORS REF.

17531

VERSION 1 - DRAWN 11/01/2017

NOTATIONS

AREAS ARE APPROXIMATE ONLY  
DIMENSIONS ARE SUBJECT TO SURVEY

DESIGN RESPONSE

PARISH OF COLQUHOUN  
CROWN ALLOTMENTS 27A, 28A & 30A (PARTS)  
LOT 2 ON P512500K

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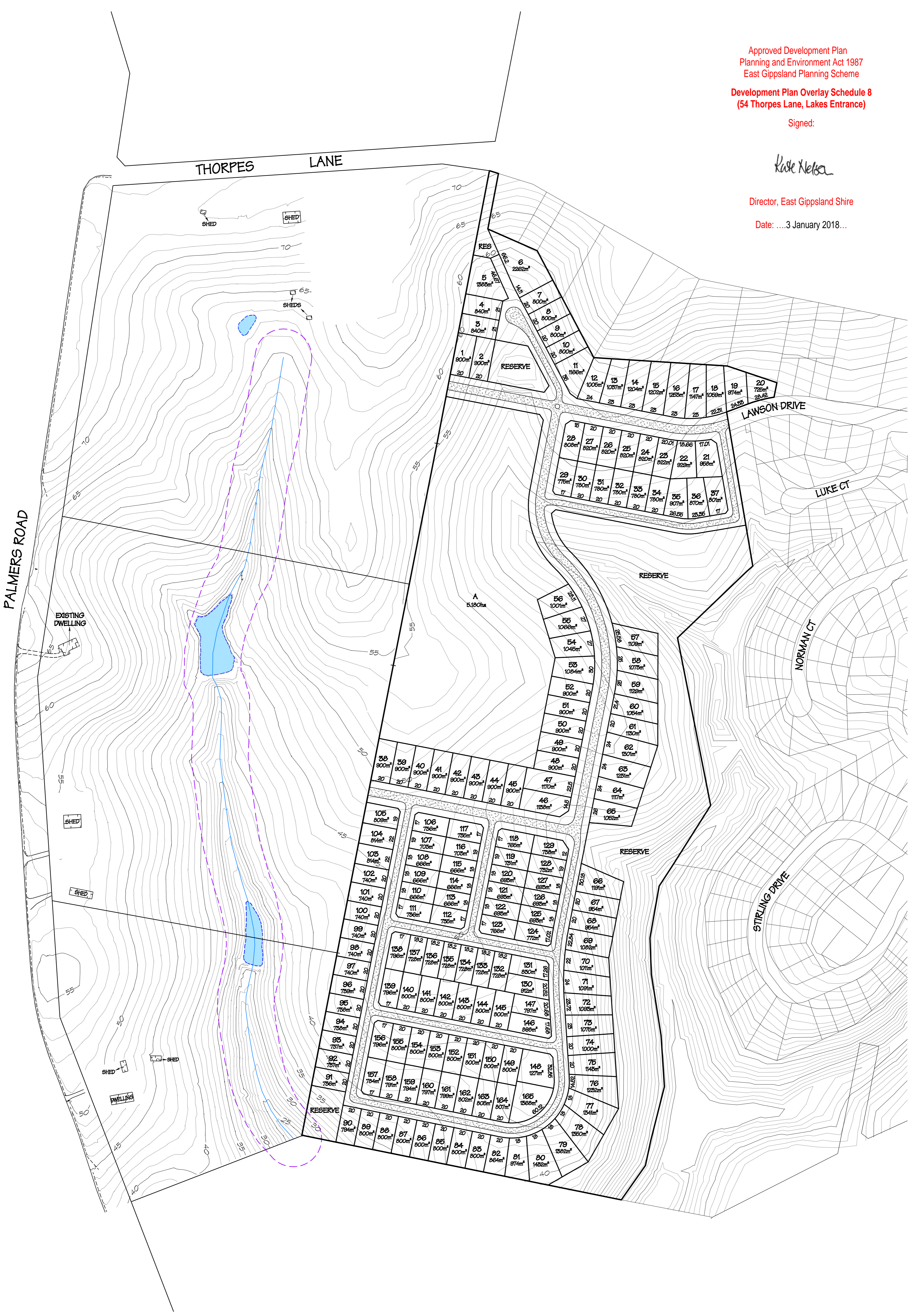
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Director, East Gippsland Shire

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PROPOSED SUBDIVISION

PARISH OF COLQUHOUN  
 CROWN ALLOTMENTS 27A, 28A & 30A (PARTS)  
 LOT 2 ON P5712500K

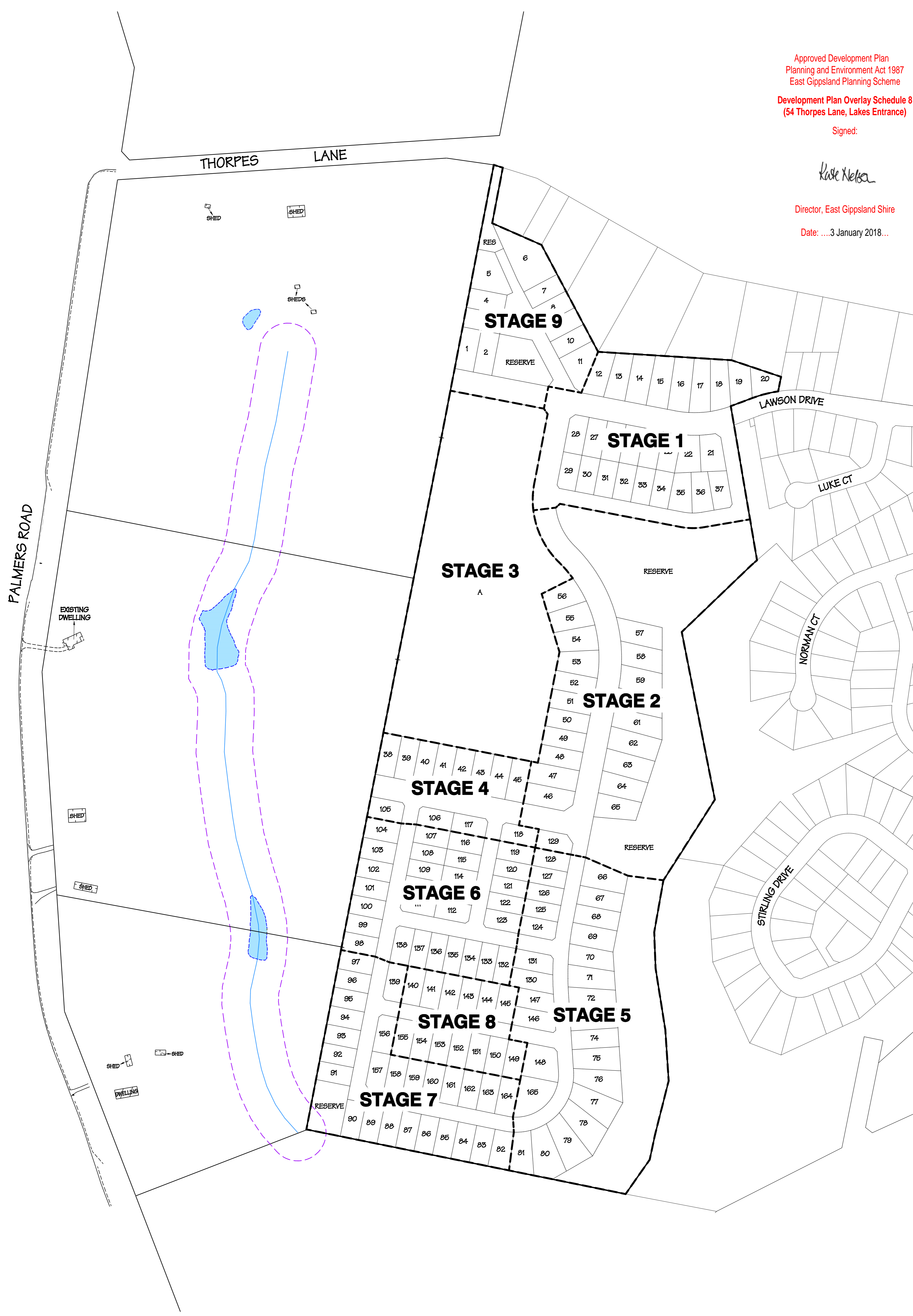
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 P. (03) 6162 5011 E. contact@rowthierand Sadler.com.au

FILENAME: N:\Jobs\17000-17999\17500-17599\17531 Merrangbaur Heights\17531 Staging V1.pro

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STAGE	#LOTS	ROAD LENGTH
1	26	636.8m
2	21	454.6m
3	1	NIL
4	12	225m
5	27	425.5m
6	29	384.3m
7	26	328.9m
8	13	120m
9	11	205.7m

**STAGING PLAN**

PARISH OF COLQUHOUN  
 CROWN ALLOTMENTS 27A, 28A & 30A (PARTS)  
 LOT 2 ON PST12500K



**WATSONS**

Please Reply To: Mornington  
Ref: 35658A

4 April 2011

Manager Planning Projects  
East Gippsland Shire Council  
PO Box 1618  
273 Main Street  
Bairnsdale VIC 3875

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(54 Thorpes Lane, Lakes Entrance)

Signed:

Director, East Gippsland Shire

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Dear Sir/Madam,

**Staged Subdivision, Access to Road Zone (Category 1),  
Vegetation Removal and Removal of Easement  
54 Thorpes Lane, Lakes Entrance  
Lot A on PS517816  
110 Palmers Road, Lakes Entrance  
Lot 2 on PS505056**

On behalf of our client Merrangbaur Heights Pty Ltd we are applying to subdivide Lot A on PS517816 which comprises 30.54ha of the total 40.05ha subject site into residential allotments, a retirement village site and public open space.

The remaining land area of 6.7ha is to be retained as a single lot with a new access road constructed connecting the subdivision site to Colquhoun Road.

An application for a 186 lot residential subdivision and retirement village for the site was previously applied for in 2008 under planning applications 321/2008/P and 441/2008/P respectively. The expert reports that are enclosed with this application were prepared for the previous proposal. However we consider that these reports are still relevant and informative of the current state of the site and can be considered with this application.



**WATSONS**

ABN: 47 637 509 613

Signed:

Director, East Gippsland Shire

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## Subject Land

The subject land of 40.05ha comprises the following lots:

**Lot A on PS517816**— The lot has an area of 33.38ha with frontages of 10m to Thorpes Road and 20m to Stirling Drive.

The lot contains an existing dwelling with sheds and other outbuildings. The dwelling is accessed via a driveway from Thorpes Lane that runs along the top of a bank in a southerly direction. The dwelling is located in the southern part of the lot. The land comprising the lot and surrounding this dwelling is predominantly used for grazing purposes. Along the majority of the eastern boundary the property abuts a drainage gully (Council reserve), except for the north east corner of the site where the lot extends to Stirling Drive via the constructed Lawson Court entry, and medium density residential lots accessed from Norman Court back onto the property. To the west the lot adjoins larger rural lots in use for farming/grazing. Residential lots also back onto the lot on the northern boundary with the exception of a 10m frontage to Thorpes Lane. To the south the lot also backs onto medium density residential lots accessed from Kinkuna Court.

Stormwater flows across the lot to the drainage gully on the eastern boundary of the lot. The catchment area of the gully is relatively small and is shown in more detail in the stormwater assessment submitted as part of the application.

Please note: An area of 2.76ha in the north-east corner of Lot A on PS517816 has been approved under Planning Application 115/2005/P/A for an 18 lot subdivision. Therefore this area is not included in this proposal.

**Lot 2 on PS505056** – The lot has an area of 6.67ha with a 338m frontage to Colquhoun Road.

This lot comprises an existing dwelling, shed and outbuilding located close to Colquhoun Road. A driveway extends from Colquhoun Road to the dwelling through areas of native vegetation, both on the property and in the road reserve. With the exception of the west boundary which fronts Colquhoun Road the property abuts larger rural lots on all sides. It is on the eastern boundary that the lot adjoins Lot A on PS517816. Features of the lot include a dam on the northern boundary, a gully line running north to south across the property, and several areas of remnant vegetation patches and scattered indigenous trees which are typical of the original vegetation type (EVC Limestone Box Forest).



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A feature of the combined 40ha site is a varying topography with a number of steeper sections, banks, hills and dips forming the landscape. The highest part of the application site is to the north close to Thorpes Lane in the north west corner, from here the land generally falls to the south east. In the area where the two lots join the land falls steeply to a gully which traverses the smaller lot. For more details please refer to the levels and features plan showing contours at 0.5m intervals across the site.

The site is encumbered by two easements both affecting the larger Lot A on PS517816. Easement E1 in the north east corner of the site is a 20m wide way, sewerage and drainage easement in favour of land in LP210631 and the Shire of Tambo & Tambo Water Board. Easement E2 to the south of the property is a 16m wide powerline in favour of TXU Electricity Ltd.

A Section 173 agreement covenants the owner of Lot A on PS517816 to *"the stormwater discharge from the whole of the catchment draining through the subdivision will be progressively extended by a piped underground drainage system constructed at the developer's expense as future stages of the land are developed for residential use"*. The drainage solution/ stormwater management plan will provide for this requirement.

The Neighbourhood Description and Context Plan (Watsons Plan No 35658NC-A) identifies the features of the site described above including the areas of vegetation, contours, location of dwellings and electricity easement. This plan also identifies surrounding lots including the eastern residential estate accessed from Stirling Drive and the adjoining Council reserves.

The subject land is located approximately 1.7km north east of the shops and amenities of Lakes Entrance Town Centre. Primary schools, a secondary college, leisure centre/swimming pool and foreshore are all within 500m- 2km of the subject site.

### **Council Reserves**

Please note: the site abuts the following Council reserves:

- 20 Norman Court (Lot RES1 on PS517816);
- 77a Stirling Drive (Lot RES1 on PS510085);
- 121 Princes Highway (Lot RES1 on PS328995); and
- 55a Stirling Drive (Lot RES1 on PS328994).

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## Planning Scheme

The majority of the land (33.38ha) is zoned **Residential 1 Zone**, the remaining 6.67ha is zoned **Farming Zone – Schedule 3**. Pursuant to the East Gippsland Planning Scheme the land is also affected by the following overlays:

- **Erosion Management Overlay (EMO)** (affects whole site);
- **Vegetation Protection Overlay – Schedule 1 (VPO1)** (affects approximately 40m wide strip parallel to frontage of Colquhoun Rd)

Colquhoun Road is designated a Road Zone - Category 1.

**Pursuant to Clause 32.01-2 of the Planning Scheme, a permit is required to subdivide land and must meet the requirements of Clause 56 – Residential Subdivision.**

Clause 32.01 sets out the purpose of the zone to include “*to provide for residential development at a range of densities with a variety of dwellings to meet the housing needs of all households*”.

Pursuant to Clause 35.07 (FZ3) a permit is not required to construct a road (Section 1 use).

### Other permit triggers:

Pursuant to Clause 44.01-3 (EMO) a permit is required to subdivide land. Further “*a permit is required to construct a building or construct or carry out works*” (this includes a road). Under this same overlay a permit is also required to remove vegetation as exemptions in the overlay and schedule are not valid for this proposal/ site.

Pursuant to Clause 42.02-1 (VPO1) a permit is required to remove, destroy or lop native vegetation. No exemptions listed in the VPO or VPO1 apply to this site or proposal.

Pursuant to Clause 52.17, a permit is required to remove native vegetation on lots exceeding 4000m<sup>2</sup> in area.

Pursuant to Clause 52.29 (Land Adjacent to Road Zone Category 1 Road, or Public Acquisition Overlay for a Category 1 Road) a permit is required to create a new access to a Road Zone Category 1 Road.

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## Proposal

It is proposed to subdivide the site in the following manner:

- 152 residential allotments each located within walking distance of the Public Open Space (local park) which forms part of the subdivision and each lot fronting the internal road network and Recreation Area;
- Creation of a 6.478ha lot designated for future development and use as a Retirement Village;
- Provision of a 4.24ha of Reserve (Public Open Space) located within 500m walking distance of all lots and being an unencumbered position on the site. This area will be transferred to Council as a reserve;
- Create a road access to Colquhoun Road which will require road works within the existing Road Reserve and the subject site as required and will incorporate an unsignalised access arrangement onto Colquhoun Road incorporating a 'Type B' or 'AUR' right turn lane treatment and a 'AUL' left turn lane treatment;
- Create a further road access adjoining Lawson Drive;
- Remove native vegetation including 5 indigenous trees and areas of degraded treeless vegetation, as shown on the permit application plans and detailed in the 'Flora and Fauna Assessment' dated June 2008 carried out by Brett Lane & Associates Pty Ltd;
- Removal of native vegetation in the Colquhoun Road reserve to allow construction of an appropriate intersection. This includes the removal of four areas of remnant patch vegetation (Habitat zones K, L, M, U) and the removal of 3 large trees from Habitat K;
- Removal of Easement E2, a powerline easement that affects the site.

The layout and design of the subdivision is responsive to the topography of the land. Normal medium density lots are proposed ranging from 708m<sup>2</sup> to 2088m<sup>2</sup> with the average lot size being 1027m<sup>2</sup> (excluding 'Retirement Village' site). The subdivision will be engineered with no estate or connector road exceeding a gradient of 20%, and lots terraced and/or battered where required (subject to detailed engineering design in accordance with the Responsible Authorities requirements). On the higher sloping parts of site larger lots are designed to incorporate sufficient frontage and depth for the siting of a conventional family sized house, parking and access.

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For lots 122, 132 to 142 a building area has been nominated taking into account the slope of the land and to protect areas outside the building area more prone to erosion or other land degradation process in accordance with the requirements and objective of the Erosion Management Overlay affecting the site. Further in these protected areas (outside the building areas) no vegetation removal is proposed thereby minimising ground disturbance.

The designated 'Retirement Village Site' is to be located on a 6.478ha regular shaped lot in the most responsive location being central to the site, within walking distance of the open space and as the application plans identify the least sloping area of the site. The retirement village site has a 59m frontage to the main estate road and will be accessed from a roundabout, as recommended by traffic engineers and transport planners 'Traffix Group', assessment attached. The roundabout will be constructed as part of the residential subdivision estate.

Removal of native vegetation is to occur only in areas where vegetation removal is absolutely necessary (5 trees to be removed to enable road access) in accordance with 'Victoria's Native Vegetation Management – A Framework for Action' and the principles of Net Gain (Avoid, Minimise, Offset). The majority of existing native vegetation is to be retained and protected in reserve areas, road reserves or private lots. Retained significant native vegetation in private lots is outside the designated building areas. Native vegetation to be removed and offset planting is calculated in accordance with net gain principles and the required planting and maintenance/management requirements are proposed to be carried out in protected 'Offset Planting Areas' within the designated on-site open space/ Council reserve. We propose this is incorporated as a condition on any permit granted which will also require a follow up assessment (carried out at spring time, recommendation of Brett Lane & Associates Report) of vegetation present and to be removed within the Colquhoun Road reserve and offsets calculated. Please refer to the attached 'Flora and Fauna Assessment' carried out by Brett Lane and Associates Pty Ltd for further details.

## **STRATEGIC PLANNING POLICY ASSESSMENT**

### **State Policy Framework**

#### **Clause 11 – Settlement**

The state policy seeks as part of its two part objective to achieve the following: *"to facilitate the orderly development of urban areas"* and *"to ensure a sufficient supply of land is available for residential,*

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*commercial, retail, industrial, recreational, institutional and other community uses.”*

The proposal is identified as infill development on a large lot located within the existing and established residential area. The development aims to integrate into the established urban area and utilises the existing infrastructure provision on a development site suited to residential development. The proposal is in accordance with this clause.

#### Clause 15 – Built Environment and Heritage

This policy seeks *“To ensure the design of subdivisions achieves attractive, liveable, walkable, cyclable, diverse and sustainable neighbourhoods”*. As well as:

- *“Contributing to an urban structure where networks of neighbourhoods are clustered to support larger activity centres on the regional public transport network” and*
- *“Creating a strong sense of place because neighbourhood development emphasises existing cultural heritage values, well designed and attractive built form, and landscape character.”*
- *“Providing a range of lot sizes to suit a variety of dwelling and household types to meet the needs and aspirations of different groups of people.”*

The proposal is designed to create a liveable and attractive subdivision layout while respecting the hill form, landscape and character of Lakes Entrance. The subdivision adjoins existing residential estates which are within walkable and cyclable distances. The connection to existing neighbourhoods also makes use of established urban structure.

The range of lot sizes provides options to suit a variety of people and creating diversity within the subdivision. All lots have reasonable walking distances to public open space.

#### Clause 15 – Infrastructure

This policy seeks *“To reduce the impact of stormwater on bays and catchments” and “Ensure stormwater and groundwater entering wetlands do not have a detrimental effect on wetlands and estuaries.”*

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The proposed development will incorporate storm water management to the satisfaction of the responsible authority. A series of linear wetlands are proposed within the adjacent Council reserve in order to treat the stormwater to best practice levels. The solution proposed (please refer to Water Technology report May 2008) is considered to be sustainable for the location and would provide substantial benefits to the onsite drainage lines and the receiving waters from the catchment area.

The proposal will also provide suitable sewer, water and drainage for the subdivision to Council's standards.

#### Clause 16 – Housing

The Housing State Planning Policy applies to the land and states that *“new housing should have access to services and be planned for long term sustainability, including walkability to activity centres, public transport, schools and open space.”*

The Housing Policy seeks to *“facilitate residential development that is cost-effective in infrastructure provision and use, energy efficient, incorporates water efficient design principles and encourages public transport use”* and *“increase the supply of housing in existing urban areas by facilitating increased housing yield in appropriate locations, including under-utilised urban land.”*

The proposed subdivision plan complies with the objectives of this policy in the following ways:

- The subdivision is the development of land zoned Residential 1 and it is the strategic objectives that determined the Residential 1 Zone;
- The subdivision layout incorporates a range of lot sizes consistent with the surrounding neighbourhood;
- The site is within 2km of Lakes Entrance Town Centre for services and amenities and within the designated growth area for the township;
- The provision of bicycle and pedestrian paths integrated with the existing neighbourhood structure; and
- A predominantly north-south, east-west geometrical subdivision layout that enables dwellings to be sited taking advantage of northern sunlight minimising reliance on the use of heating and cooling appliances.

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## Local Planning Policy

### Clause 21.05-1 Housing

Housing policy of the East Gippsland Shire Planning Scheme states as its singular objective *"to encourage developments which increase the quality, diversity of types and tenures, and the affordability of housing in East Gippsland, to cater for the housing needs and preferences of all segments of the community"*.

The proposed subdivision creates a range of lot sizes from 708 sq metres to 2088 sq metres and will provide further diversity and choice in a popular location in line with market requirements.

### Clause 21.05-4 Urban Centres

Strategies and actions relating to 'Residential development' in urban centres seek to implement the following:

*"Permit new residential development (lots generally less than 4000 sq m) on suitably zoned land adjoining existing towns, where it is able to be serviced with reticulated water, sewerage and drainage, and where it is generally in line with an approved Outline Development Plan, which promotes good community design"*

The proposed subdivision satisfies this strategy by creating lots less than 4000 sq metres on residential zoned land within a specified growth area adjoining Lakes Entrance and in providing reticulated services including sewer to all proposed lots. In accordance with the objective of the local strategy relating to urban centres, the subdivision is the continuation of development from the east and "fills in" an area surrounded by residential lots on 3 sides. The proposal is not for dispersed development.

### Clause 21.06-2 of the Municipal Strategic Statement (MSS): Lakes & Coastal

Lakes Entrance and the environs comprise part of the sub-region identified in the Municipal Strategic Statement (MSS) of the Planning Scheme as *"Lakes & Coastal"*.

The MSS goes on to set out a strategy for the Lakes & Coastal sub-region which includes *"encouraging population growth and development in fully serviced residential land in the major towns"*. Clearly this proposal implements this policy in being a subdivision utilizing existing service and road infrastructure constructed and intended to facilitate further development proposed by this subdivision.

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The subdivision proposal reinforces the intent of the MSS in providing residential development in a location identified for future residential growth

### **Residential 1 Zone**

The Residential 1 Zone seeks to: *“To provide for residential development at a range of densities with a variety of dwellings to meet the housing needs of all households”* and *“to encourage residential development that respects the neighbourhood character”*.

The proposed subdivision layout provides varying lot sizes ranging from 708m<sup>2</sup>– 2088m<sup>2</sup> with an average lot size of approximately 1027m<sup>2</sup>. The proposed design enables future dwelling development that is capable of achieving sufficient street setback, car parking provision and secluded private open space provision. The proposal is consistent with the surrounding residential development and respects the existing neighbourhood character of the area.

### **Residential Subdivision**

Please refer to the attached Clause 56 assessment submitted as part of this application for further details on the site and neighbourhood context analysis.

### **Erosion Management Overlay and Schedule**

As stated above for lots 95-115 the area/size of the lots had been significantly increased and a building area applied to take into account the slope of the land and to protect areas outside the building area that are more prone to erosion or other land degradation process in accordance with the requirements and objective of the Erosion Management Overlay affecting the site. Further in these protected areas (outside the building areas) no vegetation removal is proposed thereby minimising ground disturbance.

Across the balance of the subdivision site effective stormwater management, engineering design and landscaping will mitigate any potential risk for future erosion of the land.

### **Vegetation Protection Overlay Schedule 1**

#### **Clause 52.17 Native Vegetation**

Part of the site, a 40m wide strip adjacent to the Colquhoun Road reserve is affected by VPO1. It is proposed for vegetation in the form of remnant vegetation patches and three large trees to be removed in

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this area to enable construction of an access road and intersection with Colquhoun Road incorporating an auxiliary right turn lane and basic left turn lane with required visibility splays. A further 5 scattered trees outside the VPO1 area, are proposed to be removed to enable construction of an access road to Colquhoun Road. We propose to offset the vegetation removal with protection and management of retained vegetation and new planting within 'offset planting areas' in the Council reserve. In accordance with recommendations of Brett Lane & Associates the offset calculation can be finalised until a spring time assessment of the road reserve has been carried out to confirm if further vegetation is present which requires removal and an offset calculated.

In summary the vegetation removal proposed is necessary to provide an access road to the subdivision, all other native vegetation is to be retained this proposal therefore reinforces 'Victoria's Native Vegetation Management – A Framework for Action' and the principles of Net Gain (Avoid, Minimise, Offset).

### **Background Reports**

The following reports have been prepared and are submitted as part of the application, an overview of the main points and recommendations is provided below;

- Flora and Fauna Assessment June 2008 (Brett Lane & Associates);
- Traffic Engineering Assessment June 2008 (Traffix Group);
- Surface Water Management Assessment and Stormwater Management Plan May 2008 (Water Technology).
- Cultural Heritage Management Plan October 2008 (AHMS);

These reports were prepared based on an earlier version of the proposed subdivision plan. While minor adjustments have been made to the layout of the subdivision, the lot sizes and road layout are generally consistent with the initial plan and the reports findings and recommendations are still relevant.

The Flora and Fauna assessment identifies all site vegetation, vegetation to be removed to allow for construction of an access road and new intersection, and the required offsets. The assessment recommends the carrying out of a further spring assessment limited to the Colquhoun Road reserve to ensure all vegetation has been

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recorded and offsets are calculated correctly. We propose a permit condition covers this recommendation and the offset requirement.

The Traffic Engineering assessment considers volumes of traffic and road network including the proposed access point at the existing end of Lawson Court, the assessment confirming this access point is adequate and will operate satisfactory. The assessment also recommends for the Colquhoun Road intersection to be designed with an auxiliary right turn lane and a basic left turn lane in order to accommodate anticipated traffic volumes and for the provision of a roundabout at the entry to the retirement village site.

The Water Technology report considers both the surface water management and water quality issues. The report identifies the catchment area of the gully along the eastern boundary of the site. Surface water from the catchment area currently runs into the gully across the subject land. Whilst also taking into account water quality the report recommends that storage for 100 year ARI storm events be located within the main gully to the east of the site (Council reserve). This gully area can combine the dual benefits of both stormwater attenuation and water quality treatments through use of retarding basin and linear wetlands. Please refer to assessment for further details.

A Cultural Heritage Management Plan (CHMP) for the proposal/site has been undertaken in accordance with the Cultural Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2007. The CHMP has been approved by Aboriginal Affairs for Victoria. The CHMP found that the density of artefacts across the subject site was generally low with the exception of test pits G1 and G2. These test pits are located in Lot 2 on PS505056, where the road access from Colquhoun Road is proposed.

The CHMP's recommendations include the salvage excavation of the G1 and G2 test pits, and the creation of public open space/reserve area in the north-east corner of the site where a low-density artefact scatter was found.

In summary the development respects the neighbourhood character and enhances the objectives of urban consolidation in an area of high demand. The proposal will increase housing diversity and choice close to a wide range of local commercial and community infrastructure facilities.

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## Application

In support of the application we enclose the following:

1. Completed Planning Application form;
2. Titles for each of the two lots (including S173 agreement);
3. A cheque payable to 'East Gippsland Shire Council' for \$1032.00 for the application fee for subdivision, and removal of easement;
4. Ten copies of the Proposed Subdivision plan (Watsons Plan No 35658CP-E Rev F) ;
5. Ten copies of the 'Neighbourhood Description, Vegetation Removal and Context Plan' (Watsons Plan No 35658NC-A);
6. Ten copies of the 'Plan of Levels & Features' (Watsons Plan No 35658LF-A Rev B);
7. An assessment of the subdivision against Clause 56 of the Planning Scheme including a Site and Context Description;
8. A copy of the Brett Lane & Associates Flora and Fauna Assessment dated June 2008;
9. A copy of the Traffix Group 'Traffic Engineering Assessment' dated June 2008;
10. A copy of the Water Technology 'Surface Water Management Assessment and Stormwater Management Plan' dated May 2008;
11. A copy of the AHMS 'Cultural Heritage Management Plan (AAV#10282)' dated 3<sup>rd</sup> October 2008;

Should you have any questions please do not hesitate to contact the undersigned.

Yours sincerely  
**Watsons Pty.Ltd.**

  
**Scott Torrington MPIA  
Senior Town Planner**

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Signed:



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Signed:

*Rose Nelson*

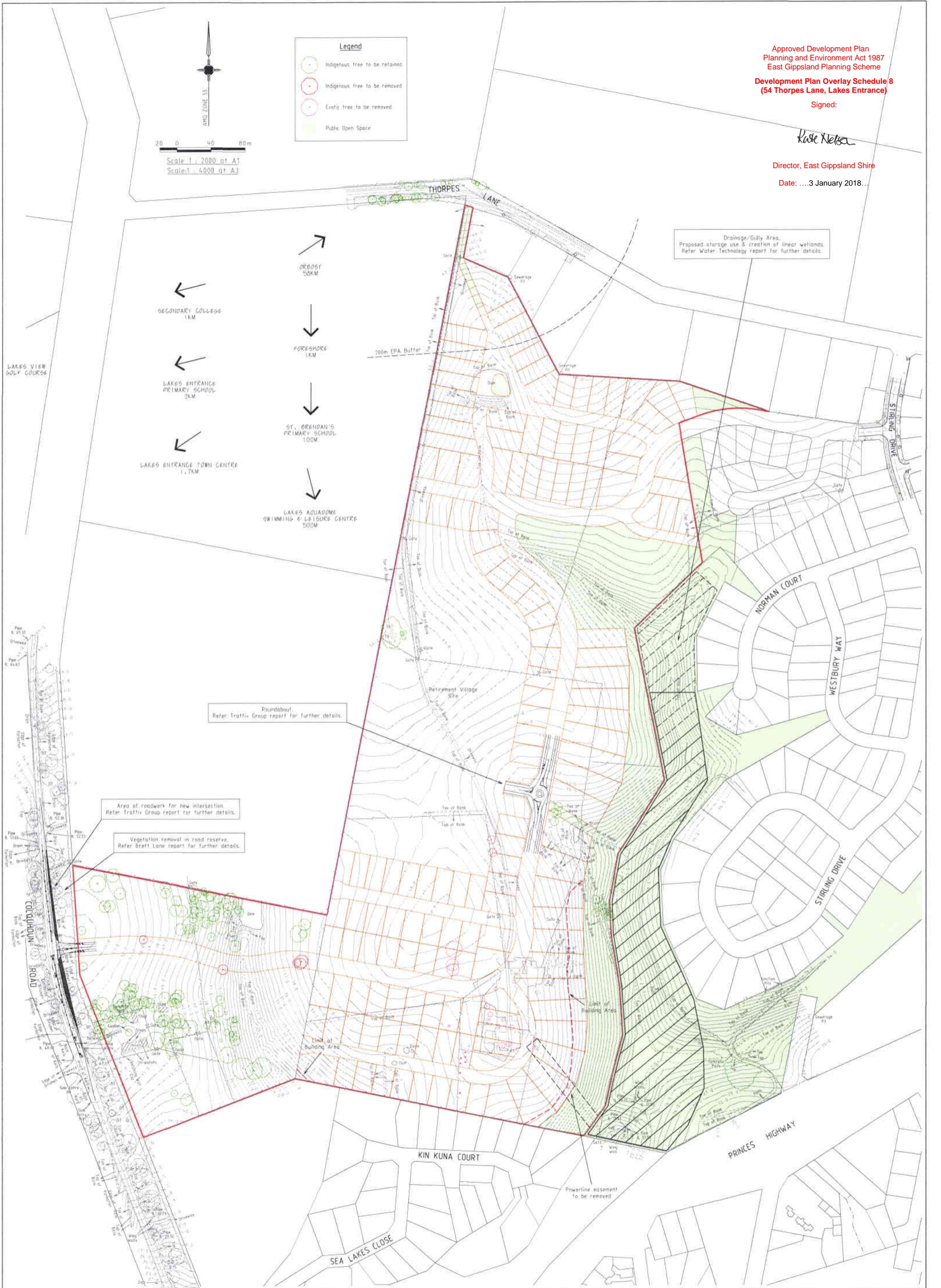
Director, East Gippsland Shire

Date: .....3 January 2018...

**Legend**

- Indigenous tree to be retained
- Indigenous tree to be removed
- Exotic tree to be removed
- Public Open Space

Scale 1 : 2000 at A1  
 Scale 1 : 4000 at A3



- ← SECONDRY COLLEGE 1.1KM
- ← LAKES ENTRANCE PRIMARY SCHOOL 2.1KM
- ← LAKES ENTRANCE TOWN CENTRE 1.7KM
- ← LAKES AQUADOME SWIMMING & LEISURE CENTRE 500M

Drainage/Gully Area.  
 Proposed storage use & creation of linear wetlands.  
 Refer Water Technology report for further details.

Roundabout.  
 Refer Traffic Group report for further details.

Area of roadwork for new intersection.  
 Refer Traffic Group report for further details.

Vegetation removal in road reserve.  
 Refer Brett Lane report for further details.

Limit of Building Area

Powerline easement to be removed

<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>DATE</th> <th>DETAILS</th> <th>AUTHORISED</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	DATE	DETAILS	AUTHORISED													SCALE: 1 : 2000 at A1 DATE PRINTED: 18/02/2017 LEVEL DATUM: - LEVEL DATUM: - PROJECT NO.: 35558A DRAWN: E.L.M. DATE: 18/2/17 DESIGNED: DATE: - AUTHORIZED: S.H.T. DATE: 18/2/17	HORNINGTON 5 Fish Street, Phone(03) 5475 4666 Fax(03) 5475 3976 MELBOURNE The Melbourne Suite 2 250 St. Kilda Rd. Phone(03) 9497 8800 Fax(03) 9497 8899	<ul style="list-style-type: none"> <li>• TOWN PLANNERS</li> <li>• CIVIL ENGINEERS</li> <li>• SURVEYORS</li> <li>• Project Managers</li> <li>• Urban Designers</li> <li>• Structural Engineers</li> </ul>	<p><b>WATSONS</b>                  URBAN DEVELOPMENT                  CONSULTANTS &amp; MANAGERS                  ABN 47 637 504 673</p>	EAST GIPPSLAND SHIRE MERRANGBAUR HEIGHTS PTY LTD STIRLING DRIVE LAKES ENTRANCE NEIGHBOURHOOD CONTEXT, VEGETATION REMOVAL & CONCEPT PLAN	PLAN NUMBER 35558A NC-A REVISION SHEET 1 OF 1
REVISIONS	DATE	DETAILS	AUTHORISED																				

GOLF LINKS ROAD

FILENAME: K:\35558\app\planning\35558A\_NC\_A.dgn



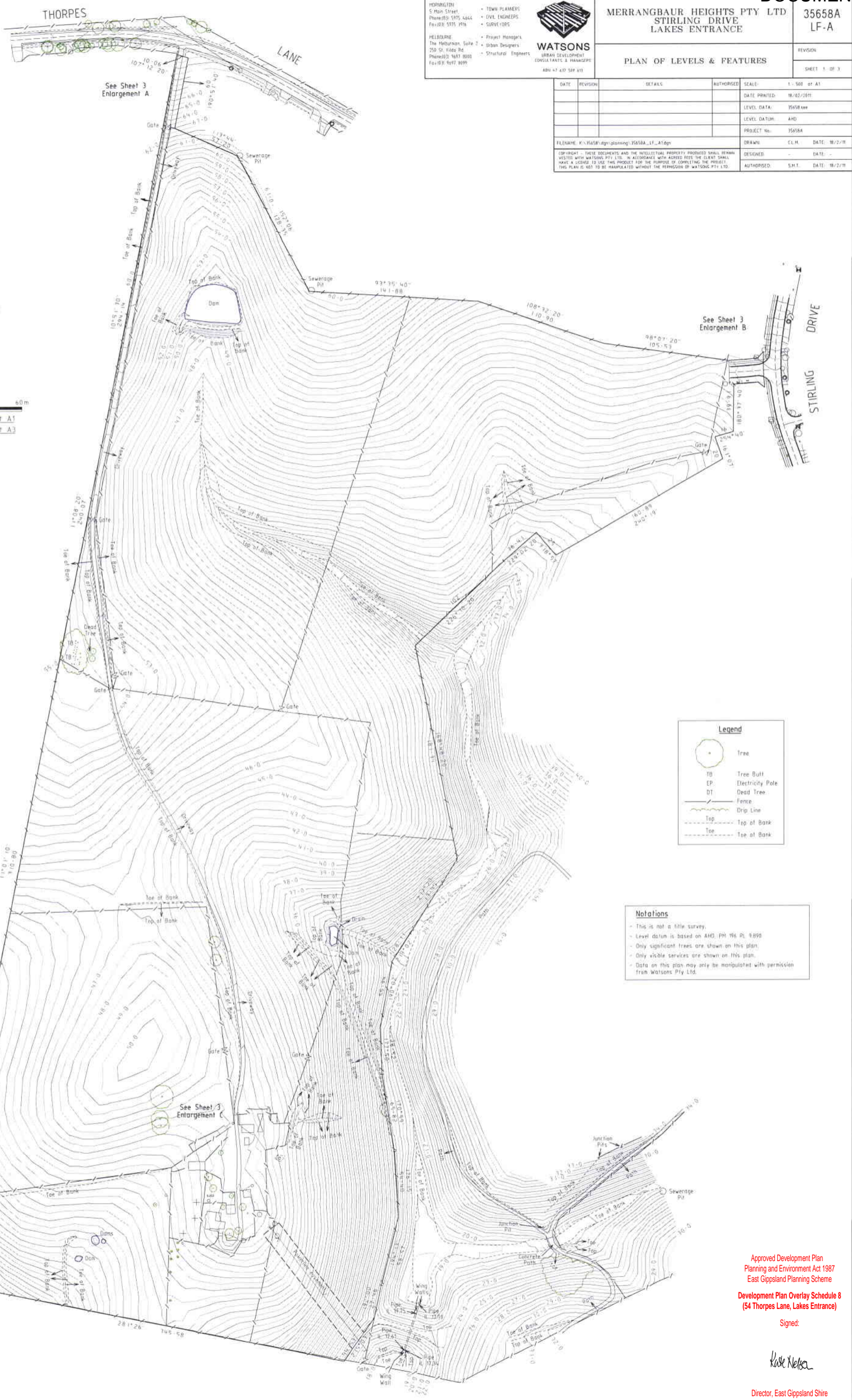
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CONSULTANTS & MANAGERS  
ADV 47 437 587 415

PLAN OF LEVELS & FEATURES

DATE	REVISION	DETAILS	AUTHORISED	SCALE
				1:500 at A1
				DATE PRINTED: 18/02/2011
				LEVEL DATA: 35658A
				LEVEL DATUM: AHD
				PROJECT No: 35658A
				DRAWN: C.L.H. DATE: 18/2/11
				DESIGNED: - DATE: -
				AUTHORISED: S.H.T. DATE: 18/2/11

FILENAME: K:\35658A\plan\35658A\_LF\_A1.dgn  
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Scale 1:1500 at A1  
Scale 1:3000 at A3

**Legend**

	Tree
	Tree Bull
	Electricity Pole
	Dead Tree
	Fence
	Drip Line
	Top of Bank
	Toe of Bank

**Notations**

- This is not a title survey.
- Level datum is based on AHD, PM 196 Pt. 1999
- Only significant trees are shown on this plan.
- Only visible services are shown on this plan.
- Data on this plan may only be manipulated with permission from Watsons Pty Ltd.

See Sheet 2 for continuation

See Sheet 3 Enlargement A

See Sheet 3 Enlargement B

See Sheet 3 Enlargement C

See Sheet 2 for continuation

Approved Development Plan  
Planning and Environment Act 1987  
East Gippsland Planning Scheme  
Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)

Signed:

*Rose Nelson*


Director, East Gippsland Shire

Date: ...3 January 2018...

## Clause 56 – Residential Subdivision Assessment



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Objectives A development <u>must</u> meet all these objectives	Standard A development <u>should</u> meet all these standards.	Assessment
<p><b>Clause 56.01 – Subdivision Site and Context Description and Design Response</b></p>		
<p><b>Clause 56.01 -1</b>  <b>Subdivision Site and Context Description</b>            The site and context description may use a site plan, photographs or other techniques and must accurately describe:</p> <ul style="list-style-type: none"> <li>▪ In relation to the site:               <ul style="list-style-type: none"> <li>▪ Site shape, size, dimensions and orientation.</li> <li>▪ Levels and contours of the site.</li> <li>▪ Natural features including trees and other significant vegetation, drainage lines, water courses, wetlands, ridgelines and hill tops.</li> <li>▪ The siting and use of existing buildings and structures.</li> <li>▪ Street frontage features such as poles, street trees and kerb crossovers.</li> <li>▪ Access points.</li> <li>▪ Location of drainage and other utilities.</li> <li>▪ Easements.</li> <li>▪ Any identified natural or cultural features of the site.</li> <li>▪ Significant views to and from the site.</li> <li>▪ Noise and odour sources or other external influences.</li> <li>▪ Soil conditions, including any land affected by contamination, erosion, salinity, acid sulphate soils or fill.</li> <li>▪ Any other notable features or characteristics of the site.</li> <li>▪ Adjacent uses.</li> <li>▪ Any other factor affecting the capacity to develop the site including whether the site is affected by inundation.</li> </ul> </li> <li>▪ An application for subdivision of 3 or more lots must also describe in relation to the surrounding area:               <ul style="list-style-type: none"> <li>▪ The pattern of subdivision.</li> <li>▪ Existing land uses.</li> <li>▪ The location and use of existing buildings on adjacent land.</li> <li>▪ Abutting street and path widths, materials and detailing.</li> <li>▪ The location and type of significant vegetation.</li> </ul> </li> </ul>		<p><b>Achieved</b>            See attached Neighbourhood Concept Plan - Watsons Plan No. 35658ANC-A which details the layout of the proposed subdivision, including lot dimensions. The levels and contours of the site, including natural features such as vegetation. Existing buildings and structures and the location of drainage and other utilities, easements.</p> <p style="text-align: right;">Approved Development Plan            Planning and Environment Act 1987            East Gippsland Planning Scheme</p> <p style="text-align: right;"><b>Development Plan Overlay Schedule 8</b>  <b>(54 Thorpes Lane, Lakes Entrance)</b></p> <p style="text-align: right;">Signed:              Director, East Gippsland Shire</p> <p style="text-align: right;">Date: ....3 January 2018...</p>

## Clause 56 – Residential Subdivision Assessment



An application for subdivision of 60 or more lots must also describe in relation to the surrounding area:

- Location, distance and type of any nearby public open space and recreational facilities.
- Direction and distances to local shops and community facilities.
- Directions and walking distances to public transport routes and stops
- Direction and walking distances to existing neighbourhood, major and principal activity centres and major employment areas.
- Existing transport routes, including freeways, arterial roads and streets connecting neighbourhoods.
- Local street network including potential connections to adjacent subdivisions.
- Traffic volumes and movements on adjacent roads and streets.
- Pedestrian, bicycle and shared paths identifying whether their primary role is neighbourhood or regional access.
- Any places of cultural significance.
- Natural features including trees and other significant vegetation, drainage lines, water courses, wetlands, ridgelines and hill tops.
- Proximity of any fire threats.
- Pattern of ownership of adjoining lots.

If in the opinion of the responsible authority a requirement of the site and context description is not relevant to the assessment of an application, the responsible authority may waive or reduce the requirement.

### Clause 56.01 -2

#### Subdivision Design Response

The design response must explain how the proposed design:

- Derives from and responds to the site and context description.
- Responds to any site and context features for the area identified in a local planning policy or a Neighbourhood Character Overlay.
- Responds to any relevant objective, policy, strategy or plan set out for the area in this scheme.
- Meets the relevant objectives of Clause 56.

The design response must include a dimensioned plan to scale showing the layout of the subdivision in context with the surrounding area. If in the opinion of the responsible authority this requirement is not relevant to the assessment of an application, it may waive or reduce the requirement.

An application for subdivision of 60 or more lots must also include a plan that meets the requirements of Standard C2. The plan must also show the:

- Proposed uses of each part of the site.
- Natural features of the site and identify any features proposed to be altered.

Approved Development Plan  
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(54 Thorpes Lane, Lakes Entrance)

Signed:

Director, East Gippsland Shire

Date: ...3 January 2018...

#### Achieved

Please refer to applications plans – Watsons Plan Nos. 35658CP-E Rev F and 35658NC-A for further details which shows the proposed use of each part of the site (majority of the areas will be used for residential allotments).

An integrated water management system has not been shown on the plans; this is something that can be achieved via a planning permit condition in negotiation with the relevant water authority. A report has been carried out by Water Technology in regards to the Surface Water Management Assessment; Stormwater and Erosion Management Plan.

Staging for the Subdivision is proposed as shown on the plans.

# Clause 56 – Residential Subdivision Assessment



<ul style="list-style-type: none"> <li>Proposed integrated water management system.</li> <li>Proposed staging of the subdivision.</li> </ul>	
<p><b>Clause 56.02 - Policy Implementation</b></p>	
<p><b>Clause 56.02 -1</b></p> <p><b>Strategic implementation objective</b></p> <ul style="list-style-type: none"> <li>To ensure that the layout and design of a subdivision is consistent with and implements any objective, policy, strategy or plan for the area set out in this scheme.</li> </ul>	<p><b>Standard C1</b></p> <p>An application <u>must</u> be accompanied by a written statement that describes how the subdivision is consistent with and implements any relevant growth area, activity centre, housing, access and mobility, community facilities, open space and recreation, landscape (including any native vegetation precinct plan) and urban design objective, policy, strategy or plan for the area set out in this scheme.</p>
<p><b>Achieved</b></p> <p>The development will provide for additional land and housing choice within a designated urban growth area. The development incorporates 'best practice' urban design standards which achieve high sustainability targets and as well as incorporating a portion of the site for a Retirement Village.</p> <p>The development proposal is consistent with the policies of Clause 16 of the scheme relating to 'medium density housing' in being a development within the urban growth boundary that can be fully serviced. The residential subdivision adds to the diverse array of housing choice within Lakes Entrance and the surrounding area.</p> <p>In accordance with the objectives of the Municipal Strategic Statement (and Local Planning Policy Framework this development is consistent with Council's strategic vision for the area which is recognised for an area of residential growth in the Lakes Entrance Strategy Plan 1987.</p> <p>The subdivision will provide increase housing allotment choices (Clause 21.05-1) through the transfer of a significant area of currently private owned land to create a residential estate that is easily accessible with public open space to contribute to the community's sense of wellbeing.</p> <p>The development is in reasonable proximity to a range of community facilities. The development is also within reasonable proximity to public transport routes.</p>	<p>Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p>Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</p> <p>Signed:</p> <p><i>Kate Nelson</i></p> <p>Director, East Gippsland Shire</p> <p>Date: ....3 January 2018...</p>

# Clause 56 – Residential Subdivision Assessment



<p><b>Clause 56.03 - Liveable and Sustainable Communities</b></p> <p><b>Clause 56.03-1</b> <b>Compact and walkable neighbourhoods objectives</b></p> <ul style="list-style-type: none"> <li>To create compact neighbourhoods that are oriented around easy walking distances to activity centres, schools and community facilities, public open space and public transport.</li> <li>To allow easy movement through and between neighbourhoods for all people.</li> </ul>	<p><b>Standard C2</b> A subdivision <u>should</u> implement any relevant growth area or any approved land-use and development strategy, plan or policy for the area set out in this scheme. An application for subdivision <u>must</u> include a plan of the layout of the subdivision that:</p> <ul style="list-style-type: none"> <li>Meets the objectives (if relevant to the class of subdivision specified in the zone) of: <ul style="list-style-type: none"> <li>Clause 56.03-2 Activity centres</li> <li>Clause 56.03-3 Planning for community facilities</li> <li>Clause 56.04-1 Lot diversity and distribution</li> <li>Clause 56.06-2 Walking and cycling network</li> <li>Clause 56.06-3 Public transport network</li> <li>Clause 56.06-4 Neighbourhood street network</li> </ul> </li> <li>Shows the 400 metre street walking distance around each existing or proposed bus stop, 600 metres street walking distance around each existing or proposed tram stop and 800 metres street walking distance around each existing or proposed railway station and shows the estimated number of dwellings within those distances.</li> <li>Shows the layout of the subdivision in relation to the surrounding area.</li> <li>Is designed to be accessible for people with disabilities.</li> </ul>	<p><b>Variation</b> Please refer to the 'Neighbourhood Description and Context Plan' which shows the distance of the subject site from Lakes Entrance Town Centre, educational facilities and nearest bus stops. The development is greater than the 400 metre recommended distances.</p> <p>The proposed road network enables safe and efficient vehicle movements within the estate and provides a link to the existing street networks to Stirling Drive and Colquhoun Road.</p> <p>The movement network within the estate will enable safe and efficient vehicle, pedestrian and bicycle movements.</p> <p>The subdivision pattern and street layout encourages pedestrian access by providing a footpath within the proposed street network which link with existing road and networks.</p> <p>The application plans also show the layout of the subdivision in relation to the surrounding area and has been designed to accord and meet the specific objectives of Clause 56 as detailed below.</p>
<p><b>Clause 56.03-2</b> <b>Activity centre objective</b></p> <ul style="list-style-type: none"> <li>To provide for mixed-use activity centres, including neighbourhood activity centres, of appropriate area and location.</li> </ul>	<p><b>Standard C3</b> A subdivision should implement any relevant activity centre strategy, plan or policy for the area set out in this scheme. Subdivision should be supported by activity centres that are:</p> <ul style="list-style-type: none"> <li>Accessible by neighbourhood and regional walking and cycling networks.</li> <li>Served by public transport that is connected to the regional public transport network.</li> </ul>	<p><b>Achieved</b> The subdivision is located within close proximity to Lakes Entrance Town Centre situated approx. 2.0km south west of the subject site, accessed from Princes Highway; a major arterial road.</p> <p>The development of further residential dwellings within Lakes</p>

Approved Development Plan  
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East Gippsland Planning Scheme

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(54 Thorpes Lane, Lakes Entrance)

Signed:


*Kate Nelson*

Director, East Gippsland Shire

Date: ...3 January 2018...

# Clause 56 – Residential Subdivision Assessment




<p><b>Clause 56.03-3 Planning for community facilities objective</b></p> <ul style="list-style-type: none"> <li>To provide appropriately located sites for community facilities including schools, libraries preschools and childcare, health services, police and fire stations, recreation and sports facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Located at public transport interchange points for the convenience of passengers and easy connections between public transport services.</li> <li>Located on arterial roads or connector streets.</li> <li>Of appropriate size to accommodate a mix of uses that meet local community needs.</li> <li>Oriented to support active street frontages, support street-based community interaction and pedestrian safety.</li> </ul>	<p>Entrance will reinforce the town as a growing area and encourage further businesses to locate and services to expand in an appropriate and desirable location in accordance with strategic State and Local Planning objectives and policy.</p>
<p><b>Clause 56.03-3 Planning for community facilities objective</b></p> <ul style="list-style-type: none"> <li>To provide appropriately located sites for community facilities including schools, libraries preschools and childcare, health services, police and fire stations, recreation and sports facilities.</li> </ul> <p style="text-align: right;">                 Approved Development Plan                  Planning and Environment Act 1987                  East Gippsland Planning Scheme   <b>Development Plan Overlay Schedule 8                  (54 Thorpes Lane, Lakes Entrance)</b>                   Signed:                      Director, East Gippsland Shire                   Date: .....3 January 2018...             </p>	<p><b>Standard C4</b> A subdivision should:</p> <ul style="list-style-type: none"> <li>Implement any relevant regional and local community facility strategy, plan or policy for the area set out in this scheme.</li> <li>Locate community facilities on sites that are in or near activity centres and public transport.</li> </ul> <p>School sites <u>should</u>:</p> <ul style="list-style-type: none"> <li>Be integrated with the neighbourhood and located near activity centres.</li> <li>Be located on walking and cycling networks.</li> <li>Have a bus stop located along the school site boundary.</li> <li>Have student drop-off zones, bus parking and on-street parking in addition to other street functions in abutting streets.</li> <li>Adjoin the public open space network and community sporting and other recreation facilities.</li> <li>Be integrated with community facilities.</li> <li>Be located on land that is not affected by physical, environmental or other constraints.</li> </ul> <p>Schools <u>should</u> be accessible by the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne. Primary schools <u>should</u> be located on connector streets and not on arterial roads. New State Government school sites <u>must</u> meet the requirements of the Department of Education and Training and at least two streets with sufficient widths to provide student drop-off zones, bus parking and on-street parking in addition to other street functions.</p>	<p><b>Achieved</b> The proposed subdivision layout promotes a sense of community and landscaped public open space areas fully accessible to surrounding residents.</p> <p>The township has a range of community facilities. The subdivision will utilise these existing community facilities which include St. Brendans School; East Gippsland Shire Council; Lakes Entrance Primary and Secondary Schools which are all located within close proximity of the subject site.</p> <p>Public transport is located within a short journey to Lakes Entrance Town Centre or Princes Hwy.</p>

## Clause 56 – Residential Subdivision Assessment



WATSONS

<p><b>Clause 56.03-4</b>  <b>Built environment objective</b></p> <ul style="list-style-type: none"> <li>To create urban places with identity and character.</li> </ul>	<p><b>Standard C5</b>  The built environment <u>should</u>:</p> <ul style="list-style-type: none"> <li>Implement any relevant urban design strategy, plan or policy for the area set out in this scheme.</li> <li>Provide living and working environments that are functional, safe and attractive.</li> <li>Provide an integrated layout, built form and urban landscape.</li> <li>Contribute to a sense of place and cultural identity.</li> </ul> <p>An application <u>should</u> describe the identity and character to be achieved and the elements that contribute to that identity and character.</p>	<p><b>Achieved</b>  The development will create an urban place with identity and character in accordance with the objectives and principles of the approved Development Plan. The site is predominantly devoid of any vegetation, the proposed subdivision does not require the removal of significant vegetation (except for new road intersection). The layout of the subdivision is considered to be site responsive providing open space areas and shared pathways linked to the street network and public open space. The subdivision responds to the contours of the land with a developable building line limiting development within areas of steep embankments.</p>
<p><b>Clause 56.03-5</b>  <b>Neighbourhood character objective</b></p> <ul style="list-style-type: none"> <li>To design subdivisions that respond to neighbourhood character.</li> </ul> <p style="text-align: right;"> <small>Approved Development Plan  Planning and Environment Act 1987  East Gippsland Planning Scheme  Development Plan Overlay Schedule 8  (54 Thorpes Lane, Lakes Entrance)</small>    <small>Signed</small>    <small>Director, East Gippsland Office</small>    <small>Date: ...January 2018.</small> </p>	<p><b>Standard C6</b>  Subdivision <u>should</u>:</p> <ul style="list-style-type: none"> <li>Respect the existing neighbourhood character or achieve a preferred neighbourhood character consistent with any relevant neighbourhood character objective, policy or statement set out in this scheme.</li> <li>Respond to and integrate with the surrounding urban environment.</li> <li>Protect significant vegetation and site features.</li> </ul>	<p><b>Achieved</b>  The development responds to the existing natural constraints of the land as well as responding and reflecting the existing subdivision pattern in the surrounding area.</p> <p>A high level of landscaping will be achieved throughout the estate which will contribute to the environmental values of the land.</p> <p>A positive pedestrian environment will be designed that emphasises the quality and safety of the streetscape and creates linkages to the wider neighbourhood.</p>
<p><b>Clause 56.04 - Lot Design</b></p> <p><b>Clause 56.04-1</b>  <b>Lot diversity and distribution objectives</b></p> <ul style="list-style-type: none"> <li>To achieve housing densities that</li> </ul>	<p><b>Standard C7</b>  A subdivision <u>should</u> implement any relevant housing strategy, plan or policy for the area set out in this scheme.</p>	<p><b>Achieved</b>  The proposed lot sizes are consistent with the size and dimensions of residential lots on similar medium density</p>

# Clause 56 – Residential Subdivision Assessment



<p>support compact and walkable neighbourhoods and the efficient provision of public transport services.</p> <ul style="list-style-type: none"> <li>To provide higher housing densities within walking distance of neighbourhood centres.</li> <li>To achieve increased housing densities in designated growth areas.</li> <li>To provide a range of lot sizes to suit a variety of dwelling and household types.</li> </ul> <p style="text-align: center;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: center;">Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</p> <p style="text-align: center;">Signed:</p> <p style="text-align: center;"><i>Kate Nelson</i></p> <p style="text-align: center;">Director, East Gippsland Shire</p> <p style="text-align: center;">Date: ...3 January 2018...</p>	<p>Lot sizes and mix <u>should</u> achieve the average net residential density specified in any zone or overlay that applies to the land or in any relevant policy for the area set out in this scheme. A range and mix of lot sizes <u>should</u> be provided including lots suitable for the development of:</p> <ul style="list-style-type: none"> <li>Single dwellings.</li> <li>Two dwellings or more.</li> <li>Higher density housing.</li> <li>Residential buildings and Retirement villages.</li> </ul> <p>Unless the site is constrained by topography or other site conditions, lot distribution <u>should</u> provide for 95 per cent of dwellings to be located no more than 400 metre street walking distance from the nearest existing or proposed bus stop, 600 metres street walking distance from the nearest existing or proposed tram stop and 800 metres street walking distance from the nearest existing or proposed railway station. Lots of 300 square metres or less in area, lots suitable for the development of two dwellings or more, lots suitable for higher density housing and lots suitable for Residential buildings and Retirement villages should be located in and within 400 metres street walking distance of an activity centre.</p>	<p>subdivisions which benefit from public transport links and are in close proximity to a range of services and facilities as mentioned previously.</p> <p>Lot sizes vary in size from the smallest being 708 sq m to 2088 sq m. In accordance with Residential 1 Zone objectives and Melbourne 2030 policies and initiatives the proposed subdivision provides a diversity and choice of lot sizes to accommodate the diverse needs of the community in an establishing residential area.</p> <p>The proposed subdivision also proposes medium density lots without any significant impact on the surrounding neighbourhood.</p> <p>A retirement village site is designated to the western side of the site and will contribute to the diverse array of housing choices proposed within the subdivision.</p>
<p><b>Clause 56.04-2</b></p> <p><b>Lot area and building envelopes objective</b></p> <ul style="list-style-type: none"> <li>To provide lots with areas and dimensions that enable the appropriate siting and construction of a dwelling, solar access, private open space, vehicle access and parking, water management, easements and the retention of significant vegetation and site features.</li> </ul>	<p><b>Standard C8</b></p> <p>An application to subdivide land that creates lots of less than 300 square metres <u>should</u> be accompanied by information that shows:</p> <ul style="list-style-type: none"> <li>That the lots are consistent or contain building envelope that is consistent with a development approved under this scheme, or</li> <li>That a dwelling may be constructed on each lot in accordance with the requirements of this scheme.</li> </ul> <p>Lots of between 300 square metres and 500 square metres <u>should</u>:</p> <ul style="list-style-type: none"> <li>Contain a building envelope that is consistent with a development of the lot approved under this scheme, or</li> <li>If no development of the lot has been approved under this</li> </ul>	<p><b>Achieved</b></p> <p>It is considered that each of the new lots are of sufficient size and shape to accommodate a single dwelling with secluded open space, parking and vehicular access. No lot is under 700 sq m.</p> <p>The design and layout of the subdivision is responsive to the topography and constraints of the site which includes a building line which to the eastern allotments restricting any development within the steep embankment on these lots.</p> <p>All allotments are able to fully contain a rectangle measuring at least 10 metres by 15 metres.</p>


# Clause 56 – Residential Subdivision Assessment



<p style="text-align: center;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: center;"><b>Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</b></p> <p style="text-align: center;">Signed:</p> <p style="text-align: center;"><i>Kate Nelson</i></p> <p style="text-align: center;">Director, East Gippsland Shire</p> <p style="text-align: center;">Date: .....3 January 2018...</p>	<p>scheme, contain a building envelope and be able to contain a rectangle measuring 10 metres by 15 metres, or 9 metres by 15 metres if a boundary wall is nominated as part of the building envelope.</p> <p>If lots of between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north unless there are significant physical constraints that make this difficult to achieve.</p> <p>Lots greater than 500 square metres <u>should</u> be able to contain a rectangle measuring 10 metres by 15 metres, and may contain a building envelope.</p> <p>A building envelope may specify or incorporate any relevant siting and design requirement. Any requirement <u>should</u> meet the relevant standards of Clause 54, unless:</p> <ul style="list-style-type: none"> <li>▪ The objectives of the relevant standards are met, and</li> <li>▪ The building envelope is shown as a restriction on a plan of subdivision registered under the Subdivision Act 1988, or is specified as a covenant in an agreement under Section 173 of the Act.</li> </ul> <p>Where a lot with a building envelope adjoins a lot that is not on the same plan of subdivision or is not subject to the same agreement relating to the relevant building envelope:</p> <ul style="list-style-type: none"> <li>▪ The building envelope <u>must</u> meet Standards A10 and A11 of Clause 54 in relation to the adjoining lot, and</li> <li>▪ The building envelope <u>must</u> not regulate siting matters covered by Standards A12 to A15 (inclusive) of Clause 54 in relation to the adjoining lot. This <u>should</u> be specified in the relevant plan of subdivision or agreement.</li> </ul> <p>Lot dimensions and building envelopes <u>should</u> protect:</p> <ul style="list-style-type: none"> <li>▪ Solar access for future dwellings and support the siting and design of dwellings that achieve the energy rating requirements of the Building Regulations.</li> <li>▪ Existing or proposed easements on lots.</li> </ul> <p>Significant vegetation and site features.</p>	
<p><b>Clause 56.04-3</b></p> <p><b>Solar orientation of lots objective</b></p> <ul style="list-style-type: none"> <li>▪ To provide good solar orientation of lots</li> </ul>	<p><b>Standard C9</b></p> <p>Unless the site is constrained by topography or other site</p>	<p><b>Variation</b></p> <p>The size and orientation of new lots is sufficient to enable a</p>


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<p>and solar access for future dwellings.</p> <p style="text-align: center;"> <small>Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</small>  <small>Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</small>  <small>Signed:</small>    <small>Director, East Gippsland Shire</small>  <small>Date: ...3 January 2018...</small> </p>	<p>conditions, at least 70 percent of lots <u>should</u> have appropriate solar orientation. Lots have appropriate solar orientation when:</p> <ul style="list-style-type: none"> <li>▪ The long axis of lots are within the range north 20 degrees west to north 30 degrees east, or east 20 degrees north to east 30 degrees south.</li> <li>▪ Lots between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north.</li> <li>▪ Dimensions of lots are adequate to protect solar access to the lot, taking into account likely dwelling size and the relationship of each lot to the street.</li> </ul>	<p>future dwelling to take advantage of the northern sunlight. The orientation of the majority of lots is north- east owing to the size and shape of the site, the fixed position of the road and the layout for development future designs of dwellings will be able to achieve appropriate solar orientation.</p>
<p><b>Clause 56.04-4</b> <b>Street orientation objective</b></p> <ul style="list-style-type: none"> <li>▪ To provide a lot layout that contributes to community social interaction, personal safety and property security.</li> </ul>	<p><b>Standard C10</b> Subdivision <u>should</u> increase visibility and surveillance by:</p> <ul style="list-style-type: none"> <li>▪ Ensuring lots front all roads and streets and avoid the side or rear of lots being oriented to connector streets and arterial roads.</li> <li>▪ Providing lots of 300 square metres or less in area and lots for 2 or more dwellings around activity centres and public open space.</li> <li>▪ Ensuring streets and houses look onto public open space and avoiding sides and rears of lots along public open space boundaries.</li> <li>▪ Providing roads and streets along public open space boundaries.</li> </ul>	<p><b>Achieved</b> Each of the proposed new lots is provided with public road frontage within the subdivision.</p> <p>All streets within the subdivision will have a maximum speed limit of 50km /hour to maximise the safety of cyclists and pedestrians.</p> <p>The average lot size is approx. 1027sq m with no lot being less than 700sq m.</p>
<p><b>Clause 56.04-5</b> <b>Common area objectives</b></p> <ul style="list-style-type: none"> <li>▪ To identify common areas and the purpose for which the area is commonly held.</li> <li>▪ To ensure the provision of common area is appropriate and that necessary management arrangements are in place.</li> <li>▪ To maintain direct public access</li> </ul>	<p><b>Standard C11</b> An application to subdivide land that creates common land <u>must</u> be accompanied by a plan and a report identifying:</p> <ul style="list-style-type: none"> <li>▪ The common area to be owned by the body corporate, including any streets and open space.</li> <li>▪ The reasons why the area <u>should</u> be commonly held.</li> <li>▪ Lots participating in the body corporate.</li> </ul>	<p><b>Achieved</b> No Common Property is proposed as part of the subdivision.</p> <p>All open spaces including drainage reserves are to be transferred to Council who will ultimately be responsible for their maintenance.</p>

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<p>throughout the neighbourhood street network.</p>	<p>The proposed management arrangements including maintenance standards for streets and open spaces to be commonly held.</p>	
<p><b>Clause 56.05 - Urban Landscape</b></p>		
<p><b>Clause 56.05-1</b>  <b>Integrated urban landscape objectives</b></p> <ul style="list-style-type: none"> <li>▪ To provide attractive and continuous landscaping in streets and public open spaces that contribute to the character and identity of new neighbourhoods and urban places or to existing or preferred neighbourhood character in existing urban areas.</li> <li>▪ To incorporate natural and cultural features in the design of streets and public open space where appropriate.</li> <li>▪ To protect and enhance native habitat and discourage the planting and spread of noxious weeds.</li> <li>▪ To provide for integrated water management systems and contribute to drinking water conservation.</li> </ul> <p style="text-align: right;">                     Approved Development Plan                      Planning and Environment Act 1987                      East Gippsland Planning Scheme   <b>Development Plan Overlay Schedule 8</b>                      (54 Thorpes Lane, Lakes Entrance)                       Signed:                          Director, East Gippsland Shire                       Date: ....3 January 2018...                 </p>	<p><b>Standard C12</b>                      An application for subdivision that creates streets or public open space <u>should</u> be accompanied by a landscape design. The landscape design <u>should</u>:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant streetscape, landscape, urban design or native vegetation precinct plan, strategy or policy for the area set out in this scheme.</li> <li>▪ Create attractive landscapes that visually emphasise streets and public open spaces.</li> <li>▪ Respond to the site and context description for the site and surrounding area.</li> <li>▪ Maintain significant vegetation where possible within an urban context.</li> <li>▪ Take account of the physical features of the land including landform, soil and climate.</li> <li>▪ Protect and enhance any significant natural and cultural features.</li> <li>▪ Protect and link areas of significant local habitat where appropriate.</li> <li>▪ Support integrated water management systems with appropriate landscape design techniques for managing urban run-off including wetlands and other water sensitive urban design features in streets and public open space.</li> <li>▪ Promote the use of drought tolerant and low maintenance plants and avoid species that are likely to spread into the surrounding environment.</li> <li>▪ Ensure landscaping supports surveillance and provides shade in streets, parks and public open space.</li> <li>▪ Develop appropriate landscapes for the intended use of</li> </ul>	<p><b>Achieved</b>                      All streets within the subdivision will be provided with street trees which will compliment existing vegetation retained and will enhance and define the landscape character of the area.</p> <p>Public Open Space will contain existing indigenous vegetation and will also be landscaped subject to a condition of the planning permit. The proposed area of Public Open Space will positively contribute to the character and identity of the subdivision. The landscaping of the Public Open Space will assist in providing habitat areas for local flora and fauna to establish and discourage the spreading of noxious weeds.</p>

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<p><b>Clause 56.05-2</b></p> <p><b>Public open space provision objectives</b></p> <ul style="list-style-type: none"> <li>To provide a variety of open spaces with links to other open spaces and regional parks where possible.</li> <li>To ensure that public open space of appropriate quality and quantity is provided in convenient locations to meet the recreational and social needs of the community.</li> <li>To support active and healthy communities.</li> </ul>	<p>public open space including areas for passive and active recreation, the exercising of pets, playgrounds and shaded areas.</p> <ul style="list-style-type: none"> <li>Provide for walking and cycling networks that link with community facilities.</li> <li>Provide appropriate pathways, signage, fencing, public lighting and street furniture.</li> <li>Create low maintenance, durable landscapes that are capable of a long life.</li> </ul> <p>The landscape design must include a maintenance plan that sets out maintenance responsibilities, requirements and costs.</p>	
<p><b>Clause 56.05-2</b></p> <p><b>Public open space provision objectives</b></p> <ul style="list-style-type: none"> <li>To provide a variety of open spaces with links to other open spaces and regional parks where possible.</li> <li>To ensure that public open space of appropriate quality and quantity is provided in convenient locations to meet the recreational and social needs of the community.</li> <li>To support active and healthy communities.</li> </ul> <p style="text-align: right;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: right;">Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</p> <p style="text-align: right;">Signed:</p> <p style="text-align: right;"><i>Kate Nelson</i></p> <p style="text-align: right;">Director, East Gippsland Shire</p> <p style="text-align: right;">Date: ...3 January 2018...</p>	<p><b>Standard C13</b></p> <p>The provision of public open space should:</p> <ul style="list-style-type: none"> <li>Implement any relevant open space plan, strategy or policy for the area set out in this scheme.</li> <li>Provide a network of well-distributed regional and local open space that includes: <ul style="list-style-type: none"> <li>Regional public open space where appropriate, including along foreshores, streams and permanent water bodies.</li> <li>Regional parks of at least 3 hectares, combining passive and active use, within 2 kilometres of all dwellings.</li> <li>Large local parks of at least 1 hectare for active and passive use, within 500 metres safe walking distance from all dwellings.</li> <li>Small local parks within 150 metres to 300 metres safe walking distance of all dwellings, where appropriate.</li> </ul> </li> <li>Include land used for drainage control or stream and floodway purposes if generally available for recreational use.</li> <li>Be integrated with urban water management systems including watercourses and water bodies.</li> <li>Incorporate natural and cultural features where appropriate.</li> <li>Encourage shared use of active open space.</li> </ul>	<p><b>Achieved</b></p> <p>An area of Public Open Space has been incorporated into the proposed subdivision which includes areas for active and inactive recreation.</p> <p>Three small Public Open Spaces are proposed to the northern half of the site, averaging 911sq m in area.</p> <p>A large park is proposed (3.967ha in size) which is strategically located on the site within 500m walking distance from allotments connected via local paths throughout the subdivision.</p> <p>The Public Open Space incorporates the sites existing natural features (contours of the land).</p> <p>The Public Open Space areas and surrounding subdivision have been orientated and designed to promote personal safety and surveillance of users of the Public Open Space from surrounding streets.</p> <p>The area and dimensions of the Public Open Space are sufficient to provide for a range of recreational uses by residents.</p>

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<p style="text-align: center;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: center;"><b>Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</b></p> <p style="text-align: center;">Signed:</p> <p style="text-align: center;"><i>Kate Nelson</i></p> <p style="text-align: center;">Director, East Gippsland Shire</p> <p style="text-align: center;">Date: .....3 January 2018...</p>	<ul style="list-style-type: none"> <li>▪ Adjoin schools and other community facilities where practical.</li> <li>▪ Meet the social, cultural, recreational and sporting needs of the community including different age groups and abilities.</li> <li>▪ Be linked to existing or proposed future public open spaces where appropriate.</li> <li>▪ Include publicly owned plazas or parks in activity centres where appropriate.</li> </ul> <p>Land provided for public open space should be:</p> <ul style="list-style-type: none"> <li>▪ Of a quality, quantity and character that makes it fit for its potential functions.</li> <li>▪ Located so that every lot in the subdivision is within 500 metres street walking distance of existing or proposed public open space.</li> <li>▪ Related to the street and lot layout in a manner that promotes personal safety and surveillance of users of the public open space from streets along public open space boundaries.</li> <li>▪ Of an area and dimensions to allow easy adaptation to different uses in response to changing community sport and recreational preferences.</li> </ul>	
<b>Clause 56.06 – Access and Mobility Management</b>		
<p><b>Clause 56.06-1</b></p> <p><b>Integrated mobility objectives</b></p> <ul style="list-style-type: none"> <li>▪ To achieve an urban structure where compact and walkable neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.</li> </ul>	<p><b>Standard C14</b></p> <p>An application for a subdivision must include a plan of the layout of the neighbourhood that meets the objectives of:</p> <ul style="list-style-type: none"> <li>▪ Clause 56.06-2 Walking and cycling network.</li> <li>▪ Clause 56.06-3 Public transport network.</li> <li>▪ Clause 56.06-4 Neighbourhood street network.</li> </ul>	<p><b>Achieved</b></p> <p>Pedestrian and bike pathways will be provided throughout the subdivision.</p>

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<ul style="list-style-type: none"> <li>To provide for walking (including persons with impaired mobility), cycling, public transport and other motor vehicles in an integrated manner.</li> <li>To contribute to reduced car dependence, improved energy efficiency, reduced greenhouse gas emissions and reduced air pollution.</li> </ul>		
<p><b>Clause 56.06-2</b></p> <p><b>Walking and cycling network objectives</b></p> <ul style="list-style-type: none"> <li>To contribute to community health and well being by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.</li> <li>To provide safe and direct movement through and between neighbourhoods by pedestrians and cyclists.</li> <li>To reduce car use, greenhouse gas emissions and air pollution.</li> </ul> <p style="text-align: right;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: right;">Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</p> <p style="text-align: right;">Signed:</p> <p style="text-align: right;"><i>Kate Nelson</i></p> <p style="text-align: right;">Director, East Gippsland Shire</p> <p style="text-align: right;">Date: ...3 January 2018...</p>	<p><b>Standard C15</b></p> <p>The walking and cycling network should be designed to:</p> <ul style="list-style-type: none"> <li>Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.</li> <li>Link to any existing pedestrian and cycling networks.</li> <li>Provide safe walkable distances to activity centres, community facilities, public transport stops and public open spaces.</li> <li>Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces.</li> <li>Provide direct cycling routes for regional journeys to major activity centres, community facilities, public transport and other regional activities and for regional recreational cycling.</li> <li>Ensure safe street and road crossings including the provision of traffic controls where required.</li> <li>Provide an appropriate level of priority for pedestrians and cyclists.</li> <li>Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.</li> <li>Be accessible to people with disabilities.</li> </ul>	<p><b>Achieved</b></p> <p>The subdivision promotes cycling and pedestrian movements with high accessibility within the proposed street network and shared pathways of the subdivision which includes an adequate paved footpath within the road reserve.</p> <p>The width of proposed street and footpaths will enable safe and convenient movement for cyclists and pedestrians, as the proposed lots will face the street and will enable casual visual surveillance by residents.</p>
<p><b>Clause 56.06-3</b></p> <p><b>Public transport network objectives</b></p> <ul style="list-style-type: none"> <li>To provide an arterial road and</li> </ul>	<p><b>Standard C16</b></p> <p>The public transport network <u>should</u> be designed to:</p>	<p><b>Achieved</b></p> <p>It is not proposed or necessary for Public Transport to</p>

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<p>neighbourhood street network that supports a direct, efficient and safe public transport system.</p> <ul style="list-style-type: none"> <li>To encourage maximum use of public transport.</li> </ul> <p style="text-align: center;"> <small>Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</small>  <b>Development Plan Overlay Schedule 8</b>  <small>(54 Thorpes Lane, Lakes Entrance)</small>   <i>Kate Nelson</i>  <small>Signed:</small>   <small>Director, East Gippsland Shire</small>   <small>Date: ...3 January 2018...</small> </p>	<ul style="list-style-type: none"> <li>Implement any relevant public transport strategy, plan or policy for the area set out in this scheme.</li> <li>Connect new public transport routes to existing and proposed routes to the satisfaction of the relevant public transport authority.</li> <li>Provide for public transport links between activity centres and other locations that attract people using the Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne.</li> <li>Locate regional bus routes principally on arterial roads and locate local bus services principally on connector streets to provide:             <ul style="list-style-type: none"> <li>Safe and direct movement between activity centres without complicated turning manoeuvres.</li> <li>Direct travel between neighbourhoods and neighbourhood activity centres.</li> <li>A short and safe walk to a public transport stop from most dwellings.</li> </ul> </li> </ul>	<p>enter the subdivision site.</p> <p>V-Line operates public bus services out of the town centre of Lakes Entrance.</p>
<p><b>Clause 56.06-4</b></p> <p><b>Neighbourhood street network objective</b></p> <ul style="list-style-type: none"> <li>To provide for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles using the neighbourhood street network.</li> </ul>	<p><b>Standard C17</b></p> <p>The neighbourhood street network must:</p> <ul style="list-style-type: none"> <li>Take account of the existing mobility network of arterial roads, neighbourhood streets, cycle paths, cycle paths, footpaths and public transport routes.</li> <li>Provide clear physical distinctions between arterial roads and neighbourhood street types.</li> <li>Comply with the Roads Corporation's arterial road access management policies.</li> <li>Provide an appropriate speed environment and movement priority for the safe and easy movement of pedestrians and cyclists and for accessing public transport.</li> <li>Provide safe and efficient access to activity centres for commercial and freight vehicles.</li> <li>Provide safe and efficient access to all lots for service and emergency vehicles.</li> <li>Provide safe movement for all vehicles.</li> <li>Incorporate any necessary traffic control measures and traffic</li> </ul>	<p><b>Achieved</b></p> <p>The layout predominantly embodies T- intersections to control safe turning movements within the local street network. A collector road is located centrally within the subdivision which enables vehicles to conveniently enter the and leave the site via Stirling Drive and Colquhoun Road.</p> <p>Pedestrian footpaths are also proposed to both sides of all public streets to provide a safe and convenient pedestrian interconnectivity between the individual lots and the Public Open Space areas.</p>

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- management infrastructure.
- The neighbourhood street network should be designed to:
- Implement any relevant transport strategy, plan or policy for the area set out in this scheme.
  - Include arterial roads at intervals of approximately 1.6 kilometres that have adequate reservation widths to accommodate long term movement demand.
  - Include connector streets approximately halfway between arterial roads and provide adequate reservation widths to accommodate long term movement demand.
  - Ensure connector streets align between neighbourhoods for direct and efficient movement of pedestrians, cyclists, public transport and other motor vehicles.
  - Provide an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists, public transport and other vehicles.
  - Provide an appropriate level of local traffic dispersal.
  - Indicate the appropriate street type.
  - Provide a speed environment that is appropriate to the street type.
  - Provide a street environment that appropriately manages movement demand (volume, type and mix of pedestrians, cyclists, public transport and other motor vehicles).
  - Encourage appropriate and safe pedestrian, cyclist and driver behaviour.
  - Provide safe sharing of access lanes and access places by pedestrians, cyclists and vehicles.
  - Minimise the provision of cul-de-sac.
  - Provide for service and emergency vehicles to safely turn at the end of a dead-end street.
  - Facilitate solar orientation of lots.
  - Facilitate the provision of the walking and cycling network, integrated water management systems, utilities and planting of trees.
  - Contribute to the area's character and identity.
  - Take account of any identified significant features.

Approved Development Plan  
 Planning and Environment Act 1987  
 East Gippsland Planning Scheme  
**Development Plan Overlay Schedule 8**  
**(54 Thorpes Lane, Lakes Entrance)**

Signed:


*Kate Nelson*

Director, East Gippsland Shire

Date: ....3 January 2018...


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<p><b>Clause 56.06-5</b> <b>Walking and cycling network detail objectives</b></p> <ul style="list-style-type: none"> <li>To design and construct footpaths, shared path and cycle path networks that are safe, comfortable, well constructed and accessible for people with disabilities.</li> <li>To design footpaths to accommodate wheelchairs, prams, scooters and other footpath bound vehicles.</li> </ul> <p style="text-align: center;">             Approved Development Plan              Planning and Environment Act 1987              East Gippsland Planning Scheme               Development Plan Overlay Schedule 8              (54 Thorpes Lane, Lakes Entrance)               Signed:                  Director, East Gippsland Shire               Date: ...3 January 2018...         </p>	<p><b>Standard C18</b> Footpaths, shared paths, cycle paths and cycle lanes <u>should</u> be designed to:</p> <ul style="list-style-type: none"> <li>Be part of a comprehensive design of the road or street reservation.</li> <li>Be continuous and connect.</li> <li>Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.</li> <li>Accommodate projected user volumes and mix.</li> <li>Meet the requirements of Table C1.</li> <li>Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.</li> <li>Provide appropriate signage.</li> <li>Be constructed to allow access to lots without damage to the footpath or shared path surfaces.</li> <li>Be constructed with a durable, non-skid surface.</li> <li>Be of a quality and durability to ensure:</li> <li>Safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles.</li> <li>Discharge of urban run-off.</li> <li>Preservation of all-weather access.</li> <li>Maintenance of a reasonable, comfortable riding quality.</li> <li>A minimum 20 year life span.</li> <li>Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.</li> </ul>	<p><b>Achieved</b> The width of the proposed streets and footpaths will enable safe and convenient movement for cyclists and pedestrians and, as the proposed lots will face the street which will assist in the casual visual surveillance by residents.</p> <p>Footpaths are provided to both sides of all public streets and provide safe and convenient connection between the individual lots and public open space areas.</p> <p>Lots at roadway intersections will have splayed corners, allowing for the provision of wider footpaths in those locations.</p>
<p><b>Clause 56.06-6</b> <b>Public transport network detail objectives</b></p> <ul style="list-style-type: none"> <li>To provide for the safe, efficient operation of public transport and the comfort and convenience of public transport users.</li> </ul>	<p><b>Standard C19</b> Bus priority measures <u>must</u> be provided along arterial roads forming part of the existing or proposed Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne to the</p>	<p><b>Not applicable</b> The proposed subdivision does not contain arterial routes or major connector roads to the surrounding neighbourhood. It is not proposed for a bus to operate within the subdivision.</p>

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<ul style="list-style-type: none"> <li>To provide public transport stops that are accessible to people with disabilities.</li> </ul> <p style="text-align: center;">             Approved Development Plan              Planning and Environment Act 1987              East Gippsland Planning Scheme               Development Plan Overlay Schedule 8              (54 Thorpes Lane, Lakes Entrance)               Signed:                  Director, East Gippsland Shire               Date: .....3 January 2018...         </p>	<p>requirements of the relevant roads authority. Road alignment and geometry along bus routes <u>should</u> provide for the efficient, unimpeded movement of buses and the safety and comfort of passengers. The design of public transport stops <u>should</u> not impede the movement of pedestrians. Bus and tram stops <u>should</u> have:</p> <ul style="list-style-type: none"> <li>Surveillance from streets and adjacent lots.</li> <li>Safe street crossing conditions for pedestrians and cyclists.</li> <li>Safe pedestrian crossings on arterial roads and at schools including the provision of traffic controls as required by the roads authority.</li> <li>Continuous hard pavement from the footpath to the kerb.</li> <li>Sufficient lighting and paved, sheltered waiting areas for forecast user volume at neighbourhood centres, schools and other locations with expected high patronage.</li> <li>Appropriate signage.</li> </ul> <p>Public transport stops and associated waiting areas <u>should</u> be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with physical disabilities.</p>	
<p><b>Clause 56.06-7</b> <b>Neighbourhood street network detail objective</b></p> <ul style="list-style-type: none"> <li>To design and construct street carriageways and verges so that the street geometry and traffic speeds provide an accessible and safe neighbourhood street system for all users.</li> </ul>	<p><b>Standard C20</b> The design of streets and roads should:</p> <ul style="list-style-type: none"> <li>Meet the requirements of Table C1. Where the widths of access lanes, access places and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met.</li> <li>Provide street blocks that are generally between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speed.</li> <li>Have verges of sufficient width to accommodate footpaths, shared paths, cycle paths, integrated water management, street tree planting, lighting and utility needs.</li> <li>Have street geometry appropriate to the street type and function, the physical land characteristics and achieve a safe environment for all users.</li> <li>Provide a low-speed environment while allowing all road</li> </ul>	<p><b>Achieved</b> The main collector road within the subdivision is proposed to be 20m wide with local streets within the subdivision designed to be a minimum of 10m wide.</p> <p>The series of T-intersections will enable safe and convenient sharing of the road between vehicles and cyclists. A roundabout is proposed opposite the entrance of the retirement village.</p> <p>All public streets have minimum widths comfortably accommodating the predicted traffic volumes.</p> <p>A kerb and channel drainage system will be used throughout the subdivision.</p> <p>It is proposed that as part of the planning permit a</p>

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landscape plan will be required identifying the appropriate planting of street trees.

Detailed engineering plans will be submitted at the design stage providing further details including cross-sections, road configuration and layout and street furniture to the satisfaction of the Responsible Authority.

- users to proceed without unreasonable inconvenience or delay.
- Provide a safe environment for all street users applying speed control measures where appropriate.
- Ensure intersection layouts clearly indicate the travel path and priority of movement for pedestrians, cyclists and vehicles.
- Provide a minimum 5 metre by 5 metre corner splay at junctions with arterial roads and a minimum 3 metre by 3 metre corner splay at other junctions unless site conditions justify a variation to achieve safe sight lines across corners.
- Ensure streets are of sufficient strength to:
  - Enable the carriage of vehicles.
  - Avoid damage by construction vehicles and equipment.
- Ensure street pavements are of sufficient quality and durability for the:
  - Safe passage of pedestrians, cyclists and vehicles.
  - Discharge of urban run-off.
  - Preservation of all-weather access and maintenance of a reasonable, comfortable riding quality.
- Ensure carriageways of planned arterial roads are designed to the requirements of the relevant road authority.
- Ensure carriageways of neighbourhood streets are designed for a minimum 20 year life span.
- Provide pavement edges, kerbs, channel and crossover details designed to:
  - Perform the required integrated water management functions.
  - Delineate the edge of the carriageway for all street users.
  - Provide efficient and comfortable access to abutting lots at appropriate locations.
  - Contribute to streetscape design.
- Provide for the safe and efficient collection of waste and recycling materials from lots.
- Be accessible to people with disabilities.
- A street detail plan should be prepared that shows, as appropriate:
  - The street hierarchy and typical cross-sections for all street types.

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Director, East Gippsland Shire

Date: ....3 January 2018...

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<p><b>Clause 56.06-8</b></p> <p><b>Lot access objective</b></p> <ul style="list-style-type: none"> <li>▪ To provide for safe vehicle access between roads and lots.</li> </ul>	<p><b>Standard C21</b></p> <p>Vehicle access to lots abutting arterial roads <u>should</u> be provided from service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant roads authority. Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less <u>should</u> be provided via rear or side access lanes, places or streets. The design and construction of a crossover <u>should</u> meet the requirements of the relevant road authority.</p>	<p><b>Achieved</b></p> <p>No access to lots from arterial roads are proposed as part of this subdivision.</p> <p>All lots are over 700sqm in area, accessible via the public roads, the larger allotment sizes seek to enable vehicles associated with any future dwellings on the site to enter and exit the site in a forwards motion.</p> <p>The average lot frontage will be approx. 19m wide.</p>
<p><b>Clause 56.07 - Integrated Water Management</b></p>		
<p><b>Clause 56.07-1</b></p> <p><b>Drinking water supply objectives</b></p> <ul style="list-style-type: none"> <li>▪ To reduce the use of drinking water.</li> <li>▪ To provide an adequate, cost-effective supply of drinking water.</li> </ul>	<p><b>Standard C22</b></p> <p>The supply of drinking water must be:</p> <ul style="list-style-type: none"> <li>▪ Designed and constructed in accordance with the requirements and to the satisfaction of the relevant water authority.</li> <li>▪ Provided to the boundary of all lots in the subdivision to the satisfaction of the relevant water authority.</li> </ul>	<p><b>Achieved</b></p> <p>A reticulated water supply will be provided in accordance with the requirements of the relevant authority.</p>

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<p><b>Clause 56.07-2</b></p> <p><b>Reused and recycled water objective</b></p> <ul style="list-style-type: none"> <li>To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.</li> </ul>	<p><b>Standard C23</b></p> <p>Reused and recycled water supply systems <u>must</u> be:</p> <ul style="list-style-type: none"> <li>Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority, Environment Protection Authority and Department of Human Services.</li> <li>Provided to the boundary of all lots in the subdivision where required by the relevant water authority.</li> </ul>	<p><b>Achieved</b></p> <p>It is proposed only to provide a reticulated recycled water supply system for toilet flushing and garden watering through the use of 2000 litre stormwater tanks in each lot.</p>
<p><b>Clause 56.07-3</b></p> <p><b>Waste water management objective</b></p> <ul style="list-style-type: none"> <li>To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.</li> </ul>	<p><b>Standard C24</b></p> <p>Waste water systems <u>must</u> be:</p> <ul style="list-style-type: none"> <li>Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the Environment Protection Authority.</li> <li>Consistent with any relevant approved domestic waste water management plan.</li> </ul> <p>Reticulated waste water systems <u>must</u> be provided to the boundary of all lots in the subdivision where required by the relevant sewerage authority.</p>	<p><b>Achieved</b></p> <p>A reticulated sewer connection point will be made available to each lot in accordance with the requirements of the Responsible Authority.</p>
<p><b>Clause 56.07-4</b></p> <p><b>Urban run-off management objectives</b></p> <ul style="list-style-type: none"> <li>To minimise damage to properties and inconvenience to residents from urban run-off.</li> <li>To ensure that the street operates adequately during major storm events and provides for public safety.</li> <li>To minimise increases in stormwater runoff and protect the environmental values and physical characteristics of receiving waters from degradation by urban runoff.</li> </ul>	<p><b>Standard C25</b></p> <p>The urban stormwater management system <u>must</u> be:</p> <ul style="list-style-type: none"> <li>Designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority.</li> <li>Designed and managed in accordance with the requirements and to the satisfaction of the water authority where reuse of urban run-off is proposed.</li> <li>Designed to meet the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999) as amended.</li> <li>Designed to ensure that flows downstream of the subdivision site are restricted to predevelopment levels unless increased flows are approved by the relevant drainage authority and</li> </ul>	<p><b>Achieved</b></p> <p>The stormwater drainage from the subdivision will discharge into a proposed retarding basin/wetland area to the eastern side of the site within the existing drainage gully. Please refer to the Water Technology assessment.</p> <p>The development is to incorporate a 2000 litre stormwater reuse tank within each lot to supplement the pollutant removal from stormwater runoff and provide a potable water reduction within the development in the order of 3,500,000 litres per year. Incorporation of these tank systems will also ensure 5 Star building compliance.</p> <p>A simple, cost effective vegetated swale system, combined with the proposed retarding basin/ wetland will</p>

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there are no detrimental downstream impacts.

The stormwater management system should be integrated with the overall development plan including the street and public open space networks and landscape design. For all storm events up to and including the 20% Average Exceedence Probability (AEP) standard:

- Stormwater flows should be contained within the drainage system to the requirements of the relevant authority.
- Ponding on roads should not occur for longer than 1 hour after the cessation of rainfall.

For storm events greater than 20% AEP and up to and including 1% AEP standard:

- Provision must be made for the safe and effective passage of stormwater flows.
- All new lots should be free from inundation or to a lesser standard of flood protection where agreed by the relevant floodplain management authority.
- Ensure that streets, footpaths and cycle paths that are subject to flooding meet the safety criteria  $V_{ave} < 0.35 \text{ m}^2/\text{s}$  (where,  $V_{ave}$  = average depth in metres and  $V_{ave}$  = average velocity in metres per second).

The design of the local drainage network should:

- Ensure run-off is retarded to a standard required by the responsible drainage authority.
- Ensure every lot is provided with drainage to a standard acceptable to the relevant drainage authority. Wherever possible, run-off should be directed to the front of the lot and discharged into the street drainage system or legal point of discharge.
- Ensure that inlet and outlet structures take into account the effects of obstructions and debris build up. Any surcharge drainage pit should discharge into an overland flow in a safe and predetermined manner.
- Include water sensitive urban design features to manage run-off in streets and public open space. Where such features are provided, an application must describe maintenance responsibilities, requirements and costs.

Any flood mitigation works must be designed and constructed in accordance with the requirements of the relevant floodplain

provide very good treatment of stormflow from the proposed development before it reaches Lake King.

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	management authority.
<p><b>Clause 56.08 - Site Management</b></p>	
<p><b>Clause 56.08-1</b>  <b>Site management objectives</b></p> <ul style="list-style-type: none"> <li>▪ To protect drainage infrastructure and receiving waters from sedimentation and contamination.</li> <li>▪ To protect the site and surrounding area from environmental degradation or nuisance prior to and during construction of subdivision works.</li> <li>▪ To encourage the reuse of materials from the site and recycled materials in the construction of subdivisions where practical.</li> </ul>	<p><b>Standard C26</b>  A subdivision application <u>must</u> describe how the site will be managed prior to and during the construction period and may set out requirements for managing:</p> <ul style="list-style-type: none"> <li>▪ Erosion and sediment.</li> <li>▪ Dust.</li> <li>▪ Run-off</li> <li>▪ Litter, concrete and other construction wastes.</li> <li>▪ Chemical contamination.</li> <li>▪ Vegetation and natural features planned for retention.</li> </ul> <p>Recycled material <u>should</u> be used for the construction of streets, shared paths and other infrastructure where practicable.</p>
<p><b>Clause 56.09 – Utilities</b></p>	<p><b>Achieved</b>  A construction management plan will be prepared prior to the commencement of any construction works.</p>
<p><b>Clause 56.09-1</b>  <b>Shared trenching objectives</b></p> <ul style="list-style-type: none"> <li>▪ To maximise the opportunities for shared trenching.</li> <li>▪ To minimise constraints on landscaping within street reserves.</li> </ul>	<p><b>Standard C27</b>  Reticulated services for water, gas, electricity and telecommunications <u>should</u> be provided in shared trenching to minimise construction costs and land allocation for underground services.</p>
<p><b>Clause 56.09-2</b>  <b>Electricity, telecommunications and gas objectives</b></p> <ul style="list-style-type: none"> <li>▪ To provide public utilities to each lot in a timely, efficient and cost effective manner.</li> </ul>	<p><b>Standard C28</b>  The electricity supply system <u>must</u> be designed in accordance with the requirements of the relevant electricity supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant electricity authority.</p>
<p><b>Achieved</b>  A construction management plan will be prepared prior to the commencement of any construction works.</p>	<p>Approved Development Plan  Planning and Environment Act 1987  East Gippsland Planning Scheme  Development Plan Overlay Schedule 8  (54 Thorpes Lane, Lakes Entrance)  Signed:    Director, East Gippsland Shire  Date: ...3 January 2018.</p>
<p><b>Achieved</b>  Shared trenching will be employed where possible.</p>	<p><b>Achieved</b>  Reticulated forms of services will be provided for each lot within the subdivision including electricity, telecommunications and gas.</p>

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<ul style="list-style-type: none"> <li>▪ To reduce greenhouse gas emissions by supporting generation and use of electricity from renewable sources.</li> </ul>	<p>Arrangements that support the generation or use of renewable energy at a lot or neighbourhood level are encouraged. The telecommunication system <u>must</u> be designed in accordance with the requirements of the relevant telecommunications servicing agency and <u>should</u> be consistent with any approved strategy, policy or plan for the provision of advanced telecommunications infrastructure, including fibre optic technology. The telecommunications system <u>must</u> be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant telecommunications servicing authority. Where available, the reticulated gas supply system <u>must</u> be designed in accordance with the requirements of the relevant gas supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant gas supply agency.</p>	<p style="text-align: center;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme  Development Plan Overlay Schedule 3 (54 Thorpes Lane, Lakes Entrance)  Signed:  <i>Kate Nelson</i>  Director, East Gippsland Shire  Date: ....3 January 2018</p>
<p><b>Clause 56.09-3</b> <b>Fire hydrants objective</b></p> <ul style="list-style-type: none"> <li>▪ To provide fire hydrants and fire plugs in positions that enable fire fighters to access water safely, effectively and efficiently.</li> </ul>	<p><b>Standard C29</b> Fire hydrants <u>should</u> be provided:</p> <ul style="list-style-type: none"> <li>▪ A maximum distance of 120 metres from the rear of the each lot.</li> <li>▪ No more than 200 metres apart.</li> </ul> <p>Hydrants and fire plugs <u>must</u> be compatible with the relevant fire service equipment.</p>	<p><b>Achieved</b> Fire hydrants will be provided in accordance with the requirements of the Responsible Authority.</p>
<p><b>Clause 56.09-4</b> <b>Public lighting objective</b></p> <ul style="list-style-type: none"> <li>▪ To provide public lighting to ensure the safety of pedestrians, cyclists and vehicles.</li> <li>▪ To provide pedestrians with a sense of personal safety at night.</li> <li>▪ To contribute to reducing greenhouse gas emissions and to saving energy.</li> </ul>	<p><b>Standard C30</b> Public lighting should be provided to streets, footpaths, public telephones, public transport stops and to major pedestrian and cycle paths including public open spaces that are likely to be well used at night to assist in providing safe passage for pedestrians, cyclists and vehicles. Public lighting <u>should</u> be designed in accordance with the relevant Australian Standards. Public lighting <u>should</u> be consistent with any strategy, policy or plan for the use of renewable energy and energy efficient fittings.</p>	<p><b>Achieved</b> Appropriate street lighting will be provided in all streets throughout the subdivision in accordance with the requirements of the Responsible Authority.</p>

- End of Assessment -

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**STIRLING DRIVE, LAKES ENTRANCE  
FLORA AND FAUNA ASSESSMENT**

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**Watsons Pty Ltd**



**Brett Lane & Associates Pty. Ltd.**  
Ecological Research & Management  
605 Nicholson Street, North Carlton  
P O Box 592, North Carlton, Vic. 3054  
Ph. (03) 9387 5008  
Fax. (03) 9387 6115

June 2008

Report No. 7206 (1.2)

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## 1. EXECUTIVE SUMMARY

Brett Lane & Associates Pty Ltd was engaged by Watsons Pty Ltd to undertake a flora and fauna assessment for a parcel of land approximately 40 hectares in extent and proposed for subdivision, situated off Stirling Drive, Lakes Entrance. In addition, an ephemeral creek in the east of the land was surveyed, as well as private land and the Colquhoun Road reserve to the west.

The study area containing the proposed subdivision has been cleared of its pre-existing forest vegetation. Some 3.5 hectares of the land proposed for subdivision contained *degraded treeless vegetation* with common native ground layer plants such as Austral Bracken at greater than 25%. Eighteen scattered shrubs and trees were recorded in this main section of the study area. Of these, 16 were small trees and shrubs; two were large eucalypts. Both large trees abut the existing drainage reserve to the east of the study area on or within the boundaries of proposed residential lots. It is anticipated that these trees may be retained. Some small tree and shrub removal may be required.

Private land immediately west of this area proposed for an access road comprised several intact patches of the Ecological Vegetation Class Limestone Box Forest (EVC 15), including many large trees and a number of Coast Grey Box, listed as rare in Victoria on the Department of Sustainability and Environment advisory list. This land also contains a number of scattered trees. The ground layer in this area has been cleared of native vegetation and replaced with pasture grasses. The proposed access road alignment has been adjusted by the proponent to avoid intact patches of native vegetation; however, this road will require the removal of five scattered Coast Grey Box trees, including two large, two medium and one small tree.

Intact Limestone Box Forest and Lowland Forest (EVC 16) including large trees occurs on Colquhoun Road in several patches at the location of a proposed access road to the study area and extending in both the north and south direction along this road reserve. Coast Grey Box also occurs in some of these habitat zones. The proposed access road and widening of Colquhoun Road is anticipated to result in the removal of 0.11 hectares of Limestone Box Forest, including three small Coast Grey Box trees and one medium Coast Grey Box. The removal of three large trees may be required for road widening, to be determined through detailed roadwork surveys.

Any approved removal of native vegetation in the form of scattered trees, remnant patches or native vegetation constituting *degraded treeless vegetation* requires a permit from the Responsible Authority under the state planning scheme and local vegetation protection overlays. Net Gain offset targets for approved native vegetation removal (except for *degraded treeless vegetation*) are required under state native vegetation retention regulations.

The proposed removal of 0.11 hectares of Limestone Box Forest would result in a Net Gain offset target of 0.13 *habitat hectares*, possibly requiring the ongoing protection and 10-year maintenance for conservation purposes of approximately 0.65 hectares of similar vegetation in the region. The proposed removal of two large and two medium trees for a proposed access road will attract a Net Gain offset of the protection of four large and two medium trees, and the recruitment of an additional 30 indigenous trees for conservation purposes. Any loss of large trees for road widening or within residential lots will attract an additional Net Gain offset target.

No flora species or communities listed as *threatened* under state or national species protection legislation were observed in the study area. None are considered likely to occur on site due to a lack of suitable habitat or the absence of conspicuous species during the current investigation.

Several flora species listed as protected under the state *Flora and Fauna Guarantee Act 1988* were recorded on the publicly-owned road reserve of Colquhoun Road. A permit would be required

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from DSE if these species are proposed to be removed from the public road reserve. This roadside vegetation is also subject to a Vegetation Protection Overlay under the local planning scheme.

No fauna species or vegetation communities listed as *threatened* under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or state *Flora and Fauna Guarantee Act 1988* were detected during this investigation. Two EPBC Act listed migratory fauna species (not listed as *threatened*) occur in or adjacent to the study area in suitable habitat: the Latham's Snipe (*near threatened*) in the adjacent creek habitat and White-throated Needletail in the airspace over the study area. No implications arise from the occurrence of these migratory species listed under the EPBC Act because they are widespread and relatively common species. Recommendations for the protection of creek habitat for the Latham's Snipe are provided in this report.

A follow-up flora and fauna survey of any section of Colquhoun Road reserve and private land to the west proposed for road construction or widening is recommended for between October and November when orchids are most likely to be active and therefore above ground to determine the status of native orchids in the road reserve. The family *Orchidaceae* (orchids) is protected under the FFG Act therefore a permit for removal would be required if orchids are recorded here. Fauna surveys of any trees proposed for removal would be undertaken at this time.

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## 2. INTRODUCTION

Brett Lane & Associates Pty Ltd was engaged by Watsons Pty Ltd to undertake a flora and fauna assessment for a parcel of land approximately 40 hectares in extent, situated off Stirling Drive, Lakes Entrance. The assessment evaluates the flora and fauna of the subject land in relation to potential regulatory constraints that might affect future development of the land.

In addition to this parcel of land, private land to the west and public land in the Colquhoun Road reserve was surveyed for native vegetation in view of a proposed access road in this vicinity. Furthermore, a creek reserve to the east was surveyed.

### 2.1. Scope of investigation

The scope for this investigation included the tasks described below.

- Review of existing information (e.g. DSE's Flora Information System and Atlas of Victorian Wildlife; EPBC Act Protected Matters Search Tool);
- A site survey was undertaken involving:
  - Traversing the site on foot and preparation of an incidental flora species list;
  - Identification and mapping (using a handheld GPS unit to an accuracy of +/- 5 metres) of areas of remnant native vegetation and/or scattered trees, where present;
  - Vegetation quality assessments of areas of remnant native vegetation according to the DSE's Habitat Hectare methodology, and documentation of scattered trees;
  - Identification of any potential habitat for threatened flora and fauna; and
  - Bird surveys and incidental mammal and reptile surveys by rock and debris rolling and searching for signs such as tracks and nests.
- Maps were prepared of the site representing areas of intact native vegetation and fauna habitat, where present.

This report presents the results of the review of existing information and flora and fauna assessment, including a discussion of the implications for the findings for the proposed use of the land, including any Net Gain offsets required under the Vegetation Management Framework. Recommendations for mitigation and management strategies, as well as further investigation, are provided.

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### 2.2. Report and investigation team

This report and the results of the investigation are divided into the following sections:

**Section 3** describes the sources of information and the methods used for the assessment.

**Section 4** presents the flora and fauna of the study area, in particular assessments of vegetation and habitat condition and conservation significance.

**Section 5** presents the implications under relevant legislation and policy and compares the impacts upon each alignment option

**Section 6** presents the conclusions and recommendations

This investigation was undertaken by a team from Brett Lane & Associates Pty Ltd, comprising Davide Coppolino (Botanist), Peter Lansley (Zoologist), Mal Wright (Project Manager) and Brett Lane (Principal Consultant).

*Russ Nefer*

Director, East Gippsland Shire

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### 3. SOURCES OF INFORMATION

This section identifies the sources of information and methodologies used to undertake the detailed flora and fauna assessment.

#### 3.1. Existing Information

Existing information regarding flora and fauna utilised as part of this investigation is described below.

##### 3.1.1. Flora

Flora records from the Viridans Flora Information System (FIS), a public database administered by the Department of Sustainability and Environment were obtained. This database search listed all plant species, including rare and threatened plants found in a search region within 10 kilometres of the study area of approximate centre point coordinates: latitude 37° 51' 47" S and longitude 148° 00' 47" E.

The potential occurrence of nationally threatened flora species in the search region based on availability of suitable habitat was ascertained through a search of the online *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool (DEWR 2007) using the abovementioned search region.

Plant taxonomy used throughout this report follows the FIS standards.

##### 3.1.2. Ecological Vegetation Classes

Native vegetation mapping in the form of remnant and pre-1750 (pre-European settlement) vegetation mapping was reviewed to determine the type of native vegetation likely to be encountered in the field. Information on Ecological Vegetation Classes was obtained from published EVC benchmarks. These sources included:

- Relevant EVC benchmarks for the East Gippsland Lowlands bioregion<sup>1</sup> (DSE 2007a); and
- Biodiversity Interactive Maps (DSE 2007b).

#### 3.2. Fauna

A list of the fauna of the region was obtained from the Viridans Victorian Fauna Database (VFD), also referred to as Atlas of Victorian Wildlife (AVW), a public database administered by DSE. The search region for this list was within a 10 kilometre radius of the study area, centred on the coordinates: latitude 37° 51' 47" S and longitude 148° 00' 47" E. Fauna taxonomy used throughout this report follows the AVW standards.

The likelihood of suitable habitat on the site for nationally threatened fauna species was ascertained through a search of the *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool (DEWR 2007) using the above search region.

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<sup>1</sup> A bioregion is defined as "a geographic region that captures the patterns of ecological characteristics in the landscape, providing a natural framework for recognising and responding to biodiversity values. In general bioregions reflect underlying environmental features of the landscape (DNRE 1997).

### 3.3. Field Methodology

#### 3.3.1. Botanical and native vegetation assessment

The field assessment was conducted from the 19<sup>th</sup> to 21<sup>st</sup> December 2007 and additional areas surveyed on 12<sup>th</sup> and 13<sup>th</sup> February 2008. During the field assessment, the study area was traversed in detail on foot.

Incidental records of flora species were made based on random intuitive sampling methods. A compiled list of flora species recorded is provided in Appendix 1.

Areas within the proposed subdivision containing native vegetation subject to the state's Native Vegetation Management Framework (DNRE 2002), referred to herein as the 'Framework', were assessed using the Habitat Hectare method prescribed by the DSE and mapped using a handheld GPS and aerial photography interpretation.

Observations were made of the potential of the study area to support threatened plant species.

#### 3.3.2. Defining vegetation

Vegetation is recognised in three different categories during botanical field investigations. These categories are defined for the purpose of presenting results in this report and are based on the general rules of intactness used for categorising vegetation throughout Victoria (DNRE 2002; DSE 2007c). These vegetation categories are as follows:

1. **Remnant patch** - Patches of remnant native vegetation, including wetlands, composed of indigenous plant species **considered part of a clearly definable Ecological Vegetation Class (EVC)**. Such vegetation includes remnant vegetation with the following attributes:
  - Proportion of indigenous understorey species being greater than 25% total understorey cover (excluding bare ground); and/or
  - Indigenous canopy trees with at least 20% projected foliage canopy cover.
2. **Scattered trees** - Areas with indigenous trees whose canopy cover is less than 20% projected foliage canopy cover and less than 25% total cover of indigenous understorey vegetation (excluding bare ground).
3. **Degraded treeless vegetation** - All vegetation that is not categorised as a remnant patch or scattered trees. This category includes the following vegetation descriptions:
  - Treeless vegetation with less than 25% total cover of indigenous species (excluding bare ground); or
  - Treeless vegetation that has greater than 25% total cover of indigenous species (excluding bare ground) but is dominated by opportunistic native species which were unlikely to have been dominant prior to a disturbance event (e.g. cropping). In this case, a determination by the DSE is required to confirm its classification as *degraded treeless vegetation*, in which case its *habitat hectare* value is ignored.

#### 3.3.3. Assessing the Quality of Vegetation

The different approaches applied to assess and quantify the condition and quality of vegetation belonging to the above vegetation categories are outlined below.

##### Assessing a remnant patch

Remnant patch vegetation is assessed in the field using the formal methodology for assessing vegetation and habitat quality developed as part of the Framework (DNRE 2002). This

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methodology is known as habitat scoring or Habitat Hectare assessment (Parkes, Newell and Cheal 2003; DSE 2004). The Habitat Hectare methodology provides a quantitative measure of vegetation quality, which ultimately assists in defining the values of remnant native vegetation and guiding offsets (compensation) if native vegetation is to be removed.

#### Assessing scattered trees

Scattered indigenous trees do not constitute a remnant patch and therefore do not qualify for habitat hectare assessment. Scattered indigenous trees are counted and their diameter recorded at 1.3 metres above ground level (DBH). The size class of scattered trees is assessed based on the trunk diameter in comparison to the relevant benchmark diameter for a large old tree.

#### Degraded treeless vegetation

Degraded treeless vegetation is considered to be of minimal habitat or botanical value and therefore no assessment of quality is undertaken in accordance with DSE guidelines (DSE 2007c). Treeless native vegetation of low native species diversity with 25% native species composition or greater is assessed using the Habitat Hectare method under the precautionary principle. In the latter case, a determination by the DSE is required to confirm its classification as degraded treeless vegetation, in which case its *habitat hectare* value is ignored.

### 3.3.4. Fauna

The field survey was conducted from the 19<sup>th</sup> to 21<sup>st</sup> December 2007 of the proposed subdivision and adjacent creekline only. Weather conditions at the time of the visit were mostly fine, warm, and humid. Cloud cover was mostly 7/8 to 8/8 but sunny conditions were experienced around noon on the 20<sup>th</sup> and morning of 21<sup>st</sup> December. A thundery rain shower passed through Lakes Entrance after field work had been completed on the evening of the 20<sup>th</sup> December. Ambient temperatures during field work varied from approximately 17°C to 27°C. Generally a light east to north easterly breeze was prevalent during the field study. These conditions were considered suitable for detecting the majority of mammal, bird, reptile and frog species that could occur in the study area at the time.

The entire study area was traversed on foot or by vehicle. Techniques used to detect fauna species inhabiting the study area comprised:

- Searches for mammal scats, tracks and signs (e.g. diggings, signs of feeding and nests/burrows);
- Active bird observation; and
- Random intuitive searches (by listening for frog calls and overturning logs and debris to find reptiles) where considered appropriate.

The study area was comprised mainly of a mosaic of pasture grazed by both native and introduced, a farm dam and several artificial bog holes, an ephemeral creek and a farm house. Due to the paucity of trees within the study area, it was considered unproductive to search for mammals or nocturnal birds.

Fauna habitat types were characterised in the study area. The quality of fauna habitat was assessed based on a number of criteria (see below). These criteria have been modified to suit particular vegetation types, such as treeless environments, as necessary. Three fauna habitat quality categories were identified and are described below.

**Low:** Many fauna habitat elements in low quality remnants have been lost, including old-growth trees (e.g. due to past timber harvesting) and fallen timber, and tree canopies are often highly fragmented. Remnants may be severely weed-infested and possess few native structural and

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floristic components. Habitat linkages with other remnant ecosystems in the landscape have usually been removed by extensive past clearing.

**Moderate:** Some fauna habitat components are often missing (i.e. vegetation disturbed, old-growth trees, surface rock), although linkages with other remnant habitats in the landscape are usually intact.

**High:** Fauna habitat components are usually all present (i.e. vegetation intact, old-growth trees, and surface rock) and habitat linkages to other remnant ecosystems in the landscape are intact.

### 3.4. Limitations

Botanical and fauna field surveys usually fail to record all species present for various reasons, including the seasonal absence of some species and short survey duration. Rare or cryptic species are often missed in short surveys. Some senescing native eucalypts were not identifiable to species level due to the absence of fruiting material, and insect-damaged leaves. The summer timing of the survey was considered suitable to record most native flora species present in the study area and to ascertain the extent and quality of native vegetation. Spring-emergent flora species such as orchids would have been dormant at the time of the assessments and therefore would not have been detected.

The timing of the surveys and prevailing environmental conditions were considered suitable to record most fauna that may occur on the site. Summer is considered an appropriate time to survey for mammals and birds, given that almost all migratory species would have been present at the time of the field assessment. It is also considered a suitable time to survey for reptiles and amphibians.

Wherever appropriate, a precautionary approach has been adopted in the discussion of implications. That is, where insufficient evidence is available on the occurrence or likelihood of occurrence of a species, it is assumed that it could be in an area of habitat, if suitable, and the implications under legislation and policy are considered accordingly.

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## 4. FLORA AND FAUNA OF THE AREA

This section presents the results of the current investigation including a description of the study area.

### 4.1. Site description

The majority of the study area proposed for subdivision consisted of farming land. This open grazing land containing predominantly introduced pasture with small patches of intact native grass understorey, and a small area taken up by farm dams, ephemeral drainage lines, planted and remnant trees and a farm house. The land is currently grazed by cattle, resulting in patches dominated by introduced pasture grasses and weeds such as Kikuyu, Barley Grass, Fescue and Sweet Vernal-grass. Smaller sections were dominated by introduced Yorkshire Fog; Brown-top Bent was widespread. Bracken was present in small to medium sized areas, some of which contained a moderate cover of native Weeping Grass and Common Wheat-grass. A few remnant eucalypts that were part of the pre-existing forest vegetation remained north of the farm house. A small patch of planted Pine trees was situated near these eucalypts and two large Cypress trees were located closer to the farm house.

The ephemeral creek in the eastern part of the study area was dominated by introduced species such as Kikuyu and contained only a small area of revegetation, dominated by species such as Kangaroo Apple and native wattles. Remnant scattered trees such as Swamp Paperbark, Red Box and Red Ironbark were also observed in these areas.

Private land to the west proposed for an access road comprised cleared grazing land with several large patches of indigenous eucalypts remaining with many large trees, including the rare Victorian species Coast Grey Box. Scattered trees, including Coast Grey Box, were also recorded outside these patches within the paddock.

Colquhoun Road to the west comprised a number of narrow remnant patches of treed vegetation (including Coast Grey Box) of varying understorey quality, including many patches with intact native shrub and groundcover layers, as well as patches slashed regularly and dominated by introduced grasses. Several scattered trees were recorded in this road reserve.

Residential development occurred to the east of the study area, whilst partially completed residential estates occurred to the south and north. Land immediately to the west remained rural, comprising grazing land or small rural allotments.

The study area is situated on the boundary of the Gippsland Bioregion, East Gippsland Lowland bioregion, according to DSE mapping. Site inspection indicated that due to the hilly nature of the study area, it conformed more closely to the East Gippsland Lowlands bioregion in terms of its visible soil profile, geology and remnant forest vegetation.

The site falls within the boundaries of the East Gippsland Catchment Management Authority. The local planning authority is the East Gippsland Shire Council and the land is zoned Residential 1 Zone under the local planning scheme. A Vegetation Protection Overlay (VPO1) covers the Colquhoun Road reserve at the point of a proposed access road in the local planning scheme, aimed at protecting high conservation roadside native vegetation.

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# Study Area Boundaries



## Legend

 Study Area

Stirling Drive, Lakes Entrance

Figure 1: Study Area Boundaries

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Project No.: 7206

Date: 21/02/2008

Created by: M. Wright



Brett Lane & Associates Pty. Ltd.  
Ecological Research & Management



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605 Nicholson Street  
PO Box 592, Carlton North  
VIC 3054 Australia

ph 03 9387 5008 | fax 03 9387 6115  
brett@ecologicalresearch.com.au  
www.ecologicalresearch.com.au

0 75 150 300 450 600 Metres

## 4.2. Flora and native vegetation

### 4.2.1. Flora species

A total of 122 plant species were recorded in the study area, listed in Appendix 1. Of these, 73 (60%) were indigenous species and the remaining 49 (40%) were introduced species.

Flora Information System records and the *Environment Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool indicate that within the 10-kilometre search region there are records of, or there occurs potential habitat for, 29 flora species listed as having national or state conservation significance.

Coast Grey Box was recorded from a number of locations in private property to the east of the proposed subdivision and in the Colquhoun Road reserve. This species is listed as rare on the *Advisory List of Rare and Threatened Plants in Victoria* (DSE 2005). Coast Grey Box is not listed under the *Flora and Fauna Guarantee Act 1988* or EPBC Act. No additional flora species of conservation significance were detected during the field surveys undertaken for this assessment.

The likelihood of occurrence in the study area of flora species listed under the FFG Act or EPBC Act is addressed in Table 1. These species are either known to occur in the 10-kilometre search region or suitable habitat has been identified in this search region in the EPBC Act Protected Matters Search Tool (DEWR 2007).

This analysis of the likelihood of occurrence of flora species listed under the FFG Act and EPBC Act indicates that no threatened species are likely to occur on site due to either a lack of suitable habitat, or (for conspicuous species) no individuals being observed during the current investigation.

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Table 1: FFG Act and EPBC Act listed species and likelihood of occurrence in the study area

Common Name	Scientific Name	Family Name	Conservation Status		Habitat preference	Likelihood of occurrence
			FFG	EPBC		
Colquhoun Grevillea	<i>Grevillea celata</i>	Proteaceae	f	V	Red siliceous or pale granitic sands in dry sclerophyll forest (Makinson 1996)	No specimens observed during current investigation - <b>unlikely to occur</b>
Leafless Tongue-orchid	<i>Cryptostylis hunteriana</i>	Orchidaceae	f	V	Restricted in Victoria to near-coastal East Gippsland between Marlo and Wingan Inlet. Occurs in poorly drained heathland (Entwisle 1994)	No habitat present - <b>unlikely to occur</b>
Limestone Blue Wattle	<i>Acacia caerulescens</i>	Mimosaceae	f	V	Restricted to the Tambo Upper-Lake Tyres region north to near Murrindal. Occurs on clay over limestone in <i>Eucalyptus</i> woodland or forest (Entwisle et al. 1996)	No specimens observed during current investigation - <b>unlikely to occur</b>
Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	Orchidaceae	f	E	Favouring heathland and grassland on black clays (Bates 1994)	No habitat present - <b>unlikely to occur</b>

Key to abbreviations: EPBC – Status under EPBC Act; FFG (f) – Listed under FFG Act; E – Endangered; V – Vulnerable; f – Listed.

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#### 4.2.2. Ecological Vegetation Classes

Pre-European EVC mapping produced by the DSE indicates that the study area and surrounds would have supported Limestone Box Forest (EVC 15) in the northern half of the study area, and Lowland Forest (EVC 16) in the Colquhoun Road reserve and southern half of the study area prior to European settlement. This mapping is based on modelling of factors including rainfall, aspect, soils and remaining vegetation.

Evidence in the study area including floristic composition and soil characteristics suggested that fragmented forms of these Ecological Vegetation Classes were present in the southwest and on the Colquhoun Road reserve.

**Limestone Box Forest** has a *vulnerable* conservation status in the East Gippsland Lowlands bioregion. The benchmark for this EVC describes it as occurring “on generally well developed *terra rossa* soils derived from Tertiary limestones that outcrop around coastal streams, gullies and lakes. [It supports] open *Eucalypt* forest to 20 metres tall with a tall shrub layer understorey and a grass and herb-rich ground layer on sheltered aspects but may be almost completely bare on drier aspects” (Appendix 5).

**Lowland Forest** has a *least concern* conservation status in the East Gippsland Lowlands bioregion. The benchmark for this EVC describes it as “eucalypt forest to 25 metres tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. [It is] characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs” (Appendix 5).

A total of 15 remnant patches (referred to herein as *habitat zones*) comprising the above Ecological Vegetation Classes were recorded from the adjacent property to the southwest and Colquhoun Road reserve where an access road is proposed (Figure 2). These habitat zones are described in Table 2.

Habitat zones were not assessed using the Habitat Hectare method at this stage of the investigation. The conservation significance of each habitat zone according to the Framework, based on EVC bioregional conservation status and default habitat scores (DSE 2006) are presented in Table 2; conservation significance is described in more detail in Section 4.2.6. Large trees in habitat zones are represented in Figure 3.

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Table 2: Descriptions of habitat zones and likely conservation significance

Habitat Zone*	EVC	Area (ha)	Bioregional Conservation Status	Description	Framework Conservation Significance	No. large trees in habitat zone
G	Lowland Forest	0.05	Least Concern	Small linear area of intact eucalypt canopy with native shrubs such as Sweet Pittosporum and Common Boobialla in the understorey; occurs next to, and overshadowed by, large introduced pine trees. Ground layer largely consisting of introduced grasses such as Kikuyu and Panic Veldt-grass.	Medium	0
J	Limestone Box Forest	0.34	Vulnerable	Treed vegetation on eastern roadside with canopy of Mountain Grey Gum, Blue Box and White Stringybark (including 6 large trees). Understorey slashed in places; overall, retains a moderate cover and high diversity of native shrubs and ground layer species – including native grasses in slashed areas.	Very High	6
K	Limestone Box Forest	0.15	Vulnerable	Treed vegetation on eastern roadside with canopy of Mountain Grey Gum, White Stringybark, Blue Box and the rare <b>Coast Grey-box</b> (including 3 large trees). Understorey slashed in places and interrupted by gravel driveways; overall, retains a low to moderate cover and diversity of native shrubs and ground layer species. A high percentage cover of weeds occurs in this habitat zone, including Kikuyu, Cocksfoot and Large Quaking-grass.	Very High	3
L	Limestone Box Forest	0.07	Vulnerable	Slashed area dominated by native grasses such as Kangaroo Grass and Weeping Grass in the ground layer, and including small native shrubs such as guinea flower and rice flower. One small White Stringybark occurs in this habitat zone, with Cherry Ballart and Common Boobialla beneath this tree and a small dead standing tree.	Very High	0
M	Limestone Box Forest	0.05	Vulnerable	Treed vegetation on the eastern roadside with a reduced tree canopy comprising small White Stringybark and <b>Coast Grey-box</b> trees. Contains a moderate to high cover of understorey shrubs and trees, leading to a much-reduced weed cover. These species including Black Wattle, Sweet Pittosporum and Common Boobialla. Ground layer species include Thatch Saw-sedge, Spiny-headed Mat-rush and Flame Heath.	Very High	0

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Habitat Zone*	EVC	Area (ha)	Bioregional Conservation Status	Description	Framework Conservation Significance	No. large trees in habitat zone
N	Limestone Box Forest	0.08	Vulnerable	Stand of White Stringybark and <b>Coast Grey-box</b> on the western roadside with a mostly slashed understorey dominated by the introduced amenity grass Kikuyu. Some native understorey elements remain at the bases of trees, including Common Boobialla, Cherry Ballart and native ground layer species such as Thatch Saw-sedge, Flame Heath, Weeping Grass and Kangaroo Grass.	Very High	0
P	Limestone Box Forest	0.01	Vulnerable	Comprises three small <b>White Stringybark</b> trees on the western roadside - understorey is effectively absent.	Very High	0
Q	Limestone Box Forest	0.08	Vulnerable	Treed vegetation on the western roadside with <b>White Stringybark</b> , <b>Blue Box</b> and <b>Mountain Grey Gum</b> canopy (including 1 large tree). Understorey shrubs and trees include <b>Black Wattle</b> and <b>Coast Beard-heath</b> , with a moderate cover of native ground layer species. Interrupted by gravel driveways in places.	Very High	1
R	Limestone Box Forest	0.05	Vulnerable	Treed vegetation on the western roadside with <b>White Stringybark</b> and <b>Mountain Grey Gum</b> canopy (including 2 large trees). Understorey shrubs and trees include <b>Black Wattle</b> and <b>Cherry Ballart</b> , with a moderate cover of native ground layer species. Interrupted by gravel driveways in places.	Very High	2
S	Limestone Box Forest	0.19	Least Concern	Treed vegetation on the western roadside with <b>Coast Manna-Gum</b> and <b>White Stringybark</b> canopy (including 1 large tree and 1 small <b>Coast Grey Box</b> ). Understorey shrubs and trees include <b>Black Wattle</b> , <b>Coast Beard-heath</b> , <b>Coast Wattle</b> and <b>Common Cassinia</b> . A moderate cover of native ground layer species include <b>Kangaroo Grass</b> , <b>Tasman Flax-lily</b> , <b>Mountain Clematis</b> and <b>Wattle Mat-rush</b> . Interrupted by gravel driveways in places.	Medium	1
T	Limestone Box Forest	0.31	Least Concern	Treed vegetation on the eastern roadside with <b>Coast Manna-Gum</b> and <b>White Stringybark</b> canopy (including 1 large <b>Coast Grey Box</b> ) with mature pine trees on the edges. Understorey contains a high level cover of weed species, including <b>Kikuyu</b> , <b>Cape Ivy</b> and <b>Montpellier Broom</b> . Native shrubs include <b>Coast Tea-tree</b> , <b>Cherry Ballart</b> and <b>Seaberry Saltbush</b> .	Medium	1

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Habitat Zone*	EVC	Area (ha)	Bioregional Conservation Status	Description	Framework Conservation Significance	No. large trees in habitat zone
U	Limestone Box Forest	0.08	Vulnerable	Treed vegetation on the eastern roadside with White Stringybark and <b>Coast Grey Box</b> canopy. Understorey slashed in sections; however contains native shrubs such as Coast Beard-heath, Cherry Ballart and Common Boobiella and a moderate cover of native groundcover species such as wallaby grass, Weeping Grass and prostrate shrubs such as Flame Heath and guinea flower.	Very High	0
V	Limestone Box Forest	0.38	Vulnerable	Within private property used for grazing comprising an intact canopy of <b>Blue Box</b> and <b>Coast Grey Box</b> including six large trees. The native understorey has been cleared and replaced with introduced grasses such as Kikuyu.	Very High	1
W	Limestone Box Forest	0.49	Vulnerable	Within private property near an existing dam in a gully used for grazing. Comprised an intact canopy of <b>Blue Box</b> , <b>Mountain Grey Gum</b> and <b>Coast Grey Box</b> including five large trees. The native understorey has been cleared and replaced with introduced grasses such as Kikuyu.	Very High	5
X	Limestone Box Forest	0.29	Vulnerable	Within private property near a gully used for grazing. Comprised an intact canopy of <b>Blue Box</b> and <b>Coast Grey Box</b> including five large trees. The native understorey has been cleared and replaced with introduced grasses such as Kikuyu.	Very High	5

Note: Habitat Zone H, previously recorded, was excluded after further investigation



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#### 4.2.3. Degraded treeless vegetation

Six areas where ground layer native vegetation was found to be greater than 25% total cover (excluding bare ground) but dominated by a small number of opportunistic native species and/or occurring on modified substrates were recorded. These areas represent *degraded treeless vegetation* (Figure 2) as defined by DSE (Section 3.3.2) and are described in Table 3.

**Table 3: Areas containing degraded treeless vegetation at greater than 25% native cover**

Area	Description
A, B, E & F	Pasture lacking trees and native shrubs with a high proportion of weeds, including Kikuyu, Yorkshire Fog, Sweet Vernal-grass, Spear Thistle, Blackberry and Soft Brome. Located at higher elevations, dominated by Austral Bracken with Weeping Grass and Common Wheat-grass inhabiting small areas.
C & D	Drainage collection points containing standing water, divided by a man-made levee and colonised by wetland vegetation (Figures 4 & 5). Dominant native species included Slender Knotweed, River Club-sedge and Tall Spike-sedge. Kikuyu, Yorkshire Fog, Blackberry, Blue Canary-grass, Couch and Water Couch were the most prolific introduced species present, mostly restricted to the fringes.

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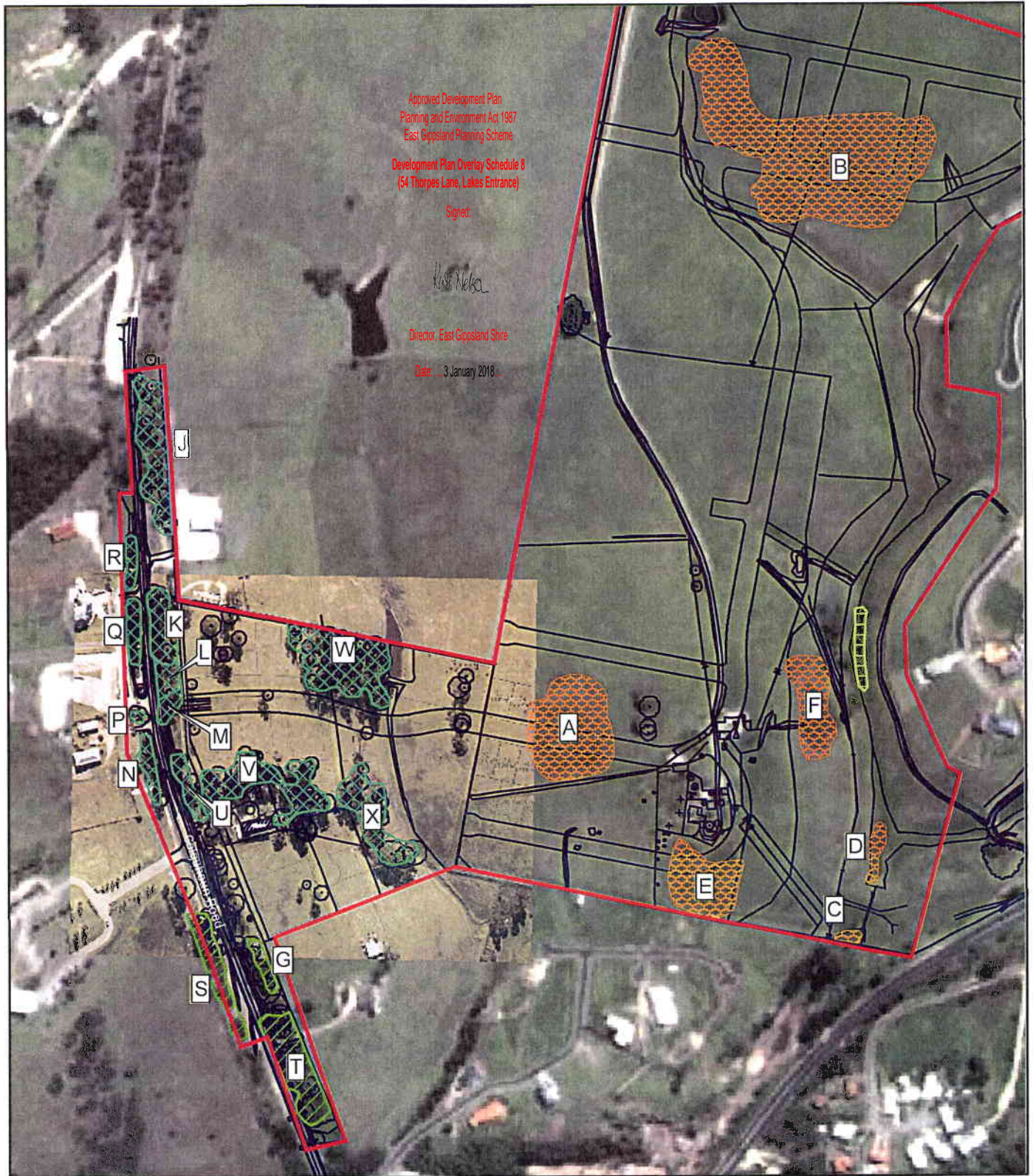
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# Habitat Zones and Degraded Treeless Vegetation



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## Legend

- Study Area
- Indigenous Revegetation Area
- Limestone Box Forest
- Lowland Forest
- Degraded Treeless Vegetation



<b>Stirling Drive, Lakes Entrance</b>		
Figure x: Habitat Zones and Degraded Treeless Vegetation		
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<b>Brett Lane &amp; Associates Pty. Ltd.</b> Ecological Research & Management		
Experience Knowledge Solutions	605 Nicholson Street PO Box 592, Carlton North VIC 3054 Australia	ph (03) 9387 5008   fax (03) 9357 6115 blane@ecologicalresearch.com.au www.ecologicalresearch.com.au

#### 4.2.4. Scattered Trees

Scattered trees recorded in the study area would have once comprised the canopy component of Limestone Box Forest (EVC 15) and Lowland Forest (EVC 16), determined by their location, aspect and nearby vegetation.

A total of 45 scattered trees were recorded in the study area, of which 9 were *large*, 5 were *medium* and 31 were *small* compared to the benchmark large tree diameter at breast height (DBH) for both Limestone Box Forest and Lowland Forest of 70 centimetres (Appendix 5). Size classes are based on the following DBH ranges:

- Large – 70 to less than 105 cm;
- Medium – 52 to less than 70 cm;
- Small – Less than 52 centimetres.

Scattered trees are listed in Appendix 3 and represented in Figure 3.

#### 4.2.5. Coast Grey Box

Coast Grey Box, rare in Victoria, was recorded throughout many habitat zones and as scattered trees in the private land to the west of the proposed subdivision and on the Colquhoun Road reserve. Given the proposal to construct an access road through this private land to Colquhoun Road, all Coast Grey Box in the vicinity of the proposed access road were documented and are presented in Figure 4. It should be noted that additional Coast Grey Box trees occur outside the search area marked in this figure, in both private land and the road reserve.

#### 4.2.6. Conservation significance according to the Framework

The likely conservation significance of habitat zones in the study area according to the Framework is summarised in Table 2. This is based on a combination of the bioregional conservation status of the EVC, together with its habitat score. Given that habitat scores have not yet been obtained for habitat zones, default habitat scores (DSE 2006) are used here.

Very large, large and medium scattered trees in the study area are assigned a conservation significance based on the bioregional conservation status of the EVC to which they once belonged, as presented in Appendix 3. Small scattered trees are defined as having low conservation significance according to the Framework.

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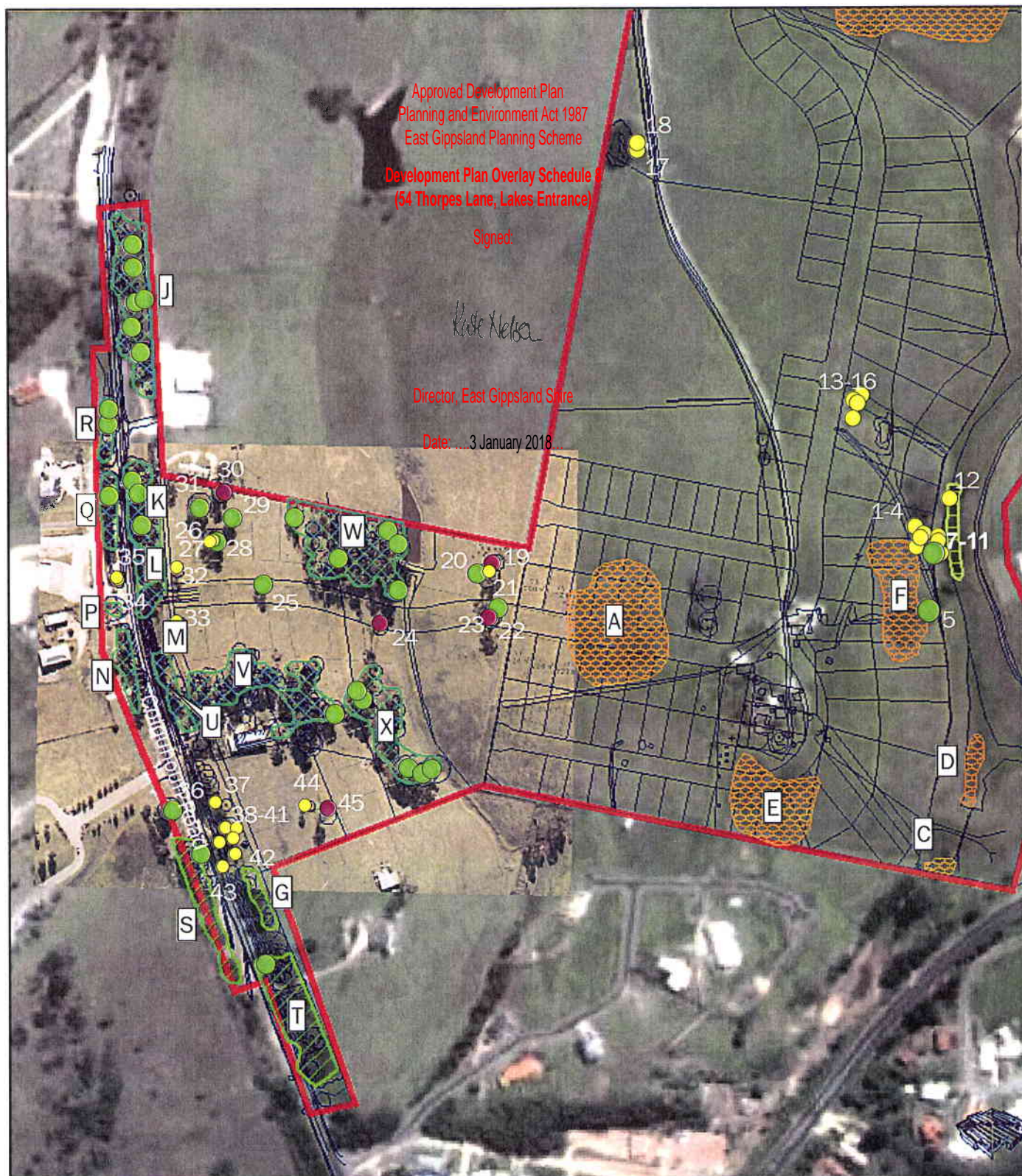
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# Scattered Trees and Large Trees in Habitat Zones



## Legend

- |  |  |
|--|--|
|  Study Area                   |  Small  |
|  Limestone Box Forest         |  Medium |
|  Lowland Forest               |  Large  |
|  Degraded Treeless Vegetation |  |

## Tree Size Classes

- |  |
|--|
|  Small  |
|  Medium |
|  Large  |



## Stirling Drive, Lakes Entrance

Figure 3: Scattered Trees and Large Trees in Habitat Zones

Client: Watsons Pty Ltd

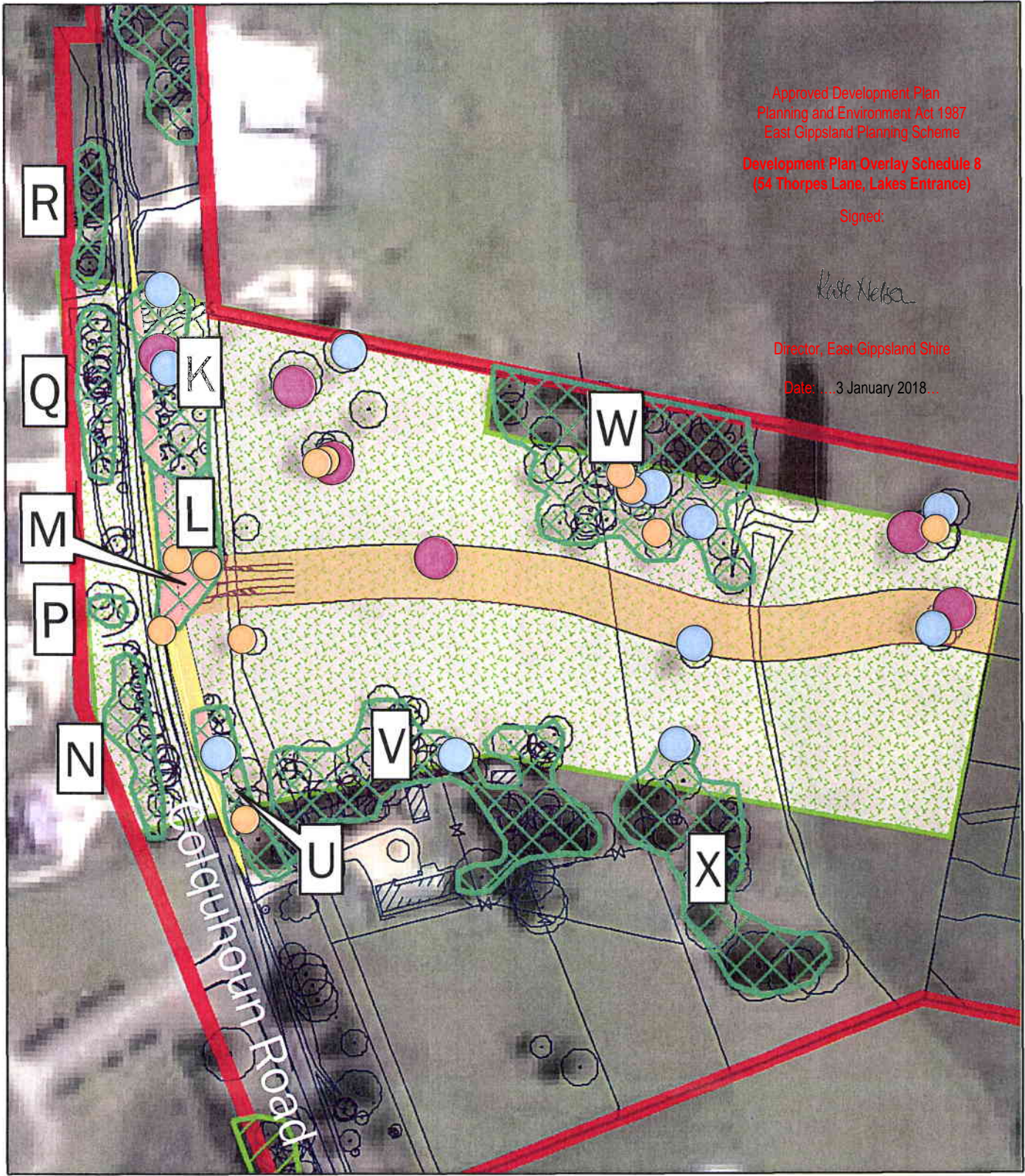
Project No.: 7206

Date: 04/06/2008

Created by: M. Wright / S. Smith

<b>BL&amp;A</b>	<b>Brett Lane &amp; Associates Pty. Ltd.</b> Ecological Research & Management	
 Experience	605 Nicholson Street	ph: (03) 9387 5008   fax: (03) 9387 6115
 Knowledge	PO Box 592, Carlton North	email: <a href="mailto:blars@ecologicalresearch.com.au">blars@ecologicalresearch.com.au</a>
 Solutions	VIC 3054 Australia	<a href="http://www.ecologicalresearch.com.au">www.ecologicalresearch.com.au</a>

# Coast Grey Box Search



Approved Development Plan  
 Planning and Environment Act 1987  
 East Gippsland Planning Scheme  
 Development Plan Overlay Schedule 8  
 (54 Thorpes Lane, Lakes Entrance)

Signed:

*Kate Nelson*

Director, East Gippsland Shire

Date: ... 3 January 2018 ...

- Legend
- Study Area
  - Proposed Access Road
  - Proposed Road Widening
  - Vegetation to be Removed
  - Limestone Box Forest
  - Coast Grey Box**
  - Large
  - Medium
  - Small



Stirling Drive, Lakes Entrance		
Figure 4: Coast Grey Box Search		
Client: Watsons Pty Ltd		
Project No.: 7206	Date: 04/06/2008	Created by: M. Wright / S. Smith
<b>Brett Lane &amp; Associates Pty. Ltd.</b> Ecological Research & Management		
<ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Experience</li> <li><span style="color: orange;">●</span> Knowledge</li> <li><span style="color: orange;">●</span> Solutions</li> </ul>	605 Nicholson Street PO Box 592, Carlton North VIC 3054 Australia	ph +03; 9387 5005   fax +03; 9387 6115 blane@ecologicalresearch.com.au www.ecologicalresearch.com.au

### 4.3. Fauna habitat assessment

The following fauna habitats were recorded in the proposed subdivision and adjacent creekline:

- Exotic-dominated pasture;
- Aquatic habitats (farm dams and ephemeral drainage line);
- Planted and remnant trees.

#### Exotic-dominated pasture

This habitat covers a large proportion of the study area. It is dominated by a variety of introduced pasture grasses such as Kikuyu, Sweet Vernal Grass and weeds such as Cats-ear. It is currently grazed by Cattle.

The existing farm house access road retains some remnant Cranberry Heath, Kangaroo Grass and Coastal Beard Heath, among other indigenous plants in a very narrow strip beside the road, intermingled with introduced grasses.

This habitat provides feeding opportunities for some open country birds such as Richard's Pipits, Starlings, Australian Magpies, Australian Ravens, and Galahs. Welcome Swallows and White-throated Needletails foraged for insects in the airspace over this habitat. Mammals such as European Rabbits inhabit the longer grass and bracken which provides cover. This artificial habitat generally provides few opportunities for native fauna and therefore is considered low quality.

#### Aquatic habitat

Two farm dams were located within study area boundaries, both containing water at the time of field inspection. One was very small and was inundated to the extent of only a few square metres. At the southern end of a creek line in the eastern boundary to the study area another small dam has been formed; this is lined with native rushes (*Eleocharis* and *Schoenoplectus* spp.: Figure 4). This drainage line contained some still water at the time of inspection. Some marshy ground formed towards the southern limit of this drainage line which formed a small extent of habitat for Latham's Snipe (Figure 2). This drainage line has been extensively revegetated. An ephemeral tributary to this creek runs through the study area but was dry during the field assessment. The tributary is dominated by Kikuyu and has little other vegetation. The aquatic habitats of the study area provide some habitat (of limited extent) for frogs and common waterbirds such as Wood Ducks and Chestnut Teal.

Connectivity with other wetlands or streams in the district was limited (although just downstream of the creek from the south eastern corner of the study area was a dam lined with *Typha* which could provide habitat for a range of waterbirds including some rare or cryptic species); this combined with their general paucity of vegetation, suggests that the wetland habitat of the study is poor quality for fauna.

#### Planted and remnant trees

This habitat covers a small area near the farmhouse, and patches on the western side of the study area (Figure 1). The habitat comprises a few eucalypt trees remaining in the paddock north

of the farm house, however these were in such poor health their species identification remained unresolved. They lacked the hollows used as roosting or nesting site by wildlife. Very few if any native understorey plants or shrubs remained within this habitat. Planted trees in the vicinity of the farm house included common orchard species such as *Citrus* sp. The ground layer of this habitat was dominated by introduced grasses such as Kikuyu and Barley-grass and weeds such as Spear Thistle.

The creekline on the eastern perimeter of the study area contains much revegetation – some of the common species used are Kangaroo Apple and wattles.

This habitat provides some foraging, perching and some nesting opportunities for a variety of common native birds, including Rosellas, Red Wattlebirds, Yellow-rumped Thornbills, and Willie Wagtails. During the field visit, a group of Yellow-tailed Black Cockatoos used some dead pine trees as perching sites. House Sparrows were prevalent around the buildings of the farm house.

This habitat retains very few fallen branches and almost no leaf litter although there is some debris of human origin, such as tiles and other building materials. This habitat could provide some sheltering habitat for common reptiles and frogs such as Common Blue-tongued Lizard and Garden Skink. The dominance of introduced plants in the ground and shrub layers and paucity of overstorey trees indicates significant modification to this habitat and there is a break of connectivity to patches of remnant woodland or forest of some 200 metres to the north. These factors indicate that it is a low quality habitat for fauna.

#### 4.4. Fauna species

Based on the field assessment and the review of existing information, the study area is known to, or may potentially support 185 species of terrestrial vertebrate fauna, including 25 species of mammals (seven introduced and eight bats), 136 species of birds (10 introduced), 17 species of reptile and seven species of frog. These species are listed in Appendix 2 (which also includes scientific names).

Those species for which habitat may occur in the study area or nearby are discussed in more detail in the following sub-sections, which include a discussion of their likelihood of occurrence.

##### 4.4.1. Mammals

Twenty-five species of mammals occur or are likely to occur within or close to the study area based on the AVW records. Seven of these are introduced species and eight are bats.

One mammal species was observed during the field assessment on 3 January 2018, the introduced European Rabbit.

The EPBC Act Protected Matters Search Tool (DEWR 2007) predicted five nationally threatened terrestrial mammal species to occur in the search region. These are the Spotted-tailed Quoll, Southern Brown Bandicoot, Long-nosed Potoroo, Smoky Mouse and Grey-headed Flying-fox. These species and their potential occurrence in the study area are discussed below. Marine species have been excluded due to the lack of marine habitat in the study area.

The **Spotted-tailed Quoll** (*Dasyurus maculatus*) is considered endangered nationally and in Victoria (DSE 2007d). This species of carnivorous marsupial inhabits high forest blocks in Victoria such as in the high country, the Otway Range and East Gippsland (Menkhorst 1995). There are four records for the search region, between 1986 and 1999. One record was not far from the study area, between Red Bluff and Lake Bunga, 5 km east of Lakes Entrance. However, this species would be unlikely to occur within the study area, since it is surrounded mainly by agricultural and urban land with negligible treed vegetation to provide cover, and the habitat of

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the study area has been extensively modified and therefore unlikely to support a range of terrestrial prey species required for a population of the quoll.

The **Southern Brown Bandicoot** (*Isoodon obesulus*) is considered endangered nationally but lower risk, near threatened in Victoria (DSE 2007d). It known from four records in the search region dated 1978 and 1979. These records are from Lake Tyers and Cunninghame Arm – the latter site being close to the study area. This bandicoot requires heathy forest or woodland, shrubland or heathland with dense cover at ground level (Menkhorst 1995). Given the lack of records since the 1970's and subsequent urban development surrounding the study area, combined with a lack of suitable habitat, the Southern Brown Bandicoot is considered unlikely to occur within the study area.

The **Long-nosed Potoroo** (*Potorous tridactylus*) is known from 11 records from the search region in the period 1975 to 1996, including some from the 1970's from Cunninghame Arm, close to the study area. The most recent records, 1994 to 1996, derive from Red Bluff Reserve, about 3.5 kilometres east of the study area. This species, in common with the Southern Brown Bandicoot, requires a dense ground layer as part of its habitat, generally within a heathy woodland or forest community (Menkhorst 1995). The lack of recent records in the region away from Red Bluff Reserve, and a lack of suitable dense ground cover throughout the study area, suggests that this species is unlikely to persist there.

The **Smoky Mouse** (*Pseudomys fumeus*) is listed as endangered nationally and critically endangered in Victoria (DSE 2007d). It occurs in several disjunct forested or heathy habitats in Victoria, namely, the Grampians and Otway Ranges, the Central and Eastern Highlands, and the East Gippsland Plains. There are very few records since 1980 from the Eastern Highlands or the Snowfields (Menkhorst 1995). The Smoky Mouse has not been recorded in the search region for this study, the closest records being from the Marlo area. Given the lack of suitable habitat (in East Gippsland, coastal heath: Menkhorst 1995), the species is unlikely to occur in the study area.

The **Grey-headed Flying-fox** (*Pteropus poliocephalus*) was identified as potentially occurring in the study area by the EPBC Protected Matters Search Tool (DEWR 2007). The two main populations in Victoria are located near Mallacoota and at the Yarra River in Melbourne. There are scattered records elsewhere in the state, mostly south of the Great Dividing Range (Menkhorst 1995). This species has been recorded twice the search region, at Lakes Entrance. Given there are a small number of orchard trees that may provide suitable foraging resources for the flying-fox, it may occasionally visit the study area, but would not be a regular visitor and therefore the study area is considered of little value overall to this species.

Four other mammal species are listed as threatened at state level (DSE 2007d) and have been recorded within 10 km of the study area. These are the Brush-tailed Phascogale, Common Dunnart, Fat-tailed Dunnart and Eastern Horseshoe Bat. These species are discussed below.

The **White-footed Dunnart** (*Sminthopsis leucopsis*) is listed as vulnerable in Victoria (DSE 2007d) but is not listed under the FFG Act. The main populations are in coastal grass and heath habitats (Menkhorst 1995). There is one record from the search region dated 1978. The study area does not retain any intact coastal habitat and the ground layer has been modified and elements such as fallen logs and branches removed. There is also poor continuity with any suitable connecting habitat in adjacent areas. These factors indicate it is unlikely that a population of White-footed Dunnart occurs within the study area.

The **Eastern Horseshoe Bat** is listed as vulnerable in Victoria (DSE 2007d). There are 11 records from the AVW search region from 1989 to 1998, mostly from a site approximately 8 kilometres north of the study area. In Victoria, it inhabits the Eastern Highlands and East Gippsland, centred

on a few known roost sites that are warm and humid, either caves or mine shafts. Since the species seems dependent on forested habitats for foraging (it requires perches from which to sally for prey in the shrub layer) and there is little of this habitat within the study area, it is unlikely the species would use the study area regularly, but may occasionally occur around the edge of the site where there are trees, such as the Colquhoun Road reserve.

#### 4.4.2. Birds

A total of 136 species of birds occur or potentially occur within the study area based on the Atlas of Victorian Wildlife records and habitat assessment. This total includes ten introduced species. Species for which there is no suitable habitat in the study area have been excluded from consideration. During the December 2007 field assessment, a total of 33 species of bird was observed (Appendix 2, which list scientific names for species which may occur in the study area).

The EPBC Act Protected Matters Search Tool (DEWR 2007) predicted three listed threatened birds and several migratory bird species to occur in the search region. Nationally threatened birds that are predicted to occur by the Search Tool are discussed below.

The **Swift Parrot** *Lathamus discolor* is endangered nationally and at state level (DSE 2007d). These woodland birds are identified by the EPBC Act Protected Matters Search Tool as being within range in the Lakes Entrance area. The Swift Parrot may pass through or visit the study area when searching for flowering eucalypts on migration or during autumn and winter. The species migrates to Victoria from Tasmania in autumn and winter to feed preferentially on the flowering eucalypts on the inland slopes of the Great Divide. They may also occur in urban areas and farmlands with remnant eucalypt trees (Higgins 1999; Kennedy and Tzaros 2005). There are two records of Swift Parrot from the search region in 1986 at Lake Bunga. The study area is unlikely to support this threatened parrot species, due to the small number of eucalypts and Banksias present. Nevertheless it may occasionally occur in transit as the paucity of regional records suggests.

The **Orange-bellied Parrot** *Neophema chrysogaster* is considered endangered nationally and critically endangered in Victoria (DSE 2007d). East Gippsland is considered outside the normal extent of the wintering range of this species which is from the Cooper in South Australia, to South Gippsland in Victoria (Higgins 1999; B.A. Lane, pers. comm.). Nonetheless, a record in 2003 from Sydney (Birds Australia 2008) suggests that the species may occasionally visit East Gippsland. Orange-bellied Parrots generally spend winter within 3 km of the coast in saltmarsh or nearby paddocks, or sometimes in coastal dunes (Higgins 1999). Given the species' overall rarity and lack of historical records from East Gippsland, the chances of it occurring within the study area are very remote, but cannot be ruled out completely.

There is little if any suitable wetland habitat for the **Australian Painted Snipe** *Rostratula australis* which is vulnerable nationally and critically endangered in Victoria (DSE 2007d). The species prefers vegetated freshwater wetlands (Marchant and Higgins 1993), which are often ephemeral and have soft muddy margins (P.S. Lansley, pers. obs). The wetlands in the study area are likely to be too limited in extent to cater for the requirements of this species; the lack of nearby extensive shallow wetlands is also a limiting factor. The lack of historical records in the search region would further suggest the species would not be expected to occur in the study area.

The **Regent Honeyeater** *Xanthomyza phrygia* is considered endangered nationally and critically endangered in Victoria where it is listed under the FFG Act (DSE 2007c). The study area is part of the former range inhabited by Regent Honeyeaters. This species prefers to feed in flowering eucalypts and mistletoe (both scarce within the study area), and is "all but extinct" in Victoria (Olsen et al. 2005); it is now mainly found in north-east Victoria and NSW (Higgins, Peter and

Steele 2001; Tzaros 2005). Any Regent Honeyeater in the study area would be a vagrant individual - there are few trees that might attract the species. There are two records of this species from within the search region, both in 1967, and the area is now unlikely to be form part of the core distribution and habitat of the species.

A number of additional listed migratory species are indicated by the EPBC Search Tool as potentially occurring in the search region; these are: the **Great Egret, Cattle Egret, White-bellied Sea-Eagle, Latham's Snipe, White-throated Needletail, Fork-tailed Swift, Rainbow Bee-eater, Black-faced Monarch, Satin Flycatcher and Rufous Fantail**. Most of these species are unlikely to occur in the study area regularly or in significant numbers. There is no extensive wetland or river habitat for the White-bellied Sea-Eagle, which however is likely to occasionally fly over since it is commonly observed along the coastal estuary at Lakes Entrance. The Great Egret requires shallow wetlands or intertidal zones and the small dams and ephemeral creek of the study area are unlikely to provide sufficient habitat. The Cattle Egret normally occurs in wetlands with lush pasture associated with dairy cattle (Emison et al. 1987) and could therefore visit the study area. The needletail and swift are likely to occasionally fly over the area, but the swift prefers areas further inland (Higgins 1999) and the needletail, despite being recorded during the field survey, is not likely to be dependent upon the study area given its widespread distribution in eastern Australia (Higgins 1999). The bee-eater is not recorded from the search region and is unlikely to occur, preferring drier inland habitats. Black-faced Monarch, Satin Flycatcher and Rufous Fantail are forest dwelling species. They are therefore unlikely to occur due to a paucity of trees within the study area.

One listed threatened migratory bird that does occur within the study area, is the **Latham's Snipe** (lower risk, near threatened in Victoria: DSE 2007). Two individuals of this species were recorded along the ephemeral creek in the eastern perimeter of the study area, where dense cover is sufficient to support a few birds in spring and summer. The area of suitable habitat is very small compared to that available to the species nationally and therefore this highly mobile species would not depend on the study area as critical habitat.

Three additional migratory species are predicted by the EPBC Act Protected Matters Search Tool to occur: **Sharp-tailed Sandpiper, Red-necked Stint and Common Greenshank** - there is no habitat within the study area for these species and they would not be expected to occur.

Several threatened species of water bird listed at state level have been recorded in the 10 km radius AVW search region. Most are unlikely to be regular visitors to the study area, owing to a lack of extensive habitat. Such species include listed threatened or near threatened species at a state level (DSE 2007d) such as **Lewin's Rail, Pied Cormorant, Magpie Goose, Cape Barren Goose, Australasian Shoveler, Bay of Islands Noddy, Masked Booby, Little Tern, Fairy Tern, Great Egret, Great Egret** (also listed under the FFG Act), **Nankeen Night Heron, Australasian Bittern, Royal Spoonbill, Whiskered Tern, Caspian Tern and Azure Kingfisher**. They are instead more likely to occur at the more extensive wetlands elsewhere in the nearby Gippsland Lakes.

One water bird listed as near threatened the **Pacific Gull** (DSE 2007d) was recorded flying over the study area. It is considered likely that the species commutes between the coast and the nearby Lakes Entrance landfill just north of the study area. This normally marine species is not therefore dependent upon the study area for its requirements.

Several threatened grassland, open country or woodland-dwelling species have been recorded from the search region and their likelihood of occurrence is discussed below.

The **King Quail** *Coturnix chinensis* is listed as critically endangered in Victoria (DSE 2007d). There is one record from the search region of this species which prefers wet heaths and moist rushy depressions (Emison et al. 1987). There are few records in Victoria recently away from French

Island (Emison et al. 1987). The study area is unlikely to support this species due to the limited extent of moist dense rushes and easy access by predators such as cats and foxes. The **Eastern Bristlebird** *Dasyornis brachypterus* has historically been recorded from similar dense heathy habitats to the King Quail (Emison et al. 1987) and for the same reasons would be very unlikely to occur in the study area, despite two records from the search region.

The **Black Falcon** *Falco subniger* (vulnerable; DSE 2007) is a species more characteristic of the inland plains than East Gippsland. It has been recorded twice from the search region in 1983. This species is irruptive in southern Victoria and occurs during favourable seasons. The timing of the historical records may be influenced by drought. The species therefore may occur infrequently in the study area but would not regularly. The **Spotted Harrier** *Circus assimilis* is another listed grassland species (near threatened: DSE 2007) that may occasionally occur but would not be a regular member of the avifauna. Three AVW records from the 1980's constitute its known occurrence in the region.

Listed threatened forest and woodlands species such as the **Square-tailed Kite** *Lophoictinia isura*, **Powerful Owl** *Ninox strenua*, **Sooty Owl** *Tyto tenebricosa*, **Glossy Black Cockatoo** *Calyptorhynchus lathami*, **Brown Treecreeper** *Climacteris picumnus*, and **Speckled Warbler** *Chthonicola sagittata* and the near threatened **Spotted Quail-thrush** *Cinclosoma punctatus* have all been recorded from the search region. These are species that require more extensive wooded cover in which to survive and are not likely to occur within the study area.

Some forest and woodland species, such as the **Masked Owl** *Tyto novaehollandiae*, may occur in the study area because it is known to utilise open areas such as river flats, over which to forage (Emison et al. 1987). There are 13 records from the search region including at sites close to the study area. This species may therefore occasionally occur however, would not breed due to a lack of hollow trees in the study area. Another threatened forest species that may occur is **Grey Goshawk** *Accipiter novaehollandiae*. This species is known to move in to more open country outside its spring and summer breeding season and there are 49 records from the search region, mostly in the May to August period. Although the species may appear in the study area, it would be unlikely to constitute a key site for the Goshawk.

#### 4.4.3. Reptiles

A total of 17 species of reptiles occurs or potentially occurs within the study area based on the field assessment and Atlas of Victorian Wildlife during the December 2007 field assessment, no species of reptile was confirmed to occur in the study area, however one snake was seen briefly and was either a Lowland Copperhead or White-lipped Snake.

No nationally threatened reptile species are predicted to occur in the search region by the EPBC Protected Matters Search Tool (DEWR 2007).

Two listed threatened species in Victoria have been recorded from the search region, the Tree Goanna and the Glossy Grass Skink.

The **Tree Goanna** *Varanus varius* is an arboreal species that requires tree hollows in well timbered areas as part of its sheltering requirements (Wilson and Swann 2003). It is listed as vulnerable in Victoria (DSE 2007d). Although there are four records from the search region between 1987 and 1997 it is not expected to occur within the study area since hollow bearing trees are entirely lacking.

**Glossy Grass Skink** *Pseudemoia rawlinsoni* is known from one record in the search region. This species is listed as near threatened in Victoria (DSE 2007d), and occurs in boggy creeks



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containing dense vegetation as well as lake edges and salt marsh (Wilson and Swann 2003). It has been recorded once from the search region at Rigby Island in January 1996. The boggy creek habitat on the eastern perimeter of the study area could support this species; however, predators such as cats are likely to be present in sufficient densities to limit the chances of a population of this reptile surviving in the study area. The study area is considered unviable as an important long term site for survival of this species which will more likely survive in more intact lakeside habitats such as those situated west of Lakes Entrance.

#### 4.4.4. Frogs

A total of seven species of frogs occurs or potentially occurs within the study area based on the AVW records. During the field inspections, two species of frog was recorded within the study area, the Whistling Tree Frog and Common Froglet. These species were heard calling from near the dam and creek lines within or alongside the study area.

Four nationally threatened species of frogs are identified as potentially occurring within the study area by the EPBC Protected Matters Search Tool (DEWR 2007). These species, none of which has been recorded from the AVW search region, are discussed below.

The **Giant Burrowing Frog** *Heleioporus australiacus* inhabits the coast and ranges in open forests of eastern Victoria and NSW where it breeds in burrows along sandy creek beds in summer and autumn after rain (Cogger 2000; Turner 2004). There appears little data about its ecological requirements upon which to base an assessment of its potential occurrence. The lack of records together with mapped distribution (Frogs.org.au 2008a) and its dependence on forested habitats would suggest it is unlikely to occur in the study area.

The **Green and Golden Bell Frog** *Litoria aurea* inhabits the warm temperate zone of eastern Victoria and NSW. It occurs in aquatic habitats, mostly permanent ones, including streams and farm dams where it likes fringing vegetation (Cogger 2000). The species may be on the edge of its range at Lakes Entrance, however the lack of records from the search region and very limited habitat suitable for the species, suggest it would be unlikely to occur.

**Littlejohn's Tree Frog** *Litoria littlejohnii* is a recently recognized species of which little is known. It is mainly an inhabitant of deeply vegetated gullies in wet and dry forest, woodland and shrublands (Frogs.org.au 2008b). Due to the lack of this habitat within the study area it would not be expected to occur.

**Growling Grass Frog** *Litoria raniformis*. This species requires vegetated freshwater wetlands with significant areas of fringing and floating vegetation, either permanent or if ephemeral, usually with a permanent water body acting as a refuge area nearby (Organ 2002). The study area is flanked by urban development to the east and south and wetland connectivity is limited. The wetland habitats of the study area are not considered suitable for supporting a permanent population of this species, for the same reasons as for the Green and Gold Bell Frog.

One other species of frog is known from the search region and listed as threatened species in Victoria.

One record of the **Southern Toadlet** *Pseudophryne semimarmorata* exists from the AVW search area, dated March 1961. This species is listed as near threatened in Victoria (DSE 2007d). Southern Toadlets are usually found in or near forests, woodlands or heathlands with leaf litter, logs and wet depressions in which it lays its eggs (Cogger 2000, Anstis 2002, Turner 2004). Although wet depressions near the drainage lines of the study area could have supported this species in the past, it is evident that the ground level habitat has been degraded by grazing, and lacks leaf litter and fallen branches or logs. Therefore, the search region is not considered suitable for this species. It is not therefore expected to occur in the study area.

#### 4.5. Fauna conservation significance of the study area

Three fauna species of conservation significance were confirmed to occur in the study area, the Latham's Snipe, Pacific Gull and White-throated Needletail. The Latham's Snipe probably occurs regularly in small numbers (less than 10 birds) along the creek on the eastern perimeter of the study area while the Pacific Gull probably files overhead regularly. The Needletail originates from the northern hemisphere and is a widespread in eastern Australia in the summer and autumn period when it feeds aerially on flying insects. The study area does not offer critical habitat to this migratory bird. The study area is therefore not important ecologically for these species in the context of their overall populations.

Open foraging habitat exists for two other state listed threatened fauna species, namely the Masked Owl and Grey Goshawk; however, the site is considered unlikely to be a key site for these two species, as it offers few or no trees suitable to provide nesting opportunities.

The pasture and planted tree habitats are rated as low quality and are not expected to support any listed threatened species regularly. For these reasons the study area is considered to be of **local** fauna conservation significance according to criteria outlined in Appendix 4.

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**Director, East Gippsland Shire**

## 5. IMPACTS AND REGULATORY IMPLICATIONS OF PROJECT

This section provides an outline of the regulatory issues related to the flora, fauna and native vegetation values present on the site. The implications under various federal, state and local policies and legislation are discussed.

### 5.1. Native vegetation retention regulations

The Framework (DNRE 2002) is the relevant state-wide policy applicable to native vegetation management and applications to remove native vegetation in Victoria. The Framework or 'Net Gain' policy is incorporated into the Victorian Planning Provisions (VPP) of the state planning scheme. The policy is discussed below.

#### 5.1.1. Avoid, minimise and offset

Any proposal to remove native vegetation from the study area in the form of *degraded treeless vegetation*, scattered trees and/or remnant patches would require a permit from the responsible authority. Any proposal to remove vegetation from the publicly-owned roadside would also require a permit under the Vegetation Protection Overlay.

Clause 15.09 of the planning scheme states that planning and responsible authorities must have regard to the Framework, and in particular the three-step approach of the Net Gain policy. The Framework must therefore be considered when an application to remove native vegetation is submitted following a planning scheme amendment or subdivision proposal.

The three-step approach of Net Gain outlined in the Framework and included in Clause 52.17 is hierarchical and includes the following:

1. Adverse impacts on native vegetation should be **avoided**, particularly removal of vegetation;
2. Where impacts cannot be avoided, impacts should be **minimised** through planning and design considerations with input from relevant experts; and
3. Appropriate **offsets** (Net Gain targets) need to be identified to compensate for native vegetation removal.

Based on recommendations in previous versions of this report, the proponent has altered the design of the proposed access road in the southwest to avoid the removal of intact native vegetation from Habitat Zone W (Figure 5).

#### 5.1.2. Framework conservation significance

As part of ecological investigations, conservation significance of remnant native vegetation is assessed under Victoria's Native Vegetation Management Framework (DNRE 2002). This assessment is separate to that of botanical conservation significance, presented in Section 5.1.1. Conservation significance is not applied to *degraded treeless vegetation*, which constitutes vegetation outside habitat zones, excluding scattered trees.

The Framework presents a set of criteria for determining the conservation significance of intact patches of native vegetation. This determination is based on the bioregional conservation status of the Ecological Vegetation Class in each habitat zone and the habitat score for each zone. The conservation significance of each habitat zone under the Framework is presented in Table 2.

The conservation significance of large and medium scattered trees in the study area is determined based on the bioregional conservation status of the EVC from which they are derived

and is presented in Table 5. The default conservation significance for all small scattered trees is low.

Framework conservation significance informs the formal determination process in response to applications for vegetation removal and the guidelines for applying the Net Gain principle and offset obligations in the event of approved removal, discussed in detail in Section 5.2.

**5.1.3. Applications for native vegetation removal**

The Framework provides a hierarchy of policy approaches to assessing applications for native vegetation removal based on Framework conservation significance (Section 5.1.2). The policy guidelines for removal of intact native vegetation of varying conservation significance according to the Framework are presented in Table 4.

**Table 4: Likely response to applications for removal of intact native vegetation**

Framework conservation significance	Likely response to application for clearing	Likely offset requirements
LOW	Clearing may be permitted but only as part of an appropriate sustainable use response	Equivalent Gain At least 1 X calculated loss in habitat hectares
MEDIUM	Clearing generally not permitted	Equivalent Gain At least 1 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
HIGH	Clearing generally not permitted	Net Gain At least 1.5 X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed
VERY HIGH	Clearing not permitted unless exceptional circumstances apply	Substantial Net Gain At least 2X calculated loss in habitat hectares plus a large tree protection and replacement offset if any large trees are removed

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Applications for vegetation removal are assessed on a case-by-case basis by the Responsible Authority, including the DSE if referred.

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**5.2. Native vegetation removal implications**

Any unavoidable and approved removal of intact native vegetation or scattered trees must be offset according to the Net Gain policy contained in the Framework. These offsets are discussed below.

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**5.2.1. Offset targets for removal of remnant patch vegetation**

Net Gain offset targets for removal of remnant patch vegetation are based on the conservation significance of each habitat zone and the offset multiplication factors related to its level of significance as outlined in the Framework. Estimated offset targets for intact native vegetation removal proposed for the access road in the southwest and associated road widening of Colquhoun Road are presented in Table 7 based on the default habitat score of 60 (out of 100) for Limestone Box Forest of vulnerable bioregional conservation status (DSE 2006). Precise offsets may be determined using the Habitat Hectare assessment method and are expected to be lower than those presented here (default habitat scores represent a 'better case' scenario).

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**Table 5: Offset targets for intact native vegetation removal**

Habitat Zone	Default habitat score (out of 1)	Area (ha)	Habitat Hectares*	Framework Conservation Significance	Net Gain Multiplier	Offset Target (habitat hectares)
K	0.6	0.029	0.017	Very High	2 x	0.035
L	0.6	0.017	0.010	Very High	2 x	0.021
M	0.6	0.042	0.025	Very High	2 x	0.050
U	0.6	0.019	0.011	Very High	2 x	0.023
<b>Totals</b>		<b>0.11</b>	<b>0.06</b>			<b>0.13</b>

\* Habitat hectares = habitat score x area (ha)

It is anticipated that proposed road widening on Colquhoun Road may result in the loss of three large trees from Habitat Zone K. This requirement will be verified by more precise roadwork surveying. Additional offset targets for removal of large trees from habitat zones apply to any such approved removal under the Framework and are presented in Table 6. These offsets contain both a protection and recruitment component, whereby a prescribed number of existing trees must be protected for conservation purposes, and a prescribed number of trees must be successfully recruited through planting and/or assisted natural regeneration.

**Table 6: Offset targets for removal of large trees from habitat zones**

Habitat Zone	No. of large trees to be removed	Conservation Significance	Protect No. trees	Recruit No. plants*
K	3	Very High	3	10

\* Based on default habitat scores (pending Habitat Hectare assessment)

The proposed access road and driveway will also result in the loss of three large small Coast Grey Box trees from Habitat Zone M and one medium Coast Grey Box tree from Habitat Zone U.

Offsets for the removal of native vegetation from habitat zones may include the permanent protection (e.g. Section 173 agreement) and maintenance for ecological conservation of other existing remnant vegetation of like-for-like nature. Offset sites fitting this description may be available within the study area if an appropriate area of the existing remnant vegetation is retained. Otherwise, an appropriated third party offset site (i.e. site located on another property) would need to be determined through discussions with the responsible authority. Financial contribution to the state government's BushBroker scheme may also be used to account for part, or all, of the required offset. This scheme identifies native vegetation protection opportunities on private land.

As a rule of thumb, 0.65 hectares of similar vegetation may be required to achieve the total offset target shown in Table 5, based on a potential 20% improvement of the offset site. For example, the retention of Habitat Zones V and X (0.67 hectares combined) may provide the area required for this offset. It should be noted that this is an approximation only.

**5.2.2. Offset targets for removal of scattered trees**

Any approved removal of scattered trees will attract Net Gain offset targets according to the Framework. Offset obligations for approved removal of large and medium scattered trees

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comprise both a recruitment (planting) component and, in some cases, a protection component, whereby a prescribed number of existing trees elsewhere in the bioregion must be protected for conservation purposes.

The Framework defers to the relevant Catchment Management Authority's Native Vegetation Plan to determine offset requirements for removal of small scattered trees. The absence of an approved East Gippsland Catchment Management Authority Native Vegetation Plan means that offsets for the approved removal of small scattered trees cannot be determined here.

A summary of scattered trees proposed for removal to accommodate the proposed access road and widening of Colquhoun Road is presented in Table 7, along with offset targets according to the Framework.

**Table 7: Summary of offset targets for scattered tree removal**

Tree no. (Figure 1)	Species	DBH	Size Class	Conservation Significance*	No. trees to be protected	No. trees to be recruited
21	Coast Grey-box	48	Small	Low	-	n/a
22	Coast Grey-box	70	Large	Medium^	2	10
23	Coast Grey-box	65	Medium	Medium^	1	5
24	Coast Grey-box	65	Medium	Medium^	1	5
25	Coast Grey-box	72	Large	Medium^	2	10
<b>Totals</b>					<b>4 large &amp; 2 medium</b>	<b>30</b>

\* Presented in Appendix 3

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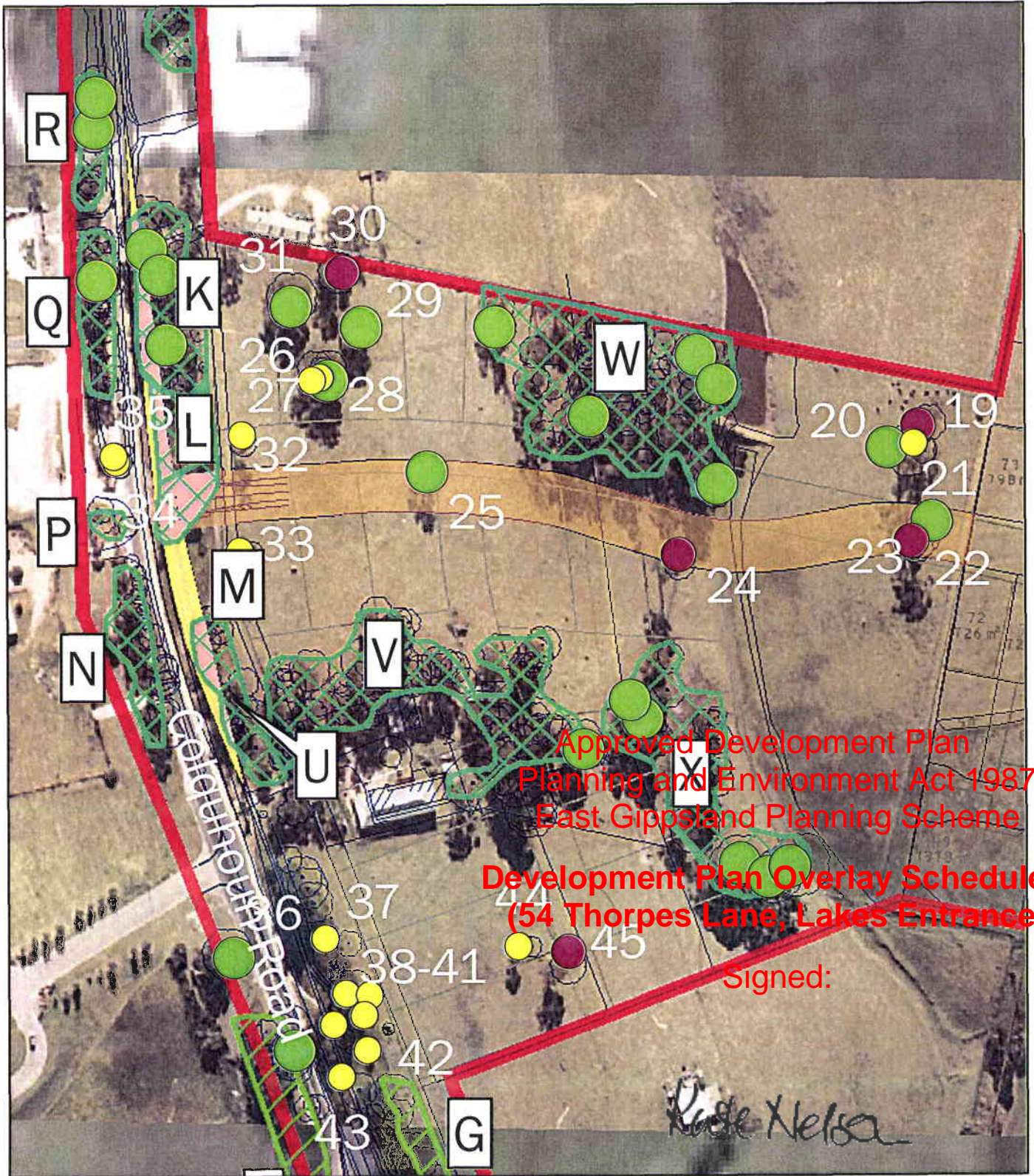
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# Proposed Access Road and Road Widening



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## Legend

- Study Area
- Proposed Access Road
- Proposed Road Widening
- Vegetation to be Removed
- Limestone Box Forest
- Tree Size Classes**
- Large
- Medium
- Small



Stirling Drive, Lakes Entrance		
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Figure 5: Proposed Access Road and Road Widening		
Client: Watsons Pty Ltd		
Project No: [redacted]	Date: <b>3 January 2018</b>	Prepared by: [redacted] / S. Smith
<b>BL&amp;A</b> Brett Lane & Associates Pty. Ltd. Ecological Research & Management		
Experience	605 Nicholson Street	ph (03) 9387 5008   fax (03) 9387 6115
Knowledge	PO Box 592, Carlton North	blang@ecologicalresearch.com.au
Solutions	VIC 3054 Australia	www.ecologicalresearch.com.au

### 5.3. EPBC Act

This section addresses any implications identified for the study area under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

No flora or fauna species or vegetation communities listed as threatened under the EPBC Act were detected during this investigation. No listed flora is considered likely to occur in the study area due to no individuals or suitable habitat being identified during the current investigation. Similarly no listed threatened fauna is considered likely to regularly occur in the study area.

Two EPBC Act listed migratory threatened fauna species were recorded to occur in the study area in suitable habitat – these species are the Latham's Snipe and White-throated Needletail. The snipe occurs in aquatic habitats associated with the boggy creek line on the eastern perimeter of the study area, while the White-throated Needletail uses airspace above the study area to forage for flying insects. The study area is unlikely to constitute critical habitat for either species and therefore no implications are identified under the Act for the subject land.

### 5.4. FFG Act

This section addresses any implications identified for the study area under the state *Flora and Fauna Guarantee Act 1988* (FFG Act). The FFG Act does not have direct bearing on private land; however, it does operate through local government planning schemes and state policies such as Victoria's Biodiversity Strategy (DNRE 1997). Therefore decision makers involved in development planning in the study area, such as council planners and DSE, should refer to the FFG Act as a decision guideline. The FFG Act also contains Action Statements for certain species, which provide broad guidance on management and conservation.

No fauna species listed as threatened under the FFG Act were detected in the study area during this investigation and none are expected to occur. Therefore there are no implications under the FFG Act arising from development of the study area.

Cranberry Heath, Sallow Wattle, Common Cassinia, Coast Wattle, Black Wattle, Common Cudweed and Narrow-leaf Wattle were recorded on the publicly-owned roadside between Colquhoun Road and the study area's proposed western access road. These species are *protected* under the FFG Act. A permit would be required under the FFG Act if these species are proposed to be removed from the public road reserve.

A follow-up survey should be conducted in late spring (when orchids are most likely to be active and therefore above ground) to determine the status of native orchids on this section of road reserve. The family *Orchidaceae* (orchids) is protected under the FFG Act therefore a permit for removal would be required if orchids are proposed for removal.

### 5.5. DSE Advisory List

The following section addresses issues surrounding flora and fauna species listed on the Department of Sustainability and Environment Advisory Lists (DSE 2005; DSE 2007) that may occur in the study area or are known to occur in the broader search region. Referral officers may use DSE Advisory Lists on rare and threatened flora and threatened fauna as a guideline when making decisions on land use changes and when considering potential impacts on threatened species.

One listed flora species, Coast Grey Box (rare in Victoria) was recorded in the study area during the current investigation. It is recommended that efforts be made to avoid the removal of this

species. No additional listed species are considered likely to occur due to the absence of suitable habitat caused by clearing and grazing.

The listed Latham's Snipe was recorded from the creek on the eastern boundary of the study area. This species is listed as *lower risk, near threatened* and is also a listed migratory species under the EPBC Act, discussed in the previous section. There are more intact and extensive habitats for this species elsewhere in the region including the nearby Gippsland Lakes catchment. Any population of this species that may utilise the study area is likely to be small and therefore any development of the study area is likely to have little impact on regional, state, or national populations of the species.

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## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1. Native vegetation

In order to demonstrate the three principles of avoid, minimise and offset as stated in Victoria's Native Vegetation Framework it is recommended that development is designed to avoid remnant patches of vegetation and scattered trees. If some unavoidable vegetation loss is necessary then offsets may need to be generated either on-site or elsewhere in the East Gippsland Lowlands bioregion.

Recommendations to ensure the avoidance and protection of native vegetation and significant flora on the study area during planning are provided below:

- Avoid disturbing intact native vegetation where possible;
- Avoid removal of large, hollow-bearing indigenous trees and Coast Grey Box trees where possible;
- If native vegetation removal is proposed from the Colquhoun Road reserve, further targeted surveys and Habitat Hectare assessments of habitat zones on this reserve should be undertaken in late spring to ascertain whether or not native orchids (protected under the FFG Act) occur there and to determine accurate habitat scores; and
- A permit would be required under the FFG Act to remove protected flora (Manberry Heath, Sallow Wattle, Common Cassinia, Coast Wattle, Black Wattle, Common Cudweed, Narrow-leaf Wattle and any other protected species found such as orchids) from public land.

### 6.2. Fauna

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The aquatic habitat of the creek line on the eastern perimeter of the study area supports a small population of the state listed *near threatened* Latham's Snipe. Development of the study area is unlikely to result in significant impacts on the regional population of the Latham's Snipe provided that:

- The creek line remains protected and sympathetically managed. This would include maintenance of boggy waterside areas with dense vegetation suitable for use by Latham's Snipe in spring and summer; and
- Ongoing weed control is undertaken along the boundaries of the development including roadsides and creek lines.

If vegetation removal is recommended from private land to the west of Colquhoun Road it is recommended that a survey of native vegetation affected be undertaken for fauna habitat to identify any potential impacts of such removal on native fauna.

### 6.3. General planning and construction environmental management recommendations

In addition to protecting threatened species and native vegetation the following recommendations have been detailed to further assist in the conservation of other natural values on the site and could be included in the construction management plan.

- Stockpiling of soil should occur outside areas of native vegetation, preferably on the cultivated land or introduced pasture, to minimise disturbance;
- Weed control, by an experienced bush regenerator, should be carried out along disturbed areas after construction to control any weed outbreaks in bushland or wetland areas.

- Construction contractors should be inducted into an environmental management program for construction works;
- All environmental controls should be checked for compliance on a regular basis;
- All machinery should enter and exit works sites along defined routes that do not impact on native vegetation or cause soil disturbance and weed spread;
- All machinery brought on site should be weed and pathogen free. This is important for environmental and agricultural protection. Soil borne pathogens such as Cinnamon Fungus and livestock diseases can be easily transported by machinery;
- All machinery wash down, lay down and personnel rest areas should be defined (fenced) and located in disturbed areas;
- Best practice erosion control should be installed where an erosion hazard is identified, erosion control activities should include;
  - The use of sediment fences down slope of exposed soil and stockpiles;
  - Bunding of Stockpiles; and
  - Minimisation of the area of disturbed soil at any one time.

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## 7. REFERENCES

- Anstis, M. (2002). 'Tadpoles of South-eastern Australia: A Guide With Keys'. Reed New Holland, Sydney.
- Bates, R.J. (1994). Prasophyllum, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Ferns and Allied Plants, Conifers and Monocotyledons, V.2, Inkata Press, Melbourne, pp 869-886.
- Birds Australia (2008). Orange-bellied Parrot Recovery Team database, accessed 30 January 2008.
- Carr, G.W. and Horsfall, P.F. (1995). 'Studies in Phormiaceae (Illiceae) 1: New Species and Combinations in Dianella Lam. Ex Juss.', Muelleria: an Australia Journal of Botany Vol 8 pp. 365 – 378, National Herbarium of Victoria.
- Cogger, H.G. *et al.* (1995), 'The Action Plan for Australian Reptiles'. Australian Nature Conservation Agency, Canberra.
- Cogger, H.G. (2000). 'Reptiles and Amphibians of Australia'. Reed New Holland, Sydney.
- DEWR (2007). EPBC Act Protected Matters Search Tool. www.dewha.gov.au. Commonwealth Department of Environment, Water, Heritage and the Arts. Australian Government, Department of the Environment and Heritage, Canberra.
- DNRE (1997). Victoria's Biodiversity – Our Living Wealth, Department of Natural Resources and Environment, Victoria.
- DNRE (2002). Victoria's Native Vegetation management – a Framework For Action, State of Victoria, Department of Natural Resources and Environment, Victoria.
- DSE (2004). Native Vegetation: sustaining a living landscape, Vegetation Quality Assessment Manual – guidelines for applying the Habitat Hectare scoring method (Version 1.3), Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE (2005). Advisory List of Rare or Threatened Plants in Victoria - 2005, Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE (2007a). Biodiversity Interactive Maps. <http://www.dse.vic.gov.au/>. Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE (2007b). Ecological Vegetation Class Benchmarks by Bioregion. [www.dse.vic.gov.au/nativevegetation](http://www.dse.vic.gov.au/nativevegetation). Department of Sustainability and Environment, East Melbourne.
- DSE (2007c). 'Native Vegetation: Guide for assessment of Referred Planning Permit Applications. Department of Sustainability and Environment, East Melbourne, Victoria.
- DSE (2007d). 'Advisory List of Threatened Vertebrate Fauna in Victoria'. Department of Sustainability and Environment, Melbourne.
- Duncan, A., Baker, G. B. Montgomery, N. (1999). The Action Plan for Australian Bats. Environment Australia, Canberra.
- Emison, W.B., Beardsell, C.M., Norman, F.I., Lynn, P.H. & Bennett, S.J. (1987). Atlas of Victorian Birds. Department of Conservation, Forests and Lands & Royal Australasian Ornithologists Union, Melbourne.

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- Entwisle, T.J. (1996a). Brassicaceae, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Dicotyledons: Winteraceae to Myrtaceae, V.3, Inkata Press, Melbourne, pp 399-459.
- Entwisle, T.J. (1996b). Thymelaeaceae, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Dicotyledons: Winteraceae to Myrtaceae, V.3, Inkata Press, Melbourne, pp 912-930.
- Flann, C. (1999). Bracteantha, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Dicotyledons, Cornaceae to Asteraceae, V.4, Inkata Press, Melbourne, pp 749-752.
- Frogs.org.au 2008a. <http://frogs.org.au/frogs/species/Heleioporus/australiacus/>, accessed 7 January 2008.
- Frogs.org.au 2008b. <http://frogs.org.au/frogs/species/Litoria/littlejohni/>, accessed 7 January 2008.
- Garnett, S. T., Crowley, G. M. (2000). The Action Plan for Australian Birds. Environment Australia, Canberra.
- Hadden, S. (1995). 'Distribution, Status and Habitat Requirements of the Striped Legless Lizard *Delma impar* (Fischer)', Flora and Fauna Branch, Department of Conservation and Natural Resources (Vic.) report to Australian Nature Conservation Agency, April 1995.
- Higgins, P.J. (ed) (1999). 'Handbook of Australian, New Zealand and Antarctic Birds, Volume 4: Parrots to Dollarbird', Oxford University Press, Melbourne.
- Higgins, P.J., Peter, J.M. and Steele, W.K. (eds) (2001). 'Handbook of Australian, New Zealand and Antarctic Birds, Volume 5: Tyrant Flycatchers to Chats', Oxford University Press, Melbourne.
- Jeanes, J.A. (1996). Fabaceae, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Dicotyledons: Winteraceae to Myrtaceae, V.3, Inkata Press, Melbourne, pp 663-829.
- Kennedy, S.J. and Tzaros, C.L. (2005). 'Foraging ecology of the Swift Parrot *Lathamus discolor* in the Box-ironbark forests and woodlands of Victoria', *Parrot Conservation in Victoria* 11A: 168 - 173.
- Lee, A K (1995). The Action Plan for Australian Rodents. Australian Nature Conservation Agency, Endangered Species Program, Project No. 130.
- Marchant, S. and Higgins, P.J. (eds) (1993). 'Handbook of Australian, New Zealand and Antarctic Birds, Volume 2: Raptors to Lapwings', Oxford University Press, Melbourne.
- Maxwell, S; Burbidge, A A; Morris, K (1996). 'The 1996 Action Plan for Australian Marsupials and Monotremes.' Wildlife Australia, Endangered Species Program, Project Number 500.
- Menkhorst, P. (1995). 'Mammals of Victoria', Oxford University Press, Melbourne.
- Organ, A. (2002). 'Survey for the Warty Bell Frog *Litoria raniformis*, at the Western Treatment Plant, Werribee, Victoria'. Biosis Research, Port Melbourne.
- Olsen, P., Weston, M., Tzaros, C. and Silcocks, A. (2005). 'The State of Australia's Birds 2005: Woodlands and Birds', *Wingspan* 15(4) Supplement, December 2005.
- Parkes, D., Newell, G. and Cheal, D. (2003). Assessing the Quality of Native Vegetation: The 'habitat hectare' approach'. *Ecological Management and Restoration*, vol 4 supplement, February 2003.
- PPWPCMA (2006). *Port Phillip and Westernport Native Vegetation Plan*, Port Phillip and Westernport Catchment Management Authority, Frankston.
- Turner, J.R. (2004). 'Frogs of Australia'. Pensoft, Sofia.

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- Tyler, M (1997). 'The Action Plan for Australian Frogs.' Australian Nature Conservation Agency, Canberra.
- Tzaros, C. (2005). 'Wildlife of the Box-Ironbark Country'. CSIRO Publishing, Collingwood, Victoria.
- Wager, R & Jackson, P (1993) 'The Action Plan for Australian Freshwater Fishes'. Australian Nature Conservation Agency, Endangered Species Program, Project Number 147.
- Walsh, N.G. (1999). Senecio, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Dicotyledons, Cornaceae to Asteraceae, V.4, Inkata Press, Melbourne, pp 941-965.
- Wilson, K.L. (1994). Cyperaceae, In Walsh, N.G. and Entwisle, T.J. (eds) Flora of Victoria: Ferns and Allied Plants, Conifers and Monocotyledons, V.2, Inkata Press, Melbourne, pp 238-356.
- Wilson, S., and Swann, G. (2003). 'A Complete Guide to Reptiles of Australia'. New Holland, Sydney.

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Appendix 1: Flora species recorded in the study area and rare or threatened species with the potential to occur in the broader search region

FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
			*	Cootamundra Wattle	<i>Acacia baileyana</i>	Mimosaceae	X
			*	African Box-thorn	<i>Lycium ferocissimum</i>	Solanaceae	X
			*	Angled Pigface	<i>Carpobrotus aequiliterus</i>	Aizoaceae	X
				Austral Bracken	<i>Pteridium esculentum</i>	Dennstaedtiaceae	X
				Austral Indigo	<i>Indigofera australis</i>	Fabaceae	X
		v		Austral Moonwort	<i>Botrychium australe</i>	Ophioglossaceae	
			*	Barley	<i>Hordeum sp.</i>	Poaceae	X
		r		Bassian Pomaderris	<i>Pomaderris oraria</i>	Rhamnaceae	
				Bidgee-widgee	<i>Acacia nuae-zelandica</i>	Rosaceae	X
			*	Black Nightshade	<i>Solanum nigrum sens. stricto (1972)</i>	Solanaceae	X
				Black Wattle	<i>Acacia mearnsii</i>	Mimosaceae	X
			*	Black-anther Flax-lily	<i>Dianella revoluta var. revoluta s.l.</i>	Phormiaceae	X
			*	Blackberry	<i>Rubus fruticosus sup. agg.</i>	Rosaceae	X
		r		Blotched Hyacinth-orchid	<i>Dipodomys variegatum</i>	Orchidaceae	
				Blue Box	<i>Eucalyptus baueriana</i>	Myrtaceae	X
			*	Blue Canary-grass	<i>Phalaris coarulescens</i>	Poaceae	X
				Bluebell	<i>Wahlenbergia spp.</i>	Campanulaceae	X
		r		Bolwarra	<i>Eupomatia laurina</i>	Eupomatiaceae	
			*	Bower Synnatch	<i>Tetradonia implexicoma</i>	Aizoaceae	X
			*	Bridal Creeper	<i>Asparagus asparagoides</i>	Asparagaceae	X
			*	Brown-top Bent	<i>Agrostis capillaris</i>	Poaceae	X
			*	Bulbil Watsonia	<i>Watsonia meriana var. bulbifera</i>	Iridaceae	X
				Burgan	<i>Kunzea eroides sup. agg.</i>	Myrtaceae	X
			*	Burr Medic	<i>Medicago polymorpha</i>	Fabaceae	X
			*	Cape Ivy	<i>Delanea torata</i>	Asteraceae	X
			*	Cat's Ear	<i>Hypochaeris radicata</i>	Asteraceae	X
				Cherry Ballart	<i>Exocarpos compressiformis</i>	Santalaceae	X

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FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
			*	Cleavers	<i>Galium aparine</i>	Rubiaceae	X
				Climbing Lignum	<i>Muehlenbeckia adpressa</i>	Polygonaceae	X
				Coast Banksia	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Proteaceae	X
				Coast Beard-heath	<i>Leucopogon parviflorus</i>	Epacridaceae	X
		r		Coast Grey-box	<i>Eucalyptus bosistoana</i>	Myrtaceae	
		r		Coast Manna-gum	<i>Eucalyptus viminalis</i> subsp. <i>pyoriana</i>	Myrtaceae	X
		k		Coast Mistletoe	<i>Muellerina celastroides</i>	Loranthaceae	
				Coast Stackhousia	<i>Stackhousia spathulata</i>	Stackhousiaceae	
				Coast Wattle	<i>Acacia longifolia</i> subsp. <i>sophorae</i>	Mimosaceae	X
			*	Cocksfoot	<i>Dactylis glomerata</i>	Poaceae	X
f	V	v		Common Broomrape	<i>Grevillea celata</i>	Proteaceae	
				Common Broomrape	<i>Lachnagrostis filiformis</i>	Poaceae	X
				Common Broomrape	<i>Schoenus apogon</i>	Cyperaceae	X
				Common Broomrape	<i>Myoporum insulare</i>	Myoporaceae	X
				Common Cassinia	<i>Cassinia aculeata</i>	Asteraceae	X
				Common Heath	<i>Correa reflexa</i>	Rutaceae	X
				Common Heath	<i>Euchiton involucreatus</i> s.l.	Asteraceae	X
				Common Heath	<i>Epacris impressa</i>	Epacridaceae	X
				Common Maidenhair	<i>Adiantum aethiopicum</i>	Adiantaceae	X
				Common Rice-flower	<i>Pimelea humilis</i>	Thymelaeaceae	X
				Common Spike-sedge	<i>Eleocharis acuta</i>	Cyperaceae	X
		r		Common Spide-sedge	<i>Asplenium trichomanes</i>	Aspleniaceae	
			*	Common Tick-apple	<i>Datura stramonium</i>	Solanaceae	X
			*	Common Vetch	<i>Vicia sativa</i>	Fabaceae	X
			*	Common Whit-grass	<i>Elymus scaber</i> var. <i>scaber</i>	Poaceae	X
			*	Common Whit-grass	<i>Coprosma repens</i>	Rubiaceae	X
				Couch	<i>Cynodon dactylon</i>	Poaceae	X
				Cranberry Heath	<i>Astroloma humifusum</i>	Epacridaceae	X

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FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
				Crane's Bill	<i>Geranium</i> spp.	Geraniaceae	X
		v		Creeping Loosestrife	<i>Lysimachia japonica</i>	Primulaceae	
				Dock	<i>Rumex</i> spp.	Polygonaceae	X
				Drooping Mistletoe	<i>Myrica pendula</i>	Loranthaceae	X
		r		Eastern Water-ribbons	<i>Tagliochroma tuberosa</i>	Juncaginaceae	
				Eucalypt	<i>Eucalyptus</i> spp.	Myrtaceae	X
		*		Fennel	<i>Foeniculum vulgare</i>	Apiaceae	X
		r		Gippsland Stringybark	<i>Eucalyptus macconnellii</i>	Myrtaceae	
				Grassland Wood-sorrel	<i>Oxalis perfolians</i>	Oxalidaceae	X
		*		Great Brome	<i>Bromus diandrus</i>	Poaceae	X
				Gumlea Flower	<i>Ullibertia</i> spp.	Dilleniaceae	X
		*		Hair Grass	<i>Poa</i> spp.	Poaceae	X
		*		Hollyhock	<i>Malva</i> spp.	Malvaceae	X
				Pop Bitter-pea	<i>Daviesia trifida</i>	Fabaceae	X
				Pop Goodenia	<i>Goodenia ovata</i>	Goodeniaceae	X
				Woolly-leaf Violet	<i>Viola hederacea</i> sensu Entwisle (1996)	Violaceae	X
		v		Jointed Mistletoe	<i>Leptotheca rubra</i> subsp. <i>rubra</i>	Viscaceae	
				Kangaroo Grass	<i>Themeda triandra</i>	Poaceae	X
				Kidney-weed	<i>Dichondra repens</i>	Convolvulaceae	X
				Kikuyu	<i>Pennisetum clandestinum</i>	Poaceae	X
		*		Kneed Wallaby-grass	<i>Austrodanthonia paniculata</i>	Poaceae	X
				Knotweed	<i>Persicaria</i> sp.	Polygonaceae	X
		*		Large Quaking-grass	<i>Briza maxima</i>	Poaceae	X
f	V	e		Leafless Tonue-orchid	<i>Dioplostylis hateriana</i>	Orchidaceae	
	V	v		Limestone Blue Wattle	<i>Acacia caeruleascens</i>	Mimosaceae	
		r		Limestone Pomaderris	<i>Pomaderris oraria</i> subsp. <i>calcicola</i>	Rhamnaceae	
f	E	e		Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	Orchidaceae	
				Mat-rush	<i>Lomandra</i> spp.	Xanthorrhoeaceae	X

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FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
			*	Monterey Cypress	<i>Cupressus macrocarpa</i>	Cupressaceae	X
			*	Montpellier Broom	<i>Genista monspessulana</i>	Fabaceae	X
				Mountain Clematis	<i>Clematis aristata</i>	Ranunculaceae	X
				Mountain Grey-gum	<i>Eucalyptus cypellocarpa</i>	Myrtaceae	X
				Narrow-leaf Wattle	<i>Acacia mucronata</i> subsp. <i>longifolia</i>	Mimosaceae	X
				Nodding Saltbush	<i>Einadia nutans</i> subsp. <i>nutans</i>	Chenopodiaceae	X
				Pale Rush	<i>Juncus pallidus</i>	Juncaceae	X
			*	Panic Veidt-grass	<i>Eriarcta erecta</i> var. <i>erecta</i>	Poaceae	X
			*	Paspalum	<i>Paspalum dilatatum</i>	Poaceae	X
			*	Perennial Rye-grass	<i>Lolium perenne</i>	Poaceae	X
			*	Petty Spurge	<i>Euphorbia peplois</i>	Euphorbiaceae	X
			*	Pimpernel	<i>Argemone arvensis</i>	Primulaceae	X
				Pinkwood	<i>Berberis discosa</i>	Euphorbiaceae	
			*	Prostrate Knotweed	<i>Polygonum aviculare</i>	Polygonaceae	X
			*	Radiata Pine	<i>Pinus radiata</i>	Pinaceae	X
				Raspberry	<i>Gopocarpus</i> spp.	Haloragaceae	X
			*	Rat-tail Grass	<i>Sporobolus africanus</i>	Poaceae	X
				Red Gum	<i>Eucalyptus polyanthus</i>	Myrtaceae	X
				Red Gum-bark	<i>Eucalyptus tricarpa</i>	Myrtaceae	X
				Reed Bent-grass	<i>Deschampsia quadrifida</i>	Poaceae	X
			*	Ribwort	<i>Plantago lanceolata</i>	Plantaginaceae	X
				River Club-sedge	<i>Sagittaria arifolia</i> subsp. <i>longifolia</i>	Cyperaceae	X
			*	Rough Dog's-tail	<i>Cyperus echinatus</i>	Poaceae	X
			*	Rough Sow-thistle	<i>Sonchus asper</i> L.	Asteraceae	X
				Ruddy Blown-grass	<i>Lachnagrostis scabra</i>	Poaceae	
				Rush	<i>Juncus</i> spp.	Juncaceae	X
				Sallow Wattle	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Mimosaceae	X
				Salt Lawrenceia	<i>Lawrenia spicata</i>	Malvaceae	

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FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
		r		Sandfly Zieria	<i>Zieria smithii</i> subsp. <i>smithii</i>	Rutaceae	
				Sea Box	<i>Alyxia buxifolia</i>	Apocynaceae	X
				Seaberry Saltbush	<i>Rhagodia candolleana</i> subsp. <i>candolleana</i>	Chenopodiaceae	X
		*		Sheep Sorrel	<i>Acetosella vulgaris</i>	Polygonaceae	X
		k		Slender Tick-trefoil	<i>Desmodium varians</i>	Fabaceae	
				Small St John's Wort	<i>Hypericum gramineum</i>	Clusiaceae	X
				Snowy Daisy-bush	<i>Olearia lirata</i>	Asteraceae	X
		*		Soft Brome	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>	Poaceae	X
		*		Sowbane	<i>Chenopodium murale</i>	Chenopodiaceae	X
		*		Spear Thistle	<i>Cirsium vulgare</i>	Asteraceae	X
				Spear-grass	<i>Austrostipa</i> spt	Poaceae	X
	r			Spicy Everlasting	<i>Oenothera longivalvis</i>	Asteraceae	
	r			Spiny-headed Mat-rush	<i>Leptandrium longifolium</i>	Xanthorrhoeaceae	X
				Spurred Helmet-orchid	<i>Clypea acuminata</i>	Orchidaceae	
		*		Squirrel-tail Fescue	<i>Vulpia bromoides</i>	Poaceae	X
	v			Star Cucumber	<i>Snyos australis</i>	Cucurbitaceae	
				Stinkweed	<i>Operculata</i> spp	Rubiaceae	X
				Striped Wallaby-grass	<i>Aelurodia honia racemosa</i> var. <i>racemosa</i>	Poaceae	X
				Swamp Paperbark	<i>Maleuca eribolia</i>	Myrtaceae	X
		*		Sweet Briar	<i>Rosa rubiginosa</i>	Rosaceae	X
		*		Sweet Pittosporum	<i>Pittosporum undulatum</i>	Pittosporaceae	X
		*		Sweet Vernal-grass	<i>Alophosarum nodatum</i>	Poaceae	X
				Tall Spike-sedge	<i>Eriopharis spachela</i>	Cyperaceae	X
				Match Saw-sedge	<i>Gahnia raii</i>	Cyperaceae	X
				Toad Rush	<i>Juncus burongii</i>	Juncaceae	X
		*		Tradescantia	<i>Tradescantia thymifolia</i>	Commelinaceae	X
				Tussock Grass	<i>Poa</i> spp.	Poaceae	X
				Twining Glycine	<i>Glycine clandestina</i>	Fabaceae	X

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FFG	EPBC	DSE	Origin	Common Name	Scientific Name	Family Name	Recorded
				Variable Sword-sedge	<i>Lepidosperma laterale</i>	Cyperaceae	X
		v		Viscid Daisy-bush	<i>Olearia viscosa</i>	Asteraceae	
		r		Wallaby-bush	<i>Beyeria lasiocarpa</i>	Euphorbiaceae	
		*		Water Courgette	<i>Paspalum distichum</i>	Poaceae	X
				Weeping Grass	<i>Microlaena stipoides var. stipoides</i>	Poaceae	X
		*		White Clover	<i>Trifolium repens var. repens</i>	Fabaceae	X
				White Stringybark	<i>Eucalyptus globoidea</i>	Myrtaceae	X
		*		Willow	<i>Salix</i> sp.	Salicaceae	X
		r		Yellow Milkvine	<i>Marsdenia flavescens</i>	Asclepiadaceae	
				Yellow Stringybark	<i>Eucalyptus muelleriana</i>	Myrtaceae	X
		r		Yellow-wood	<i>Acromychia oblongifolia</i>	Rutaceae	
				Yorkshire Fog	<i>Holcus lanatus</i>	Poaceae	X

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\* = introduced species; FFG (f) = Listed as threatened under FFG Act; EPBC = Status under EPBC Act; DSE = Status in DSE Advisory List; E, e = endangered; V, v = vulnerable; R, r = rare; K = sufficiently known



Appendix 2: Fauna species recorded or with the potential to occur in the study area

Origin	Common Name	Scientific Name	Conservation status			Recorded
			EPBC	DSE	FFG	
<b>Birds</b>						
	Australasian Grebe	<i>Tachybaptus novaehollandiae</i>				
	Australian Magpie	<i>Gymnorhina tibicen</i>				x
	Australian Raven	<i>Corvus coronoides</i>				
	Australian Shelduck	<i>Tadorna tadornoides</i>				
	Australian White Ibis	<i>Threskiornis molucca</i>				
	Australian Wood Duck	<i>Chenonetta jubata</i>				x
	Barn Owl	<i>Tyto alba</i>				
	Black Falcon	<i>Falco subniger</i>		VU		
	Black Swan	<i>Cygnus atratus</i>				
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>				
	Black-fronted Dotterel	<i>Euseyornis melanotos</i>				
	Black-shouldered Kite	<i>Elanus axillaris</i>				
	Blue-winged Parrot	<i>Neophema chrysostoma</i>				
	Brown Falcon	<i>Falco berigora</i>				
	Brown Goshawk	<i>Accipiter fasciatus</i>				
	Brown Quail	<i>Coturnix coturnix</i>				
	Brown Songlark	<i>Cincloramphus cruralis</i>				x
	Brown Thornbill	<i>Acanthiza pusilla</i>				
	Cattle Egret	<i>Ardea ibis</i>				
	Chestnut Teal	<i>Anas castanea</i>				
	Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>				
*	Common Blackbird	<i>Turdus merula</i>				x
	Common Bronzewing	<i>Phaps chalcoptera</i>				
*	Common Myna	<i>Acridotheres tristis</i>				x
*	Common Starling	<i>Sturnus vulgaris</i>				x
	Crested Pigeon	<i>Ocyphaps lophotes</i>				
	Crimson Rosella	<i>Platycercus elegans</i>				
	Dusky Moorhen	<i>Gallinula tenebrosa</i>				
	Dusky Woodswallow	<i>Artamus cyanopterus</i>				
	Eastern Rosella	<i>Platycercus eximius</i>				
	Eurasian Coot	<i>Fulica atra</i>				
*	European Goldfinch	<i>Carduelis carduelis</i>				x
*	European Greenfinch	<i>Carduelis chloris</i>				
	Fairy Martin	<i>Hirundo ariel</i>				
	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>				
	Flame Robin	<i>Petroica phoenicea</i>				
	Galah	<i>Cacatua roseicapilla</i>				
	Golden Whistler	<i>Pachycephala pectoralis</i>				

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Origin	Common Name	Scientific Name	Conservation status			Recorded
			EPBC	DSE	FFG	
	Golden-headed Cisticola	<i>Cisticola exilis</i>				
	Great Egret	<i>Ardea alba</i>		VU	L	
	Grey Butcherbird	<i>Cracticus torquatus</i>				
	Grey Currawong	<i>Strepera versicolor</i>				
	Grey Fantail	<i>Rhipidura fuliginosa</i>				
	Grey Shrike-thrush	<i>Colluricincla harmonica</i>				
	Grey Teal	<i>Anas gracilis</i>				
	Hardhead	<i>Aythya australis</i>		VU		
	Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>				
	Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>				
*	House Sparrow	<i>Passer domesticus</i>				x
	Latham's Snipe	<i>Gallinago hardwickii</i>		NT		
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>				
	Little Corella	<i>Cacatua sanguinea</i>				
	Little Grassbird	<i>Megalururus gramineus</i>				
	Little Lorikeet	<i>Glossopsitta pusilla</i>				
	Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>				
	Little Raven	<i>Corvus mellori</i>				x
	Long-billed Corella	<i>Cacatua tenuirostris</i>				
	Magpie-lark	<i>Grallina cyanoleuca</i>				x
	Masked Lapwing	<i>Vanellus miles</i>				
	Mistletoebird	<i>Dicaeum nana</i>				
	Musk Lorikeet	<i>Glossopsitta concinna</i>				
	Nankeen Kestrel	<i>Falco cenchroides</i>				x
	New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>				
	Noisy Miner	<i>Manorina melanocephala</i>				
	Pacific Black Duck	<i>Anas superciliosa</i>				
	Pallid Cuckoo	<i>Cuculus pallidus</i>				
	Peregrine Falcon	<i>Falco peregrinus</i>				
	Pied Currawong	<i>Strepera graculina</i>				
	Purple-crowned Lorikeet	<i>Glossopsitta porphyrocephala</i>				
	Red Wattlebird	<i>Anthochaera carunculata</i>				x
	Red-browed Finch	<i>Neochmia temporalis</i>				
	Red-rumped Parrot	<i>Pseholia haematotus</i>				x
	Restless Flycatcher	<i>Myiagra inquieta</i>				
	Richard's Pipit	<i>Anthus novaeseelandiae</i>				
*	Rock Dove	<i>Columba livia</i>				
	Rufous Songlark	<i>Cincloramphus mathewsi</i>				x
	Rufous Whistler	<i>Pachycephala rufiventris</i>				
	Sacred Kingfisher	<i>Todiramphus sanctus</i>				

Origin	Common Name	Scientific Name	Conservation status			Recorded
			EPBC	DSE	FFG	
	Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>				
	Silveryeye	<i>Zosterops lateralis</i>				
	Singing Bushlark	<i>Mirafrja javanica</i>				
*	Skylark	<i>Alauda arvensis</i>				
	Southern Boobook	<i>Ninox novaeseelandiae</i>				
	Spotted Harrier	<i>Circus assimilis</i>		NT		
*	Spotted Turtle-Dove	<i>Streptopelia chinensis</i>				
	Straw-necked Ibis	<i>Threskiornis spinicollis</i>				
	Striated Pardalote	<i>Pardalotus striatus</i>				
	Stubble Quail	<i>Coturnix pectoralis</i>				
	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>				x
	Superb Fairy-wren	<i>Malurus cyaneus</i>				
	Swamp Harrier	<i>Circus approximans</i>				
	Tawny Frogmouth	<i>Podargus strigoides</i>				
	Tree Martin	<i>Hirundo nigricans</i>				x
	Wedge-tailed Eagle	<i>Aquila audax</i>				
	Welcome Swallow	<i>Hirundo neoxena</i>				x
	Whistling Kite	<i>Haliastur sphenurus</i>				
	White-faced Heron	<i>Egretta novaehollandiae</i>				x
	White-fronted Chat	<i>Epthianura albifrons</i>				x
	White-necked Heron	<i>Ardea pacifica</i>				
	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>				
	White-throated Needletail	<i>Hirundapus caudacutus</i>				
	White-winged Triller	<i>Lalage sueurii</i>				
	Willie Wagtail	<i>Rhipidura leucophrys</i>				x
	Yellow-billed Spoonbill	<i>Platalea flavipes</i>				
	Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>				
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>				
	Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>				
<b>Mammals</b>						
*	Black Rat	<i>Rattus rattus</i>				
	Black Wallaby	<i>Wallabia bicolor</i>				
*	Brown Hare	<i>Lepus capensis</i>				x
	Chocolate Wattled Bat	<i>Chalinolobus pacificus</i>				
	Common Brushtail Possum	<i>Trichosurus vulpecula</i>				
	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>				
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>				
*	European Rabbit	<i>Oryctolagus cuniculus</i>				
	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>				
*	House Mouse	<i>Mus musculus</i>				

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Origin	Common Name	Scientific Name	Conservation status			Recorded
			EPBC	DSE	FFG	
	Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>				
*	Red Fox	<i>Canis vulpes</i>				
	Short-beaked Echidna	<i>Tachyglossus aculeatus</i>				
	Swamp Rat	<i>Rattus lutreolus</i>				
	Water Rat	<i>Hydromys chrysogaster</i>				
	White-striped Freetail Bat	<i>Tadarida australis</i>				
<b>Reptiles</b>						
	Blotched Blue-tongued Lizard	<i>Tiliqua nigrolutea</i>				
	Bougainville's Skink	<i>Lerista bougainvillii</i>				
	Common Blue-tongued Lizard	<i>Tiliqua scincoides</i>				
	Delicate Skink	<i>Lampropholis delicata</i>				
	Eastern Brown Snake	<i>Pseudonaja textilis</i>				
	Eastern Three-lined Skink	<i>Bassiana duperreyi</i>				
	Garden Skink	<i>Lampropholis guichenoti</i>				
	Large Striped Skink	<i>Ctenotus robustus</i>				
	Little Whip Snake	<i>Suta suta</i>				
	Lowland Copperhead	<i>Austrelaps superbus</i>				
	Marbled Gecko	<i>Phyllodactylus marmoratus</i>				
	Southern Grass Skink	<i>Pseudemoia entrecasteauxii</i>				
	Southern Water Skink	<i>Eulamprus tympanum tympanum</i>				
	Tiger Snake	<i>Dieudoanona</i>				
	Tussock Skink	<i>Pseudemoia nagenstocheri</i>				
	Weasel Skink	<i>Saproscincus mustelinus</i>				
	White-lipped Snake	<i>Drysdalia coronoides</i>				
	White's Skink	<i>Egernia whitii</i>			Cmp	
<b>Frogs</b>						
	Common Froglet	<i>Crinia signifera</i>				
	Common Spadefoot Toad	<i>Neobatrachus sudelli</i>				
	Plains Froglet	<i>Crinia parinsignifera</i>				
	Southern Brown Tree Frog	<i>Litoria ewingii</i>				
	Southern Bullfrog	<i>Limnodynastes dumerilii</i>				
	Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>				
	Striped Marsh Frog	<i>Limnodynastes peronii</i>				
	Victorian Smooth Froglet	<i>Geophobos oregonus</i>				
	Whistling Tree Frog	<i>Litoria verreauxii verreauxii</i>				
<b>Other fauna</b>						
	Golden Sun Moth	<i>Synema plia</i>				

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**Notes:** EPBC - Status under EPBC Act; TSC - Listed under TSC Act; DSE - Status from DSE (2007); FFG - Listed under FFG Act; \* - Introduced species; X - Recorded in the study area on 28 November 2007; EN - Endangered; VU - Vulnerable; NT - Lower risk near threatened; DD - Insufficiently known but presumed to be threatened; Cmp - Comprises several taxa; L - Listed as threatened under FFG Act.

Appendix 3: Scattered trees in the study area

Tree no. (Figure 1)	Species	DBH	Size Class	Conservation Significance
1	Swamp Paperbark	11	Small	Low
2	Swamp Paperbark	13	Small	Low
3	Coast Banksia	28	Small	Low
4	Swamp Paperbark	28	Small	Low
5	Red Ironbark	90	Large	Low*
6	Red Box	76	Large	Low*
7	Red Box	14	Small	Low
8	Swamp Paperbark	31	Small	Low
9	Swamp Paperbark	17	Small	Low
10	Swamp Paperbark	11	Small	Low
11	Swamp Paperbark	11	Small	Low
12	Black Wattle	49	Small	Low
13	Swamp Paperbark	15	Small	Low
14	Swamp Paperbark	12	Small	Low
15	Swamp Paperbark	10	Small	Low
16	Swamp Paperbark	10	Small	Low
17	Eucalypt	35	Small	Low
18	Eucalypt	36	Small	Low
19	Coast Grey-box	90	Medium	Medium^
20	Coast Grey-box	75	Large	Medium^
21	Coast Grey-box	43	Small	Low
22	Coast Grey-box	70	Large	Medium^
23	Coast Grey-box	65	Medium	Medium^
24	Coast Grey-box	65	Medium	Medium^
25	Coast Grey-box	72	Large	Medium^
26	Coast Grey-box	50	Small	Low
27	Coast Grey-box	29	Small	Low
28	Coast Grey-box	90	Large	Medium^
29	Blue Box	72	Large	Medium^
30	Coast Grey-box	66	Medium	Medium^
31	Coast Grey-box	120	Large	Medium^
32	Blue Box	48	Small	Low
33	Coast Grey-box	48	Small	Low
34	White Stringybark	23	Small	Low
35	White Stringybark	50	Small	Low
36	Gippsland Manna Gum	71	Large	Medium^
37	Black Wattle	45	Small	Low
38	Gippsland Manna Gum	39	Small	Low

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Tree no. (Figure 1)	Species	DBH	Size Class	Conservation Significance
39	Coast Grey-box	36	Small	Low
40	White Stringybark	36	Small	Low
41	Coast Grey-box	30	Small	Low
42	Gippsland Manna Gum	37	Small	Low
43	Eucalypt	18	Small	Low
44	Coast Grey-box	25	Small	Low
45	Coast Grey-box	61	Medium	Medium <sup>^</sup>

\* Based on the Lowland Forest *least concern* bioregional conservation status

<sup>^</sup> Based on the Limestone Box Forest *vulnerable* bioregional conservation status

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#### Appendix 4: Fauna Conservation Significance Criteria

**National** fauna conservation significance applies to an area that supports one or more of the attributes described below.

- A population of one or more species listed as nationally threatened by Maxwell *et al.* (1996), Lee (1995), Duncan *et al.* (1999), Garnett and Crowley (2000), Cogger *et al.* (1995), Tyler (1997) or Wager and Jackson (1993), or listed on the schedules of the *Environment Protection and Biodiversity Conservation Act 1999*.
- A nationally threatened ecological community listed on the schedules of the *Environment Protection and Biodiversity Conservation Act 1999*.

**State** fauna conservation significance applies to an area when it supports one or more of the following attributes.

- A population of at least one fauna species threatened in Victoria, as listed by DSE (2003), or on the schedules to the Victorian *Flora and Fauna Guarantee Act 1988*.
- An ecological community considered threatened in Victoria through its listing on the schedules of the *Flora and Fauna Guarantee Act 1988*.

**Regional** fauna conservation significance applies to an area that supports one or more of the attributes described below.

- A population of a species considered depleted in a particular bioregion based on an authoritative regional analysis, such as the Regional Native Vegetation Plan, Environment Conservation Council Report or Comprehensive Regional Assessment documents.

**Local** fauna conservation significance applies to all 'other' native fauna that do not meet the above criteria.

As it is not always possible to confirm the presence of some fauna species, due to seasonal or behavioural difficulties in detection, the foregoing significance levels can be qualified by the word "**potential**" where habitat attributes are considered suitable for a species of a particular level of conservation significance.

*Kate Nelson*

Director, East Gippsland Shire

Date: ....3 January 2018....

Appendix 5: EVC benchmarks

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East Gippsland Planning Scheme  
**Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)**

Signed:



Director, East Gippsland Shire

Date: ....3 January 2018...



Traffic Engineers and Transport Planners

Directors:  
Henry H Turnbull  
Charmaine C Dunstan  
William D de Waard  
Donald J Robertson

Associates:  
Nathan B Woolcock  
Anthony J Coyle

Traffix Group Pty Ltd ABN 32 100 481 570  
Suite 8, 431 Burke Road  
Glen Iris Victoria 3146  
Ausdoc DX12407 Camberwell  
Telephone 03 9822 2888  
Facsimile 03 9822 7444  
Email admin@traffixgroup.com.au

## TRAFFIC ENGINEERING ASSESSMENT

OF

PROPOSED RESIDENTIAL SUBDIVISION  
STIRLING DRIVE, LAKES ENTRANCE

Approved Development Plan  
Planning and Environment Act 1987  
East Gippsland Planning Scheme  
**Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)**

Signed:

Prepared for  
Oceanview Lakes Pty Ltd

Director, East Gippsland Shire

June 2008  
Our Reference: GRP09578R4572

Date: ....3 January 2018...

Traffic Engineering Report  
for  
Proposed Residential Subdivision  
at  
Stirling Drive, Lakes Entrance

Approved Development Plan  
Planning and Environment Act 1987  
East Gippsland Planning Scheme

**Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)**

Study Team:

Will de Waard  
B.E. (Civil) Hons., M.I.E. Aust., M.V.P.E.L.A., M.I.T.E.  
Signed:  
Laura Procter  
B.A./B.E. (Civil) Hons.

Our Reference:

GRP09578R4572  
*Kate Nelson*

*P. de Waard*  
Director, East Gippsland Shire

Date: .....3 January 2018....  
*[Signature]*

Prepared By

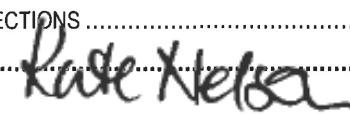
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**APPENDICES**

**Signed:**

- APPENDIX A. TRAFFIC COUNTS
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- APPENDIX D. PROPOSED COLQUHOUN ROAD & SUBDIVISION ACCESS ROAD INTERSECTION LAYOUT PLAN
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**Director, East Gippsland Shire**

**Date: ....3 January 2018...**

## 1. INTRODUCTION

Traffix Group has been engaged by Oceanview Lakes Pty Ltd to undertake a traffic engineering assessment of the proposed 186 lot residential subdivision and 6.487ha of retirement village area, known as Stirling Drive, Lakes Entrance.

This report provides a detailed traffic engineering assessment of the internal access arrangements and the likely impacts on the surrounding road network of the proposed development. In particular, this report provides an assessment of the traffic generation/distribution and appropriate intersection treatments for the proposed new access road to Colquhoun Road and the existing Lawson Court/Stirling Drive intersection.

## 2. EXISTING CONDITIONS

### 2.1. SUBJECT SITE

The subject site is generally bounded by residential and farming properties, between Thorpes Lane to the north, Colquhoun Road to the west, Sealakes Close estate to the south and Stirling Drive estate to the east. The subject site covers an area of approximately 33ha, and is for the most part vacant with the exception of a single farm house and associated buildings towards the south boundary of the site.

An aerial photograph of the subject site is provided at Figure 1 below.

The subject site is zoned Residential Zone under the East Gippsland Planning Scheme. A land use zoning map is provided at Figure 2.

Signed:



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Figure 1: Aerial Photograph of Site

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 (54 Thorpes Lane, Lakes Entrance)**

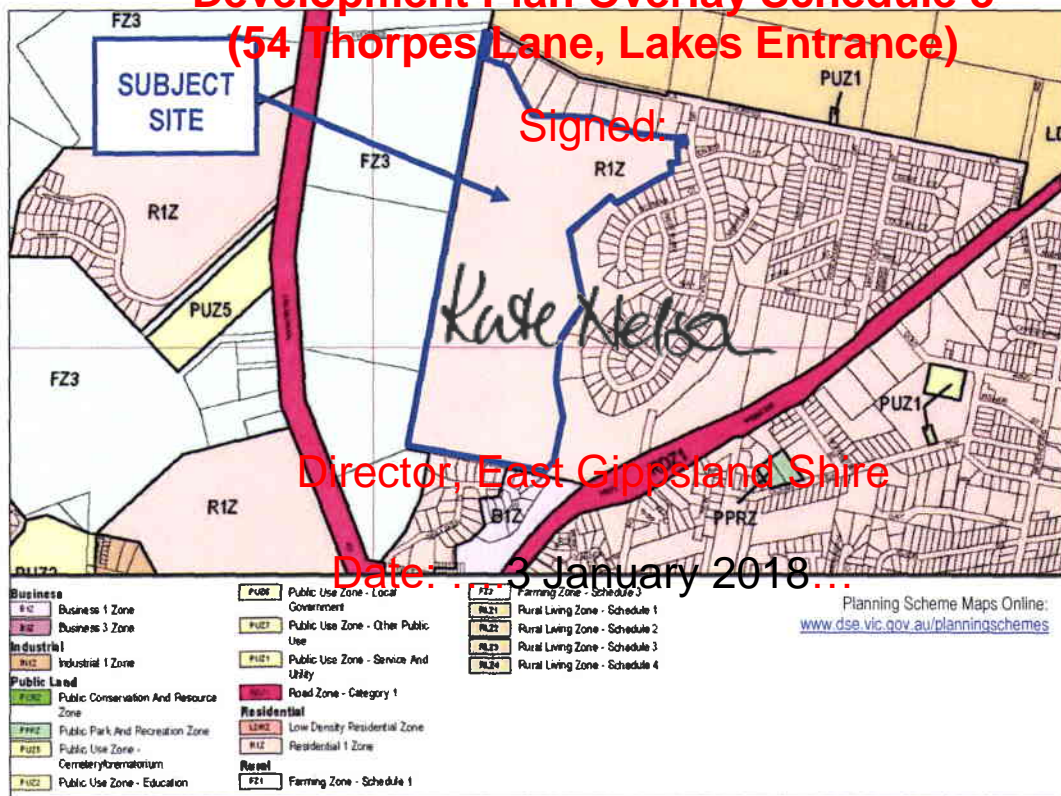


Figure 2: East Gippsland Land Use Zoning Plan

## 2.2. ROAD NETWORK

**Colquhoun Road** is classified as an 'Urban Link' road under the East Gippsland Shire Council Public Road Register, and is a Road Zone Category 1 under the East Gippsland Shire Planning Scheme. In the vicinity of the proposed site access, Colquhoun has a pavement width of approximately 5.5m with gravel and grassed shoulders of varying width within a road reservation of 60m. There is localised pavement widening along Colquhoun Road at intersections with key side streets. Colquhoun Road extends north-west from Palmers Road in Lakes Entrance to Bruthern-Nowa Road.

The posted speed limit is 80 km/h in the vicinity of the proposed access to Colquhoun Road. South of this, between just north of Golf Links Road and the Lakes Entrance township, the posted speed limit is 60 km/h.

The Shire of East Gippsland Council depot is located on the west side of Colquhoun Road, with an access point approximately 130m south of the proposed access point to the subject site. Auxiliary left and right turn lanes are provided at the Council entrance. Also on the west side of Colquhoun Road north of the proposed site access are the Lakes Entrance Cemetery, and the Lakes View Golf Course and adjoining residential estate.

**Thorpes Lane** is a local street that intersects Colquhoun Road at a right angle. Thorpes Lane has a pavement width of 6.2-8.2m with gravel and grassed shoulders of varying width within a road reservation of 20m. Thorpes Lane extends between Colquhoun Road in the west to Weekes Road in the east. The posted speed limit along Thorpes Lane is 80km/h between Colquhoun Road to west of Stirling Drive, where the speed limit drops to 60km/h.

**Stirling Drive** is a local street that intersects Thorpes Lane at a right angle. Stirling Drive has a fully constructed pavement width of 9.4m with kerb and channel provided on both sides of the road. Stirling Drive extends south from Thorpes Lane.

**Lawson Court** intersects Stirling Drive approximately 94m south of Thorpes Lane at a right angle. The proposed eastern access to the subject site is to extend from the end of Lawson Court. Lawson Court has a fully constructed pavement width of 9.25m with kerb and channel provided on both sides of the road. No existing residential lots have access to Lawson Court.

**Weekes Road** intersects the east end of Thorpes Lane at a modified T-intersection which gives priority to the Weekes Road south leg and Thorpes Lane west leg. This intersection is just north of where Weekes Road intersects with Princes Highway. Weekes Road generally has a similar cross-section to Thorpes Lane in the section between Princes Highway and Thorpes Lane, and provides for one lane of traffic in each direction.

**Princes Highway** is a VicRoads arterial road and generally provides two lanes of traffic in each direction in the vicinity of its intersection with Weekes Road, east of the subject site. At its intersection with Weekes Road, Princes Highway has a channelised right turn treatment (CHR) and a basic left turn treatment (BAL).

Photos of the road network surrounding the site are provided in Figure 3 to Figure 14.



Figure 3: Colquhoun Road View South at Proposed Access Point



Figure 4: Colquhoun Road View North at Proposed Access Point



Figure 5: Thorpes Lane & Colquhoun Road Intersection View West



Figure 6: Thorpes Lane at Stirling Drive View West



Figure 7: Thorpes Lane at Stirling Drive View East



Figure 8: Stirling Drive & Thorpes Lane Intersection View North

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Figure 9: Stirling Drive at Lawson Court View South



Figure 10: Stirling Drive at Lawson Court View North

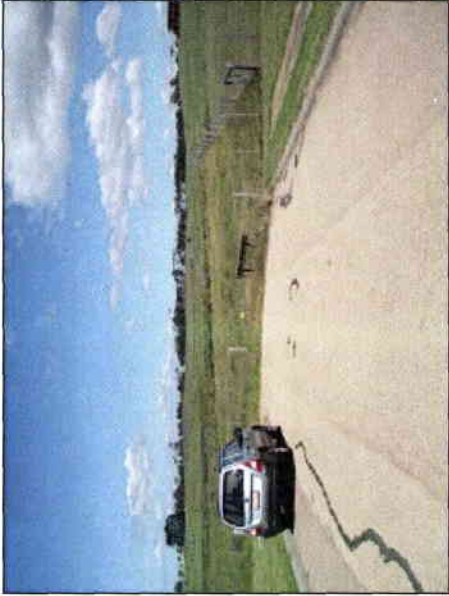


Figure 11: Lawson Court View West at Proposed Access Point



Figure 12: Princes Highway & Weekes Road View North From Intersection



Figure 13: Princes Highway & Weekes Road View South From Intersection



Figure 14: Princes Highway & Weekes Road View West Towards Intersection

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### 2.3. TRAFFIC VOLUMES

Seven day automatic traffic classification counts were conducted by Traffix Group in early December, 2007 at three locations in the vicinity of the subject site.

A summary of the traffic volumes recorded is provided Table 1.

**Table 1: Traffic Volume Counts**

All Vehicles	Eastbound/ Southbound (vehicles/day)	Westbound/ Northbound (vehicles/day)	Total (vehicles/day)	Percentage Commercial Vehicles
<b>Thorpes Lane (between Stirling Drive &amp; Panoramic Drive)</b>				
24 Hour Weekday Average	408	454	861	4.3%
AM Peak Hour Volume (8-9am)	29	46	75	-
PM Peak Hour Volume (5-6pm)	40	38	78	-
<b>Colquhoun Road (between Thorpes Lane &amp; Golf Links Road)</b>				
24 Hour Weekday Average	764	678	1,442	5.0%
AM Peak Hour Volume (8-9am)	95	36	131	-
PM Peak Hour Volume (3-4pm)	58	70	127	-
<b>Colquhoun Road (between Thorpes Lane &amp; Bunga Creek Road)</b>				
24 Hour Weekday Average	449	405	854	5.1%
AM Peak Hour Volume (8-9am)	37	25	61	-
PM Peak Hour Volume (4-5pm)	47	36	83	-

A copy of the results of the automatic traffic classification counts are attached at Appendix A

### 2.4. INTERSECTION TURNING MOVEMENT COUNTS

Traffix Group conducted turning movement counts at the following intersections on Wednesday, 5th December 2007, between 7:00am and 9:00am and between 4:00pm to 6:00pm:

1. Princes Highway and Weekes Road, and
2. Thorpes Lane and Stirling Drive.

Signed:



Director, East Gippsland Shire

Date: ....3 January 2018...

1. Princes Highway & Weekes Road Intersection:

The AM peak hour at the intersection occurred between 8:00am and 9:00am and the PM peak hour occurred between 4:15pm and 5:15pm. The peak hour turning movements are summarised in Figure 15 and Figure 16 and the detailed survey results are attached at Appendix B.

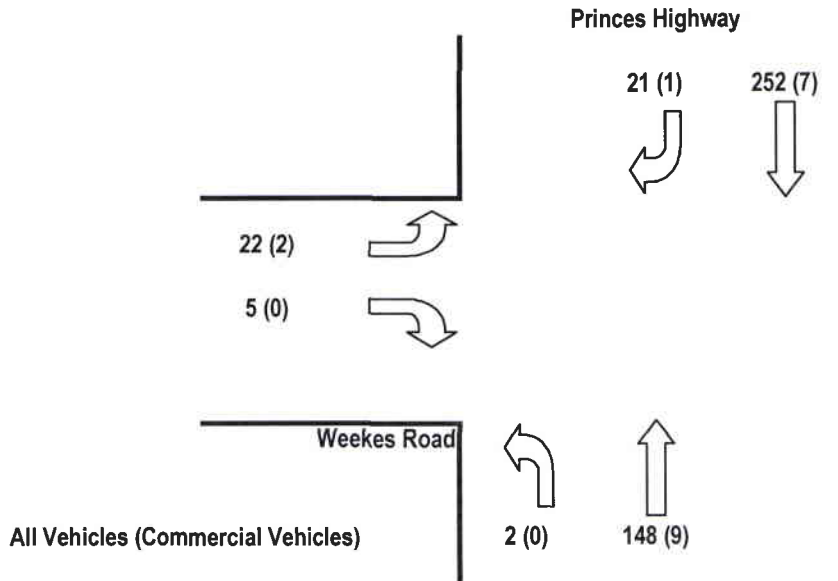


Figure 15: Princes Highway & Weekes Road Intersection – AM Peak Hour (8:00-9:00am)

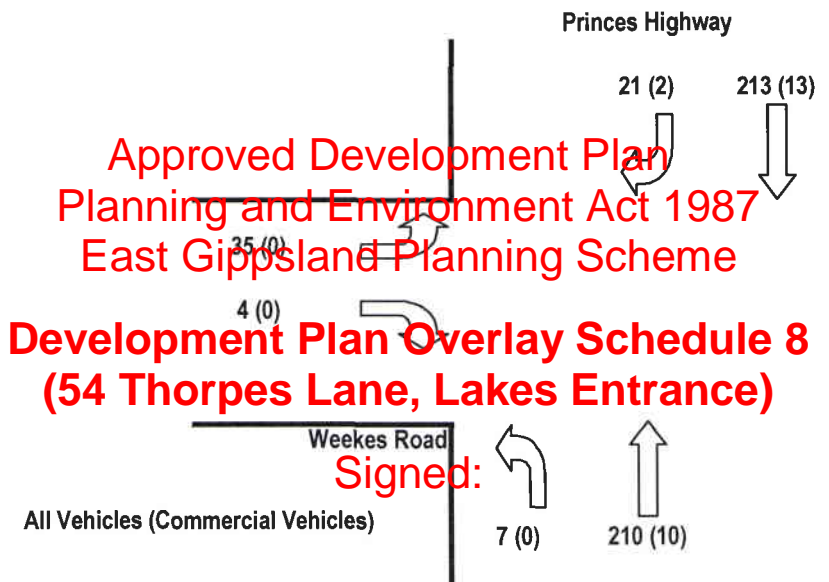


Figure 16: Princes Highway & Weekes Road Intersection – PM Peak Hour (4:15-5:15pm)

*Kate Nelson*

Director, East Gippsland Shire

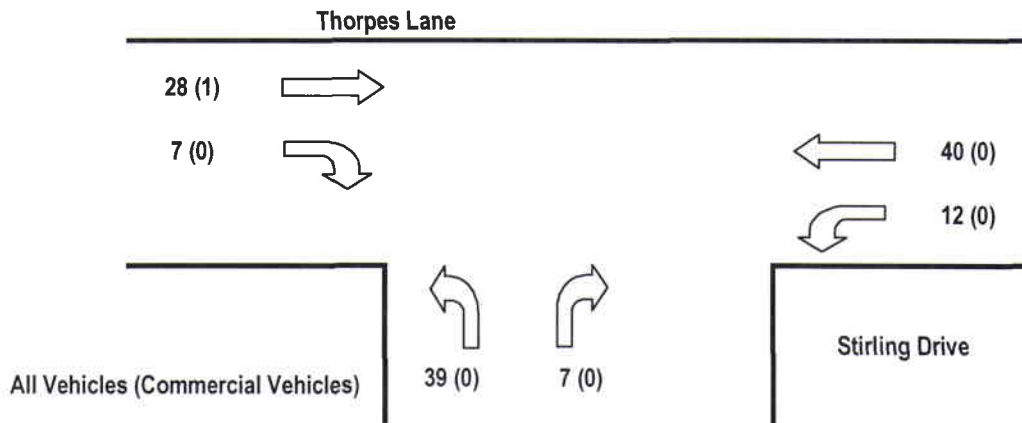
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2. Thorpes Lane & Stirling Drive Intersection:

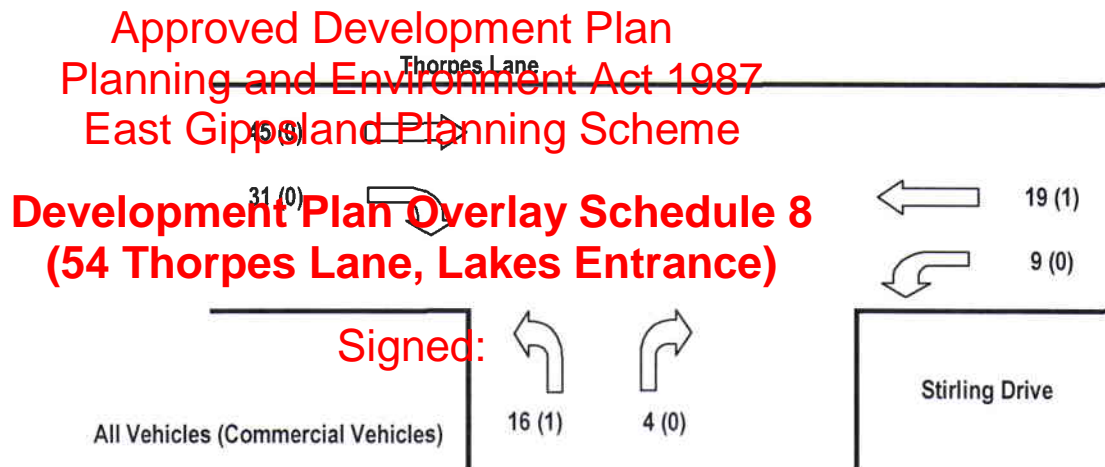
The AM peak hour at the intersection occurred between 8:00am and 9:00am and the PM peak hour occurred between 4:30pm and 5:30pm. The peak hour turning movements are summarised in

**Figure 17: Thorpes Lane & Stirling Drive Intersection – AM Peak Hour (8:00-9:00am)**

and Figure 18 and the detailed survey results are attached at Appendix B.



**Figure 17: Thorpes Lane & Stirling Drive Intersection – AM Peak Hour (8:00-9:00am)**



**Figure 18: Thorpes Lane & Stirling Drive Intersection – PM Peak Hour (4:30-5:30pm)**

*Kate Nelson*

Director, East Gippsland Shire

Date: ....3 January 2018...

### 3. PROPOSAL

The proposal is to develop the site as a 186 lot residential subdivision. A large lot (6.487ha) has been provided for a future retirement village development.

The proposed retirement village area does not form part of this proposal and will be the subject of a separate planning application. However, for the purposes of traffic generation assessment it will be assumed that the retirement village will yield in the order of 147 independent living units and 16 aged care suites.

Vehicular access to the site is proposed to be provided as follows:

- An access point to the existing end of Lawson Court, located towards the north-east corner of the site, and
- A second access point is proposed to Colquhoun Road, from towards the south-west corner of the site.

It is noted that there is the potential for future residential development within the adjacent property to the south-west corner of the site, via which the proposed access road from the subdivision will meet Colquhoun Road. This property is currently zoned Farm Zone 3 and re-zoning to residential land would form part of a separate application at a future date. It is noted that the proposed layout of the access road from the subdivision to Colquhoun Road would be conducive to this type of residential development.

A copy of the proposed residential subdivision plan (Drawing No. 35658CP-E, dated 28th May, 2008) is attached at Appendix C.

### 4. **Traffic Engineering Assessment** **Planning and Environment Act 1987**

The following traffic engineering assessment of the subdivision proposal has been undertaken with particular regard to the Clause 56 of the East Gippsland Planning Scheme and good engineering practice.

### **Development Plan Overlay Schedule 8** **(54 Thorpes Lane, Lakes Entrance)**

#### 4.1. TRAFFIC GENERATION

Residential Subdivision: Signed:

It is generally accepted that a conservative estimate of daily traffic generation of residential subdivisions is in the order of 10 trips ends per household per day, and one (1) vehicle trip end per household per day in each of the AM and PM peak hours. Based on the proposal to develop 186 residential lots, this represents a daily traffic generation of 1,860 vehicle movements.

Retirement Village:

Traffix Group surveys of existing retirement villages have determined typical generation rates of 3 to 4 vehicle trip ends per day for independent living units and between 1 to 3 vehicle trip ends per day for aged care accommodation. This is significantly less traffic than typical residential properties and consistent with what is suggested under Section 4.2.3 of the RTA Guide to Traffic Generating Developments. Furthermore, the low level of traffic is usually generated outside of the normal

commuter peak periods due to the staff shift times and fact that residents of these types of facilities typically tend to choose to drive outside of the peak periods on the surrounding road network.

If we conservatively adopt the upper limit for each component proposed at this facility then vehicle trips ends per day will be generated as follows:-

- 147 independent living units @ 4 vehicle trip ends per unit = 588 daily vehicle trip ends
- 16 aged care suites @ 3 vehicle trip ends per suite = 48 daily vehicle trip ends
- TOTAL = 636 daily vehicle trip ends

If it is conservatively assumed that 10% of this traffic is generated during the existing peak commuter hours in the area, then an additional 64 vehicle trip ends only are likely to be generated during each of these critical periods.

Summary:

Based on the above, the proposal to develop 186 residential lots, and a retirement village with 147 independent living units and 16 aged care suites, the site is expected to generate in the order of 2,496 vehicle movements per day, with 250 trips in each of the AM and PM peak hours.

#### 4.2. TRAFFIC DISTRIBUTION

The generated traffic volumes will be distributed amongst the two access points, namely:

- Colquhoun Road and West Access intersection, and
- Lawson Court/Eastern Access and Stirling Drive intersection, with all of this traffic assumed to use the Stirling Drive and Thorpes Lane intersection

Based on the location of the subject site, access to the Lakes Entrance Township, and access to the surrounding road network the distribution of generated traffic from the site has been assumed as follows:

- Southbound – 80% (to Lakes Entrance, Bairnsdale, Melbourne etc.),
- North-westbound – 5% (to Colquhoun, Bruthen, etc), and
- North-eastbound and Eastbound – 15% (to Nowa Nowa, Orbost, other parts of Lakes Entrance, etc).

Further, it has been assumed that 100% of the traffic heading to Lakes Entrance town centre and surrounds will use the Colquhoun Road access.

Of the traffic heading north-west to Colquhoun, it has been assumed that 50% will use the Colquhoun Road access and 50% will use the Lawson Court/Stirling Drive access.

It has been assumed that 100% of the traffic heading north-eastbound to Nowa Nowa and eastbound to other residential areas of Lakes Entrance will use the Lawson Court/Stirling Drive access.

The likely traffic distribution across each of the access points is summarised in Table 2.

**Table 2: Distribution of Traffic Across Access Points**

Direction	Colquhoun Road Access		Lawson Court/Stirling Drive Access	
	% of Trips	No. of Trips	% of Trips	No. of Trips
To North-east (Nowa Nowa etc) & East (Lakes Entrance Eastern Areas)	0%	0	100%	374
To North-west (Colquhoun etc)	50%	63	50%	62
To South (Lakes Entrance Town Centre, Bairnsdale etc)	100%	1,997	0%	0
<b>Total</b>		<b>2,060</b>		<b>436</b>

Based on the traffic generation rates as outlined in the previous section and the abovementioned assumptions in relation to traffic distribution, the resultant daily volumes at each access point and on the internal road network are as shown on Figure 19.

Table 3 below summarises the predicted upper limit peak hour traffic movements into and out of the site, when the proposal is fully developed. This is based on each of the dwellings generating 1.0 vehicle trips ends in each of the peak hours.

**Table 3: Expected Peak Hour Traffic Generation at Each Access Point**

Direction	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Colquhoun Road Access	62	144	206	124	82	206
Lawson Court/Stirling Drive Access	43	0	43	26	17	43
<b>Total</b>	<b>75</b>	<b>174</b>	<b>249</b>	<b>150</b>	<b>99</b>	<b>249</b>

Note: Based on directional splits of 30% in/70% out of subdivision in the AM Peak and 60% in/40% out in the PM Peak.

Based on the above, the expected peak hour turning movement volumes at the access points to the site and surrounding key intersections are presented at Figure 20 to Figure 23.

Signed:



Director, East Gippsland Shire

Date: ....3 January 2018....

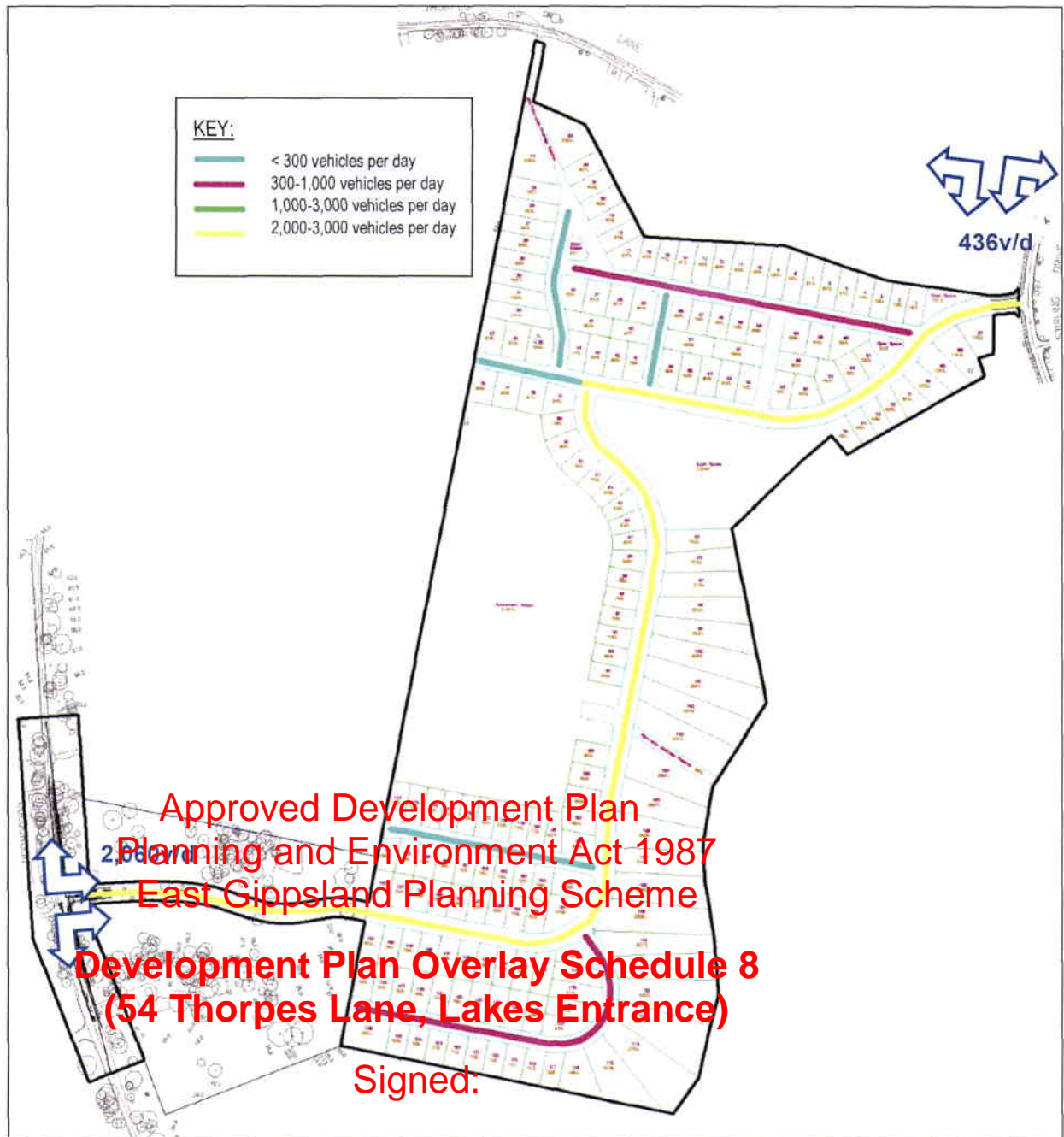


Figure 19: Expected Daily Traffic Distribution & Traffic Volumes

*Kate Nelson*

Director, East Gippsland Shire

Date: ....3 January 2018....

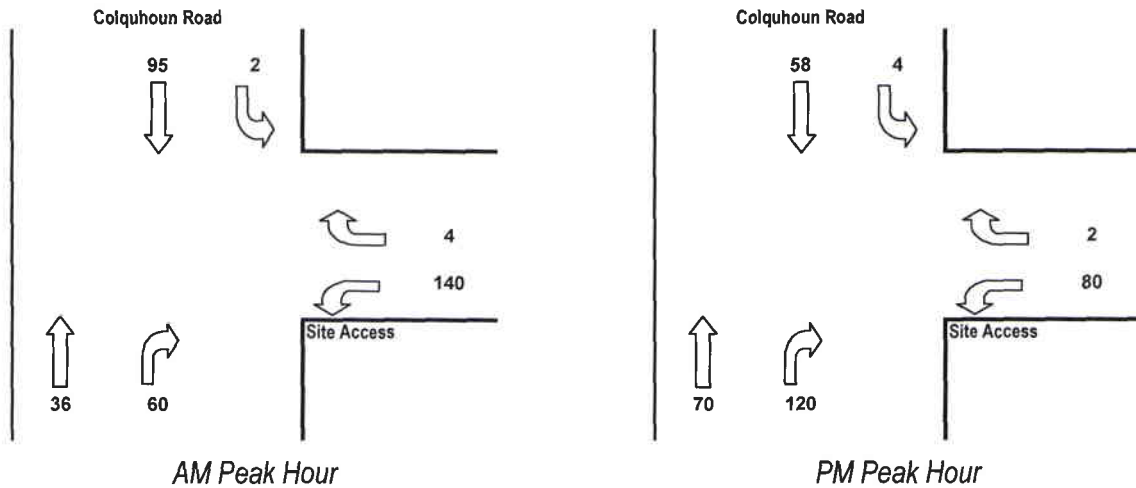


Figure 20: Colquhoun Road & West Access Post-Development Volumes

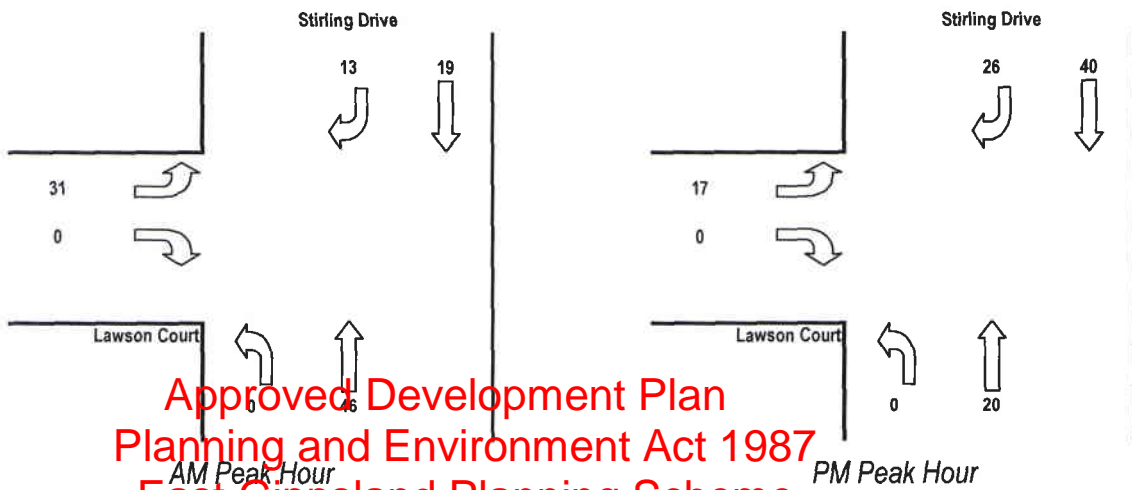


Figure 21: Lawson Court Access & Stirling Drive Post-Development Volumes

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Figure 22: Stirling Drive & Thorpes Lane Post-Development Volumes

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*Kate Nelson*

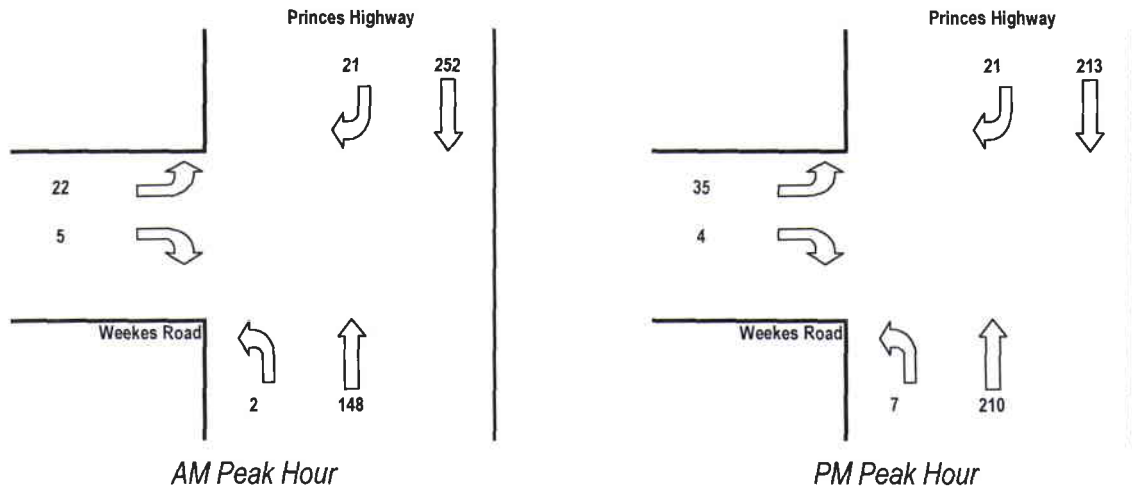


Figure 23: Weekes Road & Princes Highway Post-Development Volumes

### 4.3. ROAD HIERARCHY

An indicative road hierarchy is presented in Figure 24.

The main road through the subdivision will operate as a Connector Street (Level 1) and the remainder of the streets within the subdivision will operate as Access Streets.

A Connector Street is defined under Clause 56.06-8 as being ... "a street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods".

An Access Street is defined under Clause 56.06-8 as being ... "a street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated".

The northern east-west road connecting to the western farm boundary of the proposed subdivision layout has been designed to provide access to adjacent future developments. This street has not been designed with a court bowls or T-head treatment as it is likely that the adjacent site will be developed in the not too distant future. If this does not occur, this street will require a temporary turning treatment.

Ultimately, the access streets within the subdivision are likely to carry up to 1,000 vehicles per day and the connector street is likely to carry up to 3,000 vehicles per day some of which some may be generated from the adjacent residential development along Stirling Drive.

The predicted volumes are well within acceptable limits for the relevant streets as suggested in the Planning Scheme and no adverse traffic impacts are expected as a result.

*Kate Nelson*

Director, East Gippsland Shire

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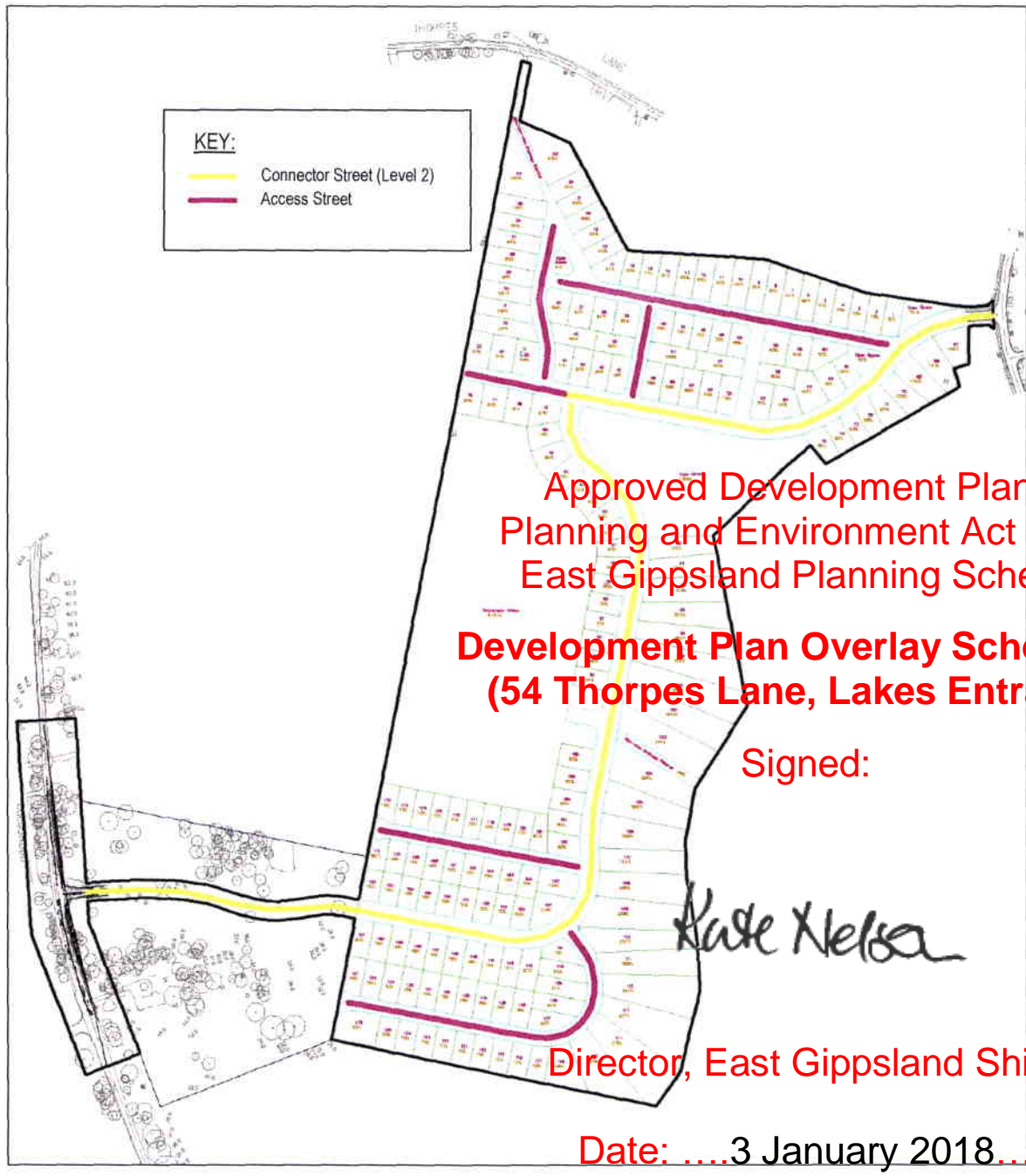


Figure 24: Indicative Road Hierarchy

#### 4.4. ROAD CROSS SECTIONS

The requirements for new access streets and connector streets are set out under Clause 56.06-8 of the East Gippsland Planning Scheme as per Table 4.

**Table 4: Clause 56.06-8 Road Cross Section Requirements**

Parameter	Access Street (Level 1 & Level 2)	Connector Street (Level 1)
Traffic Volume	Up to 3,000 vpd	3,000 vpd
Target Speed	30 – 40 km/h	50 km/h
Carriageway Width & Parking Provision Within Street Reservation	5.5m wide with 1 hard standing verge parking space per 2 lots	6m-6.5m with indented parking on both sides on a bus route
	or 7-7.5m wide with parking on both sides	or 7m-7.5m wide with indented parking on one side and kerbside parking opposite on a bus route
Verge Width	4m minimum each side	or 7.2m-7.5m wide with parking on both sides of carriageway
Kerbing	4.5m minimum each side	4.5m minimum each side with adequate road reserve width for widening for future bus route if required
Footpath Provision	Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area. 1.5m wide footpaths on both sides. Footpaths should be widened to 2.0m in vicinity of a school, shop or other activity centre. Be offset a minimum distance of 1m from the kerb.	Low back or flush and swale or other water sensitive urban design treatment area. 2.5m wide shared path on each side or 1.5m wide footpath on each side and 1-1.5m cycle lane marked on carriageway on each side
Cycle Path Provision	Carriageway designed as a shared zone and appropriately signed.	

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Based on the requirements set out in Table 4, the following cross-sections are recommended:

- Connector Street (Level 1)** – 20.0m minimum road reservation with a 6.0m carriageway plus 2.3m wide parking lanes on each side. It is noted that parking lanes will only be required adjacent to residential frontages and not along areas such as the ‘open space’ reserve. A 2.5m wide shared footpath should be provided on one side (eastern side along the ‘open space’ reserve) within a 4.9m wide verge and a 1.5m footpath should be provided on the other side within a 4.5m wide verge. An indicative cross-section is shown in Figure 25.

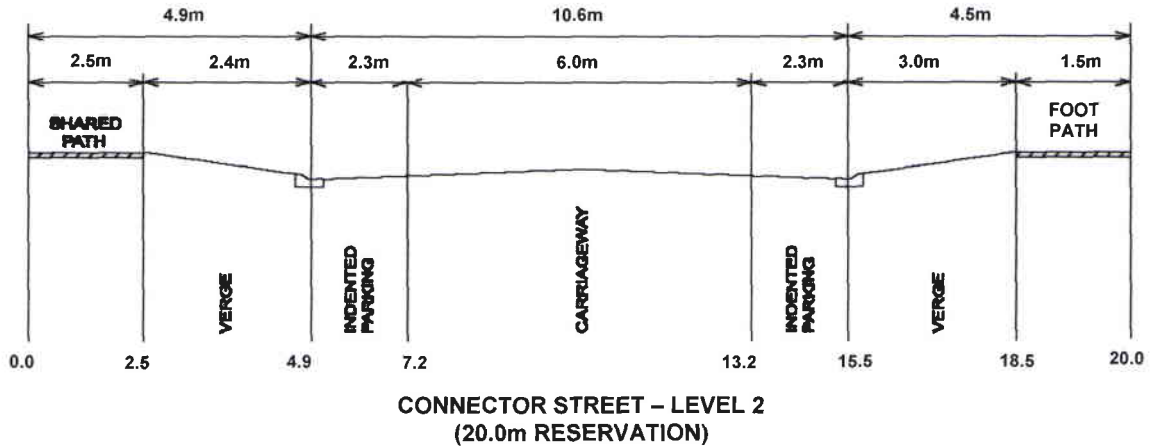
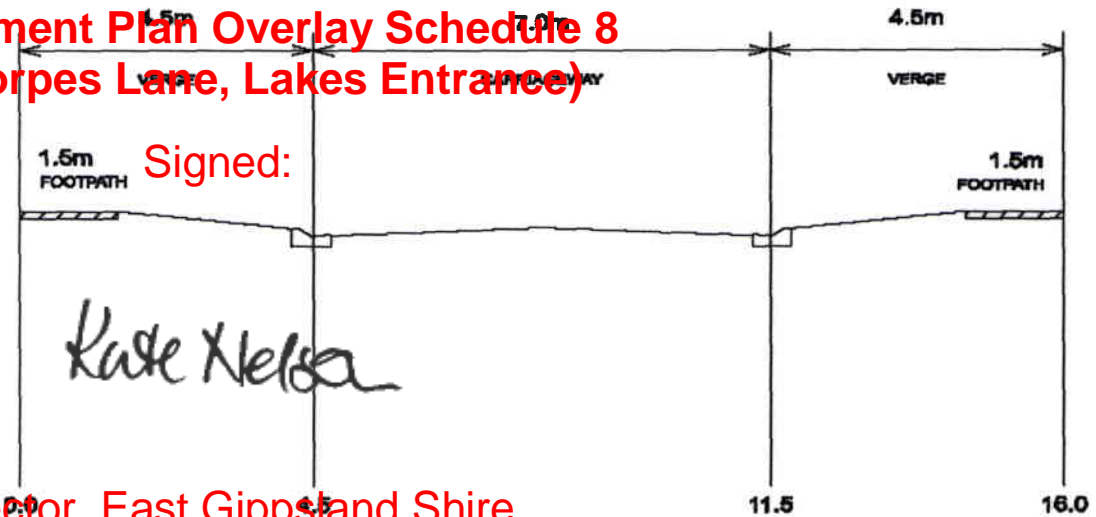


Figure 25: Connector Street (Level 1) Cross-Section

**Access Street** – 16.0m minimum road reservation with a 7.0m wide carriageway allowing parking to occur on both sides. A 1.5m wide footpath should be provided on each side within a 4.5m wide verge. An indicative cross-section is shown in Figure 26.

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Figure 26: Access Street Cross-Section

#### 4.5. EAST GIPPSLAND PLANNING SCHEME (CLAUSE 56)

The proposed layout of the subdivision has been reviewed with specific reference to the provisions of Clause 56 of the East Gippsland Planning Scheme.

The subdivision layout has been found to generally comply with the objectives and standards set out in Clause 56 in relation to the street network and design. Additional comments are provided below.

##### Standard C2, C15, C16, C18 & C19

There are no public bus routes which currently operate through the residential areas of Lakes Entrance. Provision has been made along the connector street for a future bus route. Given the location of the connector street through the site, if a bus route were to travel along it in the future, a bus stop would be expected to be located within 400m of most properties within the proposed residential subdivision. All future bus facilities will be connectable to the subdivision footpath network. All bus stops within the subdivision will be provided to comply with the DDA requirements.

Footpaths are to be provided on both sides of all streets within the subdivision, connecting to both Lawson Court and Colquhoun Road, although it is noted that there are no footpaths present along Colquhoun Road in the vicinity of the site. All pedestrian crossing points within the subdivision will be provided to comply with the DDA requirements.

All streets within the subdivision provide for either shared-path or on-road cycling. It is noted that no public facilities exist along Colquhoun Road, Lawson Court, Stirling Drive or Thorpes Lane in the vicinity of the subject site.

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The proposed layout ensures that lots front all roads and streets and avoids the sides or rear of lots being oriented to the connector street through the subdivision. Roads and streets have also been provided along public open space boundaries to increase visibility and surveillance.

##### Standard C12 Signed:

The proposed layout provides for walking and cycling facilities which link with the public open space areas within the development. A shared path is to be provided along the east/south side of the connector street, adjacent to the public open space.

##### Standard C16

All connector streets and access streets within the subdivision will have footpaths on at least one side and cycling is provided for on the road network. A future bus route is possible through the site along the connector street, and will service the subject site.

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##### Standard C17

The streets within the subdivision will provide safe and efficient access for all vehicles, including service and emergency vehicles, and have incorporated appropriate traffic management treatments.

Intersections are generally controlled by T-junctions at spacings which meet the requirements of Clause 56.06-4 to ensure that intersections are safe, convenient and appropriate for the type of street. Raised intersections or threshold treatments are proposed at some T-intersections. Roundabouts are proposed at intersections that form a significant intersection with the connector street, such as at the proposed future retirement village (subject to a separate planning application) access point.

### Standard C20 & C21

This standard primarily relates to carriageway widths, verge widths and parking provision within the road reservation. Figure 25 to Figure 26 show the indicative cross-sections of the proposed connector street and access streets.

Clause 56.06 Table C1 states that the minimum width of access streets is 5 to 5.5 metres with a verge width of 4 metres on each side. Generally, the proposed pavement widths are 7.0m within a 16.0m wide road reserve. This carriageway width meets the requirements of Clause 56.06.

The connector road is to have a carriageway width of 6.0m with 2.3m parking lanes on each side within a 20.0m road reserve, which provides for on-street parking on both sides of the road while maintaining two-way traffic flow.

This standard also relates to controlling vehicle speeds to acceptable levels. Traffic management is proposed within the subdivision to restrict vehicle speeds to those detailed in Table 4 above, as discussed in Section 4.6.4 below.

Appropriate splays are provided on the properties at the corners of the intersection of the subdivision access road to Colquhoun Road.

All properties are accessed from connector streets and access streets.

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### 1.6. INTERNAL ROAD LAYOUT

#### Planning and Environment Act 1987 East Gippsland Planning Scheme

As outlined above, the layout of internal roads generally comply with Clause 56 (ResCode) of the East Gippsland Planning Scheme.

## Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)

4.6.1. INTERSECTIONS  
The development plans indicate that the proposed internal road layout will include a number of T-junctions or intersections. Signed: Given the spacing and expected traffic volumes, we consider that T-junctions will provide satisfactory intersection control within the subdivision.

There are no cross-intersections proposed within the subdivision.

### 4.6.2. TURNING AREAS FOR GARBAGE VEHICLES

T-heads are proposed at the end of the internal roadways in order for Council's garbage vehicles appropriately manoeuvre and turn around.

## Director, East Gippsland Shire

### 4.6.3. PEDESTRIAN FACILITIES

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Footpaths are proposed on both sides of all streets within the residential subdivision, which we consider to be appropriate. We recommend that footpaths be located to ensure good 'connectivity' within the subdivision by providing connections across streets. In addition, footpath connections should be provided to public open space areas.

### 4.6.4. TRAFFIC MANAGEMENT

As outlined in Section 4.5 under Standard C17, the development plan requires an appropriate level of traffic management to provide for the safety and convenience of all road users. Spacing between traffic management devices of approximately 120-200 metres has been adopted on access streets and approximately 300-400 metres has been adopted on the connector street, to achieve the requirements

set out in Clause 56.06-4 and Table 4 above. A plan of the proposed traffic management devices within the subdivision is provided at Figure 27.

Raised intersection treatments have been provided at two T-intersections and threshold treatments have been provided at two T-intersections, in order to reduce traffic speed and unnecessary through traffic.

Roundabouts have been proposed at two intersections along the connector street, and a central blister island has been proposed at one location along the connector street, to reduce traffic speeds within the subdivision.

It is considered that no other traffic management is required within the subdivision.

#### 4.6.5. INTERNAL ROAD GRADES

A notable characteristic of the site is the undulating topography of the land. Some grades along internal roads are measured to be up to 15%. The maximum longitudinal grade of the local roads within a residential subdivision should be limited to 20%<sup>1</sup>. This has been achieved by the proposed local road network generally following the natural contours of the land in the steeper sections of the subject site.

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<sup>1</sup>

Consistent with maximum longitudinal grades specified in the Victorian Code for Residential Development (April 1992) and the Clause 56 of the Planning Scheme prior to the October 2006 revision of this clause and maximum grades specified by the CFA for emergency access.

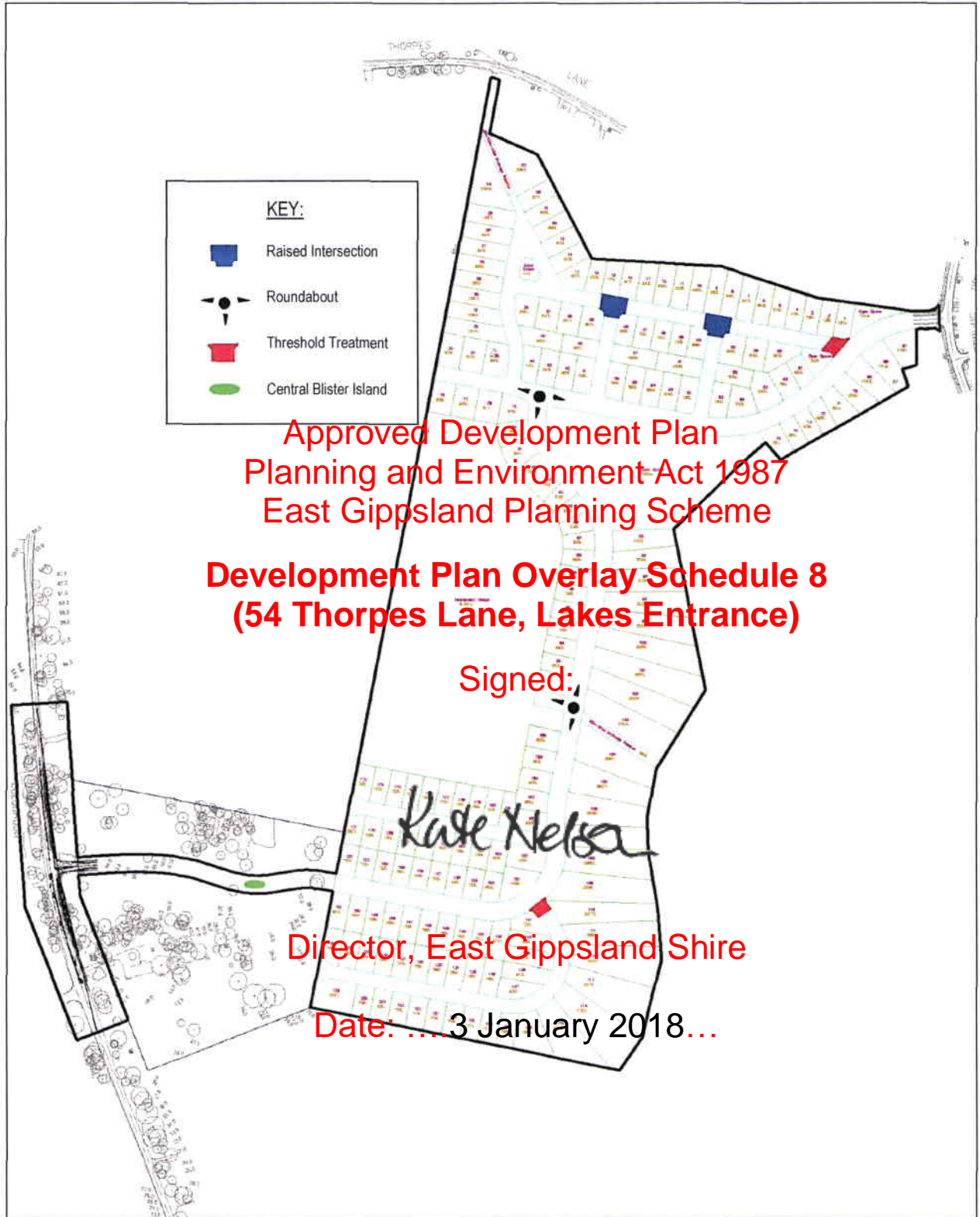


Figure 27: Proposed Traffic Management

## 5. TRAFFIC IMPACTS

The following section of the report discusses the proposed access treatments at each of the access points to the site and on the adjacent intersections, as a result of the anticipated increase in traffic from the proposed development.

Impacted access points and intersections are as follows:

1. Colquhoun Road & West Access Intersection (Proposed Intersection),
2. Lawson Court East Access & Stirling Drive Intersection (Existing Intersection),
3. Stirling Drive & Thorpes Lane Intersection (Existing Intersection) and,
4. Weekes Road & Princes Highway Intersection (Existing Intersection).

### 5.1. PROPOSED SUBDIVISION ACCESS (COLQUHOUN ROAD)

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#### 5.1.1. INTERSECTION LAYOUT

East Gippsland Planning Scheme

The proposed subdivision access intersection layout to Colquhoun Road has been designed in accordance with the requirements of the Austroads 'Guide to Traffic Engineering Practice, Part 5 – Intersections at Grade'.  
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As previously stated, the posted speed limit along the site frontage on Colquhoun Road is 80 km/h with a 60 km/h speed zone located from north of Golf Links Road to the township of Lakes Entrance.

In accordance with Figure 6.41 'Warrants for Rural Turn Lanes', the Colquhoun Road access point to the proposed residential development meets the warrants for a auxiliary right turn lane (AUR) due to the number of right turning vehicles and the volume of approach and opposing through traffic. In addition, the Colquhoun Road access meets warrants for basic left turn lanes (BAL). A plan of the proposed Colquhoun Road and subdivision access intersection layout is provided at Appendix D.

#### 5.1.2. SIGHT DISTANCE

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The sight distance requirements that are important for the proposed subdivision intersections are 'approach sight distance' and 'safe intersection sight distance'.

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Approach Sight Distance (ASD) is measured from the driver's eye height (1.05m) to 0.0m, which ensures that the driver is able to see any linemarking and kerbing at the intersection<sup>2</sup>.

Safe Intersection Sight Distance (SISD) is measured between the driver's eye height on the leg with priority (1.05m) and the driver's eye height in the side street (1.05m)<sup>1</sup>.

The ASD and SISD requirements within an 80km/h speed zone (Colquhoun Road) are as follows:

- ASD: 103m (minimum) -114m (desirable), and
- SISD: 170m (minimum) - 181m (desirable).

<sup>2</sup> Guide to Traffic Engineering Practice – Part 5: Intersections at Grade, 2005.

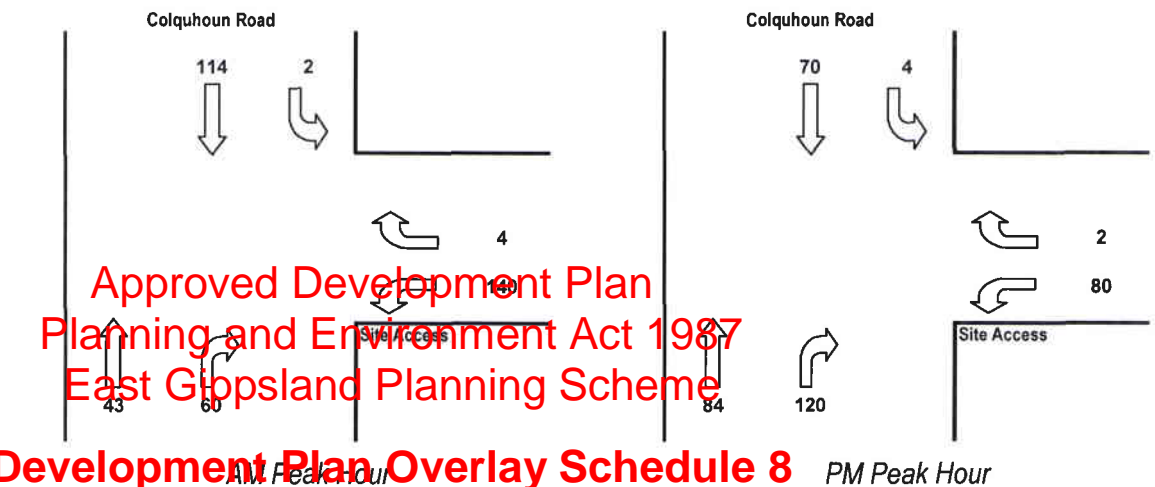
The subdivision access point to Colquhoun Road has been specifically located to provide the maximum possible sight distance in each direction within the constraints of the property limits. This point allows for the minimum sight distance requirements outlined above for an 80 km/h road to be met, however requires the removal of vegetation within the Colquhoun Road road reserve to achieve the desired sight lines.

Given these sight distance constraints along Colquhoun Road, it is recommended that consideration be given to providing a 70 km/h speed zone between the existing 60 km/h speed zone which finishes north of Golf Links Road to past the subject site's frontage to Colquhoun Road. This would be appropriate given the change in land use within this section of Colquhoun Road.

**5.1.3. INTERSECTION ANALYSIS**

The Colquhoun Road and west subject site access intersection has been analysed using the method presented in Section 4.5 of Austroads, Guide to Traffic Engineering Practice, Part 5 – Intersections at Grade for the AM and PM peak periods using volumes outlined earlier in this report.

An additional analysis was undertaken for future traffic volumes on Colquhoun Road, which assumed a 2% per annum growth over a ten (10) year period, as presented at Figure 28.



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 Figure 28: Colquhoun Road & West Access Post-development Volumes (10 year Volumes)

The following critical gap and follow up headway values were adopted:-

- Signed:**
- 4 seconds and 2 seconds for right turns across a single traffic stream,
  - 5 seconds and 3 seconds for right turns across two traffic streams, and
  - 4.5 seconds and 2.5 seconds for left turns into a single traffic stream.

It is noted that the access road was a single lane in each direction and left and right turns out of the development will occur from the same end. Therefore, the analysis for exiting traffic has been undertaken using combined peak period volumes for left and right turning vehicles, and the critical gap and follow up headway values for 'right turn out' were used.

The intersection capacity analysis allows estimation of key operating parameters such as intersection degree of saturation (X), average delay and 95th percentile queue lengths.

It is noted that typically the limit of the intersection degree of saturation (X) for unsignalised intersections is 0.80 to 0.90.

A summary of the intersection capacity analysis for the AM and PM peak hour is presented in Table 5 below and a copy of the intersection capacity analysis is presented in Appendix E.

**Table 5: Summary of Intersection Capacity Analysis**

Approach	Movement	Degree of Saturation (DoS)	Average Delay (seconds)	95 <sup>th</sup> %ile Queue Length (vehicles)
<b>Post-Development Volumes</b>				
<b>AM Peak Hour</b>				
Subject Site	Right/Left Out	0.14	1.11	1
	Right In	0.04	0.27	1
<b>PM Peak Hour</b>				
Subject Site	Right/Left Out	0.09	1.22	1
	Right In	0.07	0.23	1
<b>Future Colquhoun Road Volumes (10 years)</b>				
<b>AM Peak Hour</b>				
Subject Site	Right/Left Out	0.15	1.25	1
	Right In	0.04	0.32	1
<b>PM Peak Hour</b>				
Subject Site	Right/Left Out	0.09	1.35	1
	Right In	0.07	0.26	1

The results in Table 5 indicate that the proposed subdivision intersection with Colquhoun Road will provide good operating conditions with little or no delays or queues. Importantly, there is significant capacity available on Colquhoun Road to accommodate future growth in traffic volumes without impact on the operation of the proposed subdivision access.

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**5.2. EXISTING SURROUNDING INTERSECTIONS**

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The existing intersections surrounding the subject site impacted by the proposed residential subdivision are detailed as follows:

- Lawson Court East Access & Stirling Drive Intersection:*

This intersection is a standard T-junction with no (or little) turning volumes at present, given that no existing property access is to Lawson Court. Good sight distance is available in both directions along Stirling Drive.
- Stirling Drive & Thorpes Lane Intersection:*

This intersection is a standard T-junction arrangement, with good sight distance available in both directions along Thorpes Lane.
- Weekes Road & Princes Highway Intersection:*

This intersection is a T-junction. Princes Highway provides a channelised right turn lane into Weekes Road, and a basic left turn lane. Good sight distance is available in both directions along Princes Highway.

Given the low traffic volumes expected to use the Lawson Court access and the resultant low increase in traffic volumes at the abovementioned intersections, traffic impact analysis of the intersections was not considered necessary. The existing conditions at the intersections are such that mitigating works will not be required to cater for the additional traffic volumes.

## 6. CONCLUSIONS

Having visited the site, perused relevant documents and plans, conducted traffic counts, predicted the traffic generation and distribution and assessed the performance of the proposed access arrangements associated with the proposed residential subdivision at Stirling Drive, Lakes Entrance, we are of the opinion that:-

- a) The development is likely to generate up to 2,496 trip ends per day,
- b) Given the existing road network, the distribution of traffic to and from the site is expected to be 80% to the south via Colquhoun Road, 5% to the north-west via Colquhoun Road and Thorpes Lane and 15% to the north-east and east via Thorpes Lane,
- c) It is considered that traffic management within the proposed subdivision is appropriate and meets Clause 56 of the East Gippsland Planning Scheme,
- d) The proposed access point to Colquhoun Road has been designed with an auxiliary right turn lane (AUR) and a basic left turn lane (BAL) which is adequate for the anticipated traffic volumes and will operate satisfactorily,
- e) The proposed access point to the existing end of Lawson Court from the proposed subdivision is adequate and will operate satisfactorily, and
- f) There are no traffic engineering reasons why a permit for this residential subdivision should not be granted, subject to appropriate conditions.

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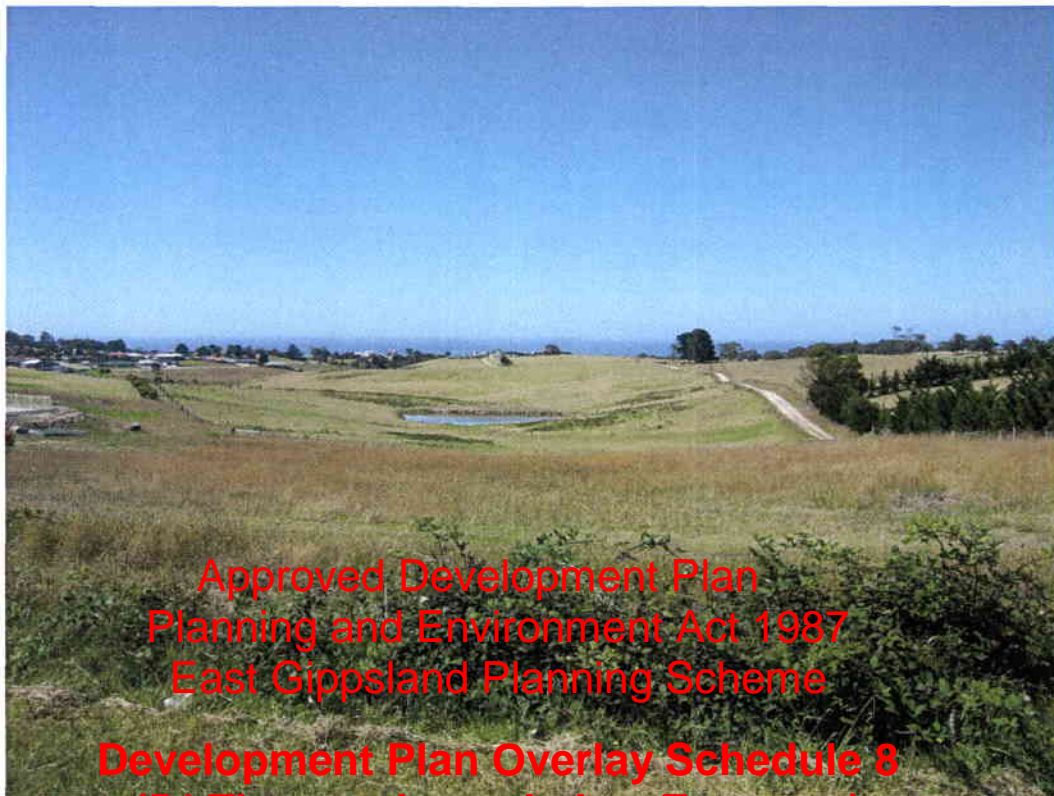
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**Ocean View Lakes Pty Ltd**

**Ocean View Lakes,  
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**May 2008**

*Kate Nelson*

Director, East Gippsland Shire



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**Ocean View Lakes Pty Ltd**

**Ocean View Lakes,  
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**May 2008**

Director, East Gippsland Shire

Date: ....3 January 2018...



WATER TECHNOLOGY  
WATER · COASTAL & ENVIRONMENTAL CONSULTANTS

**15 Business Park Drive  
Notting Hill VIC 3168**

**Telephone (03) 9558 9366  
Fax (03) 9558 9365**

**ACN No. 093 377 283  
ABN No. 60 093 377 283**

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*Kate Nelson*

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### DOCUMENT STATUS

Issue	Revision	Date	Issued To	Prepared By	Reviewed By	Approved By
RO1	A	14/02/08	Ocean View Lakes Pty Ltd	CMB/SEL/WAB	WAB	WAB
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R03	B	27/05/08	Ocean View Lakes Pty Ltd	CMB/YZ	CMB	CMB

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It is the responsibility of the reader to verify the currency of revision of this report.

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*Kate Nelson*

**Director, East Gippsland Shire**

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## 1 INTRODUCTION

Ocean View Lakes Pty Ltd is looking to develop a 33 hectare site in on Thorpes Lane, Lakes Entrance. Water Technology have been engaged to analyse the development issues associated with this development including Statutory issues including Clause 56, and other associated stormwater runoff calculations.

### 1.1 Purpose of this Report

This report has been formed to address the following objectives:

- Surface Water Management Assessment – Analyse existing surface water conditions and develop management strategies. The analysis will be in accordance with the current Concept Development Plan and will satisfy the CMA's, Council's and relevant Water Quality requirements and guidelines.
- Stormwater Management Plan – Assess stormwater yield and quality issues that arise through the extensive development of the site and provide conceptual design advice on the sizing and location of suitable stormwater treatment measures.
- Erosion management plan – Analyse the development areas for erosion potential and propose mitigation measures and strategies to minimise/eliminate the risk.

To achieve these outcomes Water Technology have begun discussions with both the EGCMA and EGSC, key referral agencies in the approval of this development.

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### 1.2 Site Description

#### Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)

The proposed Ocean View Lakes development is located approximately 3.5 kilometres North East of the Lakes Entrance town centre. The 33.38 hectare site can be accessed from Thorpe's Lane and Stirling Drive. Figure 1-1 shows the location of the study site.

Signed:  


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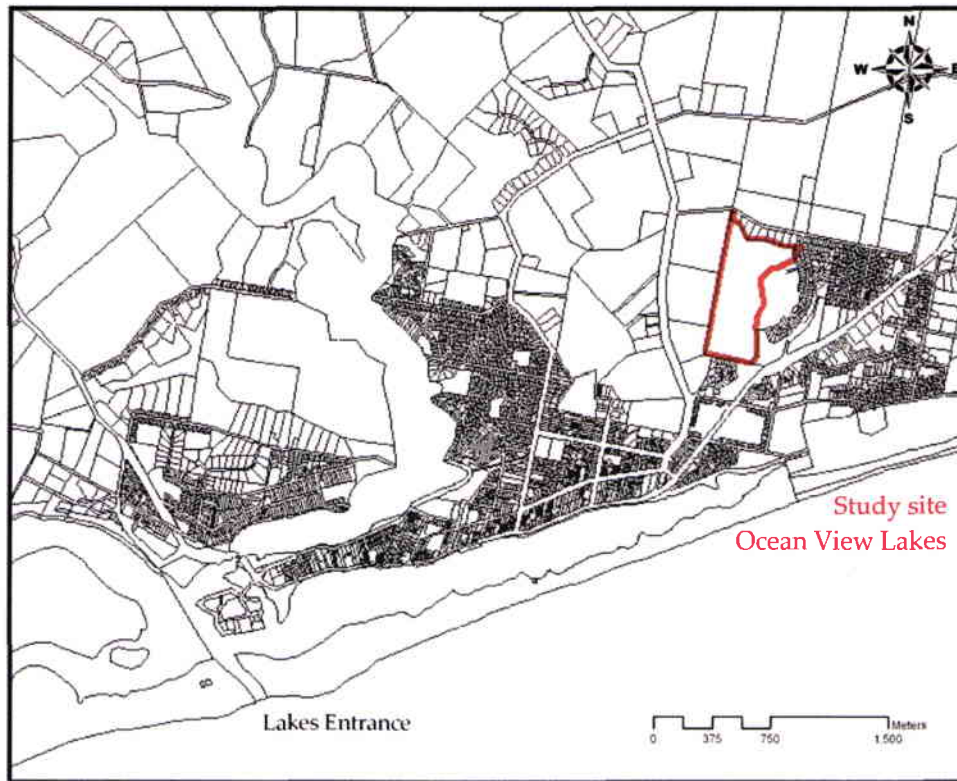


Figure 1-1 – Proposed Ocean Lakes View development site

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The topography of the site is steeply sloping. The site is primarily cleared grazing land with little vegetation. Historically, the land use was agricultural with grazing the primary venture. The land is no longer grazed and remains mostly unused.

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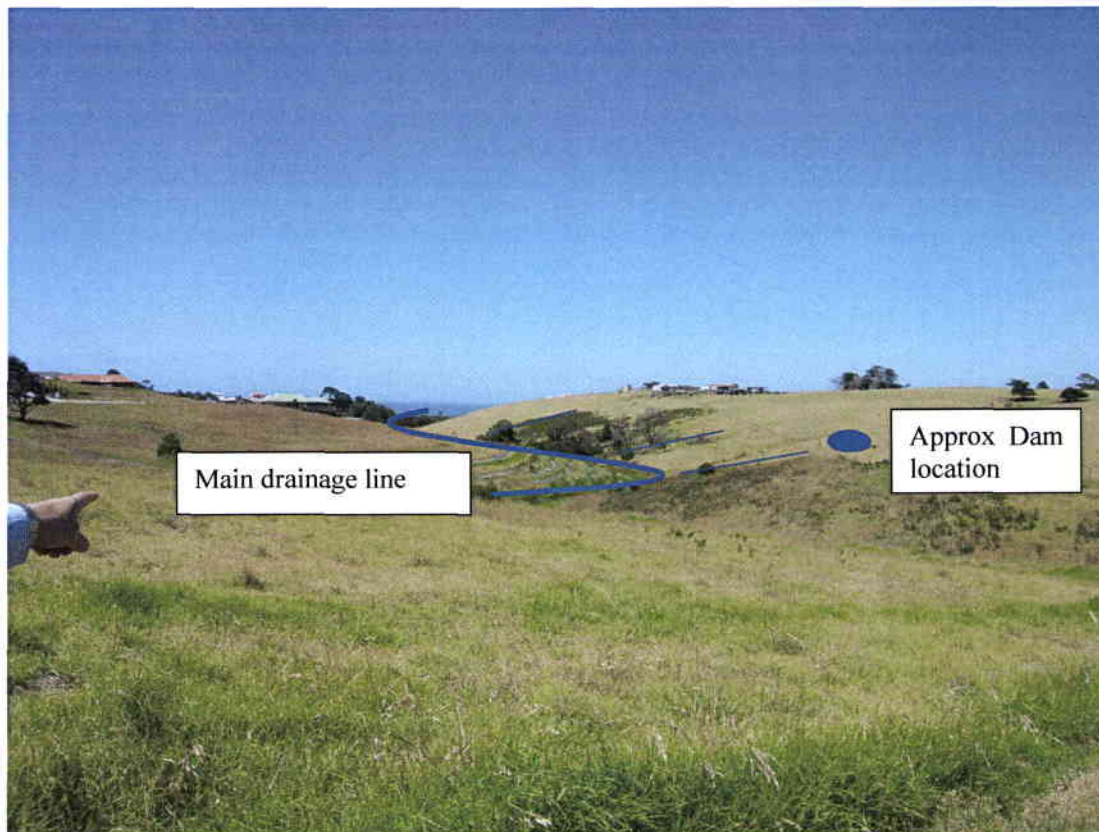


Figure 1-2 – Typical development site terrain (approximate hydrological features)

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Current hydrological features include a dam located in the north western corner of the property and a number of gully lines which traverse the site. These minor drainage lines on the study site lead into the main drainage line on the eastern boundary of the site, which is the major drainage line for the greater catchment. Some additional flow from the neighbouring development adjacent to the site also enters this major drainage line.

The outflow from the major drainage is retarded by a major retarding system then runs into the gully/creek system to the south east of the Ocean View Lakes site. Runoff generated from the adjacent developed land to the east of the study site also collects in this gully/creek system. Downstream from these receiving waters, the runoff drains into the Cunningham Arm of Lake King, part of the Gippsland Lakes system.

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**1.3 Existing Planning Controls**

The site is currently zoned Residential 1 Zone (R1Z). The planning scheme provisions for the land also include an Erosion Management Overlay (EMO)

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### 1.4 Development Proposal

The development proposed for the 33 ha site is a mixed density residential precinct. Figure 1-3 depicts a preliminary concept development plan for the Ocean Lakes View site. The concept development plan includes 185 residential allotments, a medium sized public use/park area and a retirement village of approximately 7 hectares.



Figure 1-3 – Ocean View Lakes proposed development

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## 2 PRELIMINARY ASSESSMENT

### 2.1 Overview

To gain a better understanding of the East Gippsland Shire Council (EGSC) and East Gippsland Catchment Management Authority (EGCMA) concerns regarding the proposed development, a preliminary assessment of stormwater management and water quality related issues has been carried out. The scope of the preliminary assessment was as follows:

1. A site inspection
2. Review of relevant meteorologic and hydrologic data for the waterways which traverse the site
3. Review of site survey plans making a preliminary assessment of water quality concerns for the site
4. Review of proposed development plans for the site
5. Meeting with the EGCMA and EGSC to discuss possible development scenarios for the site.

### 2.2 Surface Water Quantity Issues

#### 2.2.1 Site Analysis

The site from a hydrological viewpoint is a highly degraded catchment with little to no remanent vegetation or existing water courses. Several gully lines with minor erosion lead to the major drainage line along the gully bordering the eastern boundary of the site. Evidence of a previous dam at the top end of this drainage lines show signs of erosion. This may be attributed to the appropriate removal of this structure.

The main gully has been replanted in some areas, however in general a highly matted, exotic vegetation type predominates. This will lead to some water quality benefits, however, the general state of the waterway does not benefit from this situation. The gully line terminates at a constructed retarding basin structure, designed in theory to reduce the generated flows from the subdivision to the east of the site. It is unknown whether this structure is sufficient to reduce the flows generated from the proposed subdivision.

#### 2.2.2 Flooding

The proposed development area is wholly outside of any LSIO thus there are no flooding issues for the development site.

#### 2.2.3 Site stormwater quantity

The proportion of impervious area of the site can be expected to increase significantly through development, subsequently increasing stormwater runoff volumes and peak flows. If these larger flows are uncontrolled they may lead to local drainage problems such as *head-cut* erosion, flooding of property downstream of the receiving waters and degraded waters draining into the environmentally sensitive

Gippsland Lakes system. The management of stormwater quantity should be considered carefully due to the large drop in elevation between the site and the receiving waters (approximately 20 m).

#### 2.2.4 Summary of key issues

The surface water management issues for the development site that were identified include:

- Changed runoff yield characteristics due to extensive residential development;
- Management of waterway form and hydraulics
- Management of possible erosion, and mitigation of existing erosion sites (former dam site);
- Treatment of stormwater entering the Lakes system

### 2.3 Surface Water Quality Issues

#### 2.3.1 Development water quality characteristics

The proposed development will result in extensive land use change which, in turn, will change the runoff quality characteristics. Litter is the most visible form of pollution although contaminants such as sediment, nutrients, oil, oxygen demanding substances, residual chemicals and fertilisers are the also of concern. Depending on the relative concentrations of these contaminants, poor quality stormwater can result in fish kills, algal blooms or accumulation of toxins resulting in decreased waterway health.

An assessment of the stormwater threats was required to identify the changes in runoff water quality and potential pollutant loads under proposed development conditions.

#### 2.3.2 Stormwater management

Stormwater treatment systems and management plans are typically mandatory to protect the quality of the receiving waters to prevent the consequences of severely contaminated stormwater outlined previously. EGSCs planning scheme now includes *Schedule 56.07 – Integrated Water Management*; outlining the water quantity and quality requirements for new residential developments. It specifies that urban stormwater management systems must be designed to meet the current best practice performance objectives for stormwater quality as set out in the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee, 1999). A stormwater treatment system developed specifically for the proposed Ocean View Lakes development must be developed and accepted by the EGSC prior to approvals being granted.

In order to demonstrate compliance with *Schedule 56.07*, conceptual modelling of the proposed stormwater treatment system is required.

### 2.3.3 Summary of key issues

The surface water quality issues for the development site that have been identified include:

- Assessment of stormwater threats;
- Size and location of treatment measures;
- MUSIC modelling to demonstrate water quality objectives (Clause 56.07) can be met; and
- Stormwater Management Plan developed for construction and operational phases.

Analysis of the four aspects outlined has been undertaken in order to assess and demonstrate satisfaction of EGCMA and EGSC requirements for the development.

## 3 DIGITAL TERRAIN MODEL

### 3.1 Introduction

The various technical assessments outlined in the scoping study (Section 2) all require some terrain data. As such, a digital terrain model (DTM) of the study site was developed.

### 3.2 Available Data

Terrestrial survey information has been provided by Watson Pty Ltd. Error! Reference source not found. depicts the survey base data over the study area.

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Figure 3-1- Base Terrestrial Survey Data

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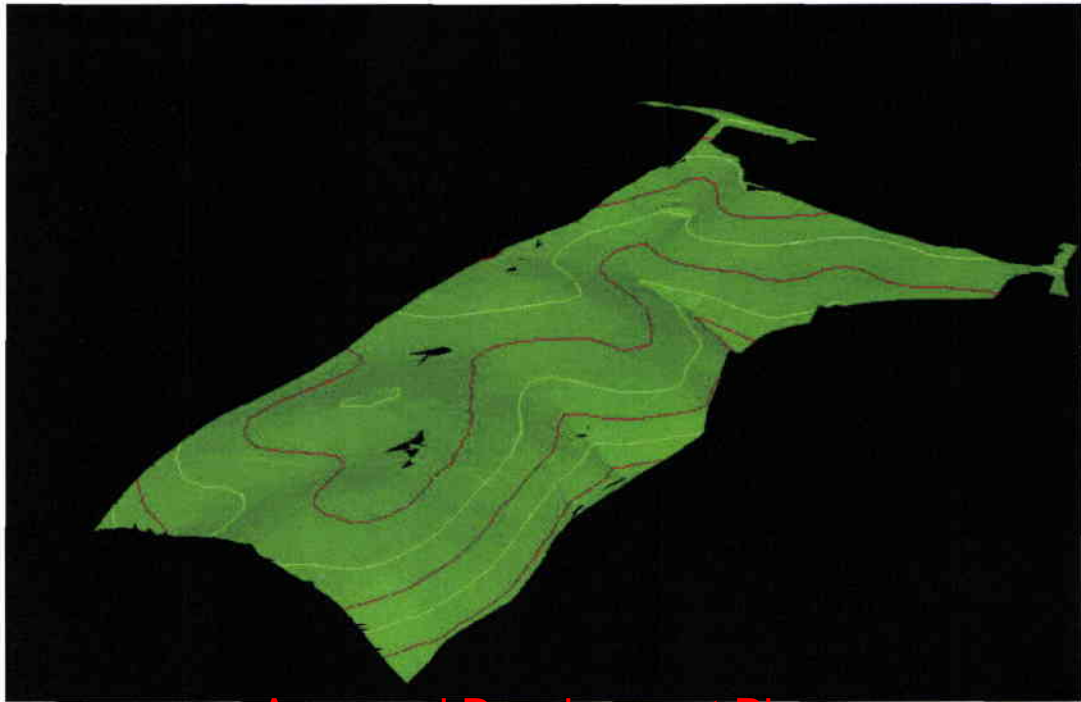
### 3.3 Terrain Model Development

A digital representation of the topography of the study site was formed. Utilising the terrestrial survey, a triangulated irregular network (TIN) was constructed to be used for digital terrain modelling. The TIN was used to guide the water balance, and water sensitive urban design element assessments.

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**Figure 3-2 – Perspective View of Terrain Model (TIN)**  
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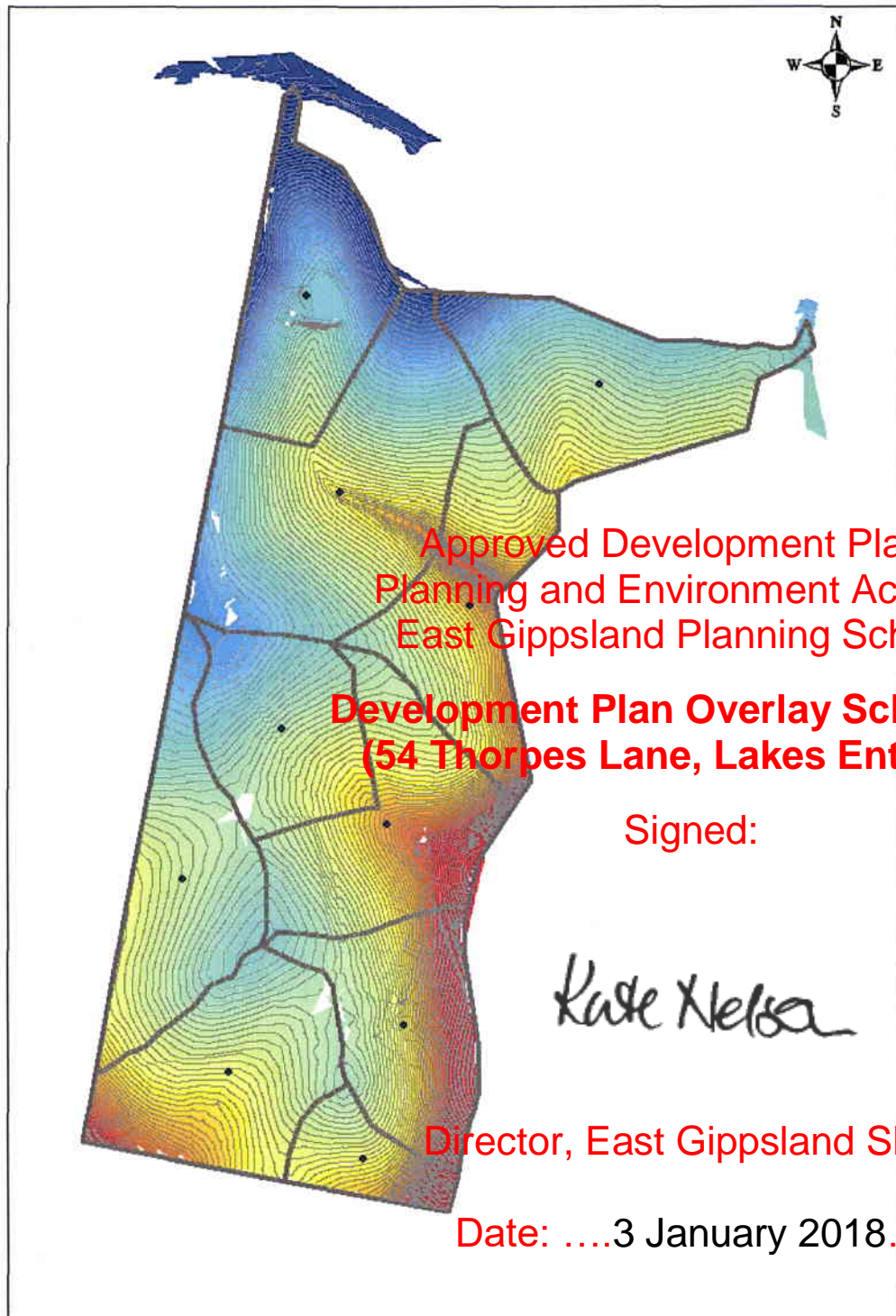


Figure 3-3- Plan View of Final Terrain Model (TIN)

## 4 SURFACE WATER MANAGEMENT

### 4.1 Overview

Under current undeveloped conditions the surface water from the steeply sloping study site runs into the gully along the eastern boundary.

Due to the location of this natural water course the optimum outcome for the surface water management is to direct all discharge into the gully/creek system along the eastern boundary of the site.

The proposed Ocean View Lakes development will increase the impervious area of the site. This will lead to a significant increase in flows which must be treated.

### 4.2 Catchment Delineation

To adequately characterise catchment hydrologic response, the boundary of the greater catchment must be known. The catchment delineation was undertaken drawing on limited contour information and aerial photographs.

The greater catchment encompasses the proposed Ocean View Lakes study site and also a portion of the existing neighbouring development. The drainage line for the greater catchment lies along the eastern fringe of the study site.

The greater catchment was then broken up into 16 sub catchments of approximately equal size. These sub catchments were based on the topography of the site and also the proposed land use under developed conditions. The sub catchments, shown in Figure 4-1.

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Figure 4-1- Catchment Delineation- 16 sub catchments.

Figure 4-2 depicts the best available estimation of the area associated with the greater catchment. The study team consider the catchment delineation to be adequate for the purposes of the hydrologic assessment.



Figure 4-2- Catchment Delineation

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### 4.3 RORB Model Development

In order to assess the rainfall-runoff relationship and subsequent stormwater and surface water management plan under developed conditions, an adequate approximation of the system must be developed and calibrated to historical conditions.

#### 4.3.1 Meteorologic data

Table 3 below details the Intensity Frequency Duration (IFD) data used in the calibration of the RORB model. The log normal rainfall intensities for the site are taken from Australian Rainfall & Runoff, 1987, Volume 2.

Table 4-1- Lakes Entrance IFD data

Lakes Entrance		Latitude: 37.88° South. Longitude: 147.991° East	
Log Normal Intensities			
2 year ARI		50 year ARI	
1 hour	19.735 mm/hr	1 hour	36.452 mm/hr
12 hour	4.545 mm/hr	12 hour	5.533 mm/hr
72 hour	1.387 mm/hr	72 hour	2.944 mm/hr
Geographic Factors			
Skewness G: 0.2908	F2: 4.207	F50: 15.433	

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**4.3.2 Catchment inflow hydrology**  
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Adequately approximating the rainfall-runoff relationship of the greater catchment is fundamental in the assessment of long-term stormwater and surface water discharge behaviour. To do this Water Technology reconciled the constructed RORB model against calculated Rational Method calculations using standard Melbourne Water procedures. The calculations for this reconciliation are contained in Appendix B.

Two catchment scenarios were assessed;

*Existing Conditions* and *Developed Conditions*. The *Existing Condition* assessment set out to develop an inflow time-series which is representative of current, undeveloped conditions of the greater catchment. This forms a basis or benchmark, to which future performance could be assessed. The *Developed Conditions* scenario included approximate changes in catchment impervious area that could be expected under developed conditions.

The aim of the RORB routing was to collect all stormwater and surface water runoff and directing it into the channel at the eastern boundary and into the receiving waters below the site. The reach lengths for the two scenarios (existing and developed) remained unchanged. The impervious fraction of each of the subcatchments was the only factor altered to mirror

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the increased volume of discharge from a developed site. shows the reach length and node network for the RORB hydrological analysis.

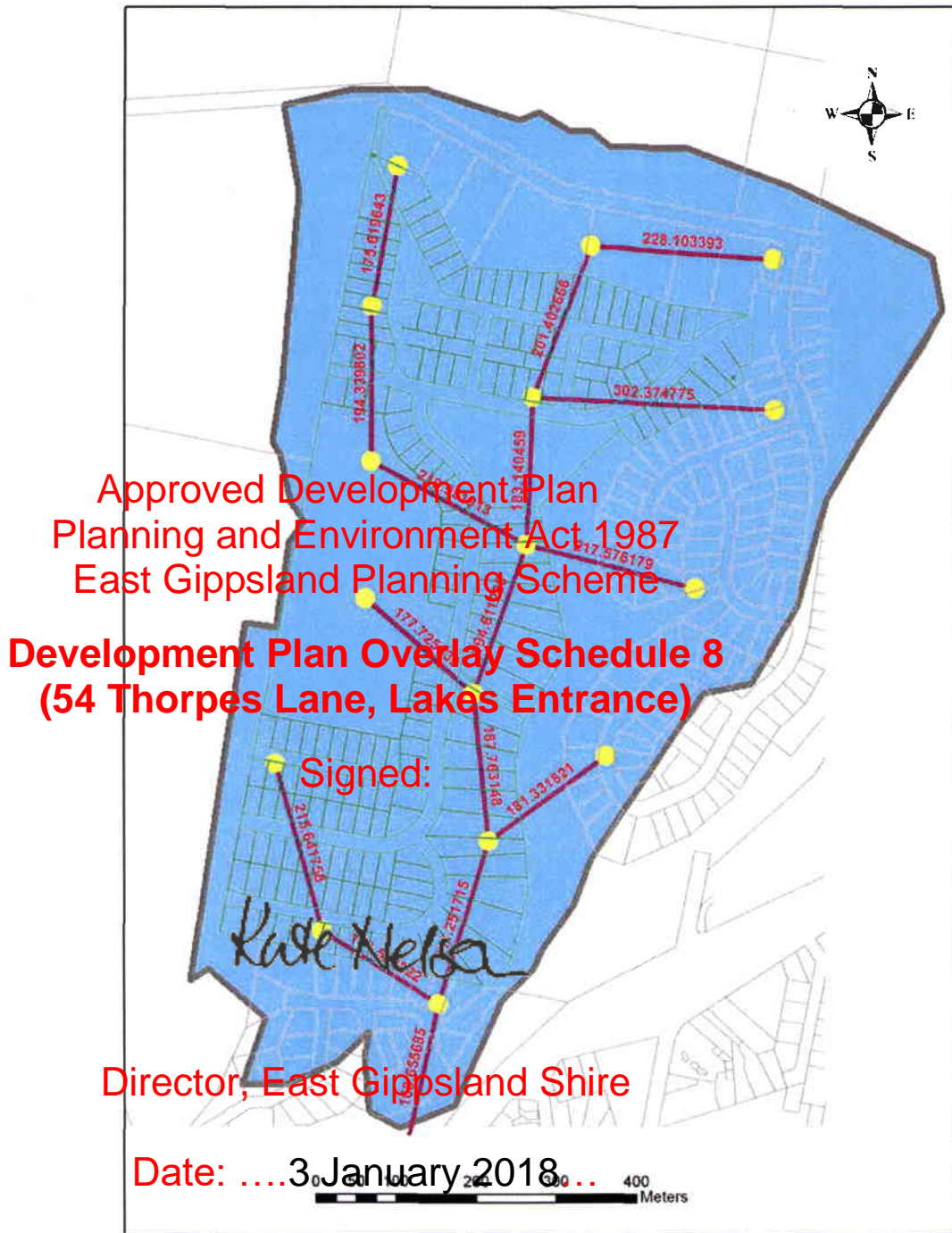


Figure 4-3- RORB node and reach network

4.3.3 RORB Results

Figure 4-4 and Figure 4-5 depict the simulated discharge at the catchment outlet for *Existing* and *Developed* conditions respectively. The volumes and discharges generated through RORB are summarised in Table 4-2.

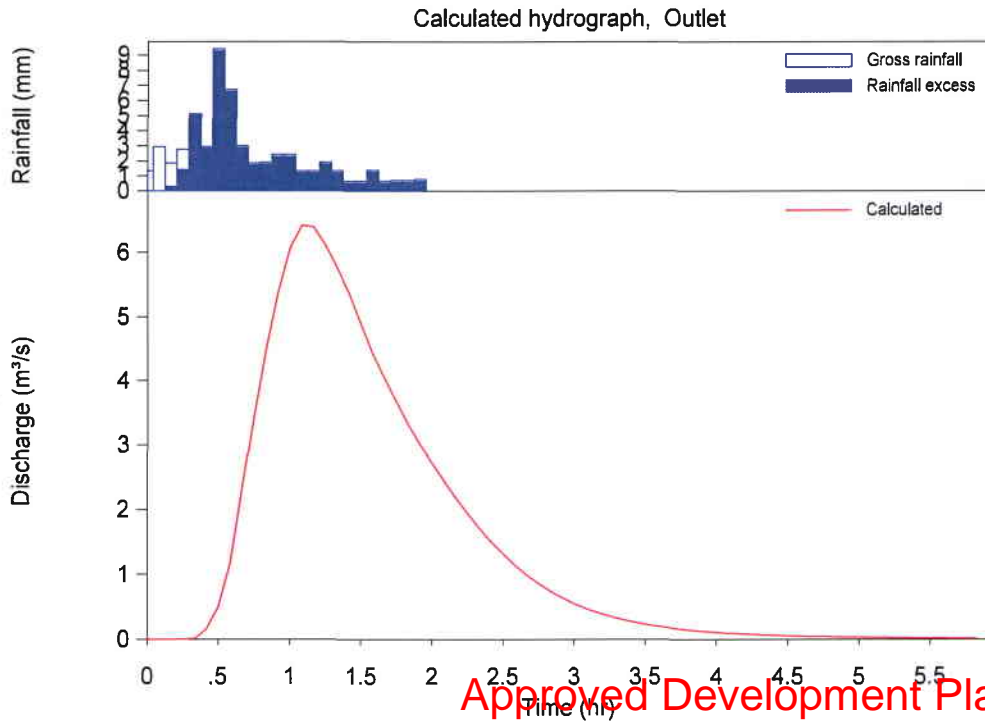


Figure 4-4 Existing Conditions, 2 hour 100 year ARI Hydrograph

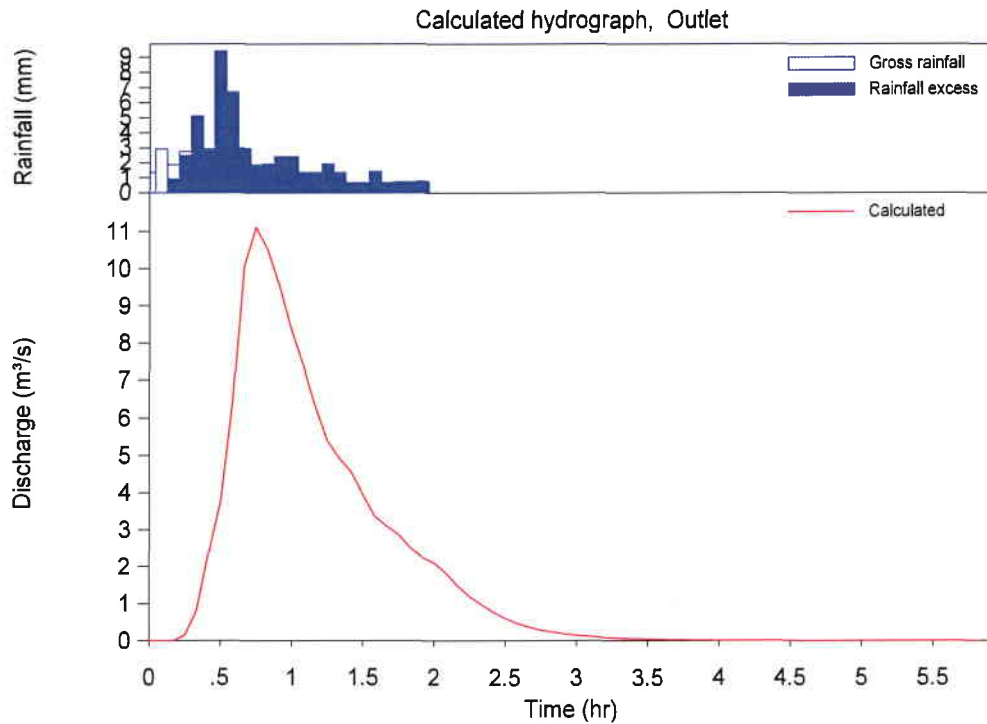
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**Figure 4-5** – Developed Conditions: 2 hour 100 year ARI Hydrograph  
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**Table 4-2 – RORR results**  
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	Existing Conditions	Developed Conditions	Absolute difference	%Increase from Existing to Developed
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<i>2 hour 100 year ARI design storm</i>				
Volume, m <sup>3</sup>	29800	36300	6500	21.81
Peak Discharge, m <sup>3</sup> /s	6.412	11.12	4.708	73.42
<i>2 hour 1 year ARI design storm</i>				
Volume, m <sup>3</sup>	5300	9600	4300	81.13
Peak Discharge, m <sup>3</sup> /s	0.4723	2.443	1.9707	417.26

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#### 4.3.4 Discussion

Based on the results of the hydrologic analysis the approximate volume of storage required to attenuate the flows to pre-development conditions can be calculated. From Table 4-2 it can be seen that for the 100 year ARI storm approximately 6500m<sup>3</sup> of storage is required. A secondary storage requirement of 4300m<sup>3</sup> is required for the 1 year ARI storm, it is assumed this can be accounted for within the larger storage.

Taking into account the results of the Water Quality analysis in section 5 below, it is suggested that this storage be located within the main gully to the east of the site. This site will combine the dual benefits of both stormwater attenuation, and water quality treatments. Figure 4-6 conceptually depicts how this combination retarding basin/wetland system could be designed. As can be seen a low flow wetland would be retained, with additional storage contained within the extended detention of the system. Detailed design of the system is outside of the scope of this report, but it can be calculated that the above storage requirements may be easily accomplished using this type of linear wetland/storage configuration.

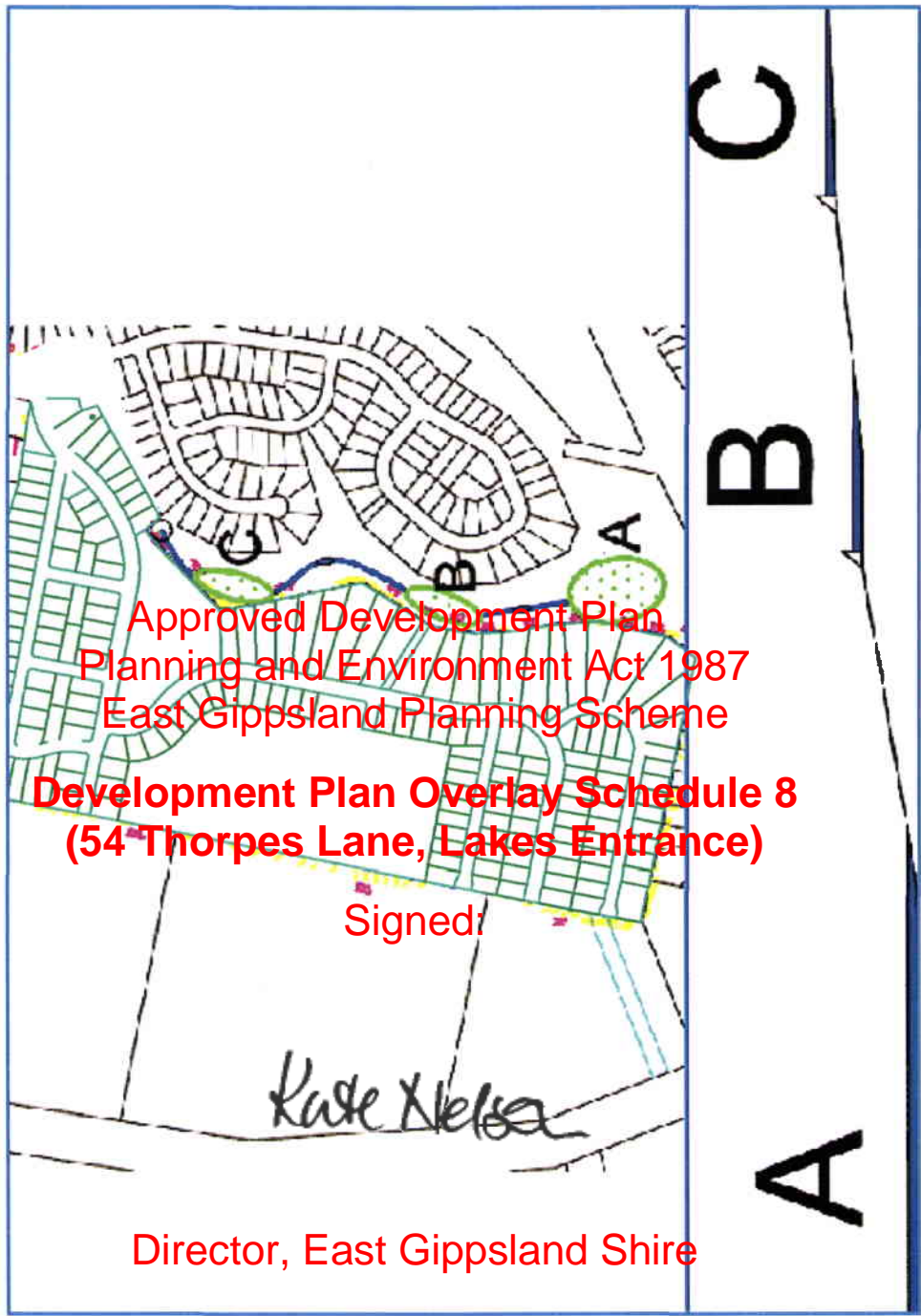
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Figure 4-6 - Development Storage layout Plan

## 5 WATER QUALITY ASSESSMENT

### 5.1 Introduction

The purpose of the Stormwater Management Plan is to develop a framework to improve stormwater runoff from the site. A best practice approach has been taken to ensure a sustainable system is developed.

The stormwater management plan was developed in order to meet the requirements of the recently implemented Clause 56 of the planning scheme (Refer to Appendix A). Clause 56 has been implemented to ensure best management practice urban stormwater management is applied to new development. It requires the development to meet the requirements and satisfaction of the relevant drainage authority and prevent degradation of downstream waterways. The Stormwater Management Plan (SWMP) consists of the following features:

- Review of the surface water management issues for the site as a whole which may impact on the sustainability of water bodies and drainage paths including consideration of Water Sensitive Urban Design (WSUD) principles in the proposed development
- Conceptual design of the proposed stormwater management system options and assessment of their suitability and effectiveness using Best Practice Management tools (stormwater treatment modelling tool MUSIC)
- Feasibility assessment evaluating size and location of proposed treatment options
- Preparation of a report detailing the conceptual design analysis of the WSUD components of the development

### 5.2 Site details

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The proposed development will consist of approximately 26 hectares of residential lots in a total developed area of 33 hectares. A major drainage line flows along the site's eastern boundary in a southerly direction. Additional runoff from developed areas is directed to the eastern boundary line into the major drainage line. A large retention basin is located immediately downstream of the study site, which then drains into a gully/creek system.

Pollution in runoff from residential sites can considerably influence the quality of stormwater entering the drainage line. Common water quality pollutants from residential sources are as follows:

- Litter
- Sediment – creating turbidity and siltation. Other pollutants may be attached to sediment
- Nutrients – promotes algal growth
- Toxicants
- Altered flow – from increased impervious area

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The pollutants produced by the new development will need to be treated within the drainage line to avoid degrading downstream waterways.

### 5.3 Receiving Waters

The major drainage line on the eastern border of the study site will be the initial receiving waterway for the site. The drainage line collects runoff from steeply graded surrounding land.

Downstream of the site the waters run into the creek/gully system. The gully discharges into Lake King, which is part of the Gippsland Lakes system. This system is a high value region in terms of its environmental and economic significance. The Gippsland Lakes is a sensitive region with a range of water quality issues. Improvements to the onsite water quality will ensure that there is no net decline to the Gippsland Lakes system due to the proposed land use changes.

### 5.4 Legislation and Regulations

Residential areas have a responsibility under the Environment Protection Act 1970, the Water Act 1989, the Water Authorities By-laws and Councils Local Laws to prevent the discharge of stormwater waste from their property. This legislation will need to be adhered to when designing the stormwater management system.

Of importance to the site is the recent addition of Clause 56 in the Victorian Planning Provisions, which has altered the site management requirements for subdivisions. As part of these modifications, subdivision applications must now demonstrate their ability to manage and minimise environmental impacts. These requirements can be met through the implementation of treatment measures set out in the stormwater management plan. East Gippsland Shire Council is keen to prevent waterway degradation and has required that stormwater discharges be treated using WSUD principles.

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### 5.5 Construction specific issues

The construction phase of development has the potential to generate significant pollutant loads. Actions required include the development of suitable sediment and erosion control measures in accordance with the EPA Construction Techniques for Sediment Pollution Control (1991) and the EPA Environmental Guidelines for Major Construction Sites (1996).

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### 5.6 Stormwater Management Issues

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### 5.6.1 Value of the Waterway and Receiving Environment

The value of the receiving environment is judged both in terms of its sensitivity to stormwater pollution and the severity of the stormwater threat.

A significant receiving waterway for the site is Lake King, which will receive stormwater input from the surrounding residential land.

#### 5.6.1.1 Environmental Value

The environmental value of a waterway is an important consideration as it can be highly sensitive to poor water quality inflows. The drainage lines are currently considered to have limited environmental value (physical and ecological) as they are predominantly grassed depressions rather than formal waterways.

Of more environmental importance is the downstream receiving waters: Lake King and the Gippsland Lakes system. The Gippsland Lakes are protected by the Ramsar Convention international treaty. First established in 1971, the Ramsar Convention strives to protect and conserve wetlands of international significance because of their ecological, botanical, zoological, or hydrological importance.

The main environmental threats to the Gippsland Lakes system are sediments, pollutants bound to sediments, dissolved nutrients, chemicals and solid litter. Seasonal toxic blue-green algal blooms plague the Lakes. Many stormwater education and infrastructure programs have been put in place to limit these water quality threats to the lakes.

#### 5.6.1.2 Amenity Value

The gully/creek system receiving waters run between privately owned property though council land. The amenity value to the general community is low. Currently there is no landscaping along the drainage lines and there are limited recreational uses. Water Sensitive Urban Design (WSUD) features, as part of the residential development, are likely to improve the visual attractiveness of the drainage line.

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#### 5.6.1.3 Economic Value

As the onsite waterways are small and ephemeral gully lines, there is no economic benefit derived from the waterway in terms of fishing or transport. The presence of drainage lines, however, would positively impact on surrounding land values. The residential development is unlikely to impact on the economic value of the drainage lines.

#### 5.6.1.4 Hydraulic Value

The major drainage line is located at the base of a relatively steep hill; hence there is a fairly low/negligible flood risk to the proposed development area. Development will increase the amount of runoff due to an increase in impervious surfaces. Incorporation of WSUD features that serve a dual function of water quality treatment and flood mitigation would be of benefit to the receiving waters.

### 5.6.2 Threats from Stormwater

Threats to the receiving waterway as a result of poor stormwater management are judged in terms of the scale and frequency of pollution. As development of the site will increase the impervious area there is potential for polluted stormwater to enter Lake King if proper management is not undertaken.

Typical residential threats to waterways include litter, sediment, toxicants, deoxygenating materials, flow and nutrients.

### 5.6.3 Priority Risks

Main threats to the receiving waterway are as follows:

- Poor water quality from the residential development entering the receiving waterway and impacting on the downstream environmental value
- Increased flow from a greater impervious area creating flooding and/or scour issues downstream
- Poor water quality and sediments entering the waterway during construction of the residential development

## 5.7 Roles and Responsibilities

In order to ensure long term sustainability of the WSUD over the lifespan of the features, a range of roles and responsibilities must be defined.

As the WSUD features are to treat stormwater falling on the development site, it is the responsibility of the developer to ensure the following:

- Best management building practices are adhered to during construction
- Assume responsibility for the design of WSUD features
- Fund the construction of all new WSUD features, including plantings and stormwater drains leading to the features
- Maintenance of the new WSUD features for the first three years after construction

It is envisaged that after a three year period the maintenance of the new WSUD features will pass over to Council. At this time the WSUD features will be handed over in a well maintained condition and entirely constructed.

## 5.8 Concept Design Considerations

### 5.8.1 WSUD Opportunities

Water Sensitive Urban Design (WSUD) features have been recommended for the site as they will treat the stormwater from the residential development before it reaches Lake King. WSUD components are a preferred option to treat the stormwater as

they limit the conventional pipe and drain systems and improve water quality through natural systems.

The main objectives of WSUD, as defined by the Victorian Stormwater Committee (1999), are as follows:

- Protect natural systems
- Integrate stormwater treatment into the landscape
- Protect water quality
- Reduce runoff and peak flows
- Add value while minimising development costs

The following Water Sensitive Urban Design measures have been short listed based on the values, constraints and opportunities for the proposed development site (refer **Error! Reference source not found.**).

**Table 5-1- Suitability of WSUD Techniques to the Proposed Development**

WSUD Measure	Suitability to the Proposed Development (Low, Medium, High)	Description
Vegetated Swales	Medium	Provide primary treatment and transfer runoff in a manner that is integrated into the landscape and helps to minimise the pervious surface area. This is not a suitable option for all of the site due to steep gradients.
Bioretention Systems	Medium	Bioretention swales, basins and infiltration measures can be used to remove finer particles and related contaminant.
Gross Pollutant Traps	Low	Primary treatment of stormwater including removal of debris, coarse sediments and litter. It is assumed that litter removal will occur on a lot scale by stormwater pit grates.
Sedimentation Basins	High	Temporary storage and removal of large sediments and related contaminants.
Stormwater Treatment Ponds and Wetlands	High	Tertiary treatment, temporary storage of stormwater.
Porous Pavements	Low	Reduce runoff from paved surfaces and can provide limited water quality treatment. However at a large scale this can be an effective measure to reduce runoff.

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Any proposed development should avoid detrimental impact to the drainage line. There is the opportunity to greatly enhance the environmental and recreational values of the waterways as part of the proposed development.

By incorporating the principals of WSUD, it is possible to put in place best practice management techniques to ensure minimal impact on water quality in the Gippsland Lakes.

### 5.8.2 Constraints

Urban development increases the nutrient load of the stormwater compared to agricultural land uses. As such, strong consideration needs to be placed on the incoming stormwater to the gully/creek system. Without pre-treatment, there is a potential for the additional nutrients to promote algal activity within the downstream receiving waters.

Due to the steep grades, a significant portion of the site is unavailable for WSUD treatment measures. Significant treatment space is located adjacent site to the south east where the major drainage line enters the gully/creek system. The gully poses location constraints as it is on council land.

Cost is always a major constraint to the implementation of water sensitive urban design features. Costs are associated with the construction, maintenance and decommissioning phases of the design. The concept design for the stormwater management system has endeavoured to meet best management practices while providing the most cost effective solution.

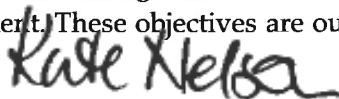
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### 5.8.3 Target Reductions

Best Practice WSUD is based on performance objectives for the receiving waterway. Water quality objectives are set in order to prevent degradation of the waterway as a result of the residential development. Water quality treatment requirements outlined in this report have been developed primarily to treat surface runoff generated on the Ocean View Lakes development site. The topography of the greater catchment and the confluence of runoff from the site and the neighbouring development into the gully/creek system dictates that additional runoff from this easterly neighbour be treated. Best practice water quality objectives, as stated in the Urban Stormwater Best Practice Environmental Management Guidelines (1999), have been adopted for the proposed development. These objectives are outlined in Error! Reference source not found.

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**Table 5-2- Objectives for Environmental Management of Stormwater**

Pollutant	Receiving Water Objective	Current Best Practice Performance Objective
<i>Post Construction Phase</i>		
Suspended Solids (SS)	Comply with SEPP (e.g. not exceed the 90 <sup>th</sup> percentile of 80 mg/L)	80% retention of the typical urban annual load
Total Phosphorus (TP)	Comply with SEPP (e.g. base flow concentration not to exceed 0.08 mg/L)	45% retention of the typical urban annual load
Total Nitrogen (TN)	Comply with SEPP (e.g. base flow concentration not to exceed 0.09 mg/L)	45% retention of the typical urban annual load
Litter	Comply with SEPP (e.g. no litter in waterways)	70% retention of the typical urban annual load
Flows	Maintain flows at pre-urbanisation levels	Maintain discharges for the 1.5 year ARI at pre-development levels
<i>Construction Phase</i>		
Suspended Solids	Comply with SEPP	Effective treatment of 90% of daily run-off events (e.g. <4month ARI). Effective treatment equates to a 50%ile SS concentration of 50 mg/L.
Litter	Comply with SEPP (e.g. no litter in waterways)	Prevent litter from entering the stormwater system.
Other Pollutants	Comply with SEPP	Limit the application, generation and migration of toxic substances to the maximum extent practicable.

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(Source: Urban Stormwater Best Practice Environmental Management Guidelines 1999)

**Signed:**

The objectives can be achieved by employing a range of structural treatment options. Performance of the structural treatment options has been assessed using the modelling program MUSIC.

**5.9 MUSIC**



MUSIC (Model for Urban Stormwater Improvement Conceptualization) is a modelling program developed by the CRC for Catchment Hydrology. It was developed in order to assess the impact of WSUD features on the receiving waterway. A useful feature of the program is to calculate the reduction of nutrients compared to WSUD guidelines for individual components or an entire treatment system.

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The development was represented in the model as a series of residential areas connecting to a “treatment train” of WSUD features, before ending at the receiving body. The layout of the model is shown in Figure 4-1. The model has been prepared with features that treat the runoff from the development areas. All proposed WSUD features have been sized to treat the developed flow generated from the site, however wider catchment benefits will also be observed.

The stormwater will be treated by online WSUD measures. The final flow input into the Creek/Gully system has been schematised as the receiving node, as seen in Figure 5-1.

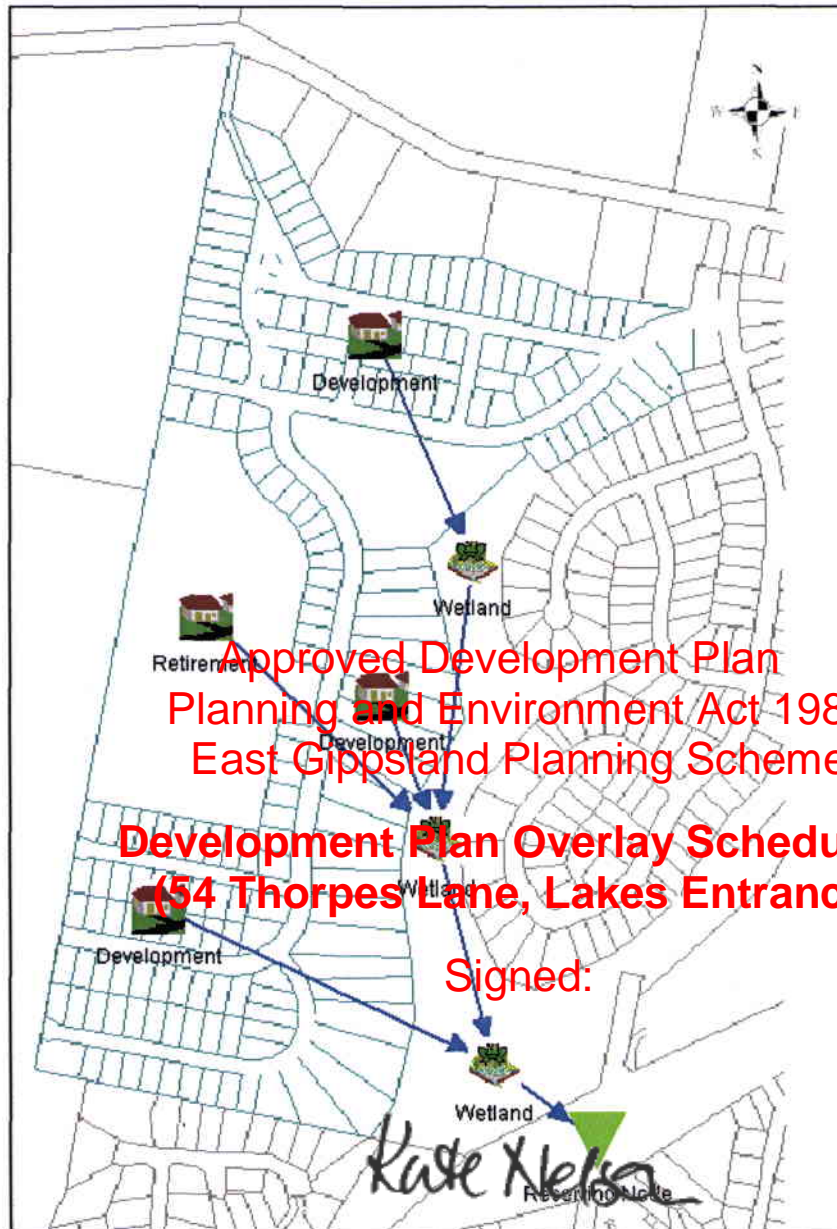


Figure 5-1- MUSIC Model Layout

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MUSIC requires the determination of various parameters to represent the conditions at the site. The following inputs were considered:

- Rainfall – Rainfall data was obtained from the Bureau of Meteorology. Daily rainfall data from the nearby stations at Bairnsdale (Station numbers 084146, 084100 and 084080) were integrated to produce a rainfall record from 1896 to 2004.
- Evaporation – Average monthly evaporation data was also sourced from Bairnsdale.
- Areas – All area data was based on the Concept Development Plan shown in Figure 5-1.
- Imperviousness Fraction – Medium/high density residential areas are typically 80% impervious due to the prevalence of rooftops and roadways. The major drainage line was assigned an impervious fraction of 10%, as was the public use area located in the north-west corner of the site.
- Pollutant Levels – Pollutants generated from the residential areas were based on typical values for residential developments (as shown in the MUSIC manual). These pollutant loads were not based on actual measurements.

## 5.10 Design Components

### 5.10.1.1 Residential Lots

The residential lots were segmented into four sections to allow stormwater to be input into the drainage line at the appropriate location. The stormwater flow generated from the lots is based on the area and fraction imperviousness. Typical pollutant loads were sourced from the MUSIC Users Manual.

The development site produced the following outflows shown in Table 5-3. Without any treatment measures these pollutants would directly enter the gully/creek system.

Table 5-3 Untreated annual pollutant load

Condition	Loads
Flow	161 ML/yr
Total Suspended Solids	32400 kg/yr
Total Phosphorus	66.2 kg/yr
Total Nitrogen	462 kg/yr
Gross Pollutants	5680 kg/yr

*Kate Nelson*

### 5.10.1.2 Prior WSUD components

Dam

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The constructed dam that is in the top north-western corner of the property provides very minimal water quality treatment. It collects very little surface runoff in its immediate catchment and under the proposed Ocean View Lakes development will be filled in. As such, the dam has no capacity to treat stormwater and surface runoff.

### Swales

All the drainage lines throughout the property are grassed depressions, which would have comparable treatment functions to constructed swales. Swales are essentially a vegetated drainage channel that allows natural processes to remove pollutants Figure 5-2. They are most effective at removing coarse and medium sediments, including the nutrients attached to the sediment. Current drainage lines will not be included as WSUD features in the model.



Figure 5-2– Grassed Swale

## 5.11 Optimised WSUD components

In order to meet the best practice guidelines, a series of WSUD features were incorporated into the design to treat the additional stormwater produced by the residential development. As stated previously, the current dam and grassed drainage lines will not be incorporated into the pollutant reduction calculations, ensuring a conservative model is established.

The MUSIC program was used to model the treatment of stormwater. The following new measures were proposed.

Signed:

### Wetlands

In order to provide sufficient water quality treatment of the stormwater before it enters the Gippsland Lakes a linear wetland system has been proposed. A linear wetland system is a series of open waterways, typically with an undulating depth less than 1.5m (see Figure 5-3). This type of treatment train is used to detain flows and allow sedimentation and nutrient reactions to take place. A wetland is able to provide water quality benefits in addition to flood retardation and habitat.

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Figure 5-3- Wetland

The optimised wetlands have the following specifications, as shown in Figure 5-4.

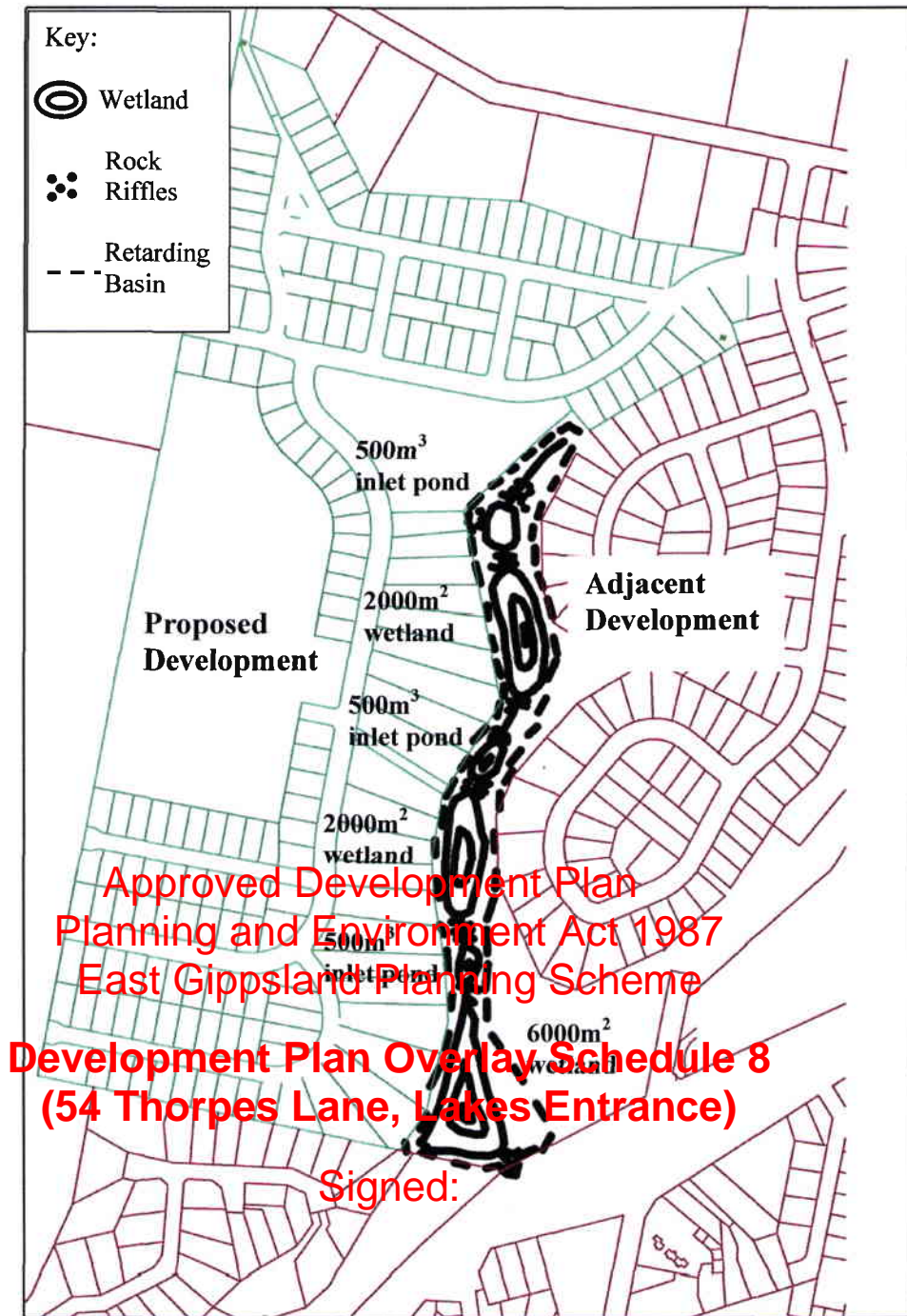


Figure 5-4 Wetland Conceptual Details

Construction of this linear wetland system will occur within the drainage line and along the eastern border of the site. Modification to the current drainage line will be required; however it will be of net benefit to the waterway.

Figure 5-5 displays the conceptual layout of the linear wetland system within the development. The wetland system is intended to treat the low (0.25 ARI) flows and will need to be scour protected and suitably planted for larger flow events.

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*Kade Nelson*  
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Figure 5-5- Conceptual Model Positioning of the Wetlands

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## 5.12 Compliance with Objectives

### 5.12.1 WSUD Performance

The treatment performance of the WSUD features, in addition to the proposed residential development, have been evaluated using CRC for Catchment Hydrology MUSIC model (version 3). Table 5-6 provides pollutant removal details .

Table 5-6 – MUSIC modelling results

Parameter	Target Reduction	No WSUD treatment features	With WSUD treatment features	
		Annual pollutant load	Annual pollutant load	Reduction
Flow	Maintain pre-development flows	161 ML/yr	148 ML/yr	8.2 %
Suspended Solids (TSS)	80%	33100 kg/yr	4160 kg/yr	87.4 %
Total Phosphorus (TP)	45%	66.7 kg/yr	17.6 kg/yr	73.2 %
Total Nitrogen (TN)	45%	463 kg/yr	232 kg/yr	49.8 %
Gross Pollutants	70%	5680 kg/yr	0 kg/yr	100 %

It is apparent from Table 5-6 that the water quality objectives are exceeded by the proposed WSUD layout. In addition, the treatment of stormwater and the amenity value of the site are enhanced by these treatment features.

### 5.12.2 Cost

Costs associated with WSUD take into consideration the price during construction and maintenance over the following three years. After which time it is assumed that the features will be handed over to the council. The costing includes the following features:

- Construction – including earthworks and plantings
- Maintenance – routine annual maintenance
- Renewal / Adaptation – infrequent maintenance such as re-contouring and planting ponds
- Inflation – using 2% inflation
- Real Discount Rate – 5.5% rate

The following costing in Table 5.7 is based on a three year maintenance lifespan. Construction costs are based on values presented in Taylor (2005). Detailed design will be required for a comprehensive cost estimate.

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**Table 5-7 – Cost Breakdown**

WSUD Feature	Costing Component	Cost
Wetland 1	Construction Cost	\$270,000
	Regular Maintenance	\$21,855
	Renewal / Adaptation Cost	\$5,730
	<b>Subtotal</b>	<b>\$297,585</b>
Wetland 2	Construction Cost	\$239,129
	Regular Maintenance	\$24,966
	Renewal / Adaptation Cost	\$6,327
	<b>Subtotal</b>	<b>\$270,422</b>
Wetland 3	Construction Cost	\$225,000
	Regular Maintenance	\$18,672
	Renewal / Adaptation Cost	\$5,097
	<b>Subtotal</b>	<b>\$248,769</b>
<b>TOTAL 3 year cost</b>		<b>\$1,232,166</b>
<i>Average cost per year</i>		<i>\$410,722</i>

**5.13 Feasibility Assessment**

**5.13.1 Cost effectiveness**

The Water Sensitive Urban Design features implemented for the site will provide multiple benefits to the receiving waters compared to pipe and drain systems. A substantial reduction in water pollutants from the site, to best practice standards, will ensure that downstream waterways will not be adversely affected. The benefits to the waterways are possible for a relatively low cost.

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**5.13.2 Implementation Capability**

The land developer will have sufficient resources to enable construction of the WSUD features. The bioretention systems and wetlands will provide an attractive feature that will increase visual and ecological amenity and reduce flooding on the site.

The capacity of the Council to maintain the features in the long term will need to be considered. However, this is a typical scenario if there is a significant benefit to the waterways.

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*Kate Nelson*

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### 5.13.3 Opportunity

There is sufficient land available adjacent to the development to enable the WSUD features to be implemented. The features have been sized to make the best use of the available space, while providing the greatest water quality treatment.

### 5.13.4 Benefits

The WSUD features incorporated into the proposed residential development are designed to provide water quality, flood mitigation and public amenity benefits including the;

- Treatment of site runoff before outfall to the Gippsland Lakes
- Rejuvenation of the existing gully/creek system adjacent to the site
- Continual treatment of flows from the greater catchment using the wetland system, and the subsequent improvement of water quality in the Gippsland Lakes
- Provision of landscaping that will be beneficial for the wider community

### 5.14 Recommendations

There is a potential for the proposed residential development to degrade downstream waterways if not managed effectively. Hence, a stormwater management plan has been formed to consider the values of the receiving environment and potential threats caused by the development. As part of this plan, structural measures were recommended to treat the stormwater runoff.

A series of linear wetlands has been recommended for the study site in order to treat the stormwater to best practice levels. Through the use of the modelling program MUSIC, the treatment measures have been optimised to provide the most cost effective solution while meeting pollutant reduction targets.

This solution is considered to be a sustainable one for the location and would provide substantial benefits to the onsite drainage lines and the receiving waters.

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## 6 EROSION MANAGEMENT PLAN

Erosion is the displacement of soil as a consequence of erosive forces such as wind, water, slope, or ice. It is a natural process; however, if enhanced by human interference can cause devastating effects to the landscape. In order to reduce the amount of erosion in the development, the erosion potential and possible mitigating options must be determined and implemented.

### 6.1 Erosion Potential

The potential for soil to erode is determined by five critical factors:

- Erodeability of the soil (type and structure)
- Lack of Vegetative Cover
- Topography – steep gradients
- Climate (high rainfall and wind)
- Nature of Land Clearing

When any of these factors, or a combination of these factors, is present the soil must be considered to have erosive potential. Once this has been determined, strong consideration needs to be placed on the water velocity across the slope. Table 1 gives an indication of maximum velocities for some typical soil types.

**Table 6-1 Maximum velocities for various soil materials**

Soil Material	Maximum Velocity (m/s)
Sand	0.3
Soft Clay	0.3
'Stiff' Clay	1 – 1.2
Coarse Gravel	1.3 – 1.8
Rock lined channels (100-150mm)	2.5 – 3.0
Grassed surfaces	1.8 (2.5 for short periods)

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For constructed drainage lines it is usually considered appropriate to have a velocity of up to 0.5 m/s in a 10 Year ARI event and up to 2 m/s in a 100 Year ARI event to reduce erosion.

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## 6.2 Erosion Control Devices

Many measures exist to control or prevent damage caused by erosion. Largely their application is based on the velocity of the water, cost, and site constraints such as steep slopes. The following is a list of typical erosion control measures.

Erosion Control Mats. Erosion Control Mats are manufactured as permanent, semi-permanent or temporary.

- Temporary mats are 100% biodegradable. This type of mat is mostly used as a temporary erosion control measure, where significant overland flow velocities are not present. They can assist in vegetation establishment and weed control.
- Semi-permanent mats consist of a biodegradable mat with reinforcing mesh. They provide a more stable base than temporary mats; however they are not a permanent erosion control measure.
- Permanent root and grass reinforcement mats will generally be black in colour and will contain mat reinforcing, root reinforcing / protection, and a mulch layer or synthetic mulch substitute (Brisbane City Council, 2004). They are designed to provide permanent root reinforcement, and can provide up to twice the erosion protection of un-reinforced vegetation (Hyperactive Technology, 2004).

Spray on Mats. Hydraulically applied mats are ideal for steep slopes and irregular surfaces.

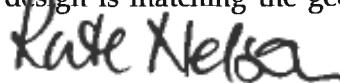
They are used to control wind and water erosion, in addition to allowing seed growth and retaining topsoil.

Gabions. Gabions are wire baskets filled with rocks of a specified size. They have a variety of uses in stream banks and pipe outfalls as they are able to protect the underlying soil from high velocities.

Geotextile. Geotextiles are manufactured fabrics / composites which provide protection for erodible soils. They are designed for various purposes such as to protect, separate, filter, reinforce or drain. As such, there are many different types of geotextile layers with varying properties.

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Rock Chute. Rock Chutes are typically used where high velocities are observed. Common uses are at pipe outfalls, stabilising channel beds, and steep gradients. An important consideration for design is matching the geometry and rock size to the expected flow.



Vegetated Surface.

Natural vegetation reduces the erosive potential of the soil by binding the soil and providing roughness. Often other erosion mitigation options are enhanced by the use of vegetation. Table 2 indicates the maximum velocities allowed with various ground covers and soil erodability categories.

**Table 6-2 Maximum velocities for various ground covers**

Ground Cover	Maximum Acceptable Velocity (m/s)		
	Soil Erodability		
	Low	Moderate	High
Mat or sword grasses with UV stabilised mesh	3.0	2.7	2.4
Kikuyu grass	2.5	2.2	1.9
Couch grass, carpet grass, rhodes grass, sword forming grasses	2.0	1.8	1.4
Other improved perennials	1.6	1.3	0.9
Tussock grasses	1.3	0.9	0.5

Source: WSUD Technical Guidelines for Western Sydney (2004) – Appendix A

Table 2 indicates that soils with lower soil erodability are able to withstand a greater velocity. Also the combination of grasses and mesh has a greater resistance to high velocities.

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Control Structures. As most of the erosion damage is done in the initial parts of the storm, it is advisable to include control structures to account for peak flows. Examples of control structures are coir logs, gabions, sediment fences, and geotextile filters.

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**6.3 Selection of the appropriate measure**

The erosion potential and mitigation option for each pipe outfall, WSUD measure, or modification to flow in the development must be considered independently.

*Kate Nelson*

For each structure or feature it is important to consider the following factors that could lead to erosion:

- Average Flow Rate
- Peak Flow Rate
- Average slope (usually 1 – 4% is acceptable)
- Cross section width & side slopes
- Vegetation selection
- Velocity

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Once the erosion potential of the soil, and possible eroding forces are determined, the appropriate mitigation option may be selected. Table 3 indicates some applications and maximum velocities for various erosion control measures.

**Table 3: Erosion Control Measure Applications**

Erosion Measure	Control Application	Approximate maximum velocity (m/s)
Jute Matting	Erosion mitigation, weed suppression, revegetation	1.5 - 3
Other erosion control mats	Erosion mitigation, weed suppression, revegetation	3.5 - 5
Spray on Mats	Seed germination, slope protection	1.8
Gabion Baskets	Steep slopes, high flow, drop structure	1.8 - 4.5
Rock Chute	Steep slopes, high flow, drop structure	4
Turf reinforcement mat	High velocity channels, drop structure	2.5 - 5.5
Natural Vegetation	Erosion mitigation, bank stabilisation	0.6 - 2.5

Based on the anticipated velocities, soil type, slopes and vegetative cover the appropriate erosion control measure may be selected.

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**6.4 Site Specific Measures**

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Based on the site layout plan in Section 1.4 many of the potential erosion sites will be mitigated by the development work. Due to its layout the water will be concentrated at a number of points, at which the erosion potential is extremely high. Figure 6-1 depicts the high erosion potential areas. The pipe network in these areas will need to drop several meters from the street network and as such drop structures should be employed at these points. The discharge from these structures will need to be mitigated using the above information and based upon the quantified velocities as part of the detailed design stage.

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The existing gully section will need to be carefully landscaped to deal with the higher overland flows that will be experienced due to the development. It is suggested this section is heavily protected during the construction phase, and then landscaped appropriately there afterwards.

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More generally however, erosion potential will be high during the construction phase of the subdivision. As such the measures set out in the Site Environmental

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Management Plan (Melbourne Water, 2007) should be followed and made part of the planning application permit.



Figure 6-1 Erosion Potential areas

*Kate Nelson*

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## 7 REFERENCE:

CSIRO (1999). Urban Stormwater Best Practice Environmental Guidelines. CSIRO Publishing, Collingwood.

EPA (1996). Environmental Guidelines for Major Construction Sites. [http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/11a96b5fc29366764a2565fc0008e284/\\$FILE/480.pdf](http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/11a96b5fc29366764a2565fc0008e284/$FILE/480.pdf) [6/08/2007]

EPA (1991). Construction Techniques for Sediment Pollution Control. [http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/f10374f564ef42e54a2565fc0008e2da/\\$FILE/275.pdf](http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/f10374f564ef42e54a2565fc0008e2da/$FILE/275.pdf) [6/08/2007]

Gippsland Water (2005). Gippsland Water's Water Quality Action Plan 2005. [http://www.wgma.vic.gov.au/mediaLibrary/files/Water\\_Quality/24Mitchell\\_ManagementActionPrograms.pdf](http://www.wgma.vic.gov.au/mediaLibrary/files/Water_Quality/24Mitchell_ManagementActionPrograms.pdf) [24/05/2007]

Brisbane City Council. 2004. Erosion treatments for urban creek guidelines. [http://www.brisbane.qld.gov.au/bccwr/lib117/etuc\\_contents\\_parts1\\_4.pdf](http://www.brisbane.qld.gov.au/bccwr/lib117/etuc_contents_parts1_4.pdf)

Hyperactive Technology. 2004. Geotextile Supplies and Engineering. <http://www.geotextile.com.au/gse-erosion.html>

WSUD in the Sydney Region. 2004. <http://www.wsud.org/tech.htm>

Melbourne Water (2007) [http://ldm.melbournewater.com.au/content/site\\_management\\_plan/site\\_management\\_plan.asp](http://ldm.melbournewater.com.au/content/site_management_plan/site_management_plan.asp)

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## APPENDIX A – Clause 56

Sourced from Department of Sustainability Planning Schemes Website  
[http://www.dse.vic.gov.au/planningschemes/aavpp/56\\_07.pdf](http://www.dse.vic.gov.au/planningschemes/aavpp/56_07.pdf) [23/05/07]

### Urban run-off management objectives

- To minimise damage to properties and inconvenience to residents from urban run-off.
- To ensure that the street operates adequately during major storm events and provides for public safety.
- To minimise increases in stormwater run-off and protect the environmental values and physical characteristics of receiving waters from degradation by urban run-off.

### Standard C25

The urban stormwater management system must be:

- Designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority;
- Designed and managed in accordance with the requirements and to the satisfaction of the water authority where reuse of urban run-off is proposed;
- Designed to meet the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999) as amended; and
- Designed to ensure that flows downstream of the subdivision site are restricted to pre-development levels unless increased flows are approved by the relevant drainage authority and there are no detrimental downstream

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The stormwater management system should be integrated with the overall development plan including the street and public open space networks and landscape design.

For all storm events up to and including the 20% Average Exceedence Probability (AEP) standard:

- Stormwater flows should be contained within the drainage system to the requirements of the relevant authority; and
- Ponding on roads should not occur for longer than 1 hour after the cessation of rainfall.

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For storm events greater than 20% AEP and up to and including 1% AEP standard:

- Provision must be made for the safe and effective passage of stormwater flows.
- All new lots should be free from inundation or to a lesser standard of flood protection where agreed by the relevant floodplain management authority.
- Ensure that streets, footpaths and cycle paths that are subject to flooding meet the safety criteria  $d_a V_{ave} < 0.35 \text{ m}^2/\text{s}$  (where,  $d_a$  = average depth in metres and  $V_{ave}$  = average velocity in metres per second).

The design of the local drainage network should:

- Ensure run-off is retarded to a standard required by the responsible drainage authority;
- Ensure every lot is provided with drainage to a standard acceptable to the relevant drainage authority. Wherever possible, run-off should be directed to the front of the lot and discharged into the street drainage system or legal point of discharge;
- Ensure that inlet and outlet structures take into account the effects of obstructions and debris build up. Any surcharge drainage pit should discharge into an overland flow in a safe and predetermined manner; and
- Include water sensitive urban design features to manage run-off in streets and public open space. Where such features are provided, an application must describe maintenance responsibilities, requirements and costs.

Any flood mitigation works must be designed and constructed in accordance with the requirements of the relevant floodplain management authority.

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**APPENDIX B – Rational Method Reconciliation Calculations**

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**Rational Method Calculations**

Lakes Entrance 100yr ARI Rational Method Discharge Estimation (patent pending)												
Instructions: Enter catchment area in m <sup>2</sup> Enter Run-off coefficient P <sub>10</sub> Calculate 100 year ARI Flow										Calculate		
Catchment (chainage)	Alignment	ARI (Yr)	Area m <sup>2</sup>	Area ha	Tc min	I100 mm/hr	P <sub>10</sub>	F <sub>a</sub>	F <sub>y</sub>	P <sub>y</sub>	QARI m <sup>3</sup> /s	Culvert Area
Ocean View		10	7.14E+05	71	157	13.82	0.19	1.36	1	0.25	0.7	
Ocean View		20	7.14E+05	71	157	15.92	0.19	1.36	1.10	0.28	0.9	
Ocean View		50	7.14E+05	71	157	18.77	0.19	1.36	1.20	0.3	1.1	
Ocean View		100	7.14E+05	71	157	21.07	0.19	1.36	1.30	0.33	1.4	

Signed

**Time of Concentration**

L	1521 m	A	0.7135 km <sup>2</sup>	L	
n*	0.053	f	0.15	V	m/s
f	49.2	S	1%		
S	0.05 m/m				
Overland Flow	T	49.97 min	Alternative TC	34.68 min	Velocity: 50.70 min

Kate Nelson

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IFD Curves

Rainfall Intensity Frequency Duration data for, Lakes Entrance Vic		Geographic Location: 37.88 Deg. South 147.991 Deg. East					
AUSIFD	Version 2.0	7-Dec	2007				
Duration (mins)	1 Year ARI (mm/hour)	2 Year ARI (mm/hour)	5 Year ARI (mm/hour)	10 Year ARI (mm/hour)	20 Year ARI (mm/hour)	50 Year ARI (mm/hour)	100 Year ARI (mm/hour)
5	48.6	64	88	104	125	154	178
5.5	47	62	85	100	120	148	171
6	45.5	60	82	96	116	143	165
6.5	44.2	59	79	93	112	138	159
7	43	57	77	90	108	133	154
7.5	41.9	55	75	88	105	129	149
8	40.8	54	73	85	102	125	145
8.5	39.8	53	71	83	99	122	140
9	38.9	51	69	81	97	119	137
9.5	38.1	50	68	79	94	115	133
10	37.3	49.1	66	77	92	113	130
11	36.8	47.1	63	74	88	107	123
12	34.4	45.3	61	71	84	103	118
13	33.2	43.7	58	68	81	98	113
14	32.1	42.2	56	65	78	95	108
15	31.1	40.9	54	63	75	91	104
16	30.2	39.7	53	61	72	88	101
17	29.4	38.5	51	59	70	85	97
18	28.6	37.4	49.5	57	68	82	94
19	27.8	36.4	48.1	56	66	80	91
20	27.1	35.5	46.8	54	64	77	88
21	26.5	34.7	45.6	53	62	75	86
22	25.9	33.8	44.4	51	60	73	84
23	25.3	33.1	43.4	50	59	71	81
24	24.8	32.4	42.4	48.8	57	69	79
25	24.3	31.7	41.4	47.7	56	68	77
26	23.8	31	40.5	46.6	55	66	75
27	23.3	30.4	39.7	45.6	54	65	74
28	22.9	29.8	38.9	44.7	52	63	72
29	22.5	29.3	38.1	43.7	51	62	70
30	22.1	28.7	37.4	42.9	50	61	69
32	21.3	27.7	36	41.3	48.4	58	66
33	20.9	26.9	34.7	39.8	46.6	56	64
36	20	26	33.5	38.4	45	54	61
38	19.5	25.7	32.5	37.7	43.5	52	59
40	19.1	25.4	31.6	36	42	50	57
45	17.7	22.9	29.4	33.5	39.1	46.7	53
50	16.7	21.6	27.6	31.4	36.5	43.5	49.2
55	15.8	20.1	25	29.5	34.3	40.8	46.1
60	15.1	19.4	24	28.9	33.4	39.1	44.4
75	13.2	17.1	21.7	24.6	28.5	33.9	38.2
90	11.9	15	19.7	22.1	26.7	31.7	35.5
105	10.9	14	17.8	20.2	23.5	28	31.5
120	10	13	16.5	18.7	21.7	25.9	29.2
135	9.37	12.1	15.4	17.5	20.3	24.1	27.2
150	8.8	11.4	14.3	16.3	19.1	22.7	25.6
165	8.31	10.7	13.7	15.5	18	21.5	24.2
180	7.89	10.2	13	14.7	17.1	20.4	23
195	7.52	9.72	12.4	14.1	16.3	19.5	21.9
210	7.2	9.3	11.8	13.4	15.6	18.6	21
225	6.9	8.92	11.4	12.9	15	17.9	20.2
240	6.64	8.58	10.9	12.4	14.4	17.2	19.4
270	6.19	8	10.2	11.6	13.5	16.1	18.1
300	5.81	7.51	9.59	10.9	12.7	15.1	17
360	5.21	6.74	8.78	9.72	11.4	13.6	15.3
420	4.76	6.15	7.95	8.92	10.4	12.4	14
480	4.39	5.68	7.26	8.25	9.59	11.4	12.9
540	4.09	5.3	6.77	7.69	8.95	10.7	12.1
600	3.85	4.98	6.36	7.23	8.41	10	11.3
660	3.63	4.7	6.01	6.84	7.96	9.5	10.7
720	3.45	4.47	5.71	6.49	7.56	9.02	10.2
840	3.13	4.06	5.21	5.94	6.93	8.29	9.37
960	2.87	3.77	4.85	5.57	6.42	7.67	8.72
1080	2.67	3.47	4.48	5.13	6	7.21	8.18
1200	2.49	3.25	4.21	4.82	5.65	6.8	7.72
1320	2.35	3.06	3.97	4.56	5.35	6.45	7.33
1440	2.22	2.89	3.77	4.33	5.09	6.14	6.98
1800	1.72	2.25	2.9	3.39	4.1	5.4	6.16
2160	1.7	2.22	2.93	3.39	4	4.86	5.55
2520	1.53	2	2.65	3.08	3.64	4.43	5.07
2880	1.39	1.83	2.43	2.82	3.35	4.08	4.68
3240	1.28	1.68	2.24	2.61	3.1	3.79	4.35
3600	1.18	1.56	2.09	2.43	2.9	3.55	4.08
3960	1.1	1.45	1.95	2.28	2.72	3.33	3.83
4320	1.03	1.36	1.83	2.14	2.56	3.14	3.62

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CULTURAL HERITAGE ADVISOR: JIM WHEELER

Signed:

AUTHORS: SHARON LANE, JIM WHEELER & ERICA WALTHER

NOTICE - THIS REPORT CONTAINS PICTURES AND  
INFORMATION ABOUT PEOPLE WHO HAVE PASSED AWAY.

3<sup>RD</sup> OCTOBER 2008

**AHMS**

Director, East Gippsland Shire

PO BOX 87  
Lakes Entrance, VIC 3862

T: 03 9378 3371

F: 03 9378 3371

Date: ..... 3 January 2018.....

E: info@arksoptions.com.au

ABN 45 088 058 388

ACN 088 058 388

ARCHAEOLOGICAL & HERITAGE  
MANAGEMENT SOLUTIONS PTY LTD

**OCEAN VIEW LAKES - RESIDENTIAL SUB-DIVISION,  
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Cultural Heritage Advisor **Signed** Jim Wheeler

Authors: Sharon Lane, Jim Wheeler & Erica Walther



Prepared by Archaeological and Heritage Management Solutions (AHMS) Pty Ltd  
for Watsons Pty Ltd.

**Director, East Gippsland Shire**

**Date:** AHMS  
PO BOX 87  
3 January 2018...

Highpoint City VIC 3032  
T: 03 9378 3371  
F: 03 9378 3371

*info@arksolutions.com.au*  
ABN 45 088 058 388  
ACN 088 058 388

## EXECUTIVE SUMMARY

Watsons Pty Ltd ('The Sponsor') engaged Jim Wheeler of Archaeological and Heritage Management Solutions (AHMS) Pty Ltd ('The Cultural Heritage Advisor') to prepare a voluntary Complex Cultural Heritage Management Plan (CHMP) in support of proposed development at Thorpe's Lane, Lakes Entrance, Victoria.

A notice of intention to prepare the CHMP was lodged with Aboriginal Affairs Victoria (AAV) on 29<sup>th</sup> January 2008 (a copy of the notice is included in Appendix 1). AAV issued a project number AAV#10282 in their letter of acknowledgement dated 1<sup>st</sup> February 2008. At that time there was no Registered Aboriginal Party therefore AAV are the evaluating authority.

The CHMP was prepared in accordance with the requirements of the Aboriginal Heritage Act 2006 and associated regulations and guidelines issued by AAV regarding preparation of CHMP's. The overriding purpose of the CHMP is to document and assess the Aboriginal heritage (archaeological and cultural) values of the subject land, the impact of future development on those values and to provide management procedures to avoid, minimise and mitigate impact before, during and after development.

The study area is located to the north of Lakes Entrance (refer to Figure 1 for general location) in the Shire of East Gippsland. It comprises 33 hectares (ha) of land south of Thorpe's Lane, east of the Lakes-Colquhoun Road and west of Stirling Drive (as shown on Figure 2) identified as Lot A PS 517816T. A proposed access road connecting the proposed subdivision land described above with Colquhoun Road is identified as part Lot 2 PS 505056H.

The activity is a proposed 33.38 hectare subdivision, which includes 186 residential allotments and a 6.48 hectare retirement village. The subdivision also incorporates open space, the main area being 28 hectares in size. The development will also include the installation of infrastructure and services including roads, storm water, power, water and sewer.

On the advice of AAV we undertook a process of consultation with the then RAP applicants relevant to the study area: the Gunaikurnai Land and Waters Aboriginal Corporation (GWLAC). The development was consented from the outset and

participated in the Standard and Complex Assessment components of the CHMP. GL&WC representatives that participated in various phases of the CHMP included Barry Kenny, Harry Stewart, Jim Kenny Tim Paton and Lloyd Hood. Following completion of the assessment work, a draft copy of the CHMP was provided to GL&WC for their review and comments. During this process comments received from GL&WC were incorporated into the CHMP and reflected in the CHMP management recommendations.

A search for known Aboriginal sites on the AAV Victorian Aboriginal Heritage Register for a four kilometre radius surrounding the subject land was undertaken to identify previously recorded sites in and around the study area. A total of 14 archaeological sites and 13 Aboriginal historical sites or places have been recorded within the search area. No previously recorded sites are located within the study area itself.

A review of previous archaeological studies, environmental and earth-science data, known land use information and ethno-historical research was used to develop a predictive model of site types and distribution within the study area. This formed the Desktop Assessment component of the CHMP. Based on the available information, a number of predictions were made, including:

- subsurface artefacts may be present where no stone artefacts are visible on the surface;
- stone artefacts may be most likely to occur on relatively flat land located within 100m of the small gullies/drainage lines;
- it is likely that any stone artefact scatters present on the property may have been disturbed by land clearing and agricultural activities;
- stone artefacts are likely to be composed of quartz, chert and silcrete and the most likely sources are local gravels;
- any stone artefact scatters present are likely to be predominantly sparse

A survey of the proposed activity area was undertaken as part of the Standard Assessment component of the CHMP. The survey found that the activity area has been cleared of the native open forest vegetation that would have existed prior to European settlement. In its place are some exotic tree plantings and pasture

grasses. No remnant mature trees with evidence of cultural scarring were present within the activity area.

Ground surface visibility within the study area was too low to enable any conclusions regarding the presence or absence of Aboriginal archaeological materials in the study area. The results of previous archaeological work in the region suggested that subsurface testing may reveal the presence of sites not visible or apparent through surface inspection. Therefore the Standard Assessment found that a programme of landform testing should be undertaken.

The overriding purpose of the test excavation programme (the Complex Assessment component of the CHMP) was to determine the extent, nature and significance of Aboriginal archaeological sites and sub-surface deposits across the activity area. The results were also used as a basis for making decisions about management of Aboriginal heritage during development in consultation with the GL&W.

Our excavation approach used the landforms within the study area as the basis for sampling, and as a means of determining the nature, extent and significance of Aboriginal use and occupation across the activity area. This approach is informed by the results of extensive excavation throughout eastern Australia, which has shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces and that surface evidence does not accurately reflect the nature of sub-surface archaeological deposits.

**Stage 1 Excavations** - The first stage of the test excavation programme consisted of manual and mechanical excavation of 3m x 1.2m test trenches spaced at 100m intervals along linear transects oriented to cover toposequences across the landscape. They were placed so as to provide samples of upper, middle and lower slopes, and relatively flat to steeply sloping ground. Eighteen trenches, comprising a total area of 64.8 square metres, were excavated.

**Stage 2 Excavations** - The second stage of test excavation comprised manual test excavation of 1m x 1m test pits located on the proposed alignment of the access road that would connect the southwestern part of the proposed subdivision with Colquhoun Road. Four 1m x 1m test pits were excavated as part of this stage.

---

<sup>1</sup> McDonald 1997

The results of the test excavations can be summarised as follows:

- A total of fifty-two stone artefacts were found during the test excavations.
- a low density scatter of stone artefacts exists across the study area;
- this scatter may have peaks of higher densities in certain landform categories and in specific places;
- artefacts in the scatter are primarily of silcrete and quartz, and much of the raw materials appear to have been derived from pebbles or water-worn stone;
- only a single formal tool (a thumbnail scraper) was found in the small recovered assemblage (although this may well be due to the small sample size); and
- the artefact deposits have, for the most part, been disturbed by both natural processes and by past land use.

Artefacts were found in at least some trenches in all of the slope and distance to water categories, with the exception of moderately to steeply sloping land. Considering the sparse artefact densities across the area, it is not certain that the apparent lack of artefacts in these trenches is of any significance.

It is argued in this CHMP that there is a relatively low density artefact scatter across the entire study area. Within that generally low-density scatter, two density peaks are apparent in the vicinity of trench C2, and at the location of test pits G1 and G2.

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The study area is considered to have a relatively low level of scientific significance, although it is recognised that the distribution of even sparse artefact distributions has the potential to address questions regarding the use of the landscape in the past. There is little to no potential for deposits within the study area to address questions of cultural change through time because vertical integrity is nil-very low.

It was concluded that while it is certain that the proposed subdivision will have the effect of disturbing some Aboriginal cultural heritage present within the activity area, the impact of this proposed development on scientifically significant Aboriginal cultural heritage can be considered to be low. In addition, the provision

for a reserve as part of the proposed subdivision will ensure that a part of the low density scatter remains undisturbed by the proposed development.

While no further work is recommended for the greater part of the activity area, salvage excavation is recommended in the area surrounding Trench G1 and G2 on the basis that this area contains a higher density of Aboriginal stone artefacts, and there is some potential for greater horizontal integrity of artefacts in this area.

An abridged summary of the recommendations of this CHMP is as follows:

#### **Recommendation 1 - Impact Avoidance**

Explains why the activity cannot be conducted in a way that completely avoids harm to Aboriginal cultural heritage. Describes proposed public open space that will ensure impact is avoided on a portion of the low density artefact deposits present across the activity area.

#### **Recommendation 2 - Impact Minimalisation**

The nature of the local topography and proposed activity, requiring cut, fill and re-grading indicates the scope to minimise impact during sub-division works is limited. Construction methods that minimise impact where possible will be employed.

#### **Recommendation 3 - Impact Mitigation (Salvage)**

A programme of archaeological salvage excavation is recommended in advance of development in the vicinity of test trenches G1 and G2 (area shaded dark blue of Figure 28).

#### **Recommendation 4 - Contingency Planning for Discovery of Aboriginal Cultural Heritage**

A series of procedures are established to manage any previously un-identified Aboriginal sites that may be discovered.

#### **Recommendation 5 - Contingency Planning for Discovery of Aboriginal Burials**

A series of procedures are established to manage and protect any Aboriginal burials that may be discovered.

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### Recommendation 6 - Removal and Curation of Aboriginal Heritage found during Development

Procedures are established to re-bury artefacts at a keeping place identified by the Gunaikurnai Land and Waters Corporation. The keeping place would be recorded on the VAHR.

### Recommendation 7 - Aboriginal consultation

The Gunaikurnai land and Waters Corporation shall be consulted about any matters relating to Aboriginal heritage in the activity area.

### Recommendation 8 - Archaeological Investigations

With the exception of salvage recommendation outlined in Recommendation 3, no further archaeological investigations are recommended prior to commencement of development.

### Recommendation 9 - Compliance Review

Procedures are established to review and report on compliance with the recommendations of the CHMP.

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### Recommendation 10 - Handling Sensitive Information

Records and information regarding the location and nature of Aboriginal cultural heritage are culturally sensitive. Provisions are established for the protection of sensitive information.

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### Recommendation 11 - Communication and Correspondence

Formal procedures and timeframes are established for communication and correspondence between RAP and Sponsor.



### Recommendation 12 - Cultural Inductions

Recommends heritage induction for all construction crew and sub-consultants employed to work on the site during the construction phase.

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**Recommendation 13 - Contingency Planning for Sub-division**

Describes the configuration of the sub-division and how each part of the proposed activity is proposed to be developed or relevant planning scheme that will apply.

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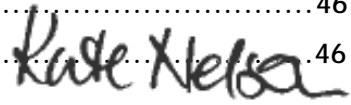


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## ABBREVIATIONS

AAV	Aboriginal Affairs Victoria
AHC	Australian Heritage Council
CHL	Commonwealth Heritage List
CHMP	Cultural Heritage Management Plan
DEH	Department of Environment and Heritage
EA	Environmental Assessment
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
EPBC	Environment Protection and Biodiversity Conservation
GSV	Ground surface visibility
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
NHL	National Heritage List
NNTT	National Native Title Tribunal
RAP	Registered Aboriginal Party
RNE	Register of the National Estate
VAHR	Victorian Aboriginal Heritage Register

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## DEFINITIONS

ACTIVITY AREA	The area or areas to be used or developed for an activity
STUDY AREA	The entire Ocean View Lakes landholding at Lakes Entrance (ie. including the activity area and areas where development is not proposed)
SUBJECT LAND	See STUDY AREA

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# 1 INTRODUCTION

## 1.1 Preamble

Watsons Pty Ltd ('The Sponsor') engaged Jim Wheeler of Archaeological and Heritage Management Solutions (AHMS) Pty Ltd ('The Cultural Heritage Advisor') to prepare a voluntary Complex Cultural Heritage Management Plan (CHMP) in support of proposed development at Thorpe's Lane, Lakes Entrance, Victoria. Jim Wheeler is a professional archaeologist with a BA Hons Archaeology qualification from the Australian National University. He has experience as a consulting archaeologist in Australia and Ireland and 8 years experience as an Excavation Director. Jim Wheeler is the Manager, Aboriginal Heritage at Archaeological & Heritage Management Solutions Pty Ltd.

The study area is located to the north of Lakes Entrance (refer to Figure 1 for general location) in the shire of East Gippsland. It comprises 33 hectares (ha) of land south of Thorpe's Lane, east of the Lakes-Colquhoun Road and west of Stirling Drive (as shown on Figure 2) identified as Lot A PS 517816T and currently owned by Merrangbaur Heights Pty Ltd. A proposed access road connecting the proposed subdivision land described above with Colquhoun Road is identified as part Lot 2 PS 505056H and is currently owned by Guillot Enterprises Pty Ltd.

A notice of intention to prepare the CHMP was lodged with Aboriginal Affairs Victoria (AAV) on 29<sup>th</sup> January 2008 (a copy of the notice is included in Appendix 1). AAV issued a project number AAV#10282 in their letter of acknowledgement dated 1<sup>st</sup> February 2008. In their letter, AAV advised that as at that time there was no Registered Aboriginal Party, AAV are the evaluating authority.

The CHMP was prepared in accordance with the requirements of the Aboriginal Heritage Act 2006 and associated regulations and guidelines issued by AAV regarding preparation of CHMP's. The overriding purpose of the CHMP is to document and assess the Aboriginal heritage (archaeological and cultural) values of the subject land, the impact of future development on those values and to provide management procedures to minimise and mitigate impact before, during and after development.



Figure 1. General Location of study area (circled red). Map source: Google Maps

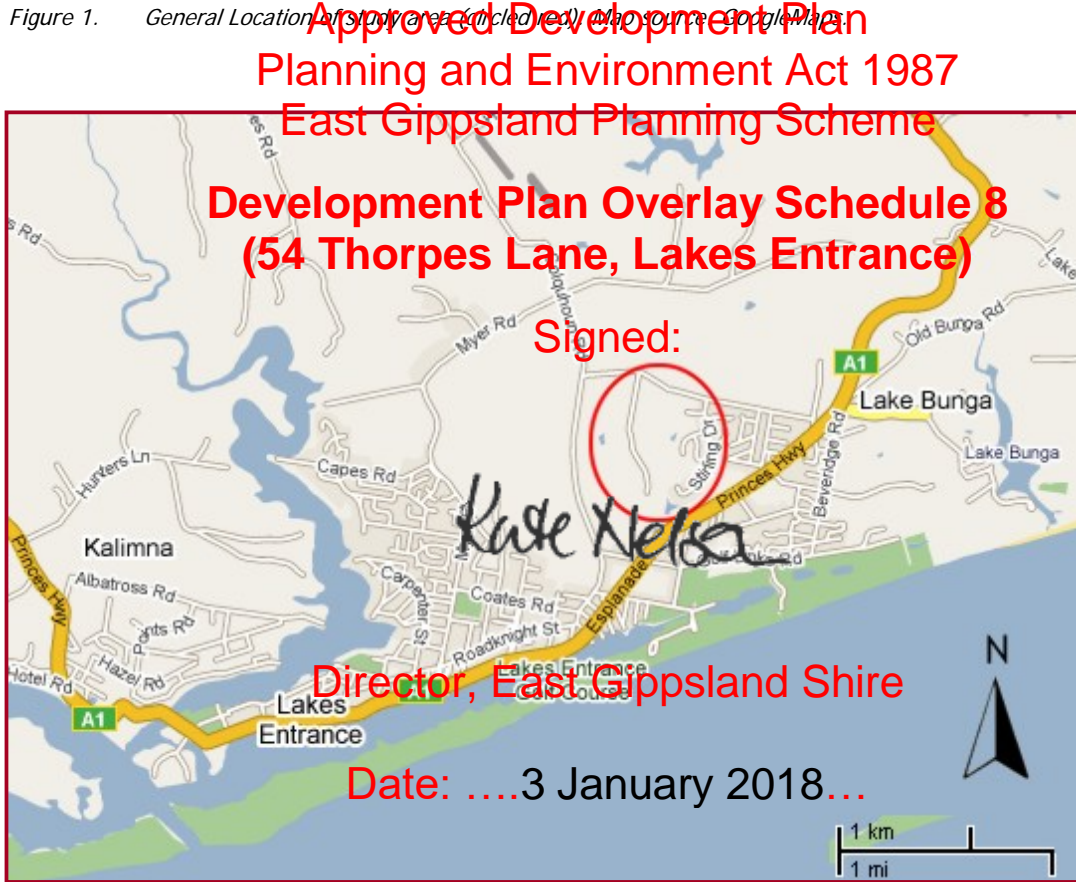


Figure 2. The study area (circled red). Map source: Google Maps

## 1.2 Reason for the current study

The purpose of the CHMP is to identify and assess the nature, extent and significance of Aboriginal sites, objects and cultural heritage values within the subject land and to provide mitigation, protection and contingency procedures to manage those values before, during and after development of the land.

In accordance with Section 61 of the *Aboriginal Heritage Act(2006)*, the following mandatory matters are considered by this CHMP:

- Whether the activity will be conducted in a way that avoids harm to Aboriginal cultural heritage;
- If it does not appear to be possible to conduct the activity in a way that avoids harm to Aboriginal cultural heritage, whether the activity will be conducted in a way that minimises harm to Aboriginal cultural heritage;
- Any specific measures required for the management of Aboriginal cultural heritage likely to be affected by the activity, both during and after the activity;
- Any contingency plans required in relation to disputes, delays and other obstacles that may affect the conduct of the activity; and
- Requirements relating to the custody and management of Aboriginal cultural heritage during the course of the activity.

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In addition the Management Plan also includes matters set out in Schedule 2 of the Regulations.

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Specific aims of the CHMP were as follows:

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- Identify any known Aboriginal sites, relics and any places of cultural significance to the Aboriginal community within the subject land;
- Assess the potential for Aboriginal sites and/or relics buried below ground surfaces;

- Assess the Aboriginal heritage significance of Aboriginal sites, relics, places and areas of archaeological potential in partnership with the local Aboriginal community;
- Assess the impact of the activity on Aboriginal sites, relics, places and significance values; and
- Make appropriate recommendations for protection of cultural heritage and/or mitigation of development impact, including contingency procedures, in consultation with the local Aboriginal community.

### 1.3 Activity Description

The Sponsor proposes to subdivide Lot A PS 517816T (33.38 hectares) for residential development and development of a retirement village. A proposed access road that will connect the sub-division with Colquhoun Rd to the west will cross through part Lot 2 PS 505056H. The proposed activity and sub-division layout is shown on Figure 3. It will include:

- Creation of 186 residential allotments. The individual allotments will not be developed by the Sponsor. They will be sold for residential development;
- Development of a 6.54 hectare retirement village comprising 162 units including areas of Public Open Space, a bowling green and a community building;
- Public open space, including a 1.8 hectare reserve (these areas are shaded green on Figure 3). The reserves will be used primarily for recreational purposes for residents and the general public. Subject to engineering design and Council requirements, the open spaces reserves may also be required to divert overland stormflows. Reserve areas will be transferred to and managed by East Gippsland Shire Council; and
- Establishment of infrastructure and services including roads, storm water, power, water and sewer. This will include the access road connecting the sub-division with Colquhoun Road to the west.

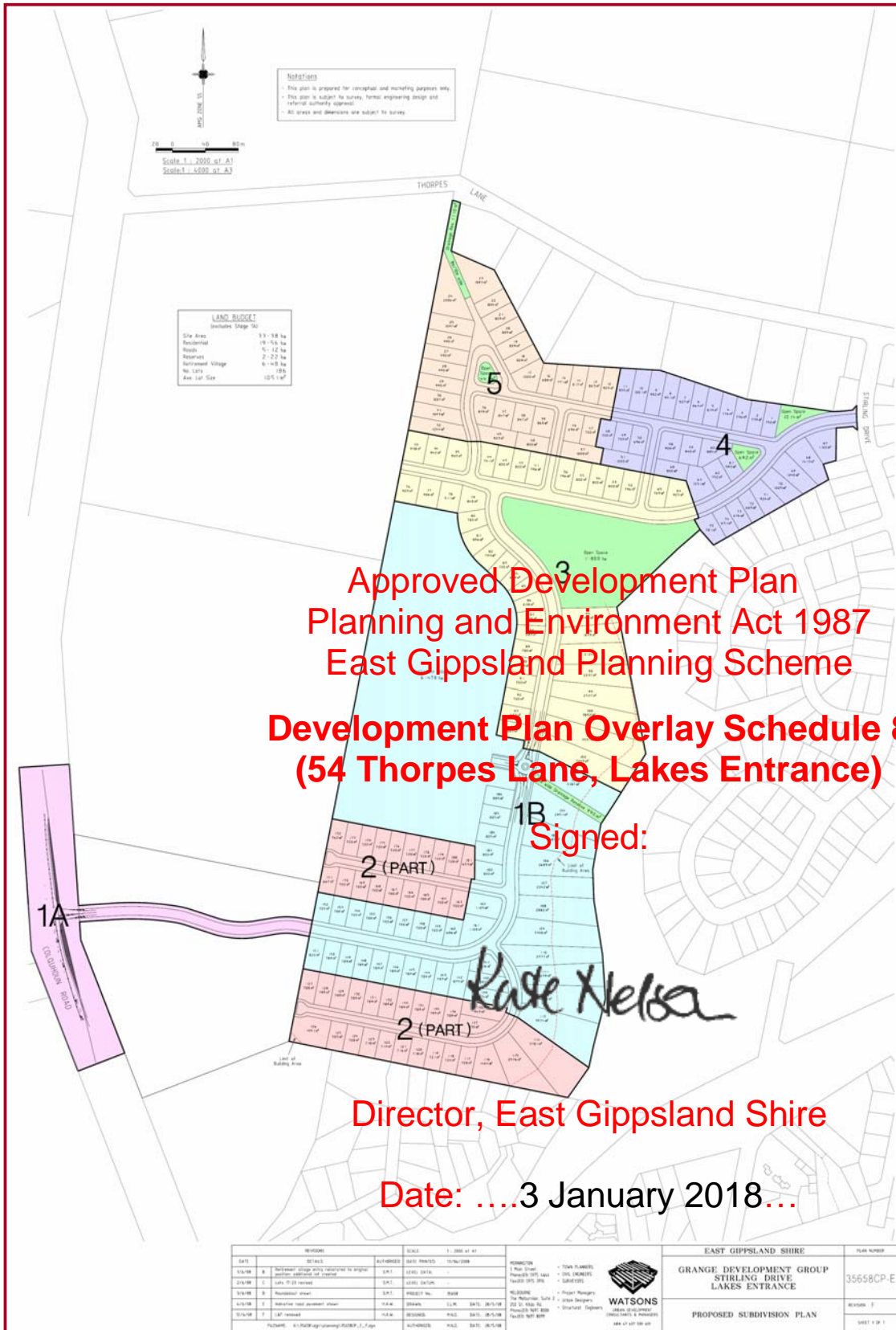


Figure 3. Showing proposed subdivision allotments and roads. Shaded areas comprise the 'Activity Area'.

The proposed subdivision would be a 'high-impact' development and would be considered a 'sub-division' under Regulation 48 of the Aboriginal Heritage Regulations 2007.

In accordance with Schedule 2 (13) of the Aboriginal Heritage Regulations 2007:

*"If the activity is a subdivision referred to in Regulation 46, the contingency plans must address -*

*(a) how each lot is intended to be used or developed by the sponsor; or*

*(b) if a lot is not intended to be used or developed by the sponsor, the use of development of the lot permitted by the relevant planning scheme."*

The Sponsor proposes to establish the subdivision, including development of roads, services and infrastructure, public open space and the retirement village. Details regarding intended uses of each of these facets of the proposed development are provided in the bullet points above. Due to the steep sloping topography, the proposed sub-division works will require substantial cut, fill and re-grading to establish levels required to build roads, excavate trenches for services and make the land suitable for residential sub-division. Cut would be typically 1.5m deep, however excavation for services and pavement could be up to 4m deep. This will remove all A-horizon topsoil deposits within the footprint of proposed development works described above and shown on Figure 3.

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The Sponsor does not propose to develop the 186 individual residential allotments shown on Figure 3. Each of these would be sold for residential development after the sub-division works are complete. The residential allotments will remain zoned 'Residential 1 Zone' under the control of the 'East Gippsland Planning Scheme'.

The purpose of the scheme is to<sup>2</sup>:

- provide for residential development at a range of densities with a variety of dwellings to meet the housing needs of all households;
- To encourage residential development that respects the neighbourhood character, and

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*Kate Nelson*  
**Director, East Gippsland Shire**  
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<sup>2</sup> [http://www.dse.vic.gov.au/planningschemes/aavpp/32\\_01.pdf](http://www.dse.vic.gov.au/planningschemes/aavpp/32_01.pdf)

- In appropriate locations, to allow educational, recreational, religious, community and a limited range of other non-residential uses to serve local community needs.

This planning scheme allows for the following permissible uses without a Permit<sup>3</sup>:

- **Animal keeping (other than Animal boarding)** - Must be no more than 2 animals.
- **Apiculture** - Must meet the requirements of the Apiary Code of Practice, May 1997.
- **Bed and breakfast** - No more than 6 persons may be accommodated away from their normal place of residence. At least 1 car parking space must be provided for each 2 persons able to be accommodated away from their normal place of residence.
- **Carnival** - Must meet the requirements of A 'Good Neighbour' Code of Practice for a Circus or Carnival, October 1997.
- **Circus** Must meet the requirements of A 'Good Neighbour' Code of Practice for a Circus or Carnival, October 1997.
- **Dependent person's unit** Must be the only dependent person's unit on the lot.
- **Dwelling (other than Bed and breakfast)**
- **Home occupation**
- **Informal outdoor recreation**
- **Mineral exploration**
- **Mining** - Must meet the requirements of Clause 52.08-2
- **Minor utility installation**
- **Natural systems**

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<sup>3</sup> [http://www.dse.vic.gov.au/planningschemes/aavpp/32\\_01.pdf](http://www.dse.vic.gov.au/planningschemes/aavpp/32_01.pdf)

- **Place of worship** - Must be no social or recreation activities. The gross floor area of all buildings must not exceed 180 square metres. The site must not exceed 1200 square metres. The site must adjoin, or have access to, a road in a Road Zone.
- **Railway**
- **Road**
- **Search for stone** - Must not be costeaning or bulk sampling.
- **Telecommunications facility** - Buildings and works must meet the requirements of Clause 52.19.
- **Tramway**

A Permit would be required for the following uses:

- **Accommodation (other than Dependent person's unit and Dwelling)**
- **Agriculture (other than Animal keeping, Animal training, Apiculture, Horse stables, and Intensive animal husbandry)**
- **Animal keeping (other than Animal boarding)** - If the Section 1 condition is not met - Must be no more than 6 animals.
- **Car park** - Must be used in conjunction with another use in Section 1 or 2.
- **Car wash** - The site must adjoin, or have access to, a road in a Road Zone.
- **Community market**
- **Convenience restaurant** - The site must adjoin, or have access to, a road in a Road Zone.
- **Convenience shop** - The leasable floor area must not exceed 80 square metres.

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<sup>4</sup> [http://www.dse.vic.gov.au/planningschemes/aavpp/32\\_01.pdf](http://www.dse.vic.gov.au/planningschemes/aavpp/32_01.pdf)

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- Food and drink premises (other than Convenience restaurant and Take away food premises)
- Leisure and recreation (other than Informal outdoor recreation and Motor racing track)
- Medical centre
- Mineral, stone, or soil extraction (other than Extractive industry, Mineral exploration, Mining, and Search for stone)
- Place of assembly (other than Amusement parlour, Carnival, Circus, Nightclub, and Place of worship)
- Plant nursery
- Service station - The site must either adjoin a business zone or industrial zone, adjoin, or have access to, a road in a Road Zone. The site must not exceed either 3000 square metres or 3600 square metres if it adjoins on two boundaries a road in a Road Zone.
- Store - Must be in a building, not a dwelling, and used to store equipment, goods, or motor vehicles used in conjunction with the occupation of a resident of a dwelling on the lot.
- Take away food premises The site must adjoin, or have access to, a road in a Road Zone.
- Utility installation (other than Minor utility installation and Telecommunications facility)

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## 1.4 Extent of Activity Area Covered by CHMP

The activity area covered by this CHMP includes the entire area of Lot A PS 517816T. This lot is located to the north of Lakes Entrance, south of Thorpe's Lane and east of the Lakes-Colquhoun Road. In addition, an access road is proposed that will connect the proposed subdivision with Colquhoun Road to the west (part Lot 2 PS 505056H). At present, the activity area consists of cleared pasture with some exotic trees. A house with associated outbuildings, and a former house site

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currently occupy part of the area. An unpaved track/drive provides access to these buildings from the entrance at Thorpe's Lane (Figure 4).

An ephemeral drainage line runs along the eastern margin of the study area. Another gully drains into the ephemeral drainage line and crosses the northern portion of the study area. A dam has been formed at the head of this gully.



Figure 4. Showing a portion of the activity area from the air. Photo facing roughly towards the south. The red line provides an indication of the activity area boundary.

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## 1.5 Statutory Controls

### 1.5.1 Statutory protection

*Kate Nelson*

The *Aboriginal Heritage Act (2006)*, the *Aboriginal Heritage Regulation (2007)* provide the statutory tools for archaeological and cultural heritage management in Victoria. The *Aboriginal and Torres Strait Islander Heritage Protection Act (1984)* and the *Environment Protection and Biodiversity Conservation (EPBC) Act (1999)*

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also provide heritage protection at a Federal level. The implications of these statutes are outlined below.

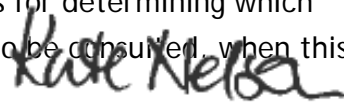
### 1.5.2 Aboriginal Heritage Act 2006

The intention behind the *Aboriginal Heritage Act (2006)* (the *Act*) is to provide better protection of Aboriginal cultural heritage (Aboriginal places, Aboriginal objects and Aboriginal human remains which are of cultural or scientific/archaeological value) in Victoria. The *Act* increases Aboriginal community decision making provisions to include Native title and other interests. The following sections of the *Act* are of particular importance:

- Sections 27 and 28 state it is an offence to knowingly undertake an act that 'harms' Aboriginal cultural heritage (this includes Aboriginal places, objects and human remains);
- Section 29 provides the circumstances in which harm may be permitted to Aboriginal cultural heritage (i.e. through either a Cultural Heritage Permit or Cultural Heritage Management Plan which have been approved by either the Secretary DPCD or Registered Aboriginal Parties);
- Section 36 allows disturbance or excavation of land under a Cultural Heritage Permit; however Section 37 states a Cultural Heritage Permit must not be granted for an activity for which a Cultural Heritage Management Plan is required by the Act;
- Section 44 and following outline when a Cultural Heritage Management Plan (CHMP) will be required;
- Section 54 and Section 59 outline requirements for determining which Registered Aboriginal Parties will be required to be consulted, when this will be required and who will later approve it;
- Sections 50 and 51 state that while a CHMP is being prepared all other authorisations including other Acts are suspended;
- Section 67 states that within 14 days of approval of the CHMP the sponsor must provide all assessment documentation relating to Aboriginal cultural

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heritage prepared or obtained during the Assessment of the plan to the Secretary; and

- Section 24 states that where an Aboriginal place or object is discovered the Secretary must be notified.

In practical terms, the provisions of the *Act* require assessment of any land where there is potential for Aboriginal cultural heritage to be disturbed by development. The necessity for a Cultural Heritage Permit or a CHMP is outlined in the *Act* and in the Aboriginal Heritage Regulation, 2007 (the Regulation). CHMP's are required for a wide range of planning approvals and can also be entered into voluntarily where a development proponent believes it to be of benefit. Where a CHMP is required under the *Act*, the CHMP would need to be completed prior to approval of a Planning Permit and/or other required approvals.

The *Act* provides for the mandatory preparation of a Management Plan if required by the Regulations or the Minister, or if the activity requires an Environment Effects Statement under the *Environment Effects Act (1978)* (sections 46 to 49).

A Management Plan may also be prepared voluntarily by any person (section 45). Regulation 6 provides that a Management Plan is required for an activity if:

- all or part of the area for activity is an area of cultural heritage sensitivity; and
- all or part of the activity is a high impact activity.

Areas of cultural heritage sensitivity are set out under Divisions 3 and 4 and high impact activities are set out under Division 5 of the Regulations, respectively. In addition, Division 2 of the Regulations sets out the activities that are exempt from preparing a Management Plan.

Consultation with Registered Aboriginal Parties is required by the *Act* prior to and during the preparation of a CHMP. Depending on the results of notification required under the *Act*, Aboriginal community participation is likely to include participation in archaeological survey and excavation work, consideration of the Aboriginal cultural significance present within the study area, discussion of recommendations as they relate to Aboriginal cultural heritage within the study area, and later, approval of the CHMP.

Aboriginal Affairs Victoria (AAV) envisage that Registered Aboriginal Parties (RAP) are likely to consist of 'native title claimants and holders, traditional owners and other Aboriginal groups with historical or contemporary links to the cultural heritage of an area and who have demonstrated expertise in managing that cultural heritage'. The *Act* provides for relevant Aboriginal Parties to be registered with the Aboriginal Heritage Council. A mechanism is also present in the *Act* to determine a CHMP where disputes arise between the sponsor of a CHMP (ie. a development proponent) and Registered Aboriginal Parties regarding approval of a CHMP. Where no RAP exists or where the RAP opts not to assess a CHMP, AAV become the default evaluating authority.

### 1.5.3 Aboriginal Heritage Regulation 2007

The Regulation provides further clarification regarding when a Cultural Heritage Management Plan is required and the format for a CHMP (content) required under the *Aboriginal Heritage Act (2006)*.

The Regulation additionally outlines the criteria for three types of CHMPs which may be prepared including desktop, standard and complex assessments. For a large development, a complex assessment comprising research, Aboriginal community consultation, survey and test excavations is likely to be required.

Archaeological investigation of land can be undertaken as part of the preparation of the CHMP without the need for approvals or permits to undertake the investigations. This means that sub-surface testing and potentially salvage excavation, may be undertaken during the CHMP process. Consultation with the Registered Aboriginal Parties is required prior to and during the preparation of the CHMP including during preparation of recommendations.

### 1.5.4 Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth)

The *Aboriginal and Torres Strait Islander Heritage Protection Act (1984)* was enacted at a Federal level to preserve and protect areas (particularly sacred sites) and objects of particular significance to Aboriginal Australians from damage or desecration. Steps necessary for the protection of a threatened place are outlined in a gazetted Ministerial Declaration (Sections 9 and 10). This can include the prevention of development.

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As well as providing protection to areas, it can also protect objects by Declaration, in particular Aboriginal skeletal remains (Section 12). Although this is a Federal Act, it can be invoked on a State level if the State is unwilling or unable to provide protection for such sites or objects.

There are no Aboriginal sites or places within the study area currently subject to a Declaration.

### **1.5.5 Environment Protection & Biodiversity Conservation Act 1999 (Commonwealth)**

The *EPBC Act* provides protection for natural and cultural heritage places at a Federal level. The Act established three heritage registers: World heritage, Commonwealth heritage and National heritage. World heritage items are those listed for outstanding international heritage values. National heritage items are assessed as having natural or cultural significance at a national level. The World and National lists may include items on private or State crown land. The Commonwealth list only includes items on land owned by the Commonwealth.

Items on the registers described above are protected under the terms of the *EPBC Act*. The Act requires approval before any action takes place which has, will have, or is likely to have, a significant impact on the heritage values of a listed place.

Proposals for actions which could affect such values are rigorously assessed. The *EPBC Act* is administered by the Australian Heritage Council.

There are no items within the study area currently listed as items of National or World heritage.

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## **1.6 Report Structure**

The remainder of the report is set out as follows:

- Summary of Aboriginal community consultation and participation (Section 2.0).
- Description of the environmental context of the study area including geology, soils, geomorphology and land-use impacts - the 'Desktop Assessment' (Section 3.0).

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- Historical background of the study area is reviewed in section 4. This includes a discussion of the known Aboriginal history and ethnohistory of the region surrounding the study area - 'The Desktop Assessment' (Section 4.0).
- A review of the archaeological context, including predictions regarding types of archaeological evidence that may be present in the development area - the 'Desktop Assessment' (Section 5.0).
- Description of the archaeological field survey results and assessment of archaeological potential - the 'Standard Assessment' (Section 6.0).
- Description of the archaeological test excavation and post-excavation analysis results - the 'Complex Assessment' (Section 7.0).
- Assessment of the heritage significance of the study area (Section 8.0).
- Constraints Analysis (Section 9.0).
- Management recommendations (Section 10.0).

## 1.7 Authorship

The principal authors of this report are Sharon Lane, Jim Wheeler and Erica Walther. Jim Wheeler was the Cultural Heritage Advisor and part author of the report. Erica Walther wrote sections of the report and prepared some maps and plans of the site. Sharon Lane directed the excavation, undertook the stone artefact analysis and wrote the majority of the report.

## 1.8 Acknowledgements

The authors acknowledge the assistance provided by Heath Woodman of Watsons Pty Ltd. We would also like to acknowledge the input and valuable assistance provided by Barry Kenny, Harry Stewart, Tim Paton, Jim Kenny and Lloyd Hood of the Gunaikurnai Traditional Owner community. In addition, we also acknowledge the assistance provided by archaeologists Ana Jakovljevic and Nicholas Berry during the survey and test excavation work.

## 2 DOCUMENTATION OF CONSULTATION

### 2.1 Development of Consultation

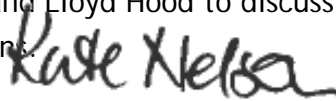
There were no Registered Aboriginal Parties (RAP) for the subject land at the time notice of intent to prepare this CHMP was provided to AAV. On the advice of AAV we undertook a process of consultation with the then RAP applicants relevant to the study area: the Gunaikurnai Land and Waters Aboriginal Corporation.

Our approach to the Aboriginal community consultation was to undertake all components of the study, including test excavation, in partnership with the RAP applicant group. In practice, we consulted with the group in order to agree on an approach and methodology for undertaking the archaeological investigations. Drawing on the results of our consultations, we prepared a proposed methodology for test excavation that was provided to the group for any final comments prior to undertaking the work.

Representatives of the RAP applicant group participated in the sign-off test excavation programme undertaken in April 2008. At the conclusion of the test excavation and post-excavation analysis we provided the group with a draft copy of the CHMP report, including the results of the test excavation and proposed management, mitigation and contingency recommendations.

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After the Gunaikurnai Land and Waters Aboriginal Corporation had considered the draft report, we contacted each of principal representatives of the organisation, including Sandra Paton, Albert Mullet and Lloyd Hood to discuss the report and proposed management recommendations.



The representatives that participated in various phases of the CHMP, including survey and excavation were as follows:

- Barry Kenny,
- Harry Stewart,
- Jim Kenny,
- Tim Paton, and

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- Lloyd Hood

The second stage of excavation was undertaken on 7<sup>th</sup> and 8<sup>th</sup> of July, 2008 by Barry Kenny, Jim Kenny and Sharon Lane.

## 2.2 Outcomes of Consultation

The results of consultation with Gunaikurnai are described below out in Table 1. In summary, the Gunaikurnai were satisfied with our methodology and approach and participated in the test excavations. Following completion of the excavation, a draft copy was provided to the principal representatives for their review and comment. No written feedback was forthcoming and Sandra Paton and Lloyd Hood could not be reached by phone to discuss the report. However, we were able to contact Albert Mullet and his comments were as follows:

- Trained and experienced Gunaikurnai representatives should be employed to assist in the recommended archaeological salvage excavations; and
- Artefacts should be returned to the Gunaikurnai keeping place located in Bairnsdale.

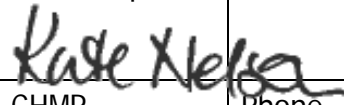
The later comment regarding return of artefacts to the keeping place is reflected in recommendations of this CHMP regarding curation of artefacts.

TABLE 1 - Aboriginal Community Correspondence Log  
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Date	Action	Method
18/1/08	Initial site visit with Lloyd Hood (Gunaikurnai) and AAV (Kate Morton and Joanna Freslov). All parties endorsed our approach in principle and Lloyd was happy to combine survey and test excavation into one batch of fieldwork. <i>Kate Nelson</i>	Site Visit
March / April	Consultation with Lloyd Hood, Albert Mullet and Sandra Paton to arrange fieldwork and allocation of representatives. <i>Director, East Gippsland Shire</i>	Phone
7 - 11/4/08	Survey and test excavation undertaken with <i>Date: 3 January 2018</i>	Survey &

	representatives of the Gunaikurnai Land & Waters Aboriginal Corporation (Barry Kenny, Harry Stewart, Tim Paton and Lloyd Hood).	Test Excavation
7 & 8/7/08	Test excavation of proposed access road with representatives of the Gunaikurnai Land & Waters Aboriginal Corp (Barry Kenny, Jim Kenny).	Test Excavation
1/8/08	Sent draft copies of report to Albert Mullet, Lloyd Hood and Sandra Patten (Gunaikurnai reps).	Express Post
8/8/08	Called Albert Mullet, Lloyd Hood and Sandra Patten to discuss the recommendations of the draft CHMP. None were available. Lloyd was in hospital. Messages left to return calls.	Phone
11/8/08	Called Sandra Patten to discuss draft CHMP - phone switched off.	Phone
11/8/08	Called Albert Mullet to discuss draft CHMP.  Albert supported our recommendations for proposed salvage excavation but stressed that trained experienced Gunaikurnai reps should be involved in the future field work.  Albert stated that artefacts should be returned to Gunaikurnai for storage in their keeping place located at Delmahoy St, Bairnsdale.	Phone

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### 3 ABORIGINAL CULTURAL HERITAGE ASSESSMENT - ENVIRONMENTAL CONTEXT (DESKTOP ASSESSMENT)

#### 3.1 Background

This chapter and chapter 4 and 5 of the report comprise the 'desktop assessment' required by the Aboriginal Heritage Regulations 2007. In accordance with the regulations this section of the report comprises the following:

- a review of the landforms/geomorphology of the activity area;
- identification of the geographic region of which the activity area forms a part;
- a search of the Victorian Aboriginal Heritage Register for information related to the present study area/ activity area;
- a review of reports and published works concerning Aboriginal cultural heritage relevant to the geographic region in which the activity area is located;
- a review of historical and ethno-historical accounts of Aboriginal occupation relating to the geographic region in which the activity area is located; and
- a review of the land use plan of the activity area.

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In the following chapters of the report, the above information is presented in three broad sections each covering the environmental (Chapt 3), ethno-historical (Chapt 4) and archaeological (Chapt 5) contexts of the activity area. This information assists in determining the archaeological potential of the activity area in a number of ways. For example:

- Considering the types of natural resources that may have been available within the study area, or in the local region, provides an indication of why

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<sup>5</sup> AAV 2007: 15

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people may have been present in the area, and of the potential physical traces of such a presence (e.g. the types of stone used for artefact making, whether trees having bark suitable for the manufacture of certain items existed/exist in the area, or whether there exists a known resource - plant animal or otherwise - that may have drawn people to the area).

- Information about previously recorded archaeological sites in the region can provide an indication of the types and distribution of archaeological deposits and material that may be present, or may once have been present, in the study area. It also provides comparative information that is essential for the assessment of the archaeological significance of any previously unrecorded archaeological material or deposits.
- Environmental and historical information (particularly regarding past and present land use) may indicate the potential for post-depositional processes to have altered or disturbed any archaeological deposits or materials that may have once, or may still, exist within the current study area.

In short, knowledge of the environmental, cultural and historical contexts of the study area is crucial for understanding the archaeological potential and significance of that area.

### 3.2 Landscape Planning and Environment Act 1987 East Gippsland Planning Scheme

A study of the Gippsland Lakes region indicates that the activity area is part of the 'Sarsfield' land system. This land system consists of dissected plateaux predominantly of Pliocene gravely colluvium with some recent alluvium. Landforms within this system consist primarily of flat-topped plateaux (70%), although sloping valley sides make up 29% of the system. The remaining 1% of land consists of incised major drainage lines. The present activity area is situated in the southern part of this land system, which is characterised by a greater degree of plateau dissection and frequent drainage lines. Consequently, the activity area consists mainly of hilly landforms with steep slope gradients, and has a much smaller proportion of land that could be considered to be flat-topped plateau<sup>7</sup>.

<sup>6</sup> Nicholson 1978: *Land Systems of the Gippsland Lakes map*

<sup>7</sup> This is if slope in the study area is assessed in terms of the percentage of slope definitions given in Nicholson's (1978) report in which the relatively flat-topped plateaux have an up to 2% slope.

### 3.3 Geomorphology

In the Late Jurassic and Early Cretaceous periods, Australia and Antarctica split apart, forming a rift valley in southern Victoria. This rift valley filled with fresh water sediments and volcanic material. The Otway and Strezlecki Ranges were formed by an uplift of these sediments in the Middle to Late Cretaceous. Outcrops of this material occur between Yallourn and Tyers. The continuous widening of this sedimentary basin formed the Gippsland Basin in the Late Cretaceous to Early Palaeocene. During the Tertiary period this basin was filled in with sediments mostly eroding from the highlands. In some places later sediments covered deposits of limestone and basalt, but in other places they have been uplifted and become outcrops. During the Pliocene, minor uplift resulted in erosion and the formation of 'gravelly alluvial fans and extensive flood plains sloping towards the south-east of the area', which in many places on the Gippsland plains have been covered by later sediments.

The foothills north of Bairnsdale extending to Orbost were created upon early Tertiary marine sediments. During the late Tertiary, the sediments that continued to build up were alluvial<sup>10</sup>. During the last Ice Age the sea level fell about 150 metres forming a secure land bridge between Victoria and Tasmania. The rivers of the area cut deep valleys into earlier flood plains that were infilled during the sea-level rise after the last Ice Age. This has resulted in a well-defined break between the old flood plain (upper terrace), and the present flood plain (lower terrace)<sup>11</sup>.

### 3.4 Soils and Geology

#### 3.4.1 Geology

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Geological mapping of the region available online from the Department of Primary Industries<sup>12</sup> (Figure 5), in the published Bairnsdale Geological Mapsheet<sup>13</sup>, and the

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<sup>8</sup> Sargeant, I & Sargeant, J 2005:3

<sup>9</sup> Sargeant, I & Sargeant, J 2005:3

<sup>10</sup> Sargeant, I & Sargeant, J 2005:3

<sup>11</sup> Sargeant, I & Sargeant, J 2005:3-4

<sup>12</sup> Geovic online address

<sup>13</sup> Bairnsdale SJ 55-7 mapsheet, Geological Survey of Victoria 1997

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Geological mapsheet provided in the Land Conservation Council report for the Gippsland Lakes Hinterland Area<sup>14</sup>, suggests that the majority of the study area comprises Tertiary fluvial deposits of the Sale Group (non-marine gravel, sand, silt, minor clay), with smaller portions of the activity area, namely those comprising the highest parts of the subject land, comprising early Quaternary (Pleistocene to Pliocene) 'unnamed alluvial terrace deposits' of 'gravel, sand, minor silt and clay, often with ferruginous cement.

The geology of the Lakes Entrance area also consists of Inland and Coastal Dunes. Inland Dunes were formed from sands blown from streams by prevailing easterly winds, particularly during periods of aridity, such as past glacial periods. Coastal Dunes and Plains were mostly formed during the Holocene<sup>15</sup>.

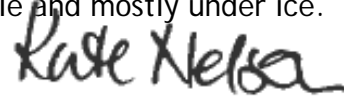
The major geological events that have formed the East Gippsland region are summarized in Table 2 below.

TABLE 2 - Summary of Geological Events in Gippsland<sup>16</sup>

Million Years Ago	Time Period	Significant Event
510-435	Ordovician	Gippsland Under Sea Cambrian Rift fill with Volcanic and Marine sediments.
435-405	Silurian	
405-380	Devonian	
~400	Bowling Orogeny	Granite around Bairnsdale and Dargo emerges.
395-385	Tabberabberan Orogeny	Tabberabberan Highlands born. Sea retreats and marine sedimentation ceases.
~370-350	Early Carboniferous	Stoney beds of Macalister, Avon and lower Mitchell are laid down.
~290	Late Carboniferous to Early Permian	Victoria near South Pole and mostly under ice.

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<sup>14</sup> LCC 1982

<sup>15</sup> Sargeant, I & Sargeant, J 2005:5

<sup>16</sup> Sargeant, I & Sargeant, J 2005:6 Table 2

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160-190	Late Jurassic to Early Cretaceous	Australia splits from Antarctica. Otways and Strzelecki Ranges born. Formation of Coal deposits.
70-60	Late Cretaceous to Early Palaeocene	Mass extinction of dinosaurs and other animals.
6.5-1.8	Tertiary	Foothills north of Bairnsdale to East of Orbost, build up on marine and alluvial sediments.
1.8-10,000 years BP	Pleistocene	Alluvial Terraces form.

### 3.4.2 Stone Sources

Archaeological studies of the Gippsland Lakes region have noted that local gravels, which are present throughout the area, most likely provided sources of raw material for stone working. Quartz, chert and rhyolite have been noted in these gravels. In addition, silcrete sources may exist in the highlands to the north of the Gippsland Lakes region, possibly near Buchan, and also in the South Gippsland Hills<sup>17</sup>.

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### 3.4.3 Soil Landscapes

In general the flat plateaux are characterised by mottled yellow, red sodic, duplex soils while the sloping valley sides (which are more characteristic of the present study area) have yellow-brown sand soils with clayey subsoil. These soils have been described as follows:

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*...on Pliocene colluvium, the profiles have surfaces of loamy coarse sand, bleached subsurfaces and yellow-brown or brown B horizons with ironstone nodules but without marked humus accumulation. Sporadic hardpans occur occasionally on Pleistocene and Pliocene sediments. The soils are of a variety of sandy clay loams, or clays that are often kaolinized or have a columnar structure<sup>18</sup>.*

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<sup>17</sup> Lomax n.d.

<sup>18</sup> Nicholson 1978: 14

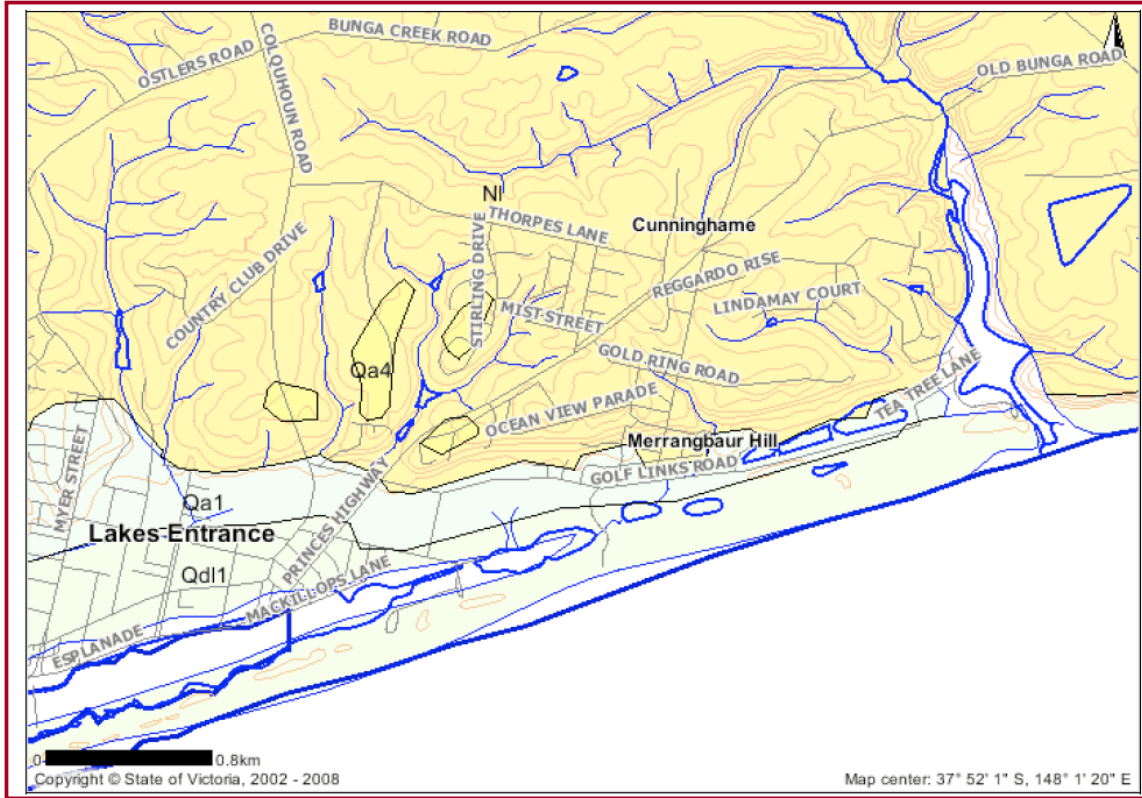


Figure 5. Geological mapping of the region including and surrounding the study area. Note N1 = "Sale Group", Qa4 = "unnamed alluvial terrace deposits". Map created on the Victorian Department of Primary Industries GeoVic website<sup>19</sup>

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The East Victorian coast comprises a variety of vegetation communities. The vegetation of the coastal zone around Lakes Entrance (approximately 1km from the coast and along estuarine areas) consists mostly of Herb Rich Woodland, Coastal Banksia Woodland, Coastal Dune Scrub and Grassland Mosaic. Also along the coastline are patches of Coastal Lagoon Wetland, Warm Temperate Rainforest and Plains Grassy Forest. The coastal areas to the south of the study area support plants and shrubs that are able to tolerate large amounts of salt spray and strong

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<sup>19</sup> DPI Geovic website at <http://www.dpi.vic.gov.au/dpi/nrenmp.nsf/LinkView/FB93FA24A8224E1DDCA256EBA001C1C3C91C40A3DD52CC00DCA256ED1000CF641>

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winds. On dunes Coast Tea-tree and Coast Banksia are common. In swampy or saline environments, Swamp Paperbark and Salt Paperbark are often widespread<sup>20</sup>.

The Sarsfield land system supports open forest vegetation communities with white stringybark and silvertop dominating the forests on the mottled yellow, red sodic duplex soils of the plateaux, and white stringybark, Gippsland grey box and mountain grey gum being the dominant species on the yellow-brown sand soils of the steep valleys. Major drainage lines in the area support a closed scrub community dominated by swamp paper-bark.

Common understorey species in this land system include bracken, broad saw sedge, silky tea tree, pomaderris and common apple-berry<sup>21</sup>.

### 3.6 Climate

Lakes Entrance has a Mediterranean climate regulated by frequent onshore breezes and coastal conditions. The area has had an average 711.2mm of rain per year for the past 41 years. The wettest month of the year is November. Summer temperatures range, on average, from 13° to 34°. Winter temperatures range from 6° to 16°<sup>22</sup>.

The climate appears to have remained stable for about the last 5,000 years. Prior to 10,000 years ago conditions were cooler and drier.

### 3.7 Landscape Modification (54 Thorpes Lane, Lakes Entrance)

Post-contact land use has altered the natural environment of the study area and surrounding region in a number of ways. Most obviously this has involved the clearing of the native open forest vegetation communities to establish pasture and agriculture.

European pastoralists have been active in the Lakes Entrance area since the 1850s. The Ewing brothers are generally identified as the first squatters in the region. Their run extended along coastal land from Merringbaur Hill (southeast of the

<sup>20</sup> Costermans 2007:135

<sup>21</sup> LCC 1982: map 6B; Nicholson 1978: 81

<sup>22</sup> Bureau of Meteorology Website accessed 5 Jan 2018  
[http://www.bom.gov.au/climate/averages/tables/cw\\_084083.shtml](http://www.bom.gov.au/climate/averages/tables/cw_084083.shtml)

present study area) east to the Snowy River<sup>23</sup>. The pastoral take-up of Gippsland was generally slow when compared to other parts of Victoria - like the Mallee. In general pastoralists entered Gippsland from two points - by sea at Port Albert, and overland from New South Wales via Omeo<sup>24</sup>.

The earliest agriculture in the Gippsland Lakes hinterland area was geared simply towards subsistence production for the local population, but by the 1880s the region was producing tobacco, maize, wheat, barley, oats, potatoes and hops amongst others<sup>25</sup>.

Examination of historic aerial photos from 1959 and 1973 provides an indication of the scale and timing of past landscape modifications and changes in occupation and use (refer to Figures 6 and 7). The 1959 aerial photograph shows the northern half of the area was tree-covered until the recent past. Distinct paddocks are visible on the southern half of the property in both photos, and it appears some of these were under crop. The current farm house is evident in the 1959 photo. During fieldwork for the CHMP, the entire study area, with the exception of land immediately surrounding the existing house and buildings, was cleared and being used for cattle grazing.

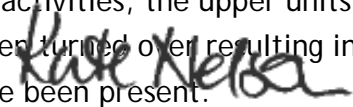
Original clearing of vegetation would have led to sheet erosion and loss of upper topsoil units down slope. Artefacts within affected soils would have been transported down slope and re-deposited in low lying landforms. Clearing of mature trees may also have destroyed any Aboriginal scarred trees that may have been originally present.

Any cultivation or ploughing of the study area land would have disturbed soils to varying depths. In areas subject to these activities, the upper units (at least 150-200mm) of the soil profile would have been turned over resulting in disturbance of any archaeological deposits that may have been present.

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<sup>23</sup> Bird and Lennon 1973: 11

<sup>24</sup> LCC 1982: 16

<sup>25</sup> LCC 1982: 23



Figure 6. Aerial photo of the study area dated 1959. Source: 'The Lakes Entrance Project' Lands Victoria.

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Figure 7. Aerial photo of the study area, dated 1973. Source: Standard Map Sheet Photography – Lands Victoria.

# 4 ABORIGINAL CULTURAL HERITAGE ASSESSMENT - ABORIGINAL HISTORY (DESKTOP ASSESSMENT)

## 4.1 Preamble

This section presents a history of Aboriginal use and occupation of the study area based on documentary evidence, archaeology and early ethnographic records. By necessity it is based predominantly on accounts of European observers who may not have understood the society and culture that they observed and may also have been influenced by their own cultural biases. Their observations are also temporally limited, being confined only to the last 200 years.

Discussions with Lloyd Hood and Albert Mullet (elders of the Gunaikurnai community) were undertaken to identify any oral history or knowledge about the study area and surrounds. No specific knowledge about the study area was provided, although they did tell us about the association between Thorpes Lane to the north of the study area and Billy Thorpe, an Aboriginal man who lived in the area in the late 19<sup>th</sup> century. Historical information about Billy Thorpe was examined during the historical research for this CHMP to determine whether or not he and his family had associations with the activity area. This research is described in Section 4.5 below.

## 4.2 Traditional owners

Archaeological evidence suggests that people have been living in the Gippsland region for at least 21,000 years<sup>26</sup>.

Territorial divisions and languages in the Gippsland region were discussed in a number of the ethnohistorical sources such as early records and observations by European settlers, Protectorate officials and other government employees and Europeans connected with mission stations. Their information has been analysed and mapped, for example, by Smyth<sup>27</sup> and Tindale<sup>28</sup>. Much of the following discussion

<sup>26</sup> Ossa, Marshall and Webb (1995) have obtained this date

<sup>27</sup> Smyth 1878

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is, however, in the main based upon a re-examination and mapping of the ethnohistorical evidence undertaken more recently by Wesson<sup>29</sup>.

The present study area lies within the land occupied by the *Gunai* or *Kurnai*<sup>30</sup> people at the time of European contact. This land extends roughly from the Tarwin River in the west, to the Snowy River in the east and the Australian Alps to the north. The southern boundary of the *Gunai* lands is formed by the Victorian coastline. There is some uncertainty as to the western boundary of the *Gunai* lands - evidence of a 'succession event' (to use Wesson's term) in which the land to the east of the Tarwin River (and including Wilson's Promontory) which had once been under the custodianship of the *Boon wurrung*<sup>31</sup> was taken over by *Gunai* people, was noted by several ethnohistorical sources. This event is thought to have occurred some time prior to 1835 (although the dating of this is debatable) and may have been part of an ongoing 'blood feud' between the *Boon wurrung* and the *Gunai*<sup>32</sup>. A detailed discussion of the possible succession process and its historical context has been undertaken by Ellender<sup>33</sup>.

The *Boon wurrung* people were part of a large linguistic and cultural group (now known as the Kulin Nation - Kulin groups shared practices relating to initiation, burial, kinship, marriage and religion<sup>34</sup>, and occupied lands consisting of much of present-day Victoria. The recorded enmity between *Boon wurrung* and *Gunai* people may have extended to all Kulin groups - McBryde has noted ethnohistorical and archaeological evidence that suggests that the hostility, or at least a separation, between the two groups, may have existed for some time<sup>35</sup>.

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<sup>28</sup> Tindale 1974

<sup>29</sup> Wesson 2000

<sup>30</sup> There exist a variety of possible spellings for this name which means 'man' in the local language (Wesson 2000: 17). For ease of discussion a single spelling 'Gunai' is used in this report.

<sup>31</sup> A language group who occupied land to the west of the *Gunai* including the Mornington Peninsula and the northern shores of Port Phillip Bay (see Clark 1990: figure 13).

<sup>32</sup> Wesson 2000: 18

<sup>33</sup> Ellender 2002

<sup>34</sup> Howitt 1996(1904):336-338

<sup>35</sup> McBryde 1984: 276

The apparent isolation of the *Gunai* people may have been partly in consequence of the geography of Gippsland itself which, with its 'swamps, mountains and dense scrubs to the west, rugged mountain ranges to the north and dense temperate jungles and mountain ranges to the east,'<sup>36</sup> provided natural barriers at the boundaries of *Gunai* country. This isolation was commented on by the ethnographer Howitt, who observed that:

*The Kurnai were isolated from other tribes by the nature of the country surrounding them. Moreover, they did not attend the ceremonies of any other tribe, nor did they receive visitors at theirs*<sup>37</sup>.

Wesson notes that there were five large divisions of the *Gunai*, three of which were identified through a 'directional system of naming' (ie easterners, southerners and westerners) while the remaining two bore names which may have referred to their characteristics or customs. The origin of these known directional names is from the perspective of the Mitchell River people who inhabited land near the centre of *Gunai* country and referred to themselves as simply as 'the people'. The current study area lies within the land of the *Krowuntunkoolong* (or eastern people) division of the *Gunai* who occupied the country between the Tambo and Snowy Rivers<sup>38</sup>. People of this region spoke a language that has been identified as *Thangui*<sup>39</sup>.

In addition to the five large *Gunai* divisions Wesson has identified 31 'named groups'<sup>40</sup> in the region. Of these, the group identified variously as *Brt-Brita* or *Ngrangit* for two of the divisions in the area (now known as Long Point and the entrance to the lakes, respectively) were located close to the present study area.

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A man known to Europeans as Billy the Bull (*Karit Lakarat*) was, according to Wesson, the head of this group. He was born in 1840 at Lakes Entrance and died at Lake Tyers in 1910. His sister Kitty of Cunninghamame (also known as Kitty Bull and



<sup>36</sup> Wesson 2000: 17

<sup>37</sup> Howitt 1904: 505 quoted in Wesson 2000: 16

<sup>38</sup> Wesson 2000: figure 14

<sup>39</sup> Wesson 2000: figure 15

<sup>40</sup> Wesson uses this term in an attempt to avoid the anthropological terms 'clan' and 'tribe' because "the information about the named groups contains a number of variables and there is no guarantee that all groups represent the same degree of division" (Wesson).

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Kitty Johnson) was identified as the head woman of this named group. Kitty of Cunninghame was likewise born at Lakes Entrance and died at Lake Tyers, presumably at the mission station that had been formed there in the early 1860s. That both Billy and Kitty appear to have died away from their identified country is a small indication of the impact of European settlement on the Aboriginal population of the region, this impact is discussed in more detail below.

## 4.3 Lifestyle of the Traditional Owners

### 4.3.1 Preamble

By studying accounts of early British settlers, we can reconstruct aspects of traditional Aboriginal lifestyles and economies. Although such accounts are fragmentary and present a biased European view of Aboriginal culture, they provide an important insight about Aboriginal use and occupation of the land at Contact.

Several ethnographic sources have been drawn on to construct an ethnohistory, including historic maps and illustrations as well as first and second hand accounts from explorers and government personnel.

### 4.3.2 Resources of the Land Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme

#### 4.3.2.1 Food Resources

Gippsland Aborigines harvested water fowl, fish, kangaroo, possum, wombat, reptiles, root vegetables (54 Thorpes Lane, Lakes Entrance), berries, fruits and honey from the rivers, swamps, plains and valleys. For their canoes, rugs, artefacts and decorative apparel there was a range of timbers, stones, leathers, ochres, seeds and feathers<sup>41</sup>.

The following short review is intended to provide an indication of the range of resources that may have been available to Aboriginal people in the Lakes Entrance area. It, by necessity, is not a complete discussion of the array of resources (plant, animal and stone) available in the region.

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<sup>41</sup> Wesson 2000:17

The following account by Bulmer<sup>42</sup> provides an indication of the activities and use of local resources which might be typical of a coastal group in the region:

*In spring their time was devoted to fishing, as the fish then begin to be plentiful... The time when they had most wild fowl was and still is in the spring, when birds are moulting. At this season they kill swans in large numbers. The wild-fowls they get are principally swans and ducks... in spring, as well as summer, they lived much on vegetables and fruits...*

*In summer time their days were spent chiefly in fishing for eels and fat mullet (Pert-piang). They camped at the entrance to the Lakes, where they are plentiful at this season. They would find also in the gullies near the entrance plenty of (Koo-oo-oo) (or apples) and these, with the fish, would form their chief diet. Excepting when they desired a change of food, they would never go in a jirrak into the bush for wallaby.*

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Elsewhere Bulmer described equipment for fishing in the Gippsland Lakes area:

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*For fishing in Gippland, bone hooks, spears and both set nets and drag nets were used...In Gippsland bark was used for floats and stones were used for sinking the net.*



*The women fished from canoes, I never saw them using their bone hooks and I cannot tell what success they had. The fish spear was a more useful instrument. I often saw them used very successfully particularly at night when a torch was used...Sometimes when a man was very hungry...he would take a bag and dive to the bottom of the river and get mussels, it would take 3 or 4 dives to fill his bag...<sup>43</sup>*

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The Yam Daisy was probably the most relied upon staple for Aboriginal groups in Victoria. Women and children gathered them using digging sticks. Before European

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<sup>42</sup> Smyth 1878:141. Bulmer was a missionary at the Lake Tyers Anglican mission station from 1860 until he retired in 1907, although he remained at the station as a 'minister and spiritual advisor to the community' until his death in 1913 (Gardner 1994: 74, 83).

<sup>43</sup> Bulmer in Vanderwal (ed) 1999: 59-61

settlement the daisy grew on most land below the snowline. It was eaten raw or cooked, taking on sweet flavours, and provided a good source of energy<sup>44</sup>.

Plant fibres were extremely important and were used in the manufacture of many significant goods. The fibres were not always simple to extract and sometimes needed preparation such as heating, chewing, beating or soaking. Fibres were used to make such items as nets, fishing line, adornments and carry bags and were also used for binding or hafting implements (such as axes). Different plants have different fibre properties, and are used in different ways.

Plant fibres played an important role in the collection of coastal resources. Canoes made and used at Gippsland Lakes post-contact are illustrated below (Figure 8). Canoe bark was removed from trees with stone axes, or during the post-contact period with metal axes. Plant fibres bound the canoes together at each end, and holes or imperfections were filled with resin or sap. Canoes facilitated access to fishing locations that could not be reached from shore such as deep holes, drops offs, snags and weed beds, where fish were speared or line caught. George Robinson commented on the use of bone fishing hooks that he was shown in Gippsland in 1844. He noted that they were 'the first [he] had seen' and also observed that the canoes in Gippsland were different 'from others [he] had seen; are sewed at the ends'. While in the Gippsland Lakes area, Robinson also commented on the abundance of fish and eels available in lakes and rivers<sup>45</sup>:

*The Lakes the chief rendezvous of the Natives contiguous to the Coast are unsurpassed by any in the Colony. Of the five Rivers flowing into them the Latrobe is prominent. Wellington, Victoria and King are united by a Strait fifteen miles in length, fish are abundant, and the Aborigines may be termed Ichthyophagist<sup>46</sup>.*

The indigenous groups along the coast exploited the abundant fish stocks of the Gippsland Lakes system using nets, spears and pens. After European settlement the fishing industry became important to the Lakes Entrance economy during the mid-1800s<sup>47</sup>.

<sup>44</sup> Zola & Gott 1992:6-8

<sup>45</sup> Robinson 10/6/1844 in Clark 2000: 73

<sup>46</sup> Robinson in Gardner 1994: 41

<sup>47</sup> Duncan & Nicolson 2007:18



Figure 8. Kitty Johnson and Nellie Blair in a bark Canoe, Lake Tyres. 1936. Photo Howard Decimus Bulmer. Image Copyright La Trobe Picture Collection, State Library of Victoria.

### 4.3.2.2 Stone

Mention has been made of the use of fibres to haft stone axes. According to Howitt, stone tomahawks in Gippsland were made from large water worn pebbles<sup>48</sup>, suitable examples were 'plentiful in the mountain streams'. He explained the manufacturing process as follows:

*A Kurnaman having found a water worn stone suitable for his purpose, first of all chipped or pounded the part intended for the cutting edge with a hard rounded pebble, then having brought it somewhat into shape, he rubbed it down on a suitable rock in the bed of a stream until he had produced a good edge...Pieces of grinding stone which are abraded quickly were kept, and even carried from camp to camp for the purpose of sharpening the edge when necessary<sup>49</sup>.*

A number of axe grinding grooves (usually sandstone outcrops with grooved marks worn into their surface from use as axe grinding stones) have been recorded on the Gippsland plains, particularly in the area between the Avon and Perry Rivers<sup>50</sup>.

*Kate Nelson*

<sup>48</sup> Howitt contrasts this method of making stone axes with that of the Kulin who used quarried stone for axes (1904: 312). Interestingly McBryde has found that the distribution of axes made from stone quarried from Mt William, located in Kulin country, appears to reflect linguistic boundaries and social factors - while the Mt William axes are relatively widespread in Kulin country and that of related language groups, they appear to be scarce in Gunai country (1984).

<sup>49</sup> Howitt 1904: 312 **Date: ....3 January 2018...**

<sup>50</sup> Lomax n.d.: section 9; West 1969

John Bulmer noted that for kangaroo hunting men carried two or three spears 'barbed with pieces of flint or in more modern times with broken glass'<sup>51</sup>. While other stone artefact types were generally not described by the early observers and ethnographers, archaeological studies of the Gippsland Lakes region have noted that local gravels, which are present throughout the area, most likely provided sources of raw material for stone working. Quartz, chert and rhyolite have been noted in these gravels. In addition, silcrete sources are likely to be present in the highlands to the north of the Gippsland Lakes region, possibly near Buchan, and also in the South Gippsland Hills<sup>52</sup>.

## 4.4 Exploration and First Contact

The pre-contact population numbers of the *Gunai* people cannot be determined with any certainty. Gardner has compiled population estimates of the Aboriginal population of Gippsland made by nineteenth century European observers - these vary between an estimation of 2,700 people made in 1846, to 80 people, made by Bulmer of the Lake Tyers mission station in 1882<sup>53</sup>. Estimates made in the 1840s generally exceed 1000 people and estimates made of the post 1870 population suggest that fewer than 200 *Gunai* remained. This indicates that population decline was rapid.

According to Gardner, the first recorded contact between the *Gunai* and Europeans took place in the region when, in 1798 a coastal exploration party lead by George Bass reported a friendly meeting on Phillip Island Beach. It is probable that sealers who worked in the Bass Strait in the early nineteenth century, met with coastal Aboriginal people. Thompson believes that the kidnapping of women and the violence against men and children by sealers had a disastrous effect on the *Gunai* people<sup>55</sup>. It was not, however, until the permanent settlement of the region by squatters and settlers that Aboriginal communities were displaced, and food resources rapidly diminished.

*Kate Nelson*

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<sup>51</sup> *Bulmer in Vanderwal (1999): 61*

<sup>52</sup> *Lomax n.d.*

<sup>53</sup> *Gardner 2001: table 2*

<sup>54</sup> *Gardner 2001: 26*

<sup>55</sup> *Thompson 1985*

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## 4.5 Early Settlement & Frontier Relations

European activity in the region has in the main been focused on the Gippsland Lakes and their natural, and then constructed outlet to the sea. It is believed that the Gippsland Lakes were first visited by Europeans in the late 1830s, but it was not until 1842 that the intermittent natural outlet of the lakes to the sea was first found. An artificial entrance was constructed in the late 1880s, but the extension of the railway to Bairnsdale lessened the importance of the entrance for transportation<sup>56</sup>.

The transportation difficulties that had hindered the region up until this time no doubt stemmed the potential tide of European settlers into the region in the nineteenth century, but settlers were nevertheless present in the Lakes Entrance area from the 1850s when the Ewing brothers 'ran sheep and cattle in the coastal country from Merringbaur Hill east to the Snowy River'<sup>57</sup>. After one of the brothers died attempting to cross the natural entrance to the lakes, the other left two hut-keepers in charge of the station which he had resolved to sell. According to Roadknight, the hut-keepers were killed by local Aboriginal people 'and the sheep were scattered far and wide'<sup>58</sup>. The run was then taken up by the Roadknight family in about 1855, who had previously squatted on land in Victoria's western district. A map dated to 1865 shows the position of Roadknight's station to the south of the present study area (Figure 9).

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Violence it seems, was a characteristic of the process of claiming and settling land in Gippsland. Gardner contends that the *Gunai* aggressively attempted to expel the intruders from their land and, it seems, in many cases retaliation was swift - stories of massacres of Aboriginal people in the region are many<sup>59</sup>. Possibly the most damning evidence against the Gippsland squatters comes from one of their own, Henry Meyrick, who wrote in 1846:

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*The blacks are very quiet here now, poor wretches. No wild beast of the forest was ever hunted down with such unsparing perseverance as they are. Men, women and children are shot whenever they can be met.*

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<sup>56</sup> Bird and Lennon 1973

<sup>57</sup> Bird and Lennon 1973: 11

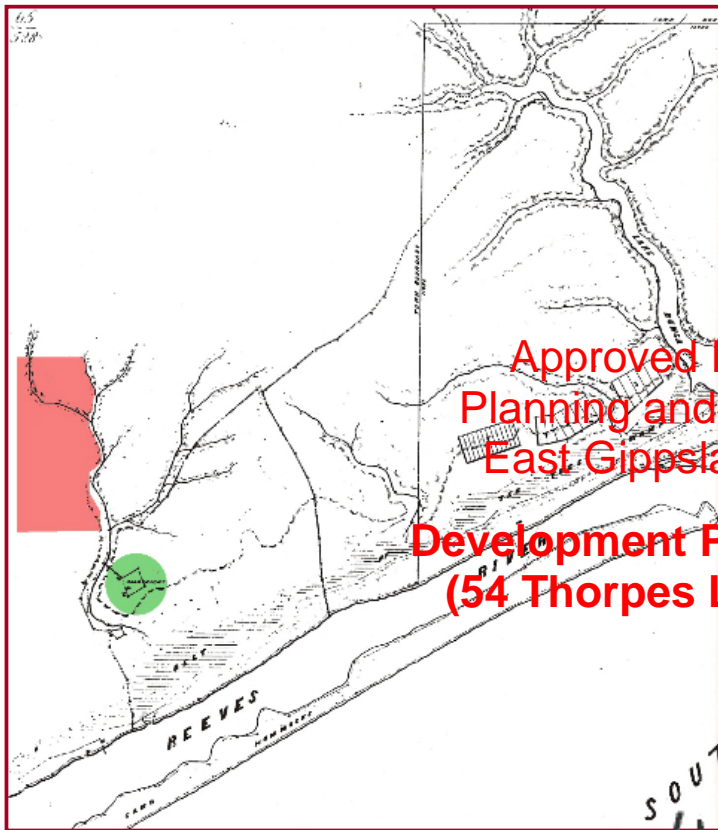
<sup>58</sup> Roadknight 1934 in Palmer et al 1956

<sup>59</sup> Gardner 2001

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*with...For myself, if I caught a black actually killing my sheep, I would shoot them with as little remorse as I would a wild dog, but no consideration on earth would induce me to ride into a camp and fire on them indiscriminately, as is the custom whenever the smoke is seen. They will very shortly be extinct. It is impossible to say how many have been shot, but I am convinced not less than 450 have been murdered altogether<sup>60</sup>.*

Despite the violence that accompanied the beginnings of the pastoral industry in Gippsland, many pastoral stations through the region employed Aboriginal workers in the nineteenth century. Goulding has noted that up to 50% of the stations in East Gippsland had Aboriginal employees - including Merrangbar and Swan Reach Stations, both located near Lakes Entrance<sup>61</sup>.



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Figure 9. Detail of 1865 plan of the Township of Cunningham, showing the position of Roadknight's station to the south of the present study area (Public Record, Office Victoria, Historical plans collection VPRS 15899, FEATR 180).

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<sup>60</sup> Meyrick 1846 in Morgan 2004: 28. see also discussion in Gardner 1994: 24-25

<sup>61</sup> Goulding 1997: 47

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Throughout the nineteenth century and later, the lives of Aboriginal people in the study area and across Victoria were greatly influenced by various government policies of Aboriginal 'protection' and 'management'. The first of these was put in place in an attempt to lessen the impact of European settlement on the Aboriginal people of the then Port Phillip District of New South Wales (now Victoria). As a result of recommendations made by the Select Committee Inquiry into the condition of Aboriginal Peoples, the Port Phillip Aboriginal Protectorate was created. The Protectorate consisted of Chief Protector George Robinson and four Assistant Protectors whose task was to physically protect the Aboriginal people of the district and also to 'civilize' them, to teach them agriculture, house-building and other white employments, to educate them to a settled European life style and to convert them to Christianity<sup>62</sup>. The protectorate lasted for only 10 years (1839-1849) and was generally deemed to be a failure. It had little to no impact on the plight of the Gippsland people. Although Assistant Protector William Thomas was assigned to the Gippsland region (in addition to the Port Phillip and Western Port areas) his only interaction with *Gunai* people during the period of the protectorate was with *Gunai* individuals who were out of their country and in the Melbourne area<sup>63</sup>.

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Chief Protector George Robinson did make a journey through Gippsland in 1844, but was, on the whole, unsuccessful in making contact with the *Gunai* people. As a result, most of his information regarding the *Gunai* came from Europeans then living in the region<sup>64</sup>.

Signed:  
*Mr Tyers Estimates the bls. of Gippsland at 3000 says they are very big and powerful men. Judging by their weapons they must be. There has been no [contact?] with them and [whether?] I shall succeed I cannot tell now<sup>65</sup>*

More relevant to the *Gunai* people was the decision by the Central Board for the Protection of Aborigines to establish Aboriginal stations and to encourage missionaries to do the same. As a result, in 1861 the Anglican Mission Committee established a 2,000 acre mission station in East Gippsland at Lake Tyers. This location was chosen both because of its location at a fishing spot commonly used by

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<sup>62</sup> Christie 1979: 85, 89

<sup>63</sup> Gardner 1994: 50

<sup>64</sup> Clark 2000

<sup>65</sup> Robinson in Gardner 1994: 48

Aboriginal people, and because the poor soil and general isolation of the location was thought unlikely to attract white settlers<sup>66</sup>. Slightly further from the present study area the Moravian missionaries established the Ramahyuck mission station on the shores of Lake Wellington in 1862<sup>67</sup>.

The commencement of the reserve and mission system saw the beginnings of greater government control and regulation of the lives of Aboriginal people. The passing of the 1869 *Act for the Protection and Management of the Aboriginal Natives of Victoria* provided the Central Board, then changed to the Board for the Protection of the Aborigines (BPA), with greater power over the lives of individuals, making the reserves or mission 'prescribed places for Aboriginal people to live [and] set out the form of work contracts and certificates for which they were eligible<sup>68</sup>'. The BPA could stipulate where people could live and decide if and where they could work.

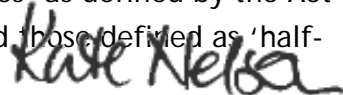
Christie has argued that the increasing institutionalisation of Aboriginal people provoked resistance and rebellion, and this, in turn provoked a radical change in government policy in the form of the 1886 *Aborigines Protection Act*. Known colloquially as the 'half-cast Act' this Act altered the definition of 'Aborigine':

*Now, according to the amended Act 'Aborigines' were full-bloods, half-castes over thirty-four, female half-castes married to 'Aborigines', the infants of 'Aborigines' and any half-caste who was licensed by the BPA to reside on the station<sup>69</sup>.*

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The Act resulted in the expulsion of many young, literate Aboriginal people from the stations which had been their only home and split families apart. Christie has described it as a 'fully-fledged absorptionist policy' - by restricting the numbers of people left on missions and reserves and discouraging the marriage between 'half-castes' and this group, it virtually ensured that 'Aborigines' as defined by the Act would eventually die out. At the same time it encouraged those defined as 'half-

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<sup>66</sup> *Caldere and Goff 1991: 15. The land taken up by many Aboriginal reserves and stations was gradually whittled away in the late nineteenth and early twentieth centuries by the encroachment of European farms. While this was less of a problem at Lake Tyers disputes did arise between the missionaries and local white fisherman who wished to exploit the abundant fish population of the lake (Gardner 1994: 81).*

<sup>67</sup> *Caldere and Goff 1991: 17*

<sup>68</sup> *Broome 2005: 131*

<sup>69</sup> *Christie 1979: 197*

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castes' to be 'gradually absorbed physically and culturally by the white population'<sup>70</sup>.

Goulding has noted that the 1886 Act had the effect of producing 'a suite of new community settlements which fostered Aboriginal identity'. Small Aboriginal settlements, occupied by those people expelled from the Lake Tyers Station, appeared at various locations including Newmeralla, Nungurner, and, most relevant to the present study area, at Thorpe's Lane. These locations allowed people to visit friends and family who remained on the Lake Tyers Station. They also:

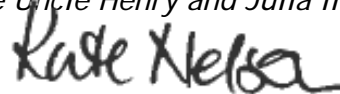
*functioned as stop-over points for families and individuals travelling to East Gippsland from other parts of the state to find work in the region. But most importantly these settlements offered people support and a sense of belonging<sup>71</sup>.*

A relatively large number of Aboriginal historical places have been recorded in the region - they illustrate a range of post-contact associations (work sites, habitations, the locations of gatherings and recreational activities of the nineteenth and twentieth centuries) between Aboriginal people and places in the region and illustrate the on-going presence and sustained cultural identity of the Aboriginal people of the region<sup>72</sup>.

Thorpe's Lane, just to the north of the study area is named after an Aboriginal man Billy Thorpe and his family who, after moving off the Lake Tyers station, selected a ten-acre farm there in the 1880s. Pepper records that Thorpe, his wife Sarah and later his son Henry lived in a timber house and grew beans and potatoes there. In 1923 Billy and Sarah Thorpe returned to live at Lake Tyers (Henry Thorpe's then widow Julia had already returned). When Phillip Pepper wrote the history of his family in the 1980s he noted that:

*Where Grandfather and Granny Thorpe lived at Lakes Entrance there is a sign up now, 'Thorpes Lane'. You'd see it if you had a look. It's the signpost to the rubbish tip. There Grandpa's house was is one of the plum trees still growing, and where Uncle Henry and Julia lived*

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<sup>70</sup> Christie 1979: 201

<sup>71</sup> Goulding 1997: 48

<sup>72</sup> Goulding 1997: 51

on the corner is a lily that Julia planted years ago and it still comes up every year<sup>73</sup>.

The location of the Thorpe's farm is shown in Figure 10 at the northeastern side of the Thorpe's Lane and Colquhoun Road intersection, to the northwest of the main part of the current study area.

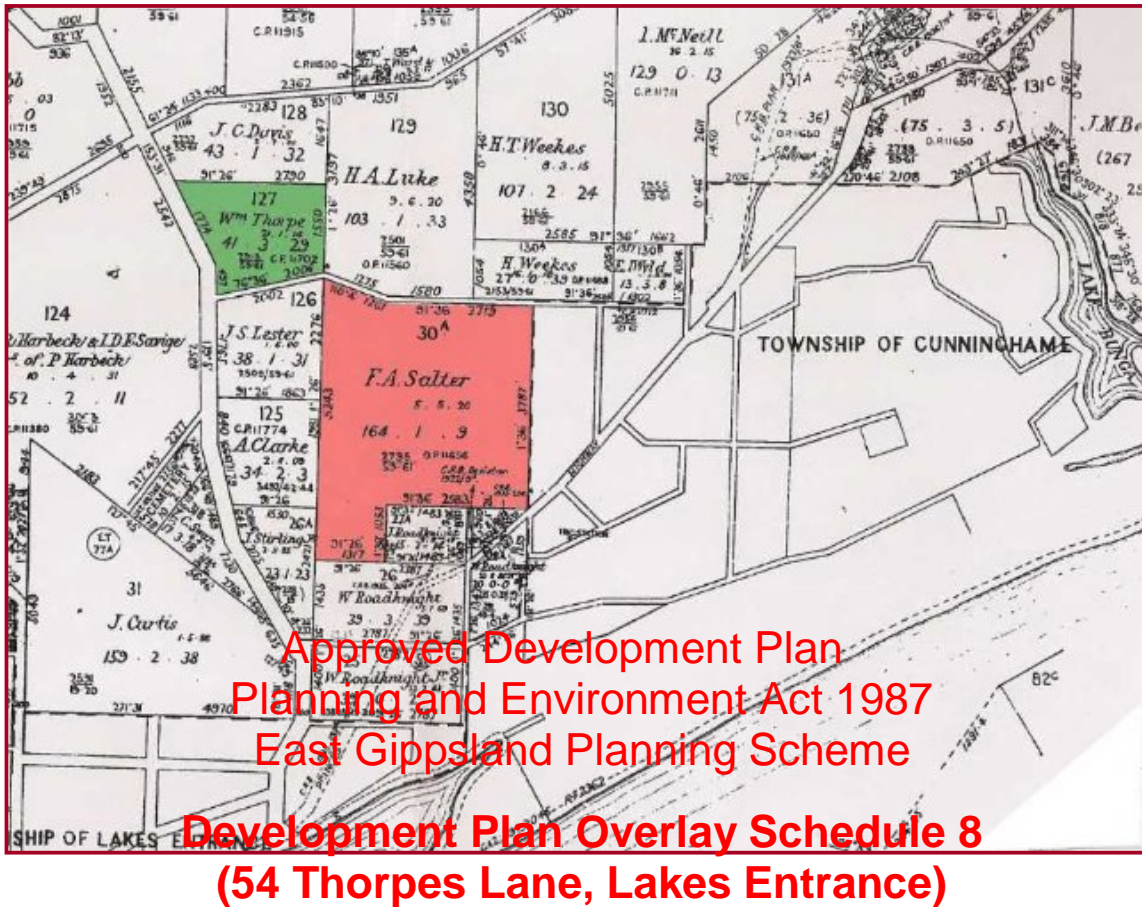


Figure 10. Detail of Colquhoun parish plan showing location of the William Thorpe's land (green) and the location allotment which makes up the majority of the present study area (Public Records Office Victoria, parish plan collection VPRS#).

The reduced numbers of people remaining on stations and reserves following the passing of the 1886 Act also presented a justification for the amalgamation of Aboriginal stations across Victoria and the relocation of Aboriginal people from across the state away from their own country to Lake Tyers, chosen for this purpose because of its relative remoteness and inaccessibility<sup>74</sup>. Eventually

<sup>73</sup> Pepper 1980: 78

<sup>74</sup> Christie 1979: 204

ownership of the Lake Tyers station was, in 1971 granted to the Lake Tyers Aboriginal Trust<sup>75</sup>.

The Aboriginal cultural heritage of the region surrounding the study area is under the custodianship of the Gunaikurnai Land and Waters Aboriginal Corporation, the RAP for this region of Victoria.

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<sup>75</sup> *Goulding 1997: 50*

## 5 ABORIGINAL CULTURAL HERITAGE ASSESSMENT - ARCHAEOLOGICAL CONTEXT (DESKTOP ASSESSMENT)

### 5.1 Regional Aboriginal Archaeological Context

For the purposes of determining settlement and site location patterns, archaeologists examine regional and local trends in the distribution of known sites in relation to environment and topography. This provides evidence about economic and social systems in the past and also assists archaeologists in predicting likely site types, site locations and the nature of the archaeological resource in any given area.

#### 5.1.1 Regional Context

A number of larger archaeological projects have been undertaken in the Gippsland Lakes region. A synthesis of the archaeology of the region, using data from projects undertaken variously by Hotchin, Hall and Lomax, has been produced by Lomax<sup>76</sup> and is summarised below.

The area discussed by Lomax's study did not encompass the present study area, but covered areas to the south and west of it (generally areas south of the Princes Highway). Landform divisions used by Lomax included coast, between coast and lakes, lakeshores (divided into north and south), islands, wetlands, plains and hills. Of these the 'hills' unit is the most relevant to the present study area. A summary of archaeological site distribution per landform unit is provided in Table 3 below.

A more recent assessment of the potential sensitivity of the forests of the Gippsland and East Gippsland regions was undertaken by McConnell, Buckley and Wickman<sup>77</sup>. This study did not have a fieldwork component, but instead drew on existing archaeological data in order to create predictive statements regarding the potential distribution of Aboriginal archaeological sites in the Gippsland and East Gippsland regions.

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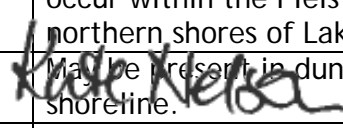
<sup>76</sup> Lomax n.d.

<sup>77</sup> McConnell, Buckley and Wickman 2002

Table 3 - Summary of Lomax's site location model for the Gippsland Lakes

Landform unit	Site types	Location/ frequency of site types
Coast	Shell midden (no stone artefacts)	Shell middens are most common within 1-2km of the coastal margin, beyond which they drop off significantly.
	Shell middens with stone artefacts	Donax middens containing small numbers of stone artefacts on local gravels and quartz are found in foredune and backdune blowouts along the coastal margin. Middens containing larger numbers of artefacts might be found in foredune blowouts near perennial water - in addition to quartz and local gravel artefacts these may contain silcrete microlithic artefacts.
	Stone artefact sites	May be found in the vicinity of perennial water sources - larger scatters with greater variety in artefact types and materials are found in close proximity to such water sources.
Between coast and lakes	Stone artefact sites	Large sites of 100's or 1000's of artefacts are not common here because of a general lack of potable water. The majority of sites in this unit consist of small artefact scatters.
Lakeshores (south)	Stone artefact sites	A range of site sizes are present, with size and content being determined by the availability of potable water. Many sites on the lake shores have been destroyed or damaged by destabilised land surfaces resulting from greater salinity in the lakes.
	Burials	May be present in Pleistocene sand dunes and ridges bordering the lakeshores.
Lakeshores (north)	Stone artefact sites	Substantial stone artefact sites are located in the vicinity of potable water, especially near wetlands. Most of these sites are characterised by assemblages composed of artefacts on quartz and local gravels and pebble, quarry sites may be found in close proximity to natural deposits of local gravels that occur within the Pleistocene terrace bordering the northern shores of Lakes Victoria and King.
	Burials	May be present in dunes and sandy banks on the shoreline.
	Scarred trees	May exist in remnant red gum forests.
Islands	Stone artefact sites	In general the lack of permanent potable water restricts the size of stone artefact sites in this unit with the exception of Raymond Island.
	Burials	May occur in dunes and other sandy areas.

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Wetlands	Stone artefact sites	Will occur most frequently in areas above the flood level of the lakes. The largest sites are likely to occur on dunes and terraces adjacent to wetlands areas.
	Scarred trees	May occur in remnant red gum forest.
	Burials	May exist in areas where sand deposits are present.
Plains	Stone artefact sites	Will be located within close proximity to potable water and occur near waterways and swamps on terraces, ridges, spurs, dunes or other high ground.
	Axe grinding grooves	Will be located where suitable outcrops of sandstone occur in the vicinity of water sources.
	Scarred trees	May occur wherever remnant forest red gum or box species occur.
Hills	Stone artefact sites	Large sites will be found on the shores of Lake Tyers, Bunga Lake, North Arm and other creek inlets in the hills while smaller flake sites, quartz workshops and isolated artefacts will be located on ridge lines and spurs leading to areas of lake shoreline and also along waterways. These sites are likely to be composed of primarily local gravels and quartz.
	Burials	May be present wherever sandy dunes are present.
	Scarred trees	May occur wherever suitable remnant trees exist in the vicinity of water sources.

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Seven sub-regions were identified for the purposes of forming predictive statements, of most relevant to this report is the 'East Gippsland coastal plains and hills' sub-region which includes the present study area. Locations of potential sensitivity for Aboriginal archaeological sites were assessed as:

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- areas within 500m of the coast;
- areas within 200m of estuary margins;
- within 100m of first order streams and 200m of other freshwater sources;
- within 75m of ridges and spurs;
- within alluvial valleys; and
- in red gum dominated woodland (for scarred trees).

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McConnell, Buckley and Wickman described the archaeological signature of the sub-region as follows:

- common site types consist of isolated finds and artefact scatters with quartz, volcanics, silcrete, cherts, metasediments, quartzite and hornfels as the main types of artefact raw materials present;
- scarred trees are also common; and
- site types rare to the region include quarries/stone sources and burials.

### 5.1.2 Early Occupation

The long presence of people in the Gippsland region has left its mark in the landscape - there is archaeological evidence of Pleistocene occupation at the New Guinea II rockshelter (21,000BP) on the Snowy River and Pleistocene deposits have also been excavated at Cloggs Cave on the Buchan River (human occupation dated to roughly 18,000BP)<sup>78</sup>. The majority of dated archaeological sites are, however, late Holocene in date. This may, at least in part, be a reflection of research bias as much of the excavation work undertaken in the region has focused on the Gippsland Lakes which became a more productive environment following the formation of the barrier about 6,000 years ago that cut the lakes off from tidal exchange<sup>79</sup>. This could also be the result of site preservation or, alternatively, there may have been a real change in the use of the landscape by Aboriginal people in this period.

### 5.1.3 Site Patterns

#### 5.1.3.1 General Patterns

Most regional studies have found that proximity to water is an important factor in site patterning. Site patterning across the Gippsland Region indicates open artefact scatters are larger, more complex and more densely clustered near permanent creeks, wetlands and estuaries, particularly where these water sources intersect with the coast. Resource intersection zones have also been cited in archaeological studies and ethnographic investigations as particularly foci of occupation and use due

<sup>78</sup> Ossa, Marshall and Webb 1995: 33, 24

<sup>79</sup> Lomax n.d.

to the broader range of resources that could support larger groups and more diverse activities<sup>80</sup>.

Artefact scatters are also clustered near stone sources. These 'on-source' sites often reflect primary activities associated with primary reduction of raw materials for transport and use elsewhere.

Extensive excavation in south-eastern Australia has demonstrated that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces. This is a critical consideration in aggrading soil landscapes. For example, a 1997 study by McDonald<sup>81</sup> found that:

- 17 out of 61 excavated sites had no surface artefacts prior to excavation;
- The ratio of recorded surface to excavated material was 1:25; and
- None of the excavated sites could be properly characterised on the basis of surface evidence. In short, surface evidence (or the absence of surface evidence) does not necessarily indicate the potential, nature or density of sub-surface material.

Although the study was undertaken on a different landscape than the study area, the results of McDonald's work clearly highlight the potential limitations of surface survey in identifying archaeological deposits. The study also demonstrates the importance of test excavation in establishing the nature and density of archaeological material.

### 5.1.3.2 Localised studies

A number of smaller or localised investigations have been undertaken in the area surrounding the subject land. Some of these are, however, in areas close to the estuarine, lakeshore or coastal environments associated with the Gippsland Lakes or the coast<sup>82</sup> and are of little use to terms site disposal and production in the present study area. On the basis of proximity and landform the study of most

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<sup>80</sup> Hynes & Chase 1982

<sup>81</sup> McDonald 1997

<sup>82</sup> Eg Duncan and Nicholson 2007; Williamson and Dudley 2007.

relevance to the Ocean View Lakes site is a subsurface testing investigation carried out at Hoggs Lane, Lakes Entrance by Rhodes in 2001.

Rhodes' study area was located approximately 2km to the north-northwest of the present study area. It was subject to subsurface testing by means of 1.5m wide transects of between 19m and 69m in length mechanically excavated to a depth of between 10cm and 25cm. Excavated soil was broken up with spades and examined by hand.

As a result of this work two Aboriginal archaeological sites (VAHR8522/0222 and 0223) were recorded. Site VAHR8522/0222 consists of three artefacts, all complete flakes, two of quartz and one of chert. Site VAHR8522/0223 consists of a broken flake and a flaked piece of chert.

Rhodes suggested that the location of his study area on a ridge above the junction of two creeks was significant in terms of the presence of Aboriginal artefacts. Also of interest in terms of the present study area is his suggestion that the north-south oriented ridge (also the route of Lakes-Colquhoun Road) may have been a natural route of movement for both Aboriginal and later European people when moving between the coast and the hinterland<sup>83</sup>.

Some fieldwork has recently been undertaken near the present study area for cultural heritage management plan VAHR8522/0222 by Dr Vivienne Clark and Associates. Site card information for three recorded stone artefact scatters found during subsurface testing for this CHMP is available. It suggests that small, low density scatters of quartz and silcrete artefacts may be common in the region.

#### 5.1.4 Stone Artefacts

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Aboriginal stone artefacts are an important source of archaeological information because stone is preserved for long periods of time whereas organic materials such as bone, shell, wood and plant fibres decay. Stone artefacts provide valuable information about technology, economy, cultural change through time and settlement patterning. Stone has also been used for 'relative' dating of sites where direct methods such as carbon dating cannot be applied.

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<sup>83</sup> Rhodes 2001: 7

There is considerable ongoing debate about the timing and nature of technological change in stone tool technologies in south-eastern Australia<sup>84</sup>. In general, however, there is evidence of a shift from large core tools, horsehoof cores and scrapers during the Pleistocene and early Holocene towards the use of ground edged implements and small tools during the mid to late Holocene. In particular, small points, blades and scrapers characterised by a distinctive form of re-touch known as 'backing'<sup>85</sup> dominate many mid Holocene assemblages. There is some evidence of a shift in the last 1,500 years towards bipolar reduction technology, increased use of ground-edged artefacts and an increase in the use of bone and shell for making tools. Particular forms such as Eloueras, have been cited as characteristic of this recent period.

Local trends in stone artefact raw materials and types noted by Lomax include an increasing proportion of quartz and non-quartz local gravels in the eastern portion of the Gippsland Lakes, while proportions of silcrete are higher in the west<sup>86</sup>. There is also a general temporal trend for fewer of the more recent sites (younger than 2,000 BP) to contain silcrete microlithic artefacts although there is, according to Lomax, evidence that the use of these artefacts 'persisted into the recent prehistoric past for specialised activities associated with swamps in the wetlands and plains units'<sup>87</sup>.

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A search for known Aboriginal sites on the AAV Victorian Aboriginal Heritage Register for a four kilometre radius surrounding the subject land was undertaken to identify previously recorded sites in and around the study area. A total of 14 archaeological sites and 13 Aboriginal historical sites or places have been recorded within the search area. These sites are summarised in Table 4 and 5 and shown on Figures 11 and 12. No previously recorded sites are located within the study area itself.

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<sup>84</sup> Hiscock & Attenbrow 2002; Hiscock & Attenbrow 1998; Hiscock & Attenbrow, 2005

<sup>85</sup> This is known as Bondaian technology and includes formal types such as Bondi Points and Backed Blades

<sup>86</sup> Lomax n.d.

<sup>87</sup> Lomax n.d.

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Recorded Pre-Contact site types and frequencies are as follows:

- Artefact Scatters - 9
- Shell Deposit & Artefact Scatter - 1
- Scarred Tree - 2
- Burial/Human Remains - 1
- Aboriginal Place - 1

TABLE 4 - AAV VAHR Recorded Sites

VAHR Site #	Site Type	Site Name (if identified)	Description	Location
8422-0083	Burial/ Human Remains	Lakes Entrance Cranium	Cranial bone exposed in dune/sandy beach in scrubland	Eastern edge of Ninety Mile Beach
8422-0126	Artefact Scatter	North Arm	Surface scatter of artefacts associated with permanent stream, in open wood and site relocated in 2006 due to low visibility	On track next to North Arm, at end of Capes Road
8422-0146	Scarred Tree	Message Tree	Site card missing	See Map
8422-0299	Artefact Scatter	Lakes Entrance 1	Two artefacts on edge of terrace (quartz/volcanic) highly eroded and damaged by stock. Site not relocated in 2006	On Private property off Hunters Lane
8422-0300	Artefact Scatter	Lakes Entrance 2	Eight artefacts on edge of terrace (quartz/ silcrete/ unid) found in open wood and site relocated in 2006.	At intersection of The Narrows and North Arm, on North shore/cliff
8422-	Scarred Tree	Kalimna Hill 1	One 60cm scar on	See Map

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0308			Red Gum. Tree destroyed.	
8522-0048	Shell Deposit	Lake Bunga	Literature Reference Only	At entrance to Lake Bunga
8522-0052	Artefact Scatter	L. Bun. 1	100s of artefacts on lake flat. Site not relocated in 2006 due to grown cover.	Near entrance to Lake Bunga
8522-0215	Aboriginal Place	Krauatungalung	Bora Ring, partly filled by golf club	North of the end of Beach Road
8522-0222	Artefact Scatter	Hoggs Lane 1	<4 artefacts, chert and quartz. On rise overlooking Bunga Ck.	East of intersection between Hoggs Lane and Old Colquhoun Road
8522-0223	Artefact Scatter	Hoggs Lane 2	One chert artefact. Located on rise overlooking Bunga Ck.	As Previous
8522-0234	Artefact Scatter	Ostlers Road 1	Four silcrete complete flakes and one quartz complete flake. Located on a rise where the corners of a gully meet.	
8522-0235	Artefact Scatter	Ostlers Road 2	Single silcrete flake located on the break of slope 100m west of a gully.	
8522-0236	Artefact Scatter	Ostlers Road 3	Single silcrete flake located on flat land	

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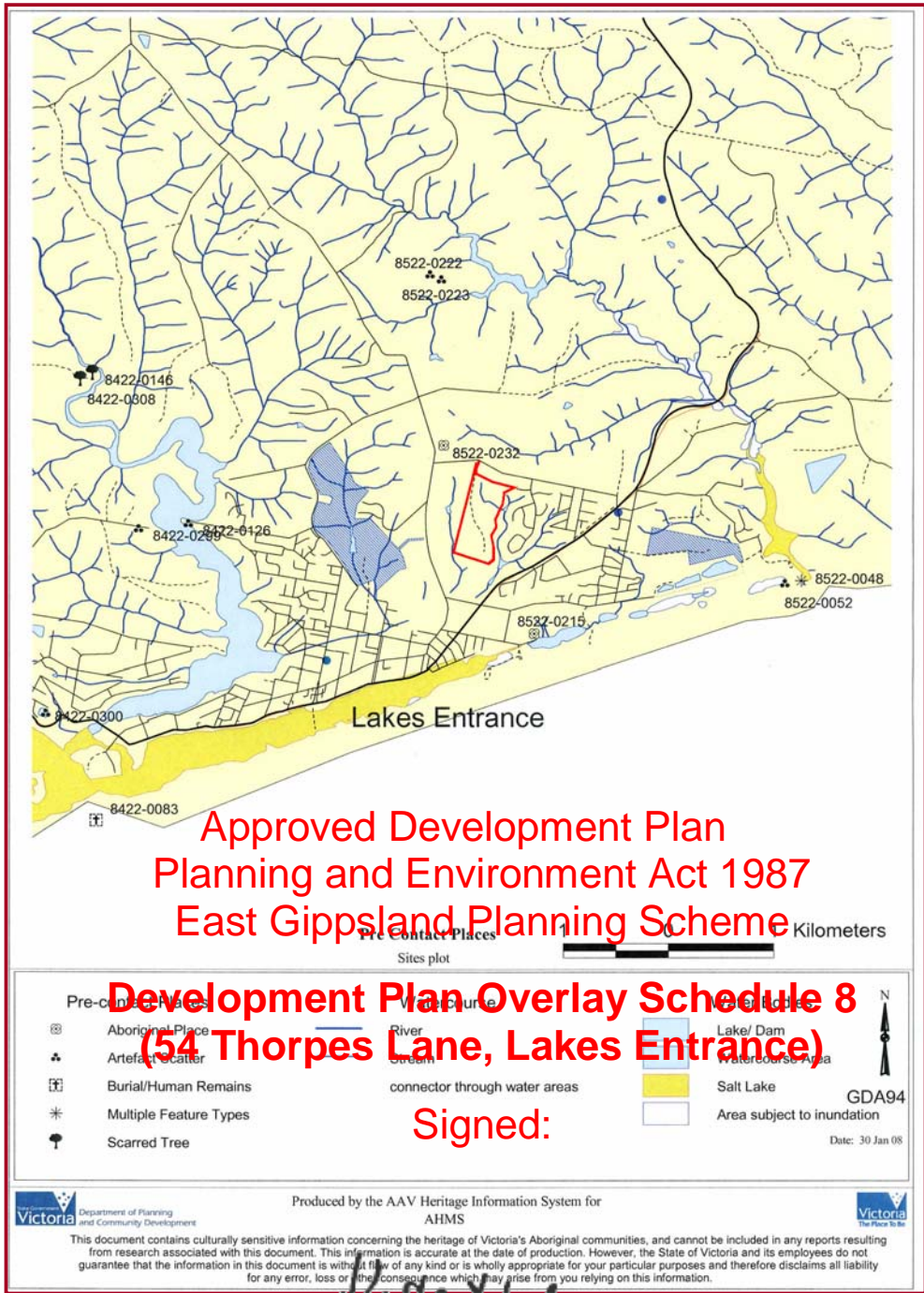


Figure 11. Pre Contact Sites from the VAHR database. Approximate extent of the Study Area outlined in red.

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Site card information for site VAHR8522-0232 shown in Figure 11 is not available on the VAHR database system. It appears to be associated with the post-contact settlement on Thorpe's Lane.

TABLE 5 - AAV VAHR Post Contact Recorded Places

VAHR Site #	Site Type	Site Name (if identified)	Description	General Location
2.1-10	Camp Near Town /Settlement	Thorpe's Lane Settlement	Historic settlement of aboriginal families, the Thorpes, the Carmichaels and the O'Rourkes. These families settled here after leaving the Lake Tyres Mission.	Believed to be directly to the North of activity area. Exact location Unknown.
2.1-15	Camp Near Town /Settlement	Thorpe's Property	Location of Billy Thorpe's slab hut, fruit tree, and farm. Includes 10 acres bought by Thorpe in 1863.	Directly to North of subject area on opposite side of Thorpes Lane
12.1-5	Resource Area	Jemmy's Point	Location of a place where people gathered to hunt waterbirds in particular.	Jemmy's Point. Area has changed significantly due to new entrance and roads.
2.1-8	Camp Near Town	Lakes Entrance Summer Camp	Aboriginal people gathered here making boomerangs, baskets and smoking tobacco during the 1880s.	South-west of the study area, near the footbridge.
4.3-4	Place of Recreation	'Native' Football Team	Place where a native football team played bare-footed during the 1900s.	Located near Lakes Entrance Summer Camp
9.3-1	Burials	Lakes Entrance Cemetery	Location of Burial, place where aboriginal people worked during the 1900s.	South of study area, directly east of 'Native' Football Team
1.1-4	Contact/ Conflict	Merrangbaur Station	Place where Thorpe family found work.	South-east of study area, South of the

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	Site		Place where violence occurred	Princes Highway
12.2-3	Camp Site /Settlement	Reeves River Camp	Place where aboriginal people camped but maintained contact with the Lake Tyres Mission.	In the general location of the Golf Course
12.5-2	Raw Material Location	Bunga Creek	Place where tribes sourced their fire-sticks	South-east of the study area, on Bunga Creek
12.4-5	Ceremonial Place	Bunga Creek Corroboree Ground	Location of corroboree at time of contact	On Bunga Creek
2.1-9	Camp Site /Settlement	Bunga Point Hill Settlement	Place where people camped when forced from Lake Tyres during heavy rain in the 1940s.	On Bunga Hill
2.1-20	Camp Site /Settlement	Harrison's Home, Bunga Hill	Place where Mary Harrison lived	On Bunga Hill
11.2-2	Significant Incident	Junction of Lake Tyres Road and Princes Highway	Aborigines from the Lake Tyres Mission gathered here to meet the Duke of Gloucester in 1934.	Junction of Lake Tyres Road and Princes Highway

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Figure 12. Post contact Places from the VAHR database. Approximate extent of study area outlined in red

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## 5.3 Predictive Modeling

### 5.3.1 Aboriginal Site Predictions

Information presented above regarding the distribution of Aboriginal archaeological sites in the region, and information about the known land use history of the study area can assist in making predictions about the distribution of Aboriginal sites within the study area. Based on the available information, the following predictions were made:

- it is likely that subsurface artefacts may be present where no stone artefacts are visible on the surface;
- stone artefacts may be most likely to occur on relatively flat land located within 100m of the small gullies/drainage lines which border the study area;
- it is likely that any stone artefact scatters present on the property may have been disturbed by land clearing and subsequent agricultural activities;
- stone artefact assemblages are most likely to be composed of quartz, chert, and silcrete and the most likely sources for the stone materials are local gravels;
- any stone artefact scatters present are likely to be relatively sparse, and
- there is a small chance that burials could be present in the sandy soils of the study area.

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## 6 ABORIGINAL CULTURAL HERITAGE ASSESSMENT - ARCHAEOLOGICAL SURVEY (STANDARD ASSESSMENT)

### 6.1 Survey Details

Fieldwork undertaken for this CHMP took place in two separate stages. The first stage of fieldwork (or part 1) consisted of a survey and test excavation of the main proposed subdivision area (undertaken in April 2008). The second stage (or part 2) consisted of a survey and test excavation along the route of the proposed road that will provide access to and from the subdivision from Colquhoun Road (shaded purple on Figure 3). This second stage of fieldwork was undertaken in July 2008.

Archaeologists Sharon Lane, Araluen and Nicholas Berry with Barry Kenny and Harry Stewart of the Gunaikurnai community carried out an inspection of the part 1 area on the 7<sup>th</sup> of April 2008. The part 2 area was surveyed by Barry Kenny and Sharon Lane on the 2<sup>nd</sup> of July 2008.

The principal aim of the surveys was to identify and record areas of exposed cultural material (ie. surface sites) and, in the case of the part 2 survey, to inspect mature native trees present in the area for cultural scarring. The surveys also aimed to identify areas of archaeological potential, particularly areas with potential to contain intact archaeological deposits with archaeological or cultural significance. The results of survey were also used to assist in developing our methodology for archaeological test excavation.

### 6.2 Survey Methodology

It was immediately evident that the thick pasture grasses and bracken which cover the property would allow for little to no ground surface visibility. The survey consisted, in the main, of a walk over the entire property by field team members who sought to examine any available patches of ground surface visibility. Areas of slightly higher ground surface visibility consisted of disturbed areas surrounding dams, stock tracks, and parts of the Colquhoun Road reserve where a combination of rabbit burrows, ground surface disturbance and the road cutting itself provided

improved visibility conditions. These areas were inspected closely for stone artefacts.

No rock outcrop or overhangs were present within the study area.

## 6.3 Survey Coverage

Effective coverage is calculated by multiplying the % ground exposure (or visibility for detecting artefacts) by the % survey coverage (or actual area surveyed). The calculation of effective coverage shows the effectiveness of the surface survey in detecting surface archaeological sites and accordingly, how much weight ought to be put on the results. In the present case the percentage of ground surface exposure or visibility is considered to be less than 1% of the study area. In terms of its usefulness for detecting Aboriginal archaeological sites or artefacts, the study area inspection was more or less ineffectual, but it did offer the opportunity to make some observations about the study area in general. These are given below.

## 6.4 Survey Results

### 6.4.1 General Observations

The study area has been cleared of the native open forest vegetation that would have existed prior to European settlement. In its place are some exotic tree plantings and pasture grasses. Bracken dominates some areas in the northern part of the study area. No remnant mature trees with evidence of cultural scarring were present within the activity area.

Post-contact structures, or remains of structures are visible in two places. A currently occupied house and associated outbuildings and stockyards are present on elevated land in the southern portion of the study area. The remains of another structure exists on elevated land near the central part of the property on its western side. These remains consist of a series of stumps which may have supported a platform or small building. Nearby is a small standing structure which, judging from its proportions, may have been an outhouse. These structures are located on the western side of the track, which runs through the property, and some rubbish has also been dumped in this area. These structures do not appear to be visible on the 1959 aerial photo of the area (Figure 6).

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An unpaved track runs from Thorpe's Lane to the existing house site. It has, in places been cut into sloping ground. It also appears have been surfaced with material brought into the study area from elsewhere - small dumps of fill containing shell fragments are visible at intervals along the track.

While the evidence from aerial photographs suggests that portions of the study area have been ploughed in the past, there are two relatively small areas where ploughing has obviously not occurred. These are located in the central northern portion of the property (surrounding subsurface testing trench B1) and in the westernmost portion of private property in the activity area, where the proposed access road meets the Colquhoun road reserve (surrounding test pits G1 and G2). Numerous tree stumps dot these areas.

### **6.4.2 Survey Conclusions**

Ground surface visibility within the study area was too low to enable any conclusions regarding the presence or absence of Aboriginal archaeological materials in the study area. The results of previous archaeological work in the region have suggested that subsurface testing may reveal the presence of sites not visible or apparent through surface inspection. The subsurface testing programme described in the following section formed the main fieldwork component of this CHMP.

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## 7 ABORIGINAL CULTURAL HERITAGE ASSESSMENT - TEST EXCAVATION (COMPLEX ASSESSMENT)

### 7.1 Preamble

The test excavation formed part of the Complex Assessment component of the Cultural Heritage Management Plan (AAV#10282). The test excavations were limited to the portion of the study area that would form the 'activity area' and be subject to future development (refer to Figure 13).

The methodology and research framework for the archaeological test excavation was developed taking into consideration results of predictive modelling. Our proposed methodology was also designed in consultation with registered Aboriginal party (RAP) applicants (the Gunaikurnai Land and Waters Aboriginal Corporation) identified by AAV. A copy of the methodology was forwarded to the AAV Bairnsdale regional office for comment prior to the commencement of fieldwork.

The overriding purpose of the test excavation programme was to determine the extent, nature and significance of Aboriginal archaeological sites and sub-surface deposits across the activity area. The results were also used as a basis for making decisions about management of Aboriginal heritage during development in consultation with the RAP applicants.

### 7.2 Objectives & Rationale Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)

The test excavation programme had three primary objectives:

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- To assess the nature, extent and significance of Aboriginal sites and archaeological deposits across the activity area, in order to;
- Inform the management of Aboriginal heritage during the process of the development of the subject land; and
- To contribute to the overall knowledge of the archaeology of the Lakes Entrance area.

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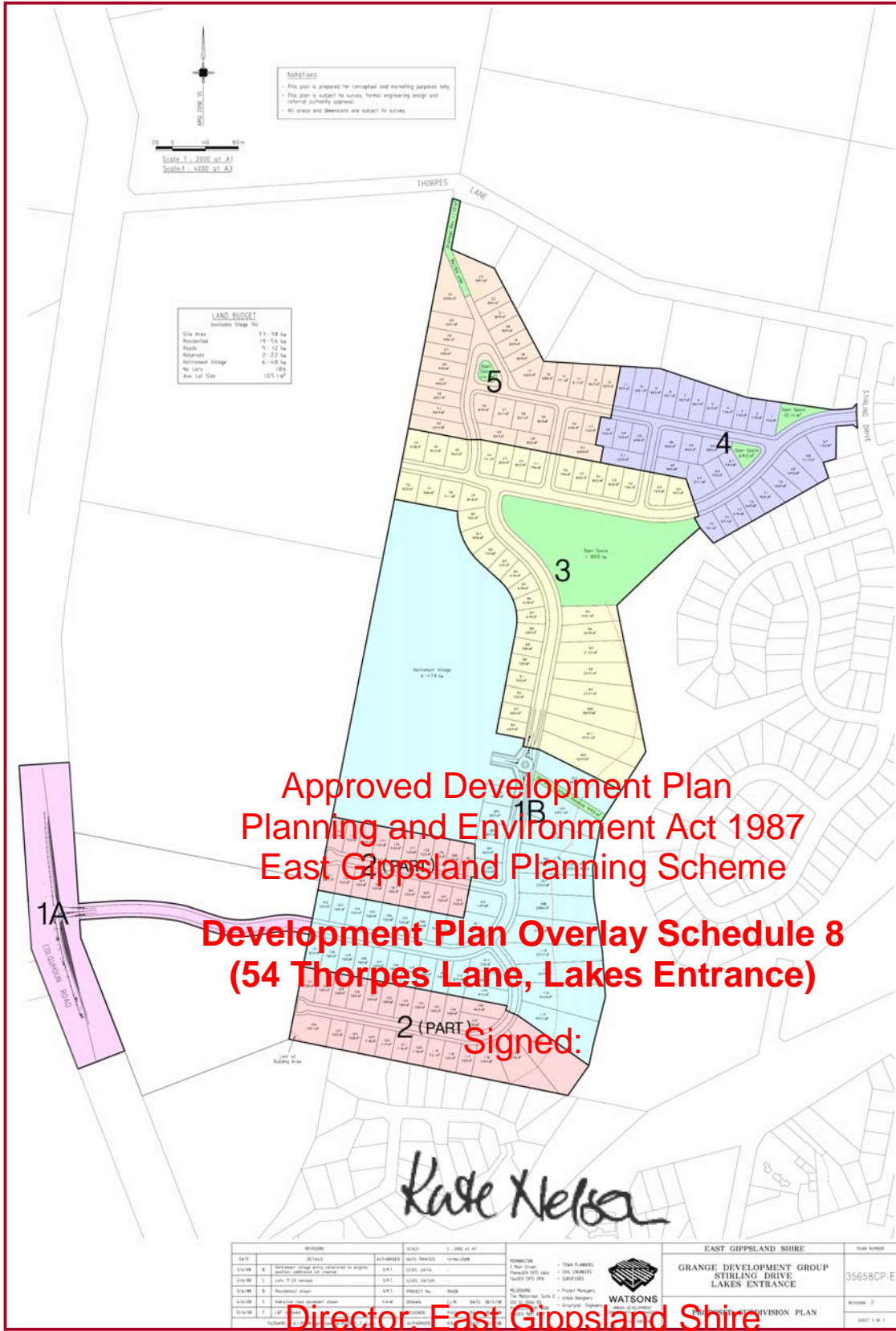


Figure 13. Proposed subdivision and subject land for the investigation.

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The main purpose of the test excavation was to assess the archaeological potential of the study area through determining whether archaeological materials or deposits are present, or are likely to be present there and, if so, to determine the significance and extent of such materials or deposits.

To these ends, and to fulfill AAV Cultural Heritage Management Plan requirements, subsurface testing and subsequent results analysis methodologies were designed to meet the following aims:

- Sample a representative range of landforms (or range of terrain) in order to characterise the nature and significance of archaeological deposits across the activity area;
- Undertake appropriate post-excavation analysis in order to address the research questions set out below;
- Prepare an excavation report presenting the results of excavations and post-excavation analysis; and
- Draw on the results of excavation in developing recommendations for management of Aboriginal heritage during development in partnership with the RAP applicant group.

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The excavation programme was designed, through controlled manual and mechanical archaeological excavation, to determine the nature, extent and significance of Aboriginal sites and relics within the subject land. The results of testing also form the basis for determining what, if any, Aboriginal heritage mitigation or salvage measures are warranted in advance of development.

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Our excavation approach used the landforms within the study area as the basis for sampling, and as a means of determining the nature, extent and significance of Aboriginal use and occupation of the various landforms and their associated environmental resources. This approach is informed by the results of extensive excavation along the eastern seaboard, which has shown that areas with no surface evidence often contain sub-surface deposits buried beneath current ground surfaces and that surface evidence does not accurately reflect the nature of sub-surface archaeological deposits. This is in accordance with traditional surface-site

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<sup>88</sup> McDonald 1997

focus of archaeological excavation may be biased toward areas of erosion and ground surface visibility (ie. where surface sites are found) at the expense of buried sites in areas of low surface visibility or within aggrading soils<sup>89</sup>. Accordingly, we have adopted a landform approach that seeks to overcome these biases and provide a more accurate characterisation of Aboriginal occupation and use across the landscape. This approach in turn facilitates more strategic management approaches that focus more on archaeological and cultural values across landscape rather than individual site by site management.

Assessment at the landscape level is essential to the definition and interpretation of Aboriginal occupation. The landscape approach is also better able to incorporate the complexity of cultural values related to broader landscape values and traditional natural resources.

For the purposes of this study, archaeological research value and significance were determined by rarity, representativeness and integrity of archaeological deposits present within the subject land. Intact portions of original topsoil containing Aboriginal objects have potential to yield information about vertical and horizontal variation (ie. change in the nature of use and occupation through time and across space).

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In most agricultural landscapes, such as the current study area, original soils have been truncated or heavily disturbed by European land use and the natural effects of bioturbation. These processes have resulted in dispersal of artefact scatters and deflation of deposits through the topsoil profile to the interface with hard impermeable subsoils (such as clay B horizon and mineral pan). In such locations, archaeological deposits may have more limited research value<sup>90</sup> because the original nature and distribution of material has been altered.

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<sup>89</sup> It also indicates that the traditional surface site focus is unlikely to accurately characterise the nature of Aboriginal use and occupation across the landscape because surface sites are more frequently found on eroding landforms than on stable landforms. This overstates the frequency of sites on the former landforms and understates the frequency of sites on the latter.

<sup>90</sup> Research value might be considered to be dependant upon the range of research questions that can be asked of the material. Most, if not all archaeological deposits are able to answer some research questions, but decreased deposit integrity or degrees of intactness may limit the number of questions that can feasibly be asked of the material.

## 7.3 Research Questions

The following questions were proposed to structure the excavation methodology, post excavation analysis and reporting. As discussed above, the ability of archaeological material to answer research questions is dependent upon factors such as degrees of integrity and intactness. It should therefore be understood that the questions posed below can only be addressed in 'best case' scenarios where appropriate materials found in appropriate degrees of intactness have been uncovered during the test excavations.

Potential research questions were as follows:

### A) What types of artefacts were produced?

The stone artefact analysis methodology aimed to determine what artefact types were produced and/or discarded on site and how the raw materials were reduced to make the artefacts. Excavation of intact deposits may show changes in artefact manufacture over time. The types of artefacts present may also assist in answering question B.

### B) How long did Aboriginal people use the site?

Identification of technologies and tool types (such as beaded artefacts) may provide an indication of how long Aboriginal people have used the site. Recovery of shell and/or charcoal samples (particularly from hearths) within intact deposits could be used for radiocarbon dating.

### C) What stone materials were used and where did they come from?

Post excavation analysis will identify stone raw material types and their relative proportions. A review of previous studies in the area, previously identified Aboriginal stone sources, and geological mapping may provide an indication about where raw materials were gathered to make stone tools.

### D) What foods were eaten by Aboriginal people at the site?

Identification and analysis of faunal remains recovered from the site, including shell and bone, could provide an indication of the foods that were eaten in the past and foraging strategy. Excavation of intact deposits may show changes in

subsistence. Certain stone artefact types may also indicate the nature of subsistence at the site.

**E) What activities did Aboriginal groups carry out at the site in the past and is there any relationship between site function(s) and the local distribution of natural resources? Is there evidence for different activities on different landforms?**

An analysis of the range, distribution, density and types of artefacts recovered may indicate the type of activities carried out in the past. An assessment of this evidence in relation to the local topography and distribution of resources such as water, workable stone material and food sources, may indicate a relationship between site activities and the environmental setting.

**F) How does the study area compare to other Aboriginal sites excavated in the local area? How did the results compare with predictions made about the likely nature and extent of archaeological deposits within the study area?**

Inter-site comparison of the excavated stone artefact assemblage, faunal assemblage and plant remains with those retrieved from previous excavations in the area will provide a means of comparing and contrasting the results.

Drawing on the results of our desktop research and the results of previous archaeological work in the region, we made the following predictions:

- The highest density of archaeological material is likely to be found on the level areas of the upper slope and hill/ridge tops;
- Intact archaeological material is less likely to be found on the relatively steeply sloping ground that makes up much of the study area; and
- Intact archaeological deposits will only be present in areas that have not been significantly disturbed by European activities. Archaeological deposits within areas that were formerly orchards are likely to be heavily disturbed.

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G) Is the density and distribution of artefacts within the study area a function of Aboriginal occupation and use or does it reflect site formation processes and the history of European activities in the area?

This question will be addressed by examining soil profiles in each test trench for evidence of soil formation processes and recent geomorphology. The localised absence of the A-horizon upslope may suggest sheet erosion. Evidence of recent colluvial deposits on lower slopes may indicate re-deposition of these soils, having been washed down slope. An examination of disturbances in the soil profile such as horizontal mixing, deflation of objects through the soil profile, disturbance of horizons or disturbance of soil lamination may indicate the depth and nature of disturbance caused by past European activities and/or bioturbation.

## 7.4 Excavation Methodology

### 7.4.1 Scope of Work

The landform testing comprised two stages.

**Stage 1 Excavations** - The first stage of the test excavation programme consisted of manual and mechanical excavation of 3m x 1.2m test trenches spaced at 100m intervals along linear transects oriented to cover topo-sequences across the landscape. They were placed so as to provide samples of upper, middle and lower slopes, and relatively flat, steeply sloping ground. Stage 1 test trench locations are shown on Figure 14. Eighteen trenches (labeled A# to E#), comprising a total area of 64.8 square metres, were excavated.

The landform testing sampled all landforms within the activity area. The 100m trench spacing was a function of the high relief landscape that has numerous landforms and a wide range of slope gradients. The 3 metre by 1.2 metre trench configuration was considered optimal for this landscape in that it allowed us to detect spatial variation within each trench and also across the range of landforms and topography across the broader landscape. This allowed us an opportunity to investigate both intra-site patterning and landscape use and occupation patterns.

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**Stage 2 Excavations** - The second stage of test excavation was of a smaller scope. It comprised manual test excavation of 1m x 1m test pits located on the proposed alignment of the access road that would connect the southwestern part of the proposed subdivision with Colquhoun Road (the area shaded purple on Figure 13). Four 1m x 1m test pits (labeled G#) were excavated as part of this stage, and the results of these excavations were incorporated into the excavation results and landform testing analysis presented in section 7.5 of this report. Stage 2 test trenches are shown on Figure 15.

## 7.4.2 Methodology

The excavation methodology is described below.

### 7.4.2.1 Excavation

The stage 1 excavations were undertaken both mechanically using a small rubber-tracked mechanical excavator equipped with a 120cm batter bucket (mud bucket), and manually using pointing trowels, coal shovels, shovels and hoes. Excavation of an initial 1m square was undertaken on each principal landform to establish the stratigraphy and general sub-surface nature of soil deposits, as per AAV guidelines. The initial manual excavations indicated that a combination of post-contact land use and bioturbation has disturbed stratigraphic integrity that may once have ordered sub-surface deposits present in the study area. Therefore, controlled mechanical excavation in 100mm SPT lifts was undertaken for the remainder of the trenches in the stage 1 area (refer to Appendix 4 for details about the use of manual and mechanical excavation during stage 1).

The stage 2 excavations employed manual excavation techniques only. A higher density of artefacts was found during excavation in this area, therefore manual techniques were employed for all the stage 2 trenches in accordance with AAV guidelines.

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<sup>91</sup> This, it was considered, fulfils the conditions of AAV guidelines concerning excavation and sub-surface testing which requires that the "stratigraphy and general sub-surface nature of the area being investigated" must be established prior to excavation by machine (AAV 2007: 41).

Both manual and mechanical excavations were carefully controlled using 1m x 1m squares and 100mm spits as the basic excavation and recording units. A-horizon topsoil units were removed in 100mm arbitrary spits and by soil unit. Any charcoal and/or shell found (if any) within intact cultural deposits was to be retained for C14 dating.

#### 7.4.2.2 Sieving

All excavated soil was dry-sieved through a mechanical sieve equipped with a 5mm screen. The sieve has been specifically designed for archaeological work. Soils excavated during the stage 2 excavations were manually sieved through a 5mm meshed sieve attached to a tripod.

#### 7.4.2.3 Recording

Stage 1 test trench locations were set out on the ground and pegged by professional surveyors using a differential GPS. This provided us with accurate coordinates (x, y and z) for each trench.

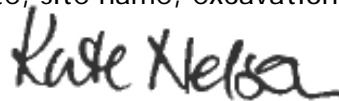
The datum peg established by the surveyors was used to record the levels of deposits and features. A dumpy level was used to measure relative levels at the completion of each excavated trench.

In stage 2 the locations of test pits were established by means of a hand-held GPS, and by tape and compass measurements from known points (eg fence-lines).

Records of each excavation included descriptions of excavated soils, photographs and section drawings.

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Artefacts recovered from sieving were retained in plastic clip-lock bags and labeled with the provenance details including: date, site name, excavation trench, soil unit and spit.



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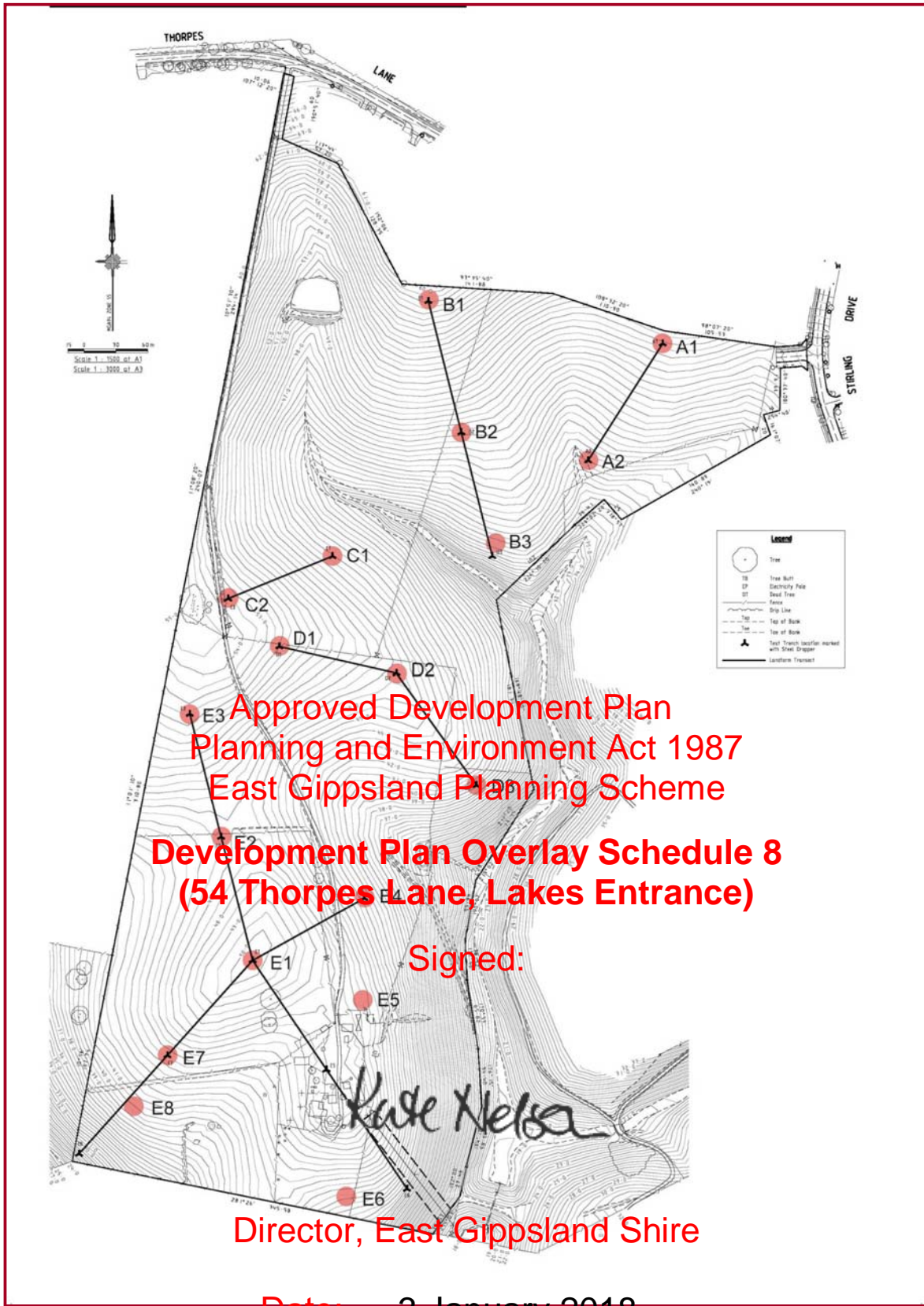


Figure 14. Location of Stage 1 subsurface testing trenches (note that B3, E5, E6 and E8 were moved from their original locations due to localised soil disturbances)



Figure 15. Location of Stage 2 sub-surface testing trenches.

### 7.4.3 Post-Excavation Methodology

The post-excavation analysis was designed to yield data comparable to that for assemblages found during previous investigations. Results of analysis are presented in relation to comparative site data. Post excavation analysis involved completion of the following procedures:

#### 7.4.3.1 Stone Artefact Analysis

A descriptive recording of recovered artefacts was undertaken by Sharon Lane. The analysis aimed to determine the following:

- Quantity of stone, by counts and weight;
- Suspected origin of the stone (whether from quarries where the rock is in place, or dispersed along riverbeds);
- Identification of the artefacts;
- Interpretation of finished implements among the artefacts, including function of the implements and what they indicate about how the makers lived;
- Patterns in spatial and chronological distributions of the artefacts;
- Age of the artefacts; and
- Archaeological research potential and significance of the site.

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#### 7.4.3.2 Other Analyses

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No other remains (faunal, shell, charcoal from hearth etc) were found.

## 7.5 Excavation Results

### 7.5.1 Preamble

The first stage of test excavation was undertaken over an eight day period in April 2008 (7<sup>th</sup>-11<sup>th</sup> and 14<sup>th</sup> to 16<sup>th</sup>). The excavation was undertaken by Sharon Lane (excavation director), a team of 2 assistant archaeologists (Ana Jakovljevic and Nicholas Berry) and representatives of Gunai Kurnai Traditional Owners (Barry



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Kenny, Harry Stewart, Tim Paton, and Lloyd Hood).<sup>92</sup> The second stage of excavation was undertaken on 7<sup>th</sup> and 8<sup>th</sup> of July, 2008 by Barry Kenny, Jim Kenny and Sharon Lane.

The test trench and test pit excavations carried out for this assessment were aimed at providing an indication of the distribution characteristics of stone artefacts and (if present) other archaeological deposits across the study area. Twenty-eight stone artefacts were located as a result of these excavations, but no intact or stratified archaeological deposits were found.

The following sections provide discussion of the results of these excavations. More detailed descriptions of individual test trenches and pits, including section drawings, photographs and details of stone artefacts recovered are provided in Appendix 4. A more detailed description and catalogue of stone artefacts is given in Appendix 5.

**7.5.2 Excavation and Planning**  
 methodology, general conditions and constraints

All archaeological fieldwork in this project was conducted under 'on-the-ground' conditions. In the present case these were, on the whole, few but in accordance with AAV guidelines potential constraints and alterations to the original planned fieldwork program are discussed below.

**7.5.2.1 Trench placement variations**

Four of the original marked trench locations were modified slightly due to local conditions encountered on the ground. The original location of Trench E5 was moved to the northeast because the original trench location was placed within the yard of the existing house. Trenches B3, E6 and E8 were each moved slightly upslope of their original locations because they were considered to be too steep for safe work. It is not expected that these variations will have an impact on the outcomes of the test excavation programme.

<sup>92</sup> Two Gunai Kurnai representatives were present on each day. Barry Kenny was present for the full eight days of work - the other representatives variously filled the second position

### 7.5.2.2 Weather

The weather during the weeks of excavation (7<sup>th</sup> and 16<sup>th</sup> of April, 2008) was generally fine and itself posed no hindrance to fieldwork.

### 7.5.3 Soil Profiles

Soil profiles observed in excavated trench sections varied in depth and composition however in general can be described as a sandy soil that comprised an upper horizon of grey to brown loamy sand over a lighter bleached sand horizon of varying depth containing generally little to no stone. The topsoil was underlain by an orange/brown clay subsoil, or a pan containing hard sandy nodules, often with some pebble inclusions. Excavation generally ceased at either solid clay, a relatively solid nodule pan or a dense layer of pebble/gravel, depending upon the profile variation within each particular trench.

#### 7.5.3.1 Soil Formation & Integrity

Past clearing and land-uses suggest that there has been disturbance of much, if not the entire ground surface in the study area since European settlement. The clearing of vegetation and subsequent ploughing for cultivation would have disturbed the upper 150-200mm of soil.

In addition to the effects of past land-uses and disturbance, the potential effect of natural post-depositional processes such as bioturbation must be considered. Studies have suggested that bioturbation and other post-depositional processes often result in artefact size-sorting, but the artefact size-classes influenced by these processes will be dependent on the frequency and direction of upward displacement of smaller objects and the downward displacement of larger ones appears to be the common result of disturbance caused by burrowing fauna, but the type of fauna, and most importantly the size of its burrows will decide the difference between 'smaller' and 'larger' artefacts<sup>93</sup>. Balek has summarised the findings of several studies:

*Through burrowing and mounding, artefacts can become displaced and sorted vertically by size thereby destroying stratigraphic integrity. Generally artifacts (stones) whose diameters are less than*

<sup>93</sup> e.g. Armour-Chou and Andrews 1994; Bocek 1986; Erlandson 1984

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*the diameter of the burrows of soil fauna may be translocated upward and deposited in mounds...Artifacts whose diameters are larger than the diameter of the burrows gradually become buried or gravitationally displaced downward to the lower depth of major biologic activity where they may become concentrated to form pseudo-artifact horizons<sup>94</sup>.*

Certainly there existed evidence of bioturbation in excavated trenches. In most instances this evidence took the form of tree roots (unsurprisingly considering that portions of the study area have only been recently cleared of tree cover), or decomposed tree root remains (Figure 16 to 19). In some instances there was visible charring and charcoal around these roots/root remains - this and frequent patches and pieces of charcoal present in excavated soil profiles were interpreted as being the result of stump-burning during land clearing.

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Figure 16. Large tree root exposed in Trench E4 profile.

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<sup>94</sup> Balek 2002: 46



Figure 17. Root staining and small roots in Trench E5 profile.



Figure 18. Decomposed roots revealed in plan during manual excavation of part of Trench D1.

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Figure 19. Decomposed roots revealed during manual excavation of part of Trench B2.

A clear example of sediment disturbance resulting from human activity was visible in Trench D3, where what appeared to be an old post-hole was sectioned by the excavation (Figure 20)

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Figure 20. Sectioned post-hole revealed in profile of Trench D3.

### 7.5.4 Stone Artefacts

The stone artefact analysis was primarily intended to gather adequate information to enable us to characterise the nature and distribution of artefacts across the study area, and to consider the effects of post-depositional processes on artefact distribution.

A total of fifty-two stone artefacts were found during the test excavations. Table 6 provides a summary of artefact types and raw materials.

Table 6 - Artefact types and raw materials

Material type	Chert	Quartz	Quartzite	Rhyolite	Silcrete	Un - sure	Total	Number showing possible use/ retouch
Complete flake			1	1	12	2	16 (31%)	1 (6%)
Proximal flake	1	1			8		10 (19%)	1 (10%)
Medial flake		1			2		3 (6%)	
Distal flake		1		1	3		5 (10%)	
Longitudinal split		1			2		3 (6%)	
Complete tool					1		1 (1%)	1 (100%)
Core		1			1		2 (4%)	
Fragment		1			11		12 (23%)	1 (8%)
Total	1(1%)	6 (12%)	1 (1%)	2 (4%)	40(77%)	2(4%)	52	

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As Table 6 shows, complete flakes were the most common artefact type recorded, making up 31% of the excavated assemblage. Silcrete<sup>95</sup>, at 77% of the total, was the most common raw material type. Artefacts described here as ‘fragments<sup>96</sup>’ made up the next most common category of artefact type (23%). Broken flakes and a single core were also present in the excavated trenches. Four artefacts were considered to retain possible traces of retouch/use - this number includes a small silcrete thumbnail scraper, the only formal tool present in the assemblage.

Most recorded complete flakes were irregular in shape (38%, or n=6), although broad/expanding and intermediate flakes were also common (each made up 25%, or n=4, of the complete flake assemblage). Flakes classed as blades were the least common type, numbering only 2, or making up 12% of the complete flake assemblage.

At least 35% (n=18) of the recorded artefacts retain some cortex - in most instances 78% (or n=14) cortex was ‘pebble cortex’ or water worn, suggesting that the raw materials used for artefact manufacture were sourced from fluvial deposits, most likely local rivers and streams.

On the whole, the recorded artefacts appear to be similar in material and type to relatively recently recorded artefact scatters in the local area (eg the Hoggs Lane and Ostler Road sites). The recorded assemblage would also seem to conform to Lomax’s prediction that smaller flake sites, quartz workshops and isolated artefacts composed of local gravels and quartz would be found on ridgelines, spurs and near waterways in the ‘hills’ landform unit surrounding the Gippsland Lakes<sup>97</sup>.

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**7.5.5 Artefact Distribution Patterns**

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Archaeological and ethnographic studies of hunter-gatherer settlement patterns and land use have long noted that human activities in such societies take place

<sup>95</sup> Identified artefact raw material types should be considered here to be tentative in that they have not been confirmed by a geologist. As Bird and Frankel have noted ‘silcrete may be easily confused with other rock types’ (2005: 16).

<sup>96</sup> Artefacts classed as fragments are those which show some signs of angular fracture but on which neither the hallmarks of a flake or core are present. They are in this instance considered to be possible artefacts, but there remains the possibility that they have been fractured by natural or agricultural processes.

<sup>97</sup> See section 5

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over much of the landscape and are not restricted to settlements or campsites alone<sup>98</sup>. The archaeological deposits formed by such societies may be created in a variety of ways, for example by discarded food debris (eg. shell middens), by the creation of cooking hearths or ovens, or by the discarding of items of material culture. While it is well known that the material culture of pre-contact Aboriginal societies was made up to a large degree by organic items (eg. items of wood, or string, or fashioned from animal products)<sup>99</sup> it is often only stone artefacts, which are not as prone to destruction or decomposition, which survive to form the visible archaeological record.

Artefacts may have been discarded, either deliberately or accidentally, by people carrying out a variety of activities in a variety of locations. Although it should be noted that there does not necessarily exist a direct relationship between activity and stone artefact discard, higher concentrations of stone artefacts are generally viewed as areas in which a greater amount of activity took place. Artefact concentrations can however form as a result of a number of factors. They can be the result of a number of associated one-off events (eg they were deposited during the occupation of a particular place within a particular timeframe) or they may be the cumulative result of a number of events not associated in time (eg sporadic short-term visits to a place over years, decades, centuries or millennia), or they may be the result of a combination of associated and unrelated events.

Post-depositional processes caused both by human activity on a variety of scales (from the trampling and scuffage of artefacts by occupants of a campsite through to landscape modification such as clearing for agriculture and excavating and levelling for construction) and by natural processes (such as animal and plant activity and fluvial processes) may displace artefacts from their original discard or deposit location<sup>100</sup>.

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<sup>98</sup> Eg Binford 1980; Foley 1981

<sup>99</sup> See section 4

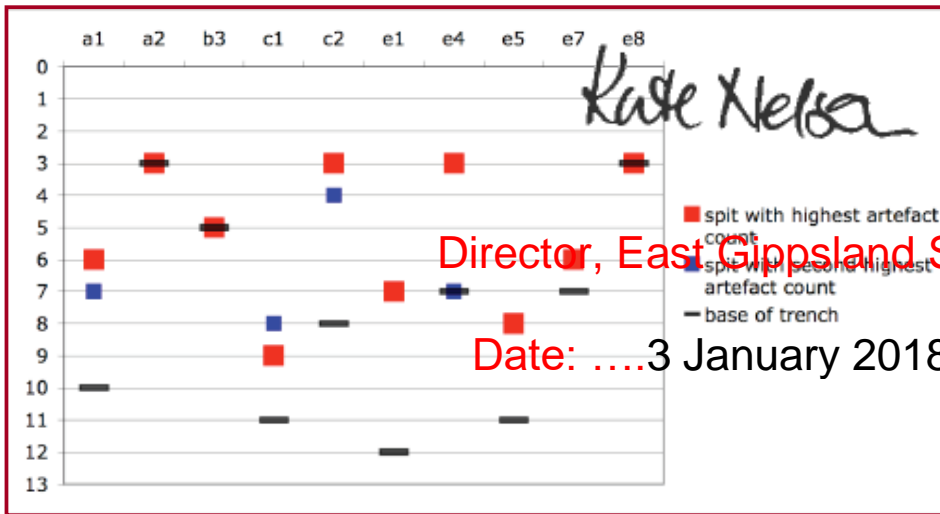
<sup>100</sup> Eg Balek 2002; Theunissen et al 1998; Armour-Chou and Andrews 1994; Nielson 1991; Bocek 1986; Gifford-Gonzalez et al 1985; Foley 1981; Wood and Johnson 1978; Stockton 1973.

### 7.5.5.1 Vertical Distribution of Artefacts

Artefacts were found at a variety of depths below the current ground surface. The observation was made during excavation that artefacts, for the most part, generally appeared at the top of or just above pebble-bearing levels of sediment (the depth of which varied - see trench descriptions in Appendix 4). This may indicate that there has been some downward movement of artefacts through the upper units (generally comprising sandy loams) and that the current level of the artefacts is a result of post-depositional displacement.

Figure 21 below shows the depth of the highest count per spit within the stage 1 test trenches and the depth of base of excavation in each respective trench. There appears to be some correlation between the base of the trench / base of the sand in shallower trenches such as A2, B3, E8 and perhaps E7. In other trenches it would seem that artefacts generally appeared at the top of or just above pebble-bearing levels of sediment.

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Figure 21. Depths of main concentrations of artefacts in stage 1 trenches containing artefacts.

The effects of bioturbation, uprooting of trees<sup>101</sup> during clearing and the probable past ploughing of portions of the study area combine to limit the probability that the artefacts recovered during the test trench excavations are *in situ*. It would seem probable that artefacts have been displaced from their original locations to some degree. The severity of this displacement is difficult to measure and may have varied across the study area. The presence of a conjoined pair of artefacts in Trench A1 suggests that, in some places at least, displacement has not been severe although the recovery of these artefacts from trench 'clean-up' means that it was not possible to assess potential vertical displacement.

**7.5.5.2 Horizontal Distribution of Artefacts**

Stone artefacts were found in 13 (or 54.5%) of the 22 test excavation trenches. As Figure 22 shows, artefact densities varied considerably between those trenches.



Figure 22. Comparison of artefact counts in test excavation trenches.

<sup>101</sup> The amount of disturbance to soil and sediments caused by the natural process of tree uprooting varies according to both the tree and the soil/sediment types (Schaeztl et al 1990) but would have the obvious result of shifting the positions of artefacts.

The mean artefact density in excavated trenches was 1.7 recovered artefacts per excavated metre square. In those trenches containing artefacts, artefact densities ranged between <1 artefact per metre square (0.3m<sup>2</sup>) and 19 artefacts per metre square. Figures 23 and 24 show the number of artefacts per test trench overlaid on a plan of the study area.

Details of artefact types and materials found within each test trench are provided in the test trench descriptions given in Appendix 4 and 5. In the following sections the distribution of artefacts over landforms in the study area is considered.

### 7.5.5.3 Artefacts & the landscape

One of the main stated aims of the test excavation fieldwork was to collect data in order to better understand the distribution of Aboriginal stone artefacts in relation to the range of landform types present in the study area. The results of this analysis are discussed below.

#### Artefact distribution & landform

Elevation in the study area varies between 60m and about 30m above the AHD and consists of low hills incised by ephemeral drainage lines<sup>102</sup>. Most of the land in the area slopes to some degree with the exception of a relatively level low ridge, which runs in a north-west to east through a portion of the study area. Our predictive model concerning the distribution of Aboriginal archaeological materials and deposits suggested that such deposits/materials would most likely be found on the higher-level ground of the study area, and were less likely to occur on sloping land.

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In order to test this prediction the landscape was divided into 4 categories of slope - 'no slope', 'little slope', 'moderate slope', and 'steep slope'. Categories were established through the use of contour lines on the surveyor's plans that are used in this section of the report. An arbitrary grid which represents an on-the-ground scale of approximately 20m<sup>2</sup> cells was placed over the base plan. The slope of each individual cell was then characterised by counting the number of contour lines visible within it<sup>103</sup>. Cells were characterised as shown in Table 7.

<sup>102</sup> See section 3.

<sup>103</sup> Contour lines on the surveyors' plans are at 50cm intervals

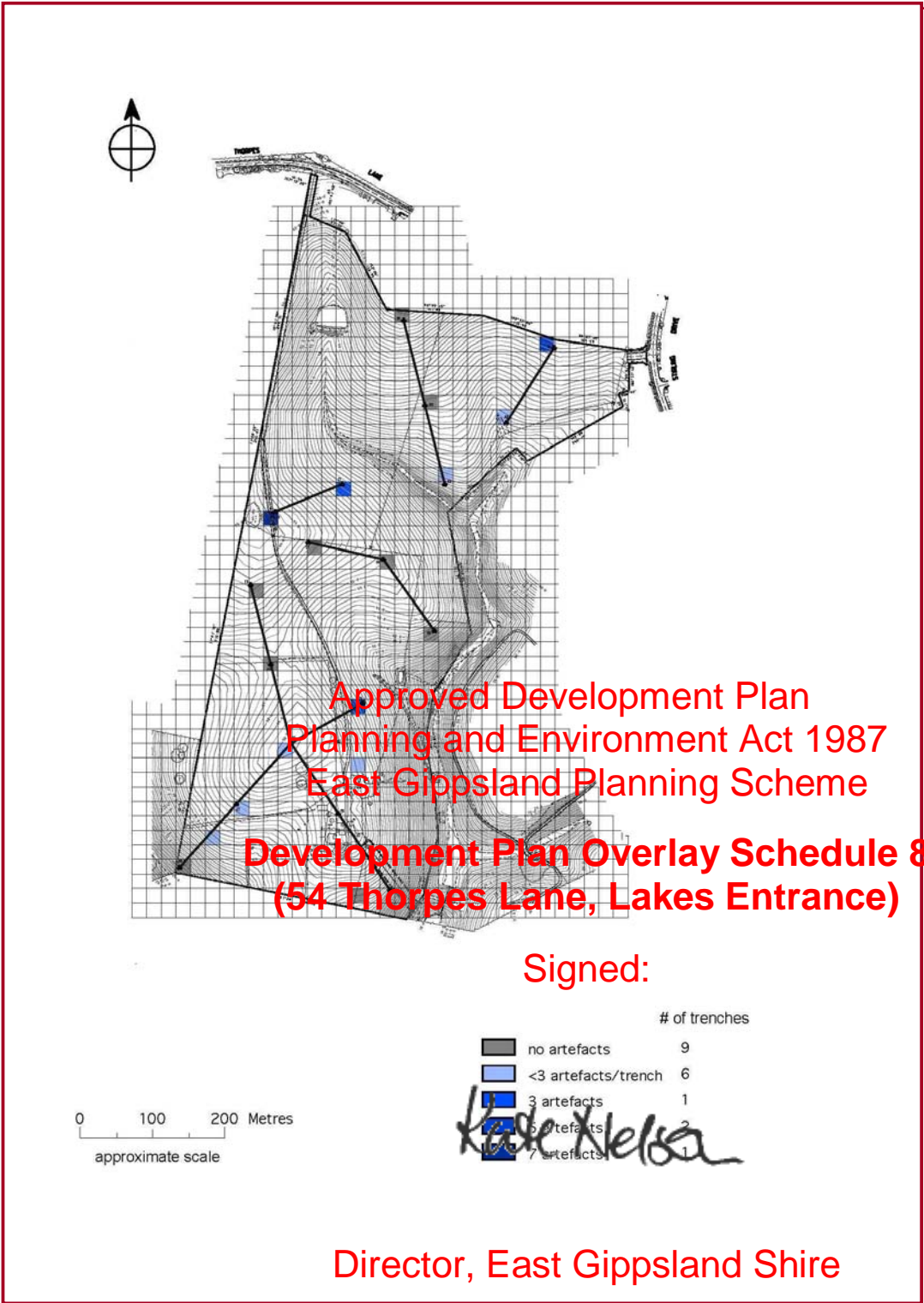
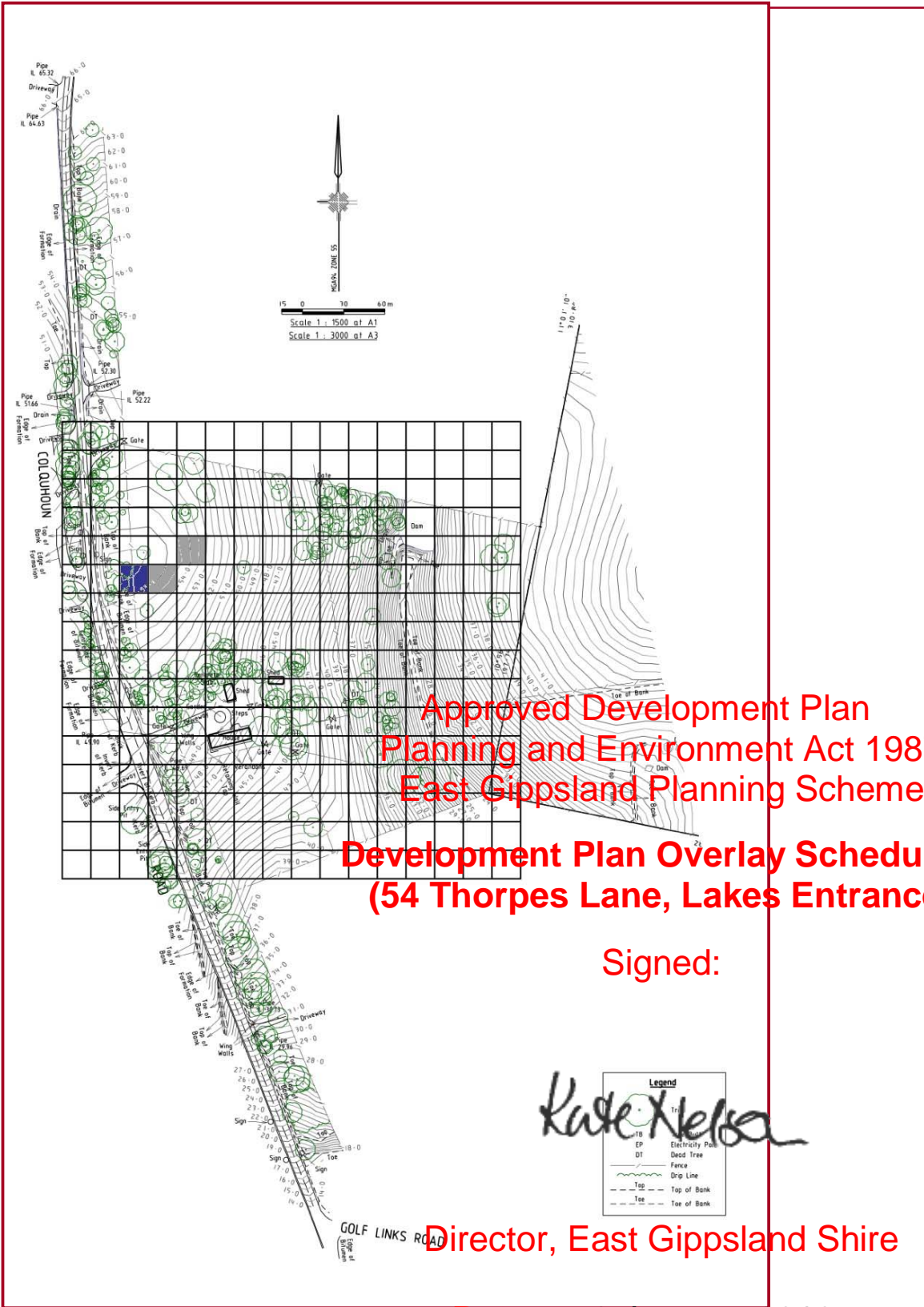


Figure 23. Distribution of trench artefact densities within stage 1 excavation area<sup>104</sup>  
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<sup>104</sup> Note that the coloured cells shown on the plan do not accurately reflect the size of the test trenches - on the scale of the plan these cells are 20m<sup>2</sup> in area. This exaggerated size is used here simply in order to assist with plan visibility.



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Figure 24. Distribution of trench artefact densities within stage 2 excavation area. (raw counts only)

Table 7 - Slope degree categories used in this analysis

Category	Number of contour lines per 20m <sup>2</sup> cell
No slope	0-1
Little slope	2-3
Moderate slope	4-5
Steep slope	6+

Figures 25 and 26 show the study area divided into the slope categories described above. Areas classified as having 'moderate slope' make up the largest proportion of the study area at 38% while only a small proportion of the area was classified as having virtually 'no slope' (4%). The remainder of the area is fairly evenly divided into 'little slope' and 'steep slope' at 30% and 28% of the area respectively.

Table 8 provides a breakdown of test trench artefact density by slope category. The results suggest that artefacts are found in all slope categories, but may be found in slightly higher densities in those areas classified as having 'no slope', although the high number in this category can be attributed to the G1/G2 location. A comparison of the median number of artefacts per trench in each category suggests, however, that the results do not indicate a general trend for higher artefact densities to occur in any one of the slope categories<sup>105</sup>.

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<sup>105</sup> A Kruskal-Wallis test (nonparametric ANOVA) comparing category medians suggests that variation among column medians is not significantly greater than expected by chance. Test undertaken using InStat 3.0b for Macintosh.

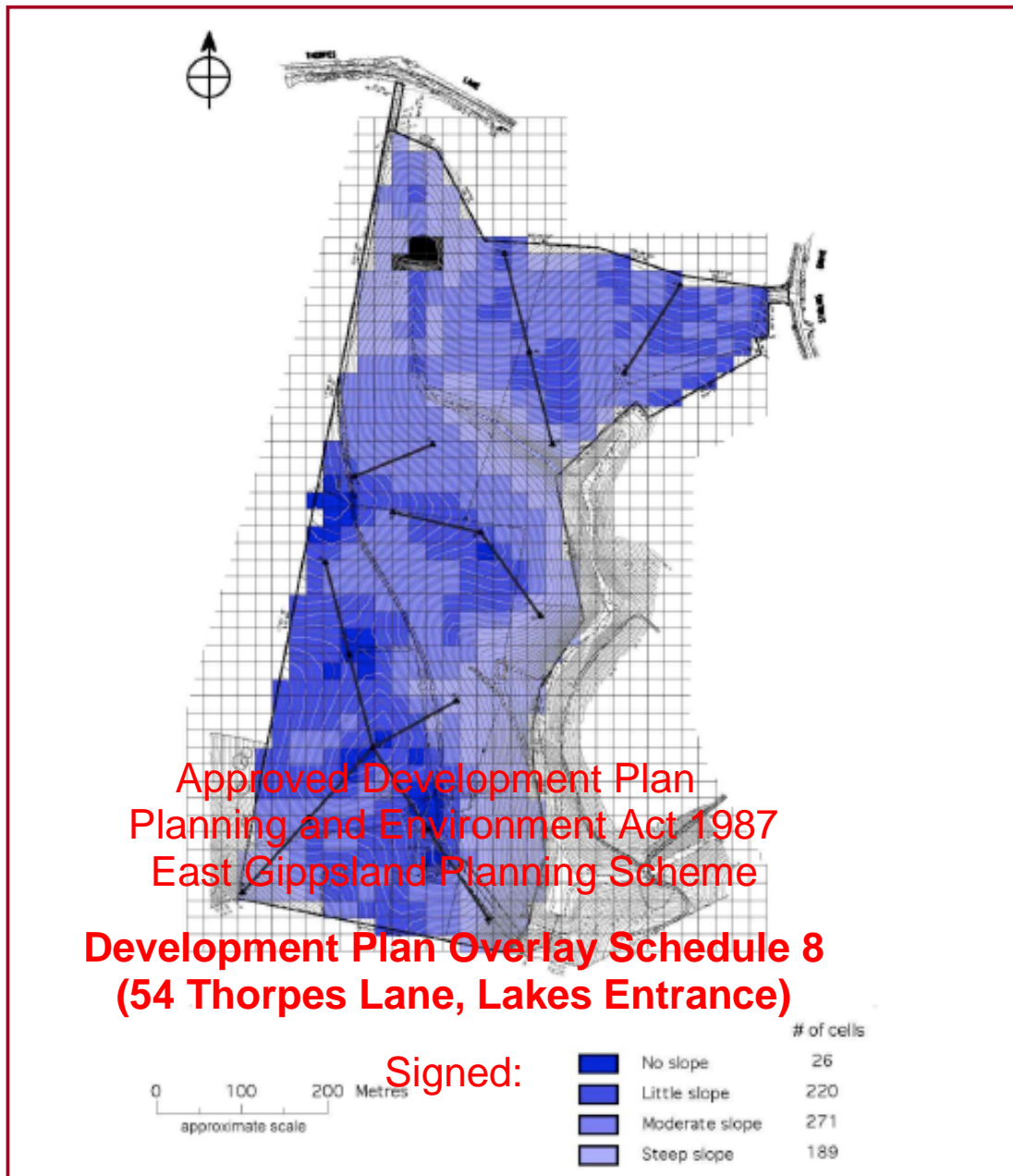


Figure 25. Stage 1 excavation area classified by steepness of slope. Note cells coloured black denote areas where significant landscape modification has changed original slope (ie in this case, a dam).

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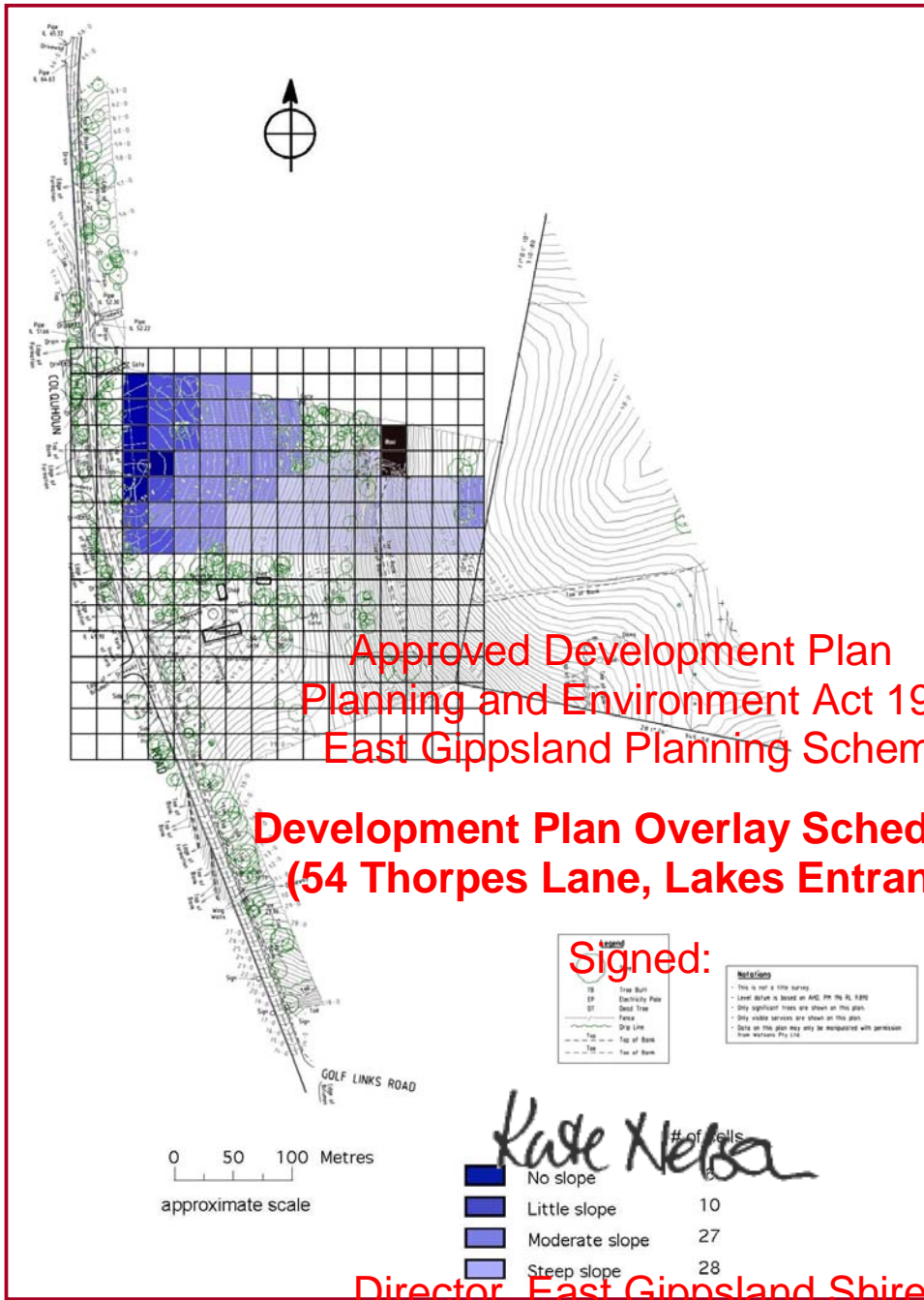


Figure 26. Stage 2 excavation area classified by steepness of slope. Note cells coloured black denote areas where significant landscape modification has changed original slope.

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Table 8 - Comparing mean number of artefacts per trench for four differing 'steepness of slope' categories.

Slope category	# trenches <sup>106</sup>	Total # of trenches containing artefacts	Mean # of artifacts per square metre	Median # of artefacts per square metre
No slope	3(14%)	2 (67%)	8.1	0.3
Little slope	7 (33%)	4 (57%)	0.6	0.3
Moderate slope	7 (33%)	2 (29%)	0.3	0
Steep slope	4 (19%)	3 (75%)	0.6	0.3

If categories are combined to form two instead of four (little to no slope and moderate to steep slope) there is a slight tendency for a higher density of artefacts to occur in less sloping areas (see Table 9). Differences between artefact trench counts within differing categories are not, however, considered to be significant<sup>107</sup>.

The generally low artefact density makes the drawing of any conclusions from these results difficult, however, as such densities make the appearance (or not) of artefacts within any one trench partially, at least, a matter of chance.

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<sup>106</sup> Test pits G1 and G2 are combined in this assessment because of their close proximity to one another and their small size (compared to the test trenches).

<sup>107</sup> A Kruskal-Wallis test (nonparametric ANOVA) comparing the median artefact counts of trenches in the four slope categories given in table # returned a P value of 0.5937, considered not significant. Likewise a Mann-Whitney test comparing the median artefact counts of trenches in the two slope categories given in table # returned a P value of 0.5899, also considered not significant. Test carried out using Instat 3.00 Statistics software for Macintosh.

Table 9 - Comparing mean number of artefacts per trench for two differing 'steepness of slope' categories

Slope category	# trenches	Total # of trenches containing artefacts	Mean # of artifacts per square metre	Median # of artefacts per square metre
No to little slope	10 (45%)	7 (64%)	2.6	0.3
Moderate to steep slope	11 (55%)	5 (45%)	0.3	0

### Artefact distribution and water

Distance to a water source is also generally considered to be a factor that has a strong influence on the distribution of Aboriginal archaeological deposits. The influence of distance to water on the distribution of stone artefacts was assessed by comparing artefact densities in trenches located above the 46m AHD contour line with those located below this line. As water sources within the study area consist of ephemeral deeply incised drainage lines, AHD ground level provides a good indication of distance from water. The 46m contour was chosen for the purposes of the analysis because it is generally situated about 100m from the drainage lines (see Figure 27).

Table 10 compares the counts of artefacts from trenches located above and below the 46m contour. While the mean number of artefacts per m<sup>2</sup> in the 'above' 46m contour category is the higher of the two, it would appear that trenches located closer to the drainage lines are more likely to contain artefacts. In fact, 67% of those trenches containing at least one, while only 33% of the trenches located above the 46m mark contained one or more artefacts. Again, however, these differences are not statistically significant<sup>108</sup>.

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<sup>108</sup> A Mann-Whitney test comparing the medians of artefact counts in trenches of the two categories (above and below the 46m contour) returned a two-tailed P value of 0.2686, considered not significant. Test carried out using InStat 3.0b statistics software for Macintosh.

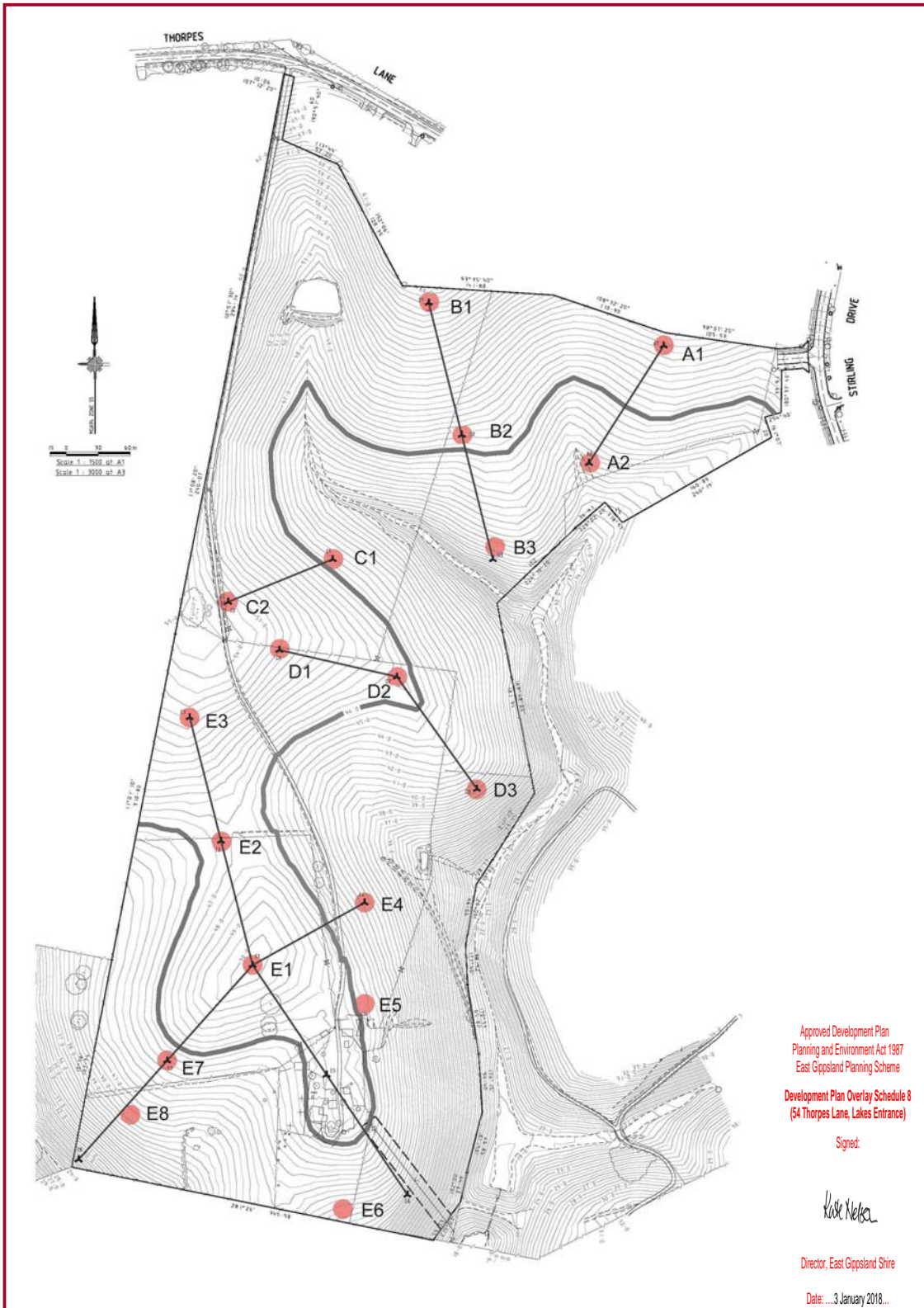


Figure 27. Topographical contour map of the study area showing test trench locations. The 46m contour is marked in bold. NB: all the trenches in the Stage 2 excavation area were above the 46m contour.

Table 10 - Comparing mean number of artefacts per trench for differing 'distance from water' categories

Distance to water	# trenches	Total # of trenches containing artefacts	Mean # of artefacts per square metre	Median # of artefacts per square metre
Below 46m	9	7 (78%)	0.5	0.3
Above 46m	12	4 (33%)	2.3	0

### 7.5.5.4 Conclusions about artefact distribution

The two variables of slope and distance to water are not unrelated - most of the land that is closest to water is also steep. Table 11 compares the two variables - slope and distance to water, and suggests that overall, artefact density in the study area is highest on flat land. However, as the median numbers indicate, this high density is skewed by the number of artefacts recovered from trench G1/G2 and is not characteristic of all trenches in this category. Artefacts are generally more likely to be present in trenches located below the 46m contour, and therefore closer to one of the small drainage lines that border the study area. The small sample size of the assemblage makes it difficult to draw any stronger conclusions about artefact distribution patterning.

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Table 11 - Comparing artefacts densities of slope and distance from water together

	Above 46m			Below 46m		
	# trenches	Mean # artefacts / square metre	Median # artefacts / square metre	# trenches	Mean # artefacts / square metre	Median # artefacts/ square metre
Slope 1	3	8.1	0.3	0	n/a	n/a

Slope 2	5	0.7	0	2	0.5	0.3
Slope 3	4	0	0	3	0.5	0.6
Slope 4	0	n/a		4	0.5	0.3

### 7.5.6 Delineation of 'Sites'

The archaeological validity of identifying artefact concentrations as discrete 'sites' has been questioned on the grounds both that the 'site' is an archaeological construct, and that implicit in the notion of the site is the suggestion that areas not identified as 'sites' are of little archaeological value, or were not used/inhabited by people in the past<sup>109</sup>.

The detection of subsurface archaeological material depends, in the main, on the factors of intersection and detection - both whether a test trench, pit or probe is excavated in an area where there does exist subsurface archaeological material, and whether that trench/pit/probe is of adequate size to detect whatever density of artefacts exists there. Factors such as the amount of excavated sediment sieved, and the sieve screen size can also influence the detection of material.

Stage 1 of the landform testing programme described in this report investigated a representative sample of landforms within the proposed activity area. In doing this the methodology employed comparatively large excavation trenches (3m x 1.2m in size) - this probably enabled the detection of more sparse artefact scatters than would have been possible with smaller excavation pits or with shovel probes<sup>110</sup>. Artefacts were found in 56% of the stage 1 trenches. The mean density of artefacts in those trenches in which artefacts were present was less than one artefact (0.875) per square metre.

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Four 1m x 1m test pits were excavated in stage 2 of the test excavation programme. Artefacts were found in two (50%) of these test pits. Considering the mean density of artefacts within the larger stage 1 test trenches that contained

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<sup>109</sup> Dunnell 1992; Wobst 1983

<sup>110</sup> Wobst has calculated that the use of 50cmx50cm test pits would require that a site has a mean artefact density of more than 12 artefacts per m<sup>2</sup> to obtain a count of one or more artefacts in 95% of the test pits excavated into that site (1983: 69).

artefacts, it cannot be stated with any certainty that a sparse artefact scatter does not also exist in those locations in which test pits G3 and G4 (those which did not contain artefacts) were situated.

Investigations into the influence of the factors of slope and distance to water on the distribution of artefacts in the study area suggests that there is a slight tendency for a higher density of artefacts to occur in some places on the less steep land of the upper slopes, although this dense distribution of artefacts is variable and does not occur uniformly across this landform category. Locations that are closer to the dissecting drainage lines were found to be more likely to contain artefacts, albeit at a lower density.

Artefacts were found in at least some trenches in all of the slope and distance to water categories with the exception of moderately to steeply sloping land located more than 100m from a drainage line. Considering the sparse artefact densities across the area, it is not certain that the apparent lack of artefacts in these trenches is of any significance.

It is argued here that there is a relatively low-density artefact scatter across the entire study area. Within that generally low-density scatter, two density peaks are apparent in the vicinity of trench C2, and at the location of test pits G1 and G2.

It is difficult to determine whether the higher density of artefacts in trench C2 (7 artefacts or < 2 artefacts per square metre) is of any significance - such an artefact density may not have even been visible in smaller test pits or shovel probes. The density of artefacts found at G1 (19 artefacts) and G2 (5 artefacts) does appear to be significantly higher than elsewhere in the study area.

As the majority of the test trenches excavated over the study area were found to contain artefacts (albeit mainly at low densities) and there was a lack of stratigraphy, it was impossible, for the most part, to draw any conclusions regarding associations between artefacts which are located in close proximity to one another. Given both the absence of past ploughing in this area and the apparent variation in artefact densities between the G1 and G2 trenches (located 1m apart) it is possible that the distribution of artefacts in this area may retain some horizontal integrity (in that they may have been less disturbed by post-depositional processes than has most of the remainder of the study area).

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Although artefact densities vary across the study area, there would appear to be no means other than arbitrary demarcation by which separate 'sites' could be delineated - given the generally ubiquitous distribution of artefacts across the activity area. On this basis, the entire study area, with the exception of those portions that have obviously been substantially altered (for example by the construction of the existing house and associated buildings) can be considered to be a single archaeological site. This site has been registered on the Victorian Aboriginal Heritage Register (VAHR) as Thorpes-Colquhoun Artefact Scatter (VAHR#8522-0238). This approach does, of course, lead to other interpretive difficulties - for example the boundaries of this continuous artefact scatter are unlikely to be at the existing property boundaries and this moderate to low-density scatter most likely extends across the surrounding areas.

## 7.5.7 Discussion of Results

### 7.5.7.1 General Discussion

The results of the test excavations can be summarised as follows:

- a low density scatter of stone artefacts exists across the study area;
- this scatter may have peaks of higher densities in certain landform categories and in specific places;
- artefacts in the scatter are primarily of silcrete and quartz, and much of the raw materials appear to have been derived from pebbles or water-worn stone;
- only a single formal tool (a thumbnail scraper) was found in the small recovered assemblage (although this may well be due to the small sample size); and
- the artefact deposits have, for the most part, been disturbed by both natural processes and by past land use.

It should be noted here that while a lack of stratigraphy is often assumed to mean that no meaningful archaeological information can be derived from a site, this is not the case. As Holdaway *et al*<sup>111</sup> have commented even the analysis of well-

<sup>111</sup> Holdaway *et al* 1998: 1-2

stratified rockshelters necessitates some conflation of, at times, hundreds or thousands of years of deposit, and Richardson<sup>112</sup> has shown that stratigraphy, or the appearance of it, can be misleading. An absence of stratigraphy does not necessarily mean that no information can be derived from these sites, simply that other methods of investigation and interpretation might be more suitable<sup>113</sup>. Generally these approaches require a horizontal, rather than a vertical approach to archaeological investigation.

### 7.5.7.2 Research Questions

In section 7.3 a number of possible research questions that could be addressed by the results of the test excavation were outlined. They are discussed below.

#### A) What types of artefacts were produced and what were they used for?

A limited range of artefacts were produced and/or used in the study area. They consisted of flakes, or parts of flakes, fragments and cores. Only a single formal tool - a thumbnail scraper - was found. The function of this type of formal tool is not fully understood. While the shape and the steepness of the retouch (and the identifying name) of this artefact type suggest use for 'scraping' Mulvaney and Kamminga have suggested that these artefacts may have been components of spears<sup>114</sup>.

#### B) How long did Aboriginal people use the site?

Little can be said on this matter with any certainty.

#### C) What stone materials were used and where did they come from?

Silcrete is the most common stone material found within the artefact assemblage making up 77% of the total. Quartz was also common (12% of the assemblage), chert, quartzite and an unidentified material were present. Pebble or water worn cortex on artefacts suggest that the raw materials used for artefact manufacture were sourced from fluvial deposits.

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<sup>112</sup> Richardson 1992

<sup>113</sup> eg Baales 2001; Bailey 2007; Barton 2001; Holdaway et al 1998; Sullivan 1992, 1995; Wandsnider 1996.

<sup>114</sup> Mulvaney and Kamminga 1999: 235

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**D) What foods were eaten by Aboriginal people at the site?**

No evidence regarding food consumption was found during the excavation.

**E) What activities did Aboriginal groups carry out at the site in the past and is there any relationship between site function(s) and the local distribution of natural resources? Is there evidence for different activities on different landforms or on different soil landscapes?**

Artefact distribution would tend to suggest that all of the study area was used at times, as it appears to contain a continuous low-density artefact scatter. The presence of artefact density peaks in places such as at the location of test pits G1 and G2, suggests that some areas may have been more preferentially used than others.

**F) How does the study area compare to other Aboriginal sites excavated in the local area? How did the results compare with predictions made about the likely nature and extent of archaeological deposits within the study area?**

The composition of the artefact scatter would appear to be similar, in both artefact types and raw materials, to other recorded scatters in the local area, such as the Hogs Lane (VAHR8522/0222, 0223) and Ostler Road sites (VAHR8522/0234, 0235, 0236).

**G) Is the density and distribution of artefacts within the study area a function of Aboriginal occupation and use or does it reflect site formation processes and the history of European activities in the area?**

While the broad patterning of artefacts in the study area, which can be characterised as a continuous low-level scatter with a small number of density peaks, is most likely a result of the Aboriginal use and/or occupation of the area, it is probable that post-depositional processes have acted to alter the vertical distribution of artefacts through the area. It is probable that both European land clearing and use and bioturbation have changed the vertical distribution of artefacts within study area soils. It is unclear how much of an impact these processes might have had on local horizontal artefact movement.

Small number of density peaks, is most likely a result of the Aboriginal use and/or occupation of the area, it is probable that post-depositional processes have acted to alter the vertical distribution of artefacts through the area. It is probable that both European land clearing and use and bioturbation have changed the vertical distribution of artefacts within study area soils. It is unclear how much of an impact these processes might have had on local horizontal artefact movement.

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## 8 SIGNIFICANCE ASSESSMENT

### 8.1 Preamble

Aboriginal sites are assessed in terms of three significance criteria: Archaeological (scientific), Cultural (Aboriginal) and Public Significance. These criteria recognise that Aboriginal sites are valuable in a number of ways. Namely:

- To the Aboriginal community as an aspect of their cultural heritage and as part of continuing traditions;
- To the broader community, for educational, historical and cultural enrichment values; and
- To the scientific community for potential research value.

This chapter includes an evaluation of significance to gauge the relative scientific and cultural (social) importance of Aboriginal sites and cultural deposits within the study area in order to inform appropriate management of those values before, during and after proposed development.

### 8.2 Principles and Evaluation Criteria

'Heritage significance' and 'cultural significance' are terms used to describe an item's value or importance to our society. The Australian ICOMOS Burra Charter (1988) defines cultural significance as:

*'Aesthetic, historic, scientific or social value for past, present or future generations'*

This value may be contained in the fabric of the item, its setting and relationship to other items, the response that the item stimulates in those who value it now, or the meaning of that item to contemporary society.

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The cultural significance of Aboriginal archaeological sites can only be assessed in consultation with the relevant Aboriginal community of communities.

The archaeological significance of an archaeological site is generally seen as being directly linked to its scientific or research value. In general this refers to the ability of the contents of a location to enable investigation of research questions, present and future. As future research questions and capabilities cannot always be predicted, archaeological significance is most often assessed in terms of the condition or integrity of deposits present at the location, and their representativeness and/or rarity<sup>115</sup>.

In Australia the concept of archaeological significance is commonly defined as a set of questions, originally proposed by Bickford and Sullivan in 1984<sup>116</sup> that are used as a means of assessing the significance of an archaeological site. These questions ask whether the site in question:

- can provide information not available from other sources;
- can provide information not available from other sites; and
- can answer pertinent research questions?

## 8.3 Significance Evaluation

For the purposes of this CHMP, the significance evaluation is a site-wide assessment because the entire 'activity area' is considered to be an Aboriginal site.

### 8.3.1 Aboriginal Cultural Significance

This area of assessment concerns the relationship and importance of sites to the Aboriginal community. Aspects of cultural significance include both people's traditional and contemporary links with a given site or landscape as well as an overall concern by Aboriginal people for sites and their


Unmodified natural features in the landscape can signify sacred sites/places of significance. As such they are archaeologically invisible and can only be identified

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<sup>115</sup> Burke and Smith 2004: 249

<sup>116</sup> Bickford and Sullivan 1984:23-24, see also Burke and Smith 2004: 250

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with the aid of Aboriginal interpretation. If such sites are known they may hold particular cultural significance to contemporary Aboriginal communities. Furthermore, sites of significance are not restricted to the period prior to contact with Europeans. Often events related to the Contact-period may be so important to local Aboriginal communities that they have become significant. If these events relate to a specific place in the landscape, then that place may become sacred or highly significant to the local Aboriginal communities.

The cultural (Aboriginal) significance is a matter for the local Aboriginal community. Please refer to Chapter 4 for a summary of consultation undertaken with the Gunaikurnai community. This summarises the attempts we made in writing, in person and by phone to seek specific information about the cultural significance of the subject land. No information regarding the cultural values of the place was forthcoming from the Gunaikurnai representatives.

### 8.3.2 Scientific Significance

The objective of undertaking scientific significance assessment for a site is to determine its research potential in terms of contribution to knowledge about the past. Criteria used to evaluate scientific potential include condition/integrity, representativeness and rarity.

The results of the test excavations described in this report suggest that a low-density scatter of stone artefacts exists over most, if not all, of the study area. The density of the artefact scatter varies slightly across the landscape, and may indicate differing degrees and types of use across the landscape. It is probable that the vertical integrity of the artefact scatter has been impinged by both post contact land use (clearing and subsequent agriculture) and natural processes (bioturbation).

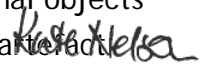
Our assessment of the scientific significance of Aboriginal objects found during test excavation is set out below.

Condition / Integrity: Aboriginal artefacts found during excavation have been disturbed by past site formation processes, which has disturbed or destroyed the vertical integrity of archaeological deposits present in the area. Aboriginal objects buried within soils across the site comprise disturbed low-density stone artefacts.

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deposits with some variation in density and contents. This variation may be indicative of a degree of preservation of horizontal (or spatial) integrity.

Representativeness: Aboriginal objects found across the study area are representative, in terms of their materials and types, of artefact scatters commonly found in the local region. The continuous low-density scatter across a landscape of moderate size (the study area) is unlikely to be an unusual archaeological feature of the dissected plateau to the north of Lakes Entrance. It is likely that such low density scatters exist across most if not all parts of the continent unless they have been removed by post-depositional processes.

Rarity: Aboriginal objects and deposits found during the excavation have a low level of rarity. The disturbed low-density artefact scatter and continuous background scatter found during the test excavation is not considered to have rarity in either frequency or research potential (ie. what they can tell us about past Aboriginal occupation). The density and composition of cultural deposits found during the test excavation is not uncommon or exceptional and would be expected in the surrounding region.

Accordingly, the study area is considered to have a relatively low level of scientific significance. That said, it should be recognised that the distribution of even sparse artefact distributions, or off-site archaeology, has the potential to address questions regarding the use of the landscape in the past. There is little to no potential for deposits within the study area to address questions of cultural change through time because vertical integrity is nil-very low.

### 8.3.3 Public Significance

This category concerns a site's potential to educate people about the past. It also relates to the heritage value of particular sites as being representative examples of past lifestyles, why they are important, and why they should be preserved.

An assessment of public significance in part considers the ability of an archaeological deposit found during excavation to demonstrate aspects of past Aboriginal life, therefore a whole range of issues need to be considered including rarity (ie. are there other resources that can demonstrate these aspects of Aboriginal life ?), aesthetics, potential for conservation and potential for interpretation.

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Physical evidence of Aboriginal occupation and use within the study area is limited to subsurface stone artefact deposits. Such sites are very difficult (from an interpretation and logistical viewpoint) to use in communicating aspects of past Aboriginal life. The most common approaches include presentation of artefacts in an interpretive display and use of latex peels to show excavation trench sections in profile. Because the artefact deposits found during test excavation are relatively low density and have been disturbed by historic land uses, they have very limited ability to communicate aspects of past Aboriginal life on the site. The vegetation and environmental context of the study area has also been radically altered by vegetation clearance. The original environmental context of the archaeological deposits has therefore been fundamentally changed, detracting from the public significance of the site.

The Aboriginal cultural deposits across the study area have some public significance as a demonstration of Aboriginal occupation and life prior to European colonisation.

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## 9 IMPACT ASSESSMENT

### 9.1 Development Design

The Sponsor proposes to subdivide Lot A PS 517816T (33.38 hectares) for residential development and development of a retirement village. A proposed access road that will connect the sub-division with Colquhoun Rd to the west will cross through part Lot 2 PS 505056H. The proposed activity and sub-division layout is shown on Figure 28. It will include:

- Creation of 186 residential allotments. The individual allotments will not be developed by the Sponsor. They will be sold for residential development;
- Development of a 6.54 hectare retirement village comprising 162 units including areas of Public Open Space, a bowling green and a community building;
- Public open space, including a 1.8 hectare reserve (these areas are shaded green on Figure 3). The reserves will be used primarily for recreational purposes for residents and the general public. Subject to engineering design and Council requirements, the open spaces reserves may also be required to divert overland stormflows. Reserve areas will be transferred to and managed by East Gippsland Shire Council; and
- Establishment of infrastructure and services including roads, storm water, power, water and sewer. This will include the access road connecting the sub-division with Colquhoun Road to the west.

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The proposed subdivision would be a 'high-impact' development and would be considered a 'sub-division' under Regulation 48 of the Aboriginal Heritage Regulations 2007.

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The Sponsor proposes to establish the subdivision, including development of roads, services and infrastructure, public open space and the retirement village. Due to the steep sloping topography, the proposed sub-division works will require substantial cut, fill and re-grading to establish levels required to build roads, excavate trenches for services and make the land suitable for residential sub-

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division. Cut would be typically 1.5m deep, however excavation for services and pavement could be up to 4m deep. This will remove all A-horizon topsoil deposits within the footprint of proposed development works described above and shown on Figure 28.

The Sponsor does not propose to develop the 186 individual residential allotments shown on Figure 28. Each of these would be sold for residential development after the sub-division works are complete. The residential allotments will remain zoned 'Residential 1 Zone' under the control of the 'East Gippsland Planning Scheme'. Permissible uses within this zoning are described in Section 1.3 of this report.

It is likely that any works that disturb or remove soils on or below current ground surfaces in the study area will disturb Aboriginal cultural material. Artefacts within affected soils would most likely be damaged and/or relocated within soils that are moved around the site for use as fill.

## 9.2 Evaluation

The comprehensive assessment found that the Aboriginal cultural material distributed across the proposed activity area comprised continuous, sparse sub-surface stone artefact deposits. This site has been registered as 'Thorpes-Colquhoun Artefact Scatter' (VAHR#8522-0238). The density of artefacts across the study area was generally found to be low - the main exception to this being the location surrounding test pits G1 and G2.

It is likely that artefacts within most of the proposed activity area have been displaced as a result of land clearing, agriculture and natural processes, although it is possible that disturbances caused by post-contact land use are fewer in the area surrounding trenches G1/G2. Accordingly, our evaluation of the scientific significance of the artefact scatter site found it to be of generally low scientific significance. As a result while it is certain that the proposed subdivision will have the effect of disturbing some Aboriginal cultural heritage present within the activity area, the impact of this proposed development on scientifically significant Aboriginal cultural heritage can be considered to be low. In addition, the provision for a reserve as part of the proposed subdivision will ensure that a part of this low density scatter remains undisturbed by the proposed development.

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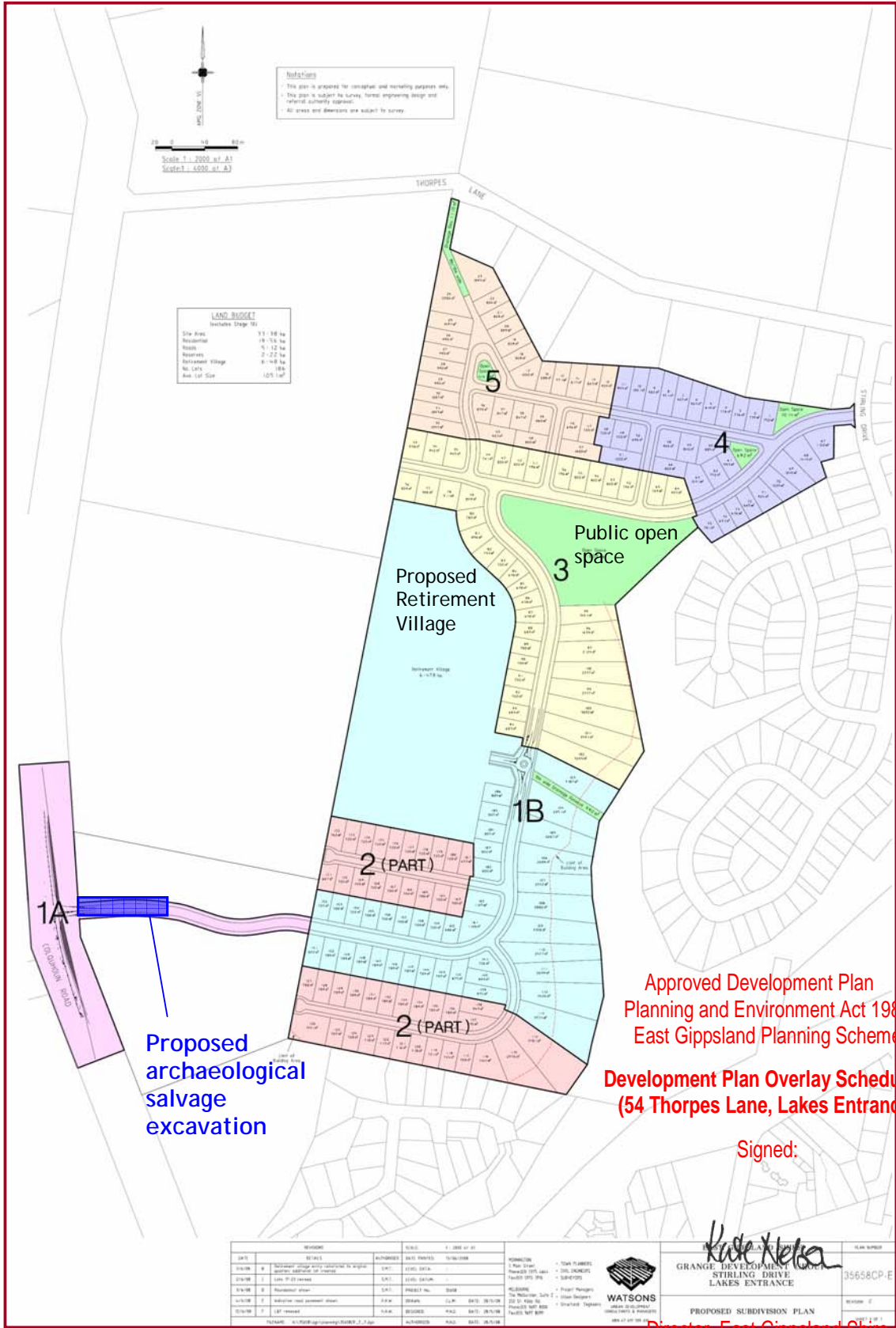


Figure 28. Plan of proposed subdivision. Proposed salvage area shaded dark blue.

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Notwithstanding the above evaluation, there always remains the possibility that undetected deposits of high scientific or cultural significance may exist in the area. For this reason contingency plans for dealing with the event of a burial or other significant material or deposits being unearthed as a result of the development are provided in the management recommendations section below.

While no further work is recommended for the greater part of the activity area, salvage excavation is recommended in the area surrounding trench G1 and G2 on the basis that this area contains a higher density of Aboriginal stone artefacts, and there is some potential for greater horizontal integrity of artefacts in this area, given the absence of past ploughing. This area is outlined and shaded blue on Figure 28. This area contained the highest density of artefacts within the activity area and has the highest potential to reveal intra-site patterning and yield a sufficient sample of artefacts to overcome small sample biases and make meaningful conclusions about past Aboriginal use and occupation.

The salvage excavation would form a requirement of the CHMP. The salvage excavation should comprise a controlled open-area excavation (minimum of 25 square metres in area). The area should be excavated by hand in 1m square spatial units and 100mm vertical units (spits). Flexibility should be allowed to vary the shape of the open-area in order to follow the extent of high-density deposits or discrete cultural features such as hearths of knapping floors. High-density artefact concentrations should be recorded 3 dimensionally with a total station or differential GPS. The salvage excavation will require a suitably qualified archaeologist or archaeological consultancy to be engaged to prepare a research design and methodology and then undertake the excavation, post excavation analysis and reporting. Input and participation of the RAP would also be required.

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## 10 CULTURAL HERITAGE MANAGEMENT

### 10.1 Basis for Recommendations

The recommendations of this CHMP are made in accordance with:

- Section 61 of the *Aboriginal Heritage Act 2006*;
- the *Aboriginal Heritage Regulations 2007*;
- the results of desktop, standard and comprehensive assessment documented in this report;
- the impact of proposed development within the activity area; and
- the views of the Aboriginal community represented by the Gunaikurnai Land and Waters Aboriginal Corporation.

### 10.2 Recommendations

The following recommendations are made in accordance with Section 61 of the Aboriginal Heritage Act:

#### Recommendation 1 - Impact Avoidance

The activity cannot be conducted in a way that completely avoids harm to Aboriginal cultural heritage. The programme of test excavation described in this report demonstrates that the activity area contains continuous sub-surface stone artefact deposits across approximately 54 % of the activity area. Considering the steep sloping topography within the activity area, the proposed subdivision works will require substantial cut, fill and re-grading. This will disturb A-horizon topsoils, and the low density artefact deposits within these topsoils, across the area of proposed sub-division works shown on Figure 28. It would not be feasible to prepare the site for sub-division if it avoided impact on the A-horizon topsoils. There are no feasible design alternatives for the sub-division works because the roads will require levelled pavement surfaces (necessitating cut and fill), services will require

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excavation of deep trenches to comply with safety and industry standards and the proposed retirement village will require re-grading and excavation of building footings that will disturb the thin topsoils that contain low densities of Aboriginal stone artefacts.

A proposed 1.8 hectare public open space reserve within the subdivision (shaded green on Figure 28) will, however, ensure that a portion of the low-density artefact scatter described in the cultural heritage assessment component of the CHMP, remains undisturbed by the proposed subdivision. The reserve will be transferred to and managed by East Gippsland Shire Council for recreational open space uses.

## Recommendation 2 - Impact Minimisation

The nature of the steep topography within the subject land and the proposed subdivision activity that will require cut, fill and re-grading, indicates the scope to minimise impact during sub-division works is limited. Essentially the steep sloping land and nature of proposed subdivision development, will require construction methods that limit the possibility of minimizing harm. As described above in Recommendation 1, there are no feasible design alternatives for the sub-division works on the steep local topography because the roads will require levelled and benched pavement surfaces (necessitating cut and fill), services will require excavation of deep trenches to comply with safety and industry standards and the proposed retirement village will require re-grading and excavation of building footings that will disturb the thin topsoils that contain low densities of Aboriginal stone artefacts.

Where possible, construction methods used for sub-division works will seek to minimise any un-necessary ground excavation and disturbance works and to combine services within shared trenches where feasible.

## Recommendation 3 - Impact Mitigation (Salvage)

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- Prior to commencement of development excavation works, the proponent shall engage a suitably qualified archaeologist or archaeological consultancy to undertake controlled archaeological salvage excavation in the area outlined and shaded dark blue on Figure 28.

- The excavation and associated research design, methodology, post-excavation analysis should be developed in consultation with Aboriginal

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Affairs Victoria and the RAP. The methodology and aims should generally conform to those described in Section 9.2 of this report.


## Recommendation 4 - Contingency planning for discovery of Aboriginal cultural heritage

If any Aboriginal cultural heritage (with the exception of burials, see Recommendation 5 below) or suspected Aboriginal cultural heritage not previously identified, and not considered to be part of the low-density site (VAHR# 8522-0238) discovered during the test excavation, should be discovered during development then the following procedures should be followed. In practical terms, high-density intact artefact deposits, hearths and/or shell middens should be reported.

- a. A person who discovers any such Aboriginal cultural heritage described above will immediately notify the person in charge of the activity.
- b. The person in charge of the activity must then immediately cease work in the location of the discovery and within a buffer zone of 50m from the suspected Aboriginal material or deposits.
- c. The Gunaikurnai Land and Waters Aboriginal Corporation (LWAC) should be contacted immediately.
- d. Representatives of the Gunaikurnai LWAC should be given the opportunity to inspect and assess any such deposits. A RAP representative and the person in charge of the activity will evaluate the Aboriginal cultural heritage to determine if it is part of an already known site or should be registered as a new site.
 

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- e. A suitably qualified archaeologist will be engaged as a cultural heritage advisor to update and/or complete site records, provide management advice and liaise with Gunaikurnai LWAC and AAV.
 

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- f. The Aboriginal site, object or deposits should be recorded and documented in accordance with all relevant AAV standards and guidelines and the artefacts should be managed in accordance with the curation procedures described in Recommendation 6.
 

  
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- g. The cultural heritage advisor must complete any necessary records and submit them to AAV so that the Secretary of the Dept of Aboriginal Affairs Victoria shall be notified of the discovery of previously unrecorded Aboriginal sites as required by the *Aboriginal Heritage Act 2006*.

## Recommendation 5 - Contingency planning for discovery of Aboriginal burials

- a. If any suspected human remains are found at any other time during construction, works in that area must cease immediately and the remains must be protected from further harm.
- b. The project's consultant archaeologist (cultural heritage advisor) should be contacted immediately and undertake an inspection to determine whether or not the remains are human or animal.
- c. If the remains are identified as human, the Victoria Police and the State Coroner's Office should be notified immediately.
- d. If there are reasonable grounds to believe that the remains are Aboriginal, the Department of Sustainability and Environment's Emergency Co-ordination Centre must be contacted immediately on 1300 888 544 and the requirements of Section 17 of the *Aboriginal Heritage Act 2006* will apply.
- e. If it is confirmed by these authorities that the discovered remains are Aboriginal skeletal remains, the person responsible for the activity must report the existence of the human remains to the Secretary, DVC in accordance with Section 17 of the Act.
- f. The Secretary, after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal human remains, will determine the appropriate course of action as required by Section 18(2)(b) of the Act.
- g. An appropriate impact mitigation or salvage strategy as determined by the Secretary must be implemented.

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## Recommendation 6 - Removal and curation of Aboriginal heritage found during development.

Artefacts found during test excavation and any subsequent artefacts that may be found during or after the activity shall be re-buried at a suitable keeping place agreed by the RAP. Artefacts will be stored in plastic clip-lock bags that include provenance details written in indelible marker. The artefact bags will be kept in a sealed plastic container with the name of the site and CHMP number written in indelible marker. The keeping place location will be recorded with a hand-held GPS by the Cultural Heritage Advisor and a site recording form will be prepared and lodged with the VAHR.

## Recommendation 7 - Aboriginal consultation

The Gunaikurnai land and Waters Corporation shall be consulted about any matters relating to Aboriginal heritage in the activity area.

## Recommendation 8 - Archaeological Investigations

With the exception of salvage recommendation outlined in Recommendation 3, no further archaeological investigations are required prior to commencement of development.

## Recommendation 9 - Compliance Review

- a. The sponsor and landowner shall be responsible for ensuring the requirements of the CHMP are implemented, including provision of appropriate funding and making reasonable time allowances for the requirements of the CHMP to be implemented.
- b. A suitably qualified archaeologist or archaeological consultancy shall be appointed to act as the Cultural Heritage Advisor throughout the duration of the construction phase.
- c. The Cultural Heritage Advisor shall be responsible for reviewing compliance with the recommendations of this CHMP. This shall include:
  - Ensuring the salvage excavation is undertaken prior to commencement of development;

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- Ensuring the post excavation analysis and reporting are completed in accordance with the research design and methodology; and
- Producing compliance reports immediately prior to commencement of development excavation works and subsequent monthly reporting during development excavation works. The report shall be provided to the RAP, AAV and the Sponsor.

## Recommendation 10 - Handling Sensitive Information

Records and information regarding the location and nature of Aboriginal cultural heritage are culturally sensitive. With the exception of public documents such as this CHMP and site records included on the VAHR, and any other uses permissible under the Aboriginal Heritage Act 2006, there shall be no communication or public release of information concerning Aboriginal heritage without the permission of the Gunaikurnai Land and Waters Corporation.

## Recommendation 11 - Communication and Correspondence

- a. Communication and correspondence regarding management of Aboriginal heritage between the Sponsor and the RAP will be maintained before, during and after the development.
- b. Unless otherwise agreed, the sponsor will hold monthly meetings with the RAP. During these meetings any issues relating to the project may be discussed. The first of these meetings shall be held not less than seven (7) days before the development excavation works are due to commence.
- c. At all such monthly meetings the land owner will provide the RAP with a rolling works programme for the forthcoming month.
- d. At the initial meeting, the sponsor and the RAP shall both specify a representative and contact details for a person who will be the designated contact for all issues relating to management of Aboriginal heritage and implementation of this management plan; and
- e. Responses to any verbal or written communication or request shall be made within seven (7) calendar days.

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## Recommendation 12 - Cultural Inductions

The Cultural Heritage Advisor together with representatives of the RAP, shall be engaged to prepare a brief Aboriginal heritage induction for all construction crew and sub-consultants employed to work on the site during the construction phase. The induction will explain the requirements of the CHMP and describe procedures and contingencies established by the CHMP.

## Recommendation 13 - Contingency Planning for Subdivision

The Sponsor proposes to subdivide Lot A PS 517816T and part Lot 2 PS 505056H to establish a residential subdivision, including development of roads, services and infrastructure, public open space and a retirement village as shown on Figure 28. This will include:

- Creation of 186 residential allotments. The individual allotments will not be developed by the Sponsor. They will be sold for residential development;
- Development of a 6.54 hectare retirement village comprising 162 units including areas of Public Open Space, a bowling green and a community building;
- Public open space, including a 1.8 hectare reserve (these areas are shaded green on Figure 3). The reserves will be used primarily for recreational purposes for residents and the general public. Subject to engineering design and Council requirements, the open spaces reserves may also be required to divert overland stormflows. Reserve areas will be transferred to and managed by East Gippsland Shire Council; and
- Establishment of infrastructure and services including roads, storm water, power, water and sewer. This will include the access road connecting the subdivision with Colquhoun Road to the west.

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The Sponsor does not propose to develop the 186 individual residential allotments shown on Figure 28. Each of these would be sold for residential development after the sub-division works are complete. The residential allotments will remain zoned 'Residential 1 Zone' under the control of the 'East Gippsland Planning Scheme'.



Permissible uses within this zoning are described in Section 1.3 of this report.

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## REFERENCES

AAV 2007, *Aboriginal Heritage Regulations 2007*. S.R. No. 41/2007 Version as at 28 May 2007

Adams, J. 1981. *The Tambo Shire Centenary History*. Shire of Tambo, Bruthen, Bairnsdale.

Armour-Chelu, M. and P. Andrews 1994. Some effects of bioturbation by earthworms (Oligochaeta) on archaeological sites. *Journal of Archaeological Science* 21: 433-443.

Baales, M. 2001. From lithics to spatial and social organization: interpreting the lithic distribution and raw material composition at the final Palaeolithic site of Kettig (Central Rhineland, Germany). *Journal of Archaeological Science* 28: 127-141.

Bailey, G. 2007. Time perspectives, palimpsests and the archaeology of time. *Journal of Anthropological Archaeology* 26: 198-223.

Balek, C. L. 2002. Buried artifacts in stable upland sites and the role of bioturbation: a review. *Geoarchaeology: an international journal* 17(1): 41-51.

Barton, H. 2001. Mobilising Lithic Studies: an application of evolutionary ecology to understand prehistoric patterns of human behaviour in the Simpson Desert, far Western Queensland. Unpublished PhD thesis, Department of Archaeology, University of Sydney.

Binford, L. 1980. Willow smoke and dog's tails: hunter-gatherer settlement systems and archaeological site formation. *American Antiquity* 45: 420-429.

Bird, E. and J. Lennon 1973. *The entrance to the Gippsland Lakes*. Gippsland Studies No 2, Bairnsdale Advertiser.

Bocek, B. 1986. Rodent ecology and burrowing behaviour: predicted effects on archaeological site formation. *American Antiquity* 51(3): 589-603.

AHMS

Broome, R. 2005. *Aboriginal Victorians: a history since 1800*. Allen and Unwin, Crows Nest.

Burke, Heather & Smith, Claire 2004. *The Archaeologist's Field Handbook*. Allen & Unwin, New South Wales.

Caldere, D. and D. Goff 1991. *Aboriginal reserves and missions in Victoria*. Department of Conservation and Environment.

Christie, M. 1979. *Aborigines in Colonial Victoria, 1835-86*. Sydney University Press, Sydney.

Clark, I. D. 1990. *Aboriginal Languages and Clans: an Historical Atlas of Western and Central Victoria, 1800-1900*. Monash Publications in Geography 37, Clayton.

Clark, I.D. (ed) 2000. *The Journals of George Augustus Robinson, Chief Protector, Port Phillip Aboriginal Protectorate, Volume Four: 1 January 1844 - 24 October 1845*. Clarendon and Heritage Matters.

Costermans, L. 2007. *Native Trees and Shrubs of South-Eastern Australia*. Reed New Holland, Sydney.

Duncan, B & O. Nicolson 2007. *Gippsland Ports Maritime Cultural Heritage Desk Study*. Unpublished report to Gippsland Ports by Environmental Resource Management.

Dunnell, R. 1992. The notion site, in J. Rossignol and L. Wandsnider (eds) *Space, time and archaeological landscapes*. Plenum Press, New York pp 21-41.

Ellender, I. 2002. The Yowenjerre of South Gippsland: traditional groups, social boundaries and land succession. *The Artefact* 25(1): 9-18.

Erlandson, J.M. 1984 A case study in faunal-turbation: delineating the effects of the burrowing pocket gopher on the distribution of archaeological materials. *American Antiquity* 49(4): 785-790.

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Planning and Environment Act 1987  
East Gippsland Planning Scheme  
Development Plan Overlay Schedule 8  
(54 Thorpes Lane, Lakes Entrance)

Signed:

Foley, R. 1981. Off-site archaeology: an alternative approach for the short sited, in G. Isaac, I. Hodder and N. Hammond (eds) *Pattern of the past: studies in honour of David Clarke*. Cambridge University Press, Cambridge pp 157-183.

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Gardner, P. 1994. *Through foreign eyes: European perceptions of the Kurnai tribes of Gippsland*. Ngarak Press, Ensay.

Gardiner, P. 2001. *Gippsland massacres: the destruction of the Kurnai tribes, 1800-1860*. Ngarak Press, Warragul.

Gifford-Gonzalez, D.P., D.B. Damrosch, D.R. Damrosch, J. Pryor and R.L. Thunen 1985. The third dimension in site structure: an experiment in trampling and vertical dispersal. *American Antiquity* 50(4): 803-818.

Goulding, M. 1997. Placing the past: Aboriginal historical places in east Gippsland, Victoria. *Historic Environment* 13(2): 40-51.

Hiscock, P. and V. Attenbrow 1998. Early Holocene Backed Artefacts from Australia. *Archaeology in Oceania* 33(2).

Hiscock, P. 2001. Sizing up Prehistory: Sample Size and Composition of Archaeological Assemblages. *Australian Aboriginal Studies* 2001/1.

Hiscock, P. and V. Attenbrow 2002. Morphological and Reduction Continuums in Eastern Australia: Measurement and Implications at Capertee 3. *Tempus* 7. Anthropology Museum, University of Queensland.

Holdaway, S. and N. Stern 2004. *A Record in Stone: the study of Australia's flaked stone artefacts*. Museum of Victoria and Aboriginal Studies Press.

Holdaway, S, D. Witter, P.Fanning, R. Musgrave, G. Cochrane, T. Doelman, S. Greenwood, D. Pigdon and J. Reeves 1998. New approaches to open site spatial archaeology in Sturt National Park, New South Wales, Australia. *Archaeology in Oceania* 33: 1-19.

Hotchin, K. 1989. *Environmental Evolution and Culture Change in the Gippsland Lakes Region, Victoria, Australia*. Unpublished Phd Thesis, ANU.

Howitt, A W. 1996 (1904). *The native tribes of South-East Australia*. Aboriginal Studies Press, Canberra.

Hynes, R.A. & Chase, A.K. (1982) Plants, Sites and Domiculture: Aboriginal Influence upon Plant Communities in Cape York Peninsula. *Archaeology in Oceania* 17(1)

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Land Conservation Council (LCC) 1982. *Report on the Gippsland Lakes Hinterland Area*. Land Conservations Council, Melbourne.

Lomax, K. n.d. *An archaeological survey of the Gippsland Lakes*. Unpublished draft report.

Mallouf, R. 1982. An analysis of plow-damaged chert artefacts: the Brookeen Creek cache (41HI86), Hill County, Texas. *Journal of Field Archaeology* 9(1): 79-98.

Marshall, B & P. Schell 1998. *Coast Action/Coast Care 1998/99 Aboriginal Archaeological Desktop Study*. Unpublished report to DNRE Coasts Division by Austral Heritage Consultants.

McBryde, I. 1984. Kulin greenstone quarries: the social contexts of production and distribution for the Mt William site. *World Archaeology* 16(2): 267-285.

McConnell, A., K. Buckley, and S. Wickman 2001. *Aboriginal Heritage Management in Victorian Forests. Subsidiary Report - Aboriginal Heritage Sensitivity Zoning, Gippsland & East Gippsland Regions*. Unpublished report to the Department of Natural Resources and Environment, Victoria.

McDonald, J. 1997. *Interim Heritage Management Report: ADI Site St Marys. Volume 1: Text*. Report to Lend Lease - ADI Joint Venture in response to the Section 22 Committee Interim Report.

Morgan, P. 2004. Gippsland settlers and the Kurnai dead. *Quadrant* October pp 26-28.

Mulvaney, D.J. & Kamminga, J. 1999. *Prehistory of Australia*. Allen & Unwin, Sydney.

Nicholson, B. 1978. *A study of the land in the Gippsland Lakes Area Soil Conservation Authority, Victoria*.

Nielsen, A.E. 1991. Trampling the archaeological record: an experimental study. *American Antiquity* 56 (3): 483-503.

Odell, G. and F. Cowan 1987. Estimating tillage effects on artifact distributions. *American Antiquity* 52(3): 456-484.

*Kate Nelson*

Ossa, P., B. Marshall and C. Webb 1995. New Guinea II Cave: A Pleistocene site on the Snowy River, Victoria. *Archaeology in Oceania* 30: 22-35.

Palmer, J., F. Ray, W. Bowler, M. Uhlhorn, D. Crone, H. Bates and W. Mitchell (eds) 1956. *A History of Lakes Entrance Victoria*. Lakes Entrance.

Pepper, P. 1980. *You are what you make yourself to be*. Highland House, Melbourne.

Powell, J.M. 1969. The squatting occupation of Victoria, 1834-60. *Australian Geographical Studies* 7: 9-27.

Rhodes, D. 2001. *Archaeological Sub-Surface Testing at the Site of New Airstrip, Hoggs Lane, Lakes Entrance* Unpublished report to Whelans Earthmoving by Terra Culture Pty Ltd.

Rhodes, D. & A. Kaplan 1998. *An Archaeological Survey of North Arm Bridge, Lakes Entrance and Bruthen-Nowa Nowa Road, Gippsland*. Unpublished report to VicRoads by duCros and Associates.

Richardson, N. 1992. Conjoin sets and stratigraphic integrity in a sandstone shelter: Kennif Cave (Queensland, Australia). *Antiquity* 66: 408-418.

Sargeant, I & J.Sargeant 2005. *Sustainable Soil Management: A reference manual to the major agricultural soils of the Bairnsdale and Dargo regions*. Report for East

Gippsland Landcare Network. Available at Victorian Resources Online  
[http://www.dpi.vic.gov.au/dpi/vro/egregn.nsf/pages/eg\\_soil\\_dargo](http://www.dpi.vic.gov.au/dpi/vro/egregn.nsf/pages/eg_soil_dargo)

Schaetzl, R., S. Burns, T. Small and D. Johnson 1990. Tree uprooting: review of types and patterns of soil disturbance. *Physical Geography* 11(3): 277-291.

Schell, P. 2000. *Red Bluff Cultural Heritage Study*. Unpublished report to Parks Victoria by Andrew Long & Associates.

Smyth, R. B. 1878. *The Aborigines of Victoria and other Parts of Australia and Tasmania, Volume One*. Government Printer, Melbourne.

Staley, D. 2006. Shadow of doubt or doubtful shadows: small-scale low-density lithic scatters and agrifacts. *North American Archaeologist* 27(2): 175-199.

Approved Development Plan  
Planning and Environment Act 1987  
East Gippsland Planning Scheme

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(54 Thorpes Lane, Lakes Entrance)

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Stockton, E.D. 1973. Shaw's Creek Shelter: human displacement of artefacts and its significance. *Mankind* 9(2): 112-117.

Sullivan, A.P. 1992. Investigating the archaeological consequences of short-duration occupations. *American Antiquity* 57(1): 99-115.

Sullivan, A.P. 1995. Artifact scatters and subsistence organization. *Journal of Field Archaeology* 22(1): 49-64.

Sullivan, H. 1981. *An Archaeological Survey of the Mornington Peninsula*. Victoria Archaeological Survey Occasional Reports 6.

Thompson, K. 1985. *A History of the Aboriginal People of East Gippsland*. Unpublished report prepared for the Land Conservation Council, Victoria.

Tindale, N 1974. *Aboriginal tribes of Australia: their terrain, environmental controls, distribution, limites and proper names*. Australian National University Press, Canberra.

Vanderwal, R. (ed) 1999. *John Bulmer's recollections of Victorian Aboriginal life, 1855-1908, compiled by Alastair Campbell*. Museum Victoria, Melbourne.

Wandsnider, P. 1996. Describing and comparing archaeological spatial structures. *Journal of Archaeological Method and Theory* 3(4): 319-384.

Wesson, S. 2000. *An Historical Atlas of the Aborigines of Eastern Victoria and Far South-Eastern New South Wales*. Monash publications in geography and environmental science 53, Monash University, Melbourne.

West, A. 1969. Axe-grinding rocks near Munro, Central Gippsland, Victoria. *Victorian Naturalist* 86: 152-159.

Wheeler, P.J & J. A. Peterson 2005. Volumetric Change in a Flood-tide Delta: Application of the Cut and Fill Process Flow Diagram for Decision Support in Port Management at Lakes Entrance, Victoria, Australia. *Proceedings of ES02005 Spatial Intelligence, Innovation and Praxis: The National Biennial Conference of the Spatial Sciences Institute, September 2005*. Spatial Sciences Institute, Melbourne.

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Planning and Environment Act 1987  
Proceedings of ES02005 Spatial  
Intelligence, Innovation and Praxis: The National  
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Williamson, C & N. Dudley 2007. *Archaeological Heritage Impact Assessment for the Sand Redistribution Works, Lakes Entrance, East Gippsland* Volume 1:

*Kate Kelso*



*Aboriginal Heritage Values*. Unpublished report to Gippsland Ports by Perspectives Heritage Solutions.

Wobst, H. 1983. We can't see the forest for the trees: sampling and shapes in archaeological distributions, in J. Moore and A. Keene (eds) *Archaeological Hammers and Theories*. Academic Press, pp 37-85.

Wood, W. R. and D.L. Johnson 1978. A survey of disturbance processes in archaeological site formation. *Advances in Archaeological Method and Theory* 1: 315-381.

Zola, N. and B. Gott 1992. *Koorie plants Koorie people : traditional Aboriginal food, fibre and healing plants of Victoria*. Koorie Heritage Trust, Melbourne.

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## APPENDIX 1 - NOTICE OF INTENT

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Director, East Gippsland Shire

Date: ....3 January 2018...

## Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the *Aboriginal Heritage Act 2006*

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the *Aboriginal Heritage Act 2006* (the "Act").

### SECTION 1 – Sponsor Information

**Name of Sponsor:** John Woodman  
**Business Name:** Watsons Pty Ltd  
**Postal Address:** PO BOX 171, Mornington, VIC, 3931  
**Tel No:** (03) 5975 4644  
**Fax No:** (03) 5975 3916  
**Mob:** 0418 586 783  
**Email Address:** jcw@watsons.net.au

### SECTION 2 – Description of proposed activity and location

- Clearly identify the project name (if applicable),
- Clearly identify the proposed activity and its extent in respect to the area for which the plan is to be prepared (attach a copy of a title search and indicate street address where applicable),
- Attach a map (to scale, with a north arrow and indicating the municipal district - if any) that clearly identifies the area and boundaries in respect of which the cultural heritage management plan is to be prepared.

**Project Name:** Ocean View Lakes, Stirling Drive Lakes Entrance CHMP

**Property Description:**

1. Lot A PS517816, Stirling Drive, Lakes Entrance  
East Gippsland Shire
2. Lot 2 PS505056, Colquhoun Road, Lakes Entrance  
East Gippsland Shire

**Proposed Activity:** Proposed subdivision incorporating roads, service infrastructure and landscaping and the residential development of the land including the development of a Retirement Village. The land is zoned Residential 1 and Part Rural Zone 3. A planning permit is required for the proposed development and use.

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**Extent of the proposed activity:**

The proposed activities identified on the current concept plan (outlined red) and included in appendix A shows the extent of the CHMP study. The total site area of lot A is 33.38 ha however only part of Lot 2 will be developed for the purpose of creating a road. The exact location of the road alignment may alter.

Signed:

*John Woodman*

Director, East Gippsland Shire

Date: ....3 January 2018...

**SECTION 3 – Expected start and finish date for the cultural heritage management plan**

**Start Date:** 18 / 01 /2008

**Finish Date:** 18 / 05 /2008

**SECTION 4 – Contact details for land owner/manager (where different to sponsor).**

**Name:** Wendy Thies  
**Company:** Watsons Pty Ltd  
**Address:** The Melburnian, Suite 2 Ground Floor  
250 St Kilda Road, Southbank, Vic, 3006

**Tel No:** 9697 8000  
**Fax No:** 9697 8099  
**Email:** wjt@watsons.net.au

**SECTION 5 – List the relevant registered Aboriginal parties (If any)**

*This section should only be completed where there is a registered Aboriginal party in relation to the Plan*

There were no Registered Aboriginal Parties for this plan at the time of lodgment.

**SECTION 6 – Signature of Sponsor**

I certify that to the best of my knowledge and belief that the information supplied is correct and complete.

Signed:

Date:

15 / 1 / 2008

[Sponsor]

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Signed:

Kate Nelson

Director, East Gippsland Shire

Date: ....3 January 2018...

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**SECTION 7 – Checklist**



Ensure appropriate attachment/s are completed and attached to this notification (see section 2 of this form).

Please ensure this notice and all attached items are sent to the:

Deputy Director

Aboriginal Affairs Victoria

Department for Victorian Communities

GPO Box 2392

MELBOURNE VIC 3001

**Notes:**

- Ensure that any relevant registered Aboriginal party/s are also notified. A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.
- In addition to notifying the Deputy Director and any relevant registered Aboriginal party/s, a sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates.

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Appendix A: Plan of the CHMP study area (outlined red), showing the extent of the proposed development activities (the 'activity area')

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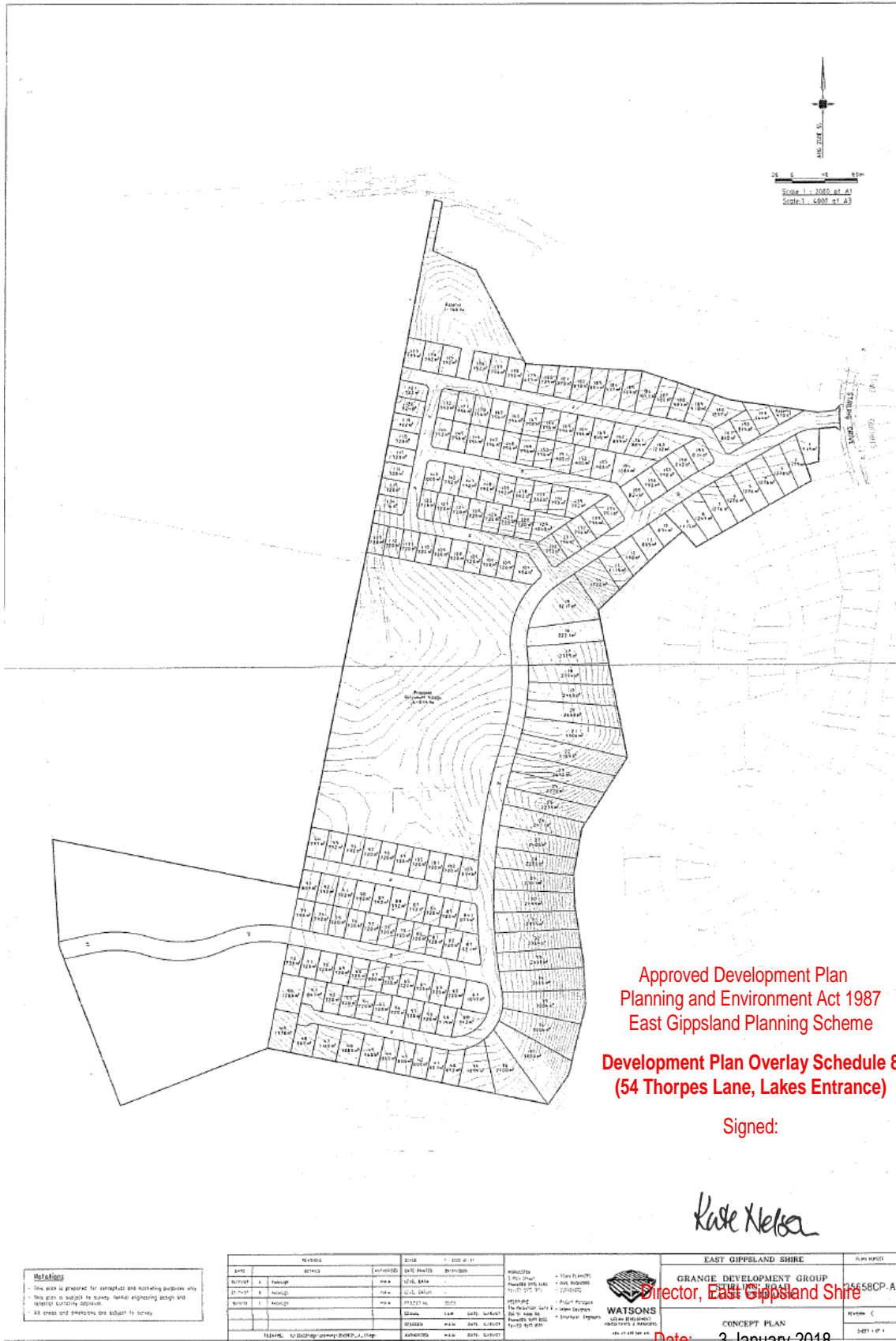
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Signed:

*Kate Nelson*

**Notations:**  
 - This plan is prepared for conceptual and marketing purposes only.  
 - This plan is subject to survey, traffic engineering design and relevant planning approvals.  
 - All areas and dimensions are subject to survey.

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 GRANGE DEVELOPMENT GROUP  
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## APPENDIX 2 - GLOSSARY OF TECHNICAL TERMS

Aeolian	Wind generated geological processes. In an archaeological context it usually refers to wind blown deposits and sands.
Backed Artefact / Backing	A retouched tool (maybe a complete, distal, medial or proximal flake) that displays evidence of backing along one lateral margin. This backing may be initiated from the ventral surfaces or alternately may be an example of bidirectional backing initiated from both surfaces (Holdaway and Stern 2004:259). There are four main types of commonly recognised backed artefacts, which include 'Bondi Points; geometric microliths (or 'Backed Blades'), Juan Knives and Eloueras'.
Bipolar	A method of removing flakes from a core, by striking a core against an anvil (Holdaway and Stern 2004:11). This is often evidenced by crushing at the platform and/or at the termination of the flake; Bipolar flaking is also evidenced as crushing at the base (end opposite the platform) of a core.
Blade	A flake that is twice as long as its width.
Bulbar	Refers to a bulb of percussion produced during a conchoidal fracture
Chert	'a dense, extremely hard, microcrystalline or cryptocrystalline, siliceous sedimentary rock, consisting mainly of interlocking quartz crystals, sub-microscopic and sometimes containing opal (amorphous silica). It is typically white, black or grey, and has an even to flat fracture. Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or a siliceous replacement of pre-existing rocks' (Lapidus 1990:21)

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Conchoidal	Where a force strikes the surface of a core forming a circular or 'ring' crack that bends back towards the surface of the core, forming a partial bulb of percussion. The fracture frequently moves towards the exterior surface of the core, detaching a flake (Holdaway and Stern 2004:34).
Core	Andrefsky (1998:80-81) states a core can be understood as 'an objective piece that has had flakes removed from its surface'; Holdaway and Stern (2004:37; 5-8) provide further clarification 'artefacts that retain the negative flake scars of previous flake removals'.
Cortex	The outer layer of patination of rock is known as cortex. It is found on weathered stone (Holdaway & Stern 2004: 26-27). Cortex types (mostly rough, water worn or pebble) can indicate the source that stone material was obtained from.
Debitage	Small spalls and flakes produced during percussion, bipolar and pressure flaking.
Fine Grained Basalt	Basalt is a volcanic rock. See Volcanic below.
Flake	Depending on the completeness of the flake, a flake may have a number of common characteristics which may include: a platform, bulb of percussion, errillure (or bulbar) scar, point of force impact (PFI or umbo), dorsal ridge and ventral surface, fissures (or indentations), ripple marks (which radiate away from the point of force impact/umbo) and a termination. Not all of these features are typically found on every flake, however they are attributes likely to be present from conchoidal fracture.
Negative Flake Scar	The negative indentation or scar left behind on a flake, core or tool when a flake is removed. The presence and abundance of negative flake scars can reveal information about the process of flaking. For example negative flake scars on a) cores can provide information on how intensely the core has been used, b) on the dorsal surface of a flake can indicate how intensely

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	<p>the core was flaked before this flakes was removed and/or that the core platform was cleaned off to start flaking again (platform rejuvenation), c) along the edge of a flake can indicate retouch/backing (Holdaway and Stern 2004:184).</p>
Point	<p>A term applied to certain formal types such as Bondi Points.</p>
Platform	<p>A striking platform or a platform is the surface from which a flake is struck from a Core (Holdaway and Stern 2004:5); flakes retain part of the platform on their proximal end.</p>
Quartz	<p>'crystalline silica, SiO<sub>2</sub>. It crystallizes in the trigonal system, commonly forming hexagonal prisms. For cryptocrystalline varieties of silica see Chalcedony. Colourless and transparent quartz, is found in good crystals, is known as rock crystal. Varieties that are colours due to the presence of impurities may be used as gemstones, amethyst, purple to blue-violet, rose quartz, pink; citrine, orange- brown; smoky quartz, pale yellow to deep brown' (Lapidus 1990:429).</p>
Quartzite	<p>'a metamorphic rock consisting primarily of quartz grains, formed by the recrystallization of sandstone by thermal or regional metamorphism; a metaquartzite and a sandstone composed of quartz grains cemented by silica; an orthoquartzite' (Lapidus 1990:430).</p>
Retouch	<p>Modification of a flake or core prior to use. Retouch is the 'removal of a series of small, contiguous flakes' from the edges of the artefact (Holdaway and Stern 2004:33). There are several different types of retouch which are identified as backing; stepped; scalar; invasive; notched and serrated retouch.</p>
Reduction	<p>By definition stone material is made smaller when it is struck to produce stone flakes and tools. This process is known as stone reduction.</p>

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*'Modern stone artefact analyses use the reductive nature of stone artefact manufacture as the basis for reconstructing the processes by which artefacts were made. By analysing the size and form of artefacts, archaeologists can obtain information about how stone was acquired from its source, the form in which the stone was transported to campsites, how it was worked, and the way stone artefacts were use until discarded'* (Holdaway and Stern 2004:3).

**Scarred Tree** A tree that has been marked as a result of bark being removed by Aboriginal people for cultural reasons or for use in making shields, containers, canoes etc. Some trees may also have marks caused by making toe holds for climbing up trees.

**Scraper** 'A minimal definition of a scraper is that it is a flake with one or more margins of continuous retouch'. It also indicates the stage of reduction the flake has reached (see Holdaway and Stern 2004:227).

**Silcrete** 'a hard surface deposit composed of sand and gravel cemented by opal, chert and quartz, formed by chemical weathering and water evaporation in semi-arid climate. Extensive deposits of silcrete are found in S. Africa and Australia. Silcrete is a siliceous duricrust' (Lapidus 1990:472).

**Termination** There are a number of different flake terminations (or ends of a flake) which are possible through flaking stone material. The main types of flake terminations include step, hinge, feather and plunging. Flake terminations can provide information about how the flake was removed.

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**Tool** A tool is an artefact which shows evidence of modification (by retouch) or without modification (i.e. show signs of usewear) (Holdaway and Stern 2004:33; 39).

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**Tuff** 'pyroclastic rock composed mainly of volcanic ash (fragments



<2mm in diameter). Tuffs may be classified as crystal tuff if they contain a large proportion of crystal fragments, vitric tuff composed mainly of glass and pumice fragments and lithic tuff, containing mainly rock fragments. A consolidated mixture of lapilli and ash is a lapilli tuff' (Lapidus 1990:519-520).

Usewear

'Evidence of distinctive patterns of wear [which is] sometimes found on the edges of artefacts that were believed to have been used for specific purposes' (Holdaway and Stern 2004:41). Several types of usewear can be observed. Holdaway and Stern (2004:41; 167) identify 'chattering' and 'edge damage' as one form of usewear.

Volcanic

'All extrusive rocks and associated high-level intrusive ones. The group is entirely magmatic and dominantly basic. Igneous lithic material generally dark in colour and may be glassy (like obsidian) or very fine-grained or glassy igneous rock produced by volcanic action at or near the Earth's surface, either extruded as lava (e.g. basalt) or expelled explosively' (Lapidus 1990:535).

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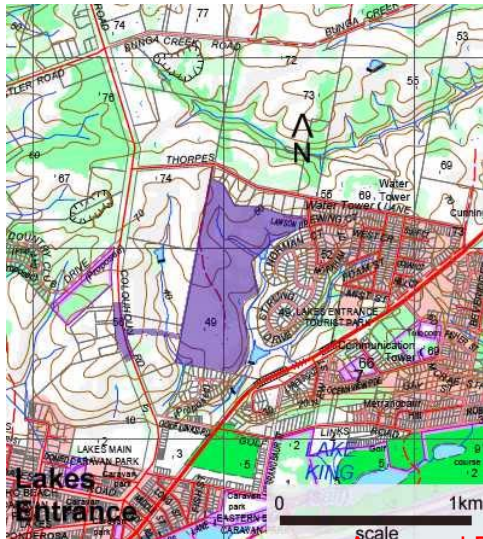


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## APPENDIX 3 - GAZETTEER

<p><b>Site Name and VAHR number:</b></p> <p>Colquhoun-Thorpes artefact scatter</p> <p>Registered as VAHR site #8522-0238</p>	<p><b>Description:</b></p> <p>Artefact scatter VAHR# 8522-0238 consists of a generally low density scatter (mean density 1.7 artefacts per m<sup>2</sup> with artefact densities ranging between &lt;1 per m<sup>2</sup> and 19 per m<sup>2</sup>).</p> <p>Artefact raw materials include silcrete, quartz, quartzite and possibly rhyolite. The majority of recorded artefacts consist of flakes and broken flakes. A thumbnail scraper formed the only formal tool in the assemblage (see Table 7.1, or Appendix 4 for a more complete description).</p> <p>The defined extent of the site consists of all of Lot A on Plan of Subdivision 517816T, part of Lot 2 on Plan of Subdivision 505056H, and part of the Colquhoun Road reserve, as shown (shaded purple) on the plan below.</p>
<p><b>Grid Reference Location:</b></p> <p>E: 588915 N: 5808590</p> <p>The above coordinate is for test excavation trench E1, located near the centre of the site (see Figure # of main report). A shape file GDA94 has been provided to AAV that maps the extent of the site.</p>	<p><b>Plan of site extent:</b></p> 
<p><b>Significance assessment:</b></p> <p>Site has been assessed as being of low scientific significance (see section 8 of the Cultural Heritage Management Plan)</p> <p>Information about the cultural significance of the site was requested from the Gunaikurnai Land and Waters Corporation, although no specific information has been provided to date.</p>	<p style="text-align: center;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme</p> <p style="text-align: center;"><b>Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</b></p> <p style="text-align: right;">Signed:</p> <p style="text-align: right;"><i>Kate Nelson</i></p>

## APPENDIX 4 - TRENCH RECORDS

<b>Trench name</b>	<b>A1</b>
Location:	589300 5809170
AHD level	51m
Slope category	2
Depth of excavation	99cm - 103cm
Description and evidence of disturbance	<p>Sandy soils - dark grey and loamy in upper spits becoming a lighter grey silty sand below. Little stone above 80cm below current ground surface, at which level small, mainly quartz, pebble was encountered. Hard sandy nodules also present here. Trench was excavated to a base of orange/brown sandy clay.</p> <p>Frequent plant roots (primarily bracken fern) as deep as 60cm below the current ground surface. Profile shows small roots, or traces of them, to the depth of the base of the excavation.</p>
Section drawing:	
Photo:	

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Categories of slope are as defined in Table 7 of the main report.

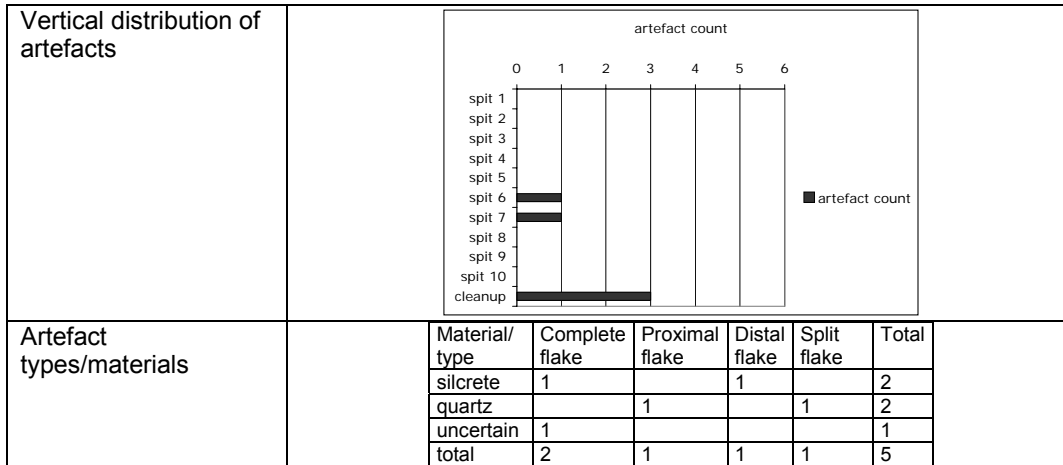
**AHMS**

ARCHAEOLOGICAL & HERITAGE  
 MANAGEMENT SOLUTIONS PTY LTD

*Kate Nelson*  
 150

Director, East Gippsland Shire

3<sup>rd</sup> October 2008  
 Date: ....3 January 2018...



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 (54 Thorpes Lane, Lakes Entrance)**

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Director, East Gippsland Shire <sup>151</sup>



<b>Trench name</b>	<b>A2</b>										
Location:	589230 5809060										
AHD level	41m										
Slope category	3										
Depth of excavation	18cm - 30cm										
Description and evidence of disturbance	<p>Relatively shallow trench. Sandy soils grading from a thin layer of dark loamy sand to lighter grey silty sand which overlies an orange/brown columnar or cracking clay base. Occasional large pebbles and pieces of stone near the base of the trench, including one large quartzite part pebble broken during excavation.</p> <p>Small plant roots throughout profile.</p>										
Section drawing:											
Photo:											
Vertical distribution of artefacts	<table border="1"> <caption>Artefact Count by Spit</caption> <thead> <tr> <th>Spit</th> <th>Artefact Count</th> </tr> </thead> <tbody> <tr> <td>spit 1</td> <td>0</td> </tr> <tr> <td>spit 2</td> <td>0</td> </tr> <tr> <td>spit 3</td> <td>2</td> </tr> </tbody> </table>			Spit	Artefact Count	spit 1	0	spit 2	0	spit 3	2
Spit	Artefact Count										
spit 1	0										
spit 2	0										
spit 3	2										
Artefact types/materials	Material/ type	Proximal flake	Total								
	silcrete	2	2								
	total	2	2								

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<b>Trench name</b>	<b>B1</b>
Location:	589080 5809210
AHD level	59m
Slope category	2
Depth of excavation	16cm - 23cm
Description and evidence of disturbance	<p>Mechanically excavated trench.</p> <p>This trench was shallow, with a relatively thin layer of sand (grey to lighter grey overlying a more compact and pebble-rich layer of near-white sand) overlying compact sandy clay.</p> <p>Plant roots, or traces of them, visible throughout the excavated trench.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were found in this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>B2</b>
Location:	589111 5809086
AHD level	47m
Slope category	3
Depth of excavation	74cm - 78cm
Description and evidence of disturbance	The first 1m <sup>2</sup> of this trench was manually excavated to a depth of 40cm (4 spits). The remainder was mechanically excavated.  Soft sandy soil becoming more compact and stony at about 60cm below the current ground surface. Frequent plant roots throughout most of the excavated trench, particularly bracken fern roots in the upper 50cm.
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were recovered from this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>B3</b>
Location:	589140 5808970 (23m north of original point which was considered to be too steep for safety)
AHD level	41m
Slope category	4
Depth of excavation	40cm - 52cm
Description and evidence of disturbance	<p>This trench was machine excavated only.</p> <p>Sandy soil - upper dark grey loamy sand topsoil over a lighter grey/brown sand which grades to a darker grey with increasing quartz pebble content. The lowest unit is more compact and stony.</p> <p>Plant roots/decomposed roots visible throughout the trench, but particularly common in the upper 40cm.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts, and type	A single possible artefact (one quartz fragment) was found in spit 5 of this trench. See discussion in main text.

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<b>Trench name</b>	<b>C1</b>									
Location:	588990 5808970									
AHD level	45m									
Slope category	3									
Depth of excavation	100cm - 118cm									
Description and evidence of disturbance	<p>The first 1m x 1m of this trench was manually excavated to a depth of 40cm. The remainder was machine excavated.</p> <p>Grey to light yellow/brown sandy soils with increasing quartz pebble from roughly 50cm below the current ground surface. Excavation was halted in a soil unit comprised of more compact brown sand containing hard nodules and frequent quartz pebble.</p> <p>Roots/decomposed roots were common throughout the excavated trench.</p>									
Section drawing:										
Photo:										
Vertical distribution of artefacts										
Artefact types/materials	<table border="1"> <thead> <tr> <th>Material/ type</th> <th>Fragment</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>silcrete</td> <td>3</td> <td>3</td> </tr> <tr> <td>total</td> <td>3</td> <td>3</td> </tr> </tbody> </table> <p>Some of the artefacts in this trench are considered to be possible artefacts only (see artefact discussion in main report).</p>	Material/ type	Fragment	Total	silcrete	3	3	total	3	3
Material/ type	Fragment	Total								
silcrete	3	3								
total	3	3								

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<b>Trench name</b>	<b>C2</b>																																																																														
Location:	588892 5808930																																																																														
AHD level	54m																																																																														
Slope category	2																																																																														
Depth of excavation	67cm - 79cm																																																																														
Description and evidence of disturbance	<p>This trench was excavated by machine only.</p> <p>Sandy soils with increasing amount of quartz pebble with depth from roughly 50cm below current ground surface. Quartz pebble concentration encountered at about 50cm below current ground surface.</p> <p>Charcoal flecks/pieces and decomposed/decomposing tree roots noted throughout the trench and visible in the trench base.</p>																																																																														
Section drawing:																																																																															
Photo:																																																																															
Vertical distribution of artefacts	<table border="1"> <caption>artefact count</caption> <thead> <tr> <th>Spit</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>spit 1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 2</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 3</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>5</td> <td>0</td> </tr> <tr> <td>spit 4</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>2</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 5</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 6</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 7</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>spit 8</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table>							Spit	0	1	2	3	4	5	6	spit 1	0	0	0	0	0	0	0	spit 2	0	0	0	0	0	0	0	spit 3	0	0	0	0	0	5	0	spit 4	0	0	0	0	2	0	0	spit 5	0	0	0	0	0	0	0	spit 6	0	0	0	0	0	0	0	spit 7	0	0	0	0	0	0	0	spit 8	0	0	0	0	0	0	0
Spit	0	1	2	3	4	5	6																																																																								
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Artefact types/materials	Material/type	Complete flake	Proximal flake	Distal flake	Fragment	Total																																																																									
	silcrete	2	2	1	2	7																																																																									
	total	2	2	1	2	7																																																																									

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<b>Trench name</b>	<b>D1</b>
Location:	588940 5808885
AHD level	52m
Slope category	3
Depth of excavation	72cm - 78cm
Description and evidence of disturbance	<p>A 1m x 1m portion of this trench was initially manually excavated to a depth of 40cm (4 spits) below ground surface. The remainder of the trench was excavated by machine.</p> <p>Soils were generally sandy grading from grey loamy sand to lighter grey sand and then to a light brown/yellow, then orange, sand in which quartz pebble (1cm to 3cm maximum dimension) became increasingly abundant with depth.</p> <p>Traces of burnt and decomposed roots were visible throughout most of the excavated trench. An ant's nest was encountered near the base of spit 2 (20cm below current ground surface) during the manual excavation. Fragments of brown bottle glass were found in spit 2.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were found in this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>D2</b>
Location:	589050 5808860
AHD level	47m
Slope category	2
Depth of excavation	48cm - 65cm
Description and evidence of disturbance	<p>This trench was excavated entirely by machine.</p> <p>Soils were sandy and consisted of an upper topsoil unit of loamy grey sand overlying a lighter grey sand which grades into a light brown/yellow sand containing occasional harder sandy nodules. Orange/brown clay sits under this.</p> <p>Again roots and decomposed roots were common in the trench, particularly in the upper 40cm of sediment, although the remains of a larger root was visible on the base of the trench (see photo).</p>
Section drawing:	
Photo: A portion of the trench D2 section. Note decomposing root near base of range pole.	
Vertical distribution of artefacts	No artefacts were recovered from this trench.
Artefact types/materials	N/A

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**AHMS**

<b>Trench name</b>	<b>D3</b>
Location:	589125 5808755
AHD level	39m
Slope category	4
Depth of excavation	30cm - 47cm
Description and evidence of disturbance	<p>This trench was machine excavated.</p> <p>Sandy soil as elsewhere, but in this trench pebble was present from the first spit onwards and the quantity of pebble/stone increased at about 30cm below current ground surface. A relatively solid clay layer was encountered at about 40cm.</p> <p>Roots/decomposed roots and possible animal burrows were visible throughout the excavated sediment. A probable posthole was cut by the trench excavation and is clearly visible in the northern section of the trench (see photo). As the 'top' of this hole appeared 20cm under the current ground surface, it would appear likely that the upper 20cm of sediment has been mixed or reworked in relatively recent times.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were found in this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>E1</b>		
Location:	588915 5808590		
AHD level	51m		
Slope category	1		
Depth of excavation	115cm - 133cm		
Description and evidence of disturbance	<p>Machine excavated trench.</p> <p>Deep sandy deposit. Pebble, mainly quartz, was first noted at about 50cm below the current ground surface and was found to be commonly present in the more coarse light brown sand that made up the lower half of the excavated sediment. While this more coarse sand also contained occasional harder nodules of sandy clay neither a solid clay base nor a more concentrated pebbly layer (at which excavation had been halted in other trenches) was encountered in this trench.</p> <p>As with other trenches traces of decomposed plant roots were relatively common here.</p>		
Section drawing:			
Photo:			
Vertical distribution of artefacts			
Artefact types/materials	Material/ type	Complete flake	Total
	silcrete	1	1
	total	1	1

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<b>Trench name</b>	<b>E2</b>
Location:	588885 5808706
AHD level	47m
Slope category	1
Depth of excavation	87cm - 91cm
Description and evidence of disturbance	<p>This trench was mechanically excavated.</p> <p>Sandy soils grading from dark to light grey, becoming light brown at 40 to 50cm below current ground surface. At 85cm more compact sand containing hard sandy nodules and stone was encountered - excavation ceased within this layer.</p> <p>Small roots were visible throughout the excavated trench, and one large (up to 10cm across) burrow was noted.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were found in this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>E3</b>
Location:	588856 5808822
AHD level	53m
Slope category	3
Depth of excavation	63cm - 70cm
Description and evidence of disturbance	<p>The first 1mx1m of this trench was manually excavated to a depth of 30cm (3 spits) the remainder was excavated by machine. Soils in this location were found to be generally sandy and ranged from an upper unit of relatively dark grey loamy sand followed by lighter grey/brown sand which became increasingly stony (small quartz pebble) and contained increased quantities of hard sandy clay nodules with depth. A fairly consistent orange/brown clay base was reached at about 65cm below the current ground surface.</p> <p>There is evidence of disturbance to the natural stratigraphy in part of the trench where a concentration of charcoal pieces and flecks, oxidised soil, patches of clayey sand and some decomposed wood suggests that a trees stump or roots may have been burnt and uprooted, or some similar event has occurred.</p>
Section drawing: Disturbed portion of trench (west section)	
<p>Photo: Section of disturbed portion of trench (west side).</p> <p>Section of less disturbed portion of trench (east side) although charcoal staining is still evident.</p>	<p style="text-align: right;">                 Approved Development Plan                  Planning and Environment Act 1987                  East Gippsland Planning Scheme  <b>Development Plan Overlay Schedule 8                  (54 Thorpes Lane, Lakes Entrance)</b>                  Signed: <i>Kate Nelson</i> </p>
Vertical distribution of artefacts	No artefacts were recovered from this trench.

Artefact types/materials	N/A
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<b>Trench name</b>	<b>E4</b>						
Location:	589020 5808648						
AHD level	42m						
Slope category	4						
Depth of excavation	47cm - 67cm						
Description and evidence of disturbance	<p>This trench was mechanically excavated.</p> <p>Sandy sediment changing from dark grey to a light yellow/brown sand. Some quartz pebble noted in sand at a depth of 45cm below current ground surface - this increases in quantity with depth. Excavation was halted when a more compact clayey sand was reached.</p> <p>Possible burrow or roots (dark stained sand) noted throughout the trench as was a near-vertical patch of charcoal stained soil which was interpreted as the probable remains of a burnt root or stump. One large decomposing root was noted near the base of the trench (see photo).</p>						
Section drawing:							
Photo: Note decomposing root in the bottom left of the photo.							
Vertical distribution of artefacts							
Artefact types/materials	Material/ type	Complete flake	Proximal flake	Medial flake	Core	Total	Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)
	silcrete	2				2	
	quartz			1	1	2	
	chert		1			1	
	total	2	1	1	1	5	

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<b>Trench name</b>	<b>E5</b>																											
Location:	589016 5808571 (Hand Held GPS)) Trench relocated as original was placed in the nearby house yard. New location in 26m from the cattleyard fence with a compass bearing of 349° back to the star picket at the trench E4 location.																											
AHD level	45m																											
Slope category	2																											
Depth of excavation	90cm - 110cm																											
Description and evidence of disturbance	This trench was mechanically excavated. Sandy sediment containing very little stone or pebble, grading from grey to light brown in colour. More compact orange clayey sand containing hard nodules encountered at about 100cm below ground surface. Roots/decomposed roots and/or animal burrows visible through the excavated sediment.																											
Section drawing:																												
Photo:																												
Vertical distribution of artefacts	<table border="1"> <caption>Artefact Count by Spit</caption> <thead> <tr> <th>Spit</th> <th>Artefact Count</th> </tr> </thead> <tbody> <tr><td>spit 1</td><td>0</td></tr> <tr><td>spit 2</td><td>0</td></tr> <tr><td>spit 3</td><td>0</td></tr> <tr><td>spit 4</td><td>0</td></tr> <tr><td>spit 5</td><td>0</td></tr> <tr><td>spit 6</td><td>0</td></tr> <tr><td>spit 7</td><td>0</td></tr> <tr><td>spit 8</td><td>2</td></tr> <tr><td>spit 9</td><td>0</td></tr> <tr><td>spit 10</td><td>0</td></tr> <tr><td>spit 11</td><td>0</td></tr> </tbody> </table>				Spit	Artefact Count	spit 1	0	spit 2	0	spit 3	0	spit 4	0	spit 5	0	spit 6	0	spit 7	0	spit 8	2	spit 9	0	spit 10	0	spit 11	0
Spit	Artefact Count																											
spit 1	0																											
spit 2	0																											
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spit 7	0																											
spit 8	2																											
spit 9	0																											
spit 10	0																											
spit 11	0																											
Artefact types/materials	Material/ type	Complete flake	Fragment	Total																								
	silcrete		1	1																								
	quartzite	1		1																								
	total	1	1	2																								

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<b>Trench name</b>	<b>E6</b>
Location:	588997 5808372 (Hand Held GPS) This trench was moved as the original location was deemed too steep to work safely. It is located 19.5m north of the southern fenceline and 10.8m west of the eastern fenceline.
AHD level	41m
Slope category	3
Depth of excavation	92cm - 119cm
Description and evidence of disturbance	<p>This trench was mechanically excavated.</p> <p>Deep trench with sandy soils. The dark grey loamy sand is here a much thicker horizon than elsewhere, continuing to a depth of over 50cm before grading into a light brown sand. Excavation was halted once we had excavated into a more compact brown/orange sand containing hard sandy nodules.</p> <p>As elsewhere, roots/decomposed roots and possible burrows were common through most of the trench.</p>
Section drawing:	
Photo:	
Vertical distribution of artefacts	No stone artefacts were found in this trench.
Artefact types/materials	N/A

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<b>Trench name</b>	<b>E7</b>		
Location:	588835 580501		
AHD level	45m		
Slope category	2		
Depth of excavation	57cm - 72cm		
Description and evidence of disturbance	<p>This trench was mechanically excavated.</p> <p>Sandy soil, as elsewhere, with harder sandy clay nodules appearing at about 50cm below the current ground surface and a more solid compact sediment encountered a short distance below.</p> <p>Frequent bracken fern roots, particularly in upper spits (up to 30cm below current ground surface).</p>		
Section drawing:			
Photo:			
Vertical distribution of artefacts			
Artefact types/materials	Material/ type	Distal flake	Total
	quartz	1	1
	total	1	1

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<b>Trench name</b>	<b>E8</b>											
Location:	588810 5808432 (Hand-held GPS) This trench was relocated upslope of the original location which was deemed to be too steep for safety. Original peg is 62m away (compass bearing 231°).											
AHD level	40m											
Slope category	4											
Depth of excavation	30cm - 34cm											
Description and evidence of disturbance	<p>This trench was mechanically excavated.</p> <p>Sandy soils - dark grey loamy sand topsoil over a lighter grey sand. This lower grey sand contains some quartz pebble which increases in quantity with depth. Orange sandy clay encountered at about 35cm below the current ground surface.</p> <p>Small plant roots throughout.</p>											
Section drawing:	<p>0 50cm cc</p> <ul style="list-style-type: none"> <li>grey sandy loam</li> <li>light grey sand with some quartz pebble (increasing with depth)</li> <li>orange clayey sand containing hard sandy nodules and quartz pebbles</li> <li>cc charcoal</li> </ul>											
Photo:												
Vertical distribution of artefacts	<p>artefact count</p> <table border="1"> <thead> <tr> <th>Spit</th> <th>Artefact count</th> </tr> </thead> <tbody> <tr> <td>spit 1</td> <td>0</td> </tr> <tr> <td>spit 2</td> <td>0</td> </tr> <tr> <td>spit 3</td> <td>1</td> </tr> </tbody> </table>			Spit	Artefact count	spit 1	0	spit 2	0	spit 3	1	
Spit	Artefact count											
spit 1	0											
spit 2	0											
spit 3	1											
Artefact types/materials	<table border="1"> <thead> <tr> <th>Material/type</th> <th>Fragment</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>silcrete</td> <td>1</td> <td>1</td> </tr> <tr> <td>total</td> <td>1</td> <td>1</td> </tr> </tbody> </table>			Material/type	Fragment	Total	silcrete	1	1	total	1	1
Material/type	Fragment	Total										
silcrete	1	1										
total	1	1										

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<b>Trench name</b>	<b>G1</b>										
Location:	588491 5808569 (hand held GPS)										
AHD level	55m										
Slope category	1										
Depth of excavation	30-34cm										
Description and evidence of disturbance	<p>Soils are sandy, consisting of grey loamy sand for the upper 10-20cm over a lighter coloured grey/brown sand containing some quartz pebble. This, in turn, overlies a compact orange/brown sandy clay.</p> <p>Located on relatively flat land on hilltop. Large number of tree stumps in the surrounding area suggests that this area has not been ploughed in the past. There was, however, evidence of disturbance by tree roots in the form of charcoal-stained sediment and 'root holes' consisting of loose sand charcoal and decomposed/decomposing wood.</p>										
Section drawing:											
Photo:											
Vertical distribution of artefacts	<p style="text-align: center;">artefact count</p> <p style="text-align: right;">Approved Development Plan Planning and Environment Act 1987 East Gippsland Planning Scheme  Development Plan Overlay Schedule 8 (54 Thorpes Lane, Lakes Entrance)</p>										
Artefact types/materials	Material/ type	Complete flake	Proximal flake	Distal flake	Medial flake	Split flake	Core	Tool	Fragment	Total	
	silcrete	5	4	2	2	1	1	1	3	19	
	total	5	4	2	2	1	1	1	3	19	

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<b>Trench name</b>	<b>G2</b>																			
Location:	1m, 70° from G1																			
AHD level	55m																			
Slope category	1																			
Depth of excavation	27cm – 33cm																			
Description and evidence of disturbance	Sandy soils. Grey sandy loam containing little or no stone overlying lighter grey sand containing increasing amounts of quartz pebble with depth. An uneven surface of compact clayey sand formed the base of the trench.																			
Section drawing:																				
Photo:																				
Vertical distribution of artefacts	<p style="text-align: center;">artefact count</p> <p style="text-align: center;">0      2      4      6</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 15%;">spit 1</td> <td style="width: 15%; border: none;"> </td> <td style="width: 15%; border: none;"> </td> <td style="width: 15%; border: none;"> </td> <td style="width: 15%; border: none;"> </td> <td style="width: 15%; border: none;"> </td> <td style="width: 15%; border: none;"> </td> </tr> <tr> <td>spit 2</td> <td colspan="5" style="background-color: black; height: 15px;"></td> <td style="border: none;"> </td> </tr> </table> <p style="text-align: right;">■ artefact count</p>						spit 1							spit 2						
spit 1																				
spit 2																				
Artefact types/materials																				
	Material/ type	Complete flake	Proximal flake	Split flake	Fragment	Total														
	silcrete	2	1	1	1	5														
	total	2	1	1	1	5														

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<b>Trench name</b>	<b>G3</b>
Location:	588515 5808558 (29m, 70° from southern peg on fenceline)
AHD level	54m
Slope category	2
Depth of excavation	19cm-28cm
Description and evidence of disturbance	Sandy soils. Grey, stone-free sandy loam overlying lighter grey sand containing increasing amounts of quartz pebble with depth and becoming more compact. Very compact sand containing nodules of sandy clay at the base of the trench.
Section drawing:	<p> <span style="display: inline-block; width: 10px; height: 10px; background-color: #333; border: 1px solid black;"></span> grey loamy sand  <span style="display: inline-block; width: 10px; height: 10px; background-color: #666; border: 1px solid black;"></span> mottled grey/light grey sand  <span style="display: inline-block; width: 10px; height: 10px; background-color: #ccc; border: 1px solid black;"></span> light grey more compact sand with some quartz pebble  <span style="display: inline-block; width: 10px; height: 10px; border: 1px solid black; border-radius: 50%;"></span> pebble concentration         </p>
Photo:	
Vertical distribution of artefacts	No artefacts were found in the trench.
Artefact types/materials	

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<b>Trench name</b>	<b>G4</b>
Location:	50m and 240° to fence at same peg at G1, G2
AHD level	53.5m
Slope category	3
Depth of excavation	30cm-38cm
Description and evidence of disturbance	Grey loamy sand overlying lighter grey/brown sand containing frequent quartz pebble. This sand overlies a very compact pebbly sand.
Section drawing:	
Photo:	
Vertical distribution of artefacts	No artefacts were found in this trench.
Artefact types/materials	

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## APPENDIX 5 - STONE ARTEFACTS REPORT

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## Ocean View Lakes, Lakes Entrance CHMP Stone Artefacts Report

By Sharon Lane

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Artefact counts/densities	46
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## Introduction

This report forms a brief description of the artefacts recovered during the course of the subsurface testing program described in the main report. The aim of this report was, in the main to discuss the following:

- Quantity of stone, by counts and weight;
- Suspected origin of the stone (whether from quarries where the rock is in place, or dispersed along riverbeds);
- Identification of the artefacts;
- Interpretation of finished implements among the artefacts, including function of the implements and what they indicate about how the makers lived;
- Patterns in spatial and chronological distributions of the artefacts;
- Age of the artefacts; and
- Archaeological research potential and significance of the site.

## Summary description of assemblage

A total of fifty-two stone artefacts, weighing a total of 124.6g, were found during the test excavations. Table 1 provides a summary of artefact types and raw materials. It should be noted that 5 artefacts are considered to be of uncertain status: LE13 is a fragment of quartz pebble which may have been broken by chance; LE29, LE30 and LE31 are all of the same material, tentatively identified as silcrete, and all display unusual fracturing - the appearance on conchoidal fracture without any complete scars; LE10 is a 'silcrete' fragment with one steep edge showing some irregular flaking/damage which has occurred at differing times as some of these scars have smoothed edges while others, by contrast, appear relatively fresh (plate 1). There exists the possibility that this edge damage happened by chance and is not cultural.

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Plate 1.

Table 1 - Artefact types and raw materials

Material type	Chert	Quartz	Quartzite	Rhyolite?	Silcrete	Uncertain	Total	Number showing possible use/retouch
Complete flake			1	1	12	2	16(31%)	1 (6%)
Proximal flake	1	1			8		10(19%)	1 (10%)
Medial flake		1			2		3 (6%)	
Distal flake		1		1	3		5 (10%)	
Longitudinal split		1			2		3 (6%)	
Complete tool					1		1 (1%)	1 (100%)
Core		1			1		2 (4%)	
Fragment		1			11		12(23%)	
<b>Total</b>	1 (1%)	6 (12%)	1 (1%)	2 (4%)	40 (77%)	2 (4%)	52	4 (8%)

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As Table 1 shows, complete flakes were the most common artefact type recorded, making up 31% of the excavated assemblage, and silcrete<sup>117</sup>, at 77% of the total, was the most common raw material type. Artefacts described here as 'fragments'<sup>118</sup> made up the next most common category of artefact type (23%). Broken flakes and a single core were also present in the excavated trenches. Four artefacts were considered to exhibit definite or possible traces of retouch/use - this number includes a small silcrete thumbnail scraper, the only formal tool present in the assemblage (plate 2).

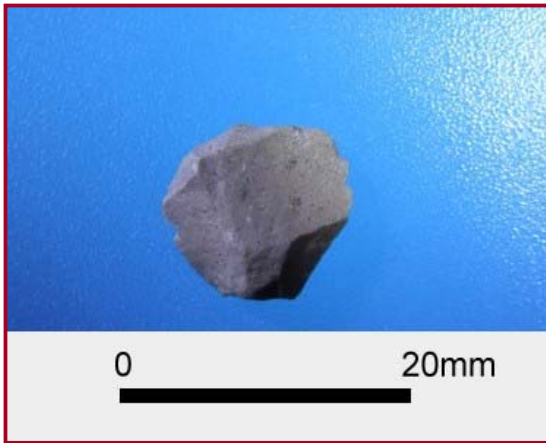


Plate 2.

Most recorded complete flakes were irregular in shape (38%, or n=6), although broad/expanding and intermediate flakes were also common (each made up 25%, or n=4, of the complete flake assemblage). Flakes classed as blades were the least common type, numbering only 2, or making up 12% of the complete flake assemblage, although a distal flake found in trench C2, and a proximal flake from trench A2 are also clearly blades.

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<sup>117</sup> Identified artefact raw material types should be considered here to be tentative in that they have not been confirmed by a geologist. As Bird and Frankel have noted, silcrete may be 'easily confused with other rock types' (2005: 16).

<sup>118</sup> Artefacts classed as fragments are those which show some signs of angular fracture but on which neither the hallmarks of a flake or core are present. They are in this instance considered to be possible artefacts, but there remains the possibility that they have been fractured by natural or agricultural processes.

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## Comparisons between trenches

### Artefact counts/densities

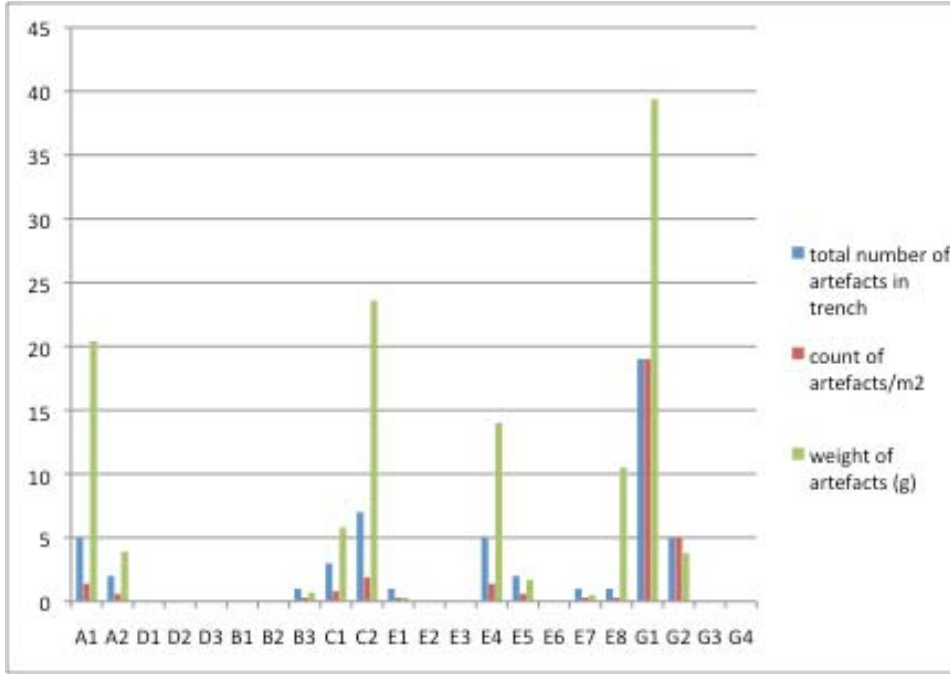


Figure 1 - Comparison of artefact counts and densities<sup>119</sup> of excavated trenches

Stone artefacts were found in 11 (or 50%) of the 22 test excavation trenches. The mean artefact density in excavated trenches was 1.7 recovered artefacts per excavated metre square. In those trenches containing artefacts, artefact densities ranged between <1 artefact per metre square (0.3m<sup>2</sup>) and 19 artefacts per metre square.

Trenches G1 and G2 contained the highest density of artefacts at 19 per m<sup>2</sup> and 5 per m<sup>2</sup> respectively. Considering the spatial proximity of these trenches (they were located only 1m apart) this relatively large difference is interesting, but whether it is a reflection of spatial variation in the use of the area by people or it is a result of the post-depositional movement of displacement of artefacts cannot be

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<sup>119</sup> Note that artefact total numbers and per m<sup>2</sup> densities for some trenches vary because trench sizes were greater than 1m<sup>2</sup> – see main report.

determined with the information currently available. Further open-area excavation work may be able to shed some light on this.

### Raw materials

Figure 2 provides an indication of the distribution of artefact raw materials over the site.

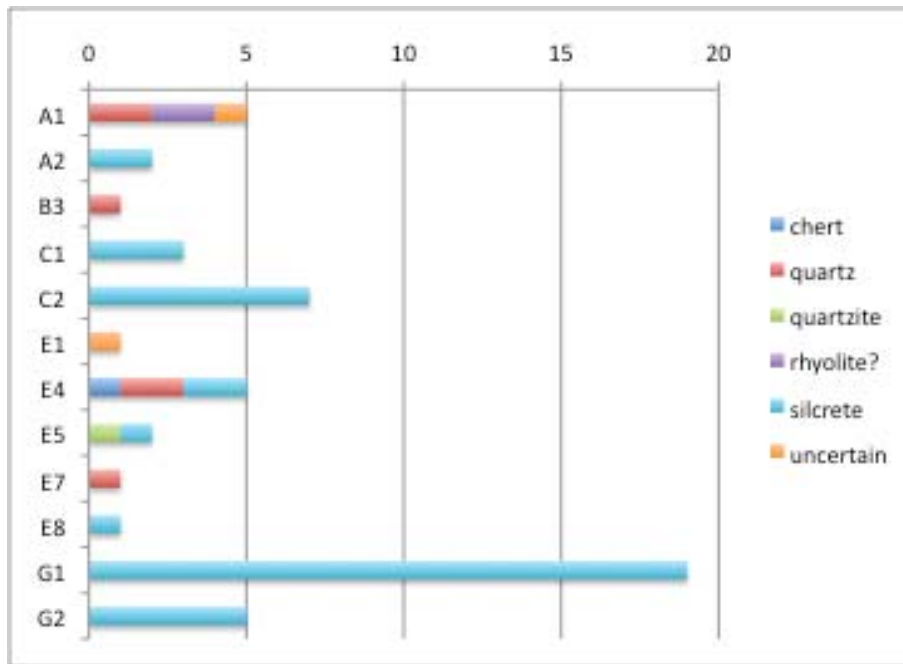


Figure 2 - Distribution of raw materials

Silcrete<sup>120</sup>, at 77% of the total, was the most common raw material type found.

Interestingly trenches associated with the highest artefact counts (trenches G1 and C2) contained only silcrete, as did G2, the second highest *density* trench.

At least 35% (n=18) of the recorded artefacts retain some cortex - in most instances 78% (or n=14) this was 'pebble' or water worn/rolled cortex, suggesting that the raw materials used for artefact manufacture were sourced from fluvial deposits - most likely local rivers and streams.

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<sup>120</sup> Identified artefact raw material types should be considered here to be tentative in that they have not been confirmed by a geologist. As Bird and Frankel have noted, silcrete may be 'easily confused with other rock types' (2005: 16).

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## Flakes and flake attributes

As mentioned above, the majority of the excavated complete flakes consist of flakes of irregular shape, although intermediate and expanding or broad flakes are also common. Only two complete blades were found - the lack of blades or long narrow flakes is reflected by a mean flake elongation (flake axial length divided by axial width) of 1.2.

Most of the excavated flakes are smaller than 2cm in length - mean axial length is 18.6mm (SD=7.6) while minimum length is 8.5 and maximum length is 33.9mm.

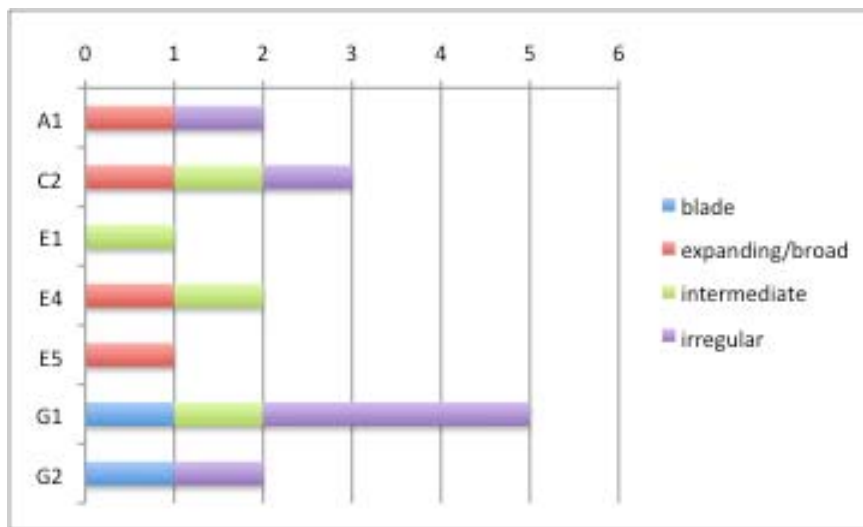


Figure 3 - Complete flake types by trench

The majority of recorded flake terminations (on complete and distal flakes) were feather or hinge terminations. The sole abrupt/axial termination was recorded on a silcrete flake located in trench C2.

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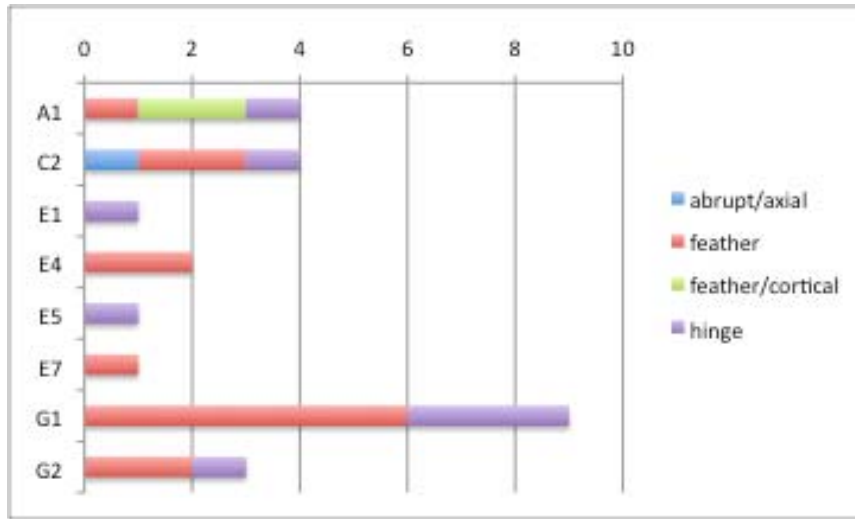


Figure 4 - Flake termination types by trench

The majority of flakes and proximal flakes have platforms recorded as flat (n=11 or 44%), but flaked (n=7 or 28%) and crushed/missing (n=5 or 20%) platforms are also common. A series of small flake scars are visible on the platform of the single formal tool found in the assemblage (the thumbnail scraper from trench G1) - it has been recorded as the sole faceted platform in the assemblage.

### Cores

Two cores were found during the excavations. One consists of a unidirectional silcrete blade core from trench G1. The second is a small quartz bipolar core from trench E2. Bipolar flaking is considered to have been employed generally in instances when raw material conservation is required, or when the core is too small to feasibly be flaked by freehand percussion<sup>121</sup>. It also appears to have been a commonly used method for knapping quartz in Aboriginal Australia<sup>122</sup>. Lomax noted that quartz artefacts in the Gippsland Lakes region were commonly knapped using the bipolar technique<sup>123</sup>.

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<sup>121</sup> See Hiscock 1996, also Bird and Frankel (2005: 25) found that bipolar knapping was the dominant core type found in excavations of material spanning 20,000 years of occupation of Gariwerd/the Grampians, and was used on both locally available and imported stone. The general reduction sequence identified at Gariwerd by Bird and Frankel (2005) has bipolar reduction as the final stage of the sequence (if it was used on smaller, already worked cores).

<sup>122</sup> Holdaway and Stern 2004: 116.

<sup>123</sup> Lomax n.d.: section 8.

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## Tools

As mentioned above, the only formal tool found in the assemblage is a silcrete thumbnail scraper found in trench G1. Although sometimes considered to be a “chronological marker for the appearance of the Australian small-tool tradition” in Victoria thumbnail scrapers have been recovered from Pleistocene deposits at Keilor<sup>124</sup>. The general dearth of formal tools, and therefore of possible chronological markers in the assemblage means that, in the absence of stratigraphy, it is virtually impossible to assign a probable date or time frame to the assemblage.

Three other artefacts in the assemblage show evidence of margin damage which *may* be an indication of their having been used as tools, or may the result of post-depositional damage. These artefacts are from trenches A2, E5 and G1. In each case the damage is restricted to a small area and is slightly irregular which may indicate post-depositional damage. Certainly studies of artefacts from cultivated fields have shown that plough-damage can result in a range of stone artefact edge-damage morphologies<sup>125</sup>. For this reason the identification of these artefacts as tools, and also of LE10 as an artefact (see above) is uncertain.

## Post-depositional movement and flake breakage

It was noted during the excavation that the majority of artefacts were found at the same depth or level as the appearance of quantity of small, generally quartz, but also other stone, pebbles. In general this was at the base of upper levels of stone-free sand or loamy sand. In some cases artefacts were found at considerable depth. This most likely indicates that there has been some downward movement of artefacts through the upper more loose and generally sandy sediment and that the current level (below ground surface) of the artefacts is a result of post-depositional displacement.

The effects of bioturbation, uprooting of trees<sup>126</sup> during clearing and the probable past ploughing of portions of the study area combine to limit the probability that

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<sup>124</sup> Holdaway and Stern 2004: 235.

<sup>125</sup> Mallouf 1982

<sup>126</sup> The amount of disturbance to soil and sediments caused by the natural process of tree uprooting varies according to both the tree and the soil/sediment types (Schaetzl et al 1990) but would have the obvious result of shifting the positions of artefacts.

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the artefacts recovered during the test trench excavations are *in situ*. It would seem probable that artefacts have been displaced from their original locations to some degree. The severity of this displacement is difficult to measure and may have varied across the study area. The presence of a conjoined pair of artefacts in trench A1 suggests that, in some places at least, displacement has not been severe although the recovery of these artefacts from trench 'clean-up' means that it was not possible to assess potential vertical displacement.

Past clearing and land-uses suggests that there has been disturbance of much, if not all of the ground surface in the study area since European settlement. The clearing of vegetation and subsequent ploughing for cultivation would have disturbed the upper 150-200mm of soil. It may be notable that the area surrounding trenches G1 and G2 has evidently not been completely cleared or ploughed as the ground surface here is dotted with the stumps of dead trees.

In addition to the effects of past and present land use, the potential effect of natural post-depositional processes, such as bioturbation must be considered. Studies have suggested that bioturbation and other post-depositional processes often result in artefact size-sorting, but the artefact size-classes influenced by these processes will vary according to the main agent of disturbance. The upward displacement of smaller objects and the downward displacement of larger ones appears to be the common result of disturbance caused by burrowing fauna, but the type of fauna, and most importantly the size of its burrows will decide the difference between 'smaller' and 'larger' artefacts.<sup>127</sup> Balek has summarised the findings of several studies:

*Through burrowing and mounding, artefacts can become displaced and sorted vertically by size thereby destroying stratigraphic integrity. Generally artifacts (stones) whose diameters are less than the diameter of the burrows of soil fauna may be translocated upward and deposited in mounds...Artifacts whose diameters are larger than the diameter of the burrows gradually become buried or gravitationally displaced downward to the lower depth of major biologic activity where they may become concentrated to form pseudo-artifact horizons<sup>28</sup>.*

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<sup>127</sup> e.g. Armour-Chou and Andrews 1994; Bocek 1986; Erlandson 1984

<sup>128</sup> Balek 2002: 46

Certainly there existed evidence of bioturbation in excavated trenches. In most instances this evidence took the form of trees roots (unsurprisingly considering that portions of the study area have only been recently cleared of tree cover), or decomposed tree root remains (Figure 12 to 15 of the main report). In some instances there was visible charring and charcoal around these roots/root remains - this and frequent patches and pieces of charcoal present in excavated soil profiles was interpreted as most likely being the result of stump-burning during land clearing.

Suspected signs of heat fracture<sup>129</sup> were noted on a few artefacts from trenches C2 and G1 but again whether this is related to the Aboriginal occupation of the site (ie from campfires or the deliberate heat-treatment of artefacts), or was caused by natural bushfires or post-contact land clearing (ie stump burning) is uncertain.

As noted above, the area surrounding G1 and G2 does not appear to have been completely cleared and ploughed, unlike much of the rest of the study area. Interestingly, however, the proportion of transversely broken flakes to complete flakes (1.5 snapped flake pieces to 1 complete flake) is higher in those trenches than for other, possibly ploughed parts of the study area (0.9 snapped flake pieces to 1 complete flake). Again, whether these flakes were snapped during and as a result of the Aboriginal occupation of the site (ie by trampling) or by post-depositional disturbance is unknown and in any case the small overall number of artefacts makes the reliability of any apparent pattern uncertain.

## Consideration of the archaeological research potential and significance of the site.

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Discussions regarding the archaeological significance of a site generally focus on the rarity or representativeness of the site, and the degree to which it can be considered to be intact.

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On the whole, the recorded artefacts appear to be similar in material and type to relatively recently recorded artefact scatters in the local area (eg the Hogs Lane and Ostler Road sites). The recorded assemblage would also seem to conform to

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<sup>129</sup> Exposure to intense heat or fire can cause crazing, cracking and pottlidding of fine-grained stone. Temperatures required to cause such damage vary between types of stone. Differing conditions, eg the rate of heating and cooling, will also have a bearing on the potential damage sustained from heating (eg see Luedtke 1992, Purdy 1975).

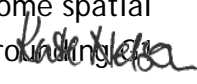
Lomax's prediction that smaller flake sites, quartz workshops and isolated artefacts composed of local gravels and quartz would be found on ridgelines, spurs and near waterways in the 'hills' landform unit surrounding the Gippsland Lakes<sup>130</sup>.

The artefacts in this site are not considered to be *in situ* - the noted tendency for artefacts to occur at similar levels to naturally-occurring stone suggests that the current depth of the artefacts is a reflection of post-depositional processes rather than of the chronological age of the artefacts. Given that much of the area of the site has been cleared and possibly ploughed in the past it is also likely that the horizontal<sup>131</sup> as well as the vertical integrity of the site has been harmed, although the presence of a conjoined pair of artefacts in trench A1 suggests that this disturbance may have not been severe. Also the location surrounding trenches G1 and G2 may not have been cleared and ploughed and may therefore have greater horizontal integrity (although natural processes such as the uprooting of trees may still have had an impact on this area).

The entire study area has been interpreted as a single site, primarily on the basis that any division of the area into discrete 'sites' would be arbitrary considering that given the apparent lack of stratigraphy there exists no basis by which to determine whether artefacts in apparent spatial association are also temporally associated.

The main report contains a discussion of artefact distribution over the landscape in relation to such factors as distance from water and landform type or slope. The analysis detailed in the report was not able to draw any clear conclusions regarding the influence of these factors on artefact distributions. The results of the subsurface testing do suggest that there exists variation in artefact densities across the area. To what degree this might be a result of variability in the use of space across this area (and an accurate reflection of artefact discard by people) or to what degree it may, instead, be the result of post-depositional movement is uncertain. Although it would seem unlikely that the artefacts within this site could be considered to be in a stratified context, here is the potential for some spatial integrity to remain, particularly in the apparently uncleared area surrounding G1 and G2.

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<sup>130</sup> See section 5 of the main report.

<sup>131</sup> See Odell and Cowan 1987.

## References

Armour-Chelu, M. and P. Andrews 1994 Some effects of bioturbation by earthworms (Oligochaeta) on archaeological sites *Journal of Archaeological Science* 21: 433-443

Balek, C. L. 2002. Buried artifacts in stable upland sites and the role of bioturbation: a review *Geoarchaeology: an international journal* 17(1): 41-51.

Bird, C. and D. Frankel 2005. *The archaeology of Gariwerd: from Pleistocene to Holocene in western Victoria* Tempus, vol. 8, University of Queensland, St Lucia.

Bocek, B. 1986. Rodent ecology and burrowing behaviour: predicted effects on archaeological site formation *American Antiquity* 51(3): 589-603.

Erlandson, J.M. 1984. A case study in faunalurbation: delineating the effects of the burrowing pocket gopher on the distribution of archaeological materials *American Antiquity* 49(4): 785-790.

Hiscock, P. 1996. Mobility and technology in the Kakadu coastal wetlands *Indo-Pacific Prehistory Association Bulletin* 15: 151-157.

Holdaway, S. and N. Stern 2004. *A Record in Stone: the study of Australia's flaked stone artefacts* Museum of Victoria and Aboriginal Studies Press.

Lomax, K. n.d. An archaeological survey of the Gippsland Lakes, unpublished draft report.

Luedtke, B.E. 1992. *An Archaeologist's Guide to Chert and Flint* Archaeological Research Tools 7, Institute of Archaeology, University of California, Los Angeles.

Mallouf, R. 1982. An analysis of plow-damaged chert artifacts: the Brookeen Creek Cache (41HI86), Hill Country, Texas.

Odell, G and F. Cowan 1987. Estimating tillage effects on artifact distributions *American Antiquity* 52 (3): 456-484.

Purdy, B. 1975. Fractures for the archaeologist, in E. Swanson (ed) *Lithic Technology: making and using stone tools* Mouton Publishers, The Hague pp 133-141.

Schaetzl, R., S. Burns, T. Small, D. Johnson, 1990 Tree uprooting: review of types and patterns of soil disturbance *Physical Geography* 11(3): 277-291.

Staley, D. 2006 Shadow of doubt or doubtful shadows: small-scale low-density lithic scatters and agrifacts *North American Archaeologist* 27(2): 175-199. ....3 January 2018...

## Attachment 1 - Artefact Catalogue

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#	area	unit	raw material	type	cortex %	cortex type	flake type	flake cortex quads	flake termination	flake platform	perc axis flake length	perc axis flake width	perc axis flake thickness	flake plat length	flake plat width	core platforms	core scar shapes	tool type	max dimension (mm)	weight (g)	dorsal colour	ventral colour	comment	count
LE5	A1	mixed	rhyolite?	complete flake	25-49	pebble	irregular	quad 3 quad 1	feather/cortical	cortical/flat	29.3	28.4	10.8	25.7	12.7				42.9	12.7	10YR 6/6	10YR 6/2	Some crushing/damage evident on distal end and right margin - limited in area and/or irregular so may be post-depositional damage. Joins with LE6	1
LE8	A1	7	unknown	complete flake	0		expanding		hinge	crushed/misssing									26.8	2.1	10YR 8/2	10YR 8/2	uncertain material - in texture almost like the 'chalky' flint cortex. Material is similarly soft.	1
LE6	A1	mixed	rhyolite?	distal flake	25-49	pebble			feather/cortical										25.9	3.6	10YR 6/6	10YR 6/6	Joins left ventral side of LE5. Unlikely to be a recent break - soil adheres to joining surfaces.	1
LE9	A1	6	quartz	longitudinal split (left)	0				feather	crushed/misssing									15.3	0.5	5YR 8/1	5YR 8/1		1
LE7	A1	mixed	quartz	proximal flake	1 to 24	pebble				cortical/flat				12.2	4.9				20.5	1.5	10YR 7/4	10YR 7/4	appear to be broken at distal end, but may have fractured along internal plane.	1
LE1	A2	3	silcrete	proximal flake	25-49	pebble/s mooth?				flaked				12.1	7.2				16	1.4	10YR 6/2	5YR 3/2	recent edge damage and snapping	1
LE4	A2	3	silcrete?	proximal flake - poss used/ret piece	0		blade			flaked				11.9	4.1				33.2	2.5	10YR 6/2	10YR 6/2	right margin shows continuous small steep flakes (stepped and feathered, broad) towards distal end.	1
LE13	B3	5	quartz	fragment	1 to 24	pebble/s mooth													19	0.7	5YR 8/1		uncertain artefact	1
LE29	C1	8	silcrete	fragment	1 to 24	pebble/s mooth													17.3	1	10R 3/4			1
LE30	C1	9	silcrete	fragment	0														23.4	0.8	10R 3/4			1
LE31	C1	9	silcrete	fragment	1 to 24	pebble/s mooth													26.1	4	10R 3/4		There are two other fragments of this material (LE 29 and 30) in this and the spit above - all are strangely fractured appearing to have some conchoidal scars, but with no complete ones. Status as artefacts is uncertain.	1
LE22	C2	3	silcrete	complete flake	0		irregular		feather	flaked	13.8	13	3.3	6.8	1.8				27.9	1.2	5Y 8/1	5Y 8/1	Irregular flake, may be platform renewing. Some edge nibbling/bevelling, but may be post-dep.	1
LE26	C2	3	silcrete	complete flake	0		intermediate		abrupt/axial	flat	14	13.5	3	13.2	3.5				2	10YR 6/2	5Y 6/1		1	
LE27	C2	4	silcrete	complete flake	0		expanding /broad - bending		hinge	flat	8.5	17.2	3.9	14.2	6.6				18.7	1.2	10YR 8/2	N8	Uncertain ID. Seems to be a bending fracture, but incomplete scars on dorsal surface suggest that part of proximal end may have broken/snapped.	1
LE21	C2	3	silcrete	distal flake	0		blade		feather										23.4	0.2	5YR 8/1	5YR 8/1	Small blade with snap at proximal end.	1
LE23	C2	3	silcrete	fragment	0														24.6	2	5YR 5/2	5YR 5/2		1

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LE40	G1	3	silcrete	complete flake - poss. used/ret piece	1 to 24	pebble/s mooth?	blade	quad 3	feather	flat	33.9	16.8	6.5								35.4	5.3	10YR 6/2	10YR 6/2	Possible use crushing on left margin (irregular damage).	1
LE43	G1	4b	silcrete	complete tool	0					facetted				5	1.9						13.2	0.4	5YR 6/1	5YR 6/1		1
LE47	G1	4b	silcrete	core	0											unidirectional	blade				28.6	6.1	5Y 8/1	10R 5/4	Irregular shape (broken flake?) with single complete flake scar. Odd fracturing at distal end of this scar - from heat?	1
LE48	G1	4b	silcrete	distal flake	1 to 24	pebble/s mooth?			hinge												15.2	0.6	5YR 5/2	5YR 5/2	Similar possible heat fracture to that noted on LE47.	1
LE50	G1	4b	silcrete	distal flake	0				feather												15	0.3	10YR 6/2	10YR 5/4	Uncertain ID.	1
LE38	G1	4a	silcrete	fragment	0																17.6	1.1	5YR 5/2			1
LE49	G1	4b	silcrete	fragment	0																12.5	0.2	10YR 6/2	10YR 6/2	Irregular damage along one edge.	1
LE34	G1	4a	silcrete	longitudinal split (right)	0				feather	flat											14.4	0.2	5YR 6/1	5YR 6/1		1
LE46	G1	4b	silcrete	marginal	0																17.1	0.6	5YR 6/1	5YR 6/1		1
LE35	G1	4a	silcrete	medial	0																12	<0.1	10YR 6/2	10YR 6/2		1
LE45	G1	4b	silcrete	medial	Jan-24	pebble/s mooth?															17.7	0.5	5YR 5/2	5YR 5/2		1
LE37	G1	4a	silcrete	proximal	0		irregular			flaked				6.8	2.9						27	2.1	5Y 8/1	5Y 8/1	Recent damage (nibbling) to quad 4 edge.	1
LE39	G1	4a	silcrete?	proximal	0		blade		feather	crushed/misssing		13.8	6/0								31.5	3.2	10YR 6/2	10YR 6/2	Distal tip broken off. Unusual dorsal surface - possible bending flake platform with this flake struck off left margin?	1
LE41	G1	3	silcrete	proximal	0					flat				12.2	3.7						17.2	0.7	5YR 6/4	5YR 6/4		1
LE44	G1	4b	silcrete	proximal	0					flat				3.5	1.1						18.6	0.8	5YR 6/1	5YR 6/1		1
LE52	G2	2a	silcrete	complete	0		blade		feather	flat	17.2	6.6	1.2	5.2	0.8						17.6	0.2	5YR 6/4	5YR 6/4		1
LE56	G2	2b	silcrete	complete	0		irregular		hinge	flat	22.9	11	2.8	3.7	1.8						28.5	1.2	5YR 6/1	5YR 6/1	Irregular fracture on dorsal surface.	1
LE54	G2	2b	silcrete	fragment	0																14.6	0.6	5YR 5/2			1
LE53	G2	2b	silcrete	longitudinal split (left)	1 to 24	pebble/s mooth?			feather	flat											24.5	1.4	10YR 6/2	10YR 6/2		1
LE55	G2	2b	silcrete	proximal	0					crushed/misssing											13.8	0.4	5YR 6/1	5YR 6/1		1

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# Road Network and Traffic Management Plan

## Residential Development, Stirling Drive Lakes Entrance

Prepared For:

**Client – Merrangbaur Heights Pty Ltd**

**Date – 7 March 2012**



Prepared by:

**Crossco Consulting Pty Ltd**  
Engineering and Environmental Consultants  
PO Box 858  
Bairnsdale VIC 3875  
Tel. 03-5152 6298  
Fax. 03-5152 7222  
consult@crossco.net.au  
www.crossco.net.au

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## Appendix

Appendix 1: Profession Qualifications and Experience

**Cover Photo:** Subject Site as Viewed From Thorpes Lane

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# INTRODUCTION

Crossco Consulting Pty Ltd, Engineering and Environmental Consultants has been requested by Merrangbaur Heights Pty Ltd to prepare a traffic engineering assessment for the proposed residential subdivision located at Stirling Drive, Lakes Entrance.

A summary of my professional qualifications and experience which qualifies me to comment on the traffic implications of this proposal are included in Appendix 1.

This report is based on the removal of the retirement village from the overall Merrangbaur Heights development due to market uncertainty and the creation of a vacant superlot to be considered on its own merit at the time of a future development. The report addresses various traffic related comments received from referral authorities as part of the original application and appraises a proposed access from Lawson Drive.

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In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development examined, and updated traffic data collected and analysed as required and discussions held with Council and VicRoads.

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## 1 Background and Existing Conditions

### 1.1 Location and Land Use

Kate Nelson

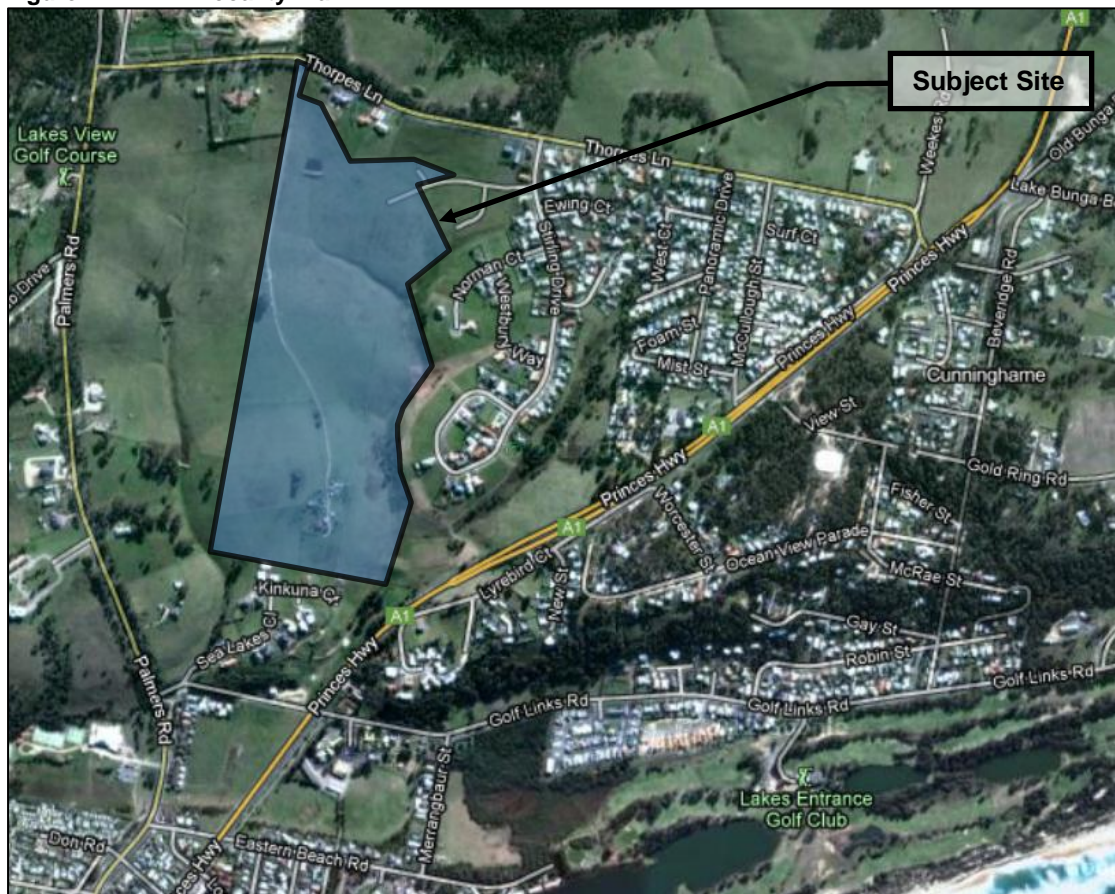
The subject site is located on the south side of Thorpes Lane generally between Palmers Road and Stirling Drive as shown in Figure 1. The site has a frontage of approximately eight metres to Thorpes Lane and a connection to Stirling Drive is proposed.

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The residential subdivision is approximately 33ha in size and is generally bounded by residential properties to the south and east with farming properties and a transfer station located to the north and west.

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Figure 1: Locality Plan



The subject site is currently zoned Residential 1 Zone and is located to the east of the township of Lakes Entrance.

## 1.2 Road Network

**Thorpes Lane** is a local road which currently operates as a Collector Road providing access from Palmers Road (Colquhoun Road) in the west through to Weekes Road in the east. In the vicinity of the subject site Thorpes Lane provides a pavement width of approximately eight metres with gravel shoulders set within a 20 metre wide road reserve, as illustrated in Figure 2.

The subject site currently has access to Thorpes Lane via an 8 metre wide road reserve which is used as a single vehicle driveway. Fully directional access is provided to/from Thorpes Lane.

In the vicinity of the subject site Thorpes Lane has a posted 80km/h speed limit reducing to 60 km/h towards Stirling Drive.

**Figure 2: Thorpes Lane Looking East Adjacent the Subject Site's Existing Access**



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**Lawson Drive** is currently a dead end street that has been constructed for a length of approximately 40 metres. Whilst running parallel to two residential properties it does not provide any vehicle access to properties at this time.

An extension of Lawson Drive is currently underway as illustrated in Figure 3 and is part of an existing Planning Permit for the Stirling Drive residential subdivision.

Lawson Drive currently has a pavement width of 9.4 metres with kerb and channel provided on both sides.

The extension of Lawson Drive is being constructed with a pavement width of 9.4 metres with kerb and channel on both sides. A 1.8 metre wide footpath is proposed on the south side and a 1.5 metre wide footpath on the north side set within a 20 metre wide road reserve.

A review of Clause 56.06-8 of the East Gippsland Planning Scheme indicates that with a pavement width of 9.4 metres Lawson Drive has been designed as a Collector Street – Level 2.

**Figure 3: Lawson Drive Looking West Towards the Subject Site**



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**Stirling Drive** currently provides access from Thorpes Lane in the north through to residential properties in the south.

In the vicinity of the subject site, Stirling Drive has a 9.5 metre wide pavement providing one wide trafficable lane in each direction, set within a 20.5 metre wide road reservation, as illustrated in Figure 4.

Discussions with various parties have indicated that as part of the Stirling Drive subdivision VicRoads prohibited the construction of an additional access point onto the Princes Highway in line with their access strategy.

Accordingly, Stirling Drive has been constructed as a Collector Road – Level 2, with a wide pavement of over 9.4 metres in accordance with Clause 56.06-8 of the East Gippsland Planning Scheme.

**Figure 4: Stirling Drive Looking North Towards Thorpes Lane**



### 1.3 Public Transport

The subject Site has limited access to Public Transport with the Route 3 bus service operated by Lakes Transit providing access from Stirling Drive to the township of Lakes Entrance.

The Route 3 bus service currently provides four services per day in each direction.

### 1.4 Traffic Volumes

To assess the operation of the existing road network within the vicinity of the proposed development a mixture of new turning movement surveys have been undertaken and existing traffic volume data has been obtained from previous traffic reports for the following intersections:

- Princes Highway/Weekes Road;
- Thorpes Lane/Stirling Drive;
- Thorpes lane/Palmers Road; and
- Princes Highway/ McCullough Street

The AM and PM network peak volumes are illustrated in Figure 5.

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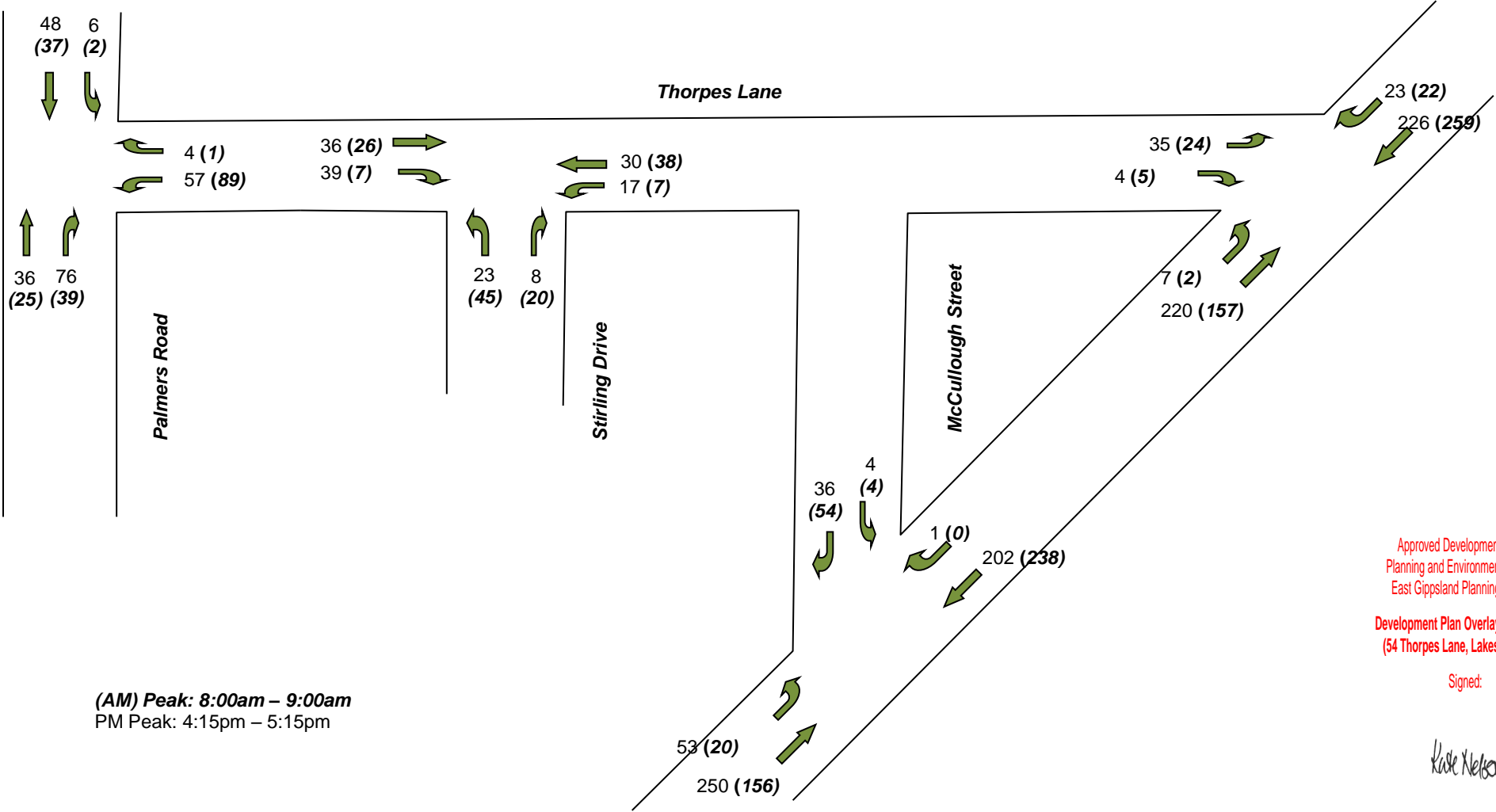
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Figure 5: Existing Traffic Volumes - AM and PM Network Peak



(AM) Peak: 8:00am – 9:00am  
PM Peak: 4:15pm – 5:15pm

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## 1.5 Existing Intersection Operations

To assess the operation of the four critical intersections within the vicinity of the site, the existing traffic volumes shown in Figure 5 have been input into SIDRA. Sidra (Signalised and Unsignalised Intersection Design and Research Aid) is a computer package, which provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (DoS) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 1.

**Table 1: Rating of Degrees of Saturation**

Degree of Saturation	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

*95th Percentile (95<sup>th</sup>ile) Queue* represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour.

Based on the existing road geometry and existing traffic volumes, the results of the analysis are presented in Table 2.

Review of the SIDRA results indicates that the critical intersections within the vicinity of the site currently operate within the 'excellent' category during both the AM and PM peak periods with minimal delays and queues for all approaches.

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Table 2: Existing Road Network – AM and PM Peak Periods

Intersection	Leg	Movement	AM Peak			PM Peak		
			DoS	Av. Delay (seconds)	95th'ile Queue (m)	DoS	Av. Delay (seconds)	95th'ile Queue (m)
Palmer's Road/ Thorpes Lane	Palmer's Road (N)	Through	0.02	0	0	0.03	0	0
		Left	0.02	11	0	0.03	11	0
	Thorpes Lane	Left	0.11	11	2	0.07	12	1
		Right	0.01	12	0	0.01	13	0
	Palmer's Road (S)	Through	0.04	0	1	0.08	0	3
	Right	0.04	11	1	0.08	11	3	
Thorpes Lane/ Stirling Drive	Thorpes Lane (E)	Through	0.02	0	0	0.02	0	0
		Left	0.01	8	0	0.01	8	0
	Stirling Drive	Left	0.06	7	1	0.01	7	0
		Right	0.03	7	1	0.03	8	1
	Thorpes Lane (W)	Through	0.02	0	1	0.05	0	2
	Right	0.02	9	1	0.05	9	2	
Weekes Road/ Princes Highway	Princes Highway (N)	Through	0.14	0	0	0.13	13	1
		Right	0.02	13	1	0.02	0	0
	Princes Highway (S)	Through	0.07	0	0	0.11	0	0
		Left	0.02	12	0	0.02	12	0
	Weekes Road	Left	0.04	13	1	0.05	13	1
	Right	0.04	13	1	0.05	13	1	
McCullough St Princes Highway	McCullough Street	Left	0.01	10	0	0.01	11	1
		Right	0.12	15	3	0.01	16	3
	Princes Highway (W)	Through	0.04	0	0	0.03	12	0
		Left	0.01	12	0	0.07	0	0
	Princes Highway (E)	Through	0.13	0	0	0.11	0	0
		Right	0.01	12	0	0.01	13	0

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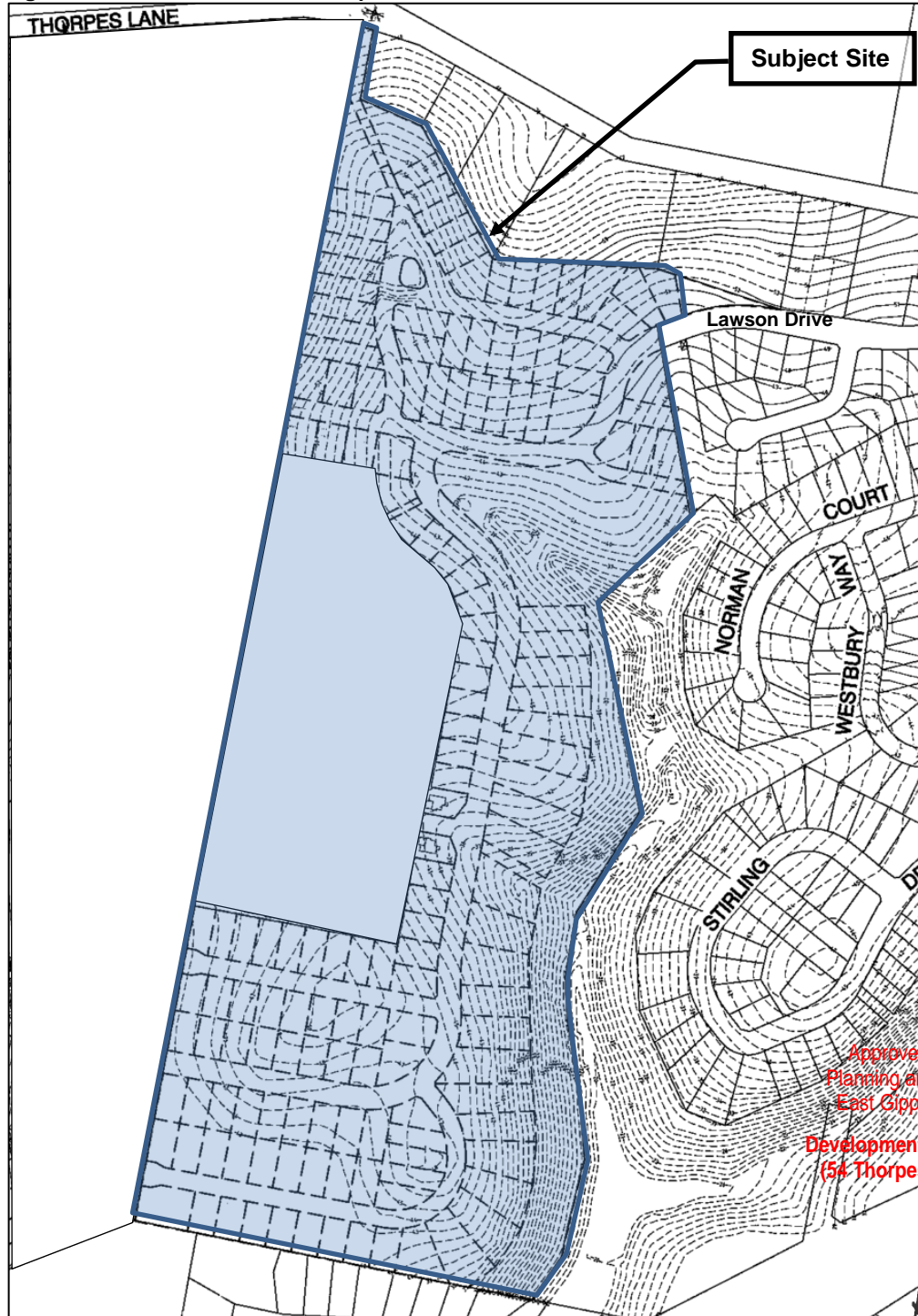
### 3 Proposed Development

#### 3.1 General

It is proposed to develop the subject site as a residential development comprising 186 residential lots and one larger super lot which will form part of a future development application.

An indicative development plan is shown in Figure 6.

Figure 6: Indicative Development Schedule



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### 3.2 Access

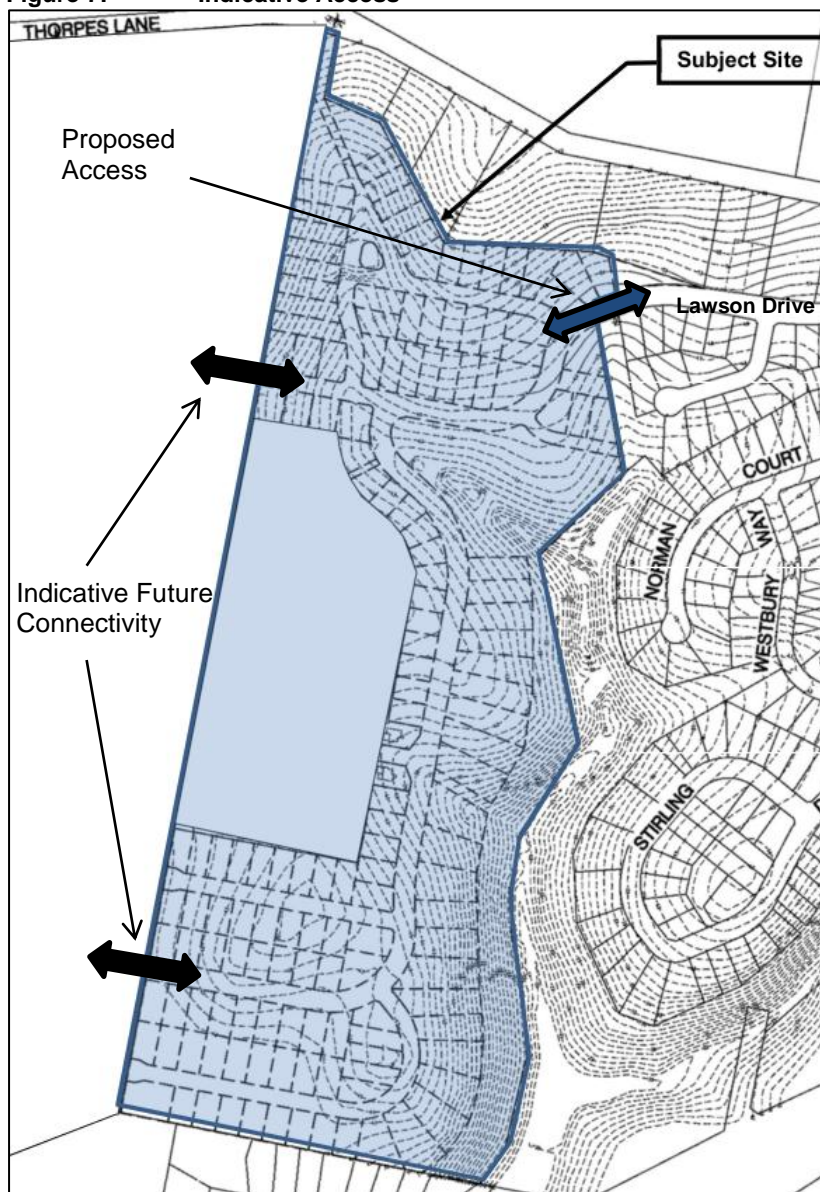
The subject site has a narrow 8 meter wide frontage to Thorpes Lane and direct access onto Lawson Drive which is currently under construction.

Given that it is not practical to provide access onto Thorpes Lane (without land acquisition) due to the narrow frontage it is proposed to provide direct access to the subdivision via Lawson Drive.

Direct road access to Palmers Rd to the west will require acquisition of third party land and construction of significant infrastructure not required for the proposed subdivision. However, consideration should be given in the design of the subdivision to provide possible access and connectivity in association with future development of the third party land. To facilitate this access two possible road connections have been included in the development proposal as shown in Figure 7.

Whilst one or more of these access points may be considered desirable they are not necessary for this development.

Figure 7: Indicative Access



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## 4 Traffic Considerations

### 4.1 Traffic Generation

Surveys undertaken by other traffic consultancies indicate that low density residential subdivisions typically generate between 6.1 and 8.5 vehicle movements per dwelling per day with 10% of daily volumes occurring in the AM and PM peak periods.

This was confirmed during turning movement surveys undertaken at the intersection of Stirling Drive and Thorpes Lane on Wednesday 8 February 2012 between 7:30am – 9:30am and 4:00pm – 6:00pm.

Stirling Drive is currently the only access to the Stirling Drive Subdivision a subdivision comprising 156 residential allotments of which 123 contained residential dwellings.

During the network peak periods the subdivision generated 0.63 movements per dwelling in the AM peak period (8:15am – 9:15am) split 17% in bound and 83% out bound and 0.71 vehicle movements per dwelling in the PM peak period (4:15pm – 5:15pm) split 65% inbound and 35% out bound.

Whilst the AM network peak and development peak coincided the development peak occurred between 4:45pm – 5:45pm with 0.78 vehicle movements per dwelling split 68% inbound and 32% out bound.

Conservatively adopting a peak AM and PM traffic generation rate of 0.8 movements per dwelling and allowing for up to 200 residential lots, the proposal could generate up to 160 vehicle movements during the AM and PM peak periods.

### 4.2 Traffic Distribution

During the AM peak it is anticipated that 83% of residential vehicle movements will be departures and 17% arrivals. During the PM peak it is anticipated that 65% of residential traffic will arrive and 35% will depart the site.

Based on the above, a total of 160 vehicle movements are expected to be generated to and from the site during each peak hour, as shown in Table 3.

**Table 3: AM and PM Peak Hour Traffic Distribution**

Time	In Bound	Out Bound	Total
AM Peak Hour	27	133	160
PM Peak Hour	104	56	160

The distribution of traffic onto the road network from the proposed subdivision will be dependent on a number of factors including:

- The purpose of the trip;
- Access points available to the surrounding arterial network; and
- Likely trip destination.

Residentially generated trips can broadly be classified into work, shopping, recreational or school based, with research conducted by the Ministry of Transport indicating the following break ups applicable to the site:

- |                                |     |
|--------------------------------|-----|
| • Work                         | 36% |
| • Personal/ business/ shopping | 34% |
| • Social/ recreational         | 25% |
| • School                       | 5%  |

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Based on the existing traffic distribution observed within the vicinity of the site it is anticipated that development traffic will be distributed to/from the site as follows:

- South bound (towards lakes Entrance) 80%
- Northeast bound (towards Nowa Nowa) 15%
- Northwest bound (towards Colquhoun Road) 5%

With regards to the intersection of Stirling Drive and Thorpes Lane it was observed that during the AM and PM peak periods traffic associated with the existing subdivisions was distributed generally as follows:

	West	East
AM Peak Period	65%	35%
PM Peak Period	70%	30%

It was also observed that development traffic heading east on Thorpes Lane wishing to access the Lakes Entrance Township and beyond generally turned right onto McCullough Street before turning right onto the Princes Highway.

Based on the preceding the anticipated development traffic volumes have been distributed onto the adjacent road network as shown in Figure 8.

In order to allow for the completion of the Sterling Drive Estate vehicle movements associated with the remaining undeveloped lots within the estate are shown in Figure 9 and allow for an additional 40 lots to be constructed. Accordingly it is anticipated that the additional 40 lots could generate up to 36 vehicle movements during the peak periods.

The post development traffic volumes are shown in Figure 10.

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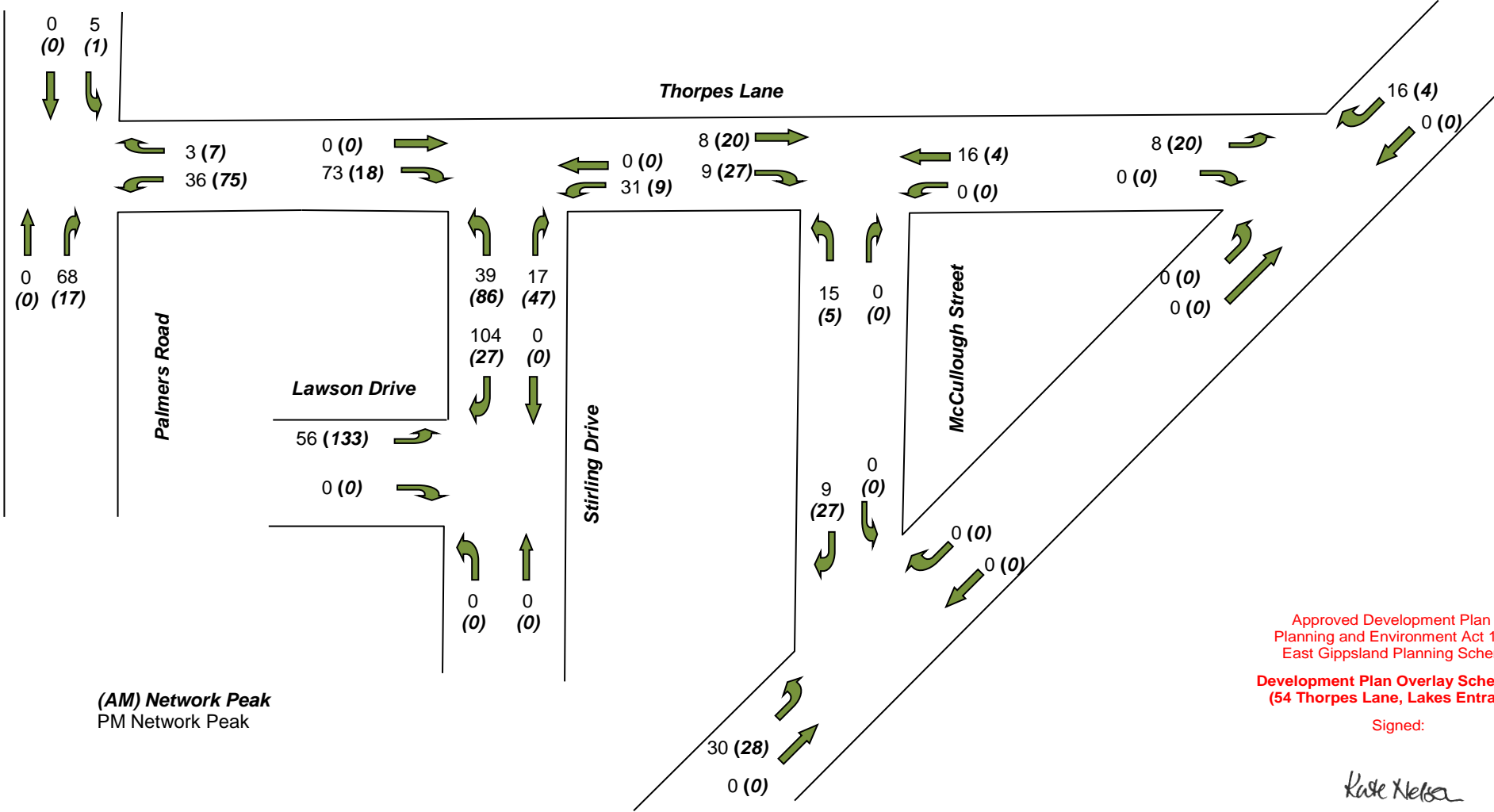
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Figure 8: Anticipated AM and PM Development Traffic Volumes



(AM) Network Peak  
PM Network Peak

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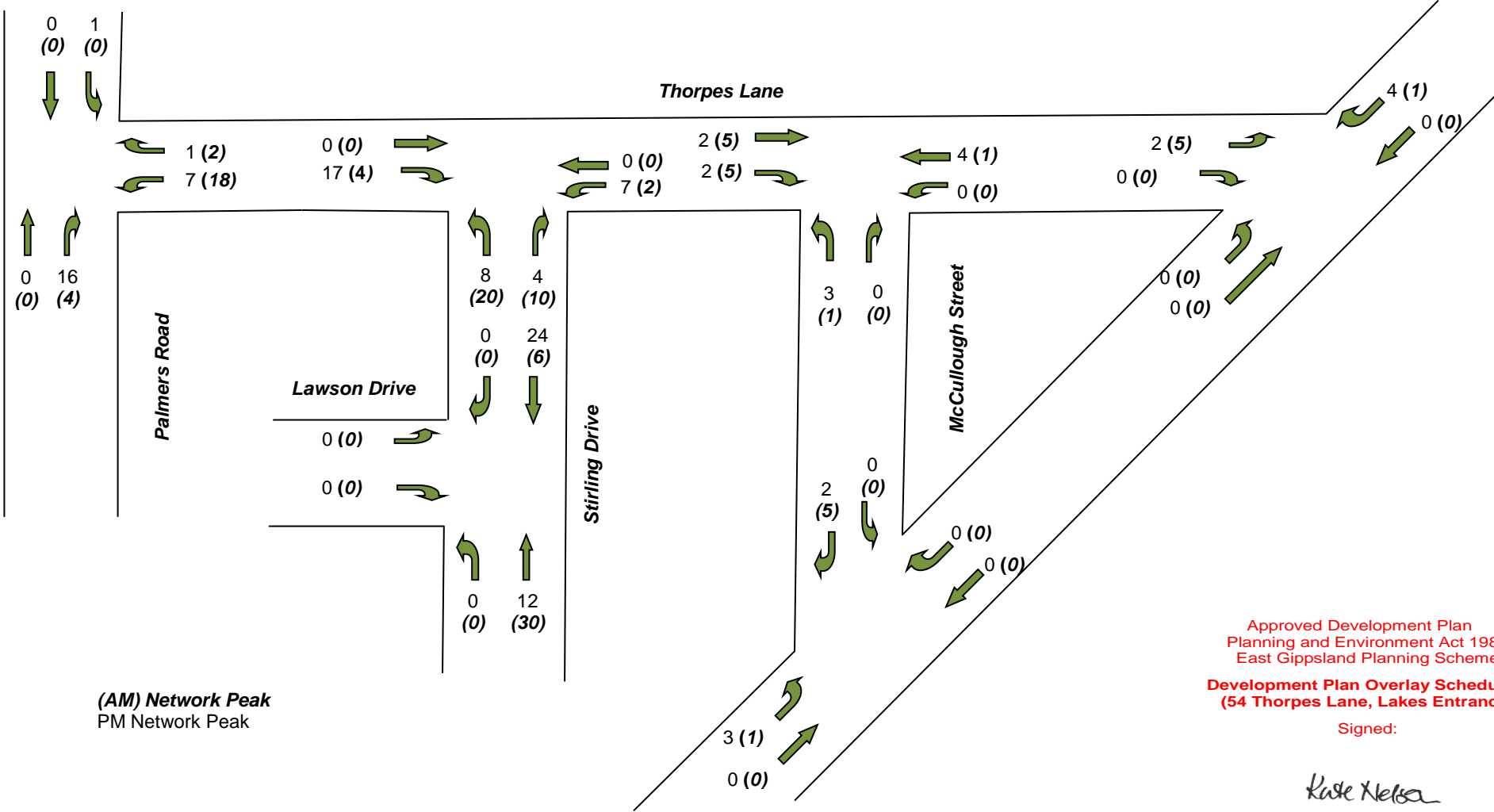
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Figure 9: Anticipate Additional AM and PM Traffic Volumes from Sterling Drive Estate



(AM) Network Peak  
PM Network Peak

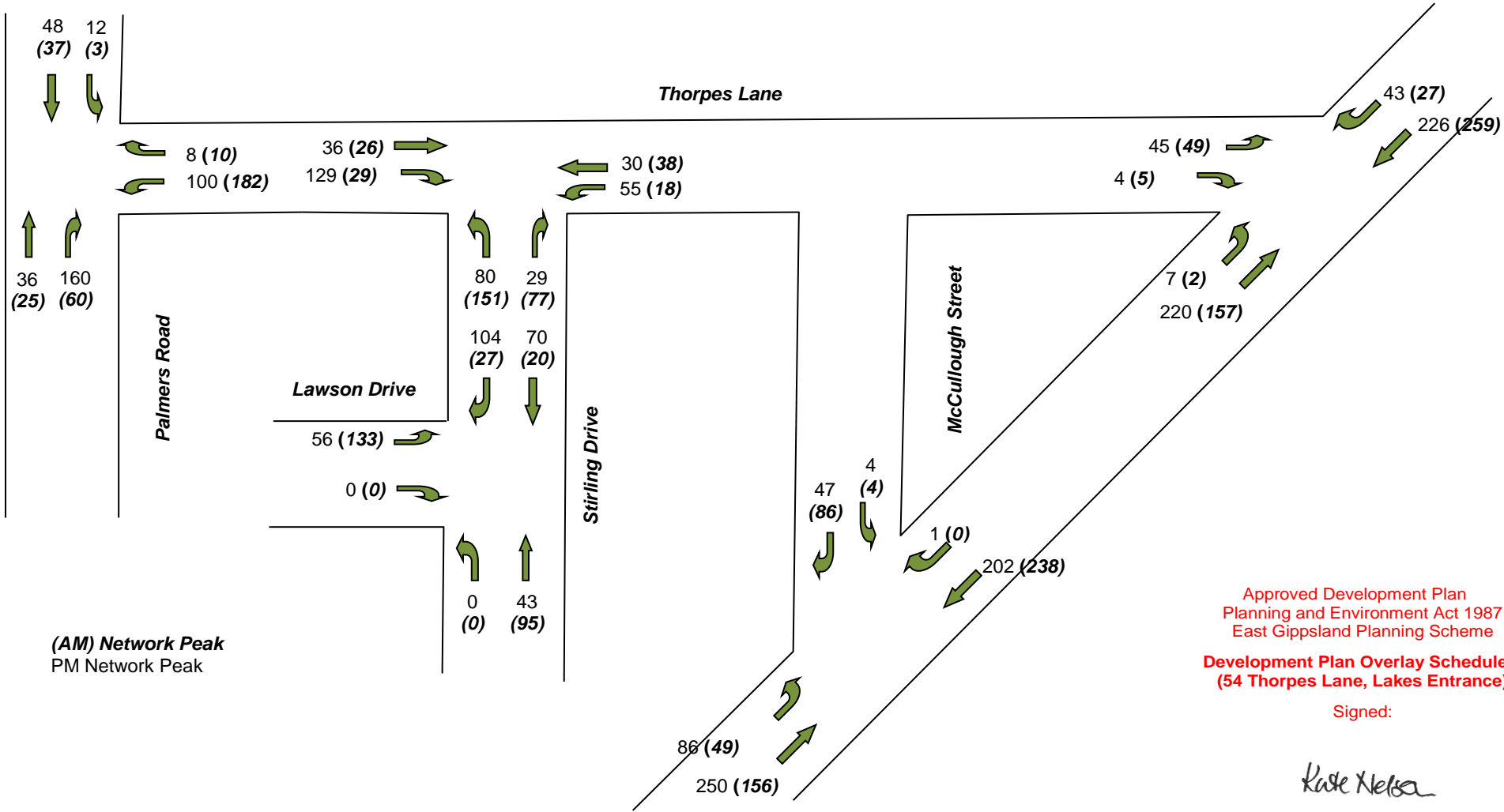
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Figure 10: Post Development AM and PM Development Traffic Volumes



(AM) Network Peak  
PM Network Peak

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### 4.3 Traffic Impacts

To assess the impacts of the proposed development on the critical intersections the projected traffic volumes illustrated in Figure 10 have been analysed using SIDRA. The results of the analysis are shown in Table 4.

**Table 4: Post Development Intersection Performance – AM and PM Peak Periods**

Intersection	Leg	Movement	AM Peak			PM Peak		
			DoS	Av. Delay (seconds)	95th'ile Queue (m)	DoS	Av. Delay (seconds)	95th'ile Queue (m)
Palmer's Road/ Thorpes Lane	Palmer's Road (N)	Through	0.02	0	0	0.03	0	0
		Left	0.02	11	0	0.03	11	0
	Thorpes Lane	Left	0.22	12	5	0.12	12	3
		Right	0.01	12	0	0.02	14	0
	Palmer's Road (S)	Through	0.06	0	2	0.15	0	6
	Right	0.06	11	2	0.15	11	6	
Thorpes Lane/ Stirling Drive	Thorpes Lane (E)	Through	0.02	0	0	0.02	0	0
		Left	0.01	8	0	0.03	8	0
	Stirling Drive	Left	0.20	7	4	0.11	7	2
		Right	0.11	8	3	0.05	9	1
	Thorpes Lane (W)	Through	0.04	0	1	0.12	0	4
		Right	0.04	9	1	0.12	9	4
Stirling Drive/ Lawson Drive	Stirling Drive (N)	Through	0.03	0	1	0.12	0	4
		Right	0.03	7	1	0.12	7	4
	Stirling Drive (S)	Through	0.05	0	0	0.03	0	0
		Left	0.05	6	0	0.03	6	0
	Lawson Drive	Left	0.13	7	4	0.05	7	1
	Right	0.13	7	4	0.05	7	1	
Weekes Road/ Princes Highway	Princes Highway (N)	Through	0.14	0	0	0.13	0	0
		Right	0.03	13	1	0.04	13	1
	Princes Highway (S)	Through	0.07	0	0	0.02	12	0
		Left	0.02	12	0	0.11	0	0
Weekes Road	Left	0.06	12	2	0.06	13	2	
	Right	0.06	12	2	0.06	13	2	
McCullough St Princes Highway	McCullough Street	Left	0.01	10	0	0.13	11	3
		Right	0.20	15	6	0.13	17	3
	Princes Highway (W)	Through	0.04	0	0	0.07	0	0
		Left	0.03	12	0	0.05	12	0
	Princes Highway (E)	Through	0.13	0	0	0.11	0	0
		Right	0.01	13	0	0.01	13	0

A review of Table 4 indicates that the four critical intersections in the vicinity of the site will continue to operate within the 'excellent' category during both the AM and PM peak periods with minimal delays and queues for all approaches.

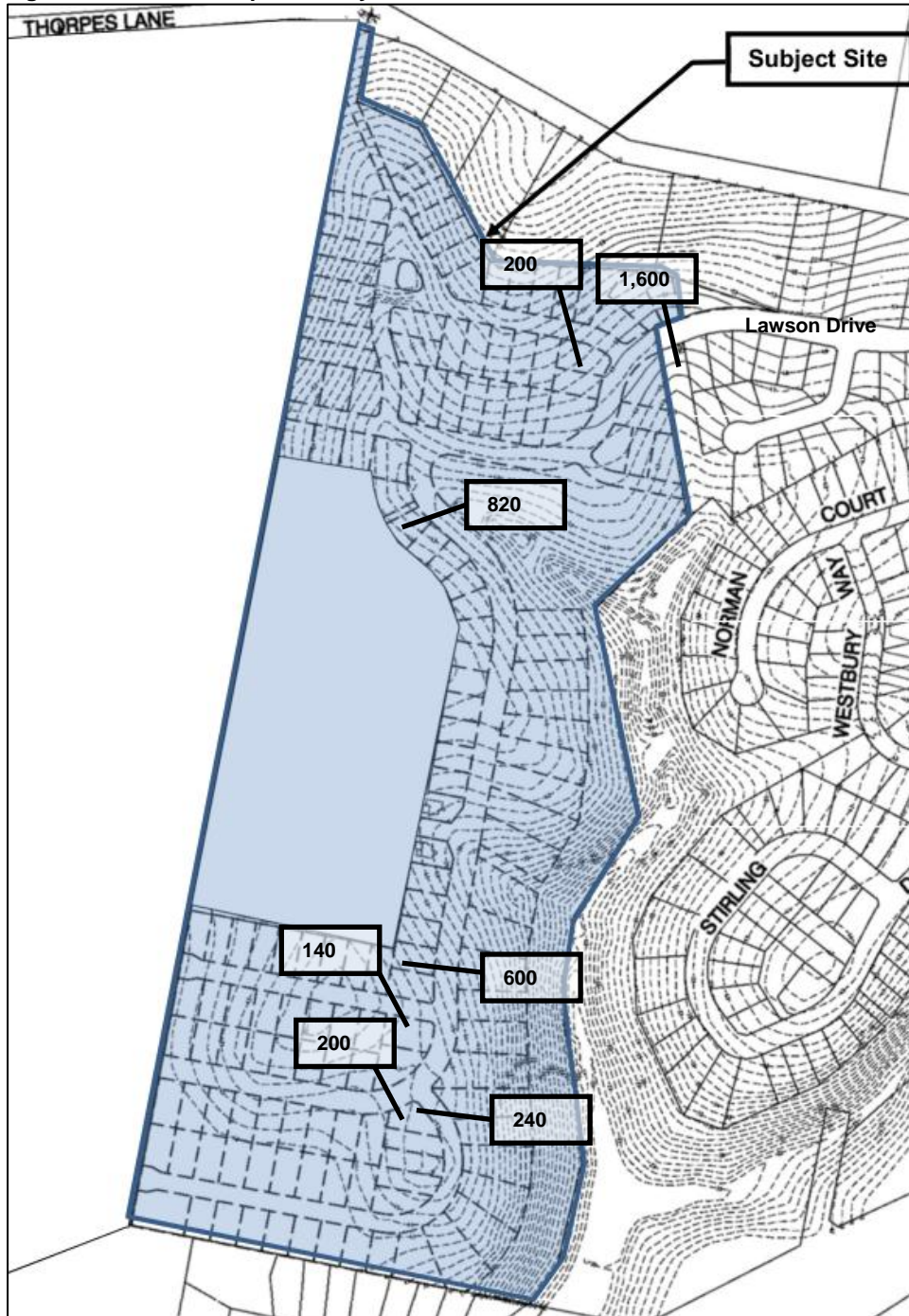
The intersection of Stirling Drive and Lawson Drive is also anticipated to operate within the 'excellent' category during both the AM and PM peak periods with minimal delays and queues for all approaches.

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### 4.4 Internal Road Network

Based on the traffic generation as discussed in Section 4.1 and adopting a development yield of 200 lots, the anticipated daily traffic volumes at various points throughout the subdivision are illustrated in Figure 11

Figure 11: Anticipated Daily Traffic Volumes



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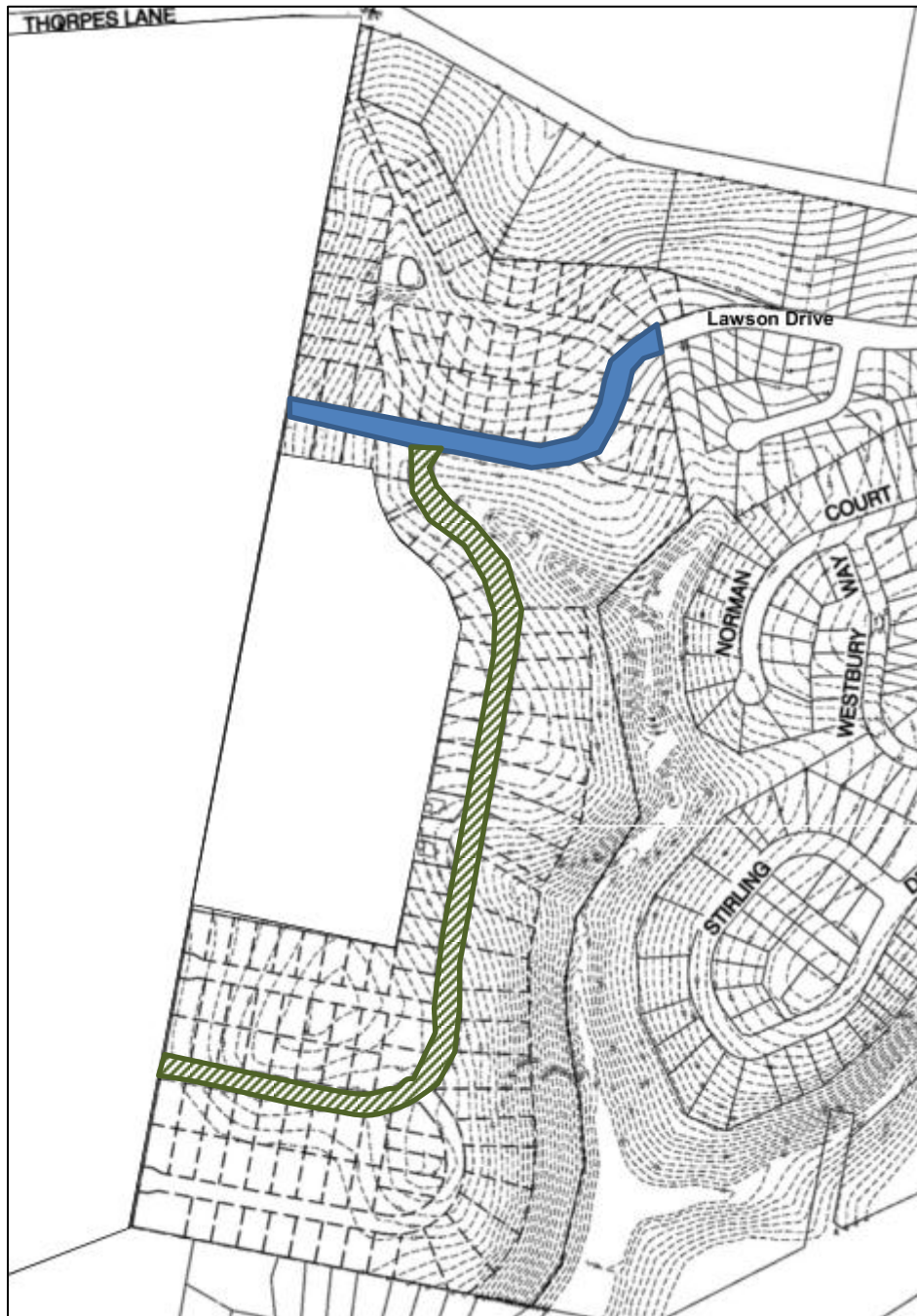
Based on the anticipated daily traffic volumes illustrated in Figure 11 the anticipated road hierarchy is illustrated in Figure 12.

The anticipated road hierarchy is detailed in Table 5 and is based on Clause 56-06.8 of the East Gippsland Planning Scheme.

It is noted the proposed road hierarchy provides sufficient additional traffic volume capacity to adequately accommodate additional vehicle movements should an access ultimately be constructed to Palmers Road in the west.

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Figure 12: Anticipated Road Hierarchy



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Table 5: Internal Road Hierarchy

Colour Code	Anticipated Daily Traffic Volumes From Subdivision (vpd)	Road Classification and Function	Road Reserve	Recommended Carriageway Width	Minimum Recommended Footway	Typical Daily Capacity (vpd)
Blue	< 1,600	Access Street – Level 2	16.0m	7.0m	1.5m footpath on both sides	2,000 – 3,000
Green (dashed)	< 850	Access Street Level 1	13.5m	5.5m	1.5m footpath on both sides	2,000
Clear	< 300	Access Place	7.5	5.5m	1.5m footpath on one side	300 – 1,000

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## 5 Planning Scheme Assessment

Clause 56 of the East Gippsland Planning Scheme relates to 'Residential Subdivision' and specifies 'Objectives' and 'Standards' to meet specified design element criteria.

With regard to traffic and car parking issues, the most relevant is Clause 56.06; Access and Mobility Management, consisting of the following key objectives:

56.06-1:	Integrated Mobility Objectives
56.06-2:	Walking and Cycling Network Objectives
56.06-3:	Public Transport Network Objectives
56.06-4:	Neighbourhood Street Network Objectives
56.06-5:	Walking and Cycling Network Detail Objectives
56.06-6:	Public Transport Network Detail Objectives
56.06-7:	Neighbourhood Street Network Detail Objectives
56.06-8:	Lot Access Objective

The assessment of the effectiveness of the road network in meeting the above objectives will be determined by its ability to provide;

- A safe and accessible road network;
- No incentive for through traffic intrusion;
- Suitable access for emergency and service vehicle access;
- A low speed traffic environment;
- A safe and convenient pedestrian and bicycle network;
- An attractive streetscape with a high level of residential amenity;
- Safe intersection design, with a preference for T-intersections; and
- Sufficient room for drainage systems, public utility services and street lighting.

An assessment of each of the relevant objectives is presented below:

### **Clause 56.06-1: Integrated Mobility**

*The intent is to achieve an urban design that is permeable and compact that encourages walking, cycling and public transport modes, with accessibility to larger activity centres.*

The relatively small scale of the subdivision does not provided substantial opportunity for integrated mobility networks to be created, however the subdivision is well serviced by footpaths to encourage walking and cycling.

Furthermore a direct connection has been allowed for in the design (extension of Lawson Drive) to any future residential development to the west and additional pedestrian and cycling opportunities are possible in the southern portion of the development to land to the west.

### **Clause 56.06-2 & 56.06-5: Walking and Cycling**

*The intent is to create subdivisions that encourage walking and cycling within the residential development, and between surrounding neighbourhoods.*

The road network within the proposed subdivision is suitably designed to encourage both pedestrian and cyclist trips within and through the area. The internal road network has footpaths on at least one side of all streets. The shared on road cycle facilities provides access through the estate and pedestrian connectivity is provided to the west with possible future linkages.

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**Clause 56.06-3 & 56.06-6: Public Transport Network**

*The intent is to encourage the use of existing public transport infrastructure, and to create new services that provide links to surrounding activity nodes.*

The public transport servicing the adjacent area is limited to one bus service which operates four times per day in each direction.

As a small residential subdivision, the opportunities to provide a specific provision for public transport connections or services are somewhat limited. Nevertheless, a significant proportion of the proposed development is located within 400 metres of Stirling Drive which is currently serviced by a bus stops.

**Clause 56.06-4 & 56.06-7: Neighbourhood Street Network**

*The intent is to for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles.*

The proposed internal subdivision roads consist of the three main road types, which generally fall under the classification of Access Street Level 2, Access Street Level 1 and Access Place (as specified in Table C1 of Clause 56.06). An Access Place is defined as a minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority. An Access Streets Level 1 and Level 2 are defined as a street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated.

The proposed road network will provide adequate clearances to cater for the access requirements of service and emergency vehicles (e.g. typically up to an 8.8m truck).

The forecast daily traffic volumes for the internal subdivision roads are well within the recommended volume limits specified in Table C1 of Clause 56.06 for an Access Place and an Access Street Level 1 and Level 2.

The Access Street Level 1 and Access Street Level 2 allow sufficient capacity to accommodate additional vehicle movements should an a direct access ultimately be constructed to Palmers Road in the west.

**Clause 56.06-8: Lot Access**

*The intent is to provide for safe vehicle access between roads and subdivision lots.*

All single dwelling lots will have direct access onto the proposed internal road.

The proposed access arrangements will provide safe and convenient access to individual lots.

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## 6 Issues Raised

A number of comments were received from various stakeholders relating to traffic engineering. These comments are discussed below with the comments shown in bold and the response following:

**VicRoads has reviewed the Traffic Impact Assessment and does not agree with the distribution. The conclusion by Traffic Group was reached that 15% of the traffic would use the Princes Highway at Weekes Road. It is of VicRoads opinion that up to 50% of the lots could use this route.**

As discussed in Section 4.2 it was observed that during the AM and PM peak periods traffic associated with the existing subdivisions was distributed generally as follows:

	West	East
AM Peak Period	65%	35%
PM Peak Period	70%	30%

It was also observed that development traffic heading east on Thorpes Lane wishing to access the Lakes Entrance Township and beyond turned right onto McCullough Street before turning right onto the Princess Highway.

Accordingly it is considered that an allowance of 15% of the development traffic accessing the intersection of Weekes Road and the Princes Highway to travel north bound is a realistic estimation.

**VicRoads has previously received information regarding left turns into Weekes Road from Princes Highway. The impacts should be looked at with more scrutiny.**

Following discussions with VicRoads officers to clarify their concerns an inspection of the intersection was undertaken.

The inspection indicated that the intersection of Weekes Road is located at the beginning of a left taper associated with two trafficable lanes merging into one lane as shown in Figure 13.

Figure 13: Princes Highway Looking Towards Weekes Road



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Based on the anticipated distribution of traffic associated with the proposed subdivision it is anticipated that traffic traveling along the Princes Highway wishing to access the site from Lakes Entrance will turn left onto McCullough Street rather than use Weekes Road.

Accordingly it is anticipated that the proposed development will have no impact on the operation of the left turn from Princes Highway into Weekes Road.

**The provision of a road connection from the subject site to Palmers Road across adjacent land to the west of the site.**

As detailed in Section 4.3 traffic generated by the proposed subdivision including additional traffic from the Stirling Drive subdivision can be accommodated by the existing road network without the need for the connection onto Palmers Road.

The current development application indicates a road connection from the subject site to Palmers Rd in the west across adjacent land which based on the findings of this report is not required; the permit applicant may consider amending the permit application to exclude this from the application.

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## 8 CONCLUSION

Based on the foregoing it is concluded that:

- It is proposed to develop the subject site as a residential development comprising 186 residential lots and one larger super lot which will form part of a future development application.
  - Access to the proposed subdivision will be via Lawson Drive, which is currently under construction.
  - There is no requirement for direct road access to Palmers Road in the west via third party land, consideration has been given in the layout to providing possible access and connectivity in association with future development of third party land to the west.
  - The internal road network for the residential subdivision has generally been designed in accordance with Clause 56 of the East Gippsland Planning Scheme and consists a mix of 'access places' and 'access streets'.
  - It is anticipated that the proposed subdivision could generate up to 1,600 vehicle movements per day including 160 vehicle movements during both the AM and PM peak periods.
  - The anticipated development traffic will be accommodated by the wider road network with the critical intersections within the vicinity of the site continuing to operate under "excellent" conditions during both the AM and PM peak periods.
- 

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## 9 APPENDICES

### 9.1 Appendix 1: Profession Qualifications and Experience

**NAME:**

James Brownlie

**ADDRESS:**

Crossco Consulting Pty Ltd  
154 Macleod Street  
Bairnsdale VIC 3875

**PROFESSIONAL QUALIFICATIONS:**

- Post Graduate Degree in Traffic and Transport, Monash University
- Graduate certificate in Traffic and Transport, Monash University
- Member of the Victorian Planning and Environmental Law Association (VPELA)
- Member of the Institute of Transport engineers
- VicRoads Accredited Senior Road Safety Auditor

**PROFESSIONAL SERVICES:**

- |  |                |
|--|----------------|
| • Senior Traffic Engineer – Crossco Consulting Pty Ltd       | 2012 - Present |
| • Principle Traffic Engineer – Sustainable Transport Surveys | 2012 – Present |
| • Associate – Cardno Victoria                                | 2011 – 2012    |
| • Associate – Cardno Grogan Richards                         | 2010 – 2011    |
| • Senior Associate – Ratio Consultants                       | 2008 – 2010    |
| • Senior Traffic Engineer – Cardno Grogan Richards           | 2006 – 2008    |
| • Traffic Engineer – Grogan Richards Pty Ltd                 | 2004 – 2006    |
| • Traffic Engineer – City of Kingston                        | 2000 - 2004    |

**AREAS OF EXPERIENCE**

- Car parking and traffic assessments;
- Traffic advice and assessments of land use and development proposals to planning authorities, government agencies, corporations and developers (including major residential, retail, commercial, industrial, institutional and mixed use proposals).
- Senior/ lead Road Safety Audits for all road safety audit types including Feasibility, Functional, Detailed, Pre-opening and existing condition audits.
- Preparation and presentation of expert evidence at Planning panels Victoria and VCAT.



James Brownlie  
**Senior Traffic Engineer**  
Crossco Consulting Pty Ltd

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# Access Assessment - Development East of Palmers Road

Lakes Entrance Northern Growth  
Area

CG151055

Prepared for  
East Gippsland Shire Council

15 July 2016

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## Contact Information

**Cardno Victoria Pty Ltd**  
**Trading as Cardno**  
ABN 47 106 610 913

Level 4  
501 Swanston Street  
Melbourne  
Victoria 3000 Australia

Telephone: (03) 8415 7777  
Facsimile: (03) 8415 7788  
International: +61 3 8415 7777

victoria@cardno.com.au  
www.cardno.com

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*Kate Nelson*

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# 1 Introduction

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Cardno has been commissioned by East Gippsland Shire Council to provide independent traffic engineering advice in relation to the transport infrastructure works required to support the development of the Lakes Entrance Northern Growth Area in accordance with the Outline Development Plan for the Area adopted by Council in October 2013.

This report assesses the traffic implications of development of the area to the east of Palmers Road, including:

1. The completion of the Merrangbaur Heights Estate being developed south of Thorpes Lane with access via Stirling Drive;
2. A proposal to extend the Merrangbaur Height Estate to the west with initial connection to Merrangbaur Height via Lawson Drive to Stirling Drive; and
3. Future development of land on the east side of Palmers Road between Thorpes Lane and Golf Links Road.

The report specifically:

- Assesses progressive access requirements which are likely to be required as the area develops in accordance with the adopted ODP;
- Recommends triggers for the creation of additional access points to Palmers Road; and
- Assesses traffic proportions from each development site which will utilise proposed new access points to Palmers Road as well as crossing points of the existing creek / gully running north south through the precinct which will require bridge or culvert crossings of the proposed connector road network.

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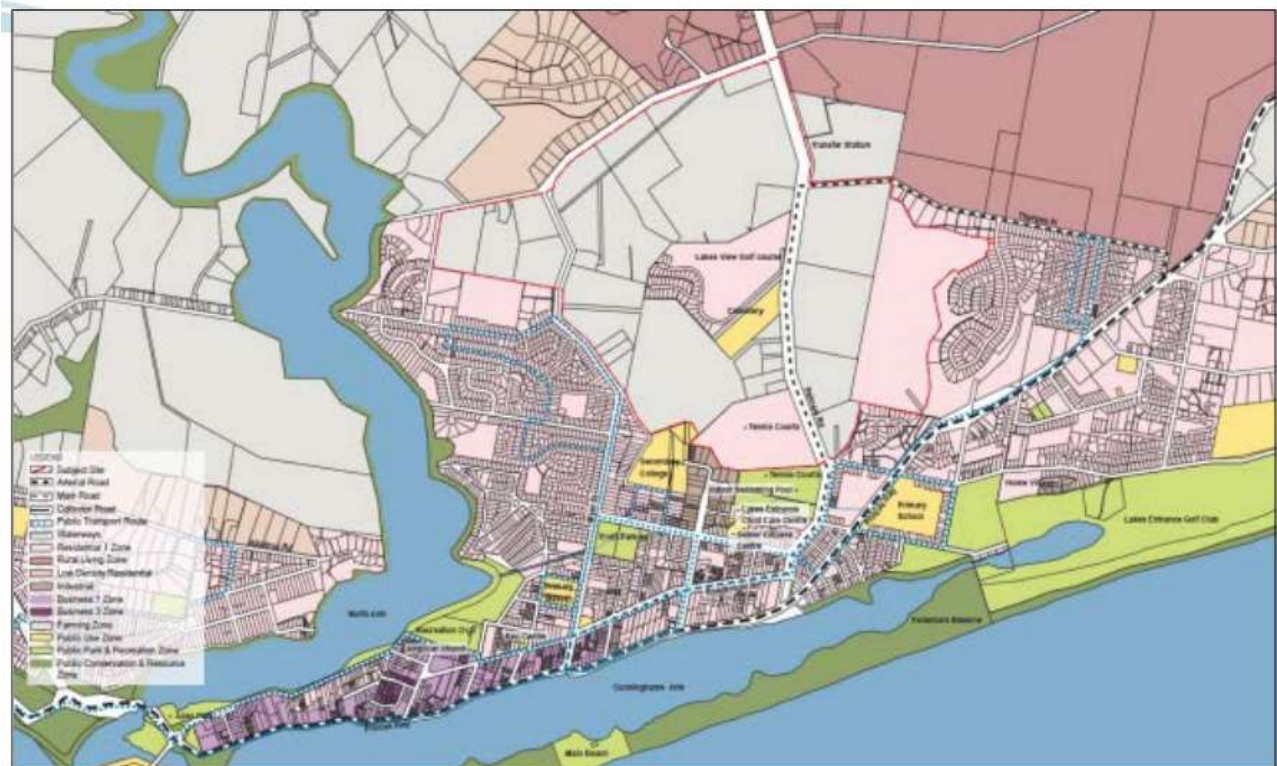
## 2 Lakes Entrance Northern Growth Area ODP

### 2.1 Overview

Amendment C112 to the East Gippsland Planning Scheme, which amended Clause 21.06 of the scheme to introduce the Lakes Entrance Northern Growth Area ODP into the planning scheme and rezoned effected land from the Farming 1 Zone to the Residential 1 Zone was gazetted in August 2014.

The Lakes Entrance Northern Growth Area, which has been identified by the Shire to largely facilitate the long term residential growth of Lakes Entrance, consists of land shown in Figure 2-1.

**Figure 2-1 Lakes Entrance Northern Growth Area**



The Outline Development Plan was prepared by SMEC Urban in October 2013 and provides the framework for the residential development of the Growth Area.

The adopted ODP is shown in Figure 2-2.

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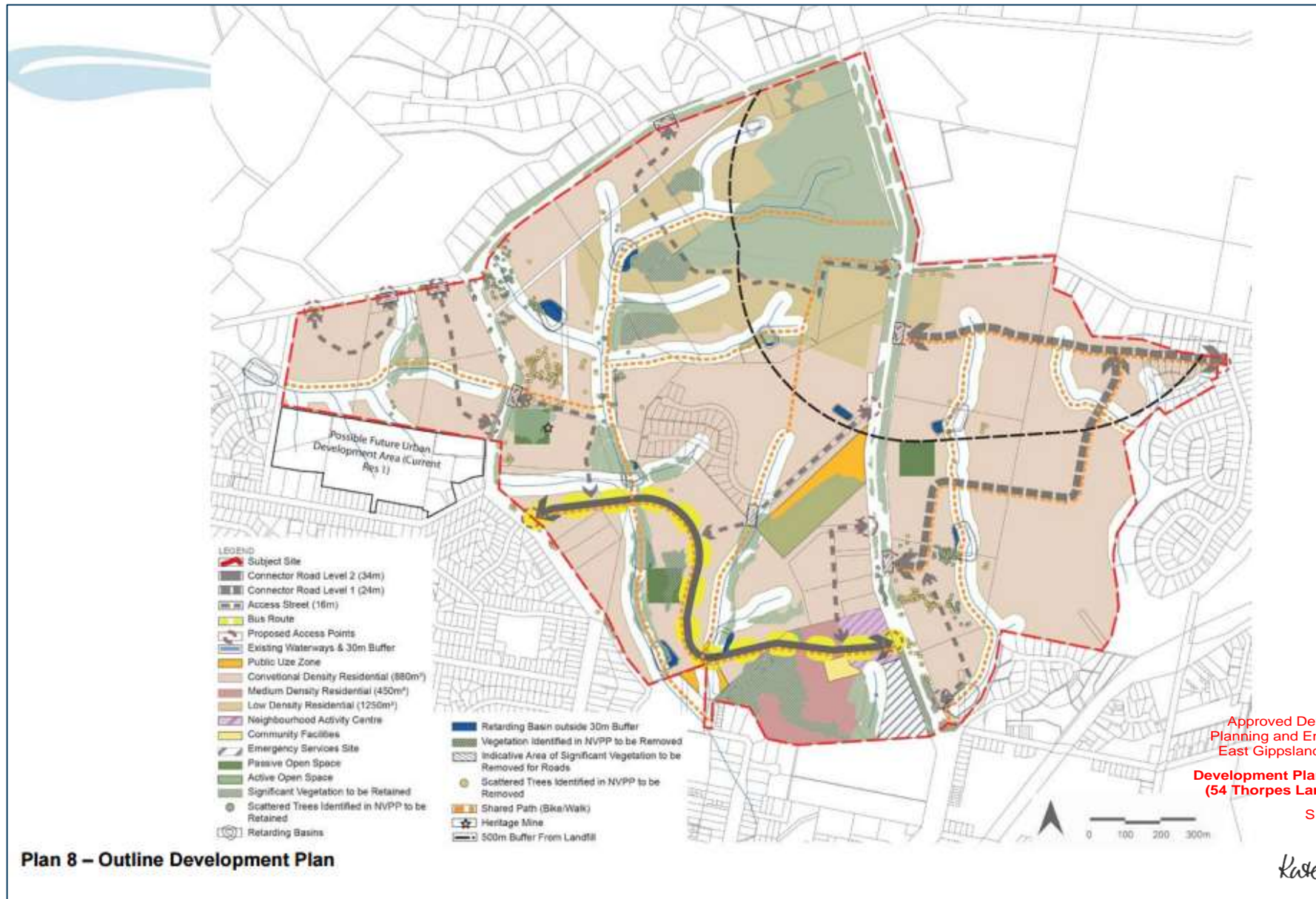
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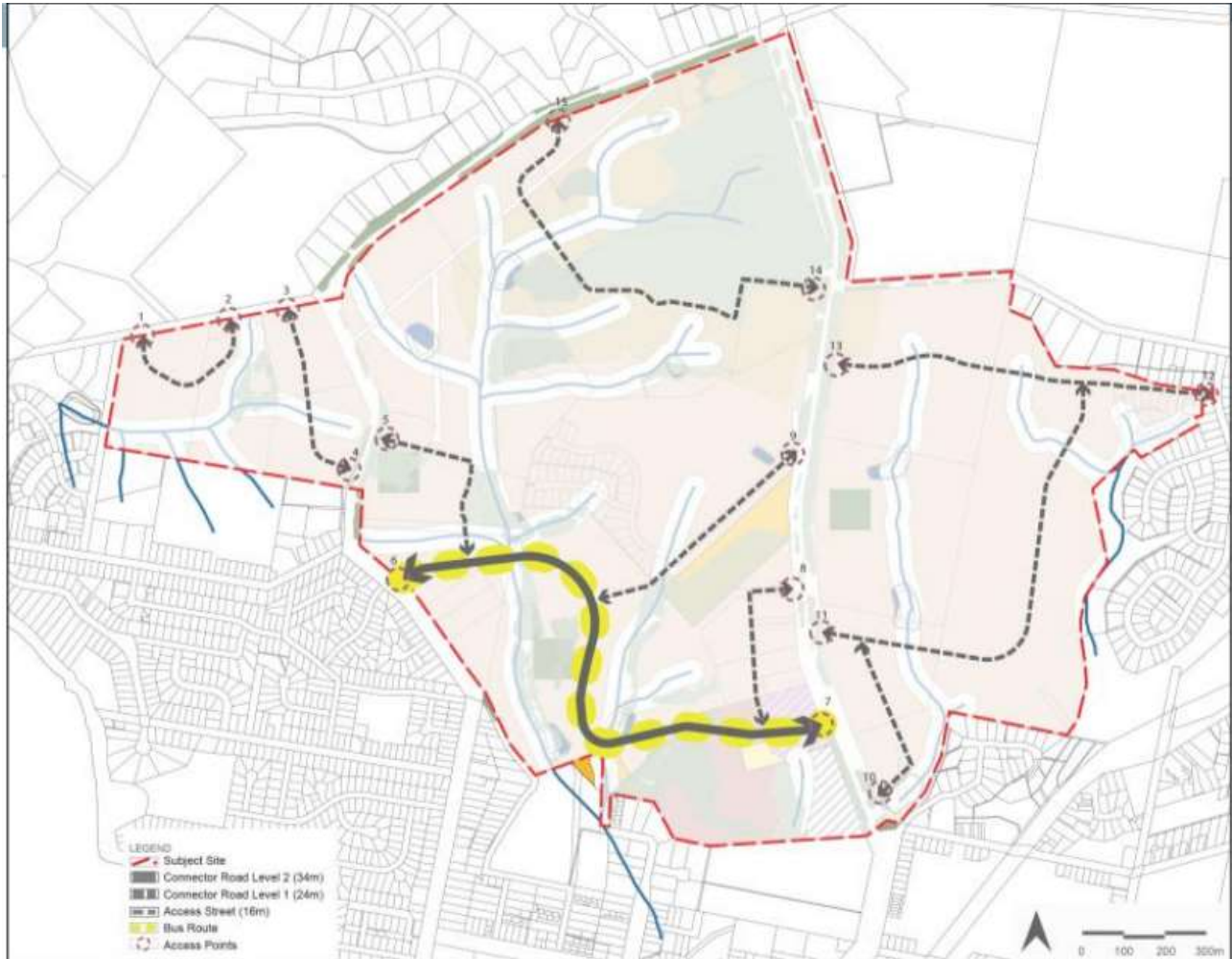
Figure 2-2 Lakes Entrance Northern Growth ODP



## 2.2 Access and Mobility

Access and Mobility within the Growth Area is detailed in Section 6 of the ODP with a recommended road hierarchy provided in Plan 10 shown in Figure 2-3.

Figure 2-3 ODP Road Hierarchy



A three tier hierarchy is specified (based on Table 2 of the Infrastructure Design Manual) as shown in Table 2-1, with required street widths, parking provision and target design speeds shown in Table 2-2.

Table 2-1 ODP Road Hierarchy and Cross Sections

Classification	Traffic Volume (max vehicles per day)	Road Classification Definition
Access Street	1,000	A street providing local residential access where traffic is subservient, speed and volume are low, and pedestrian and bicycle movements are facilitated.
Connector Street – Level 1	3,000	A street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods.
Connector Street – Level 2	3,000 to 6,000	

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**Table 2-2 Street widths, parking provision and target speed**

Street Type	Carriage-way Width*	Min Reserve Width	Parking Provision Within Street Reservation	Min Verge Width (includes footpath)	Footpath Provision	Cycle Path Provision	Target Speed <sup>^</sup> (km/h)
Access Street	7.5m	16.0m	Both sides	3.5m each side	1.5m wide both sides, minimum offset of 1m from kerb	Shared zone	40
Connector Street – Level 1	11.0m	24.0m	Both sides	6.0m each side	2.5m shared path on both sides, minimum offset of 1m from kerb	Shared zone	50
Connector Street – Level 2	2 x 7.0m + 5.0m median	34.0m	Both sides	6.0m each side	1.5m wide both sides, minimum offset of 1m from kerb	On-street, shared or dedicated lanes OR Off-street, shared path	60

\* Carriageway width is measured from kerb invert to kerb invert.

<sup>^</sup> Target speed is the desired speed at which motorists should travel.

Note: The road cross sections are to comply with the relevant IDM as updated.

The ODP provides for the area east of Palmers Road to be served by a network of Access Streets, with three connecting intersections to Palmers Road, with a single connection to the east to the Merrangbaur Heights Estate via a westerly extension of Lawson Drive.

East west access street connections in the area east of Palmers Road are limited by a creek / gully running north south through the area, with the ODP proposing two crossing points of the creek to provide connectivity from the eastern sections to Palmers Road.

No access to Thorpes Lane is proposed from this area, with the only connection available being via Lawson Drive and the existing Sterling Drive Thorpes Lane intersection.

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### 2.3 Land Budget

The Land Budget Plan in the ODP identifies 5 land parcels east of Palmers Road as shown in 0.

**Figure 2-4 Land Budget – Area East of Palmers Road**



Table 2-3 of the ODP indicates the following Indicative dwelling numbers for each land parcel east of Palmers Road.

**Table 2-3 ODP Indicative Dwelling Yield – East of Palmers Road**

Lot	Net Residential Area	Indicative Dwellings
Property 27 Part 1	0.00 ha	0
Property 27 Part 2	13.7 ha	125
Property 28 Part 1	7.7 ha	73
Property 28 Part 2	0.71 ha	24
Property 29 Part 1	5.41 ha	51
Property 30 Part 1	2.42 ha	23
Property 31 Part 1	19.22 ha	183
Property 32 Part 2	9.04 ha	80
<b>TOTAL</b>	<b>58.2 ha</b>	<b>559 dwellings</b>

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## 3 Existing Road Network

### 3.1 Palmers Road / Colquhoun Road

Palmers Road is classified in the ODP as an “Urban Collector Road” which runs north from Roadknight Street through the Growth Area, becoming Colquhoun Road north of Thorpes Lane.

Palmers Road is constructed with a sealed road pavement approximately 7 metres wide providing for a single traffic lane in each direction with gravel shoulders as shown in Figure 3-1.

**Figure 3-1 Palmers Road looking north towards Thorpes Lane**



Traffic volume data sourced from Gippsland East Shire Council indicates that Palmers Road carries in the order of 1500 vehicles per day south of Thorpes Lane.

### 3.2 Thorpes Lane

Thorpes Lane is a local road, providing a collector function, which runs east from Palmers Road through to Weekes Road and the Princes Highway in the east. A series of local streets run south from Thorpes Lane serving the existing residential precincts to the east of the Growth Area, including Sterling Drive which is the sole access to the Merrangbaur Heights Estate, and McCullough Street which provides an alternate connection to Princes Highway.

Thorpes Lane has a sealed pavement approximately 8 metres wide providing a single traffic lane in each direction, kerb and channel on the southern side within the urban sections and a gravel shoulder on the north as shown in Figure 3-2. Thorpes Lane currently carries approximately 1,400 vehicles per day west of Sterling Drive

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**Figure 3-2 Thorpes Lane looking west from Stirling Drive**



### 3.3 Sterling Drive

Sterling Drive is a local road running south from Thorpes Lane which currently provides sole access to the Merrangbaur Heights Estate.

The road has been constructed with a sealed pavement approximately 9.5 metres in width, providing for a single traffic lane and kerbside parking (if required) in each direction.

South of Thorpes Lane, Stirling Drive currently carries in the order of 800 vehicle movements per day

**Figure 3-3 Sterling Drive looking south from Thorpes Lane towards Lawson Street**



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### 3.4 Lawson Drive

Lawson Drive is a local road running west from Stirling Drive approximately 100 metres south of Thorpes Lane.

Lawson Drive is constructed with a pavement width of approximately 9.5 metres to a similar standard to Sterling Drive as shown in Figure 3-4. The road has been designed to provide future connection to undeveloped residential land to the west as shown in Figure 3-5.

**Figure 3-4 Lawson Drive looking east towards Sterling Drive**



**Figure 3-5 Lawson Drive looking west to existing cul de sac**



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## 4 Traffic Modelling

### 4.1 Overview

Traffic modelling has been undertaken in the area east of Palmers Road in order to review the likely traffic implications of the progressive development of the remaining residential zoned land, including the completion of the Merrangbaur Heights Estate, development of Lot 31 generally in accordance with development proposals for that site, and development yield estimates for properties on the east side of Palmers Road as estimated in the ODP.

Demand forecast in transport planning is the process of estimating number of trips in the future. It consists of generating trips, distribution, mode split and assignment to route.

The four steps of the classical urban transportation planning system model are:

- **Step 1 Trip Generation:** determine of the frequency trips production and attraction from each modelled zone based on the zonal land use inputs.
- **Step 2 Trip Distribution:** determining the linkages between trip origin and trip destination zones.
- **Step 3 Mode Choice:** estimating the proportion of travel by each mode of transport (e.g. private vehicle and public transport).
- **Step 4 Assignment:** determining the route used by each traveller between each pair of origin and destination zones.

### 4.2 Modelling Assumptions

To establish an appropriate traffic generation rate for the progressive development listed above, traffic movement surveys were sourced from East Gippsland Shire Council for vehicle movements along Stirling Drive immediately south of Thorpes Lane. These surveys identified the following:

- > A peak daily volume of 890 vehicle movements;
- > Peak hourly volume of 85 vehicle movements;

A total of 142 dwellings are currently developed within the Merrangbaur Estate taking access via Sterling Drive to Thorpes Lane which for the above existing traffic volumes, equates to the following traffic generation rates per dwelling:

- > Peak daily traffic generation of 6.3 vehicle movements per dwelling; and
- > Peak hourly traffic generation rate of 0.60 vehicle movements per dwelling.

These rates are marginally lower than estimates previously made by Traffix Group in 2008 and Crossco Consulting in 2012 based on traffic surveys undertaken at those times, which showed a traffic generation rates of 0.7 vehicle movements per occupied dwelling during the peak hour and 7 movements per dwelling per day overall.

For the purpose of this assessment the higher rates of 0.7 vehicle movement per hour and 7 vehicle movements per day have been adopted, noting the lower rates recorded in the traffic surveys.

Traffic distribution was established by assessment of vehicle movements recorded at the intersection of Sterling Drive and Thorpes Lane and additional counts taken at Palmers Road and Princes Lakes Entrance Highway. Trip distribution patterns were interpreted to provide for the following distribution matrix.

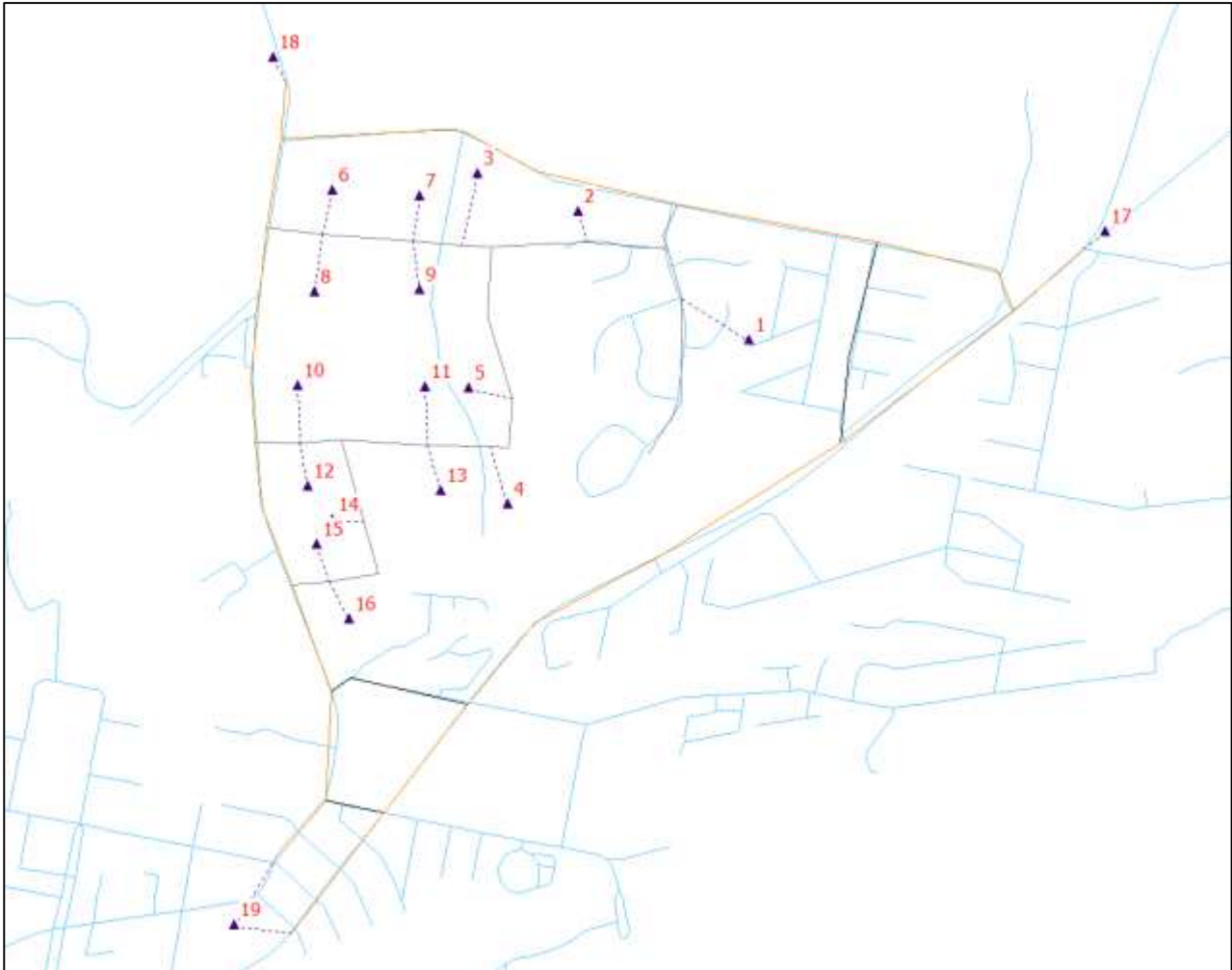
- Towards Lakes Entrance via Palmers Road or Princes Highway – 85%
- To the east via Thorps Lane to Princes Highway – 10%
- To the north via Thorps lane to Colquhoun Road – 5%

A road network model was developed to assign demands to the future road network, utilising the basic assumption that travellers will strive to find the shortest path from origin to destination. The model has been implemented in the Cube Voyager software environment.

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The modelled network adopted is shown in Figure 4-1.

**Figure 4-1 Study Area Modelling**



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### 4.3 Development Assumptions and Trip Generation

Future dwelling yields and resultant traffic generation for properties east of Palmers Road are summarised in Table 4-1.

**Table 4-1 Land Use and Trip Rate**

Precinct	Model Zone	Dwellings	Trip Rate	Daily Trips	Comment
Merrangbaur, South of Lawson Drive	1	160	7	1120 vpd	Occupation of all lots south of Lawson Drive in existing subdivision
Merrangbaur, Lawson Drive precinct	2	26	7	182 vpd	Occupation of all lots west of Sterling Drive via Lawson Drive in existing subdivision
Property 31	3	40	7	280 vpd	Precincts 1 to 3 in Watsons Subdivision Plan 35658A CP-A
Property 31	4	109	7	763 vpd	Precincts 4 to 7 in Watsons Subdivision Plan 35658A CP-A
Property 31	5	147 (RV)	4	588 vpd	Previous Retirement Village proposal for superlot
		16 (Aged Care)	3	48 vpd	As above
Property 27	6 7 8 and 9	125	7	875 vpd	ODP Land Budget
Property 28	10 11 12 and 13	97	7	679 vpd	As above
Property 29	8	51	7	357 vpd	As above
Property 30	9	23	7	161 vpd	As above
Total		631 + RV		5053 vpd	

Overall the analysis and modelling considers the completion of Merrangbaur Heights Estate to 186 lots and development of the balance of land east of Palmers Road yielding an additional 445 lots plus a Retirement Village consisting of 147 independent living units and 16 aged care beds.

In total it is estimated that the development of the area, including Merrangbaur Heights will generate slightly in excess of 5,000 vehicle movements per day.

### 4.4 Development Scenarios

It is apparent that development in the area will occur relatively slowly with the various properties developed over time as demand for housing requires. In order to test the progressive generation of traffic and options for the staging of access to the existing road network a series of scenarios have been modelled as follows.

**Table 4-2 Development Scenarios Modelled**

Scenario	Additional Development	Access
Scenario 1	Completion of Merrangbaur Height Estate (186 lots)	Stirling Drive to Thorpes Lane Only
Scenario 2	Development of Stages 1 to 7 on Property 31 (149 lots)	Lawson Drive and Stirling Drive to Thorpes Lane Only
Scenario 3	Development of Superlot on Property 31 assuming Retirement Village	Lawson Drive and Stirling Drive to Thorpes Lane Only
Scenario 4	As Above	Northern Access Street constructed to Palmers Road
Scenario 5	Development of Property 27 and 28	Central Access Street constructed to Palmers Road
Scenario 6	Development of Property 29 and 30	Southern Access Street constructed to Palmers Road

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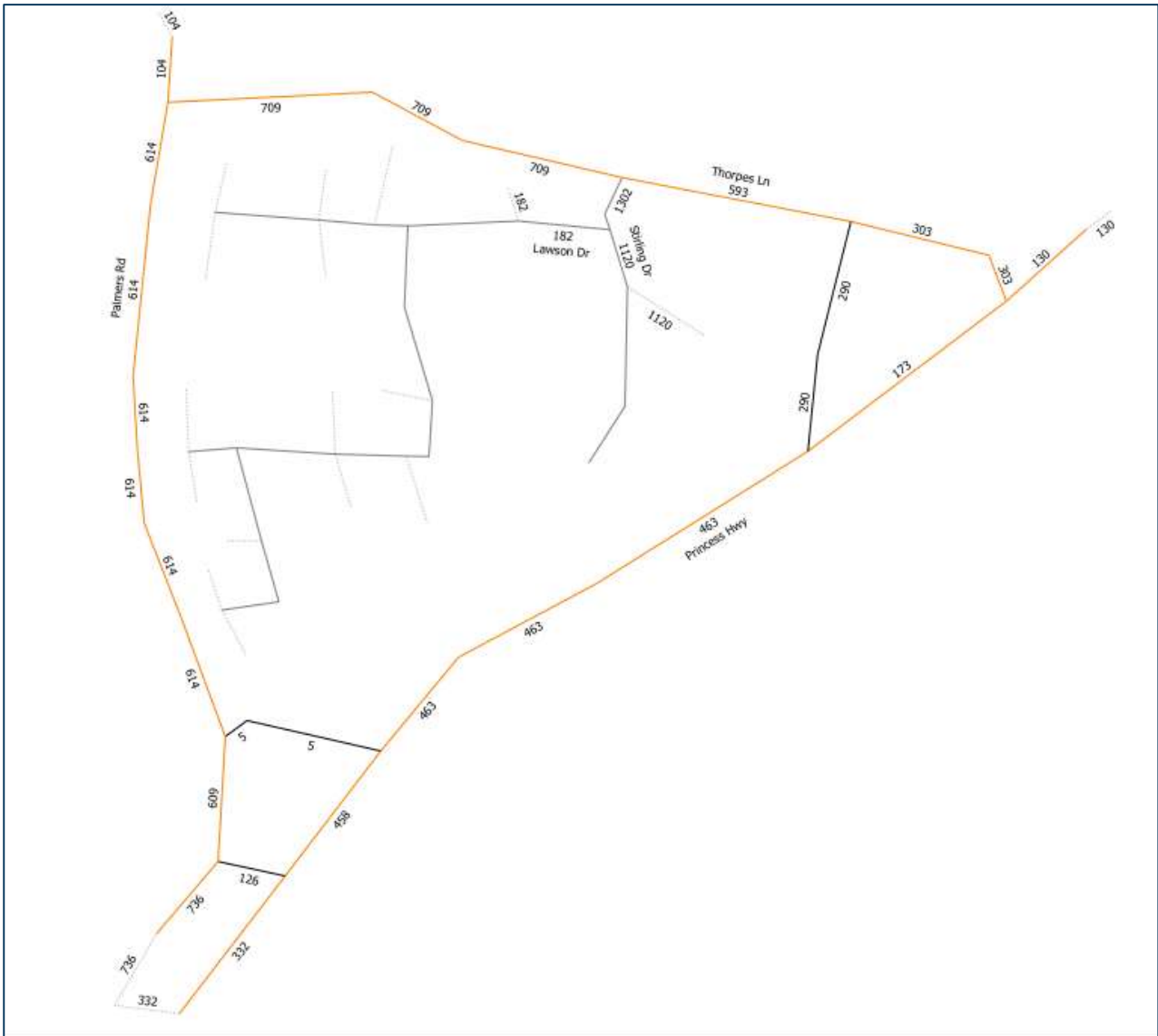
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## 4.5 Completion of Merrangbaur Heights (Scenario 1)

Modelled volumes for the completion of Merrangbaur Heights are shown in Figure 4-2.

**Figure 4-2 Modelled Daily Volumes Scenario 1**



At full development of the Estate, Stirling Drive is expected to carry approximately 1300 vehicles per day at Thorpes Lane, with Lawson Drive carrying less than 200 vehicles per day at Stirling Drive

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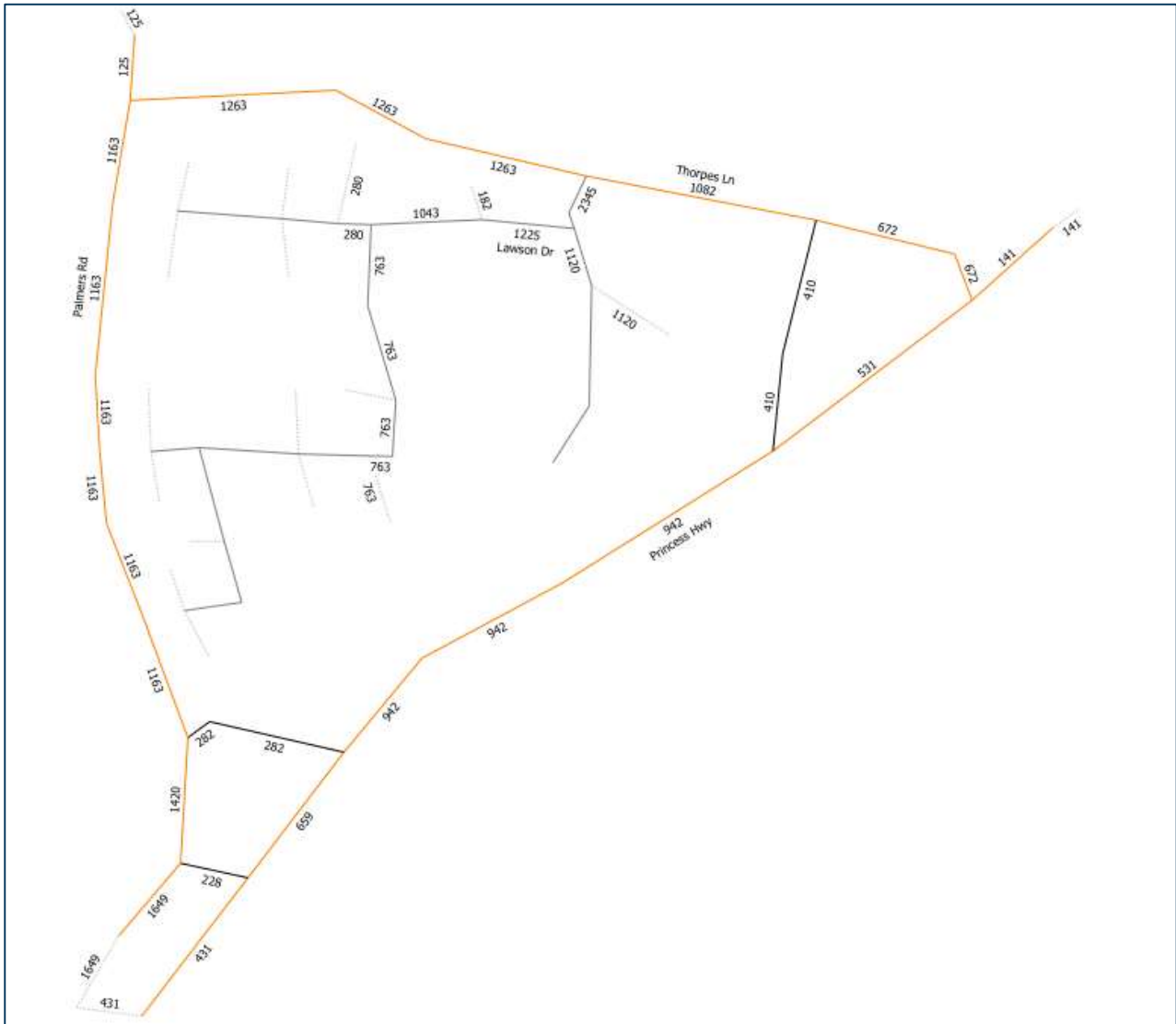
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#### 4.6 Development of Property 31 (Scenario 2)

Modelled volumes for the potential development of Stages 1 to 7 on Property 31, connecting solely to Lawson Drive are shown in Figure 4-3.

**Figure 4-3 Modelled Daily Volumes – Scenario 2**



It is expected that volumes on Lawson Drive at the boundary with Merrangbaur Heights will be in the order of 1050 vehicles per day, increasing to 1225 vpd at Stirling Drive.

Stirling Drive would carry 2,345 vehicles per day at Thorpes Lane with traffic distributed to the east and west along Thorpes Lane in similar proportions to existing traffic.

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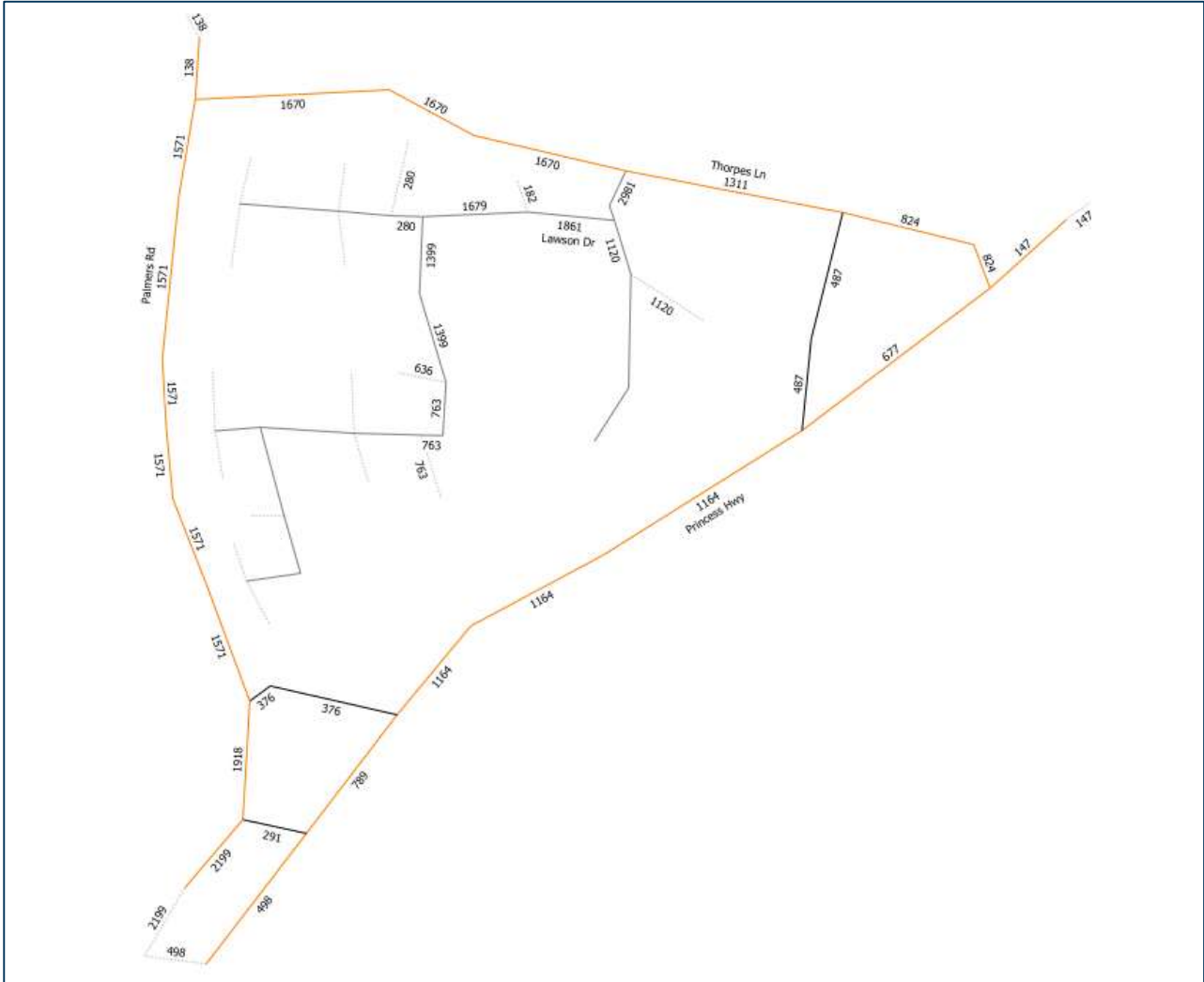


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### 4.7 Development of Retirement Village (Scenario 3)

Development of the proposed superlot on Property 31 as a retirement village is expected to generate an additional 588 vehicles a day to the local road network with overall modelled volumes shown in Figure 4-4.

**Figure 4-4 Modelled Daily Volumes – Scenario 3.**



Additional development on Lot 31 increases volumes of Lawson Drive to 1,861 vehicles per day at Stirling Drive and Stirling Drive at Thorpes Lane to approximately 3,000 vehicles per day.

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## 5 Access Capacity via Merrangbaur Estate

### 5.1 Street Classification and Function

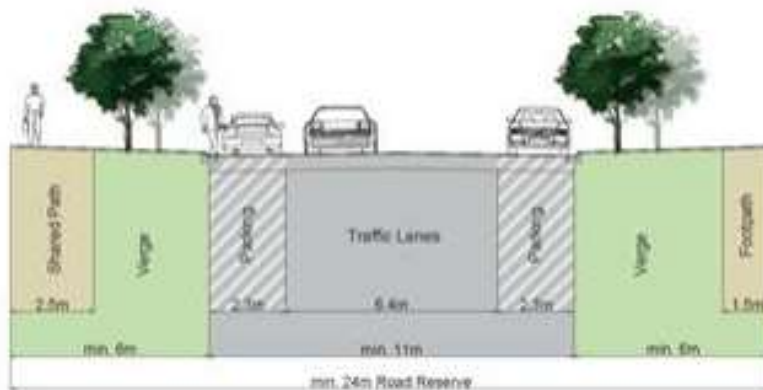
It is apparent that a key consideration in the provision of access to development areas east of Palmers Road is the capacity of Stirling Drive in environmental capacity terms to cater for additional traffic should development proceed without additional access points being available.

As discussed in Section 3.3, Sterling Drive and Lawson Drive have both been constructed with a road pavement of approximately 9.5 metres between kerbs, which allows comfortably for a single traffic lane in each direction and kerbside parking as required along either kerb.

The construction standard, in excess of the nominal 7.5 metre pavement used for an access street, suggests that Sterling Drive and Lawson Drive have been constructed to fulfil a future connector street function.

The extension of Lawson Drive to the west forms part of the Connector Road network in the ODP and in traffic function terms the existing section within the Merrangbaur Heights Estate, and the section of Sterling Drive between Lawson Drive and Thorpes Lane will form a logical completion of the overall connector network.

The ODP cross-section for a Connector Street - Level 1, carrying up to 3,000 vehicles per day, is shown below.



**Connector Street – Level 1**

A minimum pavement width of 11 metres is specified allowing two 3.2 metre traffic lanes and 2.3 metre parking lanes along each kerb designed to comply with the Department of Transport "Guidelines for Land Use and Development : Public Transport", 2008.

In effect, it appears that the designated Connector Street pavement width is designed to cater for a future bus service using the connector road, with parking occurring along both kerbs.

Lawson Drive and Stirling Drive have been constructed with a 9.5 metre pavement, and hence does not conform to the recommended standard of 11.0 metres for a connector street in the ODP.

The construction standard is however considered appropriate for Lawson Drive and Sterling Drive to function as connector roads within the overall network for the following reasons:

- The pavement width of 9.5 metres is sufficient to provide for a clear traffic lane in each direction and intermittent kerbside parking;
- The section of Stirling Drive between Thorpes Lane and Lawson Drive where traffic movements will be concentrated, is approximately 100 metres long with only five properties abutting, including two with frontage to Thorpes Lane. South of Lawson Drive, little or no growth in existing traffic volumes or function will occur;

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- There is little or no demand for on-street parking with each abutting property having garages and setbacks allowing onsite parking; and
- It is highly unlikely that a bus service would be established into the area until such time as the connector road network completed, providing alternate access to Palmers Road. At this time, traffic volumes on Sterling Drive and Lawson Drive will dissipate as alternate access to Palmers Road is established, such that bus access will readily be accommodated.

Accordingly, in assessing the opportunity for Sterling Drive and Lawson Drive to function as sole access to development in the area as development proceeds to the west from Merrangbaur Heights, the classification of the existing roads as connector roads, with an environmental capacity of up to 3,000 vehicles per day is considered appropriate.

## 5.2 Capacity for Future Development

It is considered that additional development to the west of Merrangbaur Heights can be permitted without additional connections to Palmers Road being provided having regard to the existing construction standard of Lawson Drive and Sterling Drive and the intended function of these roads.

The development of Lot 31 for up to 150 lots, as tested in Scenario 2 in Section 4.6 is expected to increase traffic volumes on Sterling Drive to approximately 2,350 vehicles per day and Lawson Drive to 1,225 vehicles per day, well within the environmental and physical capacity of both roads.

Development of additional lots, either through construction of a retirement village or additional conventional lots, could be permitted, which would increase volumes on Sterling Drive in the interim to up to 3,000 vehicles per day.

This is within the environmental capacity of the street and hence be a satisfactory outcome until such time as sufficient funding is available to construct westerly connections to Palmers Road.

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## 6 Possible Palmers Road Intersection Variations

Traffic modelling detailed in Section 4.4, is based on development of the area south of Thorpes Lane as envisaged in the LENGA ODP, with various assumptions adopted as to the likely progressive development of residential land.

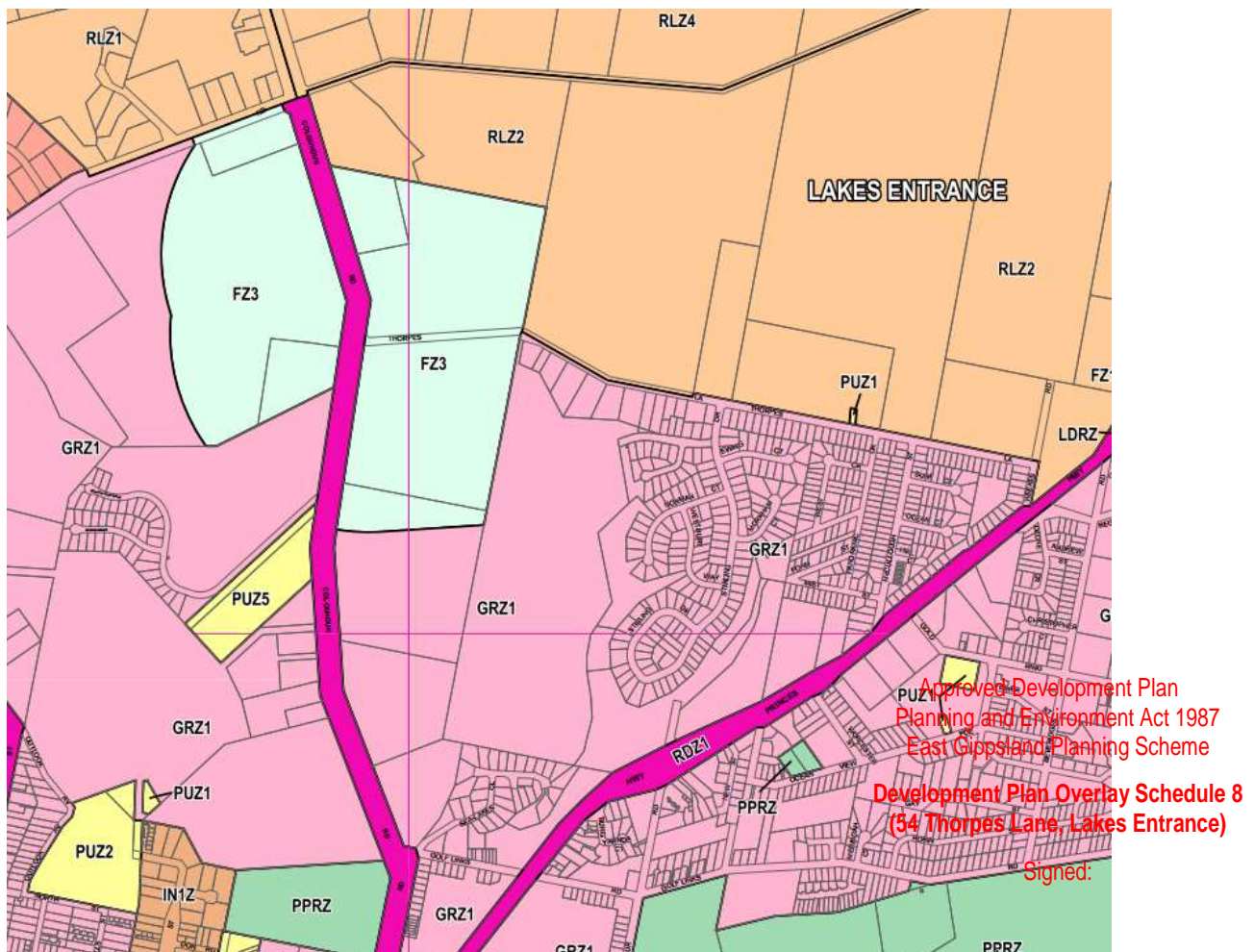
The modelling also assumes three new intersections to Palmers Road as contemplated in the ODP, which will be developed as required.

Modelling shows that Intersection 10, the most southerly intersection to Palmers Road, can be expected to carry relatively low traffic volumes (approximately 500 vehicles per day) and will predominantly be utilised as access to lots in Property 30 and, to a lesser extent, Property 29. In comparison connections to intersections 11 and 13 are expected to carry volumes in excess of 2,000 vehicles per day and accordingly will have a higher traffic function.

It is also noted that Intersection 10 is shown relatively close to the existing intersection of Palmers Road / Golf Links

In addition, Intersection 13, which is the northerly intersection is located within Property 27. As shown in Figure 6-1, this land is currently within a Farming Zone (FZ3) and will require rezoning before residential development occurs.

**Figure 6-1 Lakes Entrance Zoning Map**



If this land remains within the farming zone, then residential development east of Palmers Road will reduce, by approximately 150 lots when compared to the land budget in the ODP, and assumed in the modelling undertaken.

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In addition it is likely that the access street connecting to Intersection 13, which is also located within the Farming Zone, would not be constructed, resulting in traffic being serviced by intersections 10 and 11 only.

Additional modelling has been undertaken to test the implications of these scenarios, with modelled daily volume shown in Table 6-1.

**Table 6-1 Modelled Volumes – Intersection Variations**

	LENGA ODP	LENGA ODP (Without Intersection 10)	LENGA ODP (without Farm Zone)	LENGA ODP (without Farm Zone or Intersection 10)
Number of Dwellings*	794 dwellings	794 dwellings	644 dwellings	644 dwellings
Total Daily Volumes	5053 vpd	5050 vpd	4003 vpd	4003 vpd
Total Volumes to Palmers Rd	4489 vpd	4489 vpd	3556 vpd	3556 vpd
Intersection 10	515 vpd	-	1000 vpd	-
Intersection 11	2041 vpd	2539 vpd	2556 vpd	3556 vpd
Intersection 13	1933 vpd	1950 vpd	-	-

\*including retirement village and aged care

It is considered that, whether or not the Farming Zone land is ultimately developed, the area can be satisfactorily served by two higher order access street connections to Palmers Road.

As such development contributions from the broader area should be allocated to the provision of two intersections, notionally Intersection 11 and Intersection 13 if the entire area develops. If however the land within Property 27 remains in the Farming Zone, such that intersection 13 cannot be constructed, Intersection 10 to Palmers Road would be developed.

It is noted that, Intersection 11 is likely to carry in excess of 3,500 vpd in the scenario that the Farming Zone land is not developed and it becomes the only connection to Palmers Road. While manageable, the provision of a second intersection, to reduce traffic intensity, is considered desirable.

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## 7 Road Development Contributions

### 7.1 Properties within the GRZ1 Zone

In order to facilitate the further development of the area east of Palmers Road as contemplated in the LENGA ODP, road and intersection works will be required to provide appropriate road capacity and ensure a permeable local street network.

In particular the construction of new intersections to Palmers Road (as discussed in Section 6) and two local street crossings of the gully / creek running north south through the area will be progressively required.

It is considered that, while sufficient residual capacity is available in the existing road network to permit completion of Merranbaur Heights and development of Lot 31 without immediate intersection works, further development should contribute financially to road infrastructure required in the future for the area as a whole.

Development of Properties 28 to 30 on the east side of Palmers Road will require construction of intersections to Palmers Road which, while facilitating initial access to those properties, will also be used ultimately by traffic generated in the broader area including Merranbaur Heights.

To ensure the timely provision of the intersections and creek crossings required, it is recommended that a development contributions plan be established, with funds collected from future subdivisions in the area including Lot 31, to provide for required works. This would only include land within the GRZ1 zone.

The contribution fund, administered on a per lot basis, should be structured to fund the construction of the recommended two intersections to Palmers Road as progressively required to provide access to properties fronting Palmers Road, with the two creek crossings being constructed towards the completion of the development of the area to provide desirable local connectivity and reduce traffic concentrations to Stirling Drive and Thorpes Lane.

The staging of intersection provision to Palmers Road will depend on the timing of development of Properties 28 to 30 within the GRZ1 Zone.

Intersections triggered by development of these lots could be funded partially from funds previously collected, and augmented potentially by "works in lieu" which could be credited to a subdivision constructing an intersection to provide access which will ultimately be used by traffic from neighbouring areas.

Cost estimates for the four identified projects have been prepared and are summarised in Table 7-1

**Table 7-1 Road Work Development Contribution Projects – Cost Estimates**

Project	Cost Estimate
Intersection 10	\$280,000
Intersection 11	\$315,000
Culvert 1	\$250,000
Culvert 2	\$250,000
<b>TOTAL</b>	<b>\$1,095,000</b>

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It is recommended that the total cost of the four items be shared equally across the area with the indicative distribution of costs shown in Table 7-2.

Overall, the contribution to the four projects, on a per lot basis is equivalent to **\$2,588 per lot.** Signed:

It is noted that the scheme as proposed allows the balance of land to the east of Palmers Road within the GRZ1 zone to be developed and serviced without reliance on contributions from potential development within the FZ3 zone.



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**Table 7-2 Indicative Development Contribution Proportions - Land Within the GRZ1 Only**

Development Site	Indicative Lots	Development Units*	Proportion of Overall Contribution	Cost Contribution
Merrangbaur Heights Balance	44	44	10%	\$113,900
Property 31	149	149	35%	\$385,709
Property 31 (Retirement)	147	84	20%	\$217,447
Property 28	72	72	17%	\$186,383
Property 29	51	51	12%	\$132,022
Property 30	23	23	5%	\$59,539
<b>Total</b>	<b>486 Dwellings</b>	<b>423</b>	<b>100%</b>	<b>\$1,095,000</b>

\*Each lot is equivalent to 1 development unit with the exception of the retirement units and aged care facilities, which have been adjusted down to 57% of conventional lots to reflect lower traffic generation characteristics of this type of dwelling

## 7.2 Properties within the Farming Zone

The scheme outlined above does not include Property 27 or the northern portion of Property 28, which is currently in the FZ3 zone.

If these areas are rezoned in the future to permit residential development, it is estimated that approximately 150 lots could be developed, 125 in Property 27 and 25 additional lots in Property 28.

Access to these lots would be most likely achieved through construction of an additional third intersection to Palmers Road in the location of Intersection 13, with the intersection cost met as a subdivision cost as a condition on permit.

The cost of a separate intersection is estimated at **\$315,000**, which would result in an effective cost of approximately **\$2,100 per lot** for the 150 lots in the FZ3 zone.

It is noted that analysis shows that the area can be adequately serviced by two intersections to Palmers Road, such that an option could be pursued, if the land is rezoned, for connections to be made to the south to utilise intersections proposed within the scheme proposed for the GRZ1 land.

It is noted that, if all potential lots yet to be developed in the area east of Palmers Road, including those within the FZ3 zone, were to contribute equally to the construction of the works required for the area described in Table 7-1, the resultant cost would be approximately **\$1972** per lot.

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## 8 Conclusions

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Based on the preceding analysis it is concluded as follows:

1. Traffic surveys undertaken in the area of the Merrangbaur Heights Estate subdivision show that existing dwellings in the estate generate average weekday volumes of 6.3 vehicle movements per dwelling per day and 0.60 movements per hour at peak times.
2. Conservatively adopting a rate of 7 movements per dwelling per day for analysis purposes, sufficient capacity is available in Sterling Drive and at the Sterling Drive / Thorpes Lane Intersection to permit completion of the balance of the estate and the development of Property 31 immediately to the west without an immediate requirement to provide additional vehicular connections to the west to Palmers Road.
3. To facilitate development of lots on the east side of Palmers Road as contemplated in the Lakes Entrance North Growth Area ODP, road and intersection works will be required to provide appropriate road capacity and ensure a permeable local street network, with three intersection to Palmers Road and two local street crossings of the creek / gully being required to serve the area as a whole.
4. Further development of the area, including the balance of the Merrangbaur Estate and Property 31 should contribute financially to the road infrastructure required to complete the road network on an equal basis, with reductions considered for lower traffic generating dwellings such as retirement village or aged care facilities .
5. The contribution fund, administered on an equal basis across the area for lots yet to be developed, should be structured to initially fund the construction of the intersections to Palmers Road, with creek crossings constructed towards the end of development of the area to provide appropriate local connectivity and to reduce traffic concentrations to Sterling Drive and Thorpes Lane.

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