

ATTACHMENT 3

MONASH VIEWS DEVELOPMENT PLAN

Monash Views Development Plan



Lot A on PS701486M &
Crown Allotment 9P1 Parish of Narracan

Applicant: Monash Views P/L
February 2013

Contents

1	Introduction	3
1.1	Supporting Documentation	3
2	Development Plan Area	4
2.1	Site Context	4
2.2	Site Analysis	5
2.3	Site Photographs	8
3	Development Plan Overlay Requirements	10
3.1	Land Use and Subdivision	10
3.2	Waterways	17
3.3	Infrastructure Services	18
3.4	Open Space	23
3.5	Community Hubs and Meeting Places	25
3.6	Flora and Fauna	26
3.7	Cultural Heritage	29
3.8	Staging and Implementation	30
4	Appendix 1 – Site Conditions	31
5	Appendix 2 – Golf Course Redevelopment	32
6	Appendix 3 – Waterway & Catchments	33
7	Appendix 4 – Habitat Zones	34
8	Appendix 5 – Development Plan	35
9	Appendix 6 – Staging Plan	36
10	Appendix 7 – Landscape Concept	37
11	Appendix 8 – Ogilvy Clayton Correspondence	38
12	Appendix 9 – Traffic Engineering Assessment	39
13	Appendix 10 – Cultural Heritage Assessment	40
14	Appendix 11 – Flora, Fauna & Net Gain Assessment	41
15	Appendix 12 – Scoping Assessment	42
16	Appendix 13 – Latrobe City Council correspondence	43
17	Appendix 14 – Movement Network Plan	44
18	Appendix 15 – Interface Plan	45

1 Introduction

The Monash Views Development Plan (MVDP) comprises this document and the accompanying plans. It has been prepared for land at Monash Road, Newborough and sets out the form and conditions for future residential use and development.

The Development Plan has been prepared in accordance with the requirements of the Development Plan Overlay (DPO) provisions at Clause 43.04 of the Latrobe Planning Scheme and more particularly Schedule 5 of the Development Plan Overlay – Residential Growth Areas.

A planning permit for the subdivision, use and development of land must be generally in accordance with the Development Plan.

1.1 Supporting Documentation

Accompanying this submission is the following supporting documentation:

- | | |
|-------------------|---|
| Appendix 1 | Site Conditions
NBA Group in consultation with Millar Merrigan
Reference: 15890DP1 |
| Appendix 2 | Golf Course Redevelopment
NBA Group in consultation with Millar Merrigan
Reference: 15890DP2 |
| Appendix 3 | Waterway & Catchments
NBA Group in consultation with Millar Merrigan
Reference: 15890DP3 |
| Appendix 4 | Habitat Zones
NBA Group in consultation with Millar Merrigan
Reference: 15890DP4 |
| Appendix 5 | Development Plan - Proposed Subdivision
NBA Group in consultation with Millar Merrigan
Reference: 15890DP5 |
| Appendix 6 | Staging Plan
NBA Group in consultation with Millar Merrigan
Reference: 15890DP6 |
| Appendix 7 | Landscape Concept
NBA Group in consultation with Millar Merrigan
Reference: 15890DP7 |

- Appendix 8 Ogilvy Clayton Correspondence**
Monash Views - Design Notes
Yallourn Golf Club - letter from Ogilvy Clayton - 16 July 2012
- Appendix 9 Traffic Engineering Assessment**
Traffix Group - October 2011
Traffix Group - 23 August 2012
- Appendix 10 Cultural Heritage Assessment**
Tardis Enterprises Pty Ltd - July 2007
Requirements of Aboriginal Heritage Act – letter from Andrew Long and Associates Pty Ltd - 4 April 2011
- Appendix 11 Flora, Fauna & Net Gain Assessment**
Biosis Research Pty Ltd - August 2012
- Appendix 12 Scoping Assessment**
Water Technology - 2 August 2011
- Appendix 13 Latrobe City Council correspondence**
Dated 5 January 2012
- Appendix 14 Movement Network Plan**
NBA Group in consultation with Millar Merrigan
Reference: 15890DP8
- Appendix 15 Interface Plan**
NBA Group in consultation with Millar Merrigan
Reference: 15890DP9

2 Development Plan Area

The Monash Views Development Plan applies to Lot A on PS701486M and Crown Allotment 9P1 Parish of Narracan, which comprises a total area of 94.27 hectares.

This section of the report provides a description of the site’s surrounding context and physical features.

2.1 Site Context

The subject area is located on the eastern periphery of the Newborough Township some 140km south-east of Melbourne.

The land is a greenfield site bound by Monash Road, Golf Links Road and Coach Road. It is wedged between the established Newborough residential area to the west and the Yallourn mining land to

the east. Fairway Drive and Linkside Court, which are established residential streets, border the east boundary separating much of the site from the mining land.

The Yallourn Bowling Club abuts the south western corner of the subject land and Monash Park, which is a large recreation reserve located on the south western corner of Coach Road.

The Central Gippsland Tafe Institute and local army depot are located to the north of the subject land on Monash Road.

Refer to Figure 1 – Context Plan and Figure 2 – Site Analysis.

2.2 Site Analysis

The subject land is irregular in shape comprising of two titles; the northern which is home to the Yallourn Golf Club and the southern which is vacant and utilised for grazing purposes (see Site Conditions at Appendix 1). The golf course offers 18 holes and a well equipped clubhouse which is located towards the northern boundary adjacent Golf Links Road.

Substantial road frontages are available to Monash Road to the west, Golf Links Road to the north and Coach Road to the south. There is also minor linkage available to Fairway Drive to the east. Current access to the golf club is via Golf Links Road.

The land is gently undulating with a general slope from east to west and contains three designated waterways, including the Sandy Creek and two tributaries. A natural spring exists on the hill slope in the south east corner of the land and has been fenced to prevent stock access. There are also two large dams within the grazed portion of the land and a further dam within the golf course. The highest point on the property is on the south east corner and the lowest is on the western boundary. From the highest point, extensive views are afforded of the Great Dividing Range.

Vegetation on site is mixed, offering areas of pasture, exotic species and both disturbed and intact native vegetation. Exotic species have been introduced across the golf course where vegetation follows the design of the fairways. A strip of riparian vegetation follows the Sandy Creek in the north-western corner of the land and a large patch of intact vegetation is located towards the southern corner. The native vegetation varies in quality and significance. A full description of the vegetation and its ecological significance is contained in the Flora, Fauna and Net Gain Assessment at Appendix 11.

The land contains a number of easements and is capable of being fully serviced with reticulated infrastructure. The easement and rising sewer main running along the boundary of Lot A (see Site Conditions at Appendix 1) will be replaced with a new easement and sewer design as part of any future subdivision.

Refer to Figure 2 – Site Analysis Plan.

Figure 1: Context Plan

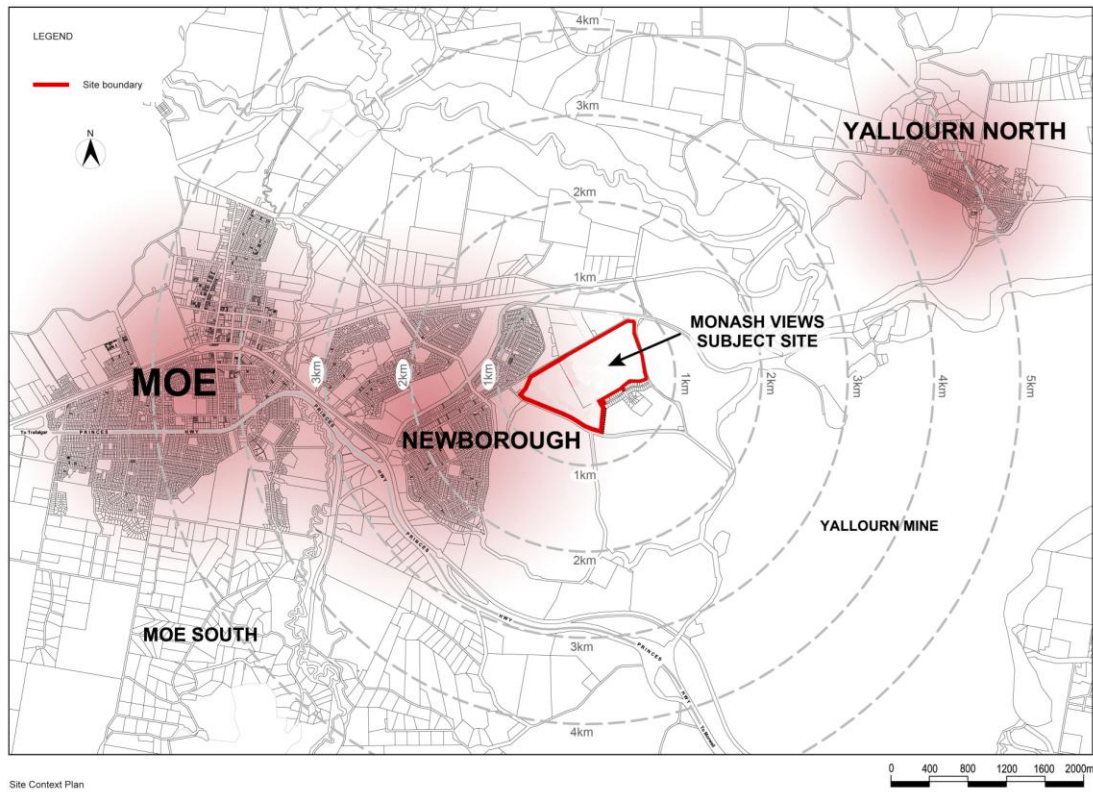
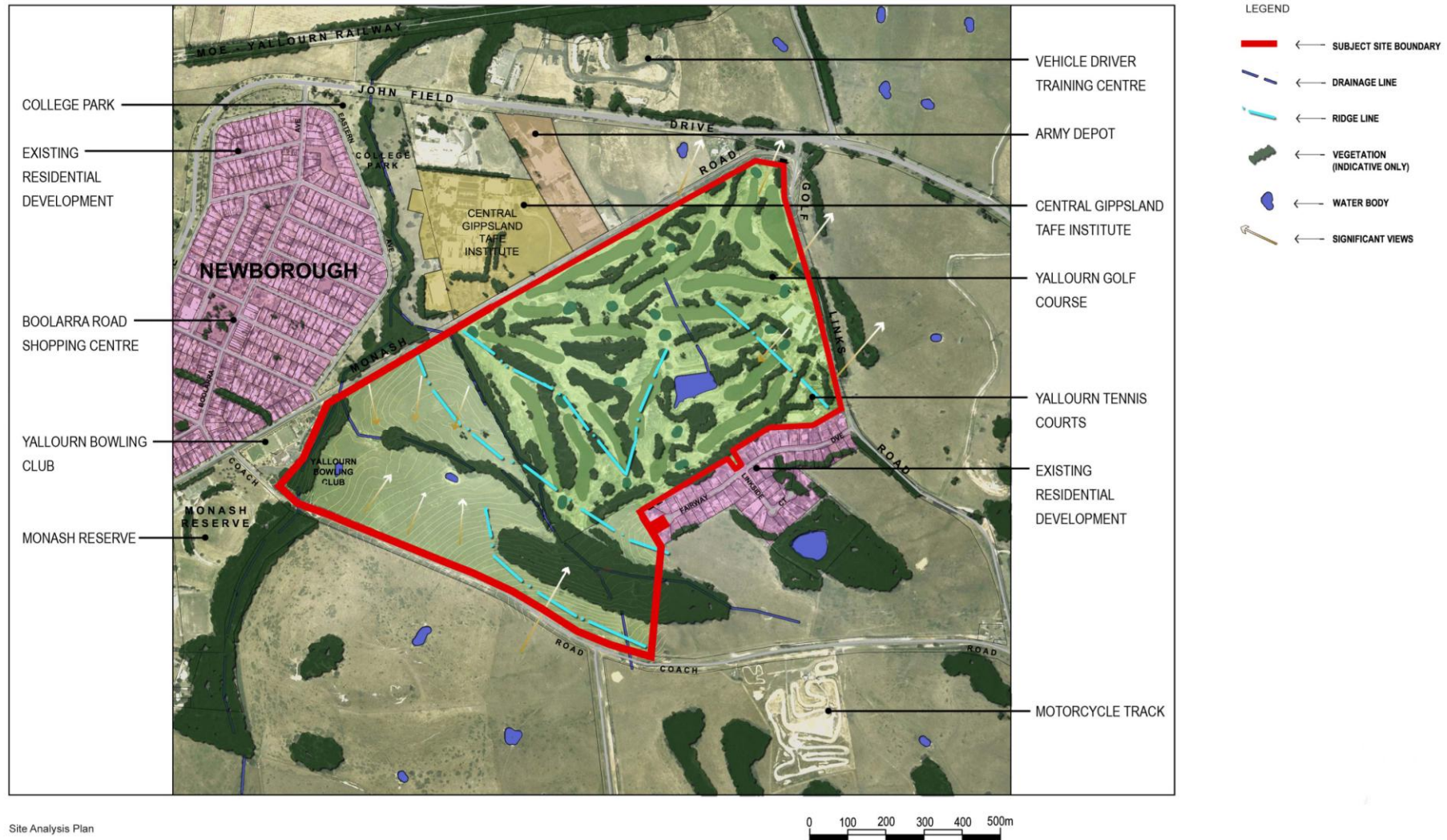


Figure 2 – Site Analysis



Site Analysis Plan

2.3 Site Photographs

Photograph 1 – Looking up the 2nd hole of the golf course



Photograph 2 – Looking down the 7th hole of the golf course



Photograph 3 – Looking towards the site from Monash Road at the portion of land currently utilised for grazing



Photograph 4 – Looking north across the grazing land towards the golf course



Photograph 5 – Looking across the site from near Coach Road in a northerly direction



Photograph 6 – Looking in a south-westerly direction across the gully in the western corner of the site



Photograph 7– North-east view down Monash Road (site on right)



Photograph 8– South west view down Monash Road (site on left)



3 Development Plan Overlay Requirements

Schedule 5 of the Development Plan Overlay requires the following:

A development plan must be prepared to the satisfaction of the Responsible Authority.

The plan must show the following.

3.1 Land Use and Subdivision

- ***The proposed boundaries of the development area, and provide the strategic justification for those boundaries.***

The Development Plan (see Appendix 5) identifies the boundary of the proposed development area. It has been derived from a detailed assessment of the existing golf course and the aspirations of the club to significantly improve the course whilst allowing for the development of surplus land. Ogilvy Clayton Golf Course Architects have prepared design notes and supplied a subsequent letter (see Appendix 2) that discuss the replacement of the 2nd, 3rd and 4th holes, together with recommendations for 'buffer zones' between residential areas and fairways. They state:

The removal of the original 2nd, 3rd and 4th, in place of new holes to the West of the course will, most importantly, allow for significant improvement to Yallourn Golf Club. These new holes replace three quite poor holes and the land over which they are planned allows for some first-class golf.

And

Thus far the proposed redevelopment of Yallourn Golf Club has been well investigated and planned by Monash Views Pty Ltd. As a minimum, 70 metres has been allowed as a buffer between the conceptual fairway centreline and the proposed property boundaries.

The entire land has been considered as a single precinct and the design is reflective of maintaining a functional course with a lifestyle village component. The Golf Course Redevelopment plan is included at Appendix 2. The overall development will provide for high amenity housing choice, consistent with Latrobe Structure Plans – Moe/Newborough and Newborough whereby the relevant objective is to:

Facilitate the development of a life-style residential neighbourhood centred on the Yallourn Golf Course to diversify overall residential market within the township.

- **The overall subdivision of the area, including where possible, the proposed size and density of allotments which provide opportunities for a diverse range of housing types.**

The Development Plan (see Appendix 5) indicates an overall subdivision for the development area. The design can be described as a curvilinear layout that offers flowing circulation, protection of significant vegetation and excellent integration with the adjoining golf course.

A lengthy design process has been undertaken for the site. The evolution of the design has resulted in best practice urban design outcomes and an improved response to the requirements of *Victoria's Native Vegetation Framework*. The plan responds to site features and constraints together with the aims of the planning scheme.

Figures 3 to 6 below show how the plan has progressed.

Figure 3: Development Plan 1 (circa August 2005) – this plan did not respond to native vegetation in the south west corner appropriately

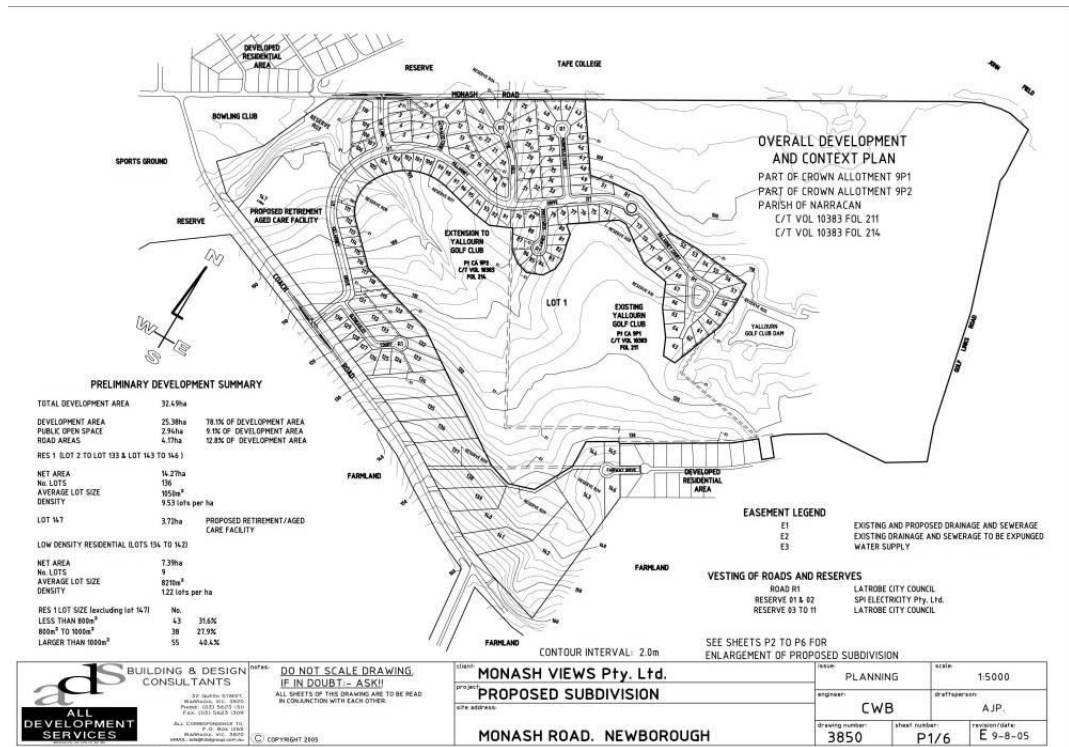


Figure 4: Development Plan 2 (circa July 2011) – this plan was utilised to inform the rezoning of the land , later review considered that a predominant interface of back fences to the golf course was not appropriate



Figure 5: Development Plan 3 (circa May 2012) – This sketch plan was prepared by DPCD on behalf of Latrobe City Council to improve circulation and the golf course interface

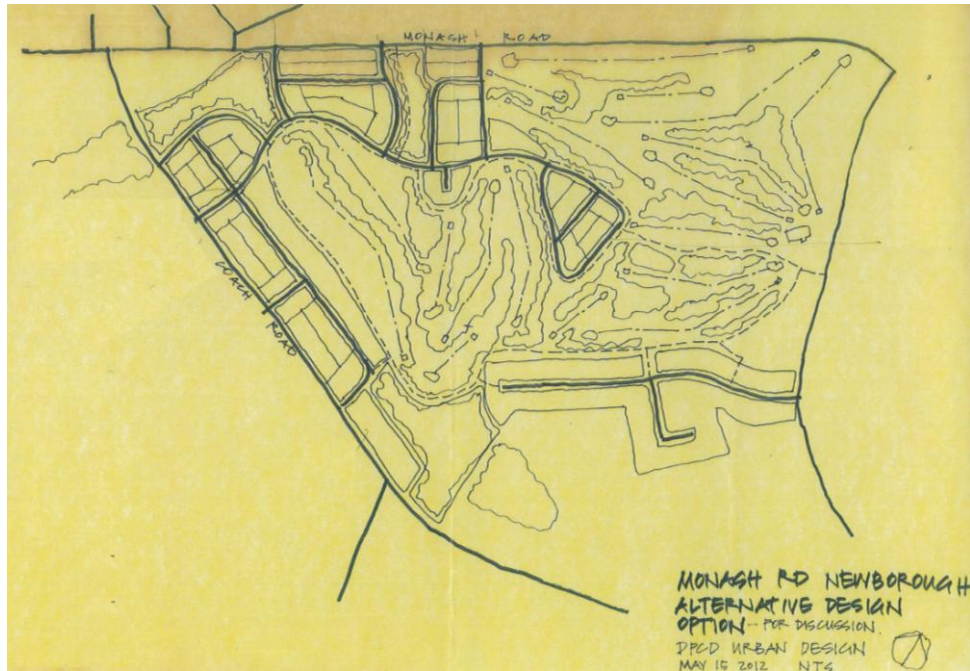
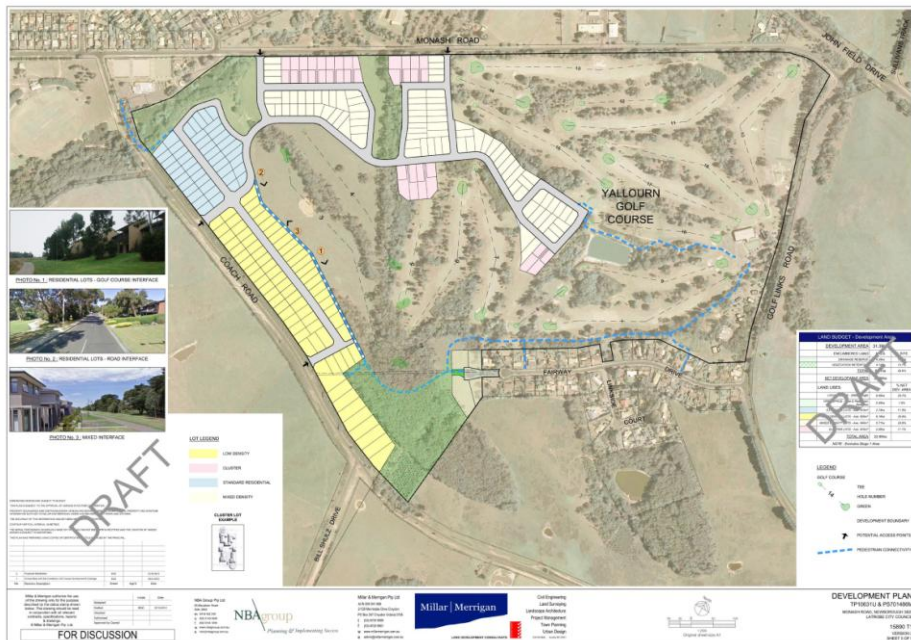


Figure 6: Development Plan 4 (May 2012) – Plan compiling detailed site analysis, Latrobe City Council’s requirements and good urban design (prepared for discussion purposes)



The final development plan layout offers approximately 221 lots at a mix of densities to cater for the varying needs of the population. Average lot sizes and percentages of the development area are as follows:

Standard lots (average 679sqm)	33.4%
Double fronted lots (average 947sqm)	11.7%
Superlots	2.4%
Cluster lots (average 705sqm)	4.4%

The development will offer a lifestyle precinct based on good urban design principles to ensure high levels of amenity and sustainable development.

- ***The overall pattern of development of the area, including any proposed re-zoning of land and proposed land uses.***

The entire land is zoned Residential 1 and there are no rezoning's sought. The land is to be developed for residential purposes in conjunction with retention and enhancement to the existing golf course.

- ***Street networks that support building frontages with two way surveillance.***

The Development Plan (see Appendix 5) offers a street network that encourages future buildings to overlook public spaces. A boulevard road is proposed along much of the abuttal to the golf course to enable high levels of surveillance whilst granting an attractive outlook.

Lots are designed in varying fashions, all of which support high levels of surveillance. They are described as follows;

Road interface– these lots front roads and generally abut other residential lots to the sides and rear. It is intended that future dwellings overlook streets.

Golf course interface- these lots have direct abuttal to the golf course at one end and a road at the other. It is intended that future dwellings provide an active frontage to the road whilst addressing the golf course, similar to that depicted in photograph 9. In some instances shared paths will be located between the lots and the golf course as depicted in photograph 10.

Cluster lots – these lots are arranged in groups of four and are utilised where two way surveillance is sought however vehicular access to one abuttal is to be avoided. Figure 7.

It is intended that Design Guidelines will be developed and implemented as part of the planning permit process to control the quality of the built form and in particular to ensure that houses that have an interface to the golf course or future reserves present an active frontage for at least part of this interface.

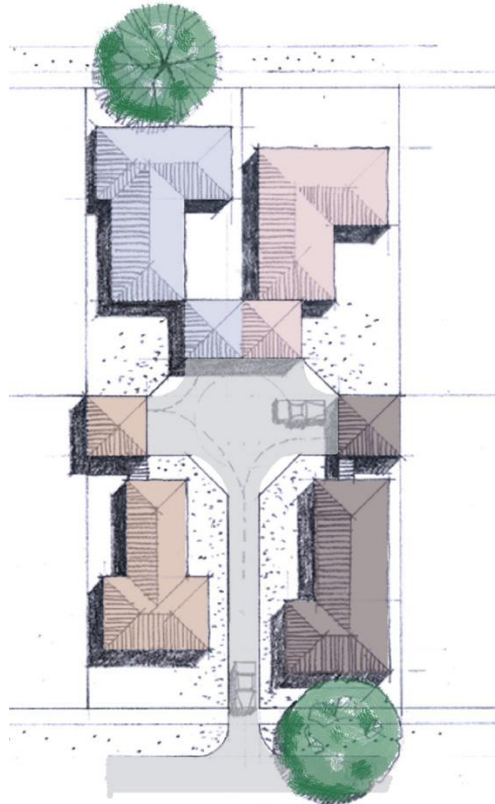
Photograph 9: Lots are designed to enable dwellings to directly abut and overlook the golf course creating a highly attractive living environment



Photograph 10: Pedestrian/cyclist paths create an active frontage for lots abutting the golf course



Figure 7: Cluster lots provide two-way surveillance whilst limiting vehicular access to one frontage



- ***An accessible and integrated network of walking and cycling routes for safe and convenient travel to adjoining communities (including existing and future areas included in the DPO), local destinations or points of local interest, activity centres, community hubs, open spaces and public transport.***

The layout caters for an integrated pedestrian and cyclist network that offers external connections where considered appropriate.

The internal street network offers a mix of access streets and access places, both of which are intended to cater for pedestrians and vehicles. Road reserves are narrowed adjacent to open spaces where the intention is that the path network be contained within the reserve, creating a pleasant and safe environment for users.

A dedicated shared path is indicated on the Development Plan (see Appendix 5) linking the proposed residential areas with the golf club house and Fairway Drive. This offers a complete walking circuit through the development and the surrounding road reserves.

The path network also offers links from the proposed residential areas to Monash Park and the Yallourn Bowling Club to the south west and to Central Gippsland Tafe to the north.

- ***The provision of any commercial facilities and the extent to which these can be collocated with community and public transport facilities to provide centres with a mix of land uses and develop vibrant, active, clustered and more walkable neighbourhood destinations.***

The redevelopment of the Yallourn Golf Club and incorporation of new residential allotments provides for the improved patronage of the existing golf course. Best practice urban design will lead to a series of interconnected and walkable reserves that will facilitate physical activity and social interaction. Additionally the subject land is located adjacent to the Yallourn Bowls Club, Monash Park, and Central Gippsland Tafe. It is also within walking distance to the Boolarra Road shops which are located approximately 500m north-west and offer various shops including Foodworks and a pharmacy.

The site layout offers a modest increase in residential lots and based on the envisaged population for this development, there is not enough demand for any additional commercial facilities. Rather, the development will increase business for the existing shops.

3.2 Waterways

- ***A buffer zone of 30 metres each side of waterways designated under the Water Act 1989 or a buffer based on a flood study which identifies the 100 year flood extent must be set aside for ecological purposes.***

The location of designated waterways has informed the extent of the development area and where possible the proposed layout offers a minimum 30 metre buffer zone each side of waterways.

Water Technology have undertaken a Scoping Assessment (see Appendix 12) which notes that:

In almost all cases the minimum WGCMA buffer requirements have been retained in the updated development concept plans. Two locations within the development include crossings over designated waterways. These works will need to be approved by the WGCMA via a formal works on waterways approval process.

And

The proposed development involves modification to some of the flow paths of the designated waterways and areas inside the WGCMA preferred 30m buffer zone, and will involve changes to natural drainage conditions. Consequently an appropriately detailed hydrology scoping study is required for the subject site that provides surface water treatment and storage for the future post-development environment.

Areas of encroachment are indicated at Figure 8 below. The proposed road layout offers waterway crossings consistent with those depicted on the DPCD Alternative Design Sketch

(see Figure 5) prepared on behalf of Latrobe City Council. They enable practical and efficient circulation across the site. Further detailed hydrology studies can be undertaken at the subdivision stage.

Figure 8: Waterway Buffer



3.3 Infrastructure Services

- ***An integrated stormwater management plan that incorporates water sensitive urban design techniques which provides for the protection of natural systems, integration of stormwater treatment into the landscape, improved water quality, and reduction and mitigation of run-off and peak flows, including consideration of downstream impacts.***

Water Technology have undertaken a Scoping Assessment in consultation with West Gippsland CMA which forms part of this submission (Appendix 12). The recommendations within the report can be incorporated into the Development Plan to ensure best practice stormwater management can be achieved at subdivision stage.

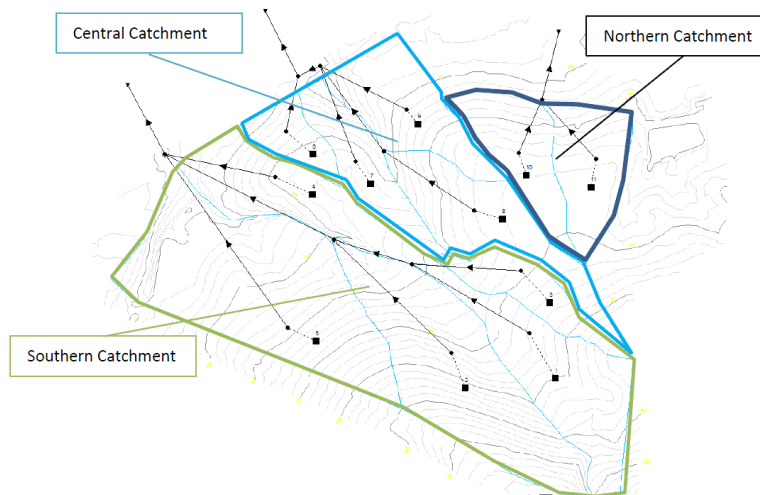
Three catchment areas have been identified on the subject land; the Northern Catchment, Central Catchment and Southern Catchment (see Figure 9 below). The Scoping Assessment noted the following in relation to post development hydrology:

Under developed conditions site specific flows are expected to generally follow similar drainage paths to existing conditions.

And

The most significant change to the system under post development conditions is seen in the northern catchment, where flows have been split into two separate catchments (northern catchment 1 and 2).

Figure 9: Three catchment areas exist on site



To meet best practice levels for water treatment, Water Technology recommends the following:

Southern catchment

Under developed conditions the southern catchment is the most significant in size and consequently requires more substantial water quality treatment features. Preliminary water quality modelling suggests that a sedimentation basin combined with a wetland and incorporation of the existing undeveloped natural buffer zone will be sufficient to treat developed flows to best practice levels.

Central catchment

A series of vegetated catchment swales (with a cumulative length of ~270m) have been proposed for water quality treatment in the central catchment. Preliminary water quality modelling suggests that this treatment alone would be insufficient to treat the catchment flows to best practice levels missing the nitrogen target by approximately 5% to 10%, the additional treatment required could be achieved by incorporating some small bio-retention features in the upstream segment of the catchment (e.g. rain-gardens or bio-swales).

Northern Catchment 1

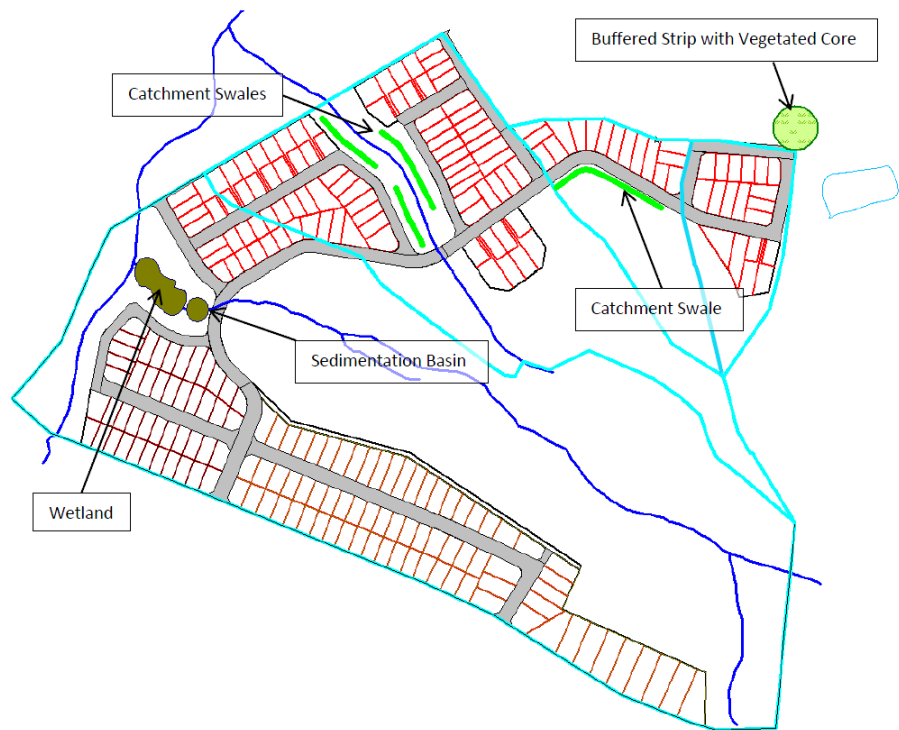
A large vegetated catchment swale (approximately 120m long) has been recommended as the primary WSUD feature in this segment of the development. Preliminary water quality modelling suggests that this treatment alone would be insufficient to treat the catchment flows to best practice levels missing the target by approximately 5%, the additional treatment required could be achieved by incorporating some small bio-retention features in the upstream segment of the catchment (e.g. rain-gardens or bio-swales).

Northern Catchment 2

Under developed conditions a small section of the northern catchment (referred to as the northern catchment 2), has been assumed to report to the North East corner before flowing into the Yallourn Golf club dam. The WSUD feature considered appropriate for this catchment is a small nodal bio-retention system with grassed buffer section on its batters flowing into a vegetated core. A linear bio-retention system could be integrated into the road reserve if required (land budget constraints) but a nodal feature would be preferable at this site. Initial modelling suggests that this type of feature would be suitable to treat site flows but this would need to be confirmed in the future SWMS.

The recommended water treatments are shown in Figure 10 below.

Figure 10: Conceptual water quality treatments



The Development Plan enables implementation of water sensitive urban design to treat developed flows to best practice reduction targets as described by Melbourne Water. A detailed WSUD analysis will be a requirement for any future subdivision of the land.

- ***The pattern and location of the major arterial road network of the area including the location and details of any required:***
 - ***road widening***
 - ***intersections***
 - ***access points***
 - ***pedestrian crossings or safe refuges***
 - ***cycle lanes***
 - ***bus lanes and stops***

The Development Plan (Appendix 5) indicates a proposed road network for the subject land. It offers a logical and safe circulation network for both vehicles and pedestrians/cyclists.

Traffic Group prepared a detailed Traffic Engineering Assessment in October 2011 followed up with a Traffic Engineering Assistance letter dated 9th August 2012 (see Appendix 9) to ensure their assessment reflects the final development layout. Together they provide a detailed traffic engineering assessment of the proposed subdivision layout, including the internal access arrangements as well as the likely impacts on the surrounding road network of the proposed development.

The traffic assessment concluded in part that:

The revised traffic distribution generally results in lower traffic volumes at the access points compared to the original assessment, given the introduction of the additional access point to Monash Road and the lots directly fronting Coach Road,

The requirements for turn lanes on Monash Road and Coach Road have generally remained unchanged, with all of the access points requiring BAL and BAR turn lane treatments. The only exception is the additional proposed access point to Monash Road (Monash Road Eastern Access) that is recommended to include a roundabout given its location opposite the existing Gippsland TAFE access,

Given the low turning movements expected at the access points and the existing low traffic volumes on Monash Road and Coach Road, the intersections will perform well and no intersection capacity analysis is required according to the AustRoads Guide to Traffic Management: Part 6,

The proposed road layout generally accords with the requirements of Clause 56 of the Latrobe Planning Scheme,

Given the proposed direct property access to Coach Road, it is recommended to reduce the speed zone on Coach Road to 60km/h,

A level of vegetation trimming / removal is required at the eastern boundary of the subject site within the Coach Road road reserve to provide for adequate sight distance, and

There are no traffic engineering reasons why a permit for the proposed residential subdivision should not be granted, subject to appropriate conditions.

The proposed road layout offers a functional and safe environment for internal access and creates acceptable impacts on the surrounding road network. Detailed design will be undertaken at subdivision stage in accordance with the requirements of the Responsible Authority.

Pedestrian/cyclist networks and public transport are discussed below.

- ***The pattern and location of any internal road system based on a safe and practical hierarchy of roads including safe pedestrian and bicycle connections and crossing points in accordance with Latrobe City Bicycle Plan 2007-2010, (as amended).***

The proposed road layout is indicated on the Development Plan (Appendix 5) and has been designed in a practical fashion to ensure traffic and pedestrian/cyclist safety. The Traffic Engineering Assistance letter (Appendix 9) discusses road hierarchy and notes the following:

Based on the revised road network, all roads within the subject site are proposed to operate as either access streets or access places.

The proposed access streets generally have road reserve widths of 16m to 20m, in line with Clause 56 of the Latrobe Planning Scheme. It is noted that the proposed access streets adjacent to reserves/open space are proposed with a 13m road reservation width. As indicated in our previous assessment, this approach is common place and is due to provision of pedestrian paths inside the reserve/open space rather than within the road reserve. This allows for acceptable cross section outcomes, such as a nominal verge width on the side of the road adjacent to the reserve/open space.

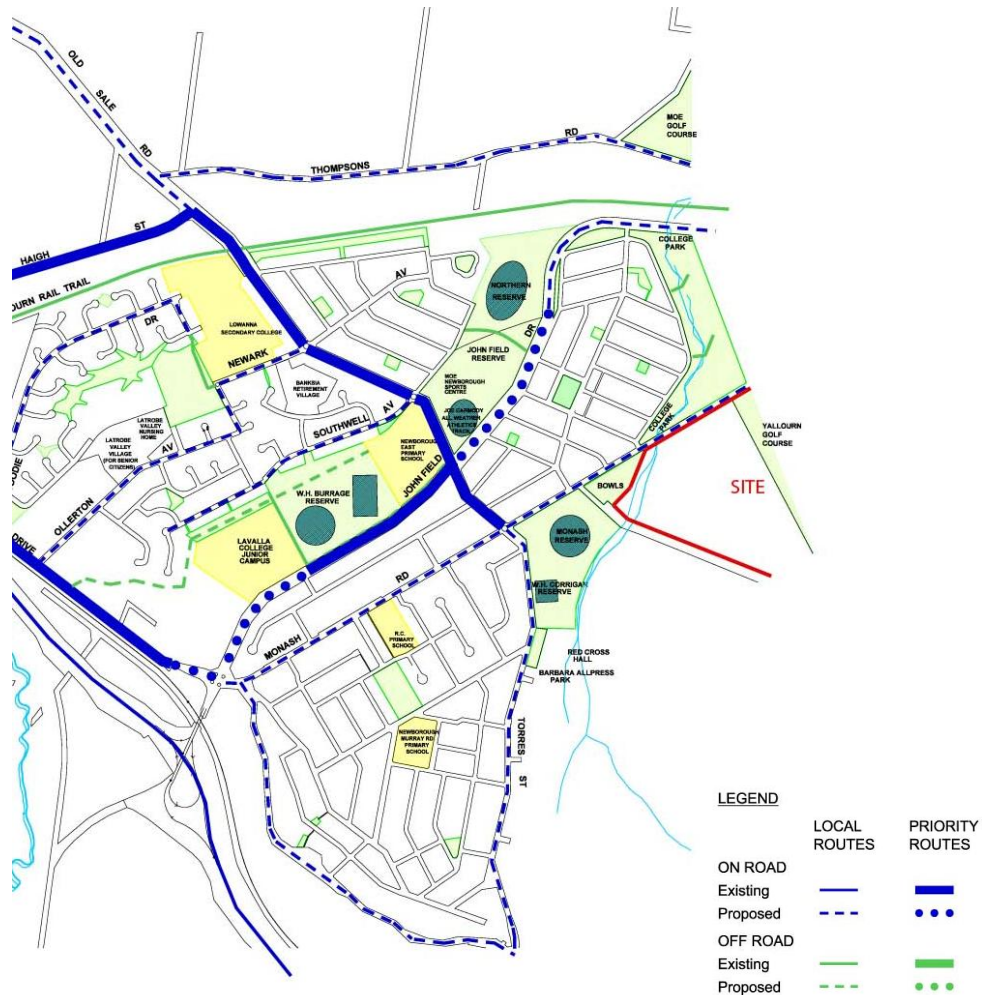
An Access Street is defined under Clause 56.06-8 as being *'a street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated'*.

An Access Place is defined under Clause 56.06-8 as being *'a minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority'*.

Both street types utilised throughout the development facilitate pedestrian and bicycle movements and each will be designed in accordance with the applicable standards at subdivision stage. In addition, designated shared pathways are proposed to link the residential areas on site to the golf club house, Monash Park, Fairway Drive and Monash Road as shown on the Development Plan (Appendix 5).

Links to Monash Road will allow for connection to future on road bicycle routes planned under the Latrobe Bicycle Plan, see Figure 11 below. The intended link from Fairway Drive through the subject site to Monash Road also provides consistency with the 'future pedestrian link' identified on the Moe-Newborough Structure Plan.

Figure 11: Latrobe Bicycle Plan – Moe/Newborough Bicycle Network (plan cropped)



- ***In consultation with relevant agencies and authorities, provision of public transport stops where appropriate within easy walking distance to residential dwellings and key destinations. Stops should also be located near active areas where possible.***

An existing bus route is present along Monash Road. All lots are within 1km of this route which is considered to be an acceptable walking distance. If the demand presents, a bus service could be accommodated within the proposed street network which offers appropriate road widths and good circulation.

3.4 Open Space

- ***The location and size of the proposed open spaces that cater for a range of user groups and provide a variety of functions that perform both an active and passive role for recreation, as appropriate.***

The Development Plan (Appendix 5) shows the location and size of proposed open space areas. Three public open space areas are proposed, each of which is designed to encompass significant vegetation and/or waterways. They offer a total of 8.41 hectares or 26.8% of the development area.

The proposed reserves cater for passive recreation and active recreation in the form of a series of interlinked pedestrian walkways, there are also numerous opportunities for active recreation within the surrounding area. The following open space facilities are located within the Newborough Township:

- Monash Park;
- Yallourn Bowling Club;
- John Field Reserve which includes Moe Newborough Sports Centre and Joe Carmody Athletics Track;
- WH Burrage Reserve.

Whilst the golf course is privately owned, the layout of the development has been designed to integrate with the golf course offering highly attractive living opportunities whereby residents can enjoy the outlook offered.

It has been considered that there is no need in this locality for any additional community facilities or playgrounds given the existence of nearby playgrounds, whereas these could be incorporated into reserves if desired by the community, it is envisaged that the overriding design intent for open space networks will be to build on the scenic and environmental benefits of the interconnected gullies and significant native vegetation whilst also providing for a series of interconnected pedestrian paths.

- ***Public open spaces designed to provide:***
 - ***Public spaces of a minimum of 0.5 hectares within a 500 metre walking distance of all residents in accordance with Latrobe City Public Open Space Plan 2007, (as amended).***
 - ***The inclusion of pedestrian and cycle paths and play equipment, that encourage active recreational opportunities.***

All lots are well within 500 metres walking distance to public open spaces of at least 0.5 hectares. A shared path network will provide accessibility to open space areas within the site and offer links to surrounding areas.

As discussed above, active recreation facilities are present to the west of the development area and offer an extensive range of recreation opportunities. It is not feasible to offer active recreation within the proposed reserves given the constraints of vegetation. The golf course does however offer an active sporting facility.

- ***Opportunities for visual surveillance to promote safety of users, through encouraging active frontages, using buildings to frame public spaces and locating open spaces within or adjacent to activity centres where possible.***

Good urban design principles have been employed to create a development with excellent levels of visual surveillance. As discussed above, the layout offers a mix of reserve interfaces

that utilise a combination of perimeter roads and direct lot abutments. It is intended that all future dwellings be orientated to overlook open spaces to maximise surveillance and create a sense of safety throughout the development.

- **A landscape concept plan for all open space areas, indicating the location of plantings, pathways, shade, shelter and seating at activity areas as well as at intervals along pathways.**

The Landscape Concept Plan (Appendix 7) shows an indicative plant schedule for public open space areas. Pedestrian links are indicated however landscape details will be developed at the subdivision stage.

3.5 Community Hubs and Meeting Places

- **In consultation with relevant agencies and authorities, the provision of appropriate community facilities, including schools, pre-schools, maternal child health centres, senior citizen centres and general community centres within a walkable range of 400- 800 metres across large subdivisions.**

The subject development plan offers approximately 221 lots which does not warrant provision of additional major education or community facilities given the location of the site on the edge of the Newborough township. Five schools are located within close proximity to the site as shown in Figure 12 below. The land is zoned Residential 1 whereby community facilities are permitted uses. If the demand for additional facilities presents as the development evolves such uses could be incorporated if required.

Figure 12: Surrounding Education facilities



- **Provision for access and social interaction, particularly where this encourages physical activity. For example:**
 - **Consider the need for public amenities, including toilets and bicycle parking at key destinations in accordance with the Latrobe City Public Toilet Strategy 2006 (as amended) and Latrobe City Bicycle Plan 2007-2010 (as amended).**
 - **The pattern and location of pedestrian and bicycle paths should provide safe and practical access to and from community hubs and meeting places.**
 - **Spaces should be designed to accommodate community events and cultural programs including local arts activities and other festivals.**

The integrated nature of the proposed residential areas and the golf course redevelopment encourage social interaction and physical activity, particularly through the road layout and lot arrangement.

The proposed shared path network provides various links to the existing Newborough Township where a wide range of facilities are available. Furthermore it creates safe and practical access to the golf club house where functions/events are likely to occur.

3.6 Flora and Fauna

- **In consultation with the Department of Sustainability and Environment, a flora and fauna survey, prepared by a suitably qualified expert, which includes but is not limited to species surveys for Growling Grass Frog (*Litoria raniformis*) and Dwarf Galaxias (*Galaxiella pusilla*), and measures required to protect the identified species.**

Biosis Research have prepared a Flora, Fauna and Net Gain Assessment (FFNG) for the subject site. The assessment has been limited to those areas that were investigated for the redevelopment of the golf course and future residential development, the balance of the golf course has not been studied in detail. The assessment describes vegetation on site as follows:

The study area contains a mosaic of disturbed and intact vegetation. Large areas of the study site have been modified by past disturbances which have included agricultural grazing and a golf course development which has replaced areas of native vegetation with exotic species. Areas of remnant native vegetation vary in quality and composition, ranging from intact areas which are relatively free of exotic species to remnant patches that have been heavily grazed or planted out with introduced species.

A total of 18.88 hectares of native vegetation was mapped within the study area, together with 19 Large Old Trees present within habitat zones. The vegetation ranges in conservation significance with some classified as *very high significance*.

The assessment reports that the vegetated areas of the subject site provide habitat to various bird and mammal species and discusses the low likelihood of many threatened species being present on site due to the modified conditions. It did however identify the Grey Goshawk, Black Falcon, Powerful Owl and Swamp Skink as being the most likely

significant species to occur in the study area. Other species of note were the Glossy Grass Skink which is listed as near threatened within Victoria. The assessment reported that:

This species has a medium likelihood of occurring within drainage lines of the study area.

It also states that Terrestrial crayfish *Engaeus* spp. are common throughout Gippsland and that:

The burrows of Engaeus sp. were observed within the drainage lines of the study area. Several threatened species of terrestrial crayfish are known from the region such as the Narracan, Strzelecki and Warragul Burrowing Crayfish.

In summary, the key ecological values identified within the study area are:

- *A population of Eucalyptus fulgens Green Scentbark (Victorian rare).*
- *At least some suitable habitat for state rare or threatened species Orange-tip Finger-orchid, Slender Pink-fingers, Mountain Bird-orchid, Green Scentbark, Grey Goshawk, Black Falcon, Powerful Owl and Swamp Skink.*
- *Contribution to surrounding values, including connectivity of site to riparian and roadside vegetation.*

The assessment recommends preparation of an Ecological Management Plan to provide detailed advice for the long-term protection and management of retained vegetation, habitat and linkages and for the creation of habitat features such as wetlands. This can be prepared at the subdivision stage.

- ***An assessment of any native vegetation to be removed having regard to Victoria’s Native Vegetation Management: A Framework for Action, including how it is proposed to protect and manage any appropriate native vegetation.***

The proposed layout requires the removal of 5.91 hectares of native vegetation, 0.19 hectares of which has very high significance, 3.29 hectares of which has a high conservation significance and 2.43 hectares of which has a medium conservation significance. The current design proposal may also result in the loss of 3 Large Old Trees subject to detailed design.

The FFNG outlines losses of native vegetation and offset requirements for the current Development Plan through the Net Gain calculation process as follows:

Native vegetation	Losses	Offsets
Patches	2.39 habitat hectares	2.43 habitat hectares
Large Old Trees	Three Large Old trees	Source and protect 12 other Large Old Trees (for the loss of large trees in patches. This will also allow for associated recruitment of 60 new trees.)

It notes that:

Some of these losses include Very High conservation significance vegetation within the bioregion and approval for clearing is required from the Minister as per the requirements of the Native Vegetation Framework (LaTrobe Planning Scheme).

If clearing is approved, a total of 2.43 habitat hectares could be generated through management of vegetation on site. This meets all net gain offset requirements including protection of the required number of Large Old Trees.

The Development Plan allows for retention and management of some areas of native vegetation which are intended to be utilised for Net Gain offsets. Through management of vegetation on site a total of 2.44 habitat hectares could be generated. The FFNG states that:

These account for all proposed losses in habitat hectares and meet like-for-like criteria described in The Framework. These areas need to be permanently protected through an appropriate legal mechanism and will be actively managed for a nominated 10 year period. They also need to be appropriately managed to DSE standards. Most management works will involve weed control and there is potential on site to significantly reduce the amount of woody weed biomass within proposed offset areas.

The FFNG concludes in part that:

The Development Plan (Appendix 6) has been prepared with regard to the three step approach of Net Gain and has sought to retain where possible the best areas of native vegetation in contiguous reserves. Anticipated loss of native vegetation can be appropriately offset on site.

An Offset Management Plan will be prepared for any Net Gain offset sites at the subdivision stage.

- **Regard must be had to the West Gippsland Native Vegetation Plan 2003.**

The offset requirements for clearing native vegetation in accordance with the West Gippsland Native Vegetation Plan have been considered within the FFNG (Appendix 11).

- **Any management plan should take into account that the Strzelecki Bioregion is one of Victoria's most fragmented Bioregions and address this as a consideration.**

The Development Plan Overlay – Schedule 5 covers a range of areas within the municipality of Latrobe City. It is noted that the subject land is not contained within the Strzelecki Bioregion, rather it is within the Gippsland Plain Bioregion as outlined in the FFNG (Appendix 11).

3.7 Cultural Heritage

- ***A cultural heritage assessment including how cultural heritage values will be managed.***

The site has been subject to an archaeological survey report entitled 'Proposed Development, Monash Views, Newborough' by Andrea Murphy (Tardis Enterprises Pty Ltd) dated March 2007 (see Appendix 10). The specific recommendations for Aboriginal Cultural Heritage are as follows:

1. *There are no recorded Aboriginal sites or places within the study area, and therefore no Consent to Disturb is currently required from the Central Gippsland Aboriginal Health and Housing Co-operative Limited.*
2. *Due to the landforms present and post settlement disturbance to the study area, no section is considered to have potential for significant Aboriginal archaeological sites. Therefore, prior to development no further investigation of the study area is required.*
3. *Both the Gippsland Aboriginal Health and Housing Co-operative Limited and Gippsland Cultural Heritage Unit have requested that the initial ground disturbance works (clear, grade, cut, trench) associated with the development should be monitored by an Aboriginal community representative. Whilst there is no legislative requirement to fund monitoring, community monitoring, supervised by a heritage consultant is considered an appropriate risk management for any stone artefacts that may be exposed during the course of initial ground disturbance. If monitoring is adopted, it should be limited to disturbance of topsoil, and any artefacts exposed should be recorded by a heritage consultant and returned to the community representative for relocation into the areas of open space.*

A subsequent desktop assessment has been prepared by Andrew Long & Associates (see Appendix 10) to review the implications of the Aboriginal Heritage Act 2006. In part it noted that:

Transitional arrangements are relevant in this instance, as a report on an archaeological survey for the proposed activity (Murphy 2007) was completed and provided to the Secretary, DPCD prior to the commencement of the Act on 28th May 2007, in accordance with Regulation 77.

And

It is my expert opinion that a CHMP, as defined in the Aboriginal Heritage Act 2006, need not be lodged as part of an application for planning approval for the proposed development.

In regards to Historic Cultural Heritage, the report by Tardis Enterprises P/L (see Appendix 10) concluded that:

- *There are no historic archaeological or heritage sites located within the present study area.*
- *The study area is not considered to contain any potential for significant buried historic deposits. Prior to development of the study area, no further historic investigation or research is required.*

3.8 Staging and Implementation

- ***The development plan should be prepared with an appropriate level of community participation as determined by the Responsible Authority.***

As discussed in section 3.1 above, the Development Plan was initiated in response to the desire of the Yallourn Golf Course to improve the existing course and integrate with a new and complementary residential component. The overall plan has undergone a lengthy design process which over the years has involved Latrobe City Council and other statutory authorities.

Correspondence received from Council on 27 February 2012 (copy attached at Appendix 13) prompted a review of the previous design and a subsequent round table meeting with Council and the applicant was held in May 2012 whereby an amended layout was tabled. Key authorities were also invited to attend.

There has been a substantial amount of consultation and the final Development Plan (Appendix 5) has considered all aspects of applicable policy and responded to site conditions appropriately.

- ***An implementation plan must be submitted as part of the development plan, indicating the proposed staging of the development.***

A Staging Plan has been prepared and is attached at Appendix 6. The residential development is proposed to be undertaken in a logical fashion, both in response to market demand and ease of infrastructure provision. Each of the three development wings are staged in groups; A, B and C, to enable the developer to act on separate areas of the site independently.

Proposed public open space areas are also included within the stages to enable their timely creation and development.

- ***The approved Development Plan may be amended to the satisfaction of the responsible authority***

Whilst a range of plans have been prepared to support this Development Plan, it is intended that the only plan to be adopted is the actual Development Plan, at Appendix 5. This outlines the intended development layout without going into too much fine grained detail to avoid the requirement for the Development Plan to be amended for minor variations.

4 Appendix 1 – Site Conditions

Reference: 15890DP1



PHOTO No. 4



PHOTO No. 3



PHOTO No. 2



PHOTO No. 1

No.	Revision Description	Drawn	App'd	Date
1	Vicmap Base with Site Conditions, Golf Course Development & Drainage	BGC		26.04.2012

DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
 THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
 PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
 THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
 CONTOUR VERTICAL INTERVAL: 10 METRES.
 THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHORECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
 THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

LEGEND

- EXISTING GOLF COURSE
- TEE
- HOLE NUMBER
- GREEN
- PHOTO LOCATION

FOR APPROVAL

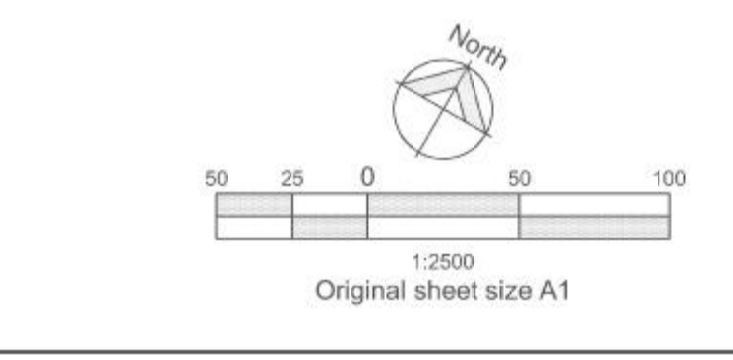
NBA Group Pty Ltd
 93 Macaulay Street
 Sale, 3850
 m 0418 402 240
 o (03) 5143 0340
 f (03) 5143 1244
 w www.nbagroup.com.au
 e nick@nbagroup.com.au



Millar & Merrigan Pty Ltd
 ACN 005 541 668
 2128 Merrindale Drive Croydon
 PO Box 247 Croydon Victoria 3136
 t (03) 8720 9500
 f (03) 8720 9501
 w www.millarmerriگان.com.au
 e admin@millarmerriگان.com.au

Millar | Merrigan
 LAND DEVELOPMENT CONSULTANTS

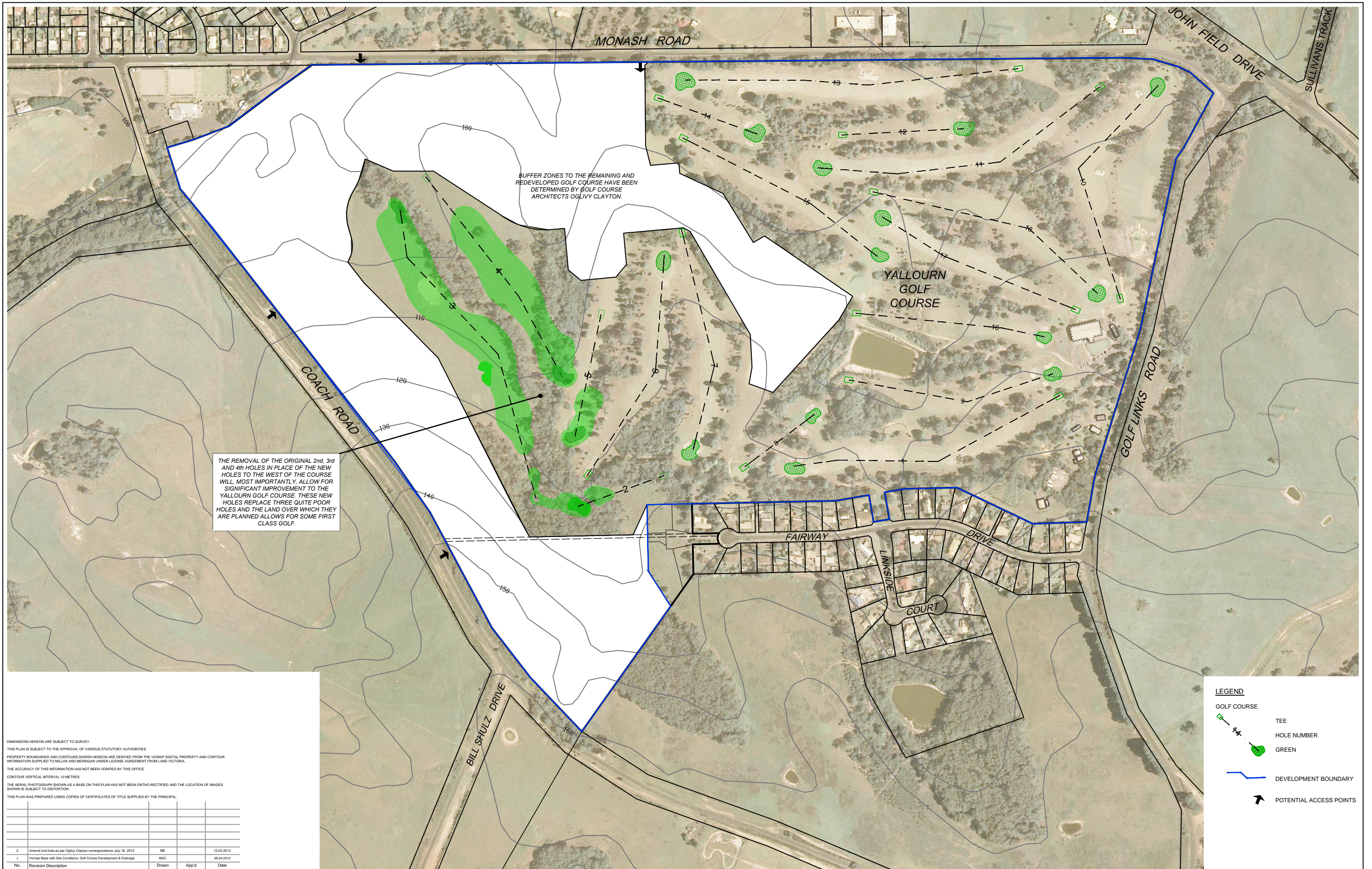
Civil Engineering
 Land Surveying
 Landscape Architecture
 Project Management
 Town Planning
 Urban Design
 SA GLOBAL Quality ISO 9001



SITE CONDITIONS
 TP10631U & PS701486M
 MONASH ROAD, NEWBOROUGH 3825
 LATROBE CITY COUNCIL
 15890DP1
 VERSION 1
 SHEET 1 OF 1

5 Appendix 2 – Golf Course Redevelopment

Reference: 15890DP2



THE REMOVAL OF THE ORIGINAL 2nd, 3rd AND 4th HOLES IN PLACE OF THE NEW HOLES TO THE WEST OF THE COURSE WILL, MOST IMPORTANTLY, ALLOW FOR SIGNIFICANT IMPROVEMENT TO THE YALOURN GOLF COURSE. THESE NEW HOLES REPLACE THREE QUITE POOR HOLES AND THE LAND OVER WHICH THEY ARE PLANNED ALLOWS FOR SOME FIRST CLASS GOLF.

BUFFER ZONES TO THE REMAINING AND REDEVELOPED GOLF COURSE HAVE BEEN DETERMINED BY GOLF COURSE ARCHITECTS OGLIVY CLAYTON.

DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
 THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
 PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
 THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
 CONTOUR VERTICAL INTERVAL 10 METRES.
 THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
 THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
2	Amend 2nd hole as per Ogilvy Clayton correspondence July 16, 2012	ME		12.02.2013
1	Setup Base with Site Conditions, Golf Course Development & Drainage	BGC		28.04.2012

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
 © Millar & Merrigan Pty. Ltd.

Initials	Date
Designed	
Drafted	BGC 07/10/2011
Checked	
Authorised	
Approved by Council	

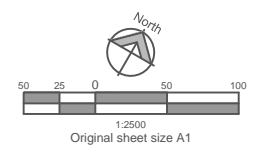
NBA Group Pty Ltd
 93 Macaulister Street
 Sale, 3850
 m 0418 402 240
 o (03) 5143 0340
 f (03) 5143 1244
 w www.nbagroup.com.au
 e nick@nbagroup.com.au



Millar & Merrigan Pty Ltd
 ACN 005 541 668
 21/25 Merrindale Drive Croydon
 PO Box 247 Croydon Victoria 3136
 t (03) 8720 9500
 f (03) 8720 9501
 w www.millarmerrigan.com.au
 e admin@millarmerrigan.com.au



Civil Engineering
 Land Surveying
 Landscape Architecture
 Project Management
 Town Planning
 Urban Design

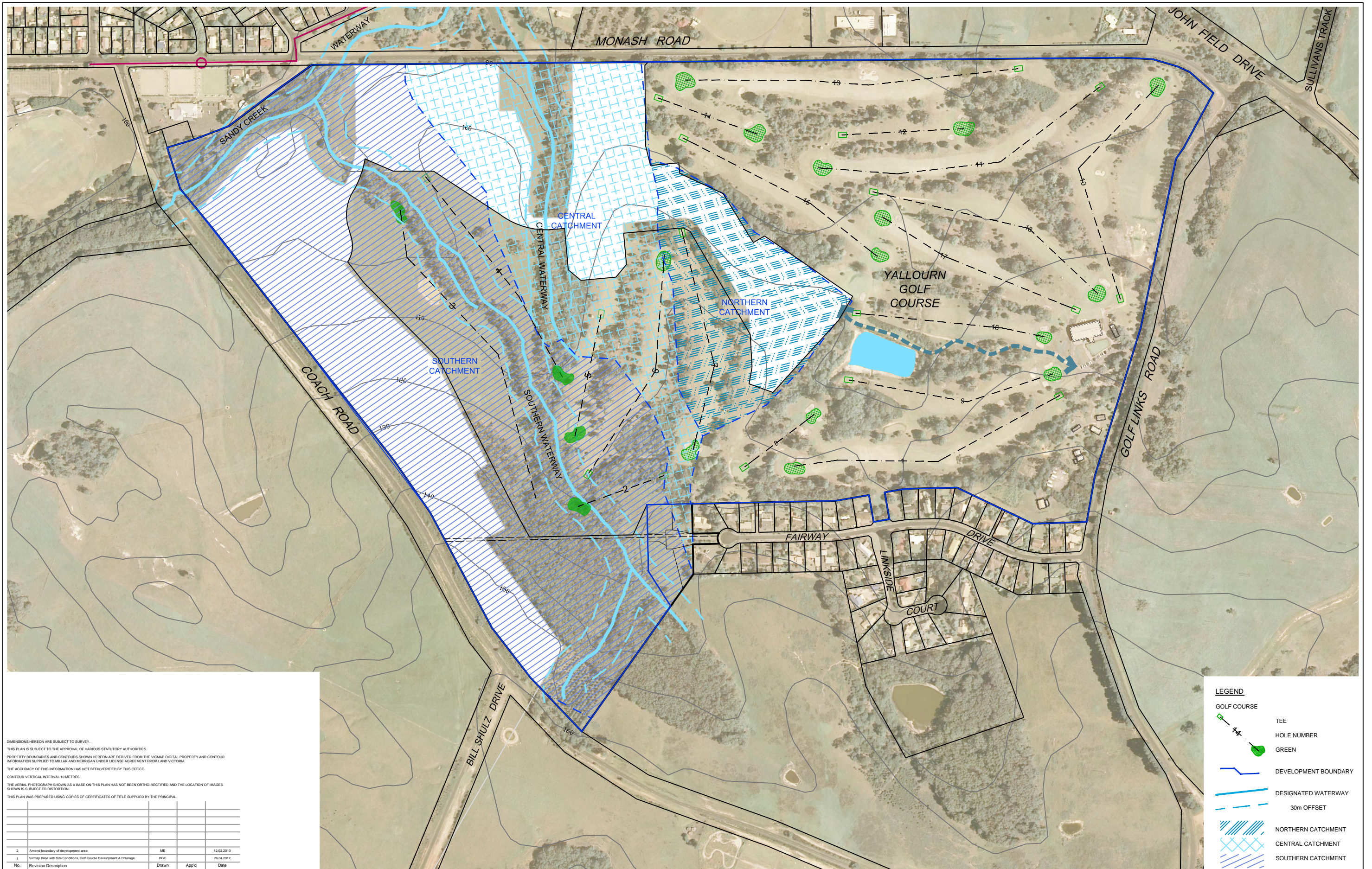


GOLF COURSE REDEVELOPMENT
 TP10631U & PS701486M
 MONASH ROAD, NEWBOROUGH 3825
 LATROBE CITY COUNCIL
 15890DP2
 VERSION 2
 SHEET 1 OF 1

FOR APPROVAL

6 Appendix 3 – Waterway & Catchments

Reference: 15890DP3



DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
 THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
 PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
 THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
 CONTOUR VERTICAL INTERVAL 10 METRES.
 THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
 THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
2	Amend boundary of development area	ME		12.02.2013
1	Volume Base with Site Conditions, Golf Course Development & Drainage	BGC		28.04.2012

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
 © Millar & Merrigan Pty. Ltd.

Initials	Date
Designed	
Drafted	BGC 07/10/2011
Checked	
Authorised	
Approved by Council	

FOR APPROVAL

NBA Group Pty Ltd
 93 Macaulister Street
 Sale, 3850
 m 0418 402 240
 o (03) 5143 0340
 f (03) 5143 1244
 w www.nbagroup.com.au
 e nick@nbagroup.com.au



Millar & Merrigan Pty Ltd
 ACN 005 541 668
 2125 Merrindale Drive Croydon
 PO Box 247 Croydon Victoria 3136
 t (03) 8720 9500
 f (03) 8720 9501
 w www.millarmerrigan.com.au
 e admin@millarmerrigan.com.au

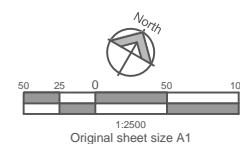


LAND DEVELOPMENT CONSULTANTS

Civil Engineering
 Land Surveying
 Landscape Architecture
 Project Management
 Town Planning
 Urban Design



SAI GLOBAL Quality ISO 9001



LEGEND

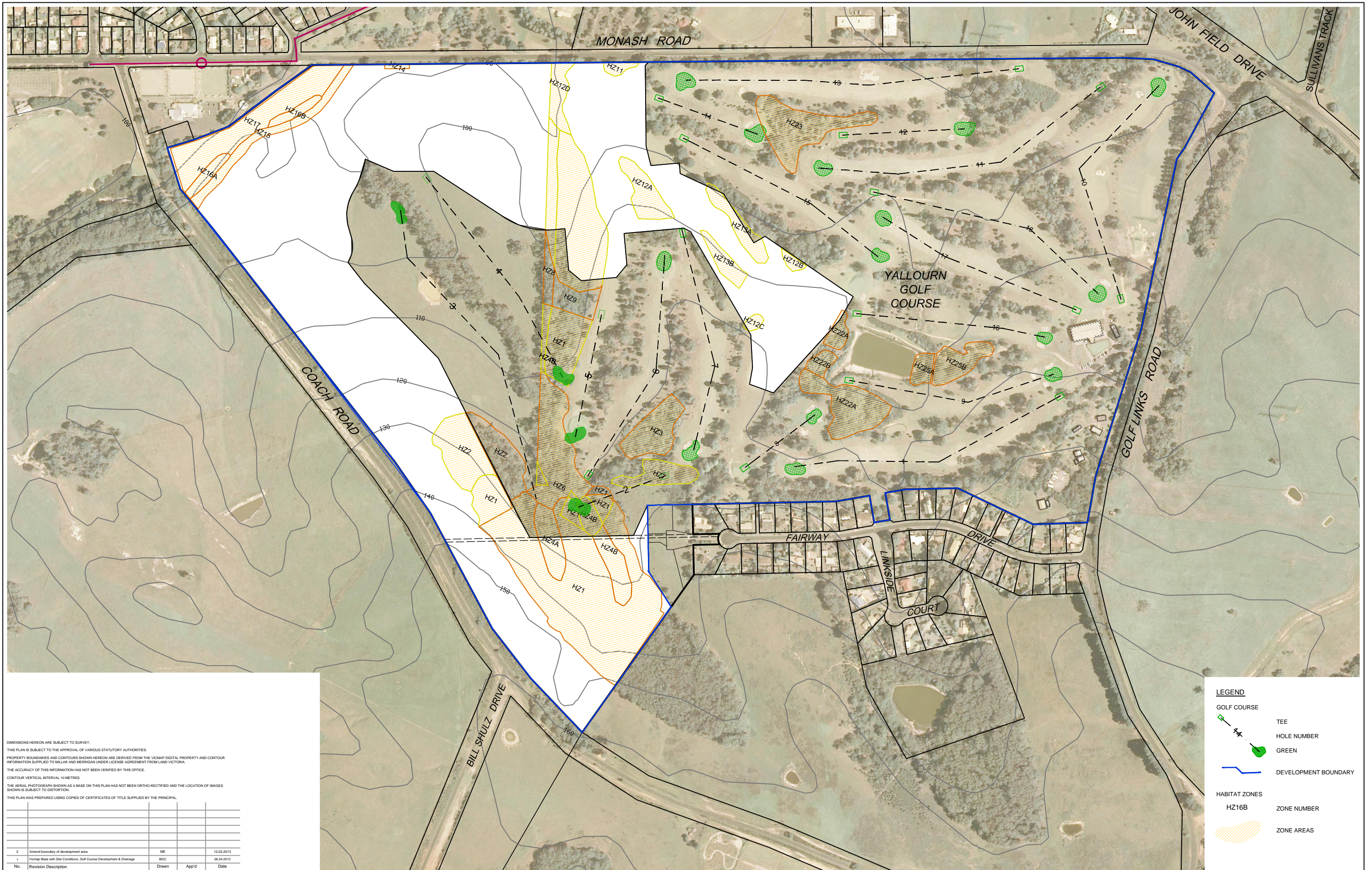
- GOLF COURSE
 - TEE
 - HOLE NUMBER
 - GREEN
- DEVELOPMENT BOUNDARY
- DESIGNATED WATERWAY
- 30m OFFSET
- NORTHERN CATCHMENT
- CENTRAL CATCHMENT
- SOUTHERN CATCHMENT

WATERWAY & CATCHMENTS
 TP10631U & PS701486M
 MONASH ROAD, NEWBOROUGH 3825
 LATROBE CITY COUNCIL

15890DP3
 VERSION 2
 SHEET 1 OF 1

7 Appendix 4 – Habitat Zones

Reference: 15890DP4



DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
 THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
 PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
 THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
 CONTOUR VERTICAL INTERVAL 10 METRES.
 THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
 THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
2	Amend boundary of development area	ME		12.02.2013
1	Setup Base with Site Conditions, Golf Course Development & Drainage	BGC		28.04.2012

LEGEND

- GOLF COURSE
 - TEE
 - HOLE NUMBER
 - GREEN
- DEVELOPMENT BOUNDARY
- HABITAT ZONES
 - ZONE NUMBER
 - ZONE AREAS

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
 © Millar & Merrigan Pty. Ltd.

Initials	Date
Designed	
Drafted	BGC 07/10/2011
Checked	
Authorised	
Approved by Council	

FOR APPROVAL

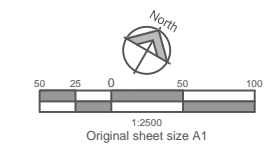
NBA Group Pty Ltd
 93 Macaulister Street
 Sale, 3950
 m 0418 402 240
 o (03) 5143 0340
 f (03) 5143 1244
 w www.nbagroup.com.au
 e nck@nbagroup.com.au

Millar | Merrigan
 ACN 005 541 668
 2125 Merrindale Drive Croydon
 PO Box 247 Croydon Victoria 3136
 t (03) 8720 9500
 f (03) 8720 9501
 w www.millarmerrigan.com.au
 e admin@millarmerrigan.com.au

LAND DEVELOPMENT CONSULTANTS

Civil Engineering
 Land Surveying
 Landscape Architecture
 Project Management
 Town Planning
 Urban Design

SAI GLOBAL Quality ISO 9001



HABITAT ZONES
 TP10631U & PS701486M
 MONASH ROAD, NEWBOROUGH 3825
 LATROBE CITY COUNCIL

15890DP4
 VERSION 2
 SHEET 1 OF 1

8 Appendix 5 – Development Plan

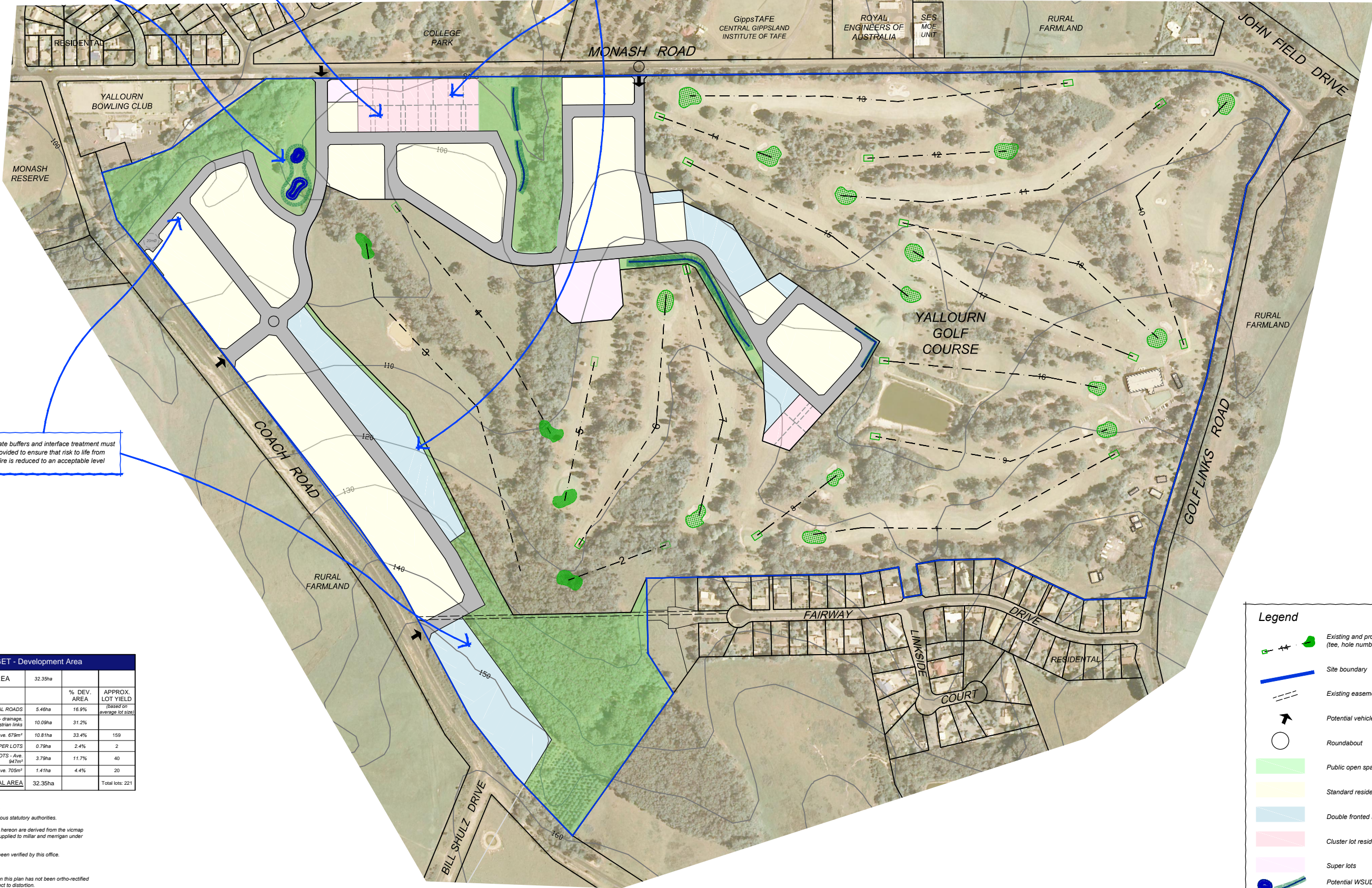
Reference: 15890DP5

Detailed Water Sensitive Urban Design (WSUD) features to be incorporated into future subdivision applications

Cluster lots are to be accessed via common property

Future subdivision applications will require the development of design guidelines to ensure that active interfaces to the public realm are achieved for cluster lots and double fronted lots

Appropriate buffers and interface treatment must be provided to ensure that risk to life from bushfire is reduced to an acceptable level



LAND BUDGET - Development Area			
DEVELOPMENT AREA	32.35ha		
LAND USES		% DEV. AREA	APPROX. LOT YIELD (based on average lot size)
LOCAL ROADS	5.46ha	16.9%	
TOTAL OPEN SPACE - drainage, vegetation & pedestrian links	10.09ha	31.2%	
STANDARD LOTS - Ave. 679m ²	10.81ha	33.4%	159
SUPER LOTS	0.79ha	2.4%	2
DOUBLE FRONTED LOTS - Ave. 947m ²	3.79ha	11.7%	40
CLUSTER LOTS - Ave. 705m ²	1.41ha	4.4%	20
TOTAL AREA	32.35ha		Total lots: 221

NOTE:
Dimensions hereon are subject to survey.
This plan is subject to the approval of various statutory authorities.
Property boundaries and contours shown hereon are derived from the vicmap digital property and contour information supplied to millar and merrigan under license agreement from land victoria.
The accuracy of this information has not been verified by this office.
Contour vertical interval 10 metres.
The aerial photograph shown as a base on this plan has not been ortho-rectified and the location of images shown is subject to distortion.
This plan was prepared using copies of certificates of title supplied by the principal.

Legend

- Existing and proposed fairway (tee, hole number, green)
- Site boundary
- Existing easement to be retained
- Potential vehicle access points
- Roundabout
- Public open space
- Standard residential
- Double fronted residential
- Cluster lot residential
- Super lots
- Potential WSUD features

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
© Millar & Merrigan Pty. Ltd.

FOR APPROVAL

NBA Group Pty Ltd
93 Macaulister Street
Sale, 3850
m 0418 402 240
o (03) 5143 0340
f (03) 5143 1244
w www.nbagroup.com.au
e nck@nbagroup.com.au

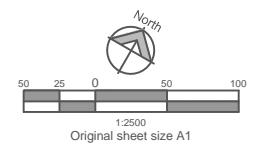
NBAgroup
Planning & Implementing Success

Millar & Merrigan Pty Ltd
ACN 005 541 668
2125 Merrindale Drive Croydon
PO Box 247 Croydon Victoria 3136
t (03) 8720 9500
f (03) 8720 9501
w www.millarmerrigan.com.au
e admin@millarmerrigan.com.au

Millar | Merrigan

LAND DEVELOPMENT CONSULTANTS

Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design

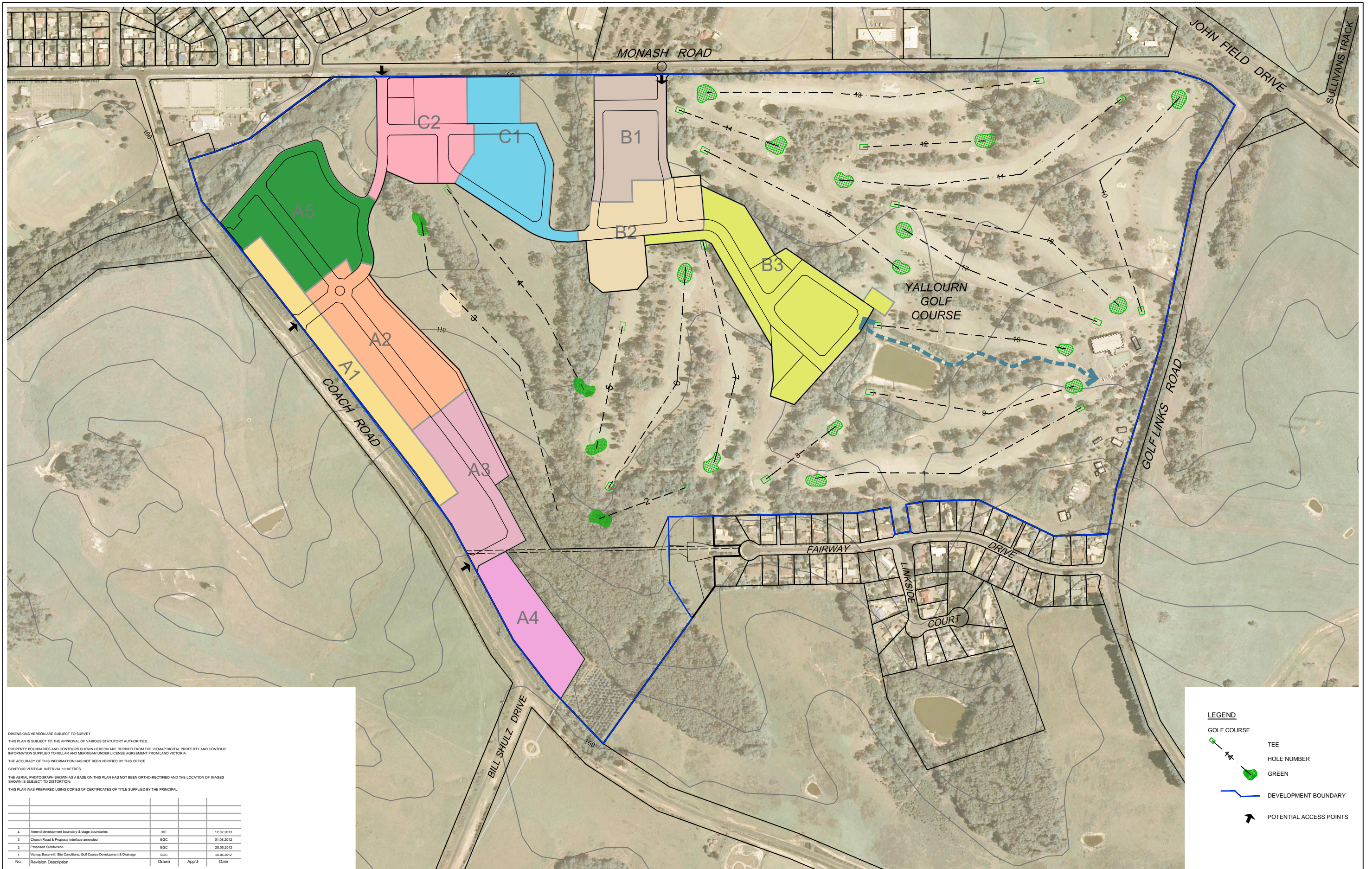


DEVELOPMENT PLAN
TP10631U & PS701486M
MONASH ROAD, NEWBOROUGH 3825
LATROBE CITY COUNCIL

15890DP5
VERSION 4
SHEET 1 OF 1

9 Appendix 6 – Staging Plan

Reference: 15890DP6



DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
 THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
 PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
 THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
 CONTOUR VERTICAL INTERVAL 10 METRES.
 THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
 THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
4	Amend development boundary & stage boundaries		ME	12.02.2013
3	Church Road & Proposal interface amended		BGC	01.08.2012
2	Proposed Subdivision		BGC	25.05.2012
1	Vomap Base with Site Conditions, Golf Course Development & Drainage		BGC	26.04.2012

LEGEND

- GOLF COURSE
 - TEE
 - HOLE NUMBER
 - GREEN
- DEVELOPMENT BOUNDARY
- POTENTIAL ACCESS POINTS

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
 © Millar & Merrigan Pty. Ltd.

Initials	Date
Designed	
Drafted	BGC 07/10/2011
Checked	
Authorised	
Approved by Council	

FOR APPROVAL

NBA Group Pty Ltd
 93 Macaulister Street
 Sale, 3950
 m 0418 402 240
 o (03) 5143 0340
 f (03) 5143 1244
 w www.nbagroup.com.au
 e nck@nbagroup.com.au

NBAgroup
Planning & Implementing Success

Millar & Merrigan Pty Ltd
 ACN 005 541 668
 2125 Merrindale Drive Croydon
 PO Box 247 Croydon Victoria 3136
 t (03) 8720 9500
 f (03) 8720 9501
 w www.millarmerrigan.com.au
 e admin@millarmerrigan.com.au

Millar | Merrigan

LAND DEVELOPMENT CONSULTANTS

Civil Engineering
 Land Surveying
 Landscape Architecture
 Project Management
 Town Planning
 Urban Design

SAI GLOBAL Quality ISO 9001

North

STAGING PLAN
 TP10631U & PS701486M
 MONASH ROAD, NEWBOROUGH 3825
 LATROBE CITY COUNCIL

15890DP6
 VERSION 4
 SHEET 1 OF 1

10 Appendix 7 – Landscape Concept

Reference: 15890DP7



Planting Schedule for Open Spaces

Botanical Name	Common Name
INDIGENOUS TREES	
<i>Acacia dealbata</i>	Silver Wattle
<i>Acacia mearnsii</i>	Black Wattle
<i>Acacia melanoxylon</i>	Blackwood
<i>Acacia stricta</i>	Hop Wattle
<i>Allocasuarina littoralis</i>	Black Sheoak
<i>Eucalyptus obliqua</i>	Messmate Stringybark
<i>Eucalyptus ovata</i> var. <i>ovata</i>	Swamp Gum
<i>Eucalyptus radiata</i> subsp. <i>radiata</i>	Narrow-leaf Peppermint
<i>Eucalyptus strezeckii</i>	Strezecki Gum
<i>Eucalyptus yarraensis</i>	Yarra Gum
NATIVE STREET TREES (non-indigenous)	
<i>Agonis flexuosa</i> 'Jervis Bay after Dark'	Willow-Myrtle
<i>Angophora floribunda</i>	Rough barked Apple
<i>Callistemon salignus</i>	Weeping Bottlebrush
<i>Corymbia ficifolia</i>	Red-Flowering Gum
<i>Corymbia maculata</i>	Spotted Gum
<i>Eucalyptus mannifera</i>	Red Spotted Gum
SHRUBS	
<i>Acacia howittii</i>	Sticky wattle
<i>Goodenia ovata</i>	Hop Goodenia
<i>Leptospermum continentale</i>	Prickly tea-tree
<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	Giant Honey-myrtle
<i>Melaleuca squarrosa</i>	Scented Paperback
NATIVE INDIGENOUS GROUNDCOVERS, TUFTED PLANTS, GRASSES, FERNS AND SEDGES	
<i>Carex breviculmis</i>	Common Grass-sedge
<i>Corrnia lawrenceana</i>	Mountain Cornea
<i>Cyathea australis</i>	Rough Tree-fern
<i>Cyathea cunninghamii</i>	Slender Tree-fern
<i>Dianella amoena</i>	Matted flax lily
<i>Epacris impressa</i>	Common Heath
<i>Juncus</i> spp.	Rush
<i>Isolepis</i> spp.	Club Sedge
<i>Kennedia prostrata</i>	Running postman
<i>Lomandra longifolia</i>	Spiny headed mat-rush
<i>Pimelea humilis</i>	Common Rice-flower
<i>Themeda triandra</i>	Kangaroo grass
<i>Xerochrysum palustre</i>	Swamp Everlasting

NOTE: The above indicative plant schedule is for all Public Open Space Reserves. To be planted and/or replanted using native plant species, mostly indigenous.



Eucalyptus mannifera
Red Spotted Gum



Isolepis spp.
Club Sedge



Callistemon salignus
Weeping Bottlebrush



Acacia dealbata
Silver Wattle



Agonis flexuosa
'Jervis Bay after Dark'
Willow-Myrtle



Acacia melanoxylon
Blackwood



Eucalyptus obliqua
Messmate Stringybark

PROPERTY BOUNDARIES AND CONTOURS SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR & MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE. CONTOUR VERTICAL INTERVAL: 10 METRES. THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION. THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
2	Amend development boundary	ME		12/02/2013
1	Worship Base with Site Conditions, Golf Course Development & Drainage	BDC		01.08.2012

Miller & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
© Miller & Merrigan Pty. Ltd.

FOR APPROVAL

NBA Group Pty Ltd
93 Macalister Street
Sale, 3850
m 0418 402 240
o (03) 5143 0340
f (03) 5143 1244
w www.nbagroup.com.au
e nick@nbagroup.com.au



Miller & Merrigan Pty Ltd
ACN 005 541 688
2/126 Merrindale Drive Croydon
PO Box 247 Croydon Victoria 3136
t (03) 8720 9500
f (03) 8720 9501
w www.millarmerrigan.com.au
e admin@millarmerrigan.com.au

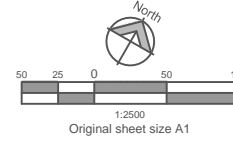


LAND DEVELOPMENT CONSULTANTS

Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design



SAI GLOBAL Quality ISO 9001



LEGEND

- GOLF COURSE
 - TEE
 - HOLE NUMBER
 - NEW FAIRWAY
 - GREEN
- DEVELOPMENT BOUNDARY
- WSUD FEATURES
- POTENTIAL ACCESS POINTS
- PEDESTRIAN AND CYCLIST CONNECTIVITY
- GRASSY WOODLANDS RESERVE
- DRAINAGE / PASSIVE OPEN SPACE RESERVES

LANDSCAPE CONCEPT
TP10631U & PS701486M
MONASH ROAD, NEWBOROUGH 3825
LATROBE CITY COUNCIL
15890DP7
VERSION 2
SHEET 1 OF 1

11 Appendix 8 – Ogilvy Clayton Correspondence

- Monash Views - Design Notes
- Yallourn Golf Club - letter from Ogilvy Clayton - 16 July 2012



Ogilvy
CLAYTON

GOLF COURSE ARCHITECTS



Monash Views - Design Notes

Introduction

It is not often that a Club makes the right decision when it sells land, however Yallourn Golf Club has a wonderful opportunity with this proposal to significantly improve the golf course.

The current 2nd, 3rd, 4th and 5th holes are amongst the weakest on the course and it is our belief that the new holes will be wonderful replacements.

Hole Two

Proposed Length Men's, Par 3, 120 metres
 Ladies, Par 3, 110 metres (tbc)

The first of the new holes is a short 'one – shotter' to a green settled into a beautiful site with an outstanding backdrop. At 120 metres it is only a pitch shot but the natural water- course across the front of the green should make for an outstanding hazard.

We see a green best set on a diagonal from front left to back right and protected by a two bunkers at the rear and a hollow at the front right designed to sweep the slightly under hit shot away from the target.

Hole Three

Proposed Length Men's, Par 5, 490 metres
 Ladies, Par 5, 410 metres (tbc)

This hole is a medium length par five that aims to take advantage of the terrific abundance of natural undulation, all the way from tee to green.

From the tee the high ground down the left side of the hole presents us with a perfect site to embed a bunker in the peak of the hill with the ideal driving line over this hazard. There is a little earth movement necessary just over the bunker to ensure balls stay up on the high side of the hole and earn the perfect line into the flag.

Most drives will tend to leak toward the lower right side of the fairway and from there the second shot will need to move a little from left to right around the gums and the natural ravine that is the primary second shot hazard.

There is a natural little hollow to the left of the green site and we see it being used as a feature to make pitching to the green from the left very interesting. Those who have played short and to the right with their second shot will enjoy the advantage of being able to pitch straight down the green. To earn that reward they will, of course, have to have played close to the ravine on the right.

The feature of the hole, however, is the old creek bed running the full length of the fairway's right. We hope to retain the natural appearance of the creek bed, but to enable recovery shots – particularly around the green – we envisage some minor earthworks such as filling low areas and removing stumps and logs.

This is an outstanding piece of ground to build a long hole over and the 3rd should be one of the best three shot holes

in the state.

Hole Four

Proposed Length Men's, Par 4, 380 metres
 Ladies, Par 4, 360 metres (tbc)

The third of the new holes is a par four of around 380 metres. It will again use the natural undulation, the feature of which is a high point in the middle of the driving area. The land falls away to the left from the centre of the fairway so only well directed drives will open up the best angle of approach into the flag.

The green will angle a little from the front right corner to the back left edge and should advantage players driving close to the right side of the fairway and the ravine.

Again it is apparent to the observer just how the natural contours of the new ground are perfect for golf and these three holes will be an outstanding addition to the Yallourn golf course.

Hole Five

Proposed Length Men's, Par 3, 170 metres
 Ladies, Par 3, 155 metres (tbc)

The 5th will be played over a familiar piece of ground to the members and our suggestion is to build a hole that incorporates the fundamentals of the excellent short 7th hole at Victoria.

There, the high point of the land is on the left of the hole and the natural undulations conspire to take a well-shaped shot across the green and down to the flag. Bunkers guard the left and the front of the green and a shot shaped from left to right is ideal. This new hole will not be a copy of the Victoria hole but it is the principles and fundamentals of it that are worthy of study and replication and the land at Yallourn is remarkably similar.

It is our strong recommendation the non-indigenous vegetation behind the green is cleared to highlight the beautiful natural bush and to open up glimpses of views through to the new 2nd green.

Bridge

The bridge proposed between the 3rd green and 4th tee will need to be structurally sound and allow not only golfers to cross the creek bed but machinery as well.

The style of the bridge should be in keeping with the natural feel through this area. As such we believe timber should be used and dark stains would be preferable so that undue attention is not bought to it when playing down the 3rd hole.

Guidelines for Golf course Boundaries

Areas adjoining golf courses have long been regarded as ideal environment for building a house. The appeal of a short walk to the Club or the aesthetic advantages of overlooking open space are easy to understand.

With the number of houses located around the boundaries of golf courses increasing, golf course architects are constantly required to evaluate the risks associated with errant golf balls traversing into adjoining properties. Required 'buffer zones' have been established by the more influential architect's of the day, with holes deemed to be safe if there was at least 150 feet from fairway centre line to boundary.

Recent improvements to the golf ball and club have prompted many architects' to revise this distance. Some suggest that it should be closer to 55 or 60 metres from centreline to boundary, whilst others believe this figure would be more relevant if it were closer to 70 metres.

Unfortunately there are no specific rules or regulations regarding these buffer zones. In part this is for fear of litigation, if someone is injured when adhering to the 'prescribed distances', but also it is because there are many more factors that need to be assessed apart from just the distance from fairway centreline to the boundary. These include: -

- Location of boundary (whether the fence line is to the left or right of the golfer can have a major effect);
- Tee and fairway elevation (a downhill shot will stay in the air longer than an uphill shot, therefore the risk off hitting off target is greater);
- Presence of wind (including its speed and direction);
- Presence of vegetation (including size, species and density);

As such we believe it is essential that holes are assessed on an individual basis with all of these factors taken into consideration, rather than just adherence to a figure.

Of course there is no way that anyone can guarantee golf balls will not find their way into adjoining properties, if one is located nearby. Whilst architect's can ensure maximum buffer zones and even erect fences, it is difficult to allow for reckless golfers or those who would willingly try and hit a neighboring house or property.

The Yallourn Golf Club Redevelopment

Thus far the proposed redevelopment of Yallourn Golf Club has been well investigated and planned by Monash Views Pty Ltd. As a minimum, 70 metres has been allowed as a buffer between the conceptual fairway centreline and the proposed property boundaries.

Following this initial Stage of planning we have had the chance to develop the concepts for each hole in more detail and as such, we can now assess any potential problems for each and recommend alterations to the boundary lines where necessary.

Hole 2

Due to the position of the proposed tee and green and the fact the boundary is uphill and to the players left (the safer of the two sides, given the most common miss-skew is a right handed slice), we believe the chances of a golf ball landing over this boundary to be extremely low. Some careful revegetation along this fence-line will only improve the safety of residents. As such we recommend no change to this boundary.

Hole 3

The boundary here is at least 75 metres from the centre-line of the fairway in the "landing zone" off the tee. In addition the boundary is elevated well above the fairway. As such we believe the risk of golf balls being struck into adjoining property as extremely low.

Hole 4

Again the boundary here is to the left, some 70 metres from the centre-line of the fairway in the "landing zone". We have moved this green some 30 metres further South than was first intended, and with this alteration the centreline of the fairway has moved further away from the boundary. We now believe the risks associated with balls flying over the boundary on this hole to be extremely low.

We also recommend here that the boundary is revegetated for aesthetic enhancement and so that over time the risks of balls leaving the property are even further reduced.

Hole 5

The boundary here is well behind the teeing area. As such there is no chance a ball could be hit over the boundary unless it was intentional.

Other holes where there is a perceived boundary risk include: -

Hole 15

Proposed housing will be to the right of this hole, but we believe with some slight design changes the risk of golf balls finding their way over the boundary can be reduced to an extremely low level. The majority of vegetation should be retained on the right and the fairway extended to the left (this will include some removal of vegetation). In effect this will move the centre-line of the fairway away from the boundary, creating a greater buffer between golf course and residential development.

Hole 7

Proposed housing is to the left of the golfer, with the distance from centre-line to boundary between 65 and 70 metres in the "landing zone". Our recommendations here are to remove vegetation on the right of the fairway and extend the fairway into this area. This will in effect shift the centre-line of the fairway right, creating a greater buffer between golf and housing. We believe this alteration will reduce the risk of golf balls leaving the property to an extremely low level.

Proposed green (500 m2).

Reshape the spring fed creek so that it is clearly visible as a hazard from the tee. Retain the indigenous plants along the waters edge.

Proposed path.



Proposed 3rd tee.

Construct hollow for difficult chips, putts and pitches.

Proposed bridge.

Existing tee to be retained.

Proposed tees.

MONASH VIEWS - YALLOURN GOLF CLUB

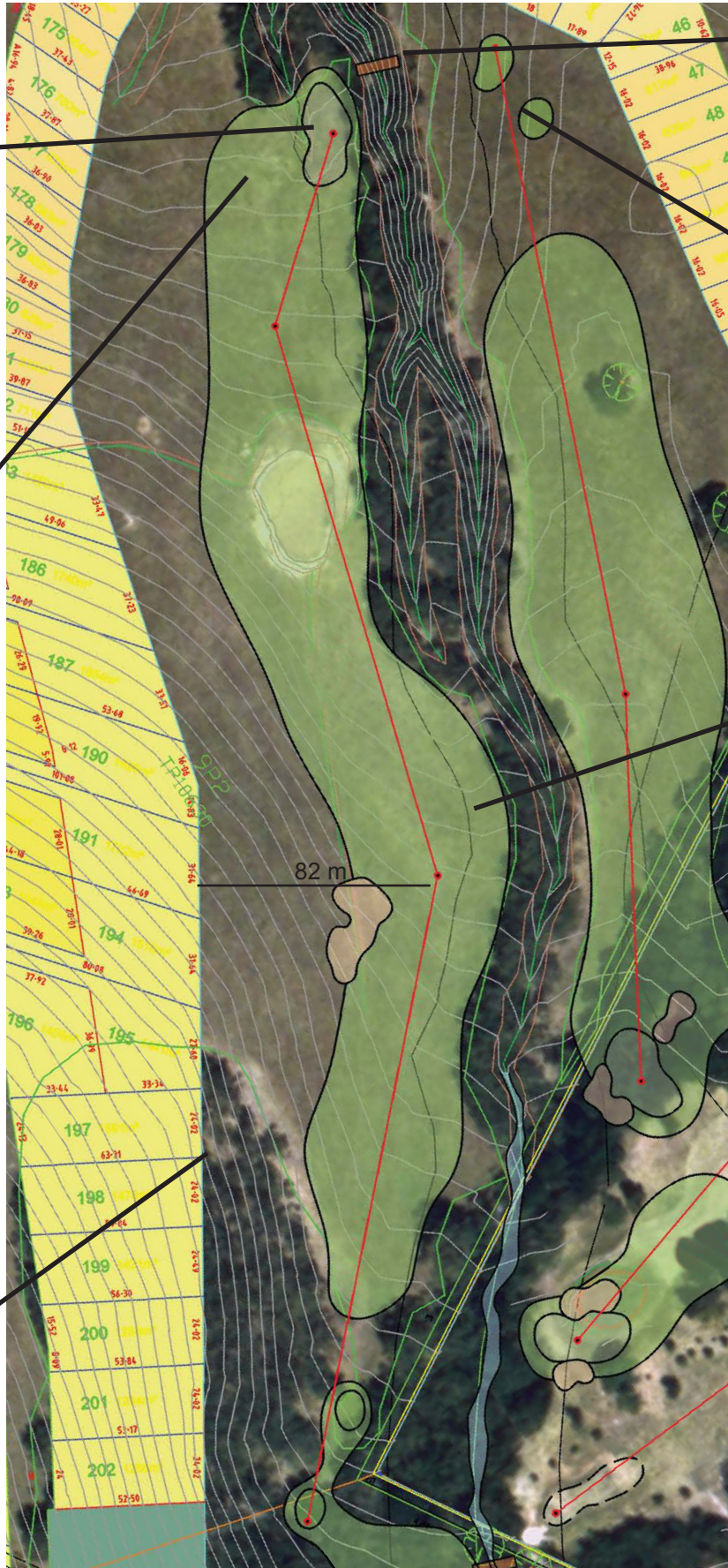
Hole - 2
121 m - Par 3



Proposed green
(480 m²).

Accentuate
valley left of
the green.

Proposed
boundary of
residential
development.



Proposed bridge.

Proposed 4th
tees.

Shot from the
right hand side
of the fairway
reminiscent of
the 6th hole at
Woodlands Golf
Club ie. requiring
a slice around
the trees in order
to have the best
approach to the
green.

82 m

MONASH VIEWS - YALLOURN GOLF CLUB

Hole - 3
502 m - Par 5



Proposed 5th hole.

Proposed green (530 m2).



Proposed 12th green.

Proposed boundary of residential development.

Proposed tees.

Proposed bridge.

MONASH VIEWS - YALLOURN GOLF CLUB

Hole - 4
368 m - Par 4



Proposed green
(502 m2).

Green favoring a
shot from left to
right.

Proposed tees.

Long term
clearing of non-
indigenous
vegetation to
open up views
through to the
2nd green and
to encourage
growth of
indigenous low
story.

Retain key trees
to aid safety.



MONASH VIEWS - YALLOURN GOLF CLUB

Hole - 5
170 m - Par 3

Ogilvy
CLAYTON

Proposed 7th tees.

Proposed green (504 m2).

Retain existing fairway.

Proposed 5th hole.

Existing tee.

Proposed 2nd tee.



MONASH VIEWS - YALLOURN GOLF CLUB

Hole - 6
362 m - Par 4



Existing green
(465 m2).

Edge of existing
fairway.

Proposed
residential
development.

Reconstruct tee
slightly to the left
of the current
tee to encourage
play away from
the proposed
housing down
the left hand side
of the hole.

Proposed 6th
hole.



MONASH VIEWS - YALLOURN GOLF CLUB

Hole - 7
341 m - Par 4





MONASH VIEWS - YALLOURN GOLF CLUB

MASTERPLAN

Ogilvy
CLAYTON

GOLF COURSE ARCHITECTS



Monash Views - Yallourn Golf Club

The removal of the original 2nd, 3rd and 4th, in place of new holes to the West of the course will, most importantly, allow for significant improvement to Yallourn Golf Club. These new holes replace three quite poor holes and the land over which they are planned allows for some first-class golf.

We considered a number of alternative holes in developing this plan. One issue with memberships in altering a course is whether the par of the course is retained and there is generally an affection for maintenance of the status quo, in this case the standard par of 72.

This design is a par of 71 which is not a particular problem but our initial design looked at making the proposed par three 2nd hole a short par four in order to retain a par 72 but that option involved a deal of tree removal. The tee was roughly in the same position but the green extended further into the bushland.

Area that would require additional vegetation removal to accommodate a Par 4



We opted instead to build a short par three and to limit the vegetation removal. The par three here is an important hole because it perfectly joins the 1st green and hole to the 3rd tee and avoids what would be a long and unsatisfactory walk. There is little flexibility to shift this green as moving it forward (and away from the bushland) either makes the hole too short, or places the green on top of a watercourse (creek) – both of which are unsatisfactory for a quality design.

There is some tree removal required in order to build the proposed 3rd tee. To move the tee well forward in order to reduce that tree removal would further reduce the par of the course (to 70) because this hole would have to be a par four. Not only does this compromise the integrity of the layout but further adds another very long walk between holes. It is important that this hole remain a par five.

Other than the 2nd green site and 3rd tee there is very little required tree removal required as part of the proposed re-development. In fact proposed holes 3 and 4 require very little work at all in order to turn pastoral land into quality golf holes – the fairways corridors are wide, what vegetation there is significantly adds to the look and feel of the holes, the land features some excellent undulations and a dry creek bed adds interest and will no doubt prove to be an interesting and strategic hazard for both holes.

Of high importance will be a re-vegetation plan in order to ensure the new holes feel much like the rest of the golf course and this should include low, middle and high story plants which are indigenous to the region.



July 16, 2012

Peter Brown
Monash Views Pty Ltd
PO Box 1265
WARRAGUL VIC 3820

Dear Peter,

Yallourn Golf Club

Further to my site visit and our recent discussions regarding the 2nd and 4th holes please find enclosed the revised concept plan and corresponding notes.

If you have any queries please don't hesitate to contact me.

Best wishes,

**MIKE COCKING
PARTNER**

PO Box 4158, Mt. Eliza 3930 Victoria Australia

Geoff Ogilvy
Principal
g.ogilvy@ogilvyclayton.com

Mike Clayton
Principal
mobile +61 (0) 417 853 835
m.clayton@ogilvyclayton.com

Mike Cocking
Partner
mobile +61 (0) 409 230 244
m.cocking@ogilvyclayton.com

Ashley Mead
Partner
mobile +61 (0) 438 395 952
a.mead@ogilvyclayton.com

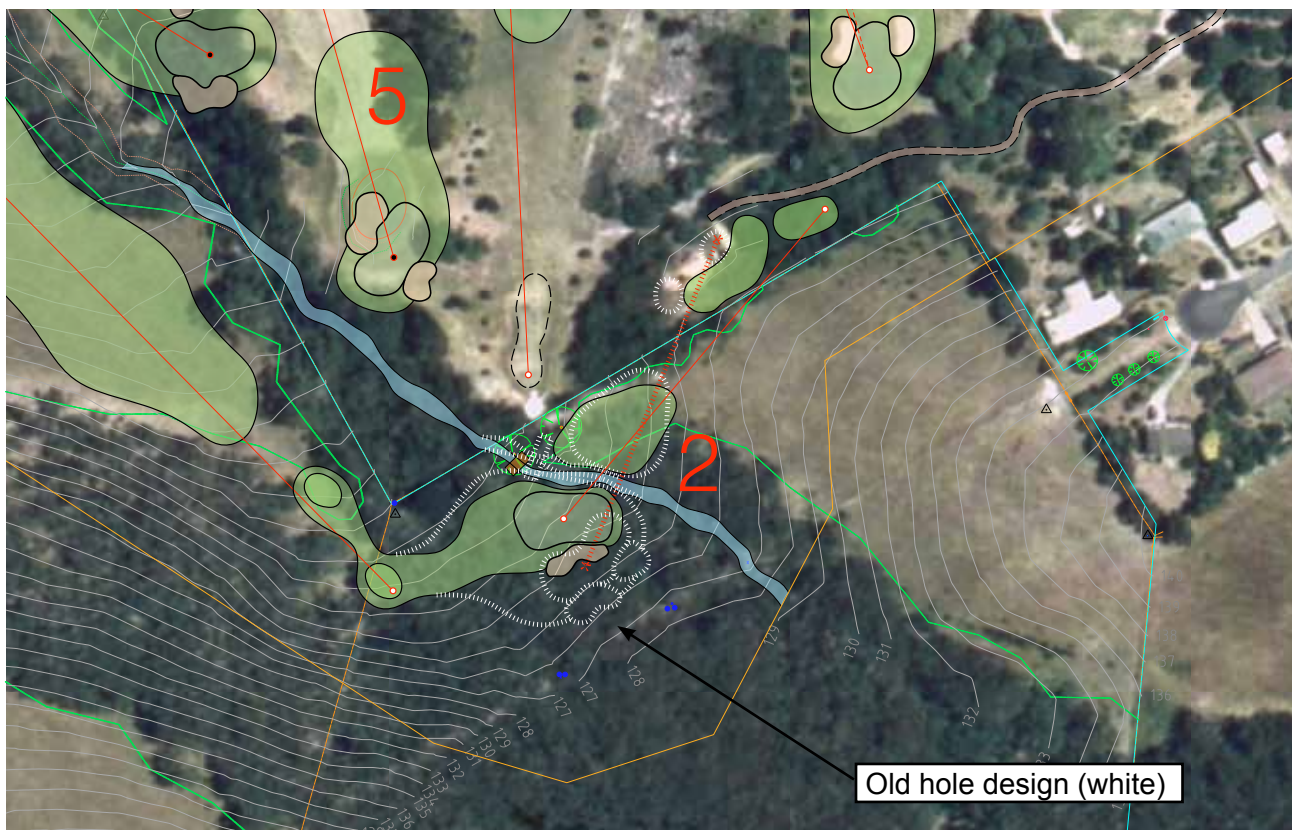
2nd hole design (revised)

The revised concept for the 2nd hole involves the green shifting approximately 20 metres to the right (North) and down the hill. This helps reduce the amount of tree removal and providing the creek can be formalised and the green site can be built up, presents an opportunity to build a quality par three that incorporates the creek into the design of the hole.

The new tee pushes back (East) into the vegetation to make up for the loss of distance at the green end, ensuring the hole is seen as being long enough (even from the forward tees) to be considered a 'proper hole'.

Whilst we looked at locating the tee out in the clearing (to the South) during our site investigation it is difficult to gain sufficient length without introducing a safety issue with neighbouring houses. From the location shown it also ensures the safety of golfers on the 6th tee is not compromised, as the vegetation to the West of the tees will help act as a screen.

As part of the review process we also looked at moving the green forward of the vegetation but there are numerous issues which prevent this as a viable alternative. First and foremost the hole can't be made long enough - it would be little more than a pitch - and secondly to position a green here would require a significant amount of earthworks including rerouting of the creek.



Comparison Plan

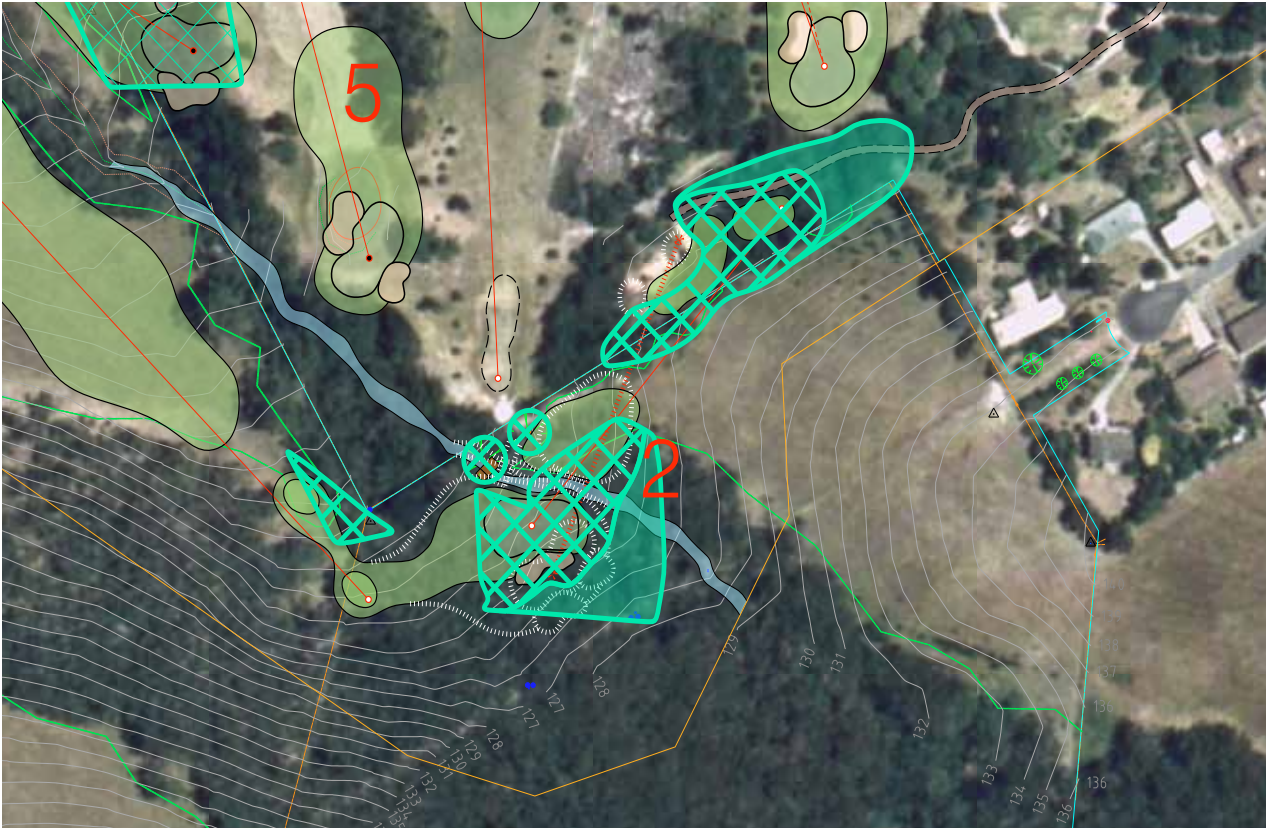
PO Box 4158, Mt. Eliza 3930 Victoria Australia

Geoff Ogilvy
Principal
g.ogilvy@ogilvyclayton.com

Mike Clayton
Principal
mobile +61 (0) 417 853 835
m.clayton@ogilvyclayton.com

Mike Cocking
Partner
mobile +61 (0) 409 230 244
m.cocking@ogilvyclayton.com

Ashley Mead
Partner
mobile +61 (0) 438 395 952
a.mead@ogilvyclayton.com



Vegetation removal plan

The proposed alterations have managed to reduce the amount of tree removal from 6, 714m² to 4, 570m².

PO Box 4158, Mt. Eliza 3930 Victoria Australia

Geoff Ogilvy
Principal
g.ogilvy@ogilvyclayton.com

Mike Clayton
Principal
mobile +61 (0) 417 853 835
m.clayton@ogilvyclayton.com

Mike Cocking
Partner
mobile +61 (0) 409 230 244
m.cocking@ogilvyclayton.com

Ashley Mead
Partner
mobile +61 (0) 438 395 952
a.mead@ogilvyclayton.com

4th hole design

In response to Matt Dell's query for the 4th we make the following comments: -

There is the possibility to create an excellent par four at the 4th, by clearing a section of vegetation and siting the green up the hill towards the existing 5th fairway. This will make for a fine looking approach as well as helping to connect the new holes with the old.

Unless the vegetation is cleared there isn't sufficient space to make a decent par four, once you take into account some sort of buffer between the vegetation and the putting surface. Due to agronomic and playability issues the green would need to be at least 20 metres forward of the trees which would only allow enough length for a long par three. With short holes at the 2nd, 5th and 8th such a change would severely compromise the course.



PO Box 4158, Mt. Eliza 3930 Victoria Australia

Geoff Ogilvy
Principal
g.ogilvy@ogilvyclayton.com

Mike Clayton
Principal
mobile +61 (0) 417 853 835
m.clayton@ogilvyclayton.com

Mike Cocking
Partner
mobile +61 (0) 409 230 244
m.cocking@ogilvyclayton.com

Ashley Mead
Partner
mobile +61 (0) 438 395 952
a.mead@ogilvyclayton.com

12 Appendix 9 – Traffic Engineering Assessment

- Traffic Group - October 2011
- Traffic Group - 23 August 2012



Traffic Engineers and Transport Planners

Traffix Group Pty Ltd
ABN 32 100 481 570

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
admin@traffixgroup.com.au
www.traffixgroup.com.au

TRAFFIC ENGINEERING ASSESSMENT

OF

PROPOSED RESIDENTIAL SUBDIVISION MONASH ROAD, NEWBOROUGH (MONASH VIEWS ESTATE)

Prepared for
Monash Views Pty Ltd

October 2011
Our Reference: GRP12913R#1.doc

Traffic Engineering Report
for
Proposed Residential Subdivision
at
Monash Road, Newborough (Monash Views Estate)

Study Team: Will de Waard
B.E. (Civil) Hons., M.I.E.Aust., M.V.P.E.L.A., M.I.T.E.

Brent Hodges
B.E. (Civil) Hons.

Our Reference: GRP12913R#1.doc

COPYRIGHT: The ideas and material contained in this document are the property of Traffix Group (Traffix Group Pty Ltd – ABN 32 100 481 570, Traffix Survey Pty Ltd – ABN 57 120 461 510, Traffix Design Pty Ltd – ABN 41 060 899 443). Use or copying of this document in whole or in part without the written permission of Traffix Group constitutes an infringement of copyright.

LIMITATION: This report has been prepared on behalf of and for the exclusive use of Traffix Group's client, and is subject to and issued in connection with the provisions of the agreement between Traffix Group and its client. Traffix Group accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

TABLE OF CONTENTS

1. INTRODUCTION	1
2. EXISTING CONDITIONS	1
2.1. SUBJECT SITE	1
2.2. ROAD NETWORK.....	3
2.3. TRAFFIC VOLUMES.....	6
3. PROPOSAL	8
4. TRAFFIC ENGINEERING ASSESSMENT	9
4.1. TRAFFIC GENERATION.....	9
4.2. TRAFFIC DISTRIBUTION.....	9
4.3. TRAFFIC IMPACTS	11
4.3.1. <i>EXTERNAL ACCESS POINTS - REQUIREMENT FOR TURN LANES</i>	11
4.3.2. <i>EXTERNAL ACCESS POINTS - CAPACITY ANALYSIS</i>	11
4.3.3. <i>MONASH ROAD AND COACH ROAD INTERSECTION</i>	12
4.4. SIGHT DISTANCE.....	14
4.4.1. <i>MONASH ROAD/KILLARNEY DRIVE ACCESS</i>	14
4.4.2. <i>COACH ROAD/TRALEE CRESCENT ACCESS</i>	14
4.4.3. <i>COACH ROAD/GLENEAGLES DRIVE ACCESS</i>	15
4.5. ROAD HIERARCHY.....	16
4.5.1. <i>LOCAL ACCESS STREETS</i>	17
4.5.2. <i>ACCESS PLACE</i>	18
4.5.3. <i>LOCAL ACCESS LANES</i>	18
4.5.4. <i>INTERNAL INTERSECTIONS</i>	18
4.6. LATROBE PLANNING SCHEME (CLAUSE 56).....	18
4.6.1. <i>TRAFFIC MANAGEMENT</i>	20
4.6.2. <i>GARBAGE VEHICLES</i>	20
4.6.3. <i>PEDESTRIAN FACILITIES</i>	20
5. CONCLUSIONS	22

FIGURES

FIGURE 1: LOCALITY PLAN	2
FIGURE 2: AERIAL PHOTO	2
FIGURE 3: LATROBE LAND USE ZONING MAP	3
FIGURE 4: MONASH ROAD ADJACENT TO SUBJECT SITE - VIEW WEST.....	5
FIGURE 5: COACH ROAD ADJACENT SUBJECT SITE - VIEW WEST	5
FIGURE 6: FAIRWAY DRIVE WESTERN END - VIEW WEST	5
FIGURE 7: MONASH ROAD ADJACENT TO SUBJECT SITE – VIEW EAST	5
FIGURE 8: COACH ROAD ADJACENT TO SUBJECT SITE - VIEW EAST	5
FIGURE 9: FAIRWAY DRIVE WESTERN END - VIEW EAST	5
FIGURE 10: TURNING MOVEMENT COUNT SUMMARY – AM PEAK (8AM-9AM)	6
FIGURE 11: TURNING MOVEMENT COUNT SUMMARY – PM PEAK (4PM-5PM)	6

FIGURE 12: PEAK POST DEVELOPMENT VOLUMES, NORTHERN SECTION 10

FIGURE 13: PEAK POST DEVELOPMENT VOLUMES, SOUTHERN SECTION ACCESS (WEST) 10

FIGURE 14: PEAK POST DEVELOPMENT VOLUMES, SOUTHERN SECTION ACCESS (EAST) 10

FIGURE 15: AUSTRROADS GUIDE TO TRAFFIC MANAGEMENT PART 6 – INTERSECTIONS, INTERCHANGES AND CROSSINGS 11

FIGURE 16: PEAK POST DEVELOPMENT VOLUMES, MONASH ROAD AND COACH ROAD INTERSECTION 13

FIGURE 17: SIGHT DISTANCE AT PROPOSED MONASH ROAD/KILLARNEY DRIVE ACCESS - VIEW WEST 14

FIGURE 18: SITE DISTANCE AT PROPOSED MONASH ROAD/KILLARNEY DRIVE ACCESS - VIEW EAST 14

FIGURE 19: SIGHT DISTANCE AT PROPOSED COACH ROAD/TRALEE CRESCENT ACCESS - VIEW EAST 15

FIGURE 20: SITE DISTANCE AT PROPOSED COACH ROAD/TRALEE CRESCENT ACCESS - VIEW WEST 15

FIGURE 21: SIGHT DISTANCE AT PROPOSED COACH ROAD/GLENEAGLES DRIVE ACCESS - VIEW EAST 16

FIGURE 22: SITE DISTANCE AT PROPOSED COACH ROAD/GLENEAGLES DRIVE ACCESS - VIEW WEST 16

FIGURE 23: INDICATIVE ROAD HIERARCHY 17

TABLES

TABLE 1: MONASH ROAD, NEWBOROUGH: TRAFFIC VOLUME SUMMARY7

TABLE 2: COACH ROAD, NEWBOROUGH: TRAFFIC VOLUME SUMMARY7

TABLE 3: REQUIREMENT FOR TURN LANES 11

TABLE 4: PEAK HOUR TRAFFIC VOLUMES 12

APPENDICES

- APPENDIX A. TRAFFIC COUNTS
- APPENDIX B. PLAN OF PROPOSED SUBDIVISION
- APPENDIX C. TRAFFIC GENERATION & DISTRIBUTION MODEL
- APPENDIX D. PLAN OF PEDESTRIAN AND BICYCLE ACCESS

1. INTRODUCTION

Traffix Group has been engaged by Monash Views Pty Ltd to undertake a traffic engineering assessment of the proposed development of a parcel of land at Monash Road, Newborough as a residential subdivision.

The proposal is to develop land currently used for farming activities for residential development (subdivision), with a yield in the order of 225 standard residential lots. The proposed subdivision will be known as the 'Monash Views' estate.

This report provides a detailed traffic engineering assessment of the proposed subdivision of the subject site, including the internal access arrangements as well as the likely impacts on the surrounding road network of the proposed development.

2. EXISTING CONDITIONS

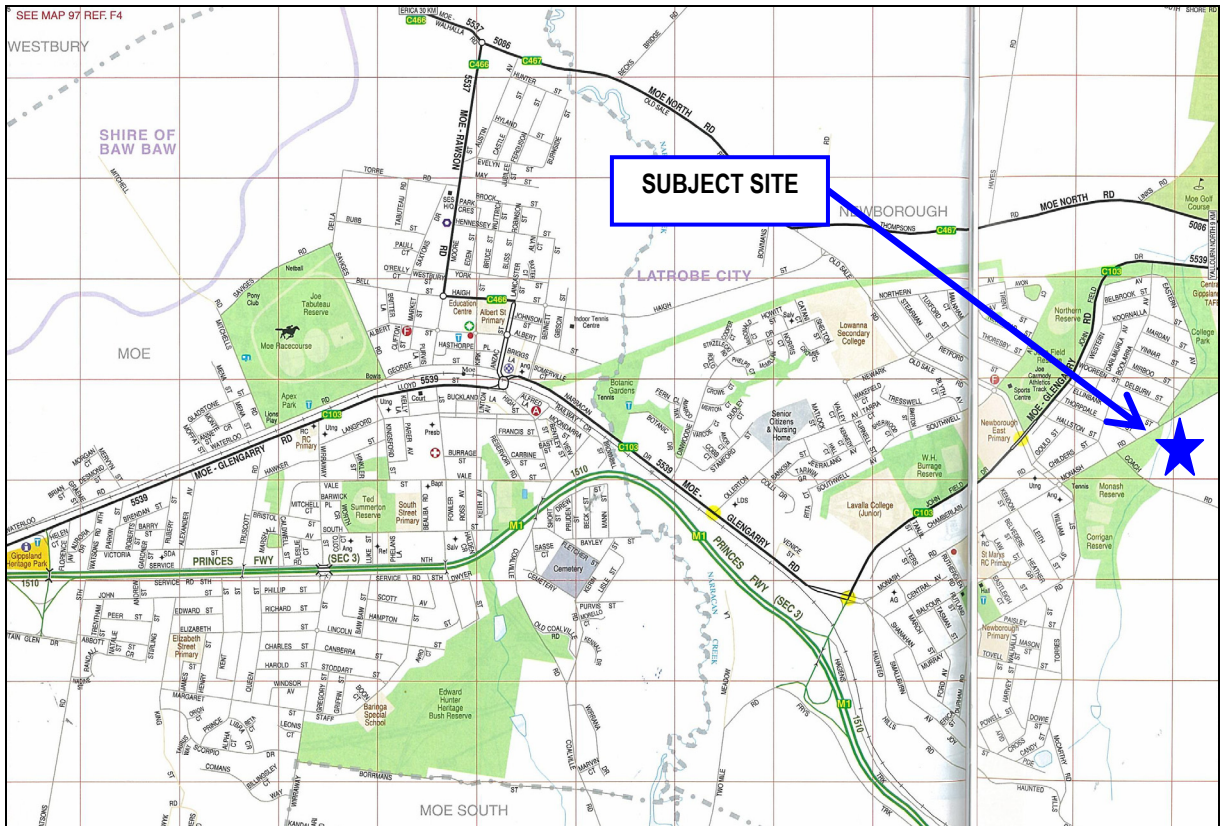
2.1. SUBJECT SITE

The subject site is located on Monash Road, Newborough with site frontages to Monash Road, Coach Road and Fairway Drive. The subject site covers an area of approximately 32.62 hectares, and is for the most part vacant. An extension to the Yallourn Golf Club is present through the centre of the subject site, expanding east to west. The presence of the golf course divides vehicle access to the subject site into three (3) sections as follows:

- Northern Section – Access to Monash Road via Killarney Drive,
- Southern Section – Access to Coach Road via Tralee Crescent and Gleneagles Drive, and
- Eastern Section – Access to Fairway Drive.

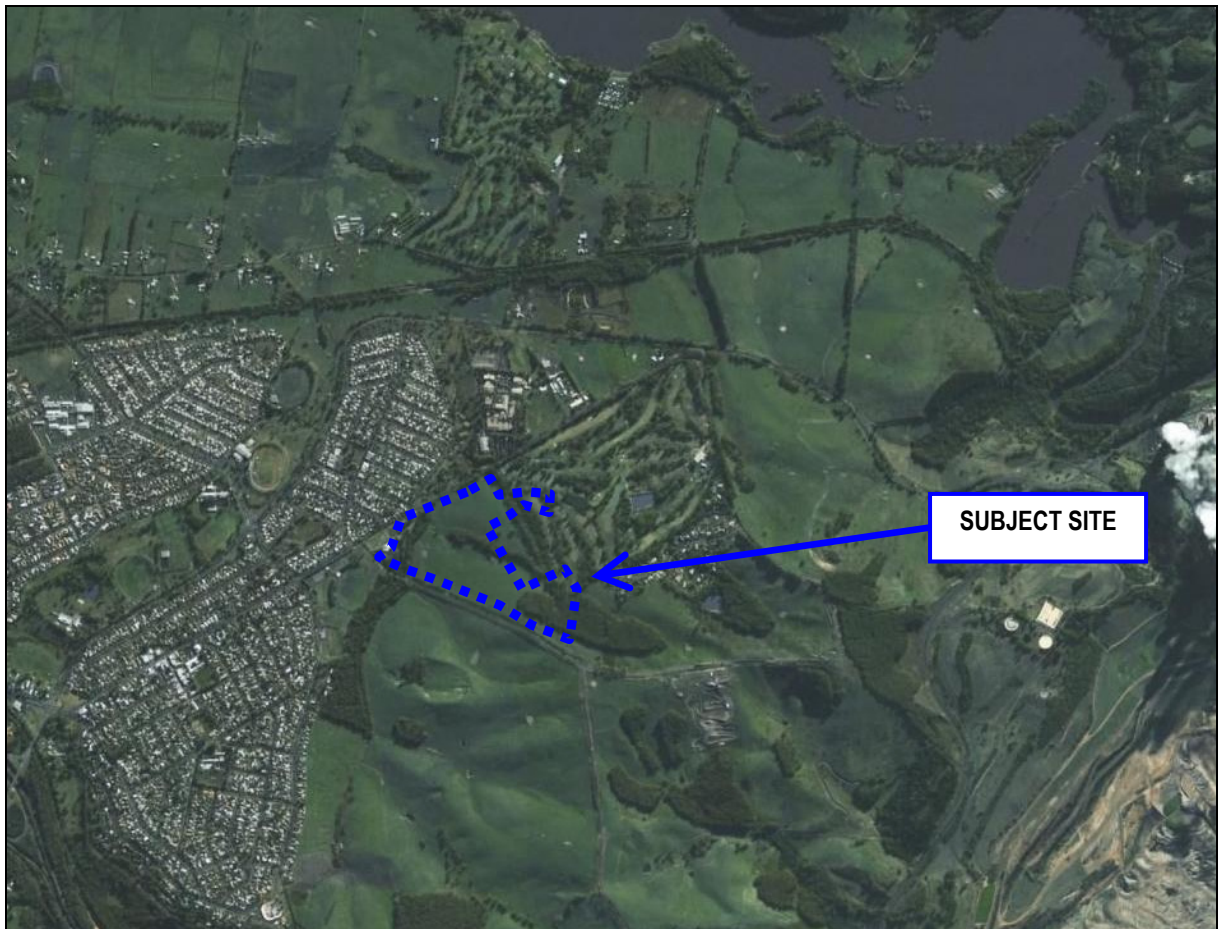
A locality plan and aerial photograph of the subject site is provided at Figure 1 and Figure 2.

The subject site is zoned Residential 1 Zone under the Latrobe Planning Scheme. A land use zoning map is provided at Figure 3. Land use surrounding the subject site includes residential land to the east, the Yallourn Golf Club and special use zones associated with the Yallourn Power Station to the west, Gippsland TAFE to the north and Farm zoned land to the south.



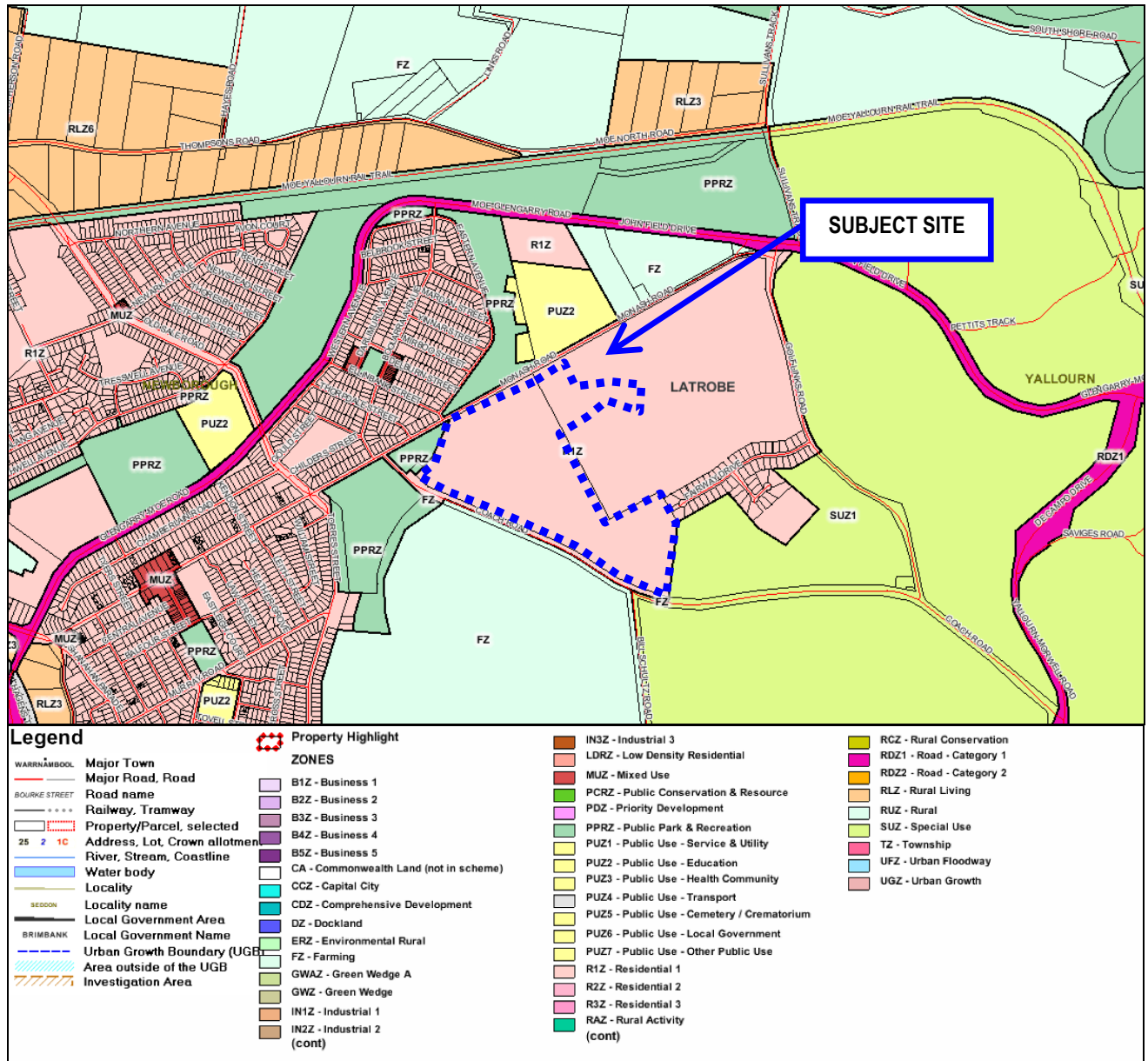
Source: Vicroads Country Street Directory of Victoria, Edition 6

Figure 1: Locality Plan



Reproduced with permission of Google Earth Pro

Figure 2: Aerial Photo



Source: www.dse.vic.gov.au

Figure 3: Latrobe Land Use Zoning Map

2.2. ROAD NETWORK

Monash Road is a local road which extends east to west from Golf Links Road in the east to Shanahan Parade in the west. In the vicinity of the subject site Monash Road provides for a lane of traffic in each direction with a carriageway width of approximately 6.8m and sealed shoulders on both sides of the road of approximately 1.5-1.75m wide. The road reserve width in the vicinity of the subject site is approximately 20m wide. Monash Road has a 60m/h speed limit west of the subject site, increasing to 80km/h along the subject site frontage.

Coach Road is a local road which extends east to west from Decampo Drive in the east to Monash Road in the west. In the vicinity of the subject site Coach Road provides for a lane of traffic in each direction with a carriageway width of approximately 5.6-5.7m. The road reserve width in the vicinity of the subject site is approximately 40m wide. Coach Road has a 60 km/h speed limit in the vicinity of Monash Road, increasing to 100km/h at the western boundary of the subject site.

Fairway Drive is a local road which extends east to west from Golf Links in the east to a court bowl (dead end) in the west. In the vicinity of the subject site Fairway Drive provides for a lane of traffic in each direction with a carriageway width of approximately 7.25m. The road reserve width in the vicinity of the subject site is approximately 15.5m wide. Fairway Drive has the default urban speed limit of 50 km/h.

Photographs of the road network surrounding the subject site are provided in Figure 4 to Figure 9.



Figure 4: Monash Road Adjacent to Subject Site - View West



Figure 5: Coach Road Adjacent Subject Site - View West



Figure 6: Fairway Drive Western End - View West



Figure 7: Monash Road Adjacent to Subject Site - View East



Figure 8: Coach Road Adjacent to Subject Site - View East



Figure 9: Fairway Drive Western End - View East

2.3. TRAFFIC VOLUMES

Traffix Group conducted Turning Movement Counts at the intersection of Monash Road and Coach Road at the following times;

- Thursday, 7th April, 2011 – 4:00pm to 6:00pm, and
- Friday, 8th April, 2011 – 7:30am to 9:30am.

Figure 10 and Figure 11 present a summary of the AM and PM peak turning movements recorded.

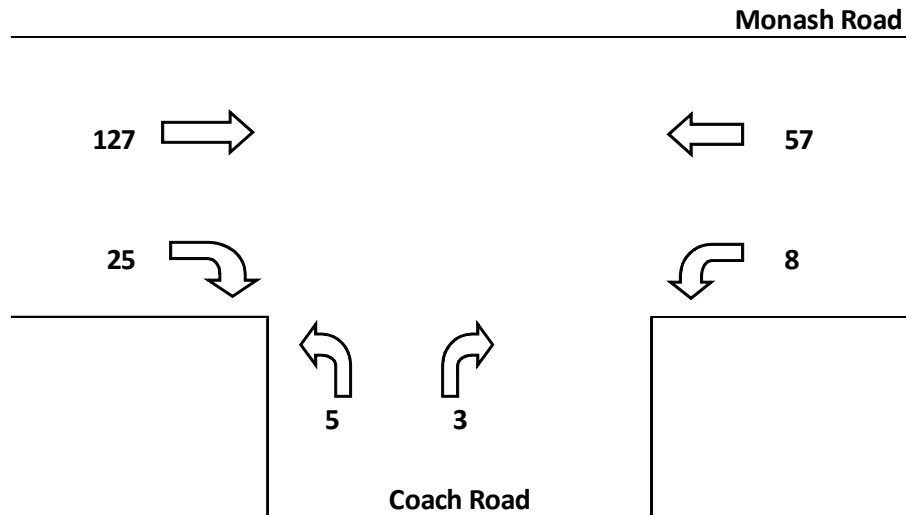


Figure 10: Turning Movement Count Summary – AM Peak (8am-9am)

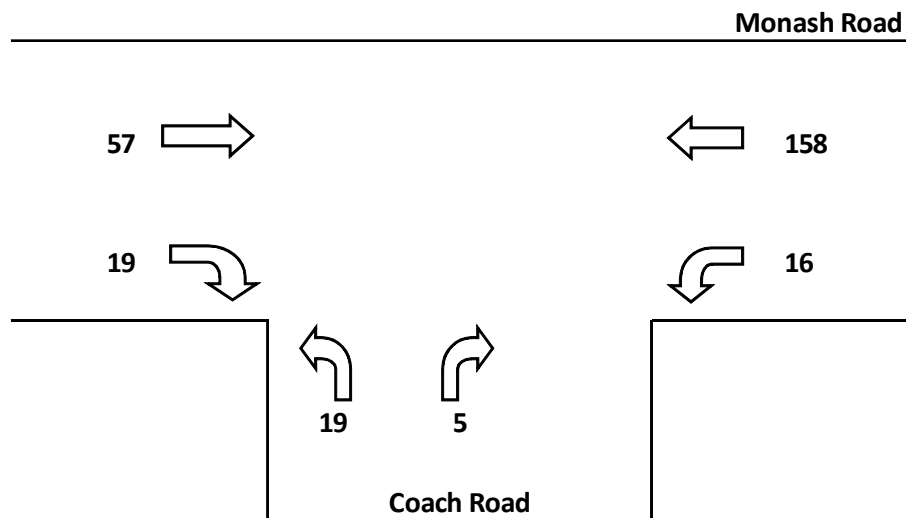


Figure 11: Turning Movement Count Summary – PM Peak (4pm-5pm)

A summary of the resultant traffic volumes for Monash Road and Coach Road (all vehicles) is provided in Table 1 and Table 2.

Table 1: Monash Road, Newborough: Traffic Volume Summary

All Vehicles	Eastbound (vehicles/hour)	Westbound (vehicles/hour)	Total (vehicles/hour)	Percentage Commercial Vehicles
Monash Road (North-east of Coach Road)				
AM Peak Hour Volume (7:45am – 8:45am)	141	53	194	3.1%
PM Peak Hour Volume (4:00pm – 5:00pm)	62	177	239	0.0%

Table 2: Coach Road, Newborough: Traffic Volume Summary

All Vehicles	Eastbound (vehicles/hour)	Westbound (vehicles/hour)	Total (vehicles/hour)	Percentage Commercial Vehicles
Coach Road (East of Monash Road)				
AM Peak Hour Volume (8:00am – 9:00am)	33	8	41	3.8%
PM Peak Hour Volume (4:00pm – 5:00pm)	35	24	59	3.5%

A copy of the results of the turning movement counts is attached at Appendix A.

3. PROPOSAL

The proposal is to develop the subject site at Monash Road, Newborough as a residential subdivision, with a yield of approximately 225 standard residential lots. The site is effectively 'split' into three (3) sections due to the presence of the golf course through the centre of the site as follows:

- Northern Section – 115 lots with access to Monash Road via Killarney Drive,
- Southern Section – 106 lots with access to Coach Road via Tralee Crescent and Gleneagles Drive, and
- Eastern Section – 4 lots with access to Fairway Drive.

Vehicular access from the subject site includes a single access point to Monash Road (Killarney Drive) for the northern section, two access points to Coach Road (Tralee Crescent and Gleneagles Drive) for the southern section and a single access point to Fairway drive for the eastern section.

All of the proposed access points are proposed to operate as standard unsignalised intersections. The access to the northern section via Killarney Drive requires a CHR(s) right turn treatment on Monash Road.

In order to provide adequate sight distance from the eastern access point to Coach Road (Gleneagles Drive) it is recommended to reduce the speed zone on Coach Road from 100km/h to 80km/h. Initial discussions with traffic engineers from LaTrobe City Council, have indicated in principle support for the speed reduction as part of the development, while initial discussions with VicRoads have indicated that Council are required to submit a proposal for the speed zone reduction.

It is noted that the proposed subdivision is generally in accordance with Clause 56 of the Latrobe Planning Scheme.

A copy of the proposed residential subdivision plan prepared by CPG is attached at Appendix B.

4. TRAFFIC ENGINEERING ASSESSMENT

The following traffic engineering assessment of the subdivision proposal has been undertaken with particular regard to Clause 56 of the Latrobe City Council Planning Scheme and the State Government's 'Public Transport Guidelines for Lane Use and Development', and good engineering practice.

4.1. TRAFFIC GENERATION

It is generally accepted that a conservative estimate of daily traffic generation of residential subdivisions is in the order of 10 trips per household per day, and one (1) vehicle trip per household per day in each of the AM and PM peak hours.

Based on the proposal to develop 225 standard lots, this represents a daily traffic generation of 2,250 trips, with around 225 trips in each of the AM and PM peak hour periods.

4.2. TRAFFIC DISTRIBUTION

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

- Northbound – 5% of trips,
- Southbound – 5% of trips,
- Eastbound – 60% of trips,
- Westbound – 30% of trips.

Directional splits of 20% in/80% out in the AM Peak, 70% in/30% out in the PM Peak have been adopted.

Given the above, an analysis has been undertaken to determine the peak hour volumes of traffic utilising the three main access points (note: analysis of the access point to Fairway Drive access is not required due to the low expected daily volumes). The complete traffic generation and distribution model is presented at Appendix C.

The anticipated traffic generated by the development has been added to the traffic survey results from the intersection of Monash Road and Coach Road to determine the post-development turning movement volumes for the three external access points. This has been completed for each of the weekday AM, weekday PM periods, and are summarised in Figure 12 to Figure 14 respectively.

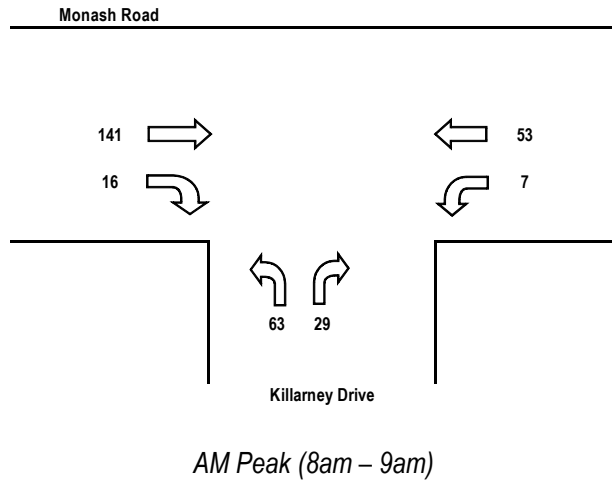


Figure 12: Peak Post Development Volumes, Northern Section

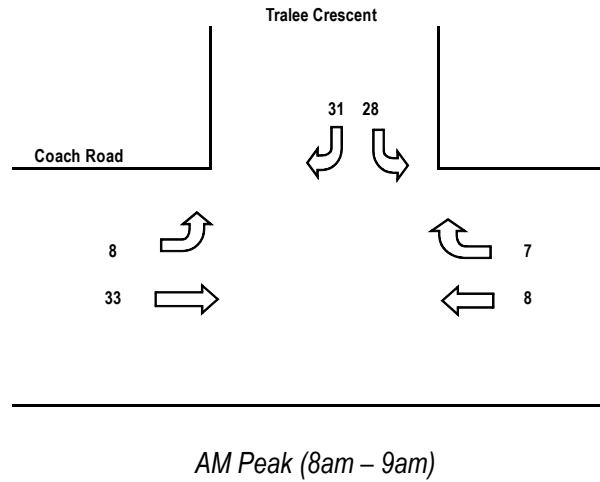


Figure 13: Peak Post Development Volumes, Southern Section Access (West)

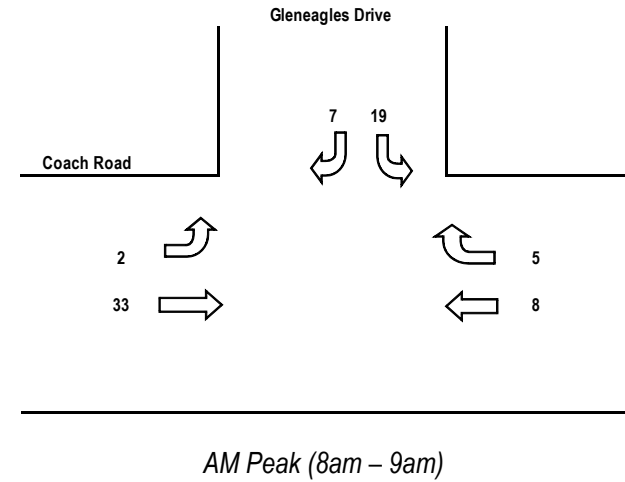
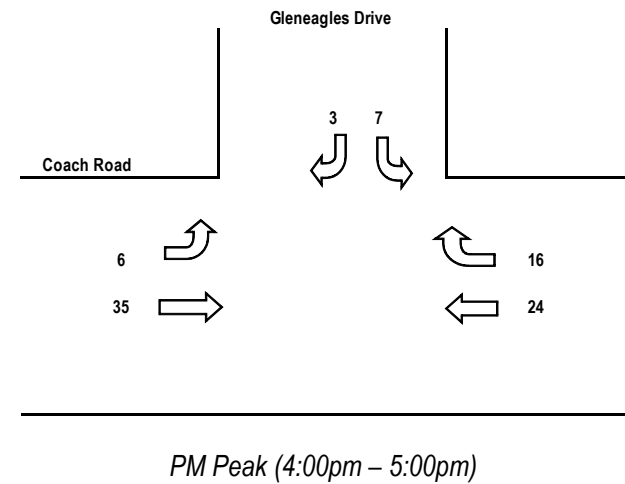
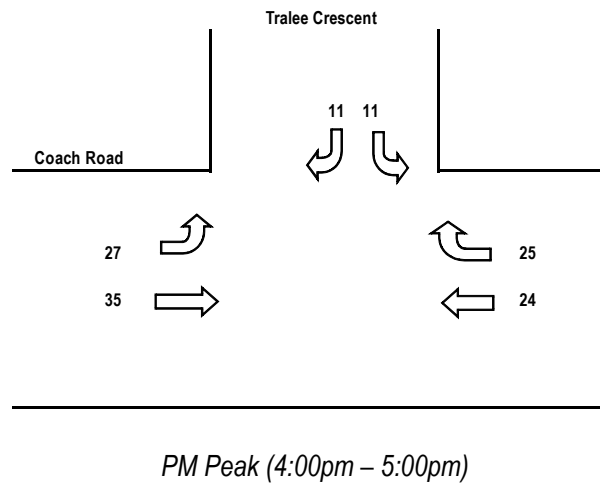
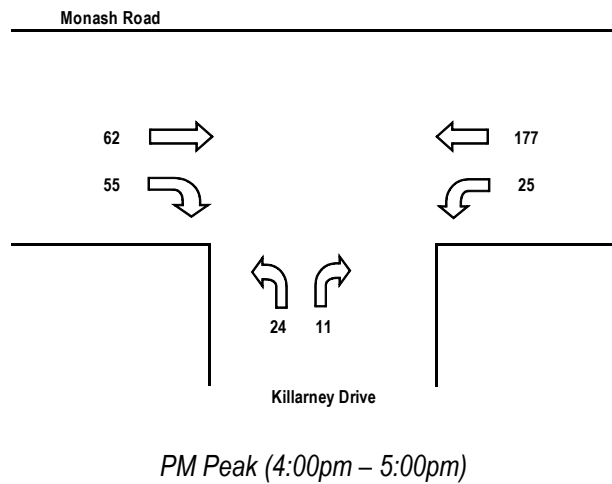


Figure 14: Peak Post Development Volumes, Southern Section Access (East)



4.3. TRAFFIC IMPACTS

The three main access points to Monash Road and Coach Road have been analysed to determine the impact of the development traffic. Sections 4.3.1 to 4.3.3 below outline the specific impacts on Monash Road and Coach Road.

4.3.1. EXTERNAL ACCESS POINTS - REQUIREMENT FOR TURN LANES

An assessment of the requirements for turn lanes at the external access points to Monash Road and Coach Road has been undertaken with regard for the Austroads Guide to Road Design: Part 4A – Unsignalised and Signalised Intersections. The assessment utilised the predicted traffic volumes from the traffic generation and distribution model presented above in Section 4.2. The assessment has indicated that a CHR (s) lane treatment is warranted at the Monash Road (Killarney Drive) access point, with basic turn lane treatments required at the remaining intersections, as indicated in Table 3 below.

Table 3: Requirement for Turn Lanes

Access Point	Left Turn Lane Requirement	Right Turn Lane Requirement
Monash Road Access (Killarney Drive)	BAL	CHR (s)
Coach Road Access (West – Tralee Crescent)	BAL	BAR
Coach Road Access (East – Gleneagles Drive)	BAL	BAR

4.3.2. EXTERNAL ACCESS POINTS - CAPACITY ANALYSIS

AustRoads Guide to Traffic Management: Part 6, Intersections, Interchanges and Crossings, outlines the capacity figures for uninterrupted flow for intersections carrying light crossing and turning volumes. Table 2.4 of the Guide indicates the maximum traffic volume combinations for uninterrupted flow conditions. The Guide states that *'When the volumes at an intersection are less than those shown, a detailed analysis to demonstrate that adequate capacity is available is unlikely to be necessary. Furthermore, flaring of the approaches is unlikely to be needed based on capacity.'* Table 2.4 is shown at Figure 15.

Major road type ¹	Major road flow (vph) ²	Minor road flow (vph) ³
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

Notes:

1. Major road is through road (i.e. has priority).
2. Major road flow includes all major road traffic with priority over minor road traffic.
3. Minor road design volumes include through and turning volumes.

Figure 15: AustRoads Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings

Table 4 below, outlines the expected peak hour traffic volumes on Monash Road, Coach Road and the proposed roads from the subject site that connect to the external road network (Killarney Drive, Tralee Crescent and Gleneagles Drive).

Table 4: Peak Hour Traffic Volumes

Road	AM Peak Hour	PM Peak Hour
Monash Road	194 veh/hour	239 veh/hour
Coach Road	41 veh/hour	59 veh/hour
Killarney Drive	115 veh/hour	115 veh/hour
Tralee Crescent	74 veh/hour	74 veh/hour
Gleneagles Drive	32 veh/hour	32 veh/hour

As can be seen from the table above, the maximum traffic volumes along the external major roads is 239 vehicles per hour (Monash Road). Further, the maximum traffic volume expected to be generated in a peak hour period by any of the internal roads connecting to the external road network is 115 vehicles per hour (Killarney Drive). As such, AustRoads Table 2.4 would indicate that it is unnecessary to undertake intersection capacity analysis for any of the external intersections for the subject site.

Further, we believe that no additional traffic management measures (apart from the turn lane requirements indicated in Section 4.3.1) will be required at these intersections to accommodate the anticipated traffic movements.

4.3.3. MONASH ROAD AND COACH ROAD INTERSECTION

Traffic volumes from the Traffic Generation and Distribution model and the existing turning movements collected by Traffix Group have been utilised to predict the turning movement volumes at the intersection of Monash Road and Coach Road. Figure 16 presents the predicted turning movement volumes.

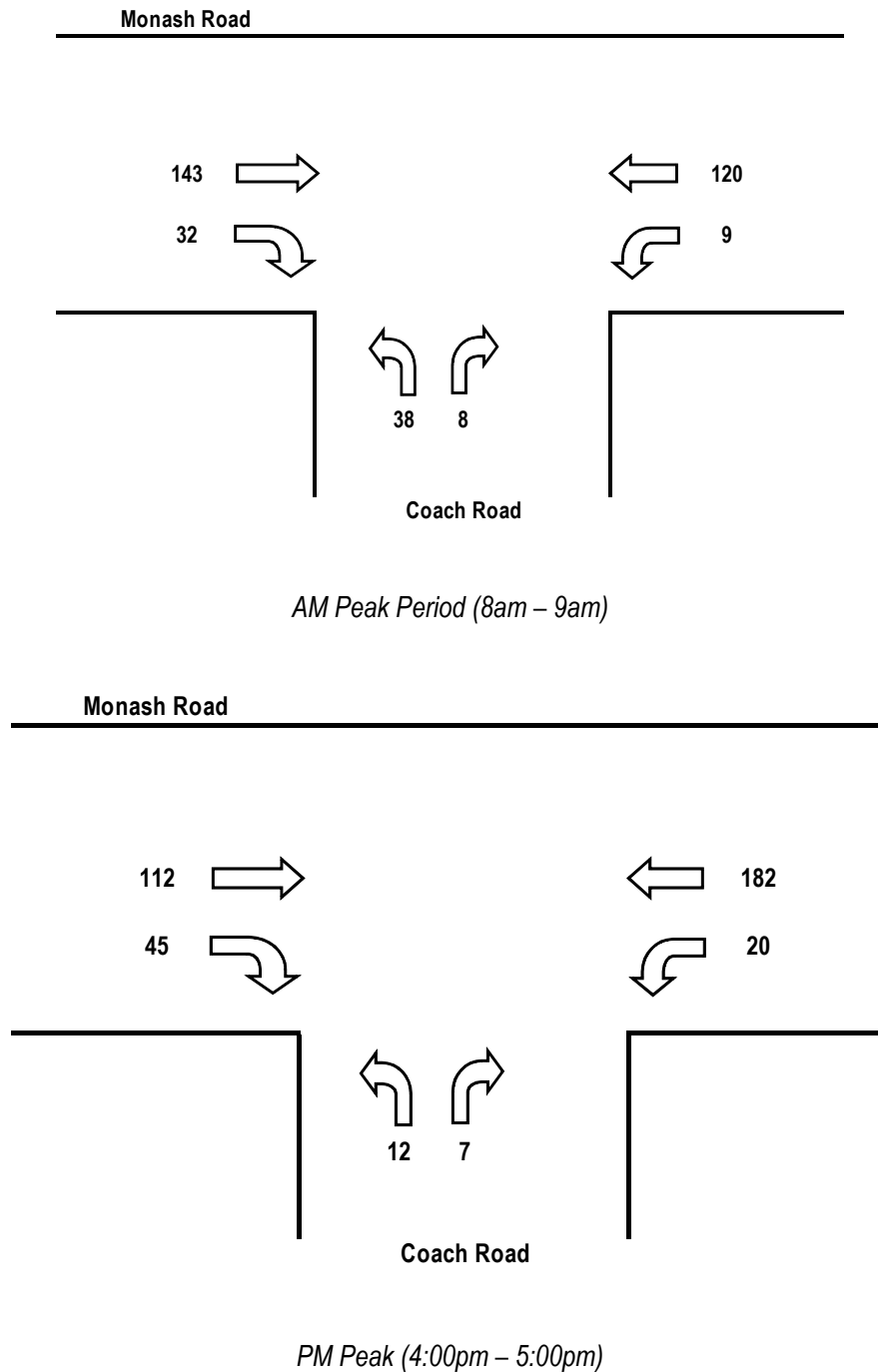


Figure 16: Peak Post Development Volumes, Monash Road and Coach Road Intersection

Given the expected traffic volumes presented above, the AustRoads Table 2.4 presented in Figure 15 would indicate that it is unnecessary to undertake intersection capacity analysis for the intersection of Monash Road and Coach Road.

In view of the above, we believe that no additional traffic management measures will be required at the intersection of Monash Road and Coach Road to accommodate the anticipated traffic movements.

4.4. SIGHT DISTANCE

The sight distance requirements that are applicable to the proposed subdivision access points are 'approach sight distance' and 'safe intersection sight distance'.

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 intersection¹.

Safe Intersection Sight Distance (SISD) is measured between the top of a car on the leg with priority (1.25m) and the driver's eye height in the side street (1.05m)¹.

The following sections discuss the sight distance available at each of the proposed access points.

4.4.1. MONASH ROAD/KILLARNEY DRIVE ACCESS

The ASD and SISD requirements on Monash Road (80km/h speed zone) are as follows:

- ASD: 114m ($R_T = 2.0s$), and
- SISD: 181m ($R_T = 2.0s$).

The required sight distances at the proposed Monash Road and Killarney Drive access point are available in both directions as seen in Figure 17 and Figure 18.



Figure 17: Sight Distance at Proposed Monash Road/Killarney Drive Access - View West



Figure 18: Site Distance at Proposed Monash Road/Killarney Drive Access - View East

4.4.2. COACH ROAD/TRALEE CRESCENT ACCESS

The ASD and SISD requirements on Coach Road (100km/h speed zone) are as follows:

- ASD: 179m ($R_T = 2.5s$), and
- SISD: 262m ($R_T = 2.5s$).

The required sight distances at the proposed Coach Road and Tralee Crescent access point are available in both directions (subject to some minor shrub trimming to the east) as seen in Figure 19 and Figure 20.

¹ Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections, 2009.



Figure 19: Sight Distance at Proposed Coach Road/Tralee Crescent Access - View East



Figure 20: Site Distance at Proposed Coach Road/Tralee Crescent Access - View West

4.4.3. COACH ROAD/GLENEAGLES DRIVE ACCESS

The ASD and SISD requirements on Coach Road (100km/h speed zone) are as follows:

- ASD: 179m ($R_T = 2.5s$), and
- SISD: 262m ($R_T = 2.5s$).

Site inspections have indicated that the following sight distance is available at the proposed intersection of Coach Road and Gleneagles Drive:

East

- ASD: 160m, and
- SISD: 195m.

West

- ASD: 224m, and
- SISD: 275m.

Therefore under the existing 100km/h speed zone on Coach Road there is insufficient sight distance to the east. Given the proposed development on the subject site, it is recommended that the speed zone on Coach Road is reduced from 100km/h to 80km/h to reflect the change in land use. Preliminary discussions with traffic engineers from Latrobe City Council have indicated support for a reduction in the speed zone to 80km/h (subject to VicRoads approval) as follows:

'When you have your discussion with VicRoads, you can indicate that Latrobe City Council supports the reduction of the speed limit along Coach Road as part of the development proposal.'

Initial discussions with VicRoads have indicated that Council are required to submit a proposal for the speed zone reduction.

Under an 80km/h speed zone on Coach Road, the required sight distance at the proposed access point would be available in both directions as seen in Figure 21 and Figure 22.



Figure 21: Sight Distance at Proposed Coach Road/Gleneagles Drive Access - View East



Figure 22: Site Distance at Proposed Coach Road/Gleneagles Drive Access - View West

4.5. ROAD HIERARCHY

An indicative road hierarchy is presented at Figure 23. The road hierarchy includes Access Streets, Access Places (cul-de-sac) and Access Lanes.

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”.

An Access Place is defined under Clause 56.06-8 as being “a minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority”.

An Access Lane is defined under Clause 56.06-8 as being ‘a side or rear lane principally providing access to parking on lots with another street frontage’.

Following the completion of this proposed development, the majority of the access streets within the subdivision are likely to carry up to 1,000 vehicles per day, with the only exception being the western section of Killarney Drive which is likely to carry approximately 1,200 vehicles per day.

The proposed access places and access lanes are anticipated to carry less than 230 vehicles per day.

The predicted volumes are well within acceptable limits for the relevant streets as suggested in the Clause 56 of the Latrobe Planning Scheme and no adverse traffic impacts are expected as a result.

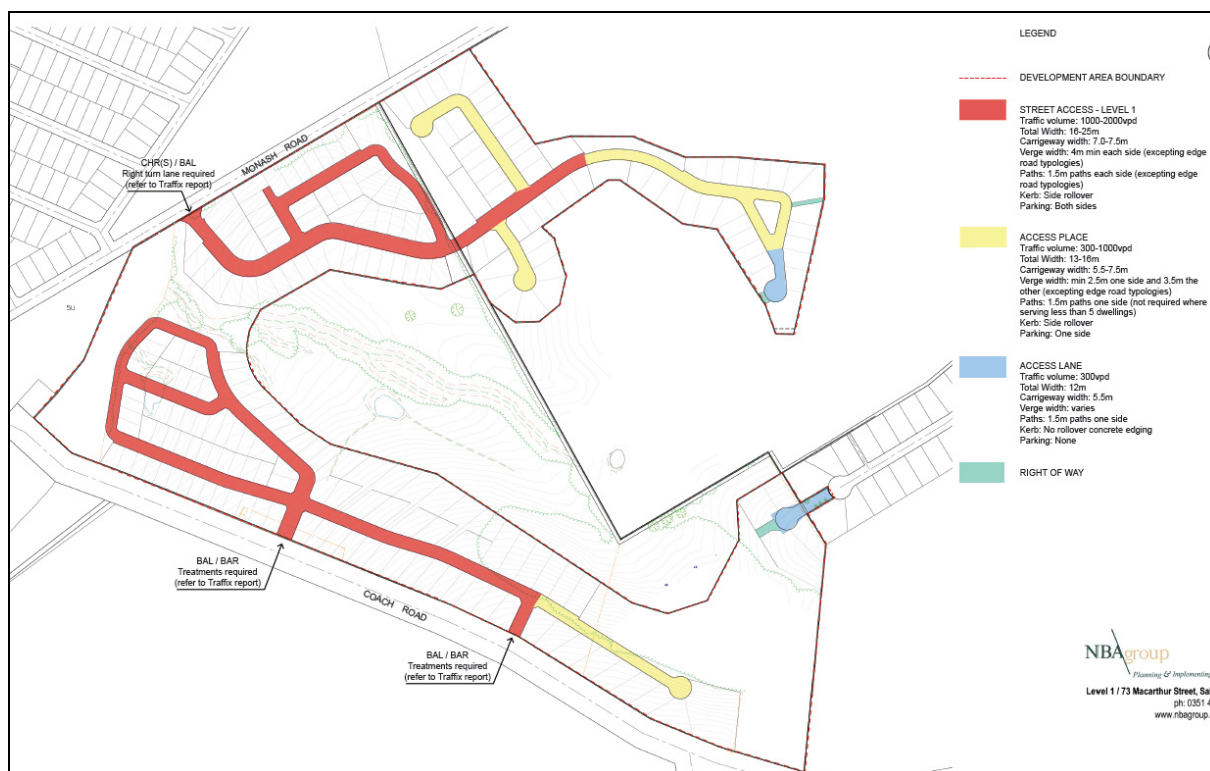


Figure 23: Indicative Road Hierarchy

4.5.1. LOCAL ACCESS STREETS

Under Clause 56, an ‘Access Street – Level 1’ generally requires a minimum road reserve of 13.5m, with a 5.5m wide carriageway (with one verge hardstand parking space per 2 lots) and a 4m verge on either side of the road (including a 1.5m wide footpath on either side).

The majority of access streets within the proposed subdivision are likely to carry less than 500 vehicles per day following the development of the subject site. Some access streets could carry up to 1,000 vehicles per day, with the western end of Killarney Drive likely to carry approximately 1,200 vehicles per day. The predicted volumes are well within acceptable limits for the relevant streets as suggested in Clause 56 of the Planning Scheme and no adverse traffic impacts are expected as a result.

A number of Access Streets adjacent to the reserve/open space areas are proposed to have a total road reserve width ranging from 13.6m to 16.8m. This approach is common place and is due to provision of pedestrian paths inside the reserve/open space rather than within the road reserve. This allows for acceptable cross section outcomes, such as a nominal verge width on the side of the road adjacent to the reserve/open space.

We believe that the proposed 16.0m wide road reserve for the majority of the Access Streets is appropriate and in-line with the Planning Scheme Clause 56 requirements. The following cross-section has been adopted:

- a 7.3m wide trafficable carriageway, to accommodate traffic and on-street parallel parking,
- a 4.35m minimum wide verge on both sides of the road, and
- a 1.5m footpath on both sides of each road within the verge.
- TOTAL Road Reserve = 16m

It is noted that a number of the local streets throughout the development potentially require traffic management due to the lengths of straight road, which is further discussed in Section 4.6.1.

4.5.2. ACCESS PLACE

Under Clause 56, an 'Access Place' generally requires a minimum road reserve of 13.0m, with a 5.5m wide carriageway (including on-street parking) and a total verge width of 7.5m including a footpath of 1.5m width if serving more than 5 dwellings.

The various access places proposed within the subject site provide access to between 8 and 22 lots. A minimum road reserve of 13.6m has been adopted, which is in excess of the requirements of the planning scheme.

It is noted that a small driveway link is located to the north of The Dell, which has a proposed road reserve width of 10m. It is envisaged that a 'driveway link' would be provided within this region. This is considered to be an acceptable outcome, given that only two (2) properties are accessed from this road.

The cross-section elements for Muirfield Court will generally be consistent the 'Access Street' indicated above (i.e. footpaths will be provided on both sides of the road due to the number of dwellings accessed from each access place) given the 16m road reserve proposed.

The cul-de-sac reserve radii are 14.3m, which will allow sufficient access outcomes for garbage collection and emergency services etc.

We believe that the proposed design is appropriate and in-line with the objectives of Clause 56.

4.5.3. LOCAL ACCESS LANES

Clause 56 of the Latrobe Planning Scheme specifies a minimum carriageway width of 5.5m for an Access Lane.

A minimum access lane width of 12.5m has been adopted for the purpose of the subject site. This provision exceeds the requirements of Clause 56 and acceptable cross-sectional outcomes can be achieved.

4.5.4. INTERNAL INTERSECTIONS

As indicated in Section 4.3.2, the Austroads Guide to Traffic Management: Part 6, Intersections, Interchanges and Crossing, outlines the capacity figures for uninterrupted flow for intersections carrying light crossing and turning volumes.

Given the low vehicle volumes expected on the internal road network and the values identified in Figure 15 previously, it is unnecessary to undertake intersection capacity analysis for any of the internal intersections within the subject site.

Further, we believe that no additional traffic management measures are required.

4.6. LATROBE PLANNING SCHEME (CLAUSE 56)

The proposed layout of the subdivision has been reviewed with specific reference to the provisions of Clause 56 of the Latrobe 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, C7, C16 & C19

A number of public bus routes operate along Monash Road past the subject site. While no provision has been made for bus services within the subject site, a bus stop could be located within 400m of the majority of properties within the proposed residential subdivision.

The available road reserves allow for footpaths to be provided on both sides of the majority of streets within the subdivision, connecting to Monash Road and Coach Road. It is noted that there are no existing footpaths along Monash Road or Coach Road in the vicinity of the site. All pedestrian crossing points within the subdivision will be provided to comply with the DDA requirements.

Bicycle facilities are designed to operate as a shared zone within the Access Street and Access Places. A plan presenting the various pedestrian links through the subject site is provided at Appendix D.

Standard C5

The built environment provides for a range of road cross-sections and integrated public spaces which provide for a functional and safe urban area. The variety of road cross-sections helps to provide identity and character to different areas within the overall development.

Standard C10 & C13

The development provides lots which front roads and streets.

Roads and streets have also generally been provided along public open space boundaries to increase visibility and surveillance.

Standard C12, C14, C15 & C18

The pedestrian network has been designed to provide safe and accessible networks linking the residential areas with public open space. The proposed network will provide an interconnected and continuous network of safe, efficient and convenient footpaths. The available road reserves allow for footpaths to be provided on both sides of all roads with the exception of the access streets adjacent to parks, where footpaths will either be provided only along the residential side, or with the reserve/open space rather than the road reserve.

The development provides lots which front all roads and streets which provide an appropriate level of surveillance and interaction of the pedestrian facilities.

Cross-section elements were discussed in Section 4.5 and were developed in-line with Table C1 of Clause 56.

Standard C17

The streets within the subdivision will provide safe and efficient access for all vehicles, including service and emergency vehicles.

The layout of the subject site is in accordance with Clause 56, and the proposed road network will allow for efficient traffic movements.

The proposal provides an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists and other vehicles and provides for an appropriate level of local traffic dispersal. The proposed cross-sections aid in indicating the 'type' of street and provide for appropriate and safe speed environments.

Standard C20 & C21

This standard primarily relates to carriageway widths, verge widths and parking provision within the road reservation. The proposed cross-sections were discussed in Section 4.5 and were shown to meet the requirements of Table C1 of Clause 56 and be in line with the objectives of Standard C20.

Appropriate splays are to be provided at intersections to ensure sight lines to traffic on intersecting roads are achieved.

Appropriate measures have been incorporated to provide a low-speed environment while allowing road users to proceed without unreasonable inconvenience or delay. Intersection layouts clearly indicate the travel paths and priority of movements.

The safe and efficient collection of waste and recycling materials has been allowed for in the design of all streets within the subject site.

The internal road layout is generally provided in accordance with principles outlined in Clause 56 of the Latrobe Planning Scheme.

Some notable details of the internal road network are outlined below.

4.6.1. TRAFFIC MANAGEMENT

Under Standard C17 of Clause 56 of the Latrobe Planning Scheme, the development plan requires an appropriate level of traffic management to provide for the safety and convenience of all road users.

Under Standard C20 the design of streets and road should provide street blocks that are generally between 120m to 240m in length and generally between 60m to 120m in width to facilitate pedestrian movement and control traffic speed. This has been achieved with the majority of the proposed local streets. However, additional traffic measures to reduce traffic speeds could potentially be required for Killarney Drive. While the lengths do not specifically meet the requirements of Standard C20, the horizontal alignment is not particularly conducive to high speeds. In any event, we are satisfied that appropriate traffic management devices could be included, if required at the detailed design stage.

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

4.6.2. GARBAGE VEHICLES

Council's garbage vehicles will be able to access the local streets and appropriately manoeuvre through all intersections.

For the access place to the north of The Dell it is recommended that bins from the minor number of impacted properties can be wheeled to the nearest street corner for collection. This is considered an appropriate and acceptable arrangement and will mean that the garbage vehicle will not have to complete any unnecessary turning manoeuvres.

At the north-east end of Killarney Drive (access lane), it is expected that garbage collection vehicles will be able to adequately access the proposed court bowl treatment.

4.6.3. PEDESTRIAN FACILITIES

The available road reserve widths allow for footpaths to be located on both sides of the access streets within the residential subdivision (with the potential exceptions noted in Section 4.6)

Footpaths have been located to ensure good 'connectivity' within the subdivision by providing connections across streets. In addition, footpath connections are provided to public open space areas to the local areas surrounding the subject site. A plan of the proposed pedestrian connections within the subject site is provided at Appendix D.

5. 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 Monash Road, Newborough, we are of the opinion that:-

- a) The development is likely to generate up to 2,250 trip ends per day with 1,150 trips per day from the northern section, 1,060 trips per day from the southern section and 40 trips per day from the eastern section,
- b) Given the existing road network, the distribution of traffic to and from the site is expected to be 5% to the north, 5% to the south, 60% to the east and 30% to the west. Access to the site will ultimately occur to Monash Road for the northern section, to coach road for the southern section and to Fairway Drive for the eastern section,
- c) The proposed access arrangements to the external road network will operate satisfactorily with a CHR (s) right turn treatment required at the Monash Road (Killarney Drive) access point with basic turn lane treatments required at the remaining access points,
- d) The intersection of Monash Road and Coach Road will operate satisfactory post development, with no additional traffic management treatments required, and
- e) The internal road layout, cross sections and intersection arrangements are appropriate and generally in accordance with and Clause 56 of the Latrobe Planning Scheme,
- f) There are no traffic engineering reasons why a permit for the proposed residential subdivision should not be granted, subject to appropriate conditions.



Appendix A

Traffic Count Results

Monash Road and Coach Road, Newborough

Turning Movement Count

Our Ref: GRP12913



Time	Standard Vehicles						Heavy vehicles					
	Monash Road (East)		Coach Road		Monash Road (West)		Monash Road (East)		Coach Road		Monash Road (West)	
	Through	Left	Right	Left	Right	Through	Through	Left	Right	Left	Right	Through
7:30	5	0	1	0	2	18	1	0	0	0	1	1
7:45	9	2	1	0	2	42	0	0	0	0	0	1
8:00	13	0	1	2	5	29	2	0	0	0	0	1
8:15	15	4	1	2	4	22	0	0	0	0	0	1
8:30	8	3	1	1	7	41	1	0	0	0	0	0
8:45	17	1	0	0	9	32	1	0	0	0	0	1
9:00	10	2	0	0	4	12	1	0	0	0	1	0
9:15	7	0	0	3	6	7	1	0	0	0	0	0

Time	All Vehicles						Total	Peak
	Monash Road (East)		Coach Road		Monash Road (West)			
	Through	Left	Right	Left	Right	Through		
7:30	6	0	1	0	3	19	29	-
7:45	9	2	1	0	2	43	57	-
8:00	15	0	1	2	5	30	53	-
8:15	15	4	1	2	4	23	49	188
8:30	9	3	1	1	7	41	62	221
8:45	18	1	0	0	9	33	61	225
9:00	11	2	0	0	5	12	30	202
9:15	8	0	0	3	6	7	24	177
Total	91	12	5	8	41	208	-	-

Time	Monash Road - All Vehicles				% HVs
	Eastbound	Westbound	Combined	Peak	
7:30	20	6	26	-	7.7%
7:45	44	9	53	-	1.9%
8:00	31	17	48	-	6.3%
8:15	24	17	41	168	2.4%
8:30	42	10	52	194	1.9%
8:45	33	18	51	192	3.9%
9:00	12	11	23	167	4.3%
9:15	7	11	18	144	5.6%

Time	Coach Road - All Vehicles				% HVs
	Eastbound	Westbound	Combined	Peak	
7:30	3	1	4	-	25.0%
7:45	4	1	5	-	0.0%
8:00	5	3	8	-	0.0%
8:15	8	3	11	28	0.0%
8:30	10	2	12	36	0.0%
8:45	10	0	10	41	0.0%
9:00	7	0	7	40	14.3%
9:15	6	3	9	38	0.0%

Monash Road and Coach Road, Newborough
Turning Movement Count

Our Ref: GRP12913



Time	Standard Vehicles						Heavy vehicles						
	Monash Road (East)		Coach Road		Monash Road (West)		Monash Road (East)		Coach Road		Monash Road (West)		
	Through	Left	Right	Left	Right	Through	Through	Left	Right	Left	Right	Through	
4:00	39	3	3	1	3	15	2	0	0	0	0	0	1
4:15	46	7	0	6	7	15	1	0	0	0	0	0	1
4:30	29	2	1	7	5	11	1	0	0	0	1	0	0
4:45	39	4	1	3	4	14	1	0	0	0	1	0	0
5:00	20	1	1	3	1	18	2	0	0	0	0	0	0
5:15	25	2	0	6	2	11	0	0	0	0	0	0	0
5:30	30	1	4	6	7	15	1	0	0	0	0	0	0
5:45	23	0	0	2	4	10	0	0	0	0	0	0	0

Time	All Vehicles						Total	Peak
	Monash Road (East)		Coach Road		Monash Road (West)			
	Through	Left	Right	Left	Right	Through		
4:00	41	3	3	1	3	16	67	-
4:15	47	7	0	6	7	16	83	-
4:30	30	2	1	8	5	11	57	-
4:45	40	4	1	4	4	14	67	274
5:00	22	1	1	3	1	18	46	253
5:15	25	2	0	6	2	11	46	216
5:30	31	1	4	6	7	15	64	223
5:45	23	0	0	2	4	10	39	195
Total	259	20	10	36	33	111	-	-

Time	Monash Road - All Vehicles				% HVs
	Eastbound	Westbound	Combined	Peak	
4:00	19	42	61	-	4.9%
4:15	16	53	69	-	2.9%
4:30	12	38	50	-	4.0%
4:45	15	44	59	239	3.4%
5:00	19	25	44	222	4.5%
5:15	11	31	42	195	0.0%
5:30	19	37	56	201	1.8%
5:45	10	25	35	177	0.0%

Time	Coach Road - All Vehicles				% HVs
	Eastbound	Westbound	Combined	Peak	
4:00	6	4	10	-	0.0%
4:15	14	6	20	-	0.0%
4:30	7	9	16	-	6.3%
4:45	8	5	13	59	7.7%
5:00	2	4	6	55	0.0%
5:15	4	6	10	45	0.0%
5:30	8	10	18	47	0.0%
5:45	4	2	6	40	0.0%

Appendix B

Plan of Proposed Subdivision

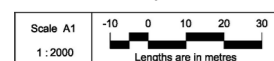


LEGEND



- DEVELOPMENT AREA BOUNDARY
- LOTS <500m²
28 lots, 12.4% of the development area
- LOTS 500-700m²
69 lots, 30.7% of the development area
- LOTS 700-900m²
65 lots, 28.9% of the development area
- LOTS 900-1200m²
30 lots, 13.3% of the development area
- LOTS >1200m²
33 lots, 14.7% of the development area

Outline Development Plan



Level 1 / 73 Macarthur Street, Sale 3850
ph: 0351 430 340
www.nbagroup.com.au

Monash Views Estate

Client **Monash Views PTY LTD** Date **19.10.2011**
Drawing No **142601 UDP005** Revision -

CPG Australia Pty Ltd
cpg-global.com

Water Transport Resources Energy Buildings Urban Development Agribusiness



Appendix C

Traffic Generation & Distribution Model

Monash Road, Newborough
Residential Subdivision
Traffic Generation and Distribution
Our Ref: GRP12913



Use	No. of Lots	Trip Generation (veh/day)	Peak Hour %	Peak Hour Volumes (v/h)	Daily Trip Generation (v/d)
Northern Section	115	10	10%	115	1,150
Southern Section	106	10	10%	106	1,060
Eastern Section	4	10	10%	4	40
TOTAL	225	-	-	225	2,250

Peak Period Splits	AM	PM
In	20%	70%
Out	80%	30%

General Traffic Direction:	Southern Section		
	Overall Percentage	Using Western Access	Using Eastern Access
To North	5%	75%	25%
To South	5%	85%	15%
To East	60%	60%	40%
To West	30%	85%	15%

Northern Section - Monash Road/Killarney Drive Access	AM Peak	PM Peak	Daily
Left in	7	25	-
Right in	16	55	-
Left Out	63	24	-
Right out	29	11	-
TOTAL:	115	115	1,150

South Section - Coach Road/Tralee Crescent Access	AM Peak	PM Peak	Daily
Left in	8	27	-
Right in	7	25	-
Left Out	28	11	-
Right out	31	11	-
TOTAL:	74	74	737

Southern Section - Coach Road/Gleneagles Drive Access	AM Peak	PM Peak	Daily
Left in	2	6	-
Right in	5	16	-
Left Out	19	7	-
Right out	7	3	-
TOTAL:	32	32	323

Eastern Section - Fairway Drive Access	AM Peak	PM Peak	Daily
In	1	3	-
Out	3	1	-
TOTAL:	4	4	40

OVERALL	225	225	2,250
----------------	------------	------------	--------------

Appendix D

Plan of Pedestrian and Bicycle Access

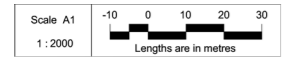


LEGEND



- - - - DEVELOPMENT AREA BOUNDARY
- ● ● ● PROPOSED SHARED PATH
2.5m wide granitic gravel / sand path for pedestrians and cyclists to share
- PROPOSED PEDESTRIAN
1.5m wide concrete path for pedestrian use

Pedestrian and Bicycle Access Plan



NBAgroup
Planning & Implementing Success
 Level 1 / 73 Macarthur Street, Sale 3850
 ph: 0351 430 340
 www.nbagroup.com.au

Monash Views Estate

Client **Monash Views PTY LTD** Date **06.09.2011**
 Drawing No **142601 UDP010** Revision **-**

CPG Australia Pty Ltd
 cpg-global.com
 Water Transport Resources Energy Buildings Urban Development Agribusiness





Traffic Engineers and Transport Planners

Traffix Group Pty Ltd
ABN 32 100 481 570

Address
Suite 8, 431 Burke Road
Glen Iris Victoria 3146

Contact
Telephone 03 9822 2888
Facsimile 03 9822 7444
admin@traffixgroup.com.au
www.traffixgroup.com.au

Our Ref.: G12913L-01A.doc

23rd August, 2012

Monash Views Pty Ltd
C/- Miller Merrigan
2/126 Merrindale Drive
CROYDON VIC 3136

Attention: Mr Simon Merrigan

Dear Mr Merrigan,

**TRAFFIC ENGINEERING ASSISTANCE:
PROPOSED RESIDENTIAL DEVELOPMENT – MONASH VIEWS, NEWBOROUGH**

We refer to your request for a traffic engineering review of the proposed revision to the Monash Views development plan.

We note that this revision relates to the revised plan 'Development Plan TP10631U & PS701486M' 15980 T1 Version 2 dated 1/08/2012 prepared by Millar Merrigan, which is provided at Attachment A.

The following letter provides our review of the proposed revised development plan compared to our previous traffic report dated October 2011 (Our Ref. GRP12913R#1).

Revised Proposal:

Traffix Group has conducted a review of the revised development plan (August 2012) and note that the proposal is generally in-line with the original development plan assessed in our previous traffic report (Our Ref: GRP12913 dated October 2011). The following changes to the original development plan are noted:

- Increase in the number of residential lots within the 'northern section' from 115 to 126,
- Increase in the number of residential lots within the 'southern section' from 106 to 116,
- Inclusions of 34 lots directly fronting Coach Road,
- Vehicle access provided internally between the northern and southern sections, and
- Inclusion of a second access point to Monash Road.

A summary of the proposed lot yield under the original development plan (Oct 2011) and the revised development plan (August 2012) is presented in Table 1. The lots in the southern section are further divided into those accessed via the internal road network and those with direct access to Coach Road.

Table 1: Development Summary

Section		Original Development Plan (Oct 2011)	Revised Development Plan (August 2012)	Change
Northern Section		115	126	+11
Southern Section	Internal Access	106	82	-24
	Direct Access to Coach Road	0	34	+34
Western Section		4	4	0
Total		225	246	+21

Overall, there has been a minor increase in the total number of lots proposed (21 lots), with the revised development plan including a total of 246 lots.

Traffic Generation and Distribution:

Based on our review of the change in lot yield, traffic volumes generated by the subject site are expected to marginally increase.

Table 2 below, outlines the predicted daily and peak hour traffic volumes under the original development plan from our previous traffic report (October 2011) and the expected changes to the traffic volumes under the revised development plan (August 2012). A trip generation rate of 10 trips per household per day with one (1) vehicle trip per household per day in each of the AM and PM peak hours been adopted consistent with our original assessment (October 2011).

Table 2: Predicted Post Development Traffic Generation

Traffic Generation	Original Development Plan (Oct 2011)	Revised Development Plan (August 2012)	Change
Daily Traffic Generation	2,250	2,460	+210
Peak Hour Traffic Generation	225	246	+21

As presented in Table 2, it is estimated that the various changes to the Monash Views development plan is likely to result in an increase of 210 vehicles per day and 21 vehicles in each peak hour.

The revised traffic volumes have been distributed to the proposed four (4) access points, direct access to Coach Road and access to Fairway Drive. This assessment has assumed the same broad traffic distribution as presented in our previous assessment with some amendments to the access point used as a result of the proposed internal connection under the revised development plan (August 2012), as follows:

- **Northbound – 5% of trips** (50% via Monash Road East and 50% via Monash Road West),
- **Southbound – 5% of trips** (50% via Monash Road West and 50% via Coach Road East),
- **Eastbound – 60% of trips** (50% via Monash Road East and 50% via Coach Road East),
- **Westbound – 30% of trips** (100% via Monash Road West).

Table 3: Predicted Traffic Distribution

Access Point	Original Development Plan (Oct 2011)	Revised Development Plan (August 2012)	Change
Daily Traffic Volumes			
Monash Road – East	-	568	+568
Monash Road – West	1,150	659	-491
Coach Road – East	323	299	-24
Coach Road - West	737	664	-73
Coach Road – Direct Access	-	230	+230
Fairway Drive	40	40	0
Total	2,250	2,460	+210
Peak Hour Volumes			
Monash Road – East	-	57	+57
Monash Road – West	115	66	-49
Coach Road – East	32	30	-2
Coach Road - West	74	66	-8
Coach Road – Direct Access	-	23	+23
Fairway Drive	4	4	0
Total	225	246	+21

The data presented in Table 3 indicates that the number of access points has increased and therefore traffic volumes have generally dispersed across the access points resulting generally lower traffic volumes at each access point. Furthermore, the proposal to include an internal vehicle connection will result in less turning movements at the intersection of Monash Road and Coach Road.

External Access Points – Requirements for Turn Lanes:

Given that traffic volumes at the individual access points are predicted to decrease as presented previously, the requirements for turn lanes at the external access points has not significantly changed from our previous assessment (October 2011).

Based on the revised turning movement volumes, the following turn lane treatments are required:

Table 4: Revised Requirement for Turn Lanes

Access Point	Left Turn Lane Requirement	Right Turn Lane Requirement
Monash Road West Access	BAL	BAR
Monash Road East Access	Roundabout Recommended	
Coach Road West Access	BAL	BAR
Coach Road East Access	BAL	BAR

As presented in Table 4, the majority of the access points require BAL and BAR facilities based on the revised turning movement volumes.

The Monash Road Eastern Access is proposed to be located directly opposite the Gippland TAFE access point on Coach Road. On this basis, the introduction of the access point to the subject site will result in a cross-intersection. In order to provide intersection control and to limit the number of conflict points, it is recommended that a roundabout is provided at this access point.

External Access Points – Capacity Analysis:

As presented in our previous assessment (October 2011), the traffic volumes along Monash Road and Coach Road are low. Furthermore, the turning volumes predicted at each of the access points are less than those under the previous assessment. Accordingly Table 2.4 of the Austroads Guide to Traffic Management Part 6 would indicate that it is unnecessary to undertake intersection capacity analysis for any of the external intersections for the subject site, consistent with our previous assessment.

Road Hierarchy:

Based on the revised road network, all roads within the subject site are proposed to operate as either access streets or access places.

The proposed access streets generally have road reserve widths of 16m to 20m, in line with Clause 56 of the Latrobe Planning Scheme. It is noted that the proposed access streets adjacent to reserves/open space are proposed with a 13m road reservation width. As indicated in our previous assessment, this approach is common place and is due to provision of pedestrian paths inside the reserve/open space rather than within the road reserve. This allows for acceptable cross section outcomes, such as a nominal verge width on the side of the road adjacent to the reserve/open space.

The proposed access places within the revised development plan are to access a maximum of four (4) lots. The driveway link in the vicinity of the Coach Road eastern access has a road reserve width of 10m. This is considered to be an acceptable outcome, given that only one (1) property will utilise this road for access. The proposed access place at the western boundary of the site accesses four (4) properties and has a road reserve width of 13m. This provision is in line with the requirements of Clause 56 of the Latrobe Planning Scheme.

All roads within the subject site are expected to carry less than 1,000 vehicles per day based on the revised development plan. The predicted volumes are well within acceptable limits for the relevant streets as suggested in the Clause 56 of the Latrobe Planning Scheme and no adverse traffic impacts are expected as a result.

Speed Zoning:

The existing speed zone on Coach Road adjacent to the subject site is 100km/h. In our previous traffic report (October 2011), it was recommended to reduce the speed zone on Coach Road to 80km/h to achieve adequate sight distance to the proposed intersection access points.

Given the revised proposal to include lots directly fronting Coach Road, a further reduction in the speed zone is considered to be required to ensure safe access to properties.

Figure 7.3 of the VicRoads Traffic Engineering Manual provides guidance for speed zoning for roads in built up areas. Given the existing nature of Coach Road, it is best categorised as an ‘undivided arterial or collector road’. For these roads with ‘significant direct access’ a speed zone of 60km/h is suggested.

A speed zone of 60km/h is common place on similar roads throughout built up areas in metropolitan Melbourne and regional Victoria.

On this basis, it is recommended that the speed zone along Coach Road in the vicinity of the subject site is reduced to 60km/h.

Sight Distance Requirements:

The sight distance requirements that are applicable to Coach Road are 'approach sight distance' and 'safe intersection sight distance'.

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 intersection¹.

Safe Intersection Sight Distance (SISD) is measured between the top of a car on the leg with priority (1.25m) and the driver's eye height in the side street (1.05m)¹.

Based on the AustRoads Guide to Road Design Part 4A: Signalised and Unsignalised Intersections, ASD and SISD requirements within a 60km/h speed zone (recommended for Coach Road) are as follows:

- ASD: 73m ($R_T = 2.0s$), and
- SISD: 123m ($R_T = 2.0s$).

The properties at eastern and western boundaries of the subject site fronting Coach Road have been assessed for sight distance, due to the level of existing vegetation within the road reserve. It is proposed to remove the existing vegetation within the Coach Road road reserve along the majority of the frontage, with the exception of adjacent to the vegetation buffers at the eastern and western ends.

As no vehicles crossovers are proposed on the development plans, it is recommended that the vehicle crossovers are located on the internal side of the property, to limit any vegetation removal. For the purposes of this assessment, 3m wide vehicle crossovers have been provided.

A sight line has been placed from the centre of each property crossover (3m setback from the edgeline of the Coach Road) to the centre of the lane in the critical sight line direction. Any existing vegetation to the outside of the sight line should be trimmed / removed to ensure that there is adequate sight distance at the property crossovers. A copy of the sight distance assessment is presented at Figure 1 and Figure 2.

¹ Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections, 2009.



Figure 1: Sight Distance Assessment – Western Property Boundary

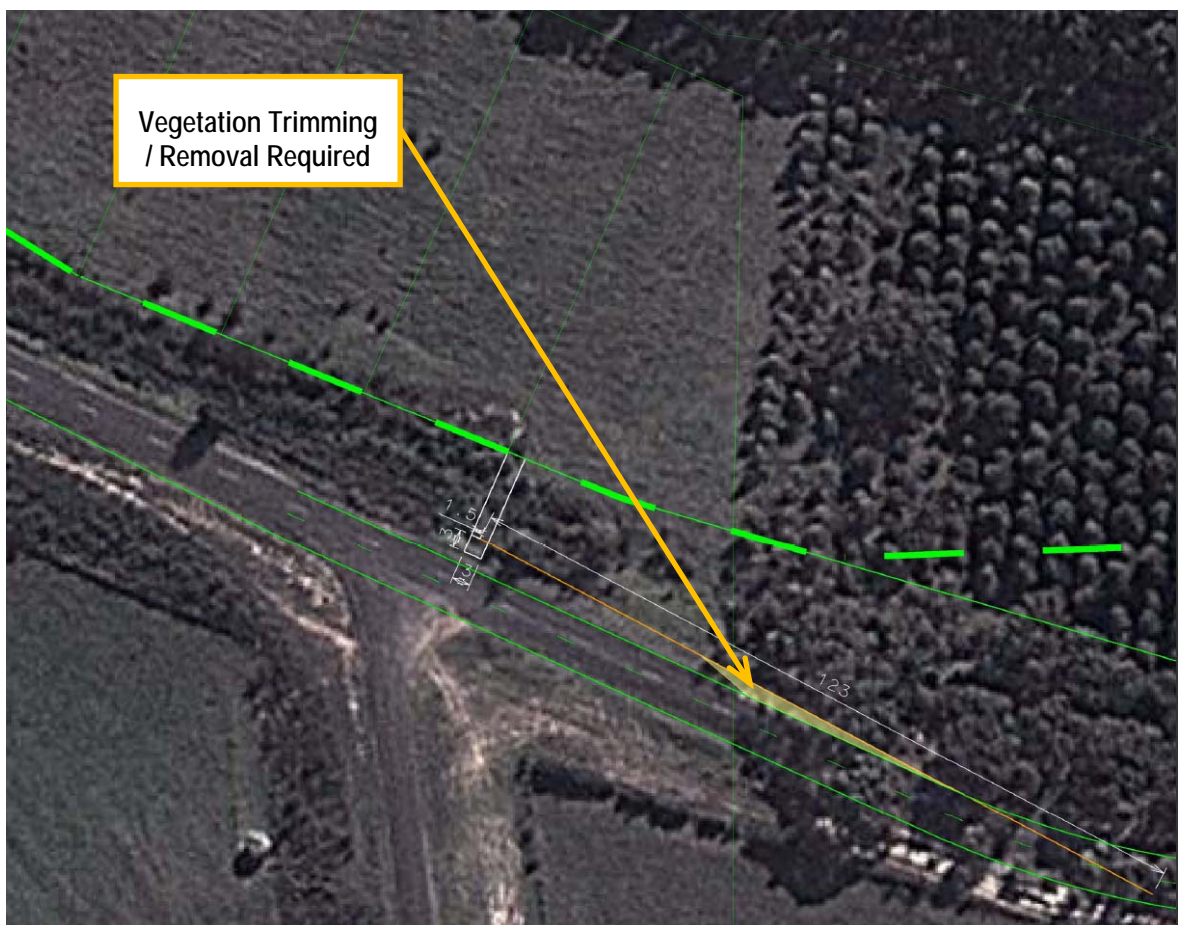


Figure 2: Sight Distance Assessment – Eastern Property Boundary

As presented in Figure 1 and Figure 2, vegetation removal is required only at the eastern boundary of the subject site to ensure adequate sight distance is available.

Only minor vegetation trimming / removal is required at the eastern boundary of the subject site, as the proposed residential properties are located on a relatively straight section of Coach Road, with the critical sight distance measured to the outside (westbound) traffic lane.

Conclusions:

Based on our review of the revised development plan for the Monash Views development, we are of the opinion that:

- (a) The revised proposal generally incorporates an increase of 21 lots with an internal vehicle connection, an additional vehicle access point to Coach Road and properties directly fronting Coach Road,
- (b) The revised proposal will result in an additional 210 trips per day and 21 trips in each peak hour when compared to our original assessment (October 2011),
- (c) The revised traffic distribution generally results in lower traffic volumes at the access points compared to the original assessment, given the introduction of the additional access point to Monash Road and the lots directly fronting Coach Road,
- (d) The requirements for turn lanes on Monash Road and Coach Road have generally remained unchanged, with all of the access points requiring BAL and BAR turn lane treatments. The only exception is the additional proposed access point to Monash Road (Monash Road Eastern Access) that is recommended to include a roundabout given its location opposite the existing Gippsland TAFE access,
- (e) Given the low turning movements expected at the access points and the existing low traffic volumes on Monash Road and Coach Road, the intersections will perform well and no intersection capacity analysis is required according to the AustRoads Guide to Traffic Management: Part 6,
- (f) The proposed road layout generally accords with the requirements of Clause 56 of the Latrobe Planning Scheme,
- (g) Given the proposed direct property access to Coach Road, it is recommended to reduce the speed zone on Coach Road to 60km/h,
- (h) A level of vegetation trimming / removal is required at the eastern boundary of the subject site within the Coach Road road reserve to provide for adequate sight distance, and
- (i) There are no traffic engineering reasons why a permit for the proposed residential subdivision should not be granted, subject to appropriate conditions.

We trust this assessment satisfies your requirements. Should you have any further queries regarding our assessment, please contact Will de Waard or Brent Hodges at Traffix Group on 9822 2888.

Yours faithfully,
TRAFFIX GROUP PTY LTD



WILL DE WAARD
Director

Attachment A: Revised Development Plan

Attachment B: Traffic Generation and Distribution Model



Attachment A

Revised Development Plan

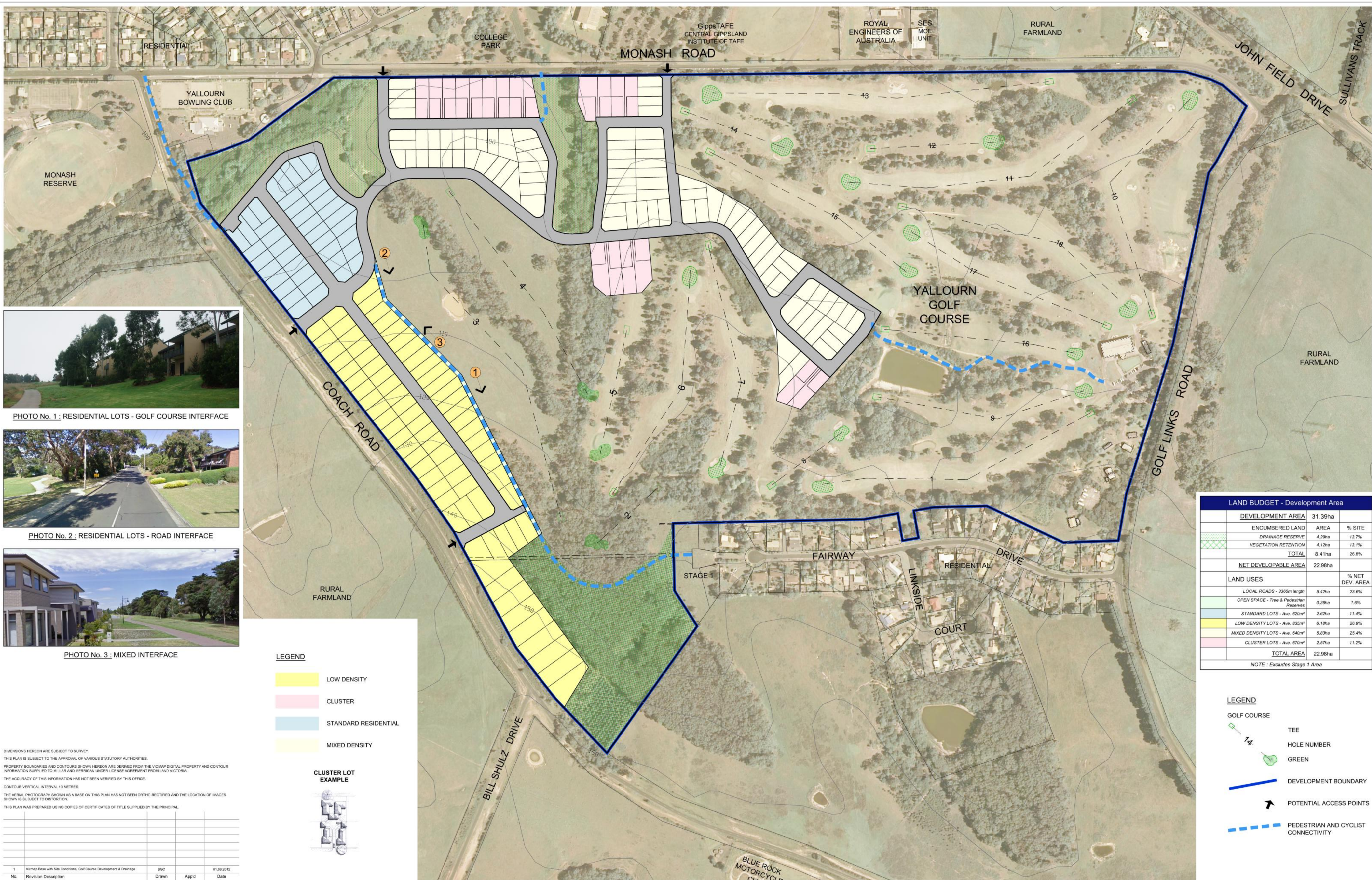


PHOTO No. 1 : RESIDENTIAL LOTS - GOLF COURSE INTERFACE



PHOTO No. 2 : RESIDENTIAL LOTS - ROAD INTERFACE



PHOTO No. 3 : MIXED INTERFACE

LEGEND

- LOW DENSITY
- CLUSTER
- STANDARD RESIDENTIAL
- MIXED DENSITY

CLUSTER LOT EXAMPLE



LAND BUDGET - Development Area

DEVELOPMENT AREA	AREA	% SITE
ENCUMBERED LAND	4.29ha	13.7%
DRAINAGE RESERVE	4.12ha	13.1%
VEGETATION RETENTION	4.12ha	13.1%
TOTAL	8.41ha	26.8%
NET DEVELOPABLE AREA	22.98ha	
LAND USES	AREA	% NET DEV. AREA
LOCAL ROADS - 3365m length	5.42ha	23.6%
OPEN SPACE - Tree & Pedestrian Reserves	0.39ha	1.6%
STANDARD LOTS - Ave. 620m ²	2.62ha	11.4%
LOW DENSITY LOTS - Ave. 835m ²	6.18ha	26.9%
MIXED DENSITY LOTS - Ave. 640m ²	5.83ha	25.4%
CLUSTER LOTS - Ave. 670m ²	2.57ha	11.2%
TOTAL AREA	22.98ha	

NOTE : Excludes Stage 1 Area

LEGEND

- TEE
- HOLE NUMBER
- GREEN
- DEVELOPMENT BOUNDARY
- POTENTIAL ACCESS POINTS
- PEDESTRIAN AND CYCLIST CONNECTIVITY

DIMENSIONS HEREON ARE SUBJECT TO SURVEY.
THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.
PROPERTY BOUNDARIES AND COORDINATES SHOWN HEREON ARE DERIVED FROM THE VICMAP DIGITAL PROPERTY AND CONTOUR INFORMATION SUPPLIED TO MILLAR AND MERRIGAN UNDER LICENSE AGREEMENT FROM LAND VICTORIA.
THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED BY THIS OFFICE.
CONTOUR VERTICAL INTERVAL 10 METRES.
THE AERIAL PHOTOGRAPH SHOWN AS A BASE ON THIS PLAN HAS NOT BEEN ORTHO-RECTIFIED AND THE LOCATION OF IMAGES SHOWN IS SUBJECT TO DISTORTION.
THIS PLAN WAS PREPARED USING COPIES OF CERTIFICATES OF TITLE SUPPLIED BY THE PRINCIPAL.

No.	Revision Description	Drawn	App'd	Date
1	Vicmap Base with Site Conditions, Golf Course Development & Drainage	BGC		01.08.2012

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
© Millar & Merrigan Pty Ltd.

FOR APPROVAL

NBA Group Pty Ltd
93 Macaulister Street
Sale, 3850
M 0418 402 240
O (03) 5143 0340
F (03) 5143 1244
W www.nbagroup.com.au
E nick@nbagroup.com.au



Millar & Merrigan Pty Ltd
ACN 005 541 668
2128 Merrindale Drive Cropton
PO Box 247 Cropton Victoria 3136
T (03) 8720 9500
F (03) 8720 9501
W www.millarmerrigan.com.au
E admin@millarmerrigan.com.au

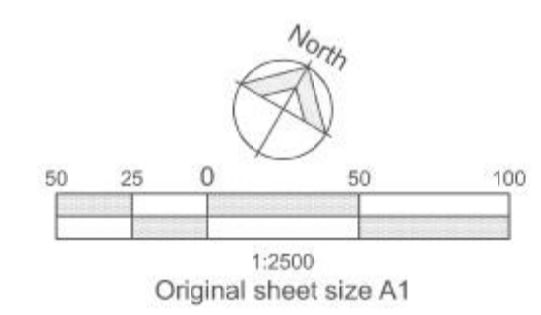


LAND DEVELOPMENT CONSULTANTS

Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design



SAI GLOBAL Quality ISO 9001



DEVELOPMENT PLAN
TP10631U & PS701486M
MONASH ROAD, NEWBOROUGH 3825
LATROBE CITY COUNCIL

15890DP5
VERSION 1
SHEET 1 OF 1

Attachment B

Traffic Generation and Distribution Model

Use	No. of Lots	Trip Generation (veh/day)	Peak Hour %	Peak Hour Volumes (v/h)	Daily Trip Generation (v/d)
Northern Section	126	10	10%	126	1,260
Southern Section - Internal Access	82	10	10%	82	820
Southern Section - Coach Road Access	34	10	10%	34	340
Eastern Section	4	10	10%	4	40
TOTAL	246	-	-	246	2,460

Peak Period Splits	AM	PM
In	20%	70%
Out	80%	30%

General Traffic Direction	Road Used to Access Site		
	Monash Road (East)	Monash Road (West)	Coach Road (East)
North	5%	50%	50%
South	5%	50%	50%
East	60%	50%	50%
West	30%	100%	

Road Used to Access Site	Overall Percentage	Northern Section Lots				Southern Section Lots - Internal Access				Southern Section Lots - Coach Road Access			
		Coach Rd Western Access	Coach Rd Eastern Access	Monash Rd Western Access	Monash Rd Eastern Access	Coach Rd Western Access	Coach Rd Eastern Access	Monash Rd Western Access	Monash Rd Eastern Access	Coach Rd Western Access	Coach Rd Eastern Access	Monash Rd Western Access	Monash Rd Eastern Access
Monash Road (East)	32.5%			40%	60%			70%	30%			80%	20%
Monash Road (West)	35.0%			50%	50%	80%	20%						
Coach Road (East)	32.5%	80%	20%			40%	60%						

Monash Road - Western Access	AM Peak	PM Peak	Daily
Left in	9	31	-
Right in	4	15	-
Left Out	18	7	-
Right out	35	13	-
TOTAL:	66	66	659

Monash Road - Eastern Access	AM Peak	PM Peak	Daily
Left in	7	24	-
Right in	4	15	-
Left Out	18	7	-
Right out	28	10	-
TOTAL:	57	57	568

Coach Road - Western Access	AM Peak	PM Peak	Daily
Left in	5	16	-
Right in	9	30	-
Left Out	35	13	-
Right out	18	7	-
TOTAL:	66	66	664

Coach Road - Eastern Access	AM Peak	PM Peak	Daily
Left in	1	4	-
Right in	5	17	-
Left Out	19	7	-
Right out	5	2	-
TOTAL:	30	30	299

Eastern Section - Fairway Drive Access	AM Peak	PM Peak	Daily
In	1	3	-
Out	3	1	-
TOTAL:	4	4	40

Coach Road - Direct Access	AM Peak	PM Peak	Daily
In	5	16	-
Out	18	7	-
TOTAL:	23	23	230

OVERALL	246	246	2,460
----------------	------------	------------	--------------

13 Appendix 10 – Cultural Heritage Assessment

- Cultural Heritage Assessment - Tardis Enterprises Pty Ltd - July 2007
- Requirements of Aboriginal Heritage Act – letter from Andrew Long and Associates Pty Ltd - 4 April 2011

Appendix 9: Cultural Heritage Assessment
(Tardis Enterprises, 2007)

PROPOSED DEVELOPMENT, MONASH VIEWS, NEWBOROUGH

CULTURAL HERITAGE ASSESSMENT

AAV Project No 3626
HV Project No 2831

A report to Monash Views Pty Ltd

July 2007

Prepared by

Andrea Murphy

Tardis Enterprises Pty Ltd
cultural heritage consultants
9 Berglund Road
Beaconsfield Upper
Victoria 3808



Some information regarding specific site details contained within this report is of a sensitive nature e.g. MGA co-ordinates and site plans.

Before releasing contents of this report to the general public permission should first be obtained from the relevant authorities/communities.

EXECUTIVE SUMMARY

This report outlines the results of a cultural heritage investigation of land proposed as a future residential development and extension to an existing golf course (Figure 1 – Study Area Location), and has been commissioned by Monash Views Pty Ltd. As part of responsible planning and management, the Monash Views Pty Ltd wish to be informed regarding cultural heritage issues within the study area. This study reviews the Aboriginal and non-Aboriginal (hereafter referred to as historic) cultural heritage background of the area, conducts a ground surface survey for cultural heritage sites, and assesses the potential impact that development of the study area may have on known and potential cultural heritage values.

Prior to this study, no Aboriginal or historic cultural heritage sites have been previously recorded and the study area has not been previously assessed for cultural heritage sites. As a result of previous broader and small scale cultural heritage investigations in the region, land within 50-100m of all past and present rivers, creeks, springs, wetlands and swamps have been assessed as containing potential for Aboriginal sites; and locations of early pastoral occupation and townships have been assessed as containing potential for historic sites.

The study area lies within traditional *Kurnai* land. Legislation regarding Aboriginal sites in this area is currently administered by the Central Gippsland Aboriginal Health and Housing Co-operative Limited (in liquidation) (Section 10). The study area is also within the Gippsland Cultural Heritage Unit, a body established by Aboriginal Affairs Victoria to assist in cultural heritage management. The consultant contacted Mr Robert Douthat, Cultural Officer with the Gippsland Cultural Heritage Unit in regard to Aboriginal community involvement in this project. As a result of these discussions, Mr William (Norm) Rutherford acted as field representative during the ground surface survey (Section 1.2).

The consultant, the client Mr Peter Brown and community representative Mr Rutherford conducted a comprehensive site survey on August 15, 2006. The survey was conducted by foot and the entire study area was inspected in detail. The survey team walked approximately 10m apart, crossing each paddock until the entire area had been inspected. All areas providing any ground surface visibility were inspected in detail, and all mature trees were inspected for any signs of cultural use. Ground surface visibility conditions were generally very low and are considered to have constrained the effectiveness of the survey (Section 6). During the site survey no Aboriginal or historic archaeological sites were identified or recorded (Section 7).

The study area has also been assessed in terms of its Aboriginal and historic archaeological potential (Section 9). The study area contains moderate potential for small numbers of previously disturbed Aboriginal stone artefacts, which may occur throughout the study area. No areas were identified as having any specific historic archaeological potential. Apart from stone artefacts, it is considered unlikely that any other site type will exist within the study area. It has been concluded in this assessment that no further archaeological investigation is required prior to development of the study area.

Appropriate management of study area and specific recommendations are presented in Section 11 (reproduced below). These comprise:

Aboriginal Cultural Heritage:

The results of this investigation have concluded that previously disturbed low-density scatter of stone artefacts are likely to be present within the study area but are currently obscured by thick pasture grasses. As the potential archaeological deposits within the study area are highly unlikely to contain any significant spatial or temporal integrity, there is no further requirement for additional scientific assessment of the study area. Such finds are ubiquitous over the entire landscape and are considered as natural archaeological background.

The only area that may contain a density of artefacts, around a natural spring, has been fenced and re-vegetated. This area is to be excluded from the development. The other area that may contain artefacts, along the banks of Sandy Creek is also to be preserved as open space and is excluded from future development.

The Central Gippsland Aboriginal Health and Housing Co-operative Limited and Gippsland Cultural Heritage Unit have both requested that monitoring by a community representative is undertaken during preliminary earth disturbance works (clear, grade, trench). In this instance, given the low risk to archaeological sites of high scientific significance, monitoring is considered an appropriate management strategy, provided this is managed by a heritage consultant. A community representative should collect any artefacts exposed during initial development works and these should be recorded by a heritage consultant. As the development includes extensive open space along Sandy Creek and its tributary, it would be appropriate that any artefacts recovered are relocated to these areas once development works are complete. This would preserve artefacts in their roughly original context, and in an area that will not be impacted by future development. If this artefact management strategy is adopted, then it would be also appropriate that a heritage consultant record the co-ordinates of the relocation point and update AAV Site Registry records.

At this stage, prior to the development occurring within the study area, Consent to Disturb is not required from the Central Gippsland Aboriginal Health and Housing Co-operative Limited. Any artefacts exposed and recorded during monitoring may require a Consent. Monitoring is a method of artefact management and is not a requirement under relevant Acts.

Historic Cultural Heritage:

There are no historic archaeological or heritage sites located within the present study area. The study area is not considered to contain any potential for significant buried historic deposits. Prior to development of the study area, no further historic investigation or research is required and no Consent or Permits are required from Heritage Victoria or Latrobe City Council.

Overall, the development of the study area is considered to have low impact on local Aboriginal archaeological and heritage values, and no impact to local historic archaeological and heritage values.

Specific Recommendations (Section 10)

Based on the results of background research, survey, and community consultation the following recommendations are made:

Aboriginal Cultural Heritage:

1. There are no recorded Aboriginal sites or places within the study area, and therefore no Consent to Disturb is currently required from the Central Gippsland Aboriginal Health and Housing Co-operative Limited.
2. Due to the landforms present and post settlement disturbance to the study area, no section is considered to have potential for significant Aboriginal archaeological sites. Therefore, prior to development no further investigation of the study area is required.
3. Both the Gippsland Aboriginal Health and Housing Co-operative Limited and Gippsland Cultural Heritage Unit have requested that the initial ground disturbance works (clear, grade, cut, trench) associated with the development should be monitored by an Aboriginal community representative. Whilst there is no legislative requirement to fund monitoring, community monitoring, supervised by a heritage consultant is considered an appropriate risk management for any stone artefacts that may be exposed during the course of initial ground disturbance.

If monitoring is adopted, it should be limited to disturbance of topsoil, and any artefacts exposed should be recorded by a heritage consultant and returned to the community representative for relocation into the areas of open space.

Historic Cultural Heritage:

4. No further historic or archaeological investigation is required prior to residential development of the study area. No Consent or Permit is required from Heritage Victoria, or any Planning approval from Latrobe City Council.

In Addition:

5. In accordance with survey requirements (see Appendix 1); the consultant will ensure copies of this report are forwarded to the Heritage Services Branch, Aboriginal Affairs Victoria, Heritage Victoria, Department of Sustainability and Environment, Gippsland Cultural Heritage Unit, and Gippsland Aboriginal Health and Housing Co-operative Limited.
6. In the unlikely event that any suspected human remains are exposed at any stage of the development, then all works must cease in the immediate area of the find and the procedure outlines in Appendix 3 adopted.

CONTENTS		PAGE NO
1	INTRODUCTION	1
1.1	Project Aims	3
1.2	Consultation	3
1.3	The Study Area	3
1.4	Impact of the Proposed Development	4
2	ENVIRONMENTAL DESCRIPTION	6
2.1	Geology and Landform	6
2.2	Flora and Fauna	7
2.3	Climate	8
2.4	European Impact on the Study Area	9
3	HISTORIC BACKGROUND	10
3.1	Previous Historic Cultural Heritage Investigations	16
3.2	Previously Recorded Historic Sites	17
3.3	Historic Site Prediction Model for the Study Area and Implications for this Investigation	18
4	ABORIGINAL BACKGROUND	19
4.1	Ethnohistory	19
4.2	Resources Available to Aboriginal People	23
4.3	Previous Aboriginal Archaeological Investigations	24
4.4	Previously Recorded Aboriginal Sites	31
4.5	Aboriginal Site Distribution Model and Implications for this Investigation	33
5	SURVEY COVERAGE, METHODOLOGY AND GROUND SURFACE VISIBILITY	34
6	SURVEY RESULTS	39
6.1	Discussion - Aboriginal Cultural Heritage	39
6.2	Historic Cultural Heritage - Discussion	39
7	ARCHAEOLOGICALLY SENSITIVE AREAS	39
8	ASSESSMENT OF SCIENTIFIC AND CULTURAL SIGNIFICANCE	41
8.1	Scientific Significance	41
8.2	Cultural Significance – Aboriginal Sites	41

9 STATUTORY REQUIREMENTS		41
9.1	Aboriginal Sites	41
9.2	Historic Archaeological Sites	43
10 RECOMMENDATIONS		45
10.1	Cultural Heritage Management Issues	45
10.2	Specific Recommendations	47
REFERENCES		49
TABLES (In Text)		
Table 1	Previously Record Historic Sites within 5km of the Study Area	18
Table 2	Previously Recorded Site within 2km of the Present Study Area	31
Table 3	Survey Units, Ground Surface Visibility and Effective Survey Coverage	35
Table 4	Summary of Areas of Archaeological Potential/Sensitivity	40
FIGURES (In Text)		
Figure 1	Study Area Location	2
Figure 2	Proposed Development Plan	5
Figure 3	Geology of the Study Area	7
Figure 4	Parish Narracan Pastoral Run 933 – No Date	13
Figure 5	Parish Narracan N129 (N)	14
Figure 6	Parish Narracan N120 (12)	15
Figure 7	Gippsland Named Groups (from Wesson 2000: 22)	20
Figure 8	Previously Recorded Aboriginal Sites in the Study Area (AAV Map)	32
Figure 9	Survey units	38
PLATES (In Text)		
Plate 1	Survey Unit A facing east, showing lack of ground surface visibility. Facing east.	36
Plate 2	Survey Unit A showing limited ground surface visibility around dams. Facing south	36
Plate 3	Survey Unit B. Section of incised drainage line provides good visibility of soil.	36
Plate 4	Survey Unit A. Re-growth native woodland. All mature (pre-contact) gums have been previously removed from the study area.	37
Plate 5	Survey Unit A – natural spring feature that has been fenced and re-vegetated. No ground surface visibility. Facing east.	37
Plate 6	Very limited ground surface visibility within Survey Unit A. Facing west.	37

APPENDICES

Appendix 1	Survey Notifications	54
Appendix 2	Glossary	58
Appendix 3	Advice on the Discovery of Human Remains	66
Appendix 4	Advice on Consent to Disturb	68
Appendix 5	Conservation Principles of the Burra Charter	71

ACKNOWLEDGEMENTS

The consultant would like to thank the following people for their assistance during the study:

Bindi Thomas, Matthew Phelan - Heritage Services Branch, AAV.

Liz Kilpatrick - Heritage Victoria, DSE

William (Norm) Rutherford – Central Gippsland Community Representative

Peter Brown – Monash Views Pty Ltd

ABBREVIATIONS

AAV	Heritage Service Branch, Aboriginal Affairs Victoria
AHD	Australian Heritage Database
CGAHHC	Central Gippsland Aboriginal Health and Housing Co-operative Limited
GCHU	Gippsland Cultural Heritage Unit
HV	Heritage Victoria
H	Heritage Victoria Inventory
LV	Land Victoria
NT	National Trust (VIC)
RNE	Register of the National Estate
SLV	State Library of Victoria
VHR	Victorian Heritage Register

**Throughout this report several technical terms are used that may not be familiar to some readers. An extensive glossary has been included as Appendix 2 and should be referenced for an explanation of terms.*

***It should be noted that archaeological reports relating to Aboriginal and historic archaeological sites/places and the recommendations contained therein, may be independently reviewed by Aboriginal Affairs Victoria, the relevant Aboriginal community, and Heritage Victoria. Although the findings of a consultant's report will be taken into consideration, recommendations by an archaeological consultant for actions in relation to the management of a site should not be taken to imply automatic approval of those actions by Aboriginal Affairs Victoria, Heritage Victoria or the relevant Aboriginal community.*

ã Copyright – This report is copyright. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the Copyright Act, no part may be reproduced by any process without written permission. Tardis Project No. 5600749.000

1 INTRODUCTION

This report outlines the results of a cultural heritage investigation of land proposed as a future residential development and extension to an existing golf course (Figure 1 – Study Area Location), and has been commissioned by Monash Views Pty Ltd. This study reviews the Aboriginal and non-Aboriginal (hereafter referred to as historic) cultural heritage background of the area, conducts a ground surface survey for cultural heritage sites, and assesses the potential impact that development of the study area may have on known and potential cultural heritage values.

Prior to this investigation the study area has not been previously surveyed and there were no previously recorded heritage sites.

The study area lies within the legislated community area of the Central Gippsland Aboriginal Health and Housing Co-operative Limited and within the jurisdiction of the Gippsland Cultural Heritage Unit. Both these groups have been consulted throughout the project and involved in the field component.

The significance of Aboriginal and historic items, sites and places that comprise the cultural heritage record varies considerably, and can be measured, primarily upon their historical, scientific, social, educational, economic and aesthetic values. However, the integrity and significance of cultural heritage items, sites and/or places can be jeopardised by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of State and Federal Legislation exists to assure preservation of elements and features of our cultural heritage (Section 9).

It is the general policy of State heritage bodies to request developers, planners, private or otherwise, to underwrite independent cultural heritage assessments such as this document. Such assessments will ensure that the significance of cultural heritage sites and places are properly documented, preserved and managed. This report fulfils a range of social and legislative obligations relating to cultural heritage sites and places within the study area.

This investigation has been undertaken in accordance with the Aboriginal Affairs Victoria *Guidelines for Conducting and Reporting upon Archaeological Surveys in Victoria* (AAV 2002), the conservation principles of *The Burra Charter* (Australia ICOMOS 1999) and best current cultural heritage practise.

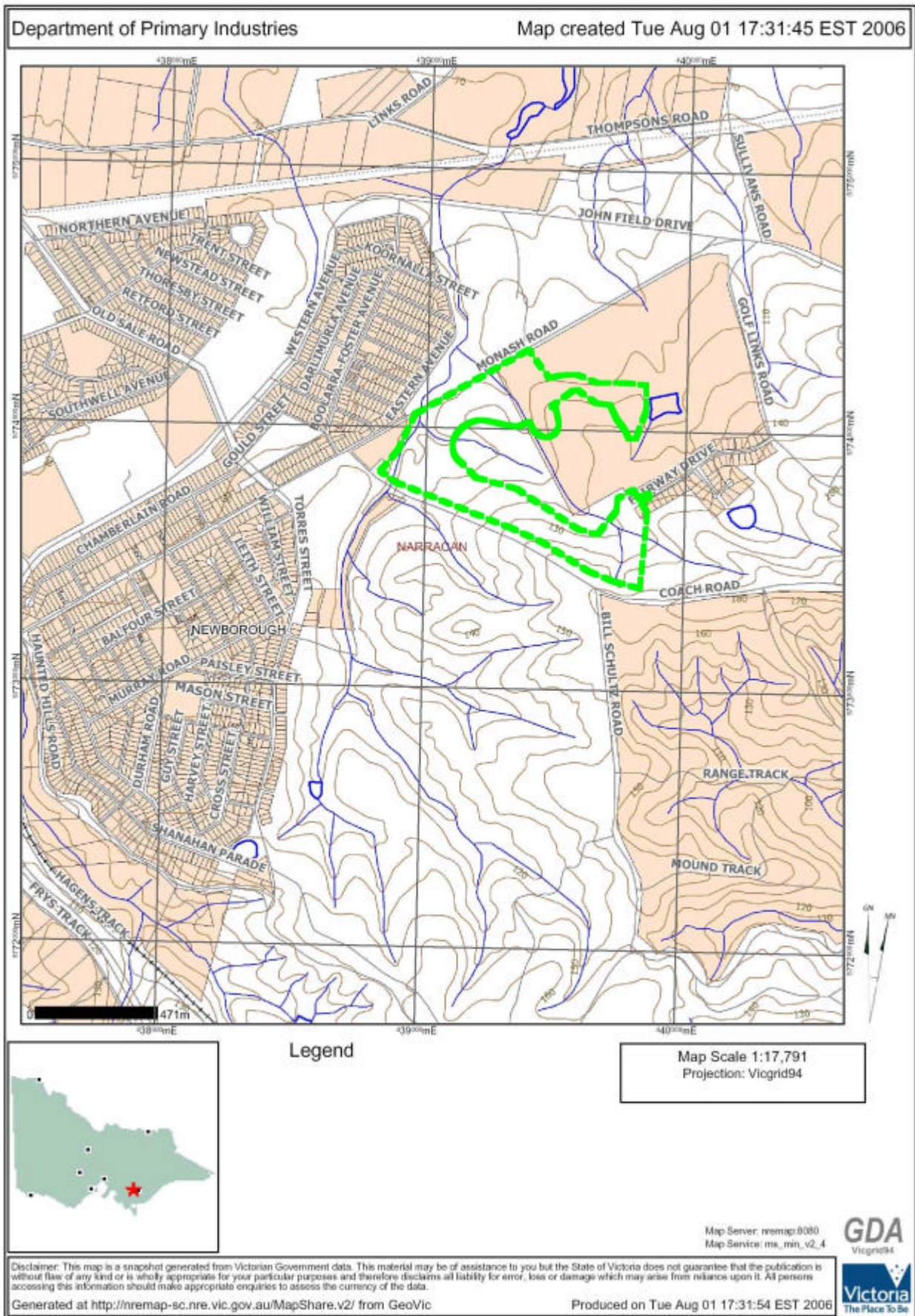


Figure 1 Study Area Location (VicRoads Map 97 F4)

1.1 Project Aims

The aims of this study are defined within the project brief (verbal), and comprise standard Aboriginal Affairs Victoria Report Guidelines format (2002) summarised as:

- A clear description of the Aboriginal and historic cultural heritage values of the study area, based on collated existing data and results of a site survey;
- An appraisal of any implications for the project arising from relevant legislation or policy;
- An objective assessment of the potential impacts of the development on these values and on local or regional historical and archaeological values;
- A description of any opportunities to avoid or mitigate these potential impacts through design or management;
- An assessment of the likely resultant level of impacts if mitigation measures are adopted;
- Any other information on historical and archaeological matters relevant to the project.

1.2 Consultation

In accordance with the *Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, Mr Robert Douthat, Heritage Officer with the Gippsland Cultural Heritage Unit was contacted by the consultant by telephone and given the background and details of the impending survey. Mr Douthat arranged for Central Gippsland community member Mr William (Norm) Rutherford to participate in the field component. A copy of this draft report has been forward to the CGAHC for review and comment, and a request made for a formal statement of Aboriginal significance of the study area. At the time of report finalisation, no formal response had been provided to the consultant.

The Site Registers held by Heritage Services Branch at AAV, Heritage Victoria (DSE), National Trust (VIC) and the Australian Heritage Database (AHD) were consulted for the presence of previously recorded Aboriginal or historic sites within the study area. Archival plans and air photographs held at the Land Victoria and State Library of Victoria were reviewed. The La Trobe City Council Online Planning Scheme was checked to see if the study area was subject to a Heritage Overlay. As required by Victorian State Legislation, a notification of 'Intention to Conduct an Archaeological Survey' was lodged (Form D) by the consultant with the Heritage Services Branch, AAV and Heritage Victoria (DSE) prior to conducting the study (Appendix 1).

1.3 The Study Area

The study area is located at Newborough approximately 140 kilometres east of Melbourne (Figure 1). The study area is bounded by Coach Road to the south, Monash Road on the north, an existing Bowling Club on the west and farm land on the east. The property comprises part of C.A. 9P1, 9P2 and is in the Parish of Narracan. The area is gently undulating and slopes from east to west, and includes a drainage line which joins Sandy Creek near the western boundary. The highest point on the property is on the south east corner (160m a.s.l.), and the lowest is on the western boundary (80m a.s.l.). From the highest point, extensive views are afforded of the Great Dividing Range.

The current use of the study area is for grazing and Yallourn Golf Club (Figure 2). The golf course has incorporated some native trees; however most have been recently planted and are not indigenous to Newborough. The course has required limited earthworks apart from

bunkers and where buildings have been constructed. The area currently used for grazing contains no extant structures, and native vegetation occurs along Sandy Creek, along the drainage line and in the western corner. The native vegetation within the study area appears to be comprised of re-growth with no trees noted that may potentially pre-date European settlement. Outside areas containing vegetation, the ground has been subject to considerable pasture improvement works, including crops.

The study area is located within the catchment system of the La Trobe River, with Sandy Creek flowing in a northerly direction through the site. The drainage lines within the study area generally have narrow and moderate to steep banks typical of increased erosion rates since European settlement. A natural spring exists on the hill slope in the south east corner. The land surrounding the natural spring has been fenced to prevent stock access and re-vegetated.

Existing services include a sewer main and Telecom, both of which are installed within a single easement the crosses the study area in the south eastern corner. There are also two large dams that have been excavated into the open farm land, and another dam which has been installed within the timbered area in the south east corner.

1.4 Impact of the Proposed Development

The proposed concept development plans for the study area comprise an extension to the existing Yallourn Golf Course and a 147 lot residential subdivision (Figure 2). The development will remove a number of existing holes at the Yallourn Golf Course for residential development, and construct new holes to replace and extend the course. The residential development is to occur adjacent to Monash and Coach Roads, which will surround the new layout of the Yallourn Golf Course. All existing vegetation areas are to be preserved either within open space or as covenants within freehold allotments, and in many cases new planting will extend vegetated areas. Whilst development of residential areas will involve high levels of ground disturbance, development of a golf course is unlikely to involve major or extensive earthworks.

Due to the lack of significant ground disturbance required, archaeological sites within the golf course can potentially be preserved via adopting management options. Sites can also be potentially preserved within the open space/reserve along drainage lines. Any archaeological sites within the high density development area are likely to be adversely impacted by both above and below ground infrastructure. As most archaeological deposits are situated within the top soil horizon, even relatively shallow modifications may adversely impact archaeological deposits. Surface archaeological material such as stone tools, may be disturbed, re-deposited or even destroyed during the course of development. Any spatial or temporal information that may exist will be destroyed as a result of the high density development. It is highly unlikely that any archaeological site could remain undisturbed within the proposed residential area. Therefore, this development type will receive greater discussion in the report in regard to management of heritage values.



OVERALL DEVELOPMENT PLAN
 PART OF CROWN ALLOTMENT 9P1
 PART OF CROWN ALLOTMENT 9P2
 PARISH OF NARRACAN
 C/T VOL 10383 FOL 211
 C/T VOL 10383 FOL 214

ads BUILDING & DESIGN CONSULTANTS

32 QUEEN STREET,
 WARRAGUL, VIC. 3820
 PHONE: (03) 5623 1311
 FAX: (03) 5623 1309

ALL CORRESPONDENCE TO:
 P.O. BOX 1265
 WARRAGUL, VIC. 3820
 EMAIL: ads@cdggroup.com.au

ALL DEVELOPMENT SERVICES

notes: **DO NOT SCALE DRAWING, IF IN DOUBT:- ASK!!**
 ALL SHEETS OF THIS DRAWING ARE TO BE READ IN CONJUNCTION WITH EACH OTHER.

© COPYRIGHT 2005

client: MONASH VIEWS Pty. Ltd.
 project: PROPOSED SUBDIVISION
 site address: THE LINK
 MONASH ROAD, NEWBOROUGH

issue:	PLANNING	scale:	NTS - Reduced
engineer:	CWB	draftsperson:	AJP.5
drawing number:	3850	sheet number:	P2/6
		revision/date:	F 28-4-06

Figure 2 Proposed Development Plan

2 ENVIRONMENTAL DESCRIPTION

The importance of understanding the past and present environment is two-fold. Firstly, it is the pre-European settlement environment that was the evolving context for Aboriginal land use in the region. Secondly, to understand the changes in the environment since European settlement is to bring an understanding of the Aboriginal archaeological sites that may have survived and their potential location.

2.1 Geology and Landform

The study area is part of the La Trobe Valley which is a mixture of fluvial and marine terraces which have resulted from fluctuating sea levels (Jenkin 1968: 75) (Figure 3). These terraces comprise silt, clays and sand and have been dissected by numerous drainage systems such as La Trobe and Thompson Rivers (LCC 1982). These major drainage systems form continuous scarps running east west forming large valleys opening at the sea to the east. The plains and ridges associated with this coastal plateau generally rise no more than 20 metres above the surrounding terrain (Jenkin 1968: 82). Rivers and streams, such as La Trobe River, are entrenched in the plain, and valleys are generally broad. Jenkins considered that this plain was formed about 10,000 years ago when rising sea-levels altered stream systems and resulting in deposition of clay, silt, sand and gravel in the previously deep valleys of Thompson and La Trobe Rivers. The valley is best known by the presence of extremely rich and deep coal seams that were formed during the Oligocene to Late Miocene periods. A low grade coal deposit exists beneath much of the present study area.

The study area is part of the South Victorian Uplands which is described as an extensive complex of hills flanking the Hoddle Range. Silt based soils and uniform sands occur throughout the area and the natural vegetation structures consists of low eucalypt forest with dense undergrowth, most of which has been cleared. Soils of a higher sand component are found along the drainage lines, and overly more compact brown silt.

The study area is largely within the Haunted Hills Gravel geological landform (Figure 3), a formation known to have supplied pre-contact Aboriginal people with a variety of raw stone materials. There are no significant outcrops of stone occurring within the study area. To the north of the study area, a number of Palaeozoic and Mesozoic rocks outcrop, and to the south west, basalts of Oligocene age also occur (LCC 1980: 275). The main form of naturally occurring stone within the study area is small water-worn quartz pebbles. The study area lies on the Haunted Hills fault line.

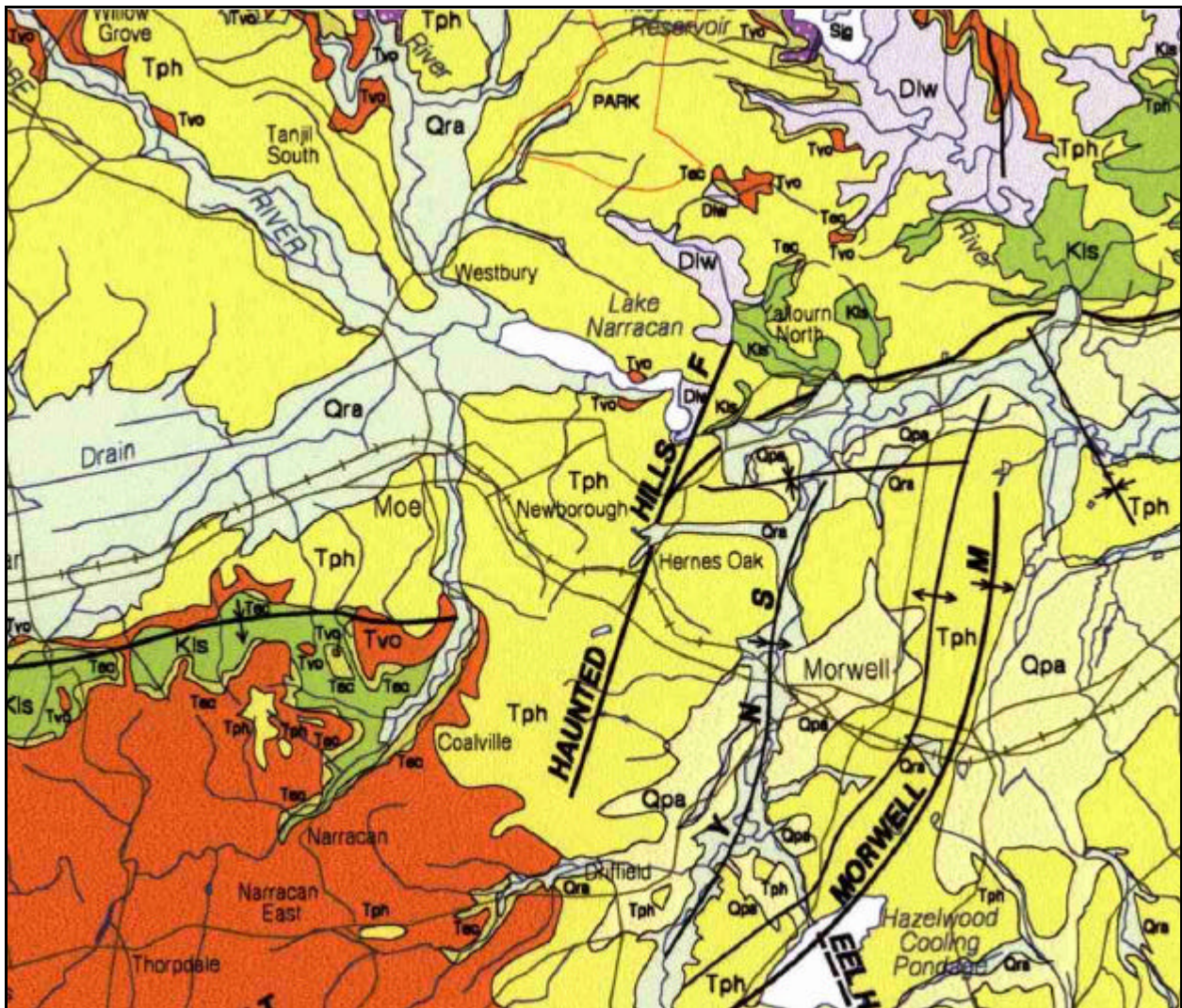


Figure 3 Geology of the Study Area (Geological Mapsheet Series of Victoria)

Qpa: Early Holocene. Fluvial: gravel, sand, silt

Tph: Pliocene to Miocene. Fluvial: gravel, sand, silt, ferruginous sand

2.2 Flora and Fauna

The native vegetation of the study area comprises re-growth along the drainage lines and a larger stand in the south eastern corner. Outside of these areas native vegetation has been cleared for pasture or golf course. Pre-settlement vegetation regime comprised plains grassy forest with swamp scrub in the drainage lines. Grassy forest under-storey was maintained by regular burning.

A flora and fauna assessment of the study area has been completed by Organ and Hill (2006) and information regarding current plant species and communities is derived from this report. The study area is considered to have originally contained three Ecological Vegetation Classes, such as Lowland Forest, Swampy Woodland and Riparian Scrub. The presence of a number of vegetation classes within the study area increases the potential for pre-contact Aboriginal archaeological sites (see section 4.2). The dominant vegetation type within the study area is Lowland Forest which is dominated by Messmate (*Eucalyptus obliqua*), Yertchuk (*Eucalyptus considerina*) and Narrow-leaf Peppermint (*Eucalyptus radiata*). Although significantly degraded, a small representative of pre-settlement

understorey is present and includes Burgan (*Kunzea ercoides*) and Tree Everlasting (*Ozothamnus ferrugineus*), Weeping Grass (*Microlaena stipoides*) Thatch Saw-sedge (*Gahnia radula*), Slender Tussock-grass (*Poa tenera*), Austral Bracken (*Pteridium esculentum*) and Forest Wire-grass (*Tatarrhena juncea*) (Organ and Hill 2006: 16-17).

Remnant Swampy Woodland is dominated by Swamp Gum (*Eucalyptus ovata*), with Burgan (*Kunzea ercoides*), Hop Goodenia (*Goodenia ovata*) and Variable Sword-sedge (*Lepidosperma laterale*) understorey (Organ and Hill 2006: 17).

Only small patches of Riparian Scrub remain in the western corner of the study area and comprise Scented paperbark (*Melaleuca squarrosa*) and Thatch Saw-sedge (*Gahnia radula*) (Organ and Hill 2006: 17). It can be assumed that all native species present within the study area once had a cultural use.

The dense under storey of woodland would have provided significant habitat for many animals, such as mammals, birds, reptiles and insects, particularly along the drainage lines. LCC (1982) lists a variety of birds for this habitat including emu, common bronzwing, crimson rosella, pallid and fantailed cuckoos, tawny frogmouth, kookaburra, variety of thornbills and honeyeaters. Mammals in this habitat include grey kangaroo, swamp wallaby, brush and ring tailed possums, bush and swamp rat, sugar glider and koala. Rivers, creek and wetlands also contained a variety of species including fish, shellfish and crustaceans (LCC 1972: 47, 89). Reptiles would also have been common within the study area. All of the flora and fauna within the study area would have been exploited to some extent by pre-contact Aboriginal people.

The faunal investigation undertaken by Organ and Hill (2006) identified 52 native species, most of which are birds. Species identified included Echidna (*Tachglossus aculeatus*), Brushtail Possum (*Trichosurus vulpecula*), Ringtail Possum (*Pseudocheirus peregrinus*), Masked Lapwing (*Vanellus miles*), Brown falcon (*Falco berigora*), Nankeen Kestrel (*Falco cenchroides*), Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*), Gang-Gang Cockatoo (*Callocephalon fimbriatum*), Sulphur-crested Cockatoo (*Cacatua galerita*), Garden Skink (*Lampropholis guichenoti*), Delicate Skink (*Lampropholis delicata*), Common Froglet (*Crinia signifera*) (Organ and Hill Appendix 4.1). All of the species still present within the study area; possums, birds, bird eggs, reptiles and frogs - would have provided reliable food sources for pre-contact Aboriginal people. The pre-settlement form of the vegetation communities within the study area would have provided significantly more plant and animal resources that are currently identified for the study area.

2.3 Climate

The climate of the study area is warm, with uniform rainfall and long temperate summer. The minimum annual average temperature is between 8 and 20 degrees Celsius (LCC 1972: 21). The average rainfall is between 550mm and 760mm, with the La Trobe River flooding on average twice per year, although some years no flooding at all has been recorded (LCC 1972: 26). In terms of Aboriginal and historic occupation and exploitation, the climate and rainfall would not have been a constraint. Rather, these conditions would have been attractive to both pre-contact Aboriginal people and early European settlers.

2.4 European Impact on the Study Area

The study area has been settled by Europeans since the 1840s. From this time various landscape changes have been made, such as clearing of scrub and timber and ploughing. These initial impacts would have resulted in the possible destruction of culturally scarred trees and a variety of surface archaeological sites such as stone arrangements and the spatial and temporal integrity of stone artefact scatters. The same activities that act to degrade Aboriginal sites will also degrade historic archaeological sites.

The history of post-settlement soil disturbance began when pastoralists commenced grazing of stock. The study area has been repeatedly ploughed, for both pasture improvement and crops. This would have disturbed sites, especially where stock movement was concentrated, such as by springs and other water sources. Impact by stock continues over much of the study area to the present. Harvesting of timber, although initially selective and done by hand, would have had a high impact on archaeological sites. Surface deposits would have been significantly disturbed by machinery and trees possessing cultural scars would have been destroyed. By the 1940s, all mature millable timber had been removed from Newborough (Aerial Photograph). Development of part of the study area as the Yallourn Golf Course involved additional clearing and localised earthworks, again having potential to adversely impact or destroy archaeological sites.

Only sites located in areas that have remained undisturbed (such as the reserve along Sandy Creek) may have any spatial or temporal integrity. Elsewhere, whilst individual stone artefacts may have survived, little information will now remain regarding how these artefacts were originally deposited. The potential for an archaeological site of high scientific significance (as significance is linked to condition) is therefore low.

In summary, the activities within the study area that would have actively degraded archaeological resources are:

- Initial grazing
- Initial clearing
- Ploughing
- Stream erosion and silt deposition as a result of clearing and grazing
- Golf Course Development
- Excavation of dams
- Installation of underground services

3 HISTORICAL BACKGROUND

Compared to other areas of Victoria, Gippsland remained one of the last European frontiers. The reason for this was access, and many initially unsuccessful attempts to explore Gippsland were made both from New South Wales and Melbourne. Several early explorers ventured into parts of Gippsland including McKillop (1835), Hutton (1838), Strzelecki (1840), McMillan (1839-41), Macarthur-Strzelecki (1840), Anderson (1840), Brodribb (1841) and Robinson (1844). Each of these expeditions was primarily in search of grazing lands and a suitable port from which cattle could be transported, or to find a tractable path along the coast to Melbourne. McMillan finally accomplished both tasks in 1840. Whilst McMillan did not pass through the study area, his reports of fine grazing land in the region prompted a significant rush to the area by squatters, and their main access route during the earliest years was via Port Albert.

In January 1840 Angus McMillan was commissioned by his employer Lachlan Macalister to find grazing lands for his cattle that were deteriorating in drought conditions on the Monaro in NSW. He eventually arrived at La Trobe River and was unable to cross due to time and provision constraints. When he arrived at La Trobe River, McMillan's party encountered a large party of Kurnai people who hurriedly abandoned their camp and fled, leaving an old man who had three dried human hands around his neck. Although McMillan had Aboriginal men from Omeo with him, they were unable to communicate with the old man camped next to La Trobe River (Synan 1994: 16). This brief expedition was the first by any Europeans to Gippsland. As a result of McMillan's expeditions into Gippsland, Macalister was to take up several runs in the area.

McMillan was soon followed by Count Paul de Strzelecki in March 1840. Strzelecki's expedition to Corner Inlet was sponsored by James Macarthur, and followed McMillan's blazed trail from Ensay (Numbla Mungee) to the Gippsland Plains. From Heyfield, the party traversed unexplored country, unable to reach Corner Inlet due to thick scrub. The party was saved from starvation by the bush craft of Aboriginal Charlie Tarra, who is today honoured by the place names of Tarra Valley and Tarra River (Synan 1994: 17). Strzelecki was the only early explorer to pass through the country between Traralgon and Morwell.

By 1841 the trail from Ensay to Port Albert had been established by McMillan. This track did not pass through Traralgon, but headed south from Sale through Longford. In addition, Strzelecki's glowing reports of Gippsland enticed squatters and merchants in Melbourne to travel to Gippsland. Strzelecki described Gippsland as:

'a fine open plain, richly watered, clothed with luxuriant grasses and fine timber, and offering charming sites for farms and country residences' (in Legg 1992: 14).

A third and unplanned event also dramatically focused the colony's attention on Port Albert. In 1841, just before McMillan reached Port Albert, the coastal steamer *Clonmel* ran aground at Corner Inlet through piloting a course too close to shore. All passengers and crew were rescued, and on return to Melbourne, Captain Lewis, the Port Phillip Harbour Master reported on the discovery of the harbour near the wreckage of the *Clonmel*. It was this news of a then much desired port for Gippsland, together with Strzelecki's story of grassy plains, which promoted the formation of the Gippsland Company. This company chartered the sailing ship *Singapore* and its expedition to Corner Inlet resulted in the first settlement of Port Albert in 1841. By the end of 1841 there were four routes into Gippsland;

by ship to Port Albert, McMillan's track, from Western Port following William Brodribb's trail, or the South Gippsland coastal route (Synan 1994: 19). It was from Port Albert that lasting settlement of the interior of Gippsland was made possible, with the plains along the coast being the first to be selected. These first European settlers brought with them large herds of cattle and sheep.

Occupation by pastoralists, who mostly arrived by the sea route, was swift. By 1842 the central plain between Tambo and La Trobe Rivers had been taken up under license. Most were of Scottish origin and came from the Yass and Monaro districts. As a result of communications with early explorers, Edward Hobson and Albert Brodribb became the first Europeans to take up land in the Traralgon district in 1844, settling on land at the junction of Traralgon Creek and La Trobe River on the run they called 'Hazelwood'. All of the early pastoral settlements dating to the 1840-60s are situated on the banks of major streams and watercourses. The country between Bunyip and Moe was wet, hilly and heavily timbered, making it a barrier for roads and railways for many years.

The present study area is included within another earlier pastoral run, Merton Rush, which extended south from La Trobe River to Narracan and Driffield Road, and between Moe and just east of Yallourn (Figure 4). When first gazetted in 1846 to Henry Scott it comprised 24,780 acres and carried 640 head of cattle. Henry Scott first arrived in Gippsland in 1842. This run changed hands several times (William Farely 1853, Westrop William Waller & George Haxell 1859, Kingrose Cabourn Waller & Westrop William Waller 1865, Kingrose Cabourn Waller, Gideon Heard & Westrop William Waller 1865, James Ford Bourn 1867, Samuel Vary 1878) before being taken over by the Bank of Australasia in 1878 (Billis and Kenyon 1972: 243). The name Moe is thought to have originated from the Aboriginal word 'mouay' meaning swamp (Australian Heritage Website).

These early pastoral runs utilised the undulating riverine plains that were interspersed with many small swamps and morasses. The river and stream channels at this time were generally almost hidden by impenetrable tea-tree thickets. At first these runs were unfenced, though were soon enclosed by a two rail wooden fences (Legg 1992: 17).

The nearest Inn to the present study area was the Retreat Inn at Moe which also served as a coaching stop. Travel overland through Gippsland was notoriously bad until the establishment of Roads Boards in 1853, who, after 1854 were permitted to charge tolls to raise funds for roadwork and bridge building. Road Boards were the forerunner to municipal shires. The area around Moe was sparsely populated and funds raised by tolls were insufficient for expanding the road network. Until 1870 travel remained difficult due to timber blocking the track and no bridges at the creek crossings.

The 1860s was the height of the squatters prosperity, as by this time there had been improvements to communications and transport and large deposits of gold were found throughout Gippsland. The opening of the new Gippsland Road from Sale in 1865 enabled Cobb & Co to extend their service to the area, halving the time to reach Melbourne. The discovery of gold at Walhalla in 1866 started the rush to Gippsland.

On December 31, 1880 all pastoral runs reverted to the Crown, officially ending the squatting era. From this time onwards, these large runs were divided into smaller allotments during selection schemes that divided leaseholds into small freehold allotments. Once these larger runs had been broken into smaller allotments, the new owners began to develop

these properties by constructing houses, associated farm sheds, fencing and extensive clearing of native vegetation. A variety of farming practices have been undertaken in the region including wheat, sheep and dairying (Priestley 1965: 60).

The study area was first subdivided into a smaller allotment in 1920 (Figure 5) comprising 816 acres. It was initially part of CP 101188 of the Parish of Narracan that was purchased, along with all of the immediately surrounding area, by the State Electricity Commission of Victoria as part of land management surround the coal mines. Prior to this time the study area was part of Crown Land (Forest) and had not been under private ownership. The land was subject to further subdivision to become C.P. 5T comprising 137 hectares (Figure 6).

A major impetus for the region was the Gippsland Railway line which opened in 1878. Apart from enabling local produce to get to Melbourne markets quickly and cheaply, the railway also opened up the Gippsland region to tourism and the new industry of commercial fishing. Moe was the terminus for several tramway routes serving the surrounding timber mills and gold mines in Walhalla before a branch line was installed Wells 1986: 86). Whilst providing a variety of economic opportunities, the opening of railway line also meant the end to local shipping, which could not compete with the faster and cheaper service.

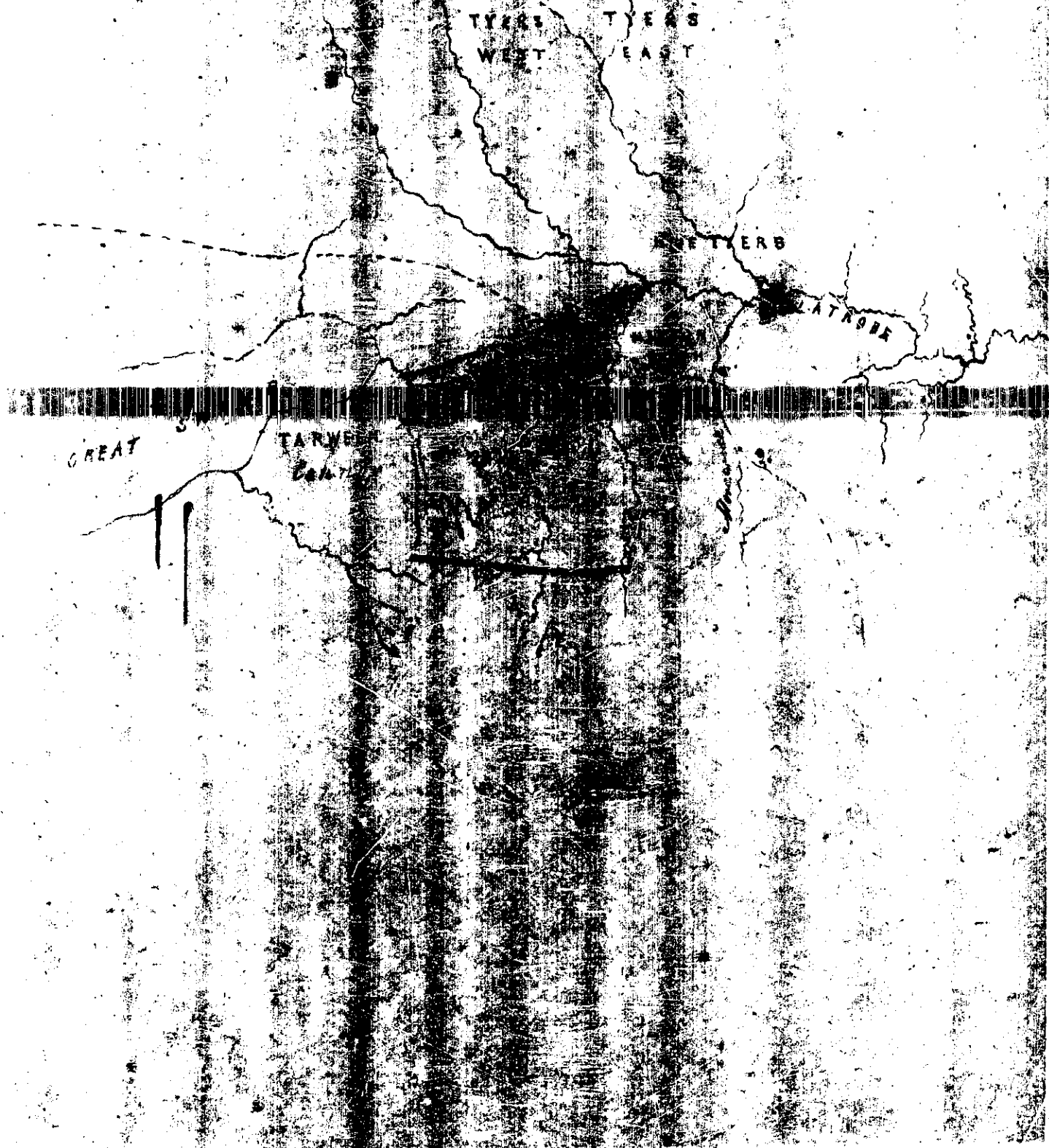
Wattle bark stripping was also important in Moe as it had been elsewhere in Gippsland and Western Port. Wattle bark from Black Wattle, Silver Wattle and Honeysuckle was one of Gippsland's earliest industries. In the 1880s there were a number of tanneries in Moe. By the late 1880s Moe was an important economic centre for the region and well established. The railway station was the focus of much of this activity including horses being sent to India as remounts, bark for tanneries, red gum and other milled timber. The main occupation of the area was dairying and remained so until the 1930s. Timber mills were also a large industry in the area, with several timber tramways terminating at Moe; where much of the timber was railed to Melbourne. In 1836 the Australian Paper Mills established a Pulp and Paper mill at Maryvale, and Moe received a significant economic boost. Although the existence of brown coal was known in the district from the 1880s, it was not commercially established until the opening of the Morwell open cut in 1955. Electricity was connected by 1923, and by 1953 the population had reached 15,000.

Moe and Newborough saw major growth after World War 11, mainly through immigration from Britain and Europe to provide labour for La Trobe Valley brown coal mines and electricity generation industries, which were initially at Yallourn and Morwell. Many of the houses and residents in Moe and Newborough were relocated from Yallourn. The Yallourn Golf course was founded in 1926 and incorporated in 1986. It moved to its present location in 1954 (Crosslinks web site).

The brief history of the study area presented in this report suggests that whilst it was included within an early pastoral runs, no potential historic site will exist from this early period. There is no evidence that any early historic activity has included the present study area. As the study area was first purchased by the State Electricity Commission it is highly unlikely that any significant historic activity occurred within the study area. Until the ownership by the SEC, the historic background of the study area was limited to being part of Crown owned forest.

Figure 4 Parish Narracan Pastoral Run 933 - No Date

*Map showing the
Land reserved for by W Wall
Scale 1/8 in*



MOUNTAIN GLEN 933

BULN BULN

SCALE OF CHAINS

Figure 5 Parish Narracan N129 (N)

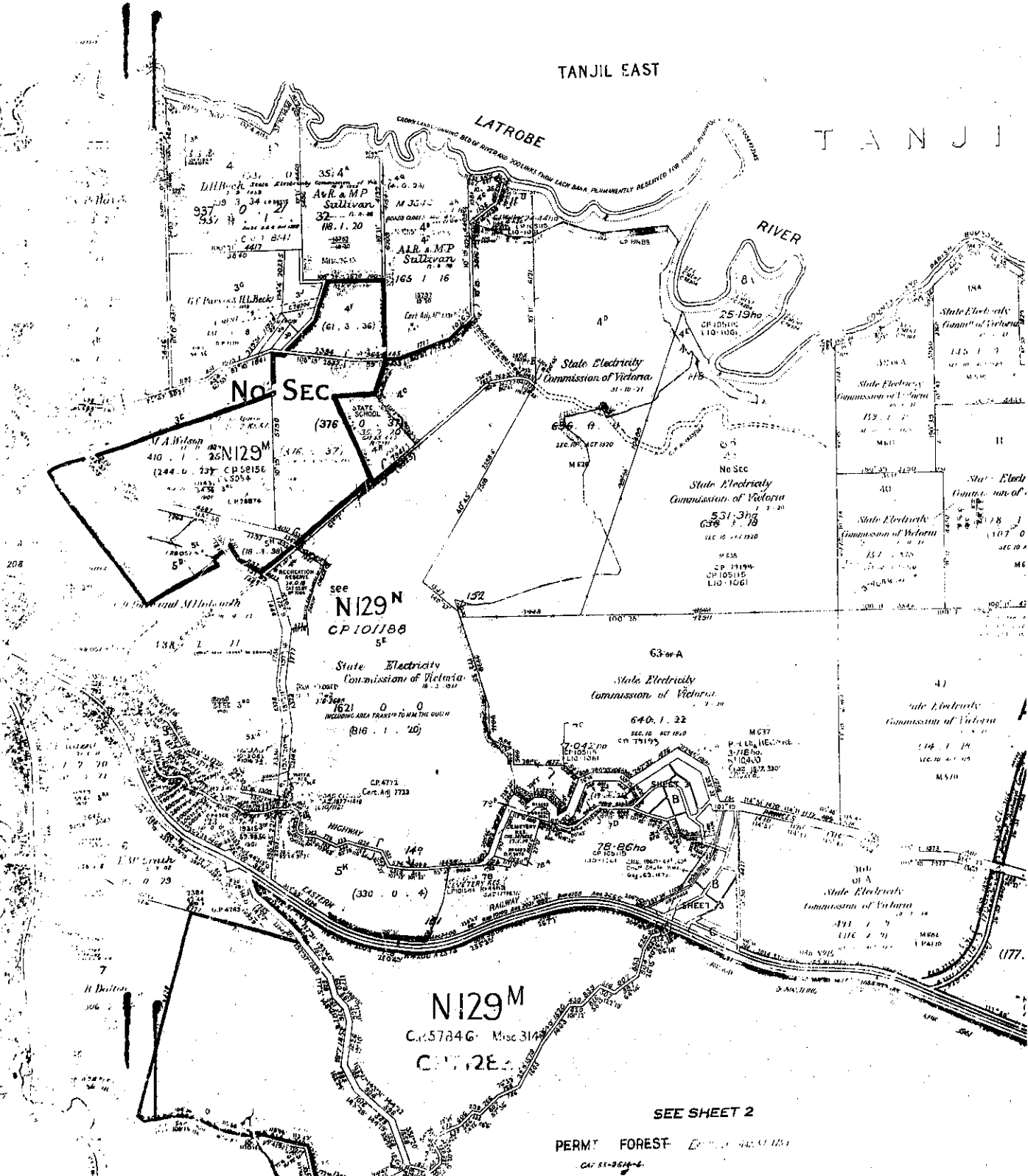
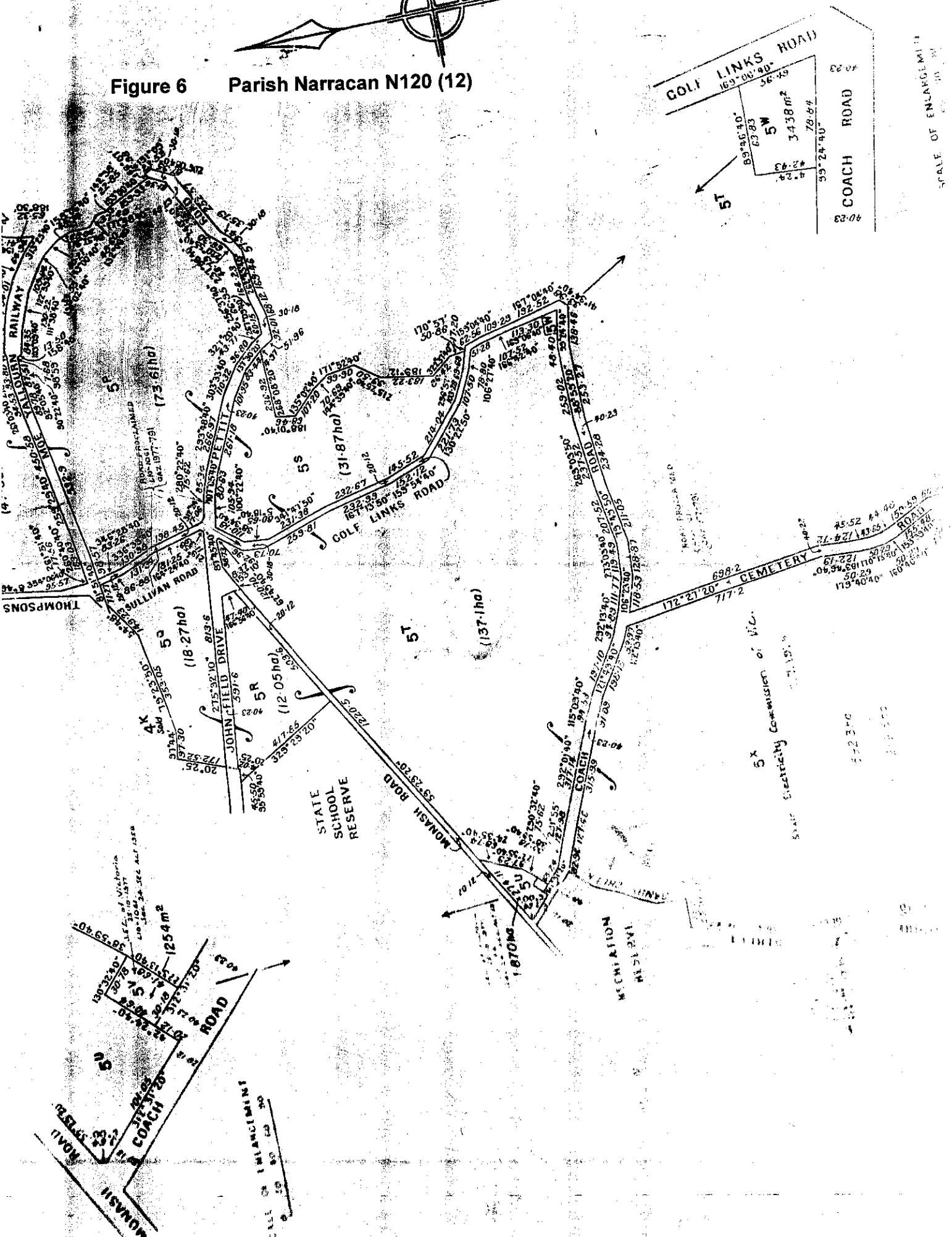


Figure 6 Parish Narracan N120 (12)



3.1 Previous Historic Cultural Heritage Investigations

The study area has not been previously surveyed, and all of the previous investigation within 10km has been in association with the coal industry. The La Trobe City has completed a heritage study and as a result many sites are now included as heritage overlays on the planning scheme, though none of these occur within the present study area.

The following summarises the results of previous investigations that have been conducted in the Moe area. This information, along with Section 3.2 will be combined in Section 3.3 to generate an historic site prediction model for the study area and implications for this investigation.

Regional Investigations:

An early investigation by **Wesson & Beck (1981)** reviewed the large area of the **Driffield project** in the La Trobe Valley to the south west of the present study area. As a result of this investigation, although less than 1% of the study area received ground survey 20 historic archaeological sites were recorded. The sites comprise 10 house sites, a shed, and building site, 2 historic artefact scatters, the remains of a bridge, 1 former quarry site, a track, grave site, former garden and the remains of the Morwell – Mirboo Railway line. The authors note that all of the earliest buildings sites are located on terraces beside creeks and rivers and that more recent sites are located away from these areas. It was also noted that newer houses were most often constructed on top of or next to earlier dwellings.

In **1989** a study of the **La Trobe Region's heritage sites** was conducted by **J. Horsfield**, which includes review of the City of Moe. There are four historic site listed in this study at Moe, comprising the former Meeniyah National Bank, 'Loren' and Bushy Park Homesteads and Old Moe Bush Nursing Hospital. Also noted as being of heritage value is the Melbourne to Sale and Bairnsdale Railway Line and the Moe to Walhalla Railway.

Long et al (1999) conducted an archaeological survey as part of a management study of the **Loy Yang property**, situated to the east of the present study area. During the sample survey of this area four historic sites (see table 1) were located comprising three homesteads and former Traralgon South township. Apart from one homestead site (H 8122-0005) that was assessed as being of moderate significance; all other sites located during this study were assessed as being of low significance.

Local Investigations:

To the south of the present study area, **Wood** investigated a **Telstra Optical Fibre Cable Route between Driffield and Yinnar (1998a)**. No historic sites were located during this investigation, and no areas of historic archaeological potential were identified either during the background research or field inspection. The lack of archaeological material was considered to be an accurate reflection of site distribution within Wood's study area.

Also by **Wood** in **1998b** was an assessment of an optical fibre cable route between **Tanjil South and Parkers Corner**. This 30km route situated north of the present study area although being associated with early historic activity such as timber and nearby gold workings, had no historic sites or areas considered as having historic archaeological potential. No further historic investigation was recommended.

The vast majority of investigations in the region have been commissioned by various coal and energy companies. The **Maryvale** coalfield was assessed in **1998 by Debney & Everett**. During this assessment two historic sites were located comprising Morwell bridge 1 (H8121-0028) and Morwell Bridge 2 (H8121-0029). These sites were assessed as being high and moderate scientific significance respectively. During sub-surface investigations of Morwell bridge area, an additional historic archaeological deposit was located, Morwell Bridge 3 (H8121-0030) which was assessed as being of low scientific significance. The sites were located on the bank of Morwell River and were interpreted as the remains of the first township on the first crossing point of the river in the mid 1800s. Site H8121-0028 was considered to be the remains of Smith's Hotel, the Cobb & Co staging point and the first Post Office. Due to the significance and historic archaeological potential attributed to this area further investigation was recommended as each of these sites was to be destroyed by coal extraction works.

Vines (2001) conducted an assessment of the **Yallourn Coalfield Development Project** (Alternative Morwell River Diversion). During the survey of the proposed river realignment, two historic sites were recorded, comprising a former farm house and a section of the Yallourn north coalmine railway. Both sites were assessed as being of low scientific significance and no further investigation was recommended. No other locations within the river diversion route were assessed as having historic archaeological potential.

In summary, the present study area has received no specific assessment in the past, both in terms of background research or ground surface survey. None of the previous investigations have located historic sites, or areas considered to have historic archaeological potential within the present study area. The Newborough area has received less than 1% previous survey coverage for historic sites.

3.2 Previously Recorded Historic Sites

There are no previously recorded historic sites within the study area or at Newborough. The current historic recorded site distribution largely reflects mostly the locations of previous survey coverage rather than accurate historic site distribution. Previous investigations that have included historic heritage, such as the Driffield Project (Wesson & Beck 1981) have located and recorded high numbers of historic sites. Although none of these investigations located historic sites within the present study area, there are a small number of historic sites listed for the Moe area, and these currently serve to characterise the nature of historic resources in region. None of these sites are located within 1km of present study area. There are also numerous historic sites listed on the Registry of the National Trust and the Australian Heritage Database, only those within 5km of the study area are presented in this report. A summary of recorded sites within 5km is presented in table 1.

Table 1 Previously Recorded Historic Sites within 5km of the Study Area

Site Listing, Name & #	Location	Description & Significance*
Morwell Bridge 1 – Smiths Hotel, Cobb & Co H8121-0028, and H 8121-0032 Ref: Everett, Rhodes & Halsey 1998	South side of Old Melbourne Road, east of Morwell River	Fenced paddock with ornamental plantings, building rubble & rubbish dump. Considered to possibly be the site of Morwell Bridge Cobb & Co staging post and hotel. Consists of exotic trees, rubbish dump with early 20 th Century bottles etc, collapsed tank stand, possible chicken coup, old trig station. Potentially of high scientific significance.
Morwell Bridge 2 H 8121-0029 Ref: Everett & Halsey 1998	On north side of Old Melbourne Road, Morwell	Abandoned house, comprising exotic plantings, remains of small brick structure and scatter of historic artefacts. Significance not assessed.
Morwell Bridge 3 Sub-Surface Deposit H 8121-0030 Debney & Halsey	On Morwell River bank north of Old Melbourne Road	Sub-surface remains of household refuse. Low scientific significance.

*Scientific and Cultural as attributed by the original recorder

The number and type of previously recorded sites directly reflects the limited scope and nature of previous investigations. Currently the recorded historic site record reflects the remains of the early domestic developments of initial selectors, local school and an historic artefact scatter. The lack of comprehensive survey coverage in region means that the vast majority of historic archaeological sites remain unrecorded.

3.3 Historic Site Prediction Model for the Study Area and Implications for this Investigation

The implications of the historic and archaeological background for this study are:

- There are no previously recorded historic sites within the study area;
- The study area has not been subject to any previous survey;
- The historic background indicates that no early or significant historic structures or features have been developed within the study area;
- It is possible that minor historic features, such as fences, rubbish dumps will exist within the study area;
- Due to the land use history of the study area the overall historic archaeological potential is considered to be low.

4 ABORIGINAL BACKGROUND

4.1 Ethnohistory

The Aboriginal people of the Gippsland areas were collectively known as the Kurnai tribe. The Kurnai occupied the areas around the Gippsland Lakes, the river valleys of East Gippsland and some parts of the coastline. The Kurnai comprised five clans: *Brataualung*, *Brayakaulung*, *Tatungalung*, *Brabralung*, *Krauatungalung* (Hall 1988, Fison and Howitt 1880: 215). They had:

“Similar dialects or languages, shared many common customs, inter-married, had a common initiation ceremony, and had a sense of identity as Kurnai (Gunai) (“men” or “people”) as opposed to the Brajerak (“wild-men”) who lived beyond the mountains and hills surrounding Gippsland and with who the Kurnai (Gunai) had little contact” (Thompson 1985: 44).

A ‘tribe’ is generally recognised as a linguistic unit with flexible territorial boundaries, and the focus of the hierarchy is known as the cultural area (Peterson 1976). All groups within a cultural area shared common characteristics such as those associated with initiation ceremonies and marriages and spoke closely related languages (Peterson 1976).

It has been estimated that each tribe contained up to 1,000 members prior to European exploration and settlement, and the movement was generally made by clans in groups of up to 100 (Charles & Loney 1989: 6). The study area lies within the traditional lands of the *Brayakaulung* people, who occupied the La Trobe, Thompson, Avon and Macalister River valleys. The southern boundary of their traditional land occurs along the Strezlecki Ranges. The present study area once formed the lands of the *Woolum-Woolum* or *Bunjil Kraura* (Figure 7) (Wesson 2000: 28). The name of this clan is considered to mean ‘west wind people’ or ‘people from the La Trobe River at Longford’ (Wesson 2000: 28). Their territory is thought to have been the country between Morwell, Rosedale and Toongabbie. The headman was *Bunjil Kraura* (b.c. 1839). In 1840, this group was considered to have numbered in the hundreds, though by 1864 this had fallen to 51. There is very little specific ethnographic information about this clan, and therefore it is necessary to cite records of other *Kurnai* clans in order to obtain a general idea of how they lived and land use patterns.

Wesson (2000: 17) considers that the geographic isolation of Gippsland impacted the relations between Gippsland people and neighbouring tribes. As Howitt observed “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”, (Howitt 1904: 505). Howitt also notes that Aboriginal identity was connected to river and lake systems which were also routes for travel: ‘The particular and private hunting and foraging ground claimed by each of the Gippsland Tribes was defined by the watersheds between the different rivers’, (Howitt 1904: 17). The country was intersected by a network of pathways which were described by nineteenth century recorders as ‘native tracks’. The routes of many present day roads follow these early pathways including the Omeo Highway from Bruthen and the South Gippsland Highway between Port Albert and Sale. It is highly likely that once explorer McMillan crossed La Trobe River, he followed a clearly defined Aboriginal pathway to ‘discover’ Port Albert.

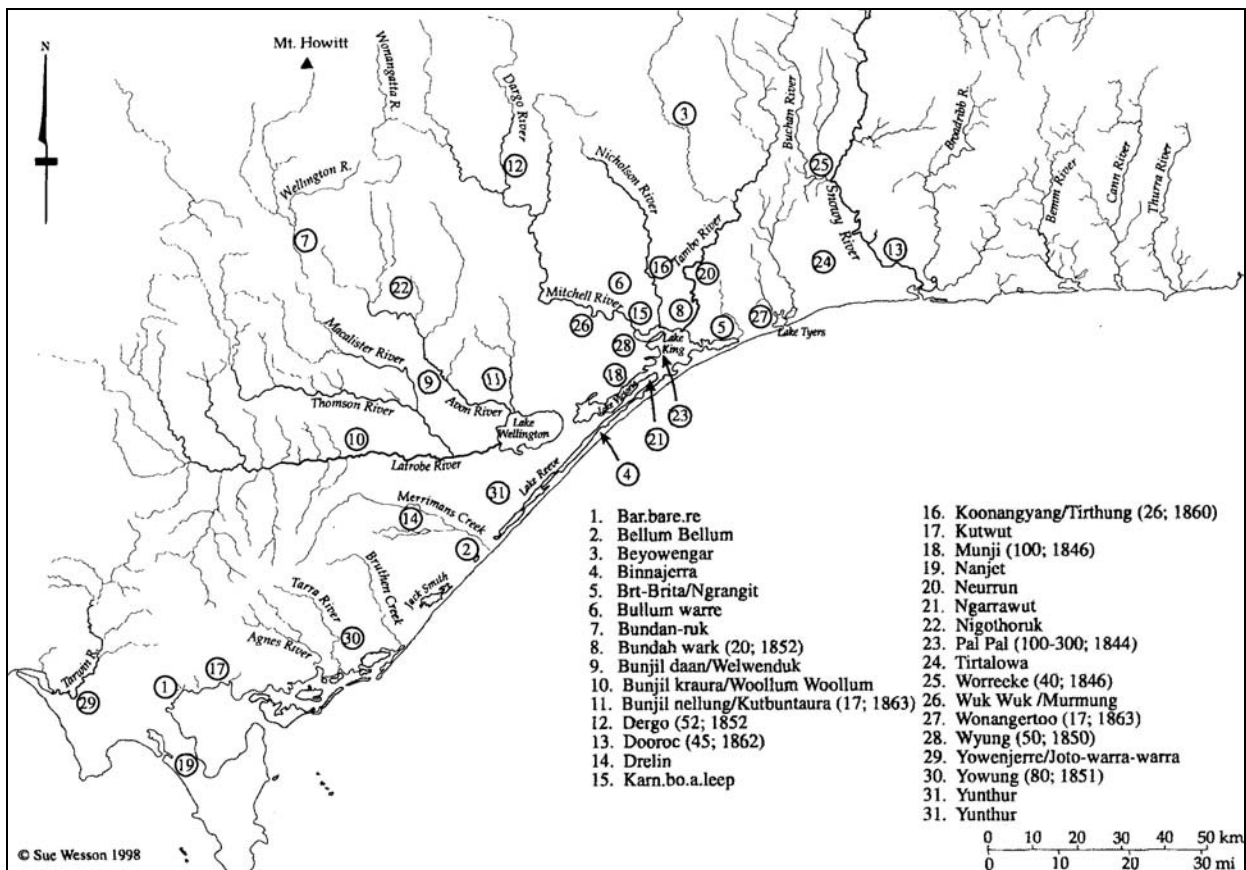


Figure 7 Gippsland Named Groups (from Wesson 2000: 22)

One of the earliest accounts of the *Kurnai* comes from survivors of the shipwrecked 'Sydney Cove' in 1797 who encountered local Aboriginals at the mouth of the Snowy River. They described these Aboriginals as being strong and muscular, wearing fish-bones and kangaroo teeth in their hair, with reeds or bones pierced through their noses and eating 'blubber or shark oil' (Thompson 1985: 13). Early explorer Bass landed on the northern section of Ninety Mile Beach in 1798 and recorded contact with Aboriginal people (probably the *Yunthar*). Between 1798 and 1838 virtually no records relating to the *Kurnai* people exist.

The initial impact of European colonisation on local Aboriginal groups probably occurred when sealers, whalers and wattle bark strippers extensively exploited the area between 1798 and 1826. During this time these men made frequent contact with local Aboriginals. There is evidence that numbers of local Aboriginal women were abducted by these men for use as slaves or concubines, with male clan members murdered when resistance to these raids was made (Charles & Loney 1989: 6). Apparently under the old sealer's law, a sealer was entitled to a maximum of five Aboriginal wives (Australian Heritage Group 1998: 7). This initial contact with sealers and whalers is also considered responsible for the introduction of many diseases fatal to Aboriginal people such as smallpox, measles, and syphilis. The effects of these diseases along with increasing inter-tribal warfare can account in some part for the very low population of Aboriginals in Gippsland when pastoral settlement began in the more accessible regions. In 1840 when McMillan rode into the Sale Plains, he estimated to have been upwards of 2,000 *Kurnai*, though by 1853 Tyres could only count 131 (Synan 1994: 23). The remaining *Kurnai* were then clustered at certain sympathetic pastoral stations such as Bushy Park or in towns like Sale.

The high country and dense forests of South Gippsland may have prevented intensive Aboriginal occupation of these areas. Evidence from historical sources (Bulmer in Smyth 1878: 141-2) and archaeological sites (Hall 1988, Hotchin & May 1984, Hotchin 1989) indicate that Aboriginal people tended to gather closer to the coastline, lakes and major water courses. However, the *Brayakaulung* people probably depended on the rivers, wetlands, plains and northern foothills of the Strezleckis for most of their resources. This region would have provided several resource zones with numerous seasonally abundant sources of food and materials. The seasonal reliability of these resources would have provided incentive for occupation of areas along and adjacent to the La Trobe River during periods of abundance.

During the period of initial settlement by Europeans, the traditional Aboriginal owners were dispossessed of their land, and many conflicts between these groups occurred. This period of conflict is thought to have peaked in 1850-51 when the Aboriginal population was reduced to almost a tenth of its previous size (du Cros 1990). The occupation of the Gippsland Plains by Europeans is marred with 'black wars' which almost eliminated the *Kurnai* of Gippsland. These 'black wars' rapidly degenerated from cattle spearing and the occasional murder of a European to the outright slaughter of *Kurnai* men, women and children.

It appears that the non-Aboriginal people entered into a conspiracy of silence, as consequences under colonial law were grave. One person, Henry Meyrick who arrived in North Gippsland in 1841 wrote:

'No wild beast of the forest was ever hunted down with such unsparing perseverance...Men, women and children are shot whenever they can be met with...It is impossible to say how many have been shot, but I am convinced that not less than 450 have been murdered altogether...' (Synan 1994: 20).

Thompson (1985) describes the period between 1838 and 1851 as the period of 'full scale European invasion', and it is also during this period that the greatest number of conflicts occurred between local Aboriginals and pastoralists.

Numerous massacres have been documented (Gardner 1993) and evidence has been found throughout Gippsland. Whilst numbers of traditional Aboriginal occupiers of the area were still high, and settlement of the land by Europeans was in its infancy, a large number of incidents between the two groups occurred. This situation was mainly in response to the pressure placed on traditional Aboriginal food resources by grazing stock. Starving Aboriginals were then forced to steal sheep and often assaulted or murdered a shepherd or squatter, and this situation generally resulted in harsh reprisals by the squatter community. The first skirmish was at McMillan's Nuntin Station on the Avon River, and soon after 'Boney Point' also on the Avon River. One of the worst documented massacres occurred at Warrigal Creek near King Lake in 1843 (Gardner 1993) and was led by Angus McMillan. Prior to this time, McMillan, Assistant Aboriginal Protector for the region, was aware that confinement within a prison cell was intolerable for Aboriginal people. He was alleged to have pleaded with magistrates not to gaole Aboriginals as a sentence on several previous occasions, and to bail those that had been gaoled (Cox 1973: 149). However, his compassion for Aboriginal people disappeared when it was discovered that local *Braikalung* clansmen had apparently murdered his good friend, Ronald Macalister. McMillan is claimed to have arranged the revenge for this murder and organised his "Highland Brigade", who

found Aboriginal clansmen on the banks of Warrigal Creek and murdered 150 people (Porter 1977: 54). Although the formation of the native police force assisted in enforcing white law throughout Gippsland, atrocities continued until the late 1840s. After 1851 there were no more reports of major clashes.

More substantial and detailed accounts of the *Kurnai* come from the Rev. Bulmer who dealt with this group at the Lake Tyres Mission Station (Smythe 1878), and from A.W. Howitt (1904, and Fison & Howitt 1880) an early anthropologist and Aboriginal Protector of the region, and Mathews (1904).

Bulmer's accounts indicate that the *Kurnai* focused their exploitation on the Gippsland Lakes and waterways, with groups moving in an annual migration pattern. In spring, activity focused on coastal wetland resources of fish and waterfowl. In summer occupation was mostly by the coast, when apart from occasional hunting forays by men into the hinterland, shellfish and fish provided the staple diet. Fishing played a significant role in utilising the riverine, estuarine and lacustrine resources, with men using spears and both sexes using nets. Women apparently exclusively used fishing lines and bone fish hooks. Fish hooks have not been identified within any of the Aboriginal artefact assemblages west of the *Kurnai* territory in Victoria (*Kulin* Nation). Autumn also provided plentiful and accessible resources, in quantities that allowed large gatherings for ceremonial or social purposes. During autumn, a higher percentage of game was hunted. During winter, fishing along the coast was less reliable, and groups would move inland to occupy inland river systems and flood plain areas (Morgan 1987: 17).

Although the *Kurnai* moved to the hinterland during the cooler months, fishing using lines and nets continued to be a preoccupation. The material culture of the *Kurnai*, with the huge range of nets, hooks and lines, canoes, and fishing spears indicates a population that had primarily adapted for coastal resource exploitation. The canoes constructed by coastal groups appear to have been more sea-worthy than elsewhere in Victoria, indicating that fishing offshore was a common practise. Populations with similar canoes appear to have also fished offshore along the south coast of New South Wales (Mackaness 1941: 19).

At campsites, family groups would construct quick huts made from saplings and green thatch and sometime bark. It was not until steel axes became available to Aboriginals after settlement by Europeans that bark was used more extensively in hut construction. The occupants' standing and relationship to others determined placement of huts at a campsite (Morgan 1987: 17).

Like Aboriginal groups of the *Kulin* to the west, members of the *Kurnai* were also thought to have practised fire-stick burning. Burning of large tracts of land to drive out game for capture was common, and it had the additional benefits of regenerating the flora that in turn attracted fauna and potential game. This meant that much of countryside was more open before European settlement than after (Morgan 1987: 17).

The *Kurnai* appeared to have a less rigid version of the moiety system than that which operated within *Kulin* lands. The *Kurnai* had only two totems that were gender linked; men identified with the emu whilst women with the superb blue wren. This meant that the normal restrictions on marrying outside the totem class were not as strict. This was one of the aspects that had led Howitt to speculate that the geographical isolation had enabled the *Kurnai* to develop a more sophisticated institution of tribal leadership (Morgan 1987: 21).

The *Kurnai* were known to both bury their dead in soft soils (placed in a sitting position) or within tree hollows. Although tree burials are unlikely to still exist, it is possible that burial sites or cemeteries exist in areas of sandy soil such as dunes of both past and present shorelines, and former river and creek beds.

Between 1851 and 1886 economic changes forced Aboriginal people to become dependent on government rations and the government became increasingly involved in the lives of Aboriginals (Thompson 1985). After this period, some of the remaining clan members moved north into the mountains away from pastoral settlements. Other remaining clan members moved to Ramahyuck Aboriginal Mission Station, which was established in 1863 and run by the Rev. Friedrich Hagenauer. The mission was situated on the shores of Lake Wellington near the mouth of Avon River. In 1908 Ramahyuck was closed, and all the inhabitants were relocated to the Lake Tyres Aboriginal Mission Station. This enforced cohesion of different Aboriginal groups onto Mission Stations generated more conflict between different tribal groups who normally did not associate with each other. In Missions, alcoholism and illness became major problems as Aboriginal people were forced to abandon their traditional lifestyle.

Descendants of the *Kurnai* tribe now live throughout Gippsland region and are represented by the Central Gippsland Aboriginal Health and Housing Co-Operative Ltd in the Newborough area.

4.2 Resources Available to Aboriginal People

The resources available for Aboriginal subsistence in the past would have been rich. The study area and surrounding region contains an array of productive ecological zones that make it attractive for hunter-gathers such as lacustrine, riverine and terrestrial.

The resources associated with woodlands and riverine areas that comprise the study area would have been plentiful and formed part of the foraging strategy employed by Aboriginal people. Procurement tasks were divided between men and women, with children also assigned roles. Men were responsible for hunting, spearing fish, cooking, butchering and dividing meat. Women and children collected plant foods, shellfish, hunted small animals and fished with lines and nets from canoes on lakes (Rhodes 1996: 17).

Within each of the above-mentioned ecological zones, there would have been variations in staple species diversity and abundance, and this would have in turn influenced site location (Walsh 1987). It would be expected then that areas associated with the creek within the study area would have been the focus of Aboriginal exploitation. The Eucalyptus woodland would have mainly been utilised by Aboriginal people for hunting game and other woodland based activities. Within wetter drainage lines both bulrush (*Typha* sp.) and water ribbons (*Triglochin* sp.) would have been a source of starchy tubers. In drier areas the daisy yam (*Microseris scapigera*) would have been heavily exploited as it formed one of the staple vegetables of pre-contact Aboriginal people.

Smyth (1878) lists the following faunal and floral species as having been utilised in the Gippsland region: fish species such as perch, mullet, bream, schnapper, gurnet, flounder and flathead; fresh water, estuarine and marine shellfish, such as mud lark (*Anadara trapezia*), mud oyster (*Ostrea anags*), mussel (*Mytilus planulatus*), pipi (*Donax deltoides*);

mammals, marsupials and reptiles including kangaroo, wallaby, emu koala, wombat, possum, pademelon, bandicoot, echidna, glider, kangaroo-rat, goanna, lizards, snakes, turtle and eel; various birds such as swan, geese, pelican, ducks, spoonbill, cormorant, gulls, cockatoo and parrots; and plant foods such as snow-thistle, pig-face, ferns native cherry and currants and kangaroo apple. Wesson cites Gippsland Aboriginal people as harvesting 'water fowl, fish, kangaroo, possum, wombat, reptiles, root vegetables, leafy vegetables, fruits and berries from lakes rivers, swamps, plains and valleys. For their canoes, rugs, artefacts and decorative apparel there was a wide range of timbers, stones, leathers, ochres, seeds and feathers' (2000: 17).

The material culture of the *Kurnai* would have included a range of items related to subsistence, cultural and social activities and shelter. Smyth (1878) noted the following items: bone and shell fish hooks, kangaroo grass fish nets, canoes, spears with polished bone or hardwood points, spears with rows of sharp stone set in a groove, spearthrowers, clubs, boomerangs, wooden shields, stone hatchets, flaked stone tools, woven bags and baskets and wooden containers. Other items likely to be present include huts, gunyahs, fish-traps, stone heat retainers, kangaroo teeth adornments, pierced nose adornments, bark drawings, and possum skin cloaks. In the archaeological record few of these items survive, and are limited to stone, bone and shell.

The availability of quartz from within naturally occurring surface deposits (Haunted Hills Gravels) is a significant feature in terms of accessible raw materials for the manufacture of stone tools. In addition to quartz, hornfels, acid volcanics, chert and aplite were locally available. Fine grained silcrete, a raw material that has particularly good flaking qualities and was a preferred stone source, does not naturally occur within the study area region, and any examples of this material can be presumed to have been culturally transported/traded into the *Woolum Woolum* clan estate. Wesson and Beck (1981) noted the presence of course grained silcrete in their Driffield study area to the south; Hall (1988) suggests silcrete sources maybe located approximately 30km north of the Gippsland Lakes in the South Gippsland Highlands. Based on the higher occurrence of silcrete artefacts to the west of the Gippsland Lakes, Lomax (1992) suggests a silcrete source may be located west of the Lakes. The locally occurring stone types could therefore be expected to be the dominant stone materials utilised for manufacturing stone tools by Aboriginal people in the past. Rarer material such as greenstone may also be occasionally identified. Thus, the geological context indicates that the vast majority of stone used in manufacturing artefacts could be obtained locally, from terrestrial sources, alluvial river gravel or even as trade goods with neighbouring groups.

E. tereticornis (forest red gum) was common throughout the plains. Because of their smooth bark and large size, these trees were commonly used for the manufacture of bark implements by Aboriginal people (Edwards 1972: 31).

4.3 Previous Aboriginal Archaeological Investigations

In this section considerable discussion is presented on previous relevant regional and localised archaeological investigations. The purpose of this is to provide a detailed context of the existing archaeological values of the region so that any sites subsequently found during the survey component can be appropriately understood and placed within both local and regional context. It also clarifies to the reader the most likely outcome of the survey as

well as giving background information regarding the survey methodology adopted for this project.

Regional Investigations:

The Aboriginal archaeology of the Gippsland coast has received considerable attention in the past. Less attention has been focused on inland areas or inland water systems. The present study area would have been well known and utilised by Aboriginal people for at least the last 20,000 years. Evidence from Clogg's Cave, located in mountainous country near Buchan dates to 17,000 years B.P. (Flood 1973, 1980), and artefacts located within Mitchell River Terraces are considered to date to the Pleistocene (Pickering 1979: 3). Use of Clogg's Cave was sporadic from 17,000 BP to 13,000 BP, at which time climatic conditions became warmer. From then until about 8,500 BP the cave was used more often, though as climatic conditions continued to improve occupation of the cave decreased, until only the overlying rock-shelter at its entrance was utilised, a practise that continued until European settlement. The artefacts retrieved from Clogg's cave also reflect a distinct change in technology. Artefacts from the lower levels of occupation (approx. 8,700 BP) were carbonate encrusted pebble tools and steep edge scrapers. In the more recent levels, small tools and backed blades that are clearly part of the Small Tool Tradition (Mulvaney 1975) dominated. Elsewhere in south-eastern Australia there is evidence of Aboriginal occupation extending back over at least 30,000 years (Bowdler 1976, Mulvaney 1970, Coutts 1977, 1980). However, much investigation of archaeological sites in the Gippsland region has been concerned with coastal middens (Hall & Lomax 1990, Hotchin 1988) all of which date to the last 1,000 years,

There have been three regional Aboriginal archaeological studies within Gippsland (Hall 1988, Hotchin 1989, Lomax 1992,) that have some relevance to the present investigation. Their findings and site prediction models will be presented in summary form to characterise the nature of Aboriginal archaeological resources of the Gippsland hinterland and plains region.

In what was the first major systematic survey for sites in the area, **Witter, Simmons & Irish (1976)** began to characterise the archaeological resources within the **Loy Yang – Bass Strait Pipeline Route**. Their study corridor extended in a broad band from Traralgon Creek to Seaspray and 25 field days were spent locating a total of 24 new sites. These sites comprise 5 middens, 6 mounds and 13 stone artefact scatters (table 1:5) and were located in a range of landform units (frontal dune, salt marsh, terrace edge, lowland plain, upland ridges and valleys, stream valleys and terraces) with upland ridges and dunes containing the greatest concentration of sites (76%). Other than sites clustering around freshwater, mounds on lowland plains and middens located on both fore and back dunes, no significant archaeological occupation pattern was considered evident. The authors conducted several statistical models with the data that indicated a minimum of five different resources zones existed within a days' forage (7km) of each of the sites recorded. Although the authors considered their investigation significantly constrained by low ground surface visibility conditions, they did generate the beginnings of statements regarding a cultural change in the 'late prehistoric' from an interior focus characterised by numerous small camps utilising chert/silcrete to a trend in the more recent past towards large base camps associated with the recently formed estuarine conditions where predominantly local raw material (quartz) was utilised (1976:15).

Hall (1988) in his investigation of the **Gippsland Lakes Region** to the south east of the present study area recorded a total of 249 archaeological sites. Although Hall included coastal geomorphic units in his survey strategy, his main focus was on areas away from the coast. The newly recorded sites comprised 33 scarred tree sites, 215 stone artefact sites, and one combined burial and surface scatter site. Of the total sites recorded 18% were identified within Plains landscape unit, and these comprised predominantly of stone artefact scatter sites and scarred tree sites. The Plains landscape unit within Hall's study is defined as the Pleistocene coastal plateau that extends southwest, west and north of the Gippsland Lakes. It comprises ridges and entrenched river valleys with escarpments between 20-40 metres above sea level. The majority of the present study area broadly conforms to Hall's landscape unit of Plains. The other relevant landform unit as defined by Hall is coast. Only a very small area of the plains landform was surveyed by Hall (<1%) locating no new sites.

The dominant raw material types identified within sites located within the Plains landscape unit were quartz and to a lesser extent silcrete. Hall noted a marked difference in the proportions of raw stone material types between the east and western section of his study area. In the east quartz dominates the assemblage, whilst in the west (near Seaspray) silcrete becomes equally important as quartz in stone preference. This trend is considered to reflect both the geological and cultural availability of raw materials. The dominant stone tool types identified within sites on the Plains were small flakes and flaked pieces; with less than 1% of formal tools being identified (1988: 94). These sites were interpreted as being waste of workshop sites from numerous stone reduction events. Eighty percent of scarred tree and stone artefact scatter sites recorded by Hall during this study were located within 100m of water. On the basis of survey coverage and site distribution, Hall considers the density of sites to accurately reflect pre-contact Aboriginal settlement patterns (1988: 106).

Based on his study, Hall constructed a site prediction model for the Gippsland Lakes (1988: 50-51). Hall's prediction models for wetlands and plains which are applicable to this study are:

For plains:

- Low to medium density distribution of stone artefact scatters along waterways, but no base camps within 10km of the lake shores;
- Larger concentrations of sites including base camps expected 10 to 12km inland from lake shores;
- Scarred trees dense due to the prevalence of the forest red gum.

For wetlands:

- High density distribution of stone artefact scatters including base camps due to the high productivity of this landform;
- Possible freshwater shell middens, but no marine or estuarine shell middens;
- Scarred trees dense due to the prevalence of the forest red gum on high ground near water.

Hall raises two scenarios regarding the lithic contents of sites located during his study. The first is that silcrete artefacts are associated with the Microblade industry that are geared specifically for the manufacture of specialised tools for hunting, namely backed blades for hafting as barbs in composite spears (McBryde 1985). Quartz is associated with the more generalised Core and Flake Tool Industry geared to producing tools for a range of purposes (Witter 1984). Hall suggests then that the variability in proportions of stone materials might then reflect different emphasis on specialised hunting as opposed to more general activities. The second explanation purported by Hotchin (1984) considers that fine-grained silcrete was used earlier, based on dates obtained from Jack Smith Lake. These hypotheses have yet to be further investigated.

Hotchin's (1989) focus of his investigation of the **Gippsland Lakes** region was to look at cultural change and environmental evolution from mostly within coastal sites. Like Hall, Hotchin considered that two different phases of occupation occurred in the Gippsland Lakes. The earliest phase relates to a period before the formation of the outer barrier (approximately 4,000 B.P.) when conditions were estuarine. Sites formed during this phase are characterised by a microlithic technology based on imported silcrete, discrete lenses of estuarine shell, and the presence of fish and terrestrial bone. The next phase reflects environmental changes in local resources as once tidal conditions cease at 4,000 B.P. there is an absence of marine shellfish until the appearance of *Donax* in sites formed after 1,000 B.P. The sites formed during this phase are characterised by a non-microlithic technology based on quartz and local gravels and extensive middens of *Donax*. Hotchin hypothesises that the earlier phase relates to diffusion of technical expertise relating to the exploitation of the littoral, and specifically the introduction of bone fish hooks. The second phase relates to a rise in resource productivity of the wetlands adjacent to the coast during the late Holocene (1989: 232). This can essentially be interpreted as reflecting an increase of activities and population along the coast in the recent prehistoric past.

Lomax 1992 conducted a site survey and a number of test excavations in the vicinity of the **Gippsland Lakes** and tributaries, producing results that conformed to archaeological models developed by Hall (1988) and Hotchin (1989). In addition to the more than 400 sites recorded during the previous investigations, Lomax identified 59 new sites, comprising 35 stone artefact scatters, 13 isolated finds and 11 scarred trees. Five test pit excavations were also conducted, and included dating of organic material. The dates obtained from these sites indicated that there was a change in raw material type and artefacts around 3,000 B.P. Lomax found evidence for the widespread use of quartz that had been reduced by means of bipolar technology. Silcrete microliths were also found to occur on old and recent landforms around wetlands; however, they were absent from source bordering lake deposits. Using the results of her investigation, the results of Hall (1988) and Hotchin (1989), Lomax summarises:

'Because of the recent processes of landscape development that have occurred within the Gippsland Lakes it is reasonable to assume that most archaeological materials located within the lakes area are Holocene. Archaeological deposits which are early to mid Holocene in age are most likely covered by fairly substantial deposits of sediments on the coastal lowland plain. Older Holocene deposits are likely to be located (given deflation of surface sediments) in sections of the prior and inner barrier; terrace tops both marine and fluvial; dune tops above wetlands; and in most sections of the plains and hills unit', (Lomax 1992).

As part of her investigation Lomax generated site prediction models based on her and all other relevant studies. The model for the inland is specifically relevant to this present investigation.

The model for Inland:

'Because of the general lack of potable water in this land unit large sites consisting of 100's to 1000's of stone artefacts will be uncommon and the majority of sites in this land unit will be small flake sites of 10's of stone artefacts. However, some larger sites can be expected to occur near swamps. These sites will be mixed flake assemblages of artefacts of quartz, local gravels and silcrete in addition to small amounts of Donax shell. They will occur near waterways and swamps on terraces, ridges, spurs, dunes or other high ground. They will be present but uncommon in areas away from these locations.

Small quartz workshops, small flake sites and isolated silcrete artefacts will be located in this land unit. Fragments of Donax shell will be present in these sites.

Major sites will occur at the limit of a days foraging range from the lakes (approximately 10km), although none have been found so far. These sites will be on major stream valleys, and on dunes and terraces overlooking wetland and swampy areas. These sites will be mixed flake assemblages containing 1000's of artefacts.

No substantial Donax middens will be located within this unit. Sites containing fragments of estuarine shell will be present but rare.

As no suitable remnant tree species such as forest red gum or box are present within this unit no Aboriginal scarred trees will be located'.

In **1998 Djekic** conducted a survey of the **La Trobe Valley Coalfields** that included areas near Traralgon. Djekic surveyed 25km of dirt roads and a small section of A.P.M. plantation in Traralgon, and chose these areas due to high levels of ground surface visibility. During this survey, two surface scatters were located on dirt tracks within forest areas near Gormandale. The dominant site type recorded during this study was small lithic sites, most of which were found on crests or upper slopes of hills and comprised mostly silcrete flakes, backed blades and waste flakes. The dominance of silcrete is considered by Djekic to indicate a locally available source of this material.

The **Loy Yang Power Property (6,000ha)** was assessed in terms of its known and potential cultural heritage values (**Long, Rogers, Schell & Cusack 1999**). During this study seven previously recorded sites were inspected and three new finds of isolated artefacts were identified. The low number of new sites identified was considered to reflect the low ground surface visibility encountered, and also prevented clear statements regarding archaeological distribution to be made. However, the authors did acknowledge a preference for creek valleys in site location, as well as potential for scarred trees within remaining stands of mature (pre-contact) trees. Overall, the sites recorded during this study were considered to broadly reflect the documented archaeological record associated with the plains and foothills of central-west Gippsland.

In **1981 Wesson and Beck** conducted an archaeological survey of the **Driffield Project** area, an area between Morwell and Yallourn and south to Yinnar. During this assessment, although less than 1% of the study area received survey coverage, 132 Aboriginal sites were recorded, comprising 22 surface scatters of stone artefacts, 4 scarred trees and 2 stone sources. The authors considered that site location was affected by proximity to water, access to and availability of resources and other natural resources (e.g. stone), vantage, drainage and type of ground surface. Apart from possibly three coarse grained silcrete sources in the Haunted Hills Gravels, the largest of which was recorded during this investigation as an Aboriginal quarry site (AAV 8121-0087). The fine grained silcrete which was found to dominate the stone artefacts recorded does not occur in the Driffield study area and no source for this rock type has yet to be found. In terms of site situation, there was a bias towards the tops (36%) and sides of rises (35%), with side of creek and undulating land (10%) also having sites. Level plains and river terraces had the least number of sites (5%), though the authors' note that the number of sites located was directly affected by ground surface visibility conditions. The largest number of sites was located within the Hills landform, and this was also the land system that received greater survey coverage due to higher levels of ground surface visibility.

Small Scale Investigations:

The following summarises the results of previous small scale investigations that have been conducted in the area between Morwell and Traralgon. This information, along with the balance of information provided in Section 4 will be combined in Section 4.5 to generate a site prediction model for the study area and implications for this investigation.

The closest previous Aboriginal heritage investigation was undertaken by **Brown and Sciusco (1995)** of a property on **Old Sale Road, Moe**, north west of the present study area. This study area consisted of a cleared gentle north west facing hill slope with no natural watercourses. During this investigation a single stone artefact was located (AAV 8121-0153) and recorded, and removed from site by the Aboriginal community representative. The artefact was considered waste/un-utilised and was assessed as being of low scientific significance. The authors concluded that the study area was unlikely to be a location frequently utilised by pre-contact Aboriginal people as a campsite due to its poor drainage. The stone artefact was considered to represent evidence of a short term ephemeral campsite location resulting from Aboriginal people foraging through the area in the past. It was recommended that no further investigation was required prior to development of the study area.

In **1998b Wood** conducted an investigation of a proposed optical fibre cable route (30km) between **Tanjil South and Parker's Corner** situated to the north of the present study area. This study area comprised road reserve within mostly hills landform with occasional stream crossings. Ground surface visibility was very poor and only one scatter of stone artefacts was located on a flood plain adjacent to Tanjil River (AAV 8121-0157). In addition to the newly recorded site, it was found that four previously recorded scatter sites occurred in close proximity to the cable route, approximately 5km south of Erica. Wood considered that recorded sites reflect an accurate model of site distribution within the OFCR. Although no further investigation was recommended, the Wurundjeri community requested that the stream crossings be subject to community monitoring.

Also in **1998a**, **Wood** conducted another assessment of a proposed optical fibre cable route between **Driffield and Yinnar**, situated to the south west of the present study area. The alignment comprised floodplains and gently undulating hills and crossed a number of waterways including Morwell River and Wilderness Creek. The ground surface visibility was poor during the survey and no new archaeological sites were located or recorded. No further investigation was recommended prior to installation works commencing, though a request was made from the local Aboriginal community to monitoring works at the Morwell River and Wilderness Creek crossing points.

The vast majority of investigations in the region have been commissioned by various coal and energy companies. The **Maryvale Coal Field** was assessed in **1998** by **Debney & Everett**. This project involved both ground surface survey and sample sub-surface testing. During the ground surface survey, five scarred trees and two artefact scatter sites were recorded. The artefact scatter sites were identified close to the Morwell River and were in a highly disturbed state of preservation. The authors suggest that based on the results of this investigation that adjacent to swamps, high points, ridges were frequently utilised as campsite locations, and that mature Eucalypts were often used for their bark resources. They also suggest that the presence of canoe trees supports the river being used as a transport route.

Three areas were chosen for archaeological sub-surface testing; the high terrace south of Morwell River, high terrace east side of Morwell river, and a series of ridges and gullies north of Old Melbourne Road. Within these areas ten trenches were excavated and four sub-surface stone artefact scatter sites were located. Apart from two single stone artefact sites, all the sites identified during this investigation were assessed as being of moderate scientific significance. The authors recommended that prior to destruction by the river re-alignment that further archaeological investigation should be undertaken at the two well preserved deposits.

Additional work on the **Maryvale Coal Field** was undertaken by **Vines (2001)** who found new sites during additional ground surface survey and identified high archaeological potential for the terraces of Morwell and Latrobe River. These terraces range from the recent Holocene to late Quaternary periods and have potential for Aboriginal sites of considerable age. Vines recommended that further archaeological investigation, in the form of sub-surface testing should be undertaken prior to these sensitive landforms being impacted by the development.

Amorosi and Debney (2001) conducted supplementary investigations of the **Maryvale and Yallourn Coal Field projects**. This investigation compared the potential impact on cultural heritage by the two projects and did involve any additional field investigation. It was found that in terms of known archaeology that the proposed Yallourn Coal Field development project resulted in the least impact to archaeological sites.

In summary, there has been limited previous regional survey coverage, and no previous survey or assessment of land at Newborough. The general site prediction model for the area suggests that larger and more significant sites will be located in close proximity to waterways, and will occur on any land system. Given the abundance of water sources in the local area sites may be distributed throughout the landscape, focusing on local, ephemeral and permanent water sources. Although fine grained silcrete dominates the raw material

used in the manufacture of stone artefacts, only course grained stone will also be heavily utilised (quartzite, quartz, chert).

A number of previous investigations have included sub-surface testing as part of their methodology. This methodology has demonstrated that a significant number of sites within sensitive landforms exist in a sub-surface context, most often buried by post contact alluvium. Sites typical for the study area landform are recently formed (last 1-2,000 years) lithic sites that reflect transient campsites where a limited range of activities were undertaken and mostly associated with hunting. The land use history of the study area will have largely destroyed any archaeological site within the present study area. However, based on previous investigations it is highly likely that evidence of Aboriginal activity will still be found in the form of heavily disturbed stone artefact scatters. Other site types, such as burials, scarred trees, mounds, hearths are all considered an extremely rare site type for the region and are unlikely to exist within the present study area.

4.4 Previously Recorded Aboriginal Sites

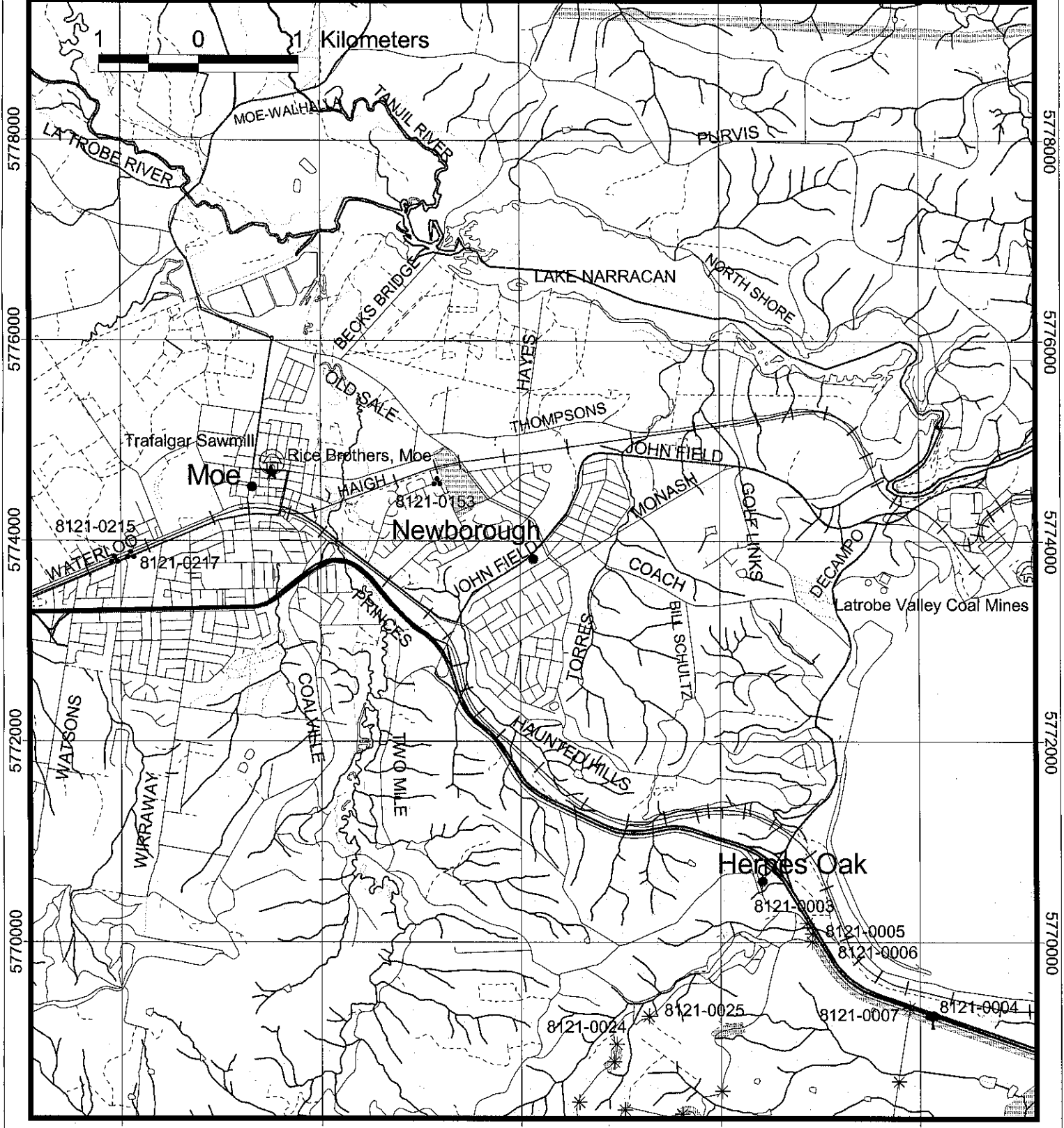
Within a 5 kilometre radius of the study area there have been 10 previously recorded Aboriginal archaeological sites comprising 9 stone artefact scatters, 6 stone artefact collections, 1 earth feature and 1 scarred tree (Figure 8). There are also 2 previously recorded post-contact Aboriginal places (Figure 8). There are no Aboriginal sites listed with the Register of the National Estate for Newborough. Figure 8 also shows land that has been subject to previous survey and serves to highlight that only areas that have received previous survey coverage contain recorded sites. Based on the site density within previously surveyed area as shown in Figure 8, many more archaeological can be expected to occur in the study area region.

Details of sites previously recorded within 2km of the present study area are presented in table 2.

Table 2 Previously Recorded Site within 2km of the Present Study Area

Site Name & AAV #	Site Type	Site Location	Site Description	Scientific Significance *
Dinwoodie 1 8121-0153 Ref: Brown & Sciusco 1995	Isolated stone artefact	437055 5774408 Two stone artefacts within an area of high disturbance at the eastern end of Dinwoodie drive.	One silcrete flake, one quartz piece.	Low

* As attributed by original recorder



434000 436000 438000 440000 442000
Residential Development, Monash Rd, Newborough Sites plot & archaeological surveys

DQS View - MGA Zone 55

<p>Post-contact Places</p> <ul style="list-style-type: none"> ⊙ Settlements/Towns ★ Mixed Site <p>Pre-contact Places</p> <ul style="list-style-type: none"> ▲ Artefact Scatter * Multiple Feature Types ⬆ Scarred Tree <p>Water Bodies</p> <ul style="list-style-type: none"> ▭ Lake/ Dam ▭ Watercourse Area 	<p>Water courses</p> <ul style="list-style-type: none"> ▬ River ▬ Stream - - - - - Channel/Aqueduct (major) - - - - - Drain/Channel - - - - - Drain - - - - - connector through water areas ▬ Railways 	<p>Area subject to inundation</p> <ul style="list-style-type: none"> ▭ Pondage 	<p>Roads</p> <ul style="list-style-type: none"> ▬ Freeway ▬ Minor road - - - - - Vehicular track - unsealed ⋯⋯⋯ Walking / bicycle track • towns and localities ▭ Archaeological survey areas and transects
--	--	--	---

N

GDA94
Date: 07 Aug 06

32 Figure 8 Previously Recorded Sites in the Study Area (AAV Map)



This document contains culturally sensitive information concerning the heritage of Victoria's Aboriginal communities, and cannot be included in any reports resulting from research associated with this document. This information is accurate at the date of production. However, the State of Victoria and its employees do not guarantee that the information in this document is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on this information.

4.5 Aboriginal Site Distribution Model and Implications for this Investigation

Based on the background information presented in this report the following statements can be made regarding Aboriginal archaeological resources within the study area and the implications for the present investigation:

- There are no previously recorded Aboriginal sites located within the present study area and the area has not been subject to previous survey;
- Low-density surface stone artefact scatters are predicted as the most likely site type to be located during this survey. Stone artefact density may range from low (1-5) to high density (10s to 100s) lithic scatters;
- Land adjacent to the drainage lines within the study area has been assessed as being of archaeological sensitivity;
- The expected dominant raw material type used for the manufacture of stone tools will be fine grained silcrete and milky quartz. Small quantities of locally available stone material such as coarse grained silcrete, hornfels and basalt may also be part of any stone tool assemblage;
- Flaked pieces and flakes are expected to be the most common type of stone artefact recorded within surface scatters or isolated artefact occurrences. Formal tool types will comprise a low proportion of any lithic assemblage. Lithic assemblage will reflect exploitation of land based resources including hunting, skin and wood working implements;
- Sites located within the study area have most likely been formed in the recent past (1-2,000 years). It is highly unlikely that a site of great antiquity will be found on the ground surface. There is limited potential of sites of early Holocene to be present in a buried context within stream alluvium;
- The majority of archaeological material is expected to occur within the topsoil horizon of the study area (top 40-50cm);
- Aboriginal burials, mounds, hearth and scarred trees are highly unlikely to occur within the study area;
- Due to the high level of ground surface modification that has impacted nearly all sections of the study area it is highly unlikely that any lithic site will remain *in situ*. Past disturbance will not have removed stone artefacts, though any site located will no longer retain any spatial or temporal integrity and will therefore have limited scientific value;
- The overall Aboriginal Archaeological potential of the study area is considered as moderate within close proximity to drainage lines and low on the gentle hill slopes and throughout the area previously developed for golf.

5 SURVEY COVERAGE, METHODOLOGY AND GROUND SURFACE VISIBILITY

The ground surface survey of the study area was conducted by the consultant and Central Gippsland Aboriginal Health and Housing Co-operative Ltd Representative William Rutherford and Mr Peter Brown on August 15, 2006.

The survey was conducted by systematically walking the entire study area, with specific attention paid to areas that provided 80-100% ground surface visibility. During the survey detailed notes were made and photographs were taken, and assessment made of any areas that may contain archaeological potential.

Archaeological visibility refers to the amount of original ground surface (bare ground) that is clearly visible for site inspection. The greater the ground surface visibility, the more effective are surface site surveys. Examples of high surface visibility are recently ploughed paddocks, recent sub-surface installation and road works (100% per square metre); and examples of poor visibility are areas of heavy vegetation cover (0-10% per square metre). Unfortunately, it is often the case that highly visible archaeological sites are also often highly disturbed. High ground surface visibility is therefore often related to the amount of disturbance that has occurred. This disturbance may be man made (such as quarrying, vehicle tracks); by stock (overgrazing, tracks), or due to natural processes (erosion by wind or water).

The ground surface visibility conditions were generally very poor (0 - 10% per. m²) throughout the study area (Plates 1 – 8). However, recent erosion along the drainage line, around dams, along stock track and beneath trees offered good to excellent ground surface visibility. The banks of Sandy Creek were not inspected in detail as this area is to be preserved as open space/reserve and thick vegetation prevented any effective survey coverage.

Less than 2% of the study area provided good to excellent ground surface visibility conditions. This equates to an effective survey rate of 2% of the total study area, a low effective survey coverage rate. The lack of ground surface visibility within the balance of the study area, when combined with relevant background information is considered not to have constrained the effectiveness of this assessment. Low levels of ground surface visibility do not limit the effectiveness for detection of scarred tree sites and extant historic sites.

For the purposes of this assessment, the study area was divided into three survey units, reflecting land use and landforms and comprised drainage line, gentle hill slopes and existing golf course (Figure 9). Brief descriptions of the survey units are presented in table 3. Examples of survey conditions are shown in plates 1 - 6.

Table 3 Survey Units, Ground Surface Visibility and Effective Survey Coverage

Survey Unit	Description	Ground Surface Visibility	Effective Survey Coverage
<p>A</p> <p>Gentle hill slopes</p> <p>Approx 80% of study area</p>	<p>This survey unit comprises land that has been heavily modified as improved pasture. It has been cleared, ploughed, and dams installed. Stand of native gum remains in south eastern section and on southern boundary of golf course. Top soil within this area is mostly shallow silt with a component of gravel. The treed section of this survey unit may retain the least disturbed archaeological deposits.</p>	<p>Poor (10-30% per m²)</p>	<p>1% (approx.)</p>
<p>B</p> <p>Drainage line</p> <p>Approx 10% of the study area.</p>	<p>This unit comprises the steep banks of the drainage lines, and extends from the creek line to top of adjacent slope. This distance varies considerably throughout the study area, but has a maximum of 10m. The drainage lines are seasonal and would not have provided running water on a year round basis. Exposure is caused by stock access, wind and water. This unit is the least stable and being most affected by current land use activities. Topsoil within this landform is sandy loam. The central drainage line has been used in the past for dumping rubbish. Potential archaeological deposits within this survey unit are unlikely to be <i>in situ</i>.</p>	<p>Poor to good (10-70% per m²)</p>	<p>2% (approx.)</p>
<p>C</p> <p>Existing Golf Course.</p> <p>Approx 10% of the study area.</p>	<p>This survey unit comprises the existing golf course development. The land has been altered via cut and fill for golf purposes and numerous exotic plants have been planted over the past 40 years. Topsoil is a mixture of shallow silts, clays and minor gravel. Any archaeological material within this survey unit will have had any spatial integrity degraded.</p>	<p>Very Poor (0-10% per m²)</p>	<p>1% (approx.)</p>



Plate 1

Survey Unit A facing east, showing lack of ground surface visibility. Facing east.



Plate 2

Survey Unit A showing limited ground surface visibility around existing dams. Facing south.



Plate 3

Survey Unit B. Section of incised drainage line provides good visibility of soil.



Plate 4

Survey Unit A. Re-growth native woodland. All mature (pre-contact) gums have been previously removed from the study area.



Plate 5

Survey Unit A – natural spring feature that has been fenced and re-vegetated. No ground surface visibility. Facing east.



Plate 6

Very limited ground surface visibility within Survey Unit A. Facing west.



OVERALL DEVELOPMENT PLAN
 PART OF CROWN ALLOTMENT 9P1
 PART OF CROWN ALLOTMENT 9P2
 PARISH OF NARRACAN
 C/T VOL 10383 FOL 211
 C/T VOL 10383 FOL 214

ads BUILDING & DESIGN CONSULTANTS

38 ALL DEVELOPMENT SERVICES

52 QUEEN STREET, WARRAGUL, VIC. 3820
 PHONE: (03) 5623 1311
 FAX: (03) 5623 1309

ALL CORRESPONDENCE TO:
 P.O. BOX 1265
 WARRAGUL, VIC. 3820
 EMAIL: info@cdsgroup.com.au

notes: **DO NOT SCALE DRAWING. IF IN DOUBT:- ASK!!**
 ALL SHEETS OF THIS DRAWING ARE TO BE READ IN CONJUNCTION WITH EACH OTHER.

© COPYRIGHT 2005

client: MONASH VIEWS Pty. Ltd.
 project: PROPOSED SUBDIVISION
 site address: THE LINK MONASH ROAD, NEWBOROUGH

issue:	PLANNING	scale:	NTS - Reduced
engineer:	CWB	drafter/person:	AJP.
drawing number:	3850	sheet number:	P2/6
		revision/date:	F 28-4-06

Figure 9 Survey Units

6 SURVEY RESULTS

During the survey no Aboriginal or historic archaeological sites were located or recorded.

6.1 Discussion – Aboriginal Cultural Heritage

The background information presented in this report indicated that the drainage lines and adjacent level areas within the study area are of moderate Aboriginal archaeological potential for low density stone artefact scatters. Although low ground surface visibility is considered to have constrained the effectiveness of this assessment, it is considered that some surface evidence would have been identified if a particularly large surface archaeological site was present within the study area. There is no potential for Aboriginal scarred trees within the study area as there are no trees that pre-date European settlement within the study area. It is considered highly likely that widely dispersed and low numbers of stone artefacts are likely to be currently obscured within the study area beneath pasture grass. There is no efficient means by which such low numbers of artefacts can be effectively identified during sub-surface testing. Subsequently isolated stone artefacts would be typically assessed as being of low scientific significance.

6.2 Historic Cultural Heritage – Discussion

The background information presented in this report did not provide any evidence for significant historic archaeological sites to be present within the study area. The study area has for most part been in the ownership of the Electricity Commission, which is unlikely to have constructed any historic features. No evidence was found during the survey and it is considered that any minor site, such as a rubbish dump or other structures have been adversely impacted by the previous ground disturbance works. No minor historic sites or areas of historic archaeological sensitivity were located during this investigation.

7 ARCHAEOLOGICALLY SENSITIVE AREAS

Areas of archaeological sensitivity are those designated as containing potential for archaeological sites. These are usually areas that have poor ground surface visibility so it is possible that surface and/or sub-surface deposits may exist but are currently obscured. Archaeologically sensitive areas are also those that may not have been previously surveyed, but within which, the results of a study indicate that sites might occur. Decisions regarding archaeological sensitivity/potential are based on historic information, geomorphology and geology, vegetation, post-contact disturbance and data from previous relevant research. The final aspect in assessing potential is based on the results on a ground surface inspection. Areas deemed archaeologically sensitive may be considered low, medium or highly sensitive.

Aboriginal Archaeological Sensitivity

Based on the Aboriginal archaeological, ethnographic and environmental background, and results of the site survey, the study area is considered to have limited Aboriginal archaeological potential. There is no section of the study area which is considered to have a concentration of cultural material. This is based on the impact of past land use as well as reflecting the pre-contact site distribution for the study area. The tributary of Sandy Creek

within the study area is not considered to have provided fresh water on a reliable basis and vegetation in the upper section of the drainage line does not change to riparian but rather remains dry woodland. Sandy Creek however, is likely to have been a reliable seasonal water source as well as provided a greater variety of resources associated with riparian habitat. The banks of Sandy Creek are to be preserved within an open space/reserve and will not be directly impacted by development of the study area. The banks of Sandy creek are the most probable landform for the presence of cultural material.

Very low density surface scatters of stone artefacts are the only predicted site type for the study area. Due to past disturbance, no other site type is considered likely or possible for the study area. Previously disturbed low density artefact scatters are common throughout the region and Victoria in general and in most cases have limited scientific value. It is predicted that sites known and yet to be found within the study area will have any 'particular cultural significance' in accordance to the 1984 Commonwealth Act.

Historic Archaeological Sensitivity

No historic archaeological sites were located or recorded during this investigation, and no area has been identified as containing historic archaeological potential.

It is always possible that historic features and artefacts, such as buried rubbish dumps may exist within the study area. The potential for this is considered as very low and is limited to the drainage line (tributary of Sandy Creek).

Areas of archaeological sensitivity are summarised in table 5 below:

Table 4 Summary of Areas of Archaeological Potential/Sensitivity

Cultural Heritage Type	Location	Potential
<u>Aboriginal Cultural Material</u> Low density surface scatters of stone tools	Throughout the study area	Low - Moderate
<u>Historic Cultural Material</u> Historic artefact scatters	Within drainage line	Very Low

8 ASSESSMENT OF SCIENTIFIC AND CULTURAL SIGNIFICANCE

8.1 Scientific Significance

As no archaeological sites were located during this investigation, nor were there any previously recorded sites, no detail of scientific significance assessment is presented in this report.

8.2 Cultural Significance – Aboriginal Sites

Both prehistoric and historic Aboriginal sites and places will generally have specific significance to the Aboriginal community possess custodianship, and more broadly to Australian Aboriginal people.

It is important also to note that archaeological (scientific) and Aboriginal (cultural) significance are not necessarily the same assessment. It is up the relevant community to decide the Aboriginal cultural significance of any site or place within the area of custodianship. A non-Aboriginal person cannot decide on Aboriginal cultural significance. Although Aboriginal views are sought at the time archaeological sites are identified, they are not necessarily the same as those provided in an archaeological assessment. In general, all Aboriginal archaeological material is considered by Aboriginal people to be of high cultural significance. A copy of this report has been provided to the CGAHC for review, and a request made for a formal statement regarding Aboriginal cultural significance of the area. At the time of report finalisation, no formal response had been provided to the consultant.

9 STATUTORY REQUIREMENTS

9.1 Aboriginal Sites

The following is a summary of the Victorian Cultural Heritage Legislation.

Victoria has both State and Commonwealth legislation providing protection for Aboriginal cultural heritage. With the exception of human remains interred after the year 1843, the *State Archaeological and Aboriginal Relics Preservation Act 1972* provides blanket protection for all material relating to the past Aboriginal occupation of Australia, both before and after European occupation. This includes individual artefacts, scatters of stone tools, rock art sites, ancient camp sites, human burials, trees with slabs of bark removed (for the manufacture of canoes, shelters etc.) and ruins and archaeological deposits associated with Aboriginal missions or reserves. The Act also establishes administrative procedures for archaeological investigations and the mandatory reporting of the discovery of Aboriginal sites. Aboriginal Affairs Victoria (AAV) administers the *Archaeological and Aboriginal Relics Preservation Relics Act 1972*.

In 1987, Part 11A of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* was introduced by the Commonwealth Government to provide protection for Aboriginal cultural property in Victoria. Immediately after enactment, the Commonwealth delegated the powers and responsibilities set out in Part 11A to the Victorian Minister Responsible for Aboriginal Affairs. Currently, the Hon. Gavin Jennings MP holds this delegation, and the legislation is administered on a day-to-day basis by AAV.

Whereas the State Act provides legal protection for all the physical evidence of past Aboriginal occupation, the Commonwealth Act deals with Aboriginal cultural property in a wider sense. Such cultural property includes places, objects and folklore that **‘are of particular significance to Aboriginals in accordance with Aboriginal tradition’**. Again, there is no cut-off date and the Act may apply to contemporary Aboriginal cultural property as well as ancient sites. The Commonwealth Act takes precedence over State cultural heritage legislation where there is conflict. In most cases, Aboriginal archaeological sites registered under the State Act will also be Aboriginal places subject to the provisions of the Commonwealth Act. Local Aboriginal communities provide information regarding whether sites are of particular significance or not.

The Commonwealth Act prohibits anyone from defacing, damaging, interfering with or endangering an Aboriginal place unless the prior consent of the local Aboriginal community has been obtained in writing. If no reply from an Aboriginal community is received to any permit application within 30 days, then an application for a permit may be made to the State Minister Responsible for Aboriginal Affairs. This is provided for under Section 21U (5-6) of the 1987 Act. The Schedule to the Act lists local Aboriginal communities and each community’s area is defined in the Regulations so that the whole of Victoria is covered. Any applications to disturb, destroy, interfere with or endanger an Aboriginal place, object or archaeological site should be made to:

The Liquidator

Central Gippsland Aboriginal Health and Housing Co-operative Limited

PO Box 250

MORWELL

Victoria 3850

Ph: (03) 5136 5100

Fax: (03) 5133 8069

Applications to excavate or disturb an Aboriginal archaeological site for purposes of archaeological fieldwork should be addressed in writing to:

The Site Registrar

Heritage Services Branch

Aboriginal Affairs Victoria

Level 9

1 Spring Street

MELBOURNE

Victoria 3000

Ph: (03) 9208 3333

GPO 2393V

MELBOURNE

Victoria 3001

In addition, all Victorian planning schemes require, under Clause 15.11 Heritage, (*Planning and Environment Act 1987*) planning and responsible authorities to identify, conserve and

protect places of Aboriginal cultural heritage significance, including historical and archaeological sites and to take into account the requirements of the Victorian *Archaeological and Aboriginal Relics Preservation Act 1972*, the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* and the views of local Aboriginal communities in providing for the conservation and enhancement of places, sites and objects of Aboriginal cultural heritage value.

9.2 Historical Archaeological Sites

Non-Aboriginal archaeological sites in Victoria are protected by the *Heritage Act 1995*. The following is a summary of the latest statutory obligations regarding non-Aboriginal historic archaeological sites:

1. All historical archaeological sites in Victoria (not included on the Heritage Register) are protected under Section 127 of the *Heritage Act 1995*. Under this section it is an offence to excavate, damage or disturb relics and sites whether they are included on the Heritage Inventory or not, unless a consent has been issued under Section 129.
2. Under Section 64 of the *Heritage Act 1995* it is an offence to damage, disturb, excavate or alter a place or object on the Heritage Register, unless a permit is granted under Section 67.
3. Under Section 132 of the *Heritage Act 1995* any person discovering or uncovering an archaeological relic is required to report the discovery to the Executive Director of the Heritage Council.
4. Schedule 5 of the Heritage (General) Regulations 1996 prescribes fees to undertake specified activities with respect to archaeological relics. These are currently \$225.00 for Consent to uncover or excavate a relic and \$420.00 for consent to damage or disturb less than 50% of a relic, and \$635.00 to damage more than 50% of a relic or site. Fees for permits to carry out works etc to a registered place or object are detailed in Schedule 3 of the Regulations. These fees range in scale from \$100.00 to \$7,160.00, depending on the nature of the works involved and the cost of the proposed works.

In addition, Heritage Victoria requires that funds be made available by developers to ensure the responsible management of all significant artefacts that are recovered during an excavation. As a condition on any consent or permit, there will be a requirement that a specified sum of money is submitted to Heritage Victoria prior to the commencement of works. The funds will be used to ensure the cataloguing and conservation of any significant artefacts that are recovered. Any unexpended funds will be returned to the client, minus a 15% levy that is used for the management of all excavation projects in Victoria.

Written application to disturb such sites should be lodged as early as possible in the planning stages of any works program, and must be directed to:

Mr Ray Tonkin
The Director
Heritage Victoria

**Department of Sustainability and Environment
Level 7/8 Nicholson Street
EAST MELBOURNE
Victoria 3002**

Ph: (03) 9637 9476

Enquires relating to the *Heritage Act*, works, site management etc should be directed to:

**Jeremy Smith
Senior Archaeologist
Heritage Victoria
Department of Sustainability and Environment
Level 7/8 Nicholson Street
MELBOURNE
Victoria 3002**

Ph: (03) 9637 9773

General enquires relating to sites, the Heritage Inventory/Register, reports, permits or consents, including application procedures and fees should be directed to:

**Liz Kilpatrick
Heritage Victoria
Department of Sustainability and Environment
Level 7/8 Nicholson Street
MELBOURNE
Victoria 3002**

Ph: (03) 9637 9285

Heritage Victoria has also recently requested that the following statements relating to sites listed on the Heritage Inventory be included within consultant's reports.

All archaeological sites in Victoria are protected by the *Heritage Act 1995*. All known archaeological sites are listed in the Heritage Inventory. Regardless of whether they are listed in the Inventory no one can knowingly excavate or disturb an archaeological site without the consent of the Executive Director.

Prior to the *Heritage Act* sites were protected under the *Archaeological and Aboriginal Relics Preservation Act 1972*. Thus since 1972 there has been protection in Victoria for archaeological sites. The protection was not about the preservation and conservation of all sites. Under the AARP there was provision for archaeological areas to be declared an archaeological area that was intended to protect and conserve an archaeological site (S15). Activities for the remainder of archaeological sites were controlled through the requirement to gain a permit (S22).

With the advent of the *Heritage Act* archaeological sites continued to be protected in two ways. Sites, which were considered to be of significance to the State, were recommended to be placed on the Victorian Heritage Register (VHR). The VHR exists to protect and conserve

places and objects. All other archaeological sites are protected through the requirement to gain consent from the Executive Director to disturb, destroy, or excavate an archaeological site.

Thus the Victorian Heritage Register enables Heritage Victoria to preserve and conserve archaeological sites which are of significance to the State of Victoria while the Heritage Inventory enables Heritage Victoria to record and monitor sites which are not considered to be of State significance or where the significance is unknown. Heritage Victoria also registers sites under a 'D' listing, which accommodates sites of very low archaeological value though they may have local historic value. 'D' listed sites are typically those that have little structural or artefactual features such as earthen formations (i.e. dams, railway formations). Sites registered under this system do not require Consent prior to any proposed development, but apart from this are managed in the same way as Heritage Inventory sites. 'D' sites therefore, may be subject to a variety of conditions prior to impact, such as detailed recorded, additional historic research and archaeological monitoring.

The two levels of protection enable two different principles in issuing consents and permits to be followed. The guiding principal for places on the Register is to protect and conserve as much of the fabric of the place and the relics/artefacts as is possible. While for places listed in the Heritage Inventory recording, excavating and monitoring are the usual methods of assessing and managing the heritage values of a site.

Consultation with Heritage Victoria, Department of Sustainability and Environment, should occur at least 4 months prior to lodgement of a permit application to disturb or destroy a historic archaeological site. In the event of a site or relic being uncovered or discovered during works, any works that would damage the relic object or place should cease and either the consulting archaeologist or Heritage Victoria be notified.

10 RECOMMENDATIONS

10.1 Cultural Heritage Management Issues

Appropriate cultural heritage management seeks to avoid any adverse impact to cultural heritage sites, especially those that are considered to be of particular significance to an Aboriginal community or has high scientific values. An adverse impact is any activity that reduces the scientific or cultural significance of a site or archaeological area. Any activity that exposes or disturbs in any way the fabric or content of an *in situ* site reduces its heritage value. Similarly, sites can be impacted if their context is reduced to a point where there are no other related reference features in the local landscape to provide context and therefore broader interpretation of a site. This is referred to as the level of cultural landscape integrity.

An archaeological site that is defined and protected under the 1984 Act relates to places or objects of 'particular' significance to the relevant Aboriginal community (Part 1. 3). It is up to the nominated community to determine the cultural significance of any sites. Previously disturbed low density stone artefacts are generally not considered of specific or particular scientific (excluding rare artefacts types such as axes, wooden implements). Within community areas administered by the Minister for Aboriginal Affairs Victoria, the Minister may determine that the Consent process is not required for such archaeological finds.

Best cultural heritage practice seeks to avoid any impact to cultural heritage sites and places by appropriate input into development design. As this is not always possible, a mitigation strategy must be developed by a consultant, in conjunction with all relevant stakeholders, to mitigate/reduce adverse impact to cultural heritage sites. Typical mitigation measures may include partial excavation to further assess a site in terms of its content, extent and significance. If a site demonstrates higher significance levels (cultural or scientific) a complete salvage excavation may be required prior to any development. Some sites such as scarred trees; monuments etc can be relocated to an appropriate location. In other instances monitoring of initial ground disturbance activities (such as clear, grade, level) may be an adequate mitigation measure. Monitoring is appropriate when the risk to a significant site has been eliminated, though collection, identification, recording and assessment of any exposed isolated artefacts are warranted. Monitoring is a means by which a local Aboriginal community representative has the opportunity to collect a sample of any cultural material that is exposed as a result of the development.

Aboriginal Cultural Heritage:

The results of this investigation have concluded that previously disturbed low-density scatter of stone artefacts are likely to be present within the study area but are currently obscured by thick pasture grasses. As the potential archaeological deposits within the study area are highly unlikely to contain any significant spatial or temporal integrity, there is no further requirement for additional scientific assessment of the study area. Such finds are ubiquitous over the entire landscape and are considered as natural archaeological background.

The only area that may contain a density of artefacts, around a natural spring, has been fenced and re-vegetated. This area is to be excluded from the development. The other area that may contain artefacts, along the banks of Sandy Creek is also to be preserved as open space and is excluded from future development.

The Central Gippsland Aboriginal Health and Housing Co-operative Limited and Gippsland Cultural Heritage Unit have both requested that monitoring by a community representative is undertaken during preliminary earth disturbance works (clear, grade, trench). In this instance, given the low risk to archaeological sites of high scientific significance, monitoring is considered an appropriate management strategy, provided this is managed by a heritage consultant. A community representative should collect any artefacts exposed during initial development works and these should be recorded by a heritage consultant. As the development includes extensive open space along Sandy Creek and its tributary, it would be appropriate that any artefacts recovered are relocated to these areas once development works are complete. This would preserve artefacts in their roughly original context, and in an area that will not be impacted by future development. If this artefact management strategy is adopted, then it would be also appropriate that a heritage consultant record the co-ordinates of the relocation point and update AAV Site Registry records.

At this stage, prior to the development occurring within the study area, Consent to Disturb is not required from the Central Gippsland Aboriginal Health and Housing Co-operative Limited. Any artefacts exposed and recorded during monitoring may require a Consent. Monitoring is a method of artefact management and is not a requirement under relevant Acts.

Historic Cultural Heritage:

There are no historic archaeological or heritage sites located within the present study area. The study area is not considered to contain any potential for significant buried historic deposits. Prior to development of the study area, no further historic investigation or research is required and no Consent or Permits are required from Heritage Victoria or Latrobe City Council.

Overall, the development of the study area is considered to have low impact on local Aboriginal archaeological and heritage values, and no impact to local historic archaeological and heritage values.

10.2 Specific Recommendations

Based on the results of background research, survey, and community consultation the following recommendations are made:

Aboriginal Cultural Heritage:

1. There are no recorded Aboriginal sites or places within the study area, and therefore no Consent to Disturb is currently required from the Central Gippsland Aboriginal Health and Housing Co-operative Limited.
2. Due to the landforms present and post settlement disturbance to the study area, no section is considered to have potential for significant Aboriginal archaeological sites. Therefore, prior to development no further investigation of the study area is required.
3. Both the Gippsland Aboriginal Health and Housing Co-operative Limited and Gippsland Cultural Heritage Unit have requested that the initial ground disturbance works (clear, grade, cut, trench) associated with the development should be monitored by an Aboriginal community representative. Whilst there is no legislative requirement to fund monitoring, community monitoring, supervised by a heritage consultant is considered an appropriate risk management for any stone artefacts that may be exposed during the course of initial ground disturbance.

If monitoring is adopted, it should be limited to disturbance of topsoil, and any artefacts exposed should be recorded by a heritage consultant and returned to the community representative for relocation into the areas of open space.

Historic Cultural Heritage:

4. No further historic or archaeological investigation is required prior to residential development of the study area. No Consent or Permit is required from Heritage Victoria, or any Planning approval from Latrobe City Council.
5. In accordance with survey requirements (see Appendix 1); the consultant will ensure copies of this report are forwarded to the Heritage Services Branch, Aboriginal Affairs Victoria, Heritage Victoria, Department of Sustainability and Environment, Gippsland Cultural Heritage Unit, and Gippsland Aboriginal Health and Housing Co-operative Limited.
6. In the unlikely event that any suspected human remains are exposed at any stage of the development, then all works must cease in the immediate area of the find and the procedure outlines in Appendix 3 adopted.

REFERENCES

- Aboriginal Affairs Victoria 2002 'Guidelines for Conducting and Reporting Upon Archaeological Surveys In Victoria'.
- Amorosi, L. & T. Debney 2001 Supplement to Maryvale Coalfield Environmental Effects Statement: Comparative desktop study of Cultural Heritage Impacts of Maryvale Coal Field development Project and Yallourn Coal Field Development Project. Report for Roche Thiess Linfox Joint Venture.
- Australia ICOMOS 1999 *The Australian ICOMOS Charter for the Conservation of Places of Cultural Significance. (The Burra Charter)*. Sydney, Australia ICOMOS.
- Australian Heritage Group 1998 'Thematic Environmental History of South Gippsland Shire'. Report to the South Gippsland Shire.
- Billis R.V. & A.S. Kenyon 1972 *Pastoral Pioneers of Port Phillip*. Stockland Press Pty Ltd, Melbourne.
- Bowdler, J.M. 1976 Recent developments in reconstructing late Quaternary Environments in Australia. In R.L. Kirk and A.G. Thorn (eds.) *The Origin of Australians*, Human Biology Series No. 6. Australian Institute of Aboriginal Studies, Canberra. pp. 55-77.
- Brown, S. & L. Sciusco 1995 A Survey for Aboriginal Archaeological Sites Old Sale Road, Moe. Draft Report to Office of Building, Department of Planning and Development.
- Charles, R. & J. Loney 1989 *Not Enough Grass to Feed a Single Bullock. A History of Tarwin Lower, Venus Bay and Waratah, Manifold Heights*. Rod Charles.
- Coutts, P.J.F. 1977 Salvage Operations. *Records of the Victoria Archaeological Survey No. 4 (Aboriginal Affairs)*.
- 1980 *Records of the VAS No. 10*.
- Cox, K. 1973 *Angus McMillan – Pathfinder*. Melbourne.
- Debney, T. & Everett, C. 1998 An archaeological investigation of the Maryvale coalfield, Morwell, Victoria. Draft report to Yallourn Energy Pty Ltd.
- Djekic, A. 1998 *LaTrobe Valley Coalfields 1981 Archaeological Study Update*. Aboriginal Affairs Victoria.

du Cros, H.	1990	'South Gippsland Highway Swing Bridge Project: An Archaeological Survey'. Report to Vic Roads, November 1990.
Edwards, R.	1972	<i>Aboriginal bark Canoes of the Murray Valley</i> . Rigby, Adelaide.
Fison, L. & A.W. Howitt	1880	Kailaroi and Kurnai. <i>Anthropological Publications</i> , Oosterhont, N.B., The Netherlands.
Flood, J.	1973	'The Moth Hunters'. Unpublished Ph.D. Thesis, Australian National University, Canberra.
	1980	<i>The Moth Hunters, Aboriginal Prehistory of the Alps</i> . Australian Institute of Aboriginal Studies, Canberra.
Gardner, P.D.	1993	<i>Gippsland Massacres: The Destruction of the Kurnai Tribe, 1800-1860</i> . Ngarak Press.
Hall, R.	1988	'An Archaeological Survey of the Gippsland Lakes'. Draft Report to Heritage Services Branch, Aboriginal Affairs Victoria.
Hall, R. & K. Lomax	1990	'Delray Beach (VAS 8321/0149) Salvage Excavation'. Report to Latrobe Valley Water & Sewerage Authority.
Hotchin, K.	1988	'Dutson Downs Sewerage Farm Pipeline Routes, Supplementary Report'. Report to the Latrobe Valley Water and Sewerage Board.
	1989	'Environmental evolution and culture change in the Gippsland Lakes region, Victoria, Australia', PhD Thesis, Australian National University.
Hotchin, K. & P.J. May	1984	'An archaeological survey of Jack Smith Lake, south-East Gippsland'. Report to the Australian Heritage Commission, Ministry for Planning and Environment.
Horsfield, J.	1989	Latrobe Region Heritage Sites. Prepared for the Latrobe Regional Strategy Plan.
Howitt, A.W.	1904	<i>The Native Tribes of South East Australia</i> . London.
Jenkin, J.J.	1968	'The Geomorphology and Upper Cainozoic Geology of South-East Gippsland, Victoria'. <i>Geological Survey of Victoria, Memoir 27</i> .
Land Conservation Council of Victoria	1980	<i>South Gippsland District 1</i> . Land Conservation Council, Melbourne.

- 1982 *Gippsland Lakes Hinterland Area*. Conservation Government Printers, Melbourne.
- Legg, S.M. 1992 *Heart of the Valley. A History of the Morwell Municipality*. City of Morwell, Victoria.
- Lomax, K. 1992 'An Archaeological Survey of the Gippsland Lakes (Stage 2)'. Victoria Archaeological Survey.
- Long, A., I. Rogers, P. Schell & J. Cusack 1999 'Loy Yang power Property Archaeological and heritage Management Plan, Stage 1'. Report to Loy Yang Power Management Pty Ltd.
- Mackeness, G. 1941 George Augustus Robinson's Journal in south east Australia, 1844 with George Henry Haydon's narrative of part of the same journey. *Australian Historical Monographs* 111.
- McBryde, I. 1985 Backed blade industries from the Graman rock shelters, New South Wales: some evidence of function. In V.N. Misra and P. Bellwood (ed.) *Recent Advances In Indo-Pacific Prehistory*. Proceedings of the International Symposium held at Poona, December 1978. Oxford and IBH Publishing Company, New Delhi.
- Morgan, P. 1997 *The Settling of Gippsland: A Regional History*. Gippsland Municipalities Association, Traralgon.
- Mulvaney, J. 1970 The Green Gully Burial: An Introduction. *Memoirs of the National Museum of Victoria*. 30: 1-2.
- 1975 *The Prehistory of Australia*. Penguin, Australia.
- Organ, A., & A.J. Hill Ecology 2006 'Flora and Fauna assessment, and Net Gain investigations, of the proposed Yallourn Golf Course re-development, Newborough, Victoria'. Report for Monash Views Pty Ltd.
- Peterson, N. 1976 *Tribes and Boundaries in Australia*. In Peterson (ed.) A.I.A.S., Canberra: 50-71.
- Pickering, M. 1979 'An Archaeological Survey Report, Mitchell River Dam Project'. A Report to State Rivers and Water Supply Commission of Victoria.
- Porter, H. 1977 *Bairnsdale: A portrait of an Australian Country Town*. John Ferguson, Sydney.
- Priestley, S. 1965 *Echuca: A Centenary History*. The Jacaranda Press Pty Ltd, Queensland in association with the Borough Council of Echuca.

Rhodes, D.	1996	'The History of Ramahyuck Aboriginal Mission and a Report on the Survey of Ramahyuck Mission Cemetery'. <i>Occasional Report</i> No. 47. Aboriginal Affairs Victoria.
Smyth, R.B.	1878	<i>The Aborigines of Victoria: with notes relating to the habits of the natives of other parts of Australia and Tasmania</i> . John Ferres, Government Printer, Melbourne.
Synan, P.	1994	<i>Gippsland's Lucky City: A History of Sale</i> . City of Sale.
Thompson, K.	1985	'A history of the Aboriginal people of east Gippsland', Unpublished report, Land Conservation Council, Victoria.
Vines, G.	2001	Yallourn Coalfield Development Project (Alternative Morwell River Diversion and East Field Extension) Archaeological Survey, Morwell, Victoria. Report for RTL.
Walsh, F.J.	1987	The influence of the spatial and temporal distribution of plant food resources on traditional Martujarra subsistence strategies. <i>Australian Archaeology</i> 25:88-101.
Wells, J.	1986	<i>Gippsland: People, a Place and Their Past</i> . Landmark Press, Drouin.
Wesson, J. & W. Beck	1981	'Archaeology section in Kinhill Pty. Ltd., Proposed Driffield project environment effects statement'. Report to State Electricity Commission of Victoria.
Wesson, S.	2000	An historical Atlas of the Aborigines of East Victoria and Far South East New South Wales. <i>Monash Publications in Geography and Environmental Science</i> No. 53.
Witter, D.	1984	Providing a regional context for management archaeology. In S. Bowdler and S. Sullivan (eds) <i>Site Surveys and significance assessment in Australian Archaeology</i> . Australian National University, Canberra pp. 48-54.
Witter, D., S. Simmons & P. Irish	1976	'Loy Yang – Bass Pipeline Archaeological Survey'. Report to Ministry for Conservation, Melbourne.
Wood, V.	1998a	An Archaeological Survey of the Proposed Telstra Optical Fibre Cable between Driffield – Yinnar, Gippsland, Victoria. A report to Telstra Australia.
	1998b	An Archaeological Survey of the proposed Telstra Optical Fibre Cable between Tanjil South – Parkers Corner, Gippsland, Victoria.

Web Addresses

Crosslinks www.crosslinks.com.au/vicgolf/yallournGC/yallourngc.html (accessed 6th Nov. 2006)

APPENDIX 1 – SURVEY NOTIFICATIONS



Level 7
8 Nicholson Street
East Melbourne 3002

Telephone (03) 9637 9475
Facsimile [03] 9637 9503

www.heritage.vic.gov.au

Ref: PL-HE/01/0008 8

27 November, 2006

Tardis Enterprises Pty Ltd
9 Berglund Road
BEACONSFIELD UPPER
VIC 3808

Dear Andrea,

RE: PROPOSED SURVEY

**2831 RESIDENTIAL DEVELOPMENT, MONASH ROAD,
NEWBOROUGH**

Thank you for forwarding your completed Notification of Survey Form, advising of your intent to conduct a survey for historical archaeological sites in the above area.

Should your survey reveal previously unrecorded sites I will be able to provide you with the appropriate Heritage Inventory numbers on receipt of completed Archaeology Site Record Forms.

Please quote project number **2831** in all following correspondence that relates to this survey. The final report will be lodged as number **2831**. Please note that you are required to provide this office with two copies (one bound and one unbound) of any resulting report.

Should you have any queries or require any further assistance please call Jeremy Smith, Senior Archaeologist, on (03) 9637 9773.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Ray Tonkin", written over a light blue rectangular background.

**RAY TONKIN
EXECUTIVE DIRECTOR**



Department for Victorian Communities

8 August 2006

Tardis Enterprises P/L
9 Berglund Rd.
BEACONSFIELD UPPER VIC 3808

1 Spring Street
Melbourne Victoria 3000
GPO 2392V
Melbourne Victoria 3001
Telephone: (03) 9208 3333
Facsimile: (03) 9208 3680
www.dvc.vic.gov.au

IH/04/0001
Project: 3626

Dear Sir/Madam

PROPOSED SITE SURVEY: PROPOSED RESIDENTIAL DEVELOPMENT, MONASH ROAD NEWBOROUGH

Thank you for providing Aboriginal Affairs Victoria (AAV) with notice of your intended survey.

Please note that, under the terms of section 22(5)(b) of the *Archaeological and Aboriginal Relics Preservation Act 1972* and associated regulations, you are required to provide this office with:

- completed AAV record forms for any sites found during the survey; and
- two copies of any resultant project report (one of which may be provided in electronic format).

Please ensure that the project number shown at the top of this letter is quoted in any correspondence with AAV relating to this survey. The project number should also be added to any record forms resulting from the survey (in the "Reference in literature or report" space provided).

Blank record forms, and copies of the document *Guidelines for Conducting and Reporting upon Archaeological Surveys in Victoria*, are available on request.

Under the terms of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*, specified local Aboriginal organisations hold responsibility for cultural heritage matters within their particular community boundaries. It is recommended that you contact the relevant organisation as soon as possible, to discuss your intended survey.

Further, if your survey includes Crown land (other than Crown land where native title has been extinguished), you are advised to consult with any parties who hold native title interests in the area. Advice on identifying and contacting groups with native title interests can be obtained from the National Native Title Tribunal (phone: 1800 640 501).

Information on Aboriginal community interests relating to your project area may also be obtained by contacting the Co-ordinator / Director / Manager for the relevant Regional Aboriginal Cultural Heritage Program (RACHP). The AAV web site at <http://www.dvc.vic.gov.au/aav.htm> includes maps and contact lists relating to local Aboriginal communities and the RACHP.

Please contact me on (ph) 03 9208 3275 if any further information is required.

Yours sincerely

BINDI THOMAS
Heritage Information Officer





Project Name Proposed development, Monsah Road, Newborough

Author/Consultant A. Murphy

Survey Id. 3626 Survey Date 15-Aug-06

Ground Surface Visibility (%) 10 Study Area Survey Coverage(%) 100

Survey Spacing (m) 5 Transect Width (m) _____ Number in Crew 3

Survey Method	Survey Design	Sample	Survey Type
<input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Vehicle <input type="checkbox"/> Mechanical <input type="checkbox"/> Auger	<input type="checkbox"/> Test Pit <input type="checkbox"/> Monitoring <input type="checkbox"/> Controlled Excavation	<input checked="" type="checkbox"/> Opportunistic <input type="checkbox"/> Random <input checked="" type="checkbox"/> Systematic <input type="checkbox"/> Stratified <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Area <input type="checkbox"/> Transect <input type="checkbox"/> Locality <input type="checkbox"/> Haphazard <input type="checkbox"/> Other
			<input checked="" type="checkbox"/> Surface <input type="checkbox"/> Sub-surface <input type="checkbox"/> Other

Disturbance

- Logged
- Levelled
- Trenched
- Ploughed
- Grazed
- Heavy Machinery
- Track
- Road Reserve
- Fire Break
- Burned
- Deflated
- Burrowing
- Gully Erosion
- Sheet Erosion
- Alluvial Erosion
- Wave Action
- Alluvial Deposition
- Wind Deposition
- General Erosion
- General Aggradation
- Other

Landform

- Dune
- Lunette
- Plain
- Floodplain
- Hill (gentle/moderate)
- Mountain/Steep hill
- Other

Vegetation

- Closed forest
- Open forest
- Open woodland
- Mallee
- Scrub
- Heath
- Wetland/Swamp
- Grassland
- Barren/Unvegetated
- Other

Comments _____

~~CGAHHC wish to monitor initial ground disturbance. No further archaeological investigations required.~~

APPENDIX 2 – GLOSSARY

TYPES OF ABORIGINAL ARCHAEOLOGICAL SITES

Artefact Scatter: A surface scatter of stone artefacts is defined as being the occurrence of five (5) or more items of cultural material within an area of about 100 square metres (AAV 1993: 1j). Artefact scatters are often the only physical remains of places where Aborigines have camped, prepared and eaten meals and worked stone material.

Burials: Burial sites may occur in association with campsites, in mounds or shell middens or in specific burial grounds that lack any other cultural material. Softer ground was chosen for burials, and any sandy area can be expected to contain burials. Burial sites can contain one or a number of individuals. Burial sites and cemeteries are a common archaeological site type in the sand country adjoining the Murray River, though are a rare feature in the southern part of Victoria.

Ceremonial Site: An area used as a meeting place where large groups gathered for feasts, ceremonies or settlement of disputes, but they are difficult or impossible to identify from material evidence. In some instances they are mentioned in historical sources, or may be known to Aboriginal people through oral tradition. These sites will be highly significant to Aboriginal communities.

Contact Site: These are sites relating to the period of first contact between Aboriginal and European people. These sites may be associated with conflict between Aborigines and settlers, mission stations or reserves, or historic camping places. The artefact assemblage of contact sites will often include artefacts manufactured from glass.

Grinding Grooves: These sites generally occur on sandstone outcrops and to a lesser extent granite outcrops and result from the sharpening of ground stone hatchets/axe heads. Grinding grooves are often located on prominent hilltops.

Hearth: Usually a sub-surface feature found eroding out of a river or creek bank or in a sand dune - it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

In Situ: Refers to cultural material that is discovered as being undisturbed and considered to be in its original context. That is, material which, when identified is considered to be in the same location when the site was abandoned.

Isolated Artefact Occurrence: An isolated artefact is defined as being the occurrence of four (4) or less items of cultural material within an area of about 100 metres (AAV 1993: 1). It/they can be evidence of an ephemeral (or one off) activity location, the results of an artefact being lost or discarded during travel or evidence of an artefact scatter which is otherwise obscured by poor ground surface visibility.

Midden Sites: 'Midden' is a term borrowed from the Danish. It originally applied to the accumulations of shell and other food remains left by Mesolithic man in that country. Australian Midden sites are an accumulation of hearth and food debris, which has built up a deposit on the ground surface over a length of time. Middens are generally comprised of charcoal and either freshwater or coastal shell species, depending on the site's location. Midden sites may also contain stone artefacts, and the food refuse of other native animals such as small mammals. Their thick deposit of burnt shells and dark grey/black deposit can distinguish midden sites within the landscape. Coastal shell middens are often found in close association with rock

platforms. Freshwater shell middens are found in close proximity to areas that provided freshwater mussels.

Mound Sites: Mound sites are accumulation of hearth (fire place) debris, which has over time built a thick deposit on the ground's surface. Mounds are generally comprised of charcoal; burnt clay balls and burnt food refuse such as native animal bones. Mound sites may also contain stone artefacts. On rare occasions mound sites may also contain human burial remains. Mound sites can be distinguished in the landscape by their characteristic dark grey/black deposit and height above surrounding land. Mounds that have been utilised over long periods can obtain dimensions of over 100 metres in length and 1 metre in height. Mound sites are generally situated close to major streams, and large water bodies. In times of flood, mound sites are often become marooned, and provide dry land points from which surrounding resources could have been exploited.

Rock Shelter/Cave: These are sites that are located within a rock shelter/overhang or caves. The archaeological deposits within such sites can vary considerably but are often predominantly lithic. Depending on their location, the archaeological deposit may also include midden deposits of shellfish, fish or terrestrial fauna. Due to the often undisturbed deposits at these sites, they are potentially very valuable sites and are generally considered of high scientific significance. Instances where rock shelter sites also possess art work on the stone walls are considered as rock shelter/art site combined.

Rock Wells: Rock Wells are natural cavities in rock outcrops that hold water. They are characterised by relatively narrow openings that limit evaporation. These water sources were commonly known to Aboriginal people and were kept clean and maintained by them. Since they are natural features, they are difficult to identify as Aboriginal sites. The most reliable indicator is the existence of a strong local oral tradition of Aboriginal use.

Scarred Tree: Scars on trees may be the result of removal of strips of bark by Aborigines for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds for climbers after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to naturally made by branches falling off, etc. is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some re-growth has occurred around the edges of the scar, and no holes or knots present in the heartwood.

Stone Arrangements: These sites are specifically patterned rocks located on the ground's surface. It is often difficult to identify these sites within the field and even more difficult to define their function unless Aboriginal oral tradition exists.

ABORIGINAL ARTEFACT TYPES

Artefact: Any product made by human hands or caused to be made through human actions.

Anvil: A portable flat stone, usually a river pebble, which has been used as a base for working stone. Anvils that have been used frequently have a small circular depression in the centre where cores were held while being struck. An anvil is often a multifunctional tool used also as a grindstone and hammer stone.

Axe: A stone artefact that has been ground on one or more sides to produce a sharp edge.

Backed Blade (Geometric Microlith): A blade flake has been abruptly retouched along one or more margins opposite an acute (sharp) edge. Backed pieces include backed blades and

geometric microliths. Flakes that have been backed along one lateral margin and that come to a point at their distal end; they have a length of less than 80mm and are asymmetrical around the longitudinal axis. They are thought to have been hafted onto wooden handles to produce composite cutting tools or spears. Backed blades are a feature of the "Australian Small Tool Tradition", dating from between 5,000 and 1,000 years ago in southern Australia (Mulvaney 1975).

Blade: A long parallel sided flake from a specially prepared core. Blade flakes are twice as long as they are wide.

Bipolar: A core or a flake, which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms tend to indicate that the flake has come off a heavily worked core.

Broad Platform: This a term used to describe the shape of the platform on a flake. A broad platform is wider than the body of a flake. Broad platform flakes are produced when flakes are struck off back from the edge of the platform on a core.

Bulb of Percussion: This is the conchoidal protuberance (percussion rings) formed under the point of impact when a flake is struck off the core.

Burin : A truncated flake (truncated either by snapping or retouch) whose resulting flat end is used as a platform from which to strike a single flake from one of its corners, forming a triangular scar that runs down the margin of the original flake. This forms a chisel-like working edge.

Core: An artefact from which flakes have been detached using a hammer stone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake.

Core types:

Unidirectional cores - These cores have scars originating from a single platform, and all the flakes struck from the core have been struck in the same direction from that platform.

Bidirectional cores - These cores have two platforms, one opposite the other; flakes have been struck from each of the platforms, and thus from opposite directions.

Bifacial cores - These kinds of core have a single platform, but the flakes struck from it have been detached from two core faces.

Multidirectional cores - These cores have two or more platforms and there is no clear pattern, either in the orientation of the platforms or in the orientation of the scars resulting from the striking of flakes from those platforms.

Bipolar Core - Nodules or cobbles that are flaked using an anvil. The resulting artefacts exhibit crushing on both their proximal and distal margins and often their lateral margins, where they have been rotated.

Cortex: Original or natural (non-flaked) surface of a stone.

Complete Flake: An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core, platform, termination and bulb of percussion).

Flaked Piece/Waste Flake/Debitage: A piece of stone with definite flake surfaces that cannot be classified as a flake or core. These artefact types are generally refuse materials discarded during the working of stone material.

Broken Flake: Defined by the part of the flake remaining, i.e. proximal (where the platform is present), medial (where neither the platform nor termination is present), or distal (where the termination is present).

Focal Platform: This is a term used to describe the shape of the platform on a flake. A focal platform is narrower than the body of the flake. Focal platform flakes are produced when flakes are struck off near the edge of the platform on a core.

Geometric microlith: Artefacts less than 80mm in maximum dimension which are backed at one or other end, sometimes at both ends, and sometimes on one lateral margin as well, the result being a form that is symmetrical around its transverse axis.

Hammerstone: A cobble or cobble fragment exhibiting pitting and abrasion as a result of percussion.

Implement: A general term for tools, weapons, etc. made by people.

Lithic: Anything made of stone.

Microlith: Small (1-3 cm long) stone tools with evidence of retouch. Includes 'Bondi Points' segment, scrapers, backed blades, triangle and trapezoid.

Mortar: The lower stone associated with grinding plants for food and medicine and/or ochre for painting. These stones are usually large and flat, and when well used show deep grooves from repeated grinding.

Notched tool: Flakes that exhibit a small area of retouch, forming a concave edge, on their lateral or distal margins.

Pestle: The "upper stone", used to grind plants for food and medicine and/or ochre for painting. A pestle stone often doubles as a hammer stone and/or anvil

Piercer: Artefacts with projections that have been created by retouch and extend up to 15mm beyond the body of the flake.

Primary Flake: The first flakes struck off a core in order to create a platform from which other flakes can then be struck.

Secondary Flaking/Retouch: Secondary working of a stone artefact after its manufacture. This was often done to resharpen stone tools after use, or in the production of formal tool types such as blade flakes and scrapers.

Scraper: A tool used for scraping. A flake with one or more margins of continuous retouch.

Thumbnail Scraper: A small flake with a convex scraper edge, shaped like a thumbnail and located opposite the flake's platform.

OTHER TERMS

Archaeological Site: A place/location of either Aboriginal or non-Aboriginal origin. Aboriginal archaeological sites have been formed prior to the European settlement of Australia, and may be in any of the forms outlined in section 1.

Post-Contact Aboriginal Site: Also referred to as Historic Aboriginal Site. These are sites/places/localities that indicate contact has been made with European culture during the period of initial European settlement (glass in tool assemblage, massacre sites), or where activities culturally significant to Aboriginal people have occurred (camping, employment, travelling routes).

B.P.: Before present. The 'Present' is defined as 1950.

Cultural Heritage: Something that is inherited or passed down because it is appreciated and cherished. Categories of cultural heritage include; built structures and their surrounds, gardens, trees; cultural landscapes; sites; areas; precincts; cemeteries; ruins and archaeological sites; shipwrecks; sites of important events; commemorative sites; contents of buildings and significant relics, objects, artefacts and collections of objects.

Cultural Landscape Integrity: The level of which the local landscape reflects the environment in which pre-contact Aboriginal people or early European settlers lived. The integrity includes all relevant aspects such as level and type of vegetation cover, hydrology, landforms and structures. A site located in a landscape of high cultural integrity has greater heritage value as it remains in context, and is therefore able to impart a greater level of information to the broader community.

Ethnography: The scientific description of living cultures.

Historic Archaeological Site: These are places where non-Aboriginal activities have occurred, and which little extant (standing) features remain. The bulk of evidence for historic occupation/utilisation is comprised of remains (artefacts/foundations etc) that are located on the ground's surface or in a sub-surface context. The primary heritage value of an archaeological site is scientific.

Historic Site: Sites/Areas that contain extant (standing) remains of pre-1950 non-Aboriginal occupation. Historic sites may or may not also contain archaeological remains (Aboriginal and/or historic).

Holocene, Recent or Postglacial Period: The time from the end of the Pleistocene Ice Age (c. 10,300 BP) to the present day.

Horizon: A term used to describe a layer of archaeological material that is *in situ*.

Heritage Place/Site: An area or region of land that represents a particular focus of past human activity or that represents a concentration of *in situ* cultural material. A place includes any structures, buildings or works upon or integral with the land, and any artefacts or other physical relic associated with the land, or it may have no visible evidence of human activity, being rather the site of a past event of importance or the embodiment of a particular belief or legend. Examples might range from an Aboriginal ceremonial ground, a pioneer's house and contents, a shop, the remains of an early whaling station or a recent fish farm, Captain Cook's landing place, a 40,000 year old Aboriginal campsite or a 1990s brick-veneer house, a shipwreck, an industrial or mining landscape, a bus stop, a Macassan trepanger campsite or the Surfer's Paradise Caravan Park, a garbage dump, the local war memorial, a garden, an Aboriginal rock painting or a band rotunda.

Potential: Based on collated existing data and site inspection an area or specific site may contain the potential for extant or archaeological deposits. Background research will present the most likely site types, contents and state of preservation. Relative levels of potential are

described as Low (10-30% probability), Moderate (40-60% probability) and High (70% and above probability).

Obtrusiveness: refers to how conspicuous a site is within a particular landscape, and thus the possibility of positive identification within a field environment. Some site types are more conspicuous than others are. Thus a surface stone artefact scatter is generally not obtrusive, especially in areas of low ground surface visibility, while a scarred tree is (Bird 1992).

Ordovician: The geological time period dating from 439-510 million years ago.

Pleistocene: The geological period corresponding with the last or Great Ice Age. The onset of the Pleistocene is marked by an increasingly cold climate, by the appearance of Calambrian mollusca and Villafranchian fauna with elephant, ox, and horse species, and by changes in foraminifera. The oldest form of man had evolved by the Early Pleistocene, and in archaeological terms the cultures classed as Paleolithic all fall within this period. The date for the start of the Pleistocene is not well established, and estimates vary from 3.5 to 1.3 million years ago. The period ends with the final but gradual retreat of the ice sheets, which reached their present conditions around 10,300 BP.

Silurian: A geological time period from 408 to 439 million years ago.

Stratigraphy: Layering

Visibility: Refers to the degree to which the surface of the ground can be observed. This may be influenced by natural processes such as wind erosion or the character of the native vegetation, and by land use practices, such as ploughing or grading. It is generally expressed in terms of the percentage of the ground's surface visible for an observer on foot (Bird 1992). For example 10% visibility equates to 10cm² per 1 m² of ground surface that is not covered by vegetation or soil deposit. The following applies to descriptions of ground surface visibility within this report.

0% =	No visible ground surface
0 – 10% =	Very Poor
10 – 30% =	Poor
30-50% =	Fair
50 – 70% =	Good
70 –90% =	Very Good
90 – 100% =	Excellent

Raw Material: Organic or inorganic matter that has not been processed by people.

Slope Wash: A term used to describe a specific process of re-deposition of cultural material. Cultural material (most often stone artefacts) that is situated on any sloping land is vulnerable to the affects of slope wash. The term relates to the downward movement of cultural material primarily due to erosion of their original context. This downward movement is most often caused by clearing of vegetation that exposes the ground surface to the affects of water erosion. The result is that cultural material will move down the slope over a period of time. How far material may move is dependent on the gradient and the intensity of the erosion.

Use Wear: Tiny flakes or chips that have been broken of the edges of a stone artefact during use.

MARITIME

Barque: Vessel with aftermost mast fore-and-aft rigged and remaining (usually two) masts square-rigged.

Brig: (abbreviation of Brigantine) Two masted square-rigged vessels, with additional lower fore-and-aft sail on gaff and boom to mainmast.

Cutter: Boat belonging to ship of war, fitted for rowing and sailing, small one masted vessel rigged like a sloop, but with running bowsprit.

Ketch: Two masted fore-and-aft rigged sailing boat with mizzen-mast, stepped forward of rudder.

Steamer Screw: Vessel propelled by steam - screw, revolving shaft with twisted blades projecting from ship, and propelling it by acting on screw principle.

REFERENCES

Aboriginal Affairs Victoria 1997. 'Guidelines for Conducting and Reporting upon Archaeological Surveys in Victoria'. (AAV, Melbourne).

Bird, C.F.M. 1992. 'Archaeology of the Goulburn River Basin. A Background Study'. Heritage Services Branch, Aboriginal Affairs Victoria.

Clark D. & J.P. Wesson. 1980 'Alcoa Portland Aluminium Smelter'. Working Paper No 2.

Mulvaney, D. J. 1975. "*The Prehistory of Australia*", Harmondsworth, Penguin.

Concise Oxford Dictionary of Current English. 1976. Oxford University Press, Oxford.

Pearson, M. & S. Sullivan 1995. '*Looking After Heritage Places – The basics of heritage planning for managers, landowners and administrators*'. Melbourne University Press.

Victorian Heritage Strategy, 2000. Heritage Victoria, Department of Infrastructure.

Holdaway, S. & N. Stern 2004. *A Record in Stone: The Study of Australia's Flaked Stone Artefacts*. Museum Victoria and Aboriginal Studies Press, Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra.

APPENDIX 3 – ADVICE ON THE DISCOVERY OF HUMAN REMAINS

ADVICE ABOUT THE DISCOVERY OF HUMAN REMAINS

Treatment of Any Suspected Aboriginal Remains Discovered in the Course of Development Work:

1. Legal Requirements

The *Coroner's Act 1985* requires anyone who discovers the remains of a "person whose identity is unknown" to report to the discovery directly to the State Coroner's Office or to Victoria Police. A person who fails to report the discovery of such remains is liable to a \$10,000 fine. The *Coroner's Act 1985* does not differentiate between treatment of Aboriginal and non-Aboriginal remains. The majority of burials found during development work are therefore likely to be subject to this reporting requirement.

In addition, Part 11A of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* requires anyone who discovers suspected Aboriginal remains in Victoria to report the discovery to the responsible Minister. The Director, Aboriginal Affairs Victoria, holds delegated authority to receive and investigate such reports.

It should be noted that the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is subordinate to the *Coroner's Act 1985* regarding the discovery of human remains. In the first instance, therefore, the location at which the remains are found should be treated as a possible crime scene and the developer and/or contractor should not make any assumptions about the age or ethnicity of the burial.

Victoria Police Standing Orders require that an archaeologist from Heritage Services Branch, Aboriginal Affairs Victoria, should be in attendance when suspected Aboriginal remains have been reported (Police Headquarters and the State Coroner's Office hold after hours contact numbers for Heritage Services Branch staff). In cases where it is believed that the remains are Aboriginal, the Police will now usually invite representatives of the local Aboriginal community to be present when remains are being assessed. This is because Aboriginal people usually have particular concerns about the treatment of Aboriginal burials and associated materials.

2. Aboriginal Affairs Victoria - Suggested Procedure to be Followed if Suspected Human Remains are Discovered

- If suspected human remains are discovered during development, work in the area must cease and the Police or State Coroner's Office must be informed of the discovery without delay. **The State Coroner's Office can be contacted at any time on ph. (03) 9684 4444.**
- If there are reasonable grounds to suspect that the remains are Aboriginal, the discovery should also be reported to Aboriginal Affairs Victoria on ph. (03) 9616 7777. Aboriginal Affairs Victoria will ensure that the local Aboriginal community is informed about the circumstances of the discovery.
- Do not touch or otherwise interfere with the remains, other than to safeguard them from further disturbance.
- Do not contact the media.

APPENDIX 4 – ADVICE ON CONSENT TO DISTURB

CONSENTS TO DISTURB

Section 21U *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

This note describes the process for dealing with 'consent to disturb' applications under section 21U of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* ("the Act"). This is one of the most commonly used sections of the Act. For example, land developers frequently negotiate such consents in relation to projects that will have an impact on Aboriginal cultural heritage places, sites or objects.

Since 1987, Part IIA of the Act has provided the main legislative basis for protection of Aboriginal cultural property in Victoria, including places and objects of heritage significance. Administration of Part IIA is delegated to the Victorian Minister for Aboriginal Affairs.

Part IIA also gives significant decision-making responsibilities to Aboriginal organisations or 'local Aboriginal communities' that are listed in a Schedule to the Act.

Most of these local Aboriginal communities exercise decision-making responsibilities within a defined community area, the boundaries of which are specified in the regulations to the Act. Together, these defined community areas cover the whole of Victoria, with no two areas overlapping.

Under section 21U of the Act, a local Aboriginal community can grant or refuse consent to 'deface, damage, otherwise interfere with or do any act likely to endanger' an Aboriginal place or object within its community area. Consents may be issued subject to terms and conditions. Examples of such conditions have included requirements for monitoring during disturbance, salvage excavation or payment of an administration fee.

If a local Aboriginal community does not grant or refuse consent within 30

days, or if the project affects an area for which there is no functioning local Aboriginal community, the applicant may apply to the Minister for Aboriginal Affairs for consent.

This procedure for dealing with section 21U applications is outlined on the reverse of this note.

Compliance with the Commonwealth Native Title Act 1993

It is understood that the granting of 'consent to disturb' in relation to an Aboriginal place or object on Crown land where native title has not been extinguished may be a 'future act'.

A 'future act' describes an action that may affect the legal rights of registered native title claimants. Such actions can include the granting of consent to undertake development or ground disturbing activity on Crown land. Depending on the nature of the action, native title claimants have the right to be notified and consulted, and in some situations (such as the renewal of a mining licence), have the right to negotiate.

The granting of 'consent to disturb' in relation to an Aboriginal place or object on Crown land is understood to fall under the 'future act' provisions of section 24MB of the *Native Title Act 1993*. This section requires that registered native title claimants must be given the same rights as would be available to a private landowner, if the area involved was freehold.

Section 21U of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* does not require notification of, or negotiation with, freehold landowners before 'consent to disturb' is granted. Consequently, it is understood that there is no legal obligation for a local Aboriginal community to consult with registered native title claimants before deciding

whether to grant a consent that will involve disturbance of Aboriginal places or objects on Crown land.

However, Aboriginal Affairs Victoria encourages consultation between Aboriginal organisations and individuals known to have interests in the cultural heritage of any particular project area. Local Aboriginal communities considering 'consent to disturb' applications relating to Crown land are therefore encouraged to notify and consult with any relevant native title holders or registered claimants before deciding whether to grant or refuse consent.

In situations where the Minister for Aboriginal Affairs is asked to grant a 'consent to disturb', the Minister is required to seek and consider recommendations from any relevant person or body. Consequently, the Minister would seek advice from any native title holders or registered claimants in the case of an application affecting Crown land.

For More Information Contact
The Heritage Policy Unit
Aboriginal Affairs Victoria
PO Box 515
East Melbourne VIC 3002



Website: www.dvc.vic.gov.au/aav.htm

© The State of Victoria, May 2003
This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Person wishes to carry out activity likely to damage, interfere with, or endanger an Aboriginal place/object in community area - 21U (1) or (3).

Application to relevant local Aboriginal community.

CONSENT GRANTED WITH OR WITHOUT CONDITIONS

Local Aboriginal community determines outcome of application - 21U (4).
OR
Local Aboriginal community does not grant or refuse consent within 30 days.

CONSENT REFUSED

Applicant may continue to seek consent from local Aboriginal community.

Applicant may continue to seek consent from local Aboriginal community.

PROCESS USUALLY ENDS HERE

Applicant applies to Minister for Aboriginal Affairs — 21U (5).

Minister seeks and considers recommendations from any person or body that in the Minister's opinion should consider the matter — 21U (6).

CONSENT GRANTED WITH OR WITHOUT CONDITIONS

Minister determines outcome of application — 21U (5).

CONSENT REFUSED

APPENDIX 5 – CONSERVATION PRINCIPLES OF THE BURRA CHARTER

The Burra Charter
The Australia ICOMOS charter
for the conservation of places
of cultural significance

1.4	<i>Conservation</i> means all the processes of looking after a <i>place</i> so as to retain its <i>cultural significance</i> .	
Conservation Principles		
Article 2	Conservation and management	
2.1	<i>Places of cultural significance</i> should be conserved.	
2.2	The aim of <i>conservation</i> is to retain the <i>cultural significance</i> of a <i>place</i> .	
2.3	<i>Conservation</i> is an integral part of good management of <i>places of cultural significance</i> .	
2.4	<i>Places of cultural significance</i> should be safeguarded and not put at risk or left in a vulnerable state.	
Article 3	Cautious approach	
3.1	<i>Conservation</i> is based on a respect for the existing <i>fabric, use, associations</i> and <i>meanings</i> . It requires a cautious approach of changing as much as necessary but as little as possible.	The traces of additions, alterations and earlier treatments to the fabric of a place are evidence of its history and uses which may be part of its significance. Conservation action should assist and not impede their understanding.
3.2	Changes to a <i>place</i> should not distort the physical or other evidence it provides, nor be based on conjecture.	
Article 4	Knowledge, skills and techniques	
4.1	<i>Conservation</i> should make use of all the knowledge, skills and disciplines which can contribute to the study and care of the <i>place</i> .	
4.2	Traditional techniques and materials are preferred for the <i>conservation</i> of significant <i>fabric</i> . In some circumstances modern techniques and materials which offer substantial conservation benefits may be appropriate.	The use of modern materials and techniques must be supported by firm scientific evidence or by a body of experience.
Article 5	Values	
5.1	<i>Conservation</i> of a <i>place</i> should identify and take into consideration all aspects of cultural and natural significance without unwarranted emphasis on any one value at the expense of others.	Conservation of places with natural significance is explained in the Australian Natural Heritage Charter. This Charter defines natural significance to mean the importance of ecosystems, biological diversity and geodiversity for their existence value, or for present or future generations in terms of their scientific, social, aesthetic and life-support value.
5.2	Relative degrees of <i>cultural significance</i> may lead to different <i>conservation</i> actions at a place.	A cautious approach is needed, as understanding of cultural significance may change. This article should not be used to

		justify actions which do not retain cultural significance.
Article 6	Burra Charter Process	
6.1	The <i>cultural significance</i> of a <i>place</i> and other issues affecting its future are best understood by a sequence of collecting and analysing information before making decisions. Understanding cultural significance comes first, then development of policy and finally management of the place in accordance with the policy.	The Burra Charter process, or sequence of investigations, decisions and actions, is illustrated in the accompanying flowchart.
6.2	The policy for managing a <i>place</i> must be based on an understanding of its <i>cultural significance</i> .	
6.3	Policy development should also include consideration of other factors affecting the future of a <i>place</i> such as the owner's needs, resources, external constraints and its physical condition.	
Article 7	Use	
7.1	Where the <i>use</i> of a <i>place</i> is of <i>cultural significance</i> it should be retained.	
7.2	A <i>place</i> should have a <i>compatible use</i> .	The policy should identify a use or combination of uses or constraints on uses that retain the cultural significance of the place. New use of a place should involve minimal change, to significant fabric and use; should respect associations and meanings; and where appropriate should provide for continuation of practices which contribute to the cultural significance of the place.
Article 8	Setting	
	<i>Conservation</i> requires the retention of an appropriate visual <i>setting</i> and other relationships that contribute to the <i>cultural significance</i> of the <i>place</i> . New construction, demolition, intrusions or other changes which would adversely affect the setting or relationships are not appropriate.	Aspects of the visual setting may include use, siting, bulk, form, scale, character, colour, texture and materials. Other relationships, such as historical connections, may contribute to interpretation, appreciation, enjoyment or experience of the place.
Article 9	Location	
9.1	The physical location of a <i>place</i> is part of its <i>cultural significance</i> . A building, work or other component of a place should remain in its historical location. Relocation is generally unacceptable unless this is the sole practical means of ensuring its survival.	
9.2	Some buildings, works or other components of <i>places</i> were designed to be readily removable or already have a history of relocation. Provided such buildings, works or other components do not have	

	significant links with their present location, removal may be appropriate.	
9.3	If any building, work or other component is moved, it should be moved to an appropriate location and given an appropriate <i>use</i> . Such action should not be to the detriment of any <i>place</i> of <i>cultural significance</i> .	
Article 10	Contents	
	Contents, fixtures and objects which contribute to the <i>cultural significance</i> of a <i>place</i> should be retained at that place. Their removal is unacceptable unless it is: the sole means of ensuring their security and <i>preservation</i> ; on a temporary basis for treatment or exhibition; for cultural reasons; for health and safety; or to protect the place. Such contents, fixtures and objects should be returned where circumstances permit and it is culturally appropriate.	
Article 11	Related places and objects	
	The contribution which <i>related places</i> and <i>related objects</i> make to the <i>cultural significance</i> of the <i>place</i> should be retained.	
Article 12	Participation	
	<i>Conservation, interpretation</i> and management of a <i>place</i> should provide for the participation of people for whom the place has special <i>associations</i> and <i>meanings</i> , or who have social, spiritual or other cultural responsibilities for the place.	
Article 13	Co-existence of cultural values	
	Co-existence of cultural values should be recognised, respected and encouraged, especially in cases where they conflict.	For some places, conflicting cultural values may affect policy development and management decisions. In this article, the term cultural values refers to those beliefs which are important to a cultural group, including but not limited to political, religious, spiritual and moral beliefs. This is broader than values associated with cultural significance.

Nick Anderson
NBA Group Pty Ltd
93 Macalister Street,
Sale
VIC 3850

4 April 2011

Dear Nick,

**PROPOSED DEVELOPMENT, MONASH VIEWS, NEWBOROUGH
REQUIREMENTS OF ABORIGINAL HERITAGE ACT 2006**

As requested, I have prepared a desktop report which reviews the implications of the *Aboriginal Heritage Act 2006* ('the Act') in relation to your client's proposed residential development and golf course extension ('the activity') of land bounded by Monash Road, Coach Road, an existing golf course and agricultural land, Newborough (part of C.A. 9P1 and 9P2, Parish of Narracan) ('the activity area').

We understand that you represent Monash Views Pty Ltd who have acquired the land with the intention of residential development and the extension of the adjoining golf course. The purpose of this study is to review the mandatory requirements of the Act, and to determine their implications for the proposed future development of the land.

Previous Aboriginal Cultural Assessment

The activity area has been subject to an archaeological survey report entitled 'proposed Development, Monash Views, Newborough' by Andrea Murphy (Tardis Enterprises Pty Ltd) dated March 2007.

Victorian Aboriginal Heritage Register (VAHR)

There are no Aboriginal heritage sites listed on VAHR in relation to the activity area.

Aboriginal Heritage Act 2006

All Aboriginal sites in Victoria are protected by the State *Aboriginal Heritage Act 2006*, and the responsibility rests with the proponent of a development to demonstrate that due care and diligence have been taken to identify and avoid impacts to archaeological sites through construction works.

A key component of this Act are Cultural Heritage Management Plans (CHMPs), which are required under certain circumstances for high impact activities that require statutory approval (see Appendix 1). Where a CHMP is not required, a Cultural Heritage Permit (CHP) may be issued for activities 'that will, or are likely to, cause harm to Aboriginal cultural heritage' (S36).

PO Box 2471 Fitzroy BC
Victoria 3065 Australia

T (03) 8415 0699
F (03) 8415 1299
www.alassoc.com.au

Andrew Long + Associates Pty Ltd
ACN 131 713 409
ABN 86 131 713 409

It is my professional opinion that the Regulations do not require a mandatory CHMP in this instance.

The following reviews the wording of the Aboriginal Heritage Regulations 2007 to explain the reasoning behind this opinion.

When is a cultural heritage management plan required?

A CHMP is required for an activity if (Regulation 6)-

- a) all or part of the activity area for the activity is an area of cultural heritage sensitivity; and
- b) all or part of the activity is a high impact activity.

Is the activity area an area of cultural heritage sensitivity?

The activity area is not classified as an area of cultural heritage sensitivity according to the wording of the Regulations, and the 1:100,000 mapsheet '*Aboriginal Heritage Act 2006 – Areas of Aboriginal Cultural Heritage Sensitivity 8121 – Moe*'.

Is the activity a high impact activity?

The following regulations define activities undertaken in the course of residential development:

Regulation 45. Dwellings

- (1) The construction of three or more dwellings on a lot or allotment is a high impact activity.
- (2) The carrying out of works for three or more dwellings on a lot or allotment is a high impact activity.

Regulation 46. Subdivision of land

- (1) The subdivision of land into three or more lots is a high impact activity if-
 - a) the planning scheme that applies to the activity area in which the land to be subdivided is located provides that at least three of the lots may be used for a dwelling or may be used for a dwelling subject to the grant of a permit; and
 - b) the area of each of at least three of the lots is less than eight hectares.

In addition, in the Victorian Planning provisions (VPP) a golf course is defined as a 'Minor Sports and Recreation facility':

Regulation 43. Buildings and works for specified uses

- (1) The construction of a building or the construction or carrying out of works on land is a high impact activity if the construction of the building or the construction or carrying out of the works-

- a) would result in significant ground disturbance; and
- b) is for or associated with the use of the land for any one or more of the following purposes-
 - (xv) a minor sports and recreation facility;

The construction of a golf course would result in significant ground disturbance, as defined in Regulation 4.

The proposed activity is thus a high impact activity, as defined in Division 5 of the Regulations.

Do any Exemptions or other Arrangements as outlined in the Aboriginal heritage Regulations 2007 apply?

No exemptions apply, however the Part 6 - Transitional arrangements are relevant in this instance, as a report on an archaeological survey for the proposed activity (Murphy 2007) was completed and provided to the Secretary, DPCD prior to the commencement of the Act on 28th May 2007, in accordance with Regulation 77:

Regulation 77. Archaeological surveys

A cultural heritage management plan is not required under regulation 6 for an activity, if before the commencement day, an archaeological survey had been carried out for the activity under the *Archaeological and Aboriginal Relics Preservation Act 1972* and-

- a) a completed record for each individual site-
 - (i) in or to the effect of Form E, F, G or H in the Schedule (whichever is relevant) of the *Archaeological and Aboriginal Relics Preservation Regulations 1992*; or
 - (ii) in the form of Schedule 3 of the *Archaeological and Aboriginal Relics Preservation Regulations 2003*; and
- b) two copies of a final report of the survey-

had been provided to the Secretary in accordance with section 22(5)(b) of the *Archaeological and Aboriginal Relics Preservation Act 1972*.

My review of the Murphy (2007) report indicates that the terms of this Regulation have been met, and as such a CHMP is not required.

Will a cultural heritage management plan be required for the activity?

It is my expert opinion that a CHMP, as defined in the *Aboriginal Heritage Act* 2006, need not be lodged as part of an application for planning approval for the proposed development. Furthermore, it is also my professional view the progress of such an application cannot be suspended in accordance with Section 52 of the Act.

This opinion is based on the understanding that:

1. the activity area is not an area of cultural heritage sensitivity, and
2. The transitional arrangements for the commencement of the *Aboriginal Heritage Act* 2006 have been met.

It should be noted that this opinion does not imply that Aboriginal cultural places are not present within the activity area, or are not at risk of impact from the proposed activity. It is simply stated that that the Aboriginal Heritage Regulations 2007 do not require a mandatory CHMP in this instance.

Any further measures to ensure compliance with the blanket protection provisions of the *Aboriginal Heritage Act* 2006 (Sections 27-29) are at the discretion of the proponent of any future development of the land. The minimum reporting requirements may be met by implementing with the attached procedure during any ground disturbing works, which is compliant with the provisions of the Act.

Andrew Long (BA Hons.; M. Litt. Archaeology) is a qualified Aboriginal heritage practitioner of high standing in Victoria with 25 years professional experience, and recognised as a cultural heritage advisor under the *Aboriginal Heritage Act* 2006.

Aboriginal Affairs Victoria (AAV) generally do not provide written support for such determinations, however are confident in accepting the judgement of recognised cultural heritage advisors. For further information, please speak to Liz Kilpatrick (Co-ordinator, Heritage Assessments, AAV) on 03 9208 3268.

If you have any queries about these matters, please don't hesitate to call me on 0410 650 923.

Yours sincerely,



Andrew Long
Director,
Andrew Long & Associates Pty Ltd

SUGGESTED PROCEDURE

IN THE EVENT

AN ABORIGINAL HERITAGE SITE

IS IDENTIFIED

DURING CONSTRUCTION

A. Management of Aboriginal Cultural Heritage Found During Works

If Aboriginal places or objects found during works the following steps must be applied:

- The person who identified the find will immediately notify the person in charge of the activity.
- The person in charge of the activity must then suspend any relevant works at the location of the discovery and within 5 m of the relevant site extent and isolate the find via the installation of safety webbing, or other suitable barrier and the material to remain *in situ*.
- Works may continue outside of the 5 m barrier.
- The person in charge of works must notify the Cultural Heritage Advisor (CHA) and the Secretary (AAV) of the find within 24 hours of the discovery.
- The CHA must notify the RAP(s) or other agreed Aboriginal stakeholder(s) within 24 hours of the discovery and invite RAP(s) or other agreed Aboriginal stakeholder(s) to inspect the find.
- Within 24 hours of notification, a CHA is to attend the site and evaluate the find to determine if it is part of an already known site or should be registered as a new site and to update and/or complete site records as appropriate and advise on possible management strategies.
- Enable RAP(s) or other agreed Aboriginal stakeholder(s) to inspect site within 24 hours of notification and remove/rebury any cultural heritage material found.
- Within a period not exceeding three (3) working days the Sponsor, in consultation with the CHA, RAP or other agreed Aboriginal stakeholder, shall, if necessary, apply for a Cultural Heritage Permit (CHP) in accordance with Section 36 of the *Aboriginal Heritage Act 2006*.
- If a CHP application is lodged, works may only recommence within the area of exclusion following the issue of a CHP and compliance with any conditions.
 - When the appropriate protective measures have been taken;
 - Where the relevant Aboriginal cultural heritage records have been updated and/or completed;

In the case of the discovery of human remains, separate procedures relating to the discovery of human skeletal remains must be adhered to (see below).

B. Custody and Management of Aboriginal Cultural Heritage Recovered

- Any Aboriginal cultural heritage recovered or salvaged from the activity area remains the property of the RAP(s) or other agreed Aboriginal stakeholder(s). Any such recovery or salvage will be agreed to and overseen by a RAP(s) or other agreed Aboriginal stakeholder representative(s). In any such instance it will be the responsibility of the Cultural Heritage Advisor to:
 - Catalogue the Aboriginal cultural heritage;
 - Label and package the Aboriginal cultural heritage with reference to provenance; and
 - With the RAP(s) or other agreed Aboriginal stakeholder(s), arrange storage of the Aboriginal cultural heritage in a secure location together with copies of the catalogue and assessment documentation.

C. The Management of the Discovery of Human Remains

Although this evaluation has determined that there is only a low risk of impacting an Aboriginal burial during the implementation of the activity, given the nature of the landforms and archaeological deposits within the activity area, it is nevertheless an extremely important consideration of any development.

The following steps must be taken if any suspected human remains are found in the activity area:

1. Discovery:

- If suspected human remains are discovered, all activity in the vicinity must *cease immediately* to ensure minimal damage is caused to the remains; and,
- The remains must be left in place, and *protected* from harm or damage.

2. Notification:

- Once suspected human skeletal remains have been found, the Coroners Office and the Victoria Police must be notified immediately;
- If there is reasonable grounds to believe that the remains could be Aboriginal, the DSE Emergency Co-ordination Centre must be immediately notified on 1300 888 544; and
- All details of the location and nature of the human remains must be provided to the relevant authorities.
- 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, Department of Victorian Communities in accordance with s.17 of the *Aboriginal Heritage Act 2006*.

3. Impact Mitigation or Salvage:

- 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 s.18(2)(b) of the Act.
- An appropriate impact mitigation or salvage strategy as determined by the Secretary must be implemented (this will depend on the circumstances in which the remains were found, the number of burials found and the type of burials and the outcome of consultation with any Aboriginal person or body).
- While opportunities to avoid impacting on a burial that may be discovered during the activity may be limited, it is important to explore opportunities to minimise disturbance to the remains through unnecessary exposure or disinterment.

4. Curation and further analysis:

- The treatment of salvaged Aboriginal human remains must be in accordance with the direction of the Secretary.

5. Reburial:

- Any reburial site(s) must be fully documented by an experienced and qualified archaeologist, clearly marked and all details provided to AAV;
- Appropriate management measures must be implemented to ensure that the remains are not disturbed in the future.

14 Appendix 11 – Flora, Fauna & Net Gain Assessment

Biosis Research Pty Ltd - August 2012

**Flora, fauna and net gain
assessment of the Yallourn Golf
Course re-development,
Newborough**

August 2012

Biosis Research Pty. Ltd.

Report to Monash View Pty Ltd

Prepared by:

Matthew Dell

Rohan Simkin

Thea Shell

of the Melbourne office.

Document Information:

Version/date	Internal review by	Date sent to client
Draft version 01	M Gibson	25/07/12
Final version 01	-	23/08/12

Biosis Research offices:

Victoria

Ballarat:

506 Macarthur Street, Ballarat VIC 3350
Ph: (03) 5331 7000 Fax: (03) 5331 7033
email: ballarat@biosisresearch.com.au

Melbourne: (Head Office)

38 Bertie Street, Port Melbourne VIC 3207
Ph: (03) 9646 9499 Fax: (03) 9646 9242
email: melbourne@biosisresearch.com.au

Wangaratta:

26a Reid Street (PO Box 943)
Wangaratta VIC 3677
Ph: (03) 5721 9453 Fax: (03) 5721 9454
email: wangaratta@biosisresearch.com.au

New South Wales & Australian Capital Territory

Canberra:

Unit 16 / 2 Yallourn Street
Fyshwick ACT 2609
Ph: (02) 6228 1599 Fax: (02) 6280 8752
email: canberra@biosisresearch.com.au

Sydney:

18-20 Mandible Street, Alexandria NSW 2015
Ph: (02) 9690 2777 Fax: (02) 9690 2577
email: sydney@biosisresearch.com.au

Wollongong:

8 Tate Street, Wollongong NSW 2500
Ph: (02) 4229 5222 Fax: (02) 4229 5500
email: wollongong@biosisresearch.com.au

Queensland

Brisbane:

Suite 4 First Floor, 72 Wickham Street
Fortitude Valley QLD 4006
email: brisbane@biosisresearch.com.au

Project no. 14964

File name: 14964 Monash Views FF Fin01 230812.docx

Citation: Biosis Research (2012). Flora, fauna and net gain assessment of the Yallourn Golf Course re-development. Report for Monash View Pty Ltd. Authors Dell M. & Shell T. Biosis Research Pty. Ltd., Melbourne.

ACKNOWLEDGEMENTS

Biosis Research acknowledges the contribution of the following people and organisations in undertaking this study:

- Peter Brown
- Debbie Shaw (DSE) for discussion regarding relevant native vegetation issues.
- DSE for access to the Victorian Biodiversity Atlas
- Craig Cleeland for advice on Southern Toadlet

The following Biosis Research staff were involved in this project:

- Martin Lee for database searches
- Matt Gibson for report review

© Biosis Research Pty. Ltd.

This document is and shall remain the property of Biosis Research Pty. Ltd. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of the Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Disclaimer:

Biosis Research Pty. Ltd. has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

CONTENTS

CONTENTS	I
SUMMARY	IV
1. INTRODUCTION	1
1.1 Project background	1
1.2 Scope of assessment	1
1.3 Location of the study area	2
Figure 1 Location of the study area, Victoria	3
2. METHODS	4
2.1 Literature and database review	4
2.2 Definitions of significance	4
2.2.1 Species and ecological communities	4
2.2.2 Biosites	5
2.3 Likelihood of occurrence	5
2.4 Site investigation	5
2.4.1 Flora assessment.....	5
2.4.2 Fauna assessment.....	6
2.4.3 Permits	6
2.5 Qualifications	6
2.6 Legislation and policy	7
2.7 Mapping	7
3. RESULTS	8
3.1 Vegetation & fauna habitat.....	8
3.2 Site context.....	14
3.3 Significant species	14
3.3.1 EPBC Act & DSE Advisory listed species.....	14
3.3.2 Other species of note	15
3.4 Significant ecological communities.....	15
3.5 Further survey recommendations.....	15
Figure 2 Ecological Vegetation Classes and Large Old Trees, Yallourn Golf Course, Victoria.....	17
4. BIODIVERSITY LEGISLATION AND GOVERNMENT POLICY	18
4.1 Commonwealth	18
4.1.1 Environment Protection and Biodiversity Conservation Act 1999	18
4.2 State	19
4.2.1 Flora and Fauna Guarantee Act 1988	19
4.2.2 Catchment and Land Protection Act 1994	20
4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)	20
4.2.4 Native Vegetation Management Framework	21
4.2.5 Wildlife Act 1975 and associated Regulations.....	23
4.2.6 Water Act 1989	23
4.2.7 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003	24
4.2.8 Regional Catchment Strategy and River Health Strategy	24
5. VICTORIA’S NATIVE VEGETATION MANAGEMENT FRAMEWORK (NET GAIN) 25	
5.1 Quantifying native vegetation on site.....	25
5.1.1 Patches of native vegetation.....	26

5.1.2 Scattered Trees.....	32
Figure 3 Proposed vegetation removal according to conservation significance, Yallourn Golf Course, Victoria.....	33
5.2 Assessing loss of native vegetation.....	34
5.2.1 Patches of native vegetation.....	34
5.2.2 Scattered Trees.....	34
5.3 Gain targets.....	34
5.4 Offsets available.....	37
5.4.1 On site.....	37
Figure 4. Proposed native vegetation offsets, Yallourn Golf Course Victoria.....	38
5.5 Summary of overall net gain result.....	40
6. ECOLOGICAL CONSTRAINTS AND RECOMMENDATIONS.....	41
REFERENCES.....	44
APPENDICES.....	45
APPENDIX 1: SURVEY METHODS.....	46
A1.1 Flora Survey Methods.....	46
A1.2 Terrestrial Fauna Survey Methods.....	46
APPENDIX 2: FLORA.....	47
A2.1 Flora species recorded from the study area.....	47
A2.2 Significant flora species.....	48
APPENDIX 3: FAUNA.....	52
A3.1 Fauna species recorded from the study area.....	52
A3.2 Significant fauna species.....	54
A3.3 Migratory species (EPBC Act listed).....	73
APPENDIX 4: NET GAIN.....	74
A4.1 Tree Data.....	74
A4.2 Net Gain Offset Calculations.....	76
A5. Glossary.....	78

List of Figures

Figure 1	Location of the study area, Victoria.....	3
Figure 2	Ecological Vegetation Classes and Large Old Trees, Yallourn Golf Course, Victoria.....	17
Figure 3	Proposed vegetation removal according to conservation significance, Yallourn Golf Course, Victoria.....	33
Figure 4.	Proposed native vegetation offsets, Yallourn Golf Course Victoria.....	38

List of Tables

Table 1: Criteria for determining significance of species & ecological communities ..	4
Table 2: Summary of significant species most likely to occur in the study area.....	15
Table 3: Assessment of the project against the EPBC Act	18
Table 4: Quantification and significance of native vegetation patches.	28
Table 5: Determination of best/remaining habitat for rare or threatened species.	29
Table 6: Impacts to vegetation patches (Gippsland Plain Bioregion)	35
Table 7: Gain targets for clearing patches of native vegetation (Gippsland Bioregion)	36
Table 8: Summary of potential offsets.....	40
Table 9: Summary of potential implications of developing the study area and recommendations to minimise ecological impacts during the design phase.....	41
Table A2.2. Significant flora species recorded / predicted to occur within 5 km of the study area.	48
Table A3.1. Fauna recorded from the study area during the present assessment (Biosis Research 2012) and previous assessment (Ecology and Heritage Partners 2005).	52
Table A3.2. Significant Fauna Species	54
Table A3.3. Migratory fauna species recorded or predicted to occur within 10 km of the study area.	73
Table A4.1 Summary of Large Old Trees and possible losses. Trees numbers are shown on Figure 2.	74

List of Plates

Plate 1: Higher quality example of Lowland Forest within the study area.....	10
Plate 2: Lower quality example of Lowland Forest within the study area.....	10
Plate 3: Pasture dominated by exotic grasses occurs across the study site.....	12
Plate 4: Artificial wetland (farm dam) within study area. Dam has been impacted by stock and has little native vegetation and poor water quality.	13

SUMMARY

Biosis Research Pty. Ltd. was commissioned by Monash Views Pty. Ltd. to review a flora and fauna assessment of an area of land proposed for a residential development and further development of an existing golf course. The study area is located at Newborough, approximately 150 km south east of Melbourne.

This assessment is made in response to a Development Plan which is intended to guide the future development and management of the golf course, future residential development and a number of reserve areas in accordance with the plan supplied by the NBA Group and included in Appendix 6.

Ecological values

The study area for this site has been limited to those areas that were investigated for the redevelopment of the golf course and future development; the balance of the golf course has not been studied in detail. Key ecological values identified within the study area include:

- 5.91 ha of native vegetation (0.19 ha of very high and 3.29 ha of high conservation significance and 2.43 ha of medium conservation significance) proposed for removal.
- Three large old trees proposed for removal.
- A population of *Eucalyptus fulgens* Green Scentbark (Victorian rare).
- At least some suitable habitat for rare or threatened species Orange-tip Finger-orchid, Slender Pink-fingers, Mountain Bird-orchid, Green Scentbark, Grey Goshawk, Black Falcon, Powerful Owl, Swamp Skink and Dwarf Galaxias.
- Contribution to surrounding values, including connectivity of site to riparian and roadside vegetation.

Government legislation and policy

An assessment of the project against key biodiversity legislation and policy is provided and summarised below.

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
EPBC Act	Dwarf Galaxias (potential)	Requirement for referral to be determined.	As no aquatic surveys have been completed to date, a survey to determine if Dwarf Galaxias is present should be undertaken. This will assist to determine whether a referral to DSEWPaC is recommended.
FFG Act		Protected Flora Permit required for some species.	Applied to public land.
Planning & Environment Act (LaTrobe Planning Scheme)	All indigenous vegetation to be cleared.	Planning permit required, including permission to lop or remove native	A permit application would need to outline measures taken to address steps 1 and 2 of Net Gain policy (Victoria's Native Vegetation

Legislation / Policy	Relevant ecological feature on site	Permit / Approval required	Notes
		vegetation.	Management Framework). Comply with 3 step approach to Net Gain. Likely to require provision of Net Gain offsets.
CaLP Act	Some listed weed species are present on site.	N/A	Comply with requirements to control/eradicate
Water Act	Sandy Creek adjacent to site	Referral to CMA	Changes to hydrology within nearby waterways are likely following residential development.
SEPP			EPA requirements

Note: Guidance provided in this report does not constitute legal advice.

Native Vegetation Management Framework (the Framework)

Losses of native vegetation and offset requirements identified for the current Development Plan through the Net Gain calculation process are summarised below. Some of these losses include Very High conservation significance vegetation within the bioregion and approval for clearing is required from the Minister as per the requirements of the Native Vegetation Framework (LaTrobe Planning Scheme).

Native vegetation	Losses	Offsets available on site
Patches	2.39 habitat hectares	2.43 habitat hectares
Large Old Trees	Three Large Old trees	Protect 12 other Large Old Trees (for the loss of large trees in patches). This will also allow for associated recruitment of 60 new trees.

If clearing is approved, a total of 2.43 habitat hectares could be generated through management of vegetation on site. This meets all net gain offset requirements including protection of the required number of Large Old Trees.

The proponent is responsible for sourcing and legal protection of offset sites in perpetuity and funding management of those sites for the initial 10 years.

Recommendations

The primary measure for the development to minimise impacts to ecological values on the site is to minimise removal of native vegetation and habitat, avoid disruption to the habitat linkage to areas of native vegetation outside of the site. To retain these values they need to be considered in the design process and allowance made for future infrastructure and services outside any reserves or retained areas. Vegetation losses deemed unavoidable in the Development Plan are proposed to be offsets as required under the Framework (summarised above).

Targeted survey is recommended for Swamp Skink, Burrowing Cray (*Engaeus* spp.), Dwarf Galaxias and some orchid species which are known to occur in the local area, to resolve presence/absence of the species and distribution within the site.

1. INTRODUCTION

1.1 Project background

Biosis Research Pty. Ltd. was commissioned by Monash Views Pty. Ltd. to review a flora and fauna assessment of an area of land proposed for a residential development and further development of an existing golf course.

This assessment is made in response to a Development Plan which is intended to guide the future development and management of the golf course, future residential development and a number of reserve areas in accordance with the plan supplied by the NBA Group and included in Appendix 6.

A flora and fauna assessment of the site was conducted by Ecology and Heritage Partners (EHP) in 2005. The report was updated by EHP in mid-2011 following several project delays. The following report will utilise the information collected by EHP in 2005 and 2011 and provide further updates and amendments based on a site assessment and the current project plans. It is noted that the assessment undertaken by EHP was limited to those areas of the golf course and adjacent land that were to be investigated for golf course redevelopment or residential development.

1.2 Scope of assessment

The objectives of this investigation are to:

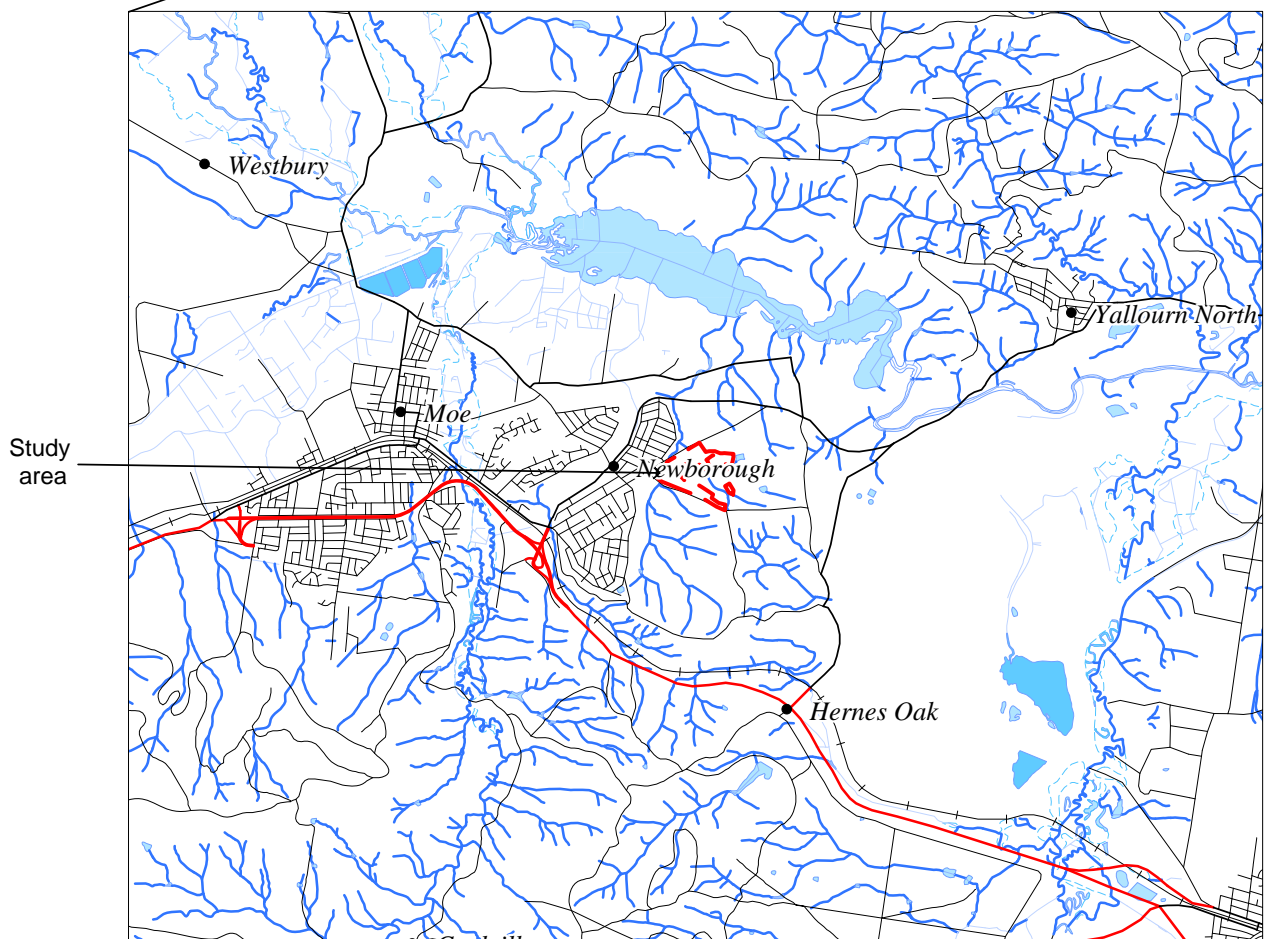
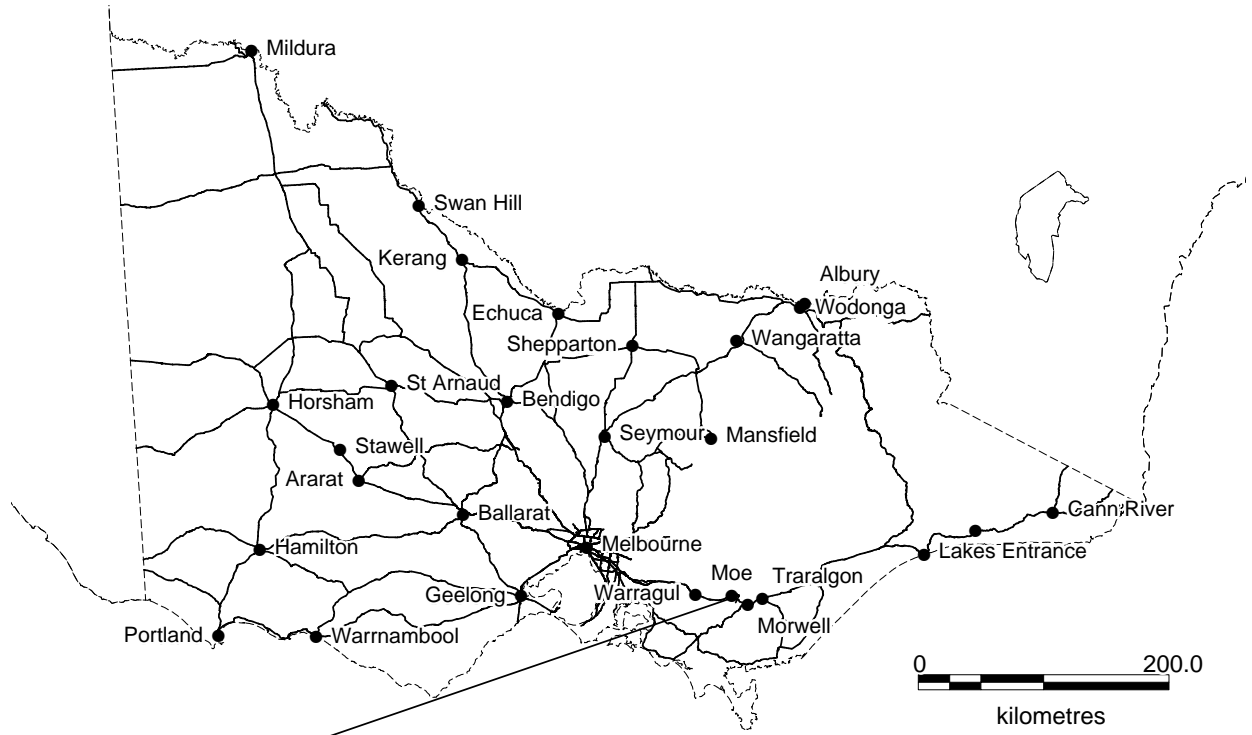
- Review the November 2011 Ecology and Heritage Partners assessment of a similar development proposal (EHP 2011).
- Provide supplementary data on the vascular flora (ferns, conifers, flowering plants) and vertebrate fauna (birds, mammals, reptiles, frogs, fish).
- Map native vegetation and other habitat features.
- Conduct a vegetation quality assessment for some areas of native vegetation.
- Review the implications of relevant biodiversity legislation and policy, including Victoria's Native Vegetation Management Framework (Net Gain policy).
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Recommend any further assessments of the site that may be required (such as targeted searches for significant species).

1.3 Location of the study area

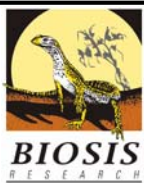
The study area is located at Newborough, approximately 150 km south east of the Melbourne CBD (Figure 1). It encompasses approximately 100 ha of private and public land including a road reserve. It is currently zoned as residential.

The study area is within the:

- Gippsland Plain Bioregion
- Latrobe River Basin (West Gippsland catchment)
- Management area of the West Gippsland CMA
- Municipality of Latrobe City Council.



Acknowledgement: VicRoads
 © State of Victoria, Department of Sustainability and Environment, 2007
 © Copyright Commonwealth of Australia (Geoscience Australia), 2006



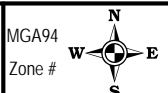
Biosis Research Pty. Ltd.
 38 Bertie Street
 (PO Box 489)
 Port Melbourne
 VICTORIA 3207
 Offices also in: Sydney, Ballarat,
 Wollongong, Canberra & Wangaratta

Figure 1: Location of the study area, Newborough Victoria

DATE: 20/07/12

Drawn by: MDD File number: 14964

Location: ...\\14964\Mapping\14964 Fig 1.wor



2. METHODS

2.1 Literature and database review

In order to provide a context for the study site, information about flora from within 5 km and fauna from within 10 km of the study site (the ‘local area’) was obtained from relevant public databases. Records from the following databases were collated and reviewed:

- Victorian Biodiversity Atlas ‘VBA_FLORA25, FLORA100 & FLORARestricted’ August 2010 © The State of Victoria, Department of Sustainability and Environment. The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged.
- Victorian Biodiversity Atlas ‘VBA_FAUNA25, FAUNA100 & FAUNARestricted’ August 2010 © The State of Victoria, Department of Sustainability and Environment.
- DSE Biodiversity Interactive Map (BIM).
- Protected Matters Search Tool of the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Other sources of biodiversity information:

- DSE Biosites Register; accessed through the Biodiversity Interactive Map.

2.2 Definitions of significance

2.2.1 Species and ecological communities

Significance of a species or community is determined by their listing as rare or threatened under Commonwealth or State legislation / policy. The sources used to categorise significance of species and communities in this report are summarised below in Table 1.

Table 1: Criteria for determining significance of species & ecological communities

Significance	
National	<ul style="list-style-type: none"> • Listed as threatened (critically endangered, endangered, vulnerable or conservation dependent) under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>.
State	<ul style="list-style-type: none"> • Listed as threatened (critically endangered, endangered, vulnerable) or poorly known for flora species, in Victoria on a DSE Advisory list (DSE 2005a, 2007a). • Listed as threatened under the <i>Flora and Fauna Guarantee Act 1988</i>.

Fauna species listed as near threatened or data deficient are listed in Appendix 2. However in accordance with advice from DSE they are not considered to be at the same level of risk as higher categories of threat. These species are generally not discussed in detail in this report.

2.2.2 Biosites

Areas of conservation significance are documented in the DSE Biodiversity Interactive Map. Biosites are ranked as significant at national, state and regional levels.

2.3 Likelihood of occurrence

The likelihood of occurrence is a broad categorisation used by Biosis Research to indicate the potential for a species to occur within the site: it is based on expert opinion and implies the relative value of a site for a particular species.

The likelihood of species occurring within the site is ranked as negligible, low, medium or high.

Species which have at least medium likelihood of occurrence are given further consideration in this report. Those species listed as rare or threatened on the DSE Advisory Lists are also addressed in the assessment of conservation significance for Net Gain (DSE 2007b). The need for targeted survey for these species is also considered.

2.4 Site investigation

2.4.1 Flora assessment

The site assessment was undertaken on the 13 June 2012 and a supplementary list of some flora species was collected. Planted species have not been recorded unless they are naturalised.

The general condition of native vegetation was observed as well as the effects of current seasonal conditions. Notes were made on specific issues such as noxious weed infestations, evidence of management works, current grazing impacts and the regeneration capacity of the vegetation.

Classification of native vegetation is based on ecological vegetation classes (EVCs). An EVC contains one or more floristic (plant) communities, and represents a grouping of broadly similar environments. Definitions of EVCs and benchmarks (condition against which vegetation quality at the site can be compared) are as determined by DSE.

Where native vegetation was identified within the study area, an assessment in relation to the Native Vegetation Management Framework (Net Gain policy) according to standard methods provided by DSE (2004) was also undertaken while on-site. This assessment is outlined in Section 5.

Ecological Vegetation Class boundaries mapped by EHP (2011) were reviewed during the site visit.

2.4.2 Fauna assessment

The study area was investigated on 13 June 2012 to determine its values for fauna. These were determined primarily on the basis of the types and qualities of habitat(s) present. All species of fauna observed during the assessment were noted and active searching for fauna was undertaken. This included direct observation, searching under rocks and logs, examination of tracks and scats and identifying calls. Particular attention was given to searching for significant species and their habitats. Fauna species were recorded with a view to characterising the values of the site and the investigation was not intended to provide a comprehensive survey of all fauna that has potential to utilise the site over time.

The investigation of fauna did not incorporate an aquatic habitat assessment.

Fauna records will be submitted to DSE for incorporation into the Victorian Biodiversity Atlas.

2.4.3 Permits

The flora and fauna assessment was conducted under the terms of a Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by the Department of Sustainability and Environment under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10006240, expiry date 9 May 2015).

2.5 Qualifications

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey, such as species dormancy, seasonal conditions, ephemeral status of waterbodies and migration and breeding behaviours of some fauna. In many cases these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The current flora and fauna assessment was conducted in winter, which is not an optimal time for survey. Many species do not produce reproductive material during winter which can make plant identification more challenging. Despite

these limitations all species in the study area were positively identified and the survey was sufficient to assess the values of the site.

2.6 Legislation and policy

The following key pieces of biodiversity legislation and policy were reviewed and the implications for the project were assessed accordingly:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Flora & Fauna Guarantee Act 1988* (FFG Act)
- Victoria's Native Vegetation Management – a Framework for Action (the Framework; DNRE 2002).
- *Planning and Environment Act 1987* – specifically Clauses 12.01-2, 52.17 and 66.02 and Overlays in the relevant Planning Scheme.
- *Catchment and Land Protection Act 1994* (CaLP Act)
- *Wildlife Act 1975* and associated Regulations
- *Water Act 1989*
- *Environment Protection Act 1971: State Environmental Protection Policy* (Waters of Victoria) 2003

2.7 Mapping

The client supplied site plans in .dwg format as well as PDF design drawing for some revised sections (dated 16 July 2012).

Mapping was conducted using hand-held (uncorrected) GPS units (WGS84) and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 7 metres) and dependent on the limitations of aerial photo rectification and registration.

Mapping has been produced using a Geographic Information System (GIS). Electronic GIS files which contain our flora and fauna spatial data are available to incorporate into design concept plans. However this mapping may not be sufficiently precise for detailed design purposes.

3. RESULTS

The ecological features of the study area are described below and mapped in Figure 2–4.

Species recorded during the flora and fauna assessment are listed in EHP (2011) and Appendix 1–2. Unless of particular note, these species are not discussed further.

A list of significant species recorded or predicted to occur in the local area is also provided in those appendices, along with an assessment of the likelihood of the species occurring within the study area.

3.1 Vegetation & fauna habitat

The study area contains a mosaic of disturbed and intact vegetation. Large areas of the study site have been modified by past disturbances which have included agricultural grazing and a golf course development which has replaced areas of native vegetation with exotic species. Areas of remnant native vegetation vary in quality and composition, ranging from intact areas which are relatively free of exotic species to remnant patches that have been heavily grazed or planted out with introduced species.

Ecological features including areas of native vegetation (Lowland Forest EVC 16, Swampy Woodland EVC 937 and Riparian Scrub EVC 191), scattered trees, drainage lines, artificial wetlands (farm dams), pasture, and planted vegetation occur within the study area. The ecological features are shown in (Figure 2 and 3) and are described below.

The current assessment agrees with the descriptions and justification of presence of EVCs within the study area provided by EHP (2011) and in comparison to NV_2005 modelled data. However, it is noted that Riparian Scrub and Riparian Shrubland are used interchangeably in EHP (2011). The EHP (2011) assessment appears to have intended to refer to Riparian Scrub which is consistent with the vegetation on site. Differences in conservation status between these two EVC (vulnerable and endangered) do not make any significant difference in assessment outcome under the Native Vegetation Framework.

Lowland Forest EVC 16 (vulnerable within the Gippsland Plain Bioregion) occupies areas of the study site (Figure 2). Lowland Forest within the study area is dominated by Messmate Stringybark *Eucalyptus obliqua*, Swamp Gum *Eucalyptus ovata* and Yertchuk *Eucalyptus consideniensis* to 20 m in height (Plate 1). Many of the trees contain small hollows. The EVC is characterised by a relatively dense and diverse understorey containing a shrub layer dominated by Prickly Tea-tree *Leptospermum continentale* and Burgan *Kunzea ericoides* to 3 m in height. The

ground layer includes a collection of indigenous grasses such as Weeping Grass *Microlaena stipoides*, sedges such as Thatch Saw-sedge *Gahnia radula* and Common Grass-sedge *Carex breviculmis*, herbs including Common Raspwort *Gonocarpus tetragynus* and ferns including Bracken *Pteridium esculentum*. This EVC also contains a dense cover of leaf litter and woody debris. Introduced plants are present, especially on the margins of remnant patches or where grazing frequently occurs. Several areas of Lowland Forest have been planted with non-indigenous Australian native species including Sweet Pittosporum *Pittosporum undulatum* and Cootamundra Wattle *Acacia baileyana* or exotic species such as Radiata Pine *Pinus radiata*.

Swampy Woodland EVC 937 (endangered within the Gippsland Plain Bioregion) occupies low lying areas of the study site and is present along drainage lines (Figure 2). Swampy Woodland within the study area is dominated by Swamp Gum to 15 m in height. Many of the trees contain small hollows. The understorey contains a shrub layer dominated by Burgan to 2 m tall and a ground layer dominated by grasses and sedges, including Variable Sword-sedge *Lepidosperma laterale* and Slender Tussock-grass *Poa tenera*. The ground layer includes a dense cover of leaf litter and woody debris. As for Lowland Forest patches, introduced plants are common, especially in disturbed areas or where planting has occurred.

Riparian Scrub EVC 175 (vulnerable within the Gippsland Plain Bioregion) is restricted to a small section of study area along Sandy Creek (Figure 2). This EVC is characterised by the presence of Scented Paperbark *Melaleuca squarrosa* to 6 m in height. The understorey is relatively species poor and is characterised by the presence of sedges such as Thatch Saw-sedge which are tolerant of seasonal waterlogging. Sandy Creek contains a heavy infestation of exotic species including, Blackberry and Sweet Pittosporum.

The quality of the remnant forest and woodland varies as some areas have been subject to grazing by stock. Areas that have been subject to intense grazing show a comparatively sparse canopy due to poor tree health. In these grazed areas, tall woody shrubs are absent and the majority of ground cover consists of common native grasses including Weeping Grass or exotic pasture grasses (Plate 2). A large number of recently fallen trees have contributed to a high density of logs.



Plate 1: Higher quality example of Lowland Forest within the study area.



Plate 2: Lower quality example of Lowland Forest within the study area.

Across the study site mature trees provide foraging, roosting and nesting habitat for bird species such as Laughing Kookaburra *Dacelo novaeguineae* and Crimson Rosella *Platycercus elegans elegans*. Small hollows in trees provide nesting habitat for lorikeets and arboreal mammals such as Common Brushtail Possum *Trichosurus vulpecula*. Small hollows or bark of these large trees provide roosting sites for insectivorous bats such as White-striped Freetail Bat *Tadarida australis*. Dense understory vegetation provides protection and resources for a wide range of

small birds including Brown Thornbill *Acanthiza pusilla* and Eastern Yellow Robin *Eopsaltria australis*. Taller shrubs and trees also provide habitat for many species of insectivorous birds such as Grey Fantail *Rhipidura albiscarpa* and Golden Whistler *Pachycephala pectoralis* as well as a wide range of honeyeaters such as Yellow-faced Honeyeater *Lichenostomus chrysops* (Appendix 4).

Dense ground cover also provides habitat for native ground dwelling mammals. During a previous assessment Bush Rat *Rattus fuscipes* was recorded on site (EHP 2005) and there is potential for Agile Antechinus *Antechinus agilis* and Swamp Rat *Rattus luteolus* to also occur within this habitat. Intact areas containing a high amount of leaf litter provide some potential habitat for the FFG listed Southern Toadlet *Pseudophryne semimarmorata* however given the disturbance to the site by stock and the fragmented nature and small size of the patches there is a low likelihood of this species occurring. Furthermore targeted surveys throughout the region have failed to locate this species within 7 km of the study area within the past 5 years (Craig Cleeland pers. comm.).

Remnant forest within the study area provides suitable resources for diurnal raptors such as Brown Falcon *Falco berigora* and has the potential to provide foraging habitat for the FFG Act listed Grey Goshawk *Accipiter novahollandiae*. There is also habitat for nocturnal raptors such as Southern Boobook *Ninox novaeseelandiae*. The Powerful Owl *Ninox strenua* has been recorded within 10 km of the study area and is known to occur throughout the region. There is also potential for Barking Owl *Ninox connivens* to occur within the forest of the study area. Although these species have the potential to forage within the study boundary and roost within dense canopy trees such as introduced pines, the lack of large hollows makes the site unsuitable for nesting and breeding of these species. Surveys for owls during a previous assessment (EHP 2005) did not record any owl species.

Scattered remnant trees within the study area provide a foraging resource for mobile fauna species such as Eastern Rosella *Platycercus eximus* and Willie Wagtail *Rhipidura leucophrys*. Some of the trees contain small hollows although due to the relative isolation of these trees, only more mobile and common species, such as insectivorous bats or small lorikeets, are likely to utilise this resource.

Pasture, (including golf greens) is characterised by exotic grasses and weeds (Plate 3). Due to its highly disturbed and modified nature, this habitat type contains few resources for fauna and as a consequence, species diversity is generally poor in these areas. Open-country ground-foraging species such as Australian Magpie *Cracticus tibicen*, Little Raven *Corvus mellori*, and Galah *Eolophus roseicapilla* are common in these areas and were recorded throughout the study area during the current assessment. Swallows and martins will occur within these areas as well as Masked Lapwing *Vanellus miles*. There is some

potential for threatened species such as Black Falcon *Falco subniger* to occasionally forage above these areas. Due to the lack of suitable cover, exotic pasture generally provides poor habitat for reptiles and native small mammals.



Plate 3: Pasture dominated by exotic grasses occurs across the study site.

Lowland Forest present in a road reserve along Coach Road is heavily modified. The area has been subject to disturbance during utility installations and the substrate has been subject to gravel/soil dumping. The vegetation present has regrown following this disturbance and is characterised by low, dense, woody vegetation dominated by adventitious colonising plant species such as Burgan and Prickly Tea-tree. It contains a significant infestation of Spanish Heath *Erica lusitanica*. Ground cover is sparse and consists of sedges and herbs with few grasses. Due to its highly disturbed nature, and minimal width, this habitat type contains fewer resources for native fauna and as a consequence, species diversity is generally poor in these areas. As an exception, small insectivorous and nectivorous birds benefit from this dense vegetation structure and species such as White-eared Honeyeater *Lichenostomus leucotis* will use habitat within the roadside.

There are two **artificial wetlands (farm dams)** within the study area (Plate 4). These were not subject to a detailed aquatic assessment. These farm dams are of low habitat quality and are situated within pasture, although they may be utilised to some extent by some native fauna species. They provide habitat for generalist species, such as Pacific Black Duck *Anas superciliosa* and Australian Wood Duck *Chenonetta jubata*, and frogs such as Common Froglet and Spotted Marsh Frog. The dams contain little to no aquatic or fringing vegetation, making them

unsuitable for Growling Grass Frog *Litoria raniformis* and certain waterfowl species such as Australian Shoveler *Anas rhynchos* and Hardhead *Aythya australis*. Both dams have poor water quality, high turbidity and have been subject to impacts by stock.



Plate 4: Artificial wetland (farm dam) within study area. Dam has been impacted by stock and has little native vegetation and poor water quality.

Drainage lines occur throughout the survey area. These were not subject to a detailed aquatic assessment. The drainage lines are naturally occurring, however the majority of them are extensively modified. Most of the drainage lines contain retained Swampy Woodland and Lowland Forest vegetation. A large portion of the drainage line central to the study area is unfenced from stock and, as a consequence of grazing lacks an understorey and ground cover is dominated by exotic pasture grasses. This section, degraded by stock access, is steep sided and contains little to no aquatic vegetation. As such the drainage lines are not suitable for threatened frog species such as Growling Grass Frog. Sections that are fenced off from stock or subject to less access generally contain higher habitat quality with an understorey. The exception to this is the eastern-most drainage line which runs south to north within the study boundary, adjacent to the Yallourn Bowls Club. This area of Lowland Forest is heavily invaded by weeds such as Blackberry *Rubus fruticosus* and Sweet Pittosporum. This drainage line, locally referred to as “Sandy Creek”, is fenced off from stock, steeply incised with a sand base. There is little or no aquatic vegetation within this section of Sandy Creek.

There is a high number of logs and other debris (corrugated tin sheeting) within or adjacent to the drainage line. Logs and other debris act as refuge, shelter and basking sites for small skinks. There is potential for the state listed Swamp Skink *Lissolepis coventryi* and near threatened Glossy Grass Skink *Pseudemoia*

rawlinsoni to occur within the drainage lines of the study area. Logs with hollows or splits can also provide roosting sites for insectivorous bats.

Terrestrial crayfish *Engaeus* spp. are common throughout Gippsland. The burrows of *Engaeus* sp. were observed within the drainage lines of the study area. Several threatened species of terrestrial crayfish are known from the region such as the Narracan, Strzelecki and Warragul Burrowing Crayfish.

Despite the modified condition of the vegetation, some sections of drainage lines and other wet depression provide habitat for Dwarf Galaxias. The suitability of habitat on site has not been assessed in detail and should be subject to further assessment.

Planted vegetation within the study area consists of exotic and non-indigenous trees and shrubs that have been planted as wind breaks and golf range features between the golf greens and fairways. Planted trees and shrubs provide some resources for native fauna in the form of foraging, nesting and roosting habitat; however, this habitat is unlikely to support any threatened species. Flowering non-indigenous species are used by common nectivorous birds such as Red Wattlebird *Anthochaera carunculata* and White-plumed Honeyeater *Lichenostomus penicillatus*. Mature trees in wind breaks or scattered within paddocks also offer perching, roosting or nesting sites for Australian Magpie and raptors such as Black-shouldered Kite and Brown Falcon. Some mature planted eucalypts may also provide foraging resources amongst fallen limbs, bark and leaf litter, and shelter for ground-dwelling mammals and reptiles. Planted trees within the study area are unlikely to contain any large hollows of value to native fauna.

3.2 Site context

The area of Sandy Creek within the study boundary serves as a habitat corridor of several reserves from Monash Reserve to Lake Narracan, including connecting Public Park and Recreational Zones such as College Reserve and Moe-Yallourn Rail Trail to Moe Golf Course. These woodland and forest areas provide valuable habitat links of relatively contiguous trees within an otherwise pasteurised landscape.

3.3 Significant species

3.3.1 EPBC Act & DSE Advisory listed species

Lists of significant flora species recorded or predicted to occur within 5 km of the study area are provided in Appendix 2. Lists of significant fauna species recorded or predicted to occur within 10 km of the study area are provided in Appendix **Error! Reference source not found.** An assessment of the likelihood of these species occurring in the study area and an indication of where within the site (i.e.

which habitats or features of relevance to the species) is included. A summary of those species recorded or with a medium or higher likelihood of occurring in the study area is provided in Table 2. .

Table 2: Summary of significant species most likely to occur in the study area

Species name	Area of value within the study area
EPBC Act listed species	
Dwarf Galaxias	Drainage Lines and wet depressions
DSE Advisory List species	
Flora	
Orange-tip Finger-orchid	Lowland Forest
Slender Pink-fingers	Lowland Forest
Mountain Bird-orchid	Lowland Forest and Swampy Woodland
Slender Tick-trefoil	Lowland Forest and Swampy Woodland
Green Scentbark	Lowland Forest
Fauna	
Grey Goshawk	Forest
Black Falcon	Woodlands and open pasture
Powerful Owl	Woodlands and Forest
Swamp Skink	Drainage lines with indigenous swamp scrub understory

3.3.2 Other species of note

Glossy Grass Skink is listed as near threatened within Victoria. This species has a medium likelihood of occurring within drainage lines of the study area.

3.4 Significant ecological communities

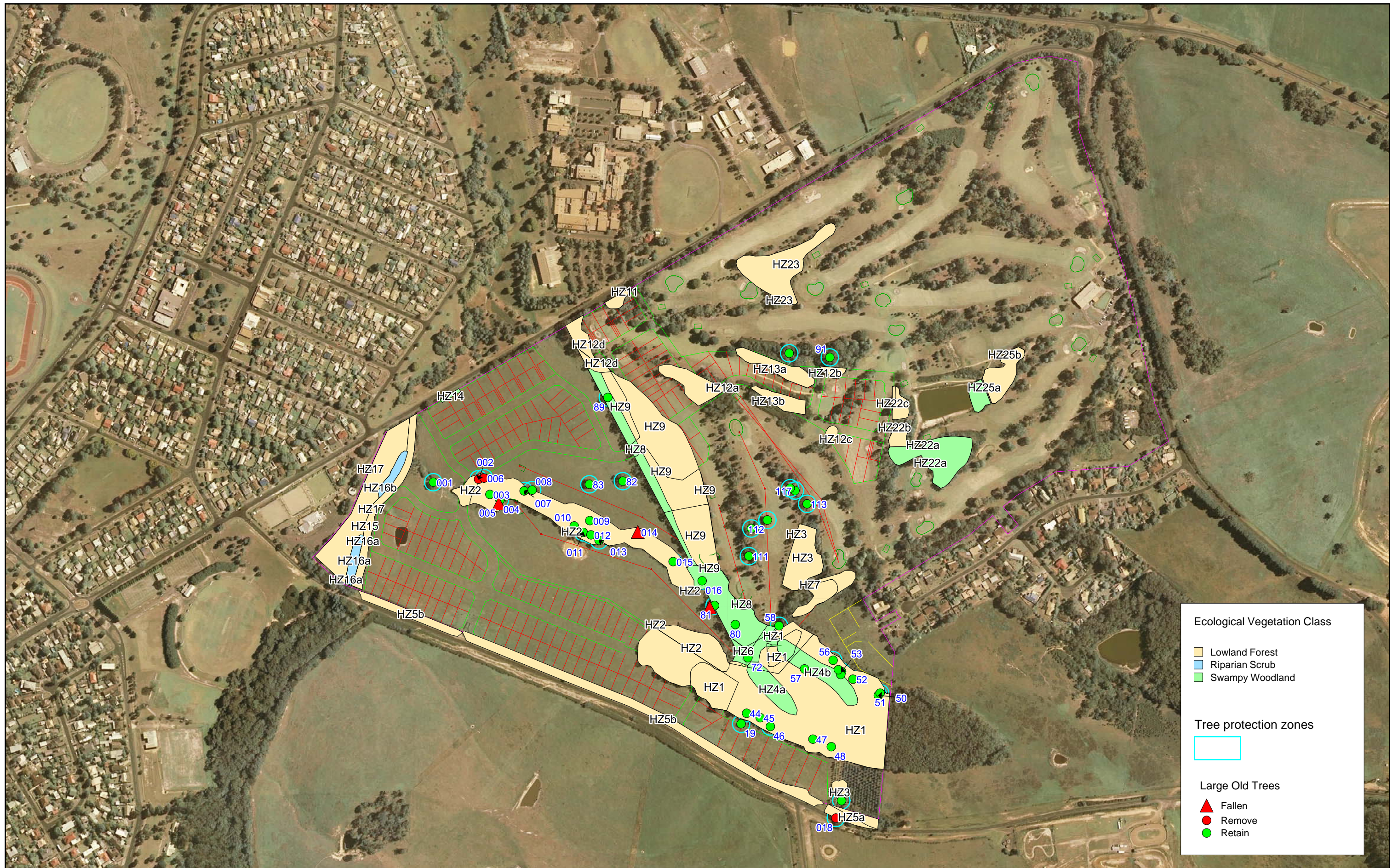
Searches of the Protected Matters Search Tool indicates that the site falls within the range predicted for the occurrence of the EPBC listed ecological community Gippsland Red-gum (*Eucalyptus tereticornis* subsp. *mediana*) Grassy Woodland and Associated Grassland. This vegetation community is listed as Critically Endangered under the EPBC Act (1999). This ecological community is an open woodland dominated by Gippsland Red-gum with an understorey of native grass species. The current site inspection indicated that this vegetation community was not present in the study site which is consistent with previous assessments.

The site does not contain communities listed under the FFG Act (1988).

3.5 Further survey recommendations

Targeted survey is recommended for the following significant species:

- **Swamp Skink and Glossy Grass Skink targeted surveys in drainage line habitat.** As a minimum, active searching of suitable areas and debris should be undertaken in spring. In addition to this it is suggested that roof tiles should be placed in transects adjacent to suitable habitat. The tiles should be placed at 5m intervals along both sides of the drainage line in August and remain *in situ* for 4–6 weeks before two checks in October.
- **Aquatic habitat surveys / targeted search for threatened terrestrial crayfish and Dwarf Galaxias.** No aquatic surveys have been conducted and there are aquatic habitats on site. Given the potential impact of a residential development on surrounding hydrology and sediment rates, and the potential for threatened terrestrial crayfish / fish species, an aquatic survey is recommended including targeted searches where required.
- **Targeted search for rare or threatened orchid species.** All orchid species identified with habitat on site are typically visible for only a short time of year. A survey during optimal flowering time is recommended to determine whether any of these species are present within the proposed impact area.



Biosis Research Pty. Ltd.
 38 Bertie Street
 (PO Box 489)
 Port Melbourne
 VICTORIA 3207

Offices also in:
 Sydney, Ballarat, Wollongong,
 Canberra, & Wangaratta

Figure 2. Ecological Vegetation Classes and Large Old Trees,
 Yallourn Golf Course, Victoria,

DATE: 17 July 2012

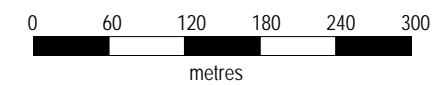
Checked by: RDS

Drawn by: MDD

File number: 14946

Location: ...\\14964\Mapping\14964 Figure 2.wor

Scale:



4. BIODIVERSITY LEGISLATION AND GOVERNMENT POLICY

This section provides an assessment of the project against key biodiversity legislation and government policy.

Where available, links to further information are provided. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

4.1 Commonwealth

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (NES) protected under the Act.

Link for further information including a guide to the referral process is available at: <http://www.environment.gov.au/epbc/index.html>

Matters of National Environmental Significance relevant to the project are summarised in Table 3. It includes an assessment against the EPBC Act policy statements published by the Australian Government which provide guidance on the practical application of EPBC Act.

Table 3: Assessment of the project against the EPBC Act

Matter of NES	Project specifics	Assessment against guidelines
Threatened species and ecological communities	<p>Five flora species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the study area is assessed in Appendix 2 .</p> <p>18 fauna species have been recorded or predicted to occur in the project search area. The likelihood of these species occurring in the study area is assessed in Appendix 2</p>	<p>All five flora species are unlikely to occur within the study site due to absence of suitable habitat. Development of the site is unlikely to constitute a significant impact on these species if they are present on the site.</p> <p>No EPBC terrestrial species are likely to occur within the study area due to an absence of suitable habitat.</p> <p>Two listed fish species were not assessed as part of the current assessment. Additional surveys for Dwarf Galaxias are recommended as there is some habitat present for this species.</p>
Migratory species	23 migratory species have been recorded or predicted to occur in the project search area (Appendix 2)	While some of these species would be expected to use the study area on occasions, it does not provide important habitat for an ecologically significant proportion of any of these species as defined by (DEWHA 2009e).
Wetlands of international importance (Ramsar sites).	The study area is identified as being within the catchment of the Ramsar site, Gippsland Lakes.	The study area does not drain directly into the Ramsar site and the development is not likely to result in a significant impact

There are a number of records of Strzelecki Gum *Eucalyptus strzeleckii* within 5 km the study area. This species is listed as Vulnerable under the EPBC Act. It typically occupies more mountainous terrain than is present in the study area, however, there is some potential for it to be present in the areas of Swampy Woodland on the site. This vegetation type is dominated by the very similar but common species Swamp Gum *Eucalyptus ovata*. Samples were collected from a number of eucalypts on site with characteristics similar to that of Strzelecki Gum, but further examination revealed that the material best fits Swamp Gum.

There is some sub-optimal habitat for Matted Flax-lily in study area, although the species is more commonly found in areas of forest with a more open and grassy understory than the remnant forest patches on site. This species has not been recorded in the immediate vicinity of the study area but records exist within 5 km of the site, close to Hazelwood and Morwell. Areas of potential habitat for this species on site have been disturbed by past land-use and are substantially fragmented.

Some habitat for Dwarf Galaxias occurs on site. Additional assessment of this species in response to the Development Plan is required to determine planning implications.

On the basis of criteria outlined in the relevant *Significant Impact Guidelines* it is considered unlikely that a significant impact to an EPBC Act listed flora or terrestrial fauna species would result from the proposed action. Additional survey is required to determine if there is likely to be an impact to Dwarf Galaxias. Monash Views Pty. Ltd. may choose to refer the proposed action to the Australian Government Minister for the Environment to determine whether the action requires approval under the EPBC Act. In the event Dwarf Galaxias are found on site, a referral to the Australian Government Minister is recommended.

4.2 State

4.2.1 Flora and Fauna Guarantee Act 1988

Under the FFG Act a permit is required from DSE to 'take' protected flora species from public land. A permit is generally not required for removal of protected flora from private land. Authorisation under the FFG Act is required to collect, kill, injure or disturb listed fish.

Link for further information: <http://www.dse.vic.gov.au/plants-and-animals/native-plants-and-animals/threatened-species-and-communities/flora-and-fauna-guarantee-act>

Native vegetation on site is not an FFG Act listed community. EHP (2001) identified the presence of a species of *Euchiton* during their assessment. *Euchiton*

species are in the Asteraceae family which is protected under the FFG Act. A permit to remove FFG protected species is required from DSE for all areas of public land within the study area. This includes roadside vegetation to be impacted where at least one FFG protected species (Common Heath *Epacris impressa*) was recorded.

The study area does not contain any declared ‘critical habitat’ for the purposes of the FFG Act. Therefore a protected flora permit is not required, however the presence of listed threatened flora and habitat for listed threatened fauna will be considered by the Responsible Authority in determining its response to an application for vegetation clearance under Clause 52.17 (see below).

4.2.2 Catchment and Land Protection Act 1994

The CaLP Act identifies and classifies certain species as noxious weeds or pest animals, and provides a system of controls on noxious species.

Ecology and Heritage Partners observed four declared noxious weed species within the study area: Spear Thistle *Cirsium vulgare*, Montpellier Broom *Genista monspessulana*, Blackberry *Rubus fruticosus* sp. agg. and Ragwort *Jacobaea vulgaris* (EHP 2011).

The proponent must take all reasonable steps to eradicate regionally prohibited weeds; prevent the growth and spread of regionally controlled weeds; and prevent the spread of, and as far as possible eradicate, established pest animals. The State is responsible for eradicating State prohibited weeds from all land in Victoria.

Link for further information: <http://www.nwc.gov.au/www/html/2100-catchment-and-land-protection-act-1994.asp>

4.2.3 Planning and Environment Act 1987 (incl. Planning Schemes)

The *Planning and Environment Act 1987* controls the planning and development of land in Victoria, and provides for the development of planning schemes for all municipalities.

Of particular relevance to the development proposed are controls over the removal of native vegetation contained within the Latrobe Planning Scheme, including permit requirements. The Planning Scheme defines ‘native vegetation’ as “Plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses” (Clause 72).

Clause 12.01-2 of the State Planning Policy Framework Clause (Native Vegetation Management) requires that a net gain in the extent and quality of native vegetation is achieved and planning must consider as relevant Victoria’s Native Vegetation

Management – a Framework for Action. An assessment of the proposed development in relation to the Framework is provided in Section 5.

Clause 52.17 requires a planning permit to remove, destroy or lop native vegetation including dead native vegetation. Exemptions identified in Clause 52.17-6 do not apply to the proposed development and a permit will be required. Decision guidelines are contained in Clause 52.17-5.

Clause 65.01 requires consideration of the extent and character of native vegetation and the likelihood of its destruction. This clause also requires consideration of whether the native vegetation is to be or can be protected, planted or allowed to regenerate.

Clause 65.02 requires consideration as to whether, in relation to subdivision plans, native vegetation can be protected through subdivision and siting of open space areas.

Clause 66.02 vegetation removal thresholds are triggered (> 0.5 ha of endangered, vulnerable or rare vegetation types or > 1.0 ha of a depleted or least concern vegetation type / > 5 trees of greater than 40 cm DBH OR > 15 trees of less than 40 cm DBH) and thus DSE will be a mandatory referral authority.

The study area is not covered by any overlays relevant to biodiversity under the Latrobe Planning Scheme.

4.2.4 Native Vegetation Management Framework

The Framework provides State Government policy (referred to as the Net Gain policy) for the protection, enhancement and revegetation of native vegetation in Victoria (DNRE 2002) and is an incorporated document in all planning schemes.

Link for further information: <http://www.dse.vic.gov.au/land-management/victorias-native-vegetation-management-a-framework-for-action>

The development seeks to remove native vegetation and as such an application will need to be made under clause 52.17 of the Latrobe Planning Scheme to remove, destroy or lop native vegetation. Within the application Monash Views Pty. Ltd. must explain (Clause 52.17-3) the steps that have been taken to:

- Avoid the removal of native vegetation, where possible.
- Minimise the removal of native vegetation through appropriate consideration in project design and management.
- Appropriately offset the loss of native vegetation, if required.

The EHP (2011) assessment provides some discussion on how vegetation removal was minimised from previous designs compared with the 2011 design. Previous

proposal and options for placement and size of residential lots have been drafted and discussion regarding measures to avoid and minimise between Monash View Pty. Ltd. and Council. The avoid and minimise discussion in EHP (2011) should be reviewed with the following information, as well as any other information provided by the proponent to address this policy.

Some buffers (3 m wide) have been added in the current assessment, increasing the area of native vegetation proposed to be removed on the edge of house lots and roads. This allows for an area of reduced fuel in anticipation of fire protection requirements for new lots. The amount of buffer has been determined only for quantifying native vegetation losses and is not provided as advice for suitability of property protection buffers in relation to bushfire. A report by a consultant qualified in Bushfire Attack Level assessment should be sought before finalising net gain calculations.

Steps have been taken to minimise vegetation removal within the study area compared to the development plan in EHP (2011). The following has been achieved:

- Reduction in the area of proposed clearing for Very High conservation significance vegetation within Habitat Zone 8. This was achieved by reducing clearing around proposed residential areas to leave a buffer of vegetation between the fairway to the west and proposed house lots. This reduction also results in retaining some of the connectivity between roadside vegetation to the north of the golf course and other vegetation within the golf course. One large tree previously proposed for removal is retained with this change to Habitat Zone 8.
- Reduction in the area of proposed clearing for Very High conservation significance vegetation within Habitat Zone 4a and high conservation significance vegetation within Habitat Zone 1 / Habitat Zone 7. This was achieved by re-designing Hole 2 and moving it 20 m to the north. According to the design drawings by Ogilvy Clayton (2012) there has been an overall reduction in footprint area by 0.214 ha.
This new proposed clearing utilises lower quality edge vegetation compared with the previous design. Note -. Photo 3 of EHP (2011) includes the caption that Burgan shown in the photo is a typical understorey of Swampy Woodland. However, in our opinion, the Burgan understorey as shown is not typical and is a result of disturbance around the edge of the patch. Moving the location of Hole 2 is likely to reduce the resulting edge on the Swampy Woodland area and be a better outcome to minimise impacts to higher quality understorey vegetation further towards the centre of the patch.
- Reduction in the area of proposed clearing for High conservation significance vegetation within Habitat Zone 9.

- A small reduction in the area of proposed clearing for Medium conservation significance vegetation within Habitat Zone 12d.

Roadside vegetation losses were not accounted for in EHP (2011). This vegetation adds to the total losses however, Habitat Zone 5b may be regarded as Degraded Treeless Vegetation by the responsible authority (see comment below Table 4). If this habitat zone is not counted as native vegetation, the total area of native vegetation proposed to be removed is 4.69 ha. The total area calculated by the EHP (2011) assessment was 5.21 ha.

This flora and fauna assessment establishes the extent, distribution and quality of native vegetation within the study area. An assessment against Victoria's Net Gain policy is included in Section 5. Responses and offset requirements for clearing native vegetation outlined in the West Gippsland Native Vegetation Plan are included in the assessment.

Regional Native Vegetation Plans provide a strategic and co-ordinated approach to the management of native vegetation within a given Catchment Management Authority region, and complement the Native Vegetation Management Framework.

4.2.5 Wildlife Act 1975 and associated Regulations

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife. The *Wildlife Regulations 2002* of the Act prescribe penalties for persons who wilfully damage, disturb or destroy any wildlife habitat without appropriate authorisation.

The Wildlife Act is not applicable to the proposed development. Biosis Research has had previous discussions with DSE and it has been resolved that the Wildlife Act is primarily to be applied in instances where wildlife habitat is wilfully or deliberately destroyed rather than where habitat is to be removed as part of developments subject to planning permits.

4.2.6 Water Act 1989

The primary purpose of the *Water Act 1989* is to provide a framework for the allocation and management of surface water and groundwater throughout Victoria. It provides a principal mechanism for maintenance of ecosystem functions including those of aquatic ecosystems.

The proposed development will involve construction activity that affects beds and banks of waterways, riparian vegetation or quality or quantity of water in Sandy Creek.

Development within the study area will require a Works on Waterways Permit from the West Gippsland Catchment Management Authority.

4.2.7 Environment Protection Act 1970: State Environmental Protection Policy (Waters of Victoria) 2003

The Environment Protection Act underpins the State Environmental Protection Policies (SEPP) which provides a legal framework for the protection and rehabilitation of Victoria's surface water environments.

The project may directly and/or indirectly impact upon Sandy Creek and its aquatic ecosystems. The SEPP requires that aquatic ecosystem values be protected. Environmental quality objectives and indicators are defined to protect beneficial uses and an attainment program provides guidance on protection of the beneficial uses (i.e. the uses and values of the water environment).

Monash View Pty. Ltd. needs to ensure that direct and indirect (e.g. runoff) impacts to surface water quality do not exceed the water quality objectives.

Link to further information: <http://www.epa.vic.gov.au/water/epa/wov.asp>.

4.2.8 Regional Catchment Strategy and River Health Strategy

State Planning Policy Framework Clause 14.02-1 (Catchment planning and management) states that planning must consider as relevant, Regional Catchment Strategies (RCS) and any associated implementation plan or strategy including any regional river health and wetland strategies.

These documents provide recommendations on the protection of existing high-value rivers and creeks that are in good condition and strategic improvement of other rivers and creeks

5. VICTORIA'S NATIVE VEGETATION MANAGEMENT FRAMEWORK (NET GAIN)

The Framework is state government policy providing the strategic direction for the protection, enhancements and revegetation of native vegetation within Victoria (DNRE 2002). It forms part of the State Policy Planning Framework. The Framework's primary goal is to achieve 'a reversal across the entire landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain'.

The approach for applying the three-step approach of Net Gain to the current proposal is described in this section. According to the design concept proposed, impacts to native vegetation cannot be avoided if the project is approved. In order to determine appropriate offsets the native vegetation on-site must be quantified.

Note: a glossary of terms used in relation to the Framework and Net Gain assessment is provided in Appendix 6.

5.1 Quantifying native vegetation on site

Native vegetation within the study area was mapped (Figure 3) and assessed in relation to Net Gain policy according to standard methods provided by DSE (2004). Vegetation quality of identified patches was assessed using the DSE Vegetation Quality Assessment Sheet (DSE 2004) and pre-determined EVC benchmarks: <http://www.dse.vic.gov.au/conservation-and-environment/ecological-vegetation-class-evc-benchmarks-by-bioregion>.

Indigenous canopy trees were mapped and their diameter at breast height (DBH) measured as follows:

- Within patches – all trees that are benchmark size and greater are termed Large Old Trees (LOTs) and assessed (DNRE 2002).
- Scattered trees outside patches – Small Trees, Medium Old Trees (MOTs), Large Old Trees (LOTs) and Very Large Old Trees (VLOTs) are assessed (DSE 2007b).

For the purposes of this assessment the limit of the resolution for the habitat hectare assessment process is taken to be 0.01 habitat hectares (Hha). That is, if native vegetation is present with sufficient cover but its condition and extent would not result in the identification of at least 0.01 habitat hectare then that vegetation will not be mapped or assessed as a separate habitat zone.

Areas of uniform quality for each EVC within the patches are termed 'habitat zones' and assessed separately.

All remaining areas that are not EVC patches or scattered remnant canopy trees are termed Degraded Treeless Vegetation (DTV; DSE 2007b).

5.1.1 Patches of native vegetation

Each habitat zone is assessed in terms of habitat hectares and number of LOTs. Smaller trees are not considered separately as their presence is incorporated into the assessment of habitat hectares.

Thirteen habitat zones have been identified (Figure 2). The results of the vegetation quality assessment are provided in

Table 4. Each habitat zone is assigned an overall habitat score, which is multiplied by its area to provide the number of habitat hectares. The conservation significance of each zone is also shown at the bottom of Table 4 and this is discussed more in the following section.

Table 4: Quantification and significance of native vegetation patches. HZ - habitat zone, LF – Lowland Forest, SW – Swampy Woodland, V – vulnerable, E – endangered, H – high, M – medium, VH – very high.

Habitat Zone		HZ1	HZ2	HZ4b	HZ5a	HZ5b	HZ6	HZ7	HZ8	HZ9	HZ11	HZ12	HZ13	HZ22c	TOTAL
Bioregion		GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	
EVC #: Name		LF	LF	SW	LF	LF	SW	LF	SW	LF	LF	LF	LF	LF	
EVC Bioregional Conservation Status		V	V	E	V	V	E	V	E	V	V	V	V	V	
Max Score		Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	
Site Condition	Large Old Trees	10	3	0	3	4	0	4	6	3	0	0	0	0	0
	Canopy Cover	5	5	4	5	3	0	5	3	5	0	0	0	3	3
	Understorey	15	15	5	15	9	7	5	5	15	10	5	5	5	15
	Lack of Weeds	25	6	2	6	10	5	6	9	2	7	2	6	6	6
	Recruitment	10	5	0	5	5	3	5	5	5	5	1	5	3	5
	Organic Matter	5	3	2	5	5	3	3	3	5	3	3	5	5	5
	Logs	5	3	2	3	4	0	0	2	2	2	0	0	0	2
	Total Site Score		40	15	42	40	18	28	33	37	27	11	21	22	36
	EVC standardiser (x 75/55)		1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted Site Score		40	15	42	40	18	28	33	37	27	11	21	22	36	
Landscape Value	Patch Size	10	4	4	4	1	1	4	4	4	1	1	1	1	1
	Neighbourhood	10	2	2	2	1	0	2	1	1	2	0	1	0	0
	Distance to Core	5	1	1	1	1	1	1	1	1	1	1	1	1	1
	Total Landscape Score		7	7	7	3	2	7	6	6	7	2	3	2	2
HABITAT SCORE	100	47	22	49	43	20	35	39	43	34	13	24	24	38	
Habitat points = #/100	1	0.47	0.22	0.49	0.43	0.2	0.35	0.39	0.43	0.34	0.13	0.24	0.24	0.38	
Habitat Zone area (ha)		0.58	0.8	0.08	0.09	1.25	0.03	0.21	0.11	1.56	0.07	0.62	0.49	0.02	5.91
Habitat Hectares (Hha)		0.27	0.18	0.04	0.04	0.25	0.01	0.08	0.05	0.53	0.01	0.15	0.12	0.01	1.74
Conservation Significance	Conservation Status x Hab Score		H	M	VH	H	M	H	H	VH	H	M	M	M	H
	Threatened Species Rating		H	H	H	NA	NA	H	H	H	H	NA	NA	NA	NA
	Other Site Attribute Rating		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Overall Conservation Significance (highest rating)		H	H	VH	H	M	H	H	VH	H	M	M	M	H
Number of Large Old Trees in patch		11	0	2	1	0	1	4	0	0	0	0	0	0	

Habitat Zone 5b occurs along most of the roadside to the south of the study area and is comprised almost entirely of species which would have not naturally dominated the original vegetation type. The most common species are Burgan and Prickly Tea-tree and the original ground flora is largely absent due to soil disturbance for the installation of utility services. This vegetation may be regarded as secondary vegetation and therefore might be categorised by the responsible authority as Degraded Treeless Vegetation.

Conservation significance for threatened species

Part of the assessment of conservation significance for Net Gain involves consideration of the value of habitat for threatened species in Victoria. Only species listed as threatened or rare under the DSE Advisory lists (DSE 2005a, 2007a) are considered in this process.

Flora and fauna species listed under DSE Advisory lists that have been recorded or have at least medium likelihood of occurrence within the study area are considered in the assessment of conservation significance provided they have potential to occur in areas of remnant vegetation that have been mapped and assessed.

The value of each habitat zone for each species is assessed against DSE's criteria (DSE 2007b, page 13). The pathway for each decision made (in accordance with DSE's Table 2) is outlined in Table 5 below.

Table 5: Determination of best/remaining habitat for rare or threatened species.

Species	Conservation Status	Habitat zone (Figure 3)	Steps*	Outcome	Conservation Significance (threatened species rating)	Notes
Flora						
Matted Flax-lily	Endangered	All habitat zones	A:D	No further consideration required	NA	This species was not recorded as present. It is typically found in grassy forests and woodlands which do not naturally occur within the study area. It is unlikely to make significant use of the site in the medium term.
Green Scentbark	Rare	HZ1, HZ2, HZ9	A;B;C	Best 50% habitat	High	Larger patches of Lowland Forest where this species is recorded around Moe / Traralgon represent the best 50% of habitat for this species within the Gippsland Plain.
		HZ4, HZ5, HZ6, HZ7, HZ8, HZ11, HZ12, HZ13, HZ22c	A;B;C	Remaining 50% habitat	Medium	Although some habitat occurs, it is not expected to make significant use of these patches / zones

Species	Conservation Status	Habitat zone (Figure 3)	Steps*	Outcome	Conservation Significance (threatened species rating)	Notes
						within the medium term.
Orange-tip Finger-orchid	Rare	HZ1, HZ2, HZ4, HZ5a, HZ6, HZ9	A;B;D:F	Remaining 50% habitat	Medium	There are no recent records of this species from within the local area. Higher quality areas of Lowland Forest provide some habitat for this species.
Slender Pink-fingers	Rare	HZ1, HZ2, HZ4, HZ5a, HZ6, HZ9	A;B;D:F	Remaining 50% habitat	Medium	The distribution and habitat preferences of this species within the local area are unclear due to similarities with other more common orchid species. It may occupy some areas of native vegetation with more intact understorey although unlikely to make significant use of these areas in the medium term.
Mountain Bird-orchid	Rare	HZ1, HZ2, HZ4, HZ5a, HZ6, HZ9	A;B;D:F			
Fauna						
Grey Goshawk	Vulnerable	All habitat zones	A;D	No further consideration required	NA	Although suitable foraging habitat occurs, it is not expected that the species would make significant use of the site in the medium term.
Black Falcon	Vulnerable	All habitat zones	A;D	No further consideration required	NA	Although suitable foraging habitat occurs, it is not expected that the species would make significant use of the site in the medium term.
Powerful Owl	Vulnerable	All habitat zones	A;D	No further consideration required	NA	Although suitable foraging habitat occurs, it is not expected that the species would make significant use of the site in the medium term.
Swamp Skink	Vulnerable	HZ1, HZ2a, HZ4B, HZ6, HZ8, HZ15, HZ16a, HZ16b, HZ17	A;D;F	Remaining 50% habitat	High	Habitat zones have habitat that clearly meets the requirements of the species, but the sites represent below-average condition and landscape context as Swamp Skink habitat for the bioregion.
		Remaining habitat zones	A;D	No further consideration required	NA	Habitat not present for Swamp Skink within the remaining habitat zones.

* Steps taken to determine best or remaining 50 % of habitat. From Table 2 in the Guide for Assessment of Referred Planning Permit Applications (DSE 2007b). HZ = Habitat Zone

The overall threatened species rating for each habitat zone is determined by the highest threatened species rating scored for any one species. This result is included in Table 4.

Modified Vegetation

DSE defines 'Degraded Treeless Vegetation (DTV)' as "*Vegetation that is neither a wetland, a remnant patch nor scattered tree(s).*" (DSE 2007b, p26).

In some cases, vegetation that meets the cover threshold for definition as a 'patch' is modified such that DSE may treat it as DTV. This includes areas that are "*now dominated by species that are unlikely to have originally dominated the site.*" (DSE 2007b, p10). This can include secondary grasslands that have been cropped and are now dominated by a small number of opportunistic species. This determination cannot be made by the consultant and must be made by DSE.

Habitat Zone 5b, along Coach Road, is a candidate for DTV. The vegetation here is locally indigenous but has arisen following heavy disturbance of the site for utility installation and dumping of soil. The vegetation is dominated by adventitious species such as Burgan and Prickly Tea-tree and does not resemble the vegetation that would have originally been on the site. DSE may consider this patch not to attract specific net gain offsets.

Summary

A total of **18.88 hectares** of native vegetation have been mapped within the study area. Of this vegetation, **5.91 ha** is proposed to be removed for the current development plan. The habitat score for the habitat zones being affected by the proposed development plan ranges from 13 to 49. Habitat zones 1, 4a, 4b, 6 and 8 represent the most intact areas of native vegetation. The vegetation ranges from medium to very high conservation significance (Figure 3).

A total of 19 Large Old Trees are present within habitat zones (see

Table 4 above, raw data is presented in Appendix 4). Of these, three are proposed to be removed.

5.1.2 Scattered Trees

Outside patches of native vegetation (previous section) only large scattered trees were recorded by EHP (EHP 2011). Indigenous scattered trees smaller than this size class were not recorded. The following locally indigenous scattered canopy trees have been recorded for the site:

- 12 Large Old Trees;

This is based on data provided by EHP (2011) and supplemented by field inspection undertaken for this assessment. Raw data is presented in Appendix 4.

Standing dead native trees of 40 centimetres DBH or greater are included in these numbers as they are not exempt from the provisions of Section 52.17 of the Victoria Planning Provisions and are subject to Net Gain policy.

Conservation significance

Scattered Old Trees (Medium to Very Large) are assigned the lowest conservation significance category appropriate to the EVC to which they originally belonged, unless there are threatened species or other attributes that increase their rating (DSE 2007b p11). As remnants of threatened EVCs, the scattered trees within the study area have high conservation significance.

Scattered small trees within the study area are assigned a conservation significance of 'low' (DSE 2007b p.11).



Biosis Research Pty. Ltd.
 38 Bertie Street
 (PO Box 489)
 Port Melbourne
 VICTORIA 3207

Offices also in:
 Sydney, Ballarat, Wollongong,
 Canberra, & Wangaratta

Figure 3. Proposed vegetation removal according to conservation significance, Yallourn Golf Course, Victoria

DATE: 17 July 2012

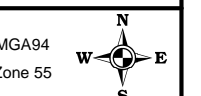
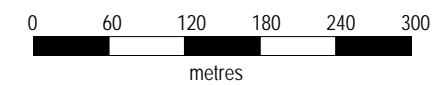
Checked by: RDS

Drawn by: MDD

File number: 14946

Location: ...\\14964\Mapping\14964 Figure 3.wor

Scale:



5.2 Assessing loss of native vegetation

Loss of native vegetation is assessed in accordance with the concept design provided as digital data and included in Figure 3.

5.2.1 Patches of native vegetation

The current design proposal may result in the loss of 1.73 habitat hectares of native vegetation (Table 6) and 3 Large Old Trees subject to detailed design.

5.2.2 Scattered Trees

The current design proposal will not result in the loss of any scattered trees. All tree losses are within patches of native vegetation.

5.3 Gain targets

Offset requirements for identified losses are summarised in Table 6.

Table 6: Impacts to vegetation patches (Gippsland Plain Bioregion)

Habitat Zone	1	2	4b	5a	5b	6	7	8	9	11	12	13	22c	Total
EVC	LF	LF	SW	LF	LF	SW	LF	SW	LF	LF	LF	LF	LF	
Area to be cleared	0.58	0.8	0.08	0.09	1.25	0.03	0.21	0.11	1.56	0.07	0.62	0.49	0.02	
Habitat hectares to be cleared (subject to detailed design):														
Very High Conservation Significance	x	x	0.04	x	x	x	x	0.05	x	x	x	x	x	0.09
High Conservation Significance	0.27	0.18	x	0.04	x	0.01	0.08	x	0.53	x	x	x	0.01	1.12
Medium Conservation Significance	x	x	x	x	0.25	x	x	x	x	0.01	0.15	0.12	x	0.53
Large Old Trees to be cleared (subject to detailed design)														
Very High Conservation Significance	x	x	x	x	x	x	x	x	x	x	x	x	x	x
High Conservation Significance	x	2	x	1	x	x	x	x	x	x	x	x	x	3

Table 7: Gain targets for clearing patches of native vegetation (Gippsland Bioregion)

Target No.	Habitat Zones	EVC #: Name	Conservation Significance	Min Habitat score for target*	Other Like-for-like reqts*	Habitat Hectares Target			Large Tree Protection Target		
						Total Losses (Hha)	Net outcome ratio	Gain Target (Hha)	Total LOTs Lost	Protection multiplier	LOTs to be protected^
VH1	HZ4b, HZ8	Swampy Woodland	Very High	0.44	Same EVC within the bioregion.	0.09	2	0.18	0	-	-
H1	HZ6	Swampy Woodland	High	0.26	Same EVC within the bioregion or very high conservation significance vegetation in same bioregion.	0.01	1.5	0.02	0	-	-
H2	HZ1, HZ2, HZ5a, HZ7, HZ9, HZ22c	Lowland Forest	High	0.36	Same EVC within the bioregion or very high conservation significance vegetation in same bioregion. Best 50% of habitat for Green Scentbark and Swamp Skink for part of losses.	1.11	1.5	1.66	3	4	12
M1	HZ5b, HZ11, HZ12, HZ13	Lowland Forest	Medium	0.13	An EVC in the bioregion or high / very high vegetation in an adjacent bioregion.	0.53	1	0.53			
TOTAL						1.73		2.39	3		12

* Based on the quality objectives for the offset specified in Table 6 of the Framework (DNRE 2002).

^ By protecting a Large Old Tree, it is assumed five recruits will be generated. To be considered protected, twice the canopy diameter for a tree must be fenced and protected from adverse impacts. It has therefore been assumed that protection of a tree will generate five recruits and no separate recruitment targets have been calculated.

In summary, the offsets for the loss of vegetation under the current concept plan and subject to detailed design are to:

- generate 2.39 habitat hectares of native vegetation through sourcing, permanent protection and management of another area of vegetation.
- source and permanently protect 12 other Large Old Trees (for the loss of large trees in patches). This will also allow for associated recruitment of 60 new trees.

A tree is considered 'protected' by protecting an area twice the canopy diameter around the tree to allow for falling limbs and other ecological processes (DSE 2007b). Trees retained in parks or road reserves that will have a mowing regime underneath and not allow for falling limbs/recruitment are counted as 'retained' but not 'protected'. Recruitment close to mature trees within tree protection areas is generally undesirable as it may stress the mature trees through competition for resources.

5.4 Offsets available

5.4.1 On site

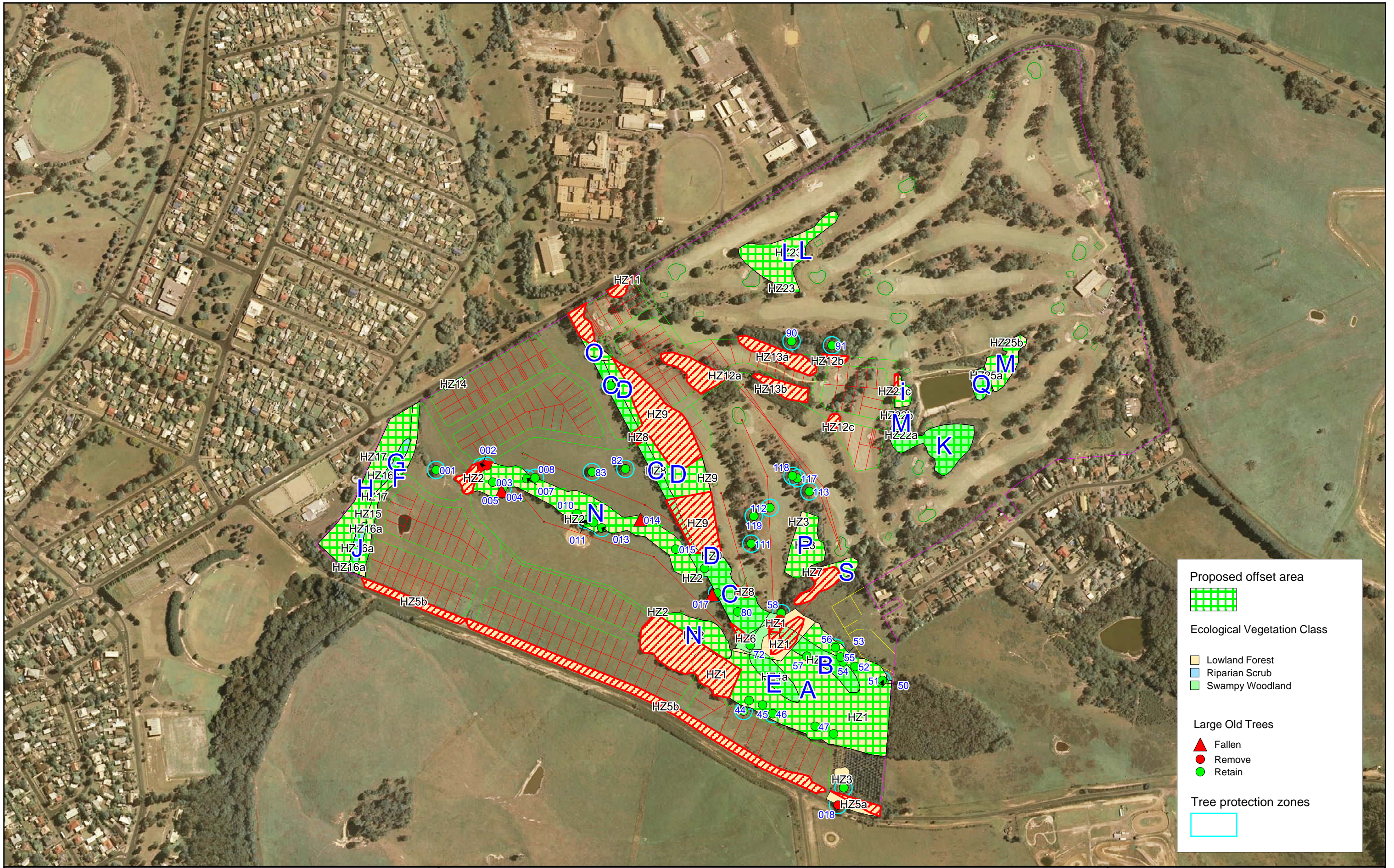
The proponent intends to retain and manage some areas of native vegetation within the study area as a Net Gain offset area (Figure 4). These account for all proposed losses in habitat hectares and meet like-for-like criteria described in The Framework. These areas need to be permanently protected through an appropriate legal mechanism and will be actively managed for a nominated 10 year period. They also need to be appropriately managed to DSE standards. Most management works will involve weed control and there is potential on site to significantly reduce the amount of woody weed biomass within proposed offset areas.

5.4.1.1 Patches of native vegetation

The offset available from retained patches on site is calculated using the DSE Gain Calculator:

(<http://www.dse.vic.gov.au/DSE/nrence.nsf/LinkView/74DC19C326C445BECA2571AE00037FC0B32D42FB223C7345CA25712B0007130A>)

Copies of the DSE Gain Calculator results for each offset habitat zone are presented in Appendix 4 and summarised in Table 8.



Biosis Research Pty. Ltd.
 38 Bertie Street
 (PO Box 489)
 Port Melbourne
 VICTORIA 3207

Offices also in:
 Sydney, Ballarat, Wollongong,
 Canberra, & Wangaratta

Figure 4. Proposed native vegetation offsets, Yallourn Golf Course, Victoria

DATE: 17 July 2012

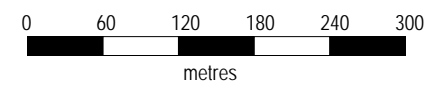
Checked by: RDS

Drawn by: MDD

File number: 14946

Location: ...\\14964\Mapping\14964 Figure 4.wor

Scale:



The total gains shown in Table 10 (2.44 HabHa) do not account for trading up in conservation significance. The gains have been determined on the following basis.

- Lowland Forest medium conservation significance zones provide 0.08 HabHa gain of a 0.53 HabHa target. This leaves a deficit of 0.46 HabHa.
- Swampy Woodland high conservation significance zones provide a 0.02 HabHa gain of a 0.02 HabHa target.
- Lowland Forest high conservation significance zones provide a 1.73 HabHa gain of a 1.66 HabHa target. This leaves a surplus of 0.07 HabHa. Some of this area needs to provide best 50% of habitat within the bioregion for Swamp Skink and Green Scentbark.
- Riparian Scrub very high conservation significance zones provide a 0.08 HabHa gain for there is no specific target. This provides a surplus of 0.08 HabHa.
- Swampy Woodland very high conservation zones provide a 0.53 HabHa gain of a 0.18 HabHa target. This leaves a surplus of 0.35 HabHa.

The deficit in Lowland Forest offset requirement (0.46 HabHa) can be achieved in surplus high or very high conservation significance vegetation. This is consistent with the Native Vegetation Framework like-for-like criteria.

Table 8: Summary of potential offsets.

Offset Habitat Zone	EVC	Current habitat score	Conservation significance	Area (ha)	Gain Score	Potential habitat hectares generated as an offset
A	SW	47	H	3.29	0.24	0.79
B	SW	49	VH	0.4	0.23	0.09
C	SW	41	VH	1.15	0.20	0.23
D	SW	34	H	0.7	0.19	0.13
E	LF	47	VH	0.3	0.22	0.07
F	LF	38	H	0.4	0.20	0.08
G	RScr	38	VH	0.3	0.20	0.06
H	LF	32	H	1.04	0.19	0.2
I	LF	29	H	0.1	0.18	0.02
J	RScr	36	VH	0.13	0.19	0.02
K	SW	43	VH	0.66	0.21	0.14
L	LF	34	H	0.8	0.20	0.16
M	LF	32	H	0.3	0.16	0.05
N	LF	22	H	2	0.12	0.25
O	LF	24	M	0.08	0.08	0.01
P	SW	26	M	0.5	0.12	0.06
Q	LF	35	H	0.14	0.17	0.02
R	LF	43	H	0.14	0.21	0.03
S	LF	60	H	0.1	0.24	0.02
Total				12.8		2.43

5.4.1.2 Protected Trees

Figure 4 provides the locations of available Large Old Trees which may be protected for the possible required 12 Large Old Tree offset. The location of the 12 trees should be determined based on best landscape protection with consideration to the proposed ongoing land use of the study area.

5.5 Summary of overall net gain result

In summary, a total of 2.44 HabHa could be generated through management of vegetation on site. This requires that some medium conservation significance losses are offset with high or very high conservation significance vegetation.

The proponent is responsible for sourcing, protection and the first 10 years of management of offset sites. An Offset Management Plan must be developed for any Net Gain offset sites.

6. ECOLOGICAL CONSTRAINTS AND RECOMMENDATIONS

This section identifies the potential implications of proposed development on the ecological values of the study area and includes recommendations to assist Monash Views Pty. Ltd. to design a development to minimise impacts on biodiversity. The Development Plan (Appendix 6) has been prepared with regard to the three step approach of Net Gain and has sought to retain where possible the best areas of native vegetation in contiguous reserves. Anticipated loss of native vegetation can be appropriately offset on site.

A summary of potential implications of development of the study area and recommendations to minimise impacts during the design phase of the project is provided in Table .

Table 9: Summary of potential implications of developing the study area and recommendations to minimise ecological impacts during the design phase.

Ecological feature (Figure 2)	Implications of development	Recommendations
Native vegetation (patches and trees)	<p>The permanent removal of up to 1.74 habitat hectares of vegetation and removal of up to three Large Old Trees.</p> <p>Removal of habitat for significant species with best or remaining 50% of habitat within the bioregion:</p> <ul style="list-style-type: none"> - Orange-tip Finger-orchid - Slender Pink-fingers - Mountain Bird-orchid - Green Scentbark - Grey Goshawk - Black Falcon - Powerful Owl - Swamp Skink 	<p>Avoid and minimise removal of native vegetation, in accordance with Net Gain policy. Refer to Section 5.</p> <p>Identify and implement appropriate offsets for vegetation losses as outlined in Section 5. There is an opportunity to provide all offsets on site.</p> <p>Further survey for Swamp Skink will resolve determination of presence in study area, and help to guide management implications.</p>
Other habitat features	<p>Removal of known/potential habitat for significant flora species (as identified in Table 2).</p> <p>Removal of potential habitat for significant fauna species (as identified in Table 2).</p>	<p>Ensure larger patches of native vegetation are linked where possible by existing native vegetation or revegetation.</p>
Instream / aquatic habitat	<p>Potential alterations to, aquatic / in-stream habitat within and in the vicinity of the study area (e.g. downstream) via hydrological changes or potential sedimentation during construction.</p>	<p>Place stormwater treatment facilities (e.g. treatment/retention wetlands) parallel / adjacent to mapped waterways (VicMap Hydro 1:25000) and not online.</p> <p>Protect waterways by inclusion of appropriate buffers into design. Road batters and all services should be excluded from waterways and their buffers.</p> <p>Incorporate relevant Water Sensitive Road</p>

Ecological feature (Figure 2)	Implications of development	Recommendations
		<p>Design (Wong et al. 2000) elements such as porous pavements, swale drains, buffer strips, flow detention/retention by infiltration and treatment wetlands/ponds, wherever practical/appropriate.</p> <p>Minimise the removal of native vegetation within or adjacent to waterbodies and watercourses.</p>
Habitat connectivity	Removal of vegetation / habitat that form linkages between significant areas of remnant forest.	<p>Retain fauna habitat linkages within the development and the local area.</p> <p>Avoid removal of vegetation that will isolate remnant patches of vegetation.</p>
Retained areas	Reduced viability of flora and fauna species in the retained areas in the longer term due to reductions in habitat.	<p>Where possible design surrounding development with a road interface rather than lot boundaries to provide a buffer from adjacent land uses.</p> <p>A management plan to retain / enhance biodiversity values of reserves (and the golf course) will need to be prepared and implemented. An ecological consultant should prepare or be involved in the preparation of these documents to ensure ecological mitigation measures are thoroughly explored.</p> <p>Areas of remnant vegetation that contain a high proportion of exotic or non-indigenous Australian natives could be subject to selective removal of these plants. This would enhance the value of the vegetation and provide opportunities for indigenous species to regenerate.</p>

The principal means to reduce impacts on biodiversity values within the study area will be to minimise removal of native vegetation and habitat, avoid disruption to the habitat linkages between areas of Lowland Forest and Swampy Woodland in the north east of the study area, and to avoid Sandy creek.

The results of this flora and fauna assessment should therefore be used to inform design of the development. The design phase of the project is critical to determining specifics of how ecological values will be incorporated and managed within the development. It is also the time during which requirements for infrastructure and services must be forecast and allowance made within the design plan for all construction works (including road batters, footpaths and services) to be sited outside of any nominated reserves/retained areas so they will be treated as no-go zones and not be encroached upon as development progresses.

Prescriptions for mitigation of potential impacts of construction activities on retained native vegetation and habitat should be addressed in a site-specific Construction Environmental Management Plan.

An Ecological Management Plan should be prepared to provide detailed advice for the long-term protection and management of retained vegetation, habitat and linkages and for the creation of habitat features such as wetlands.

REFERENCES

- DNRE 2002. *Victoria's Native Vegetation Management: A Framework for Action*. Department of Natural Resources & Environment, Victoria.
- DSE 2003. Action Statement for Swift Parrot *Lathamus discolor*. Flora and Fauna Guarantee Act 1988. Department of Sustainability & Environment, Melbourne.
- DSE 2004. *Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3*. Department of Sustainability & Environment, Melbourne.
- DSE 2005a. *Advisory List of Rare or Threatened Plants in Victoria - 2005*, Victorian Department of Sustainability & Environment, East Melbourne, Victoria.
- DSE 2005b. *Biosites Maps and Reports, Port Phillip Region* (CD). Department of Sustainability & Environment, Melbourne.
- DSE 2007a. *Advisory List of the Threatened Vertebrate Fauna in Victoria - 2007*, Department of Sustainability & Environment, East Melbourne, Victoria.
- DSE 2007b. *Native Vegetation - Guide for assessment of referred planning permit applications*. Victorian Government, Department of Sustainability & Environment, East Melbourne.
- DSE 2010. Victorian Biodiversity Atlas 'VBA_FAUNA25, FAUNA100 & FAUNARestricted, FLORA25, FLORA100 & FLORARestricted' August 2010 © The State of Victoria, Department of Sustainability & Environment.
- DEWHA 2009a. *Matters of National Environmental Significance. Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Water, Heritage & the Arts. Australian Government, Canberra.
- DEWHA 2009e. *Significant impact guidelines for 36 migratory shorebird species: Migratory species*. Draft EPBC Act policy statement 3.21. Department of the Environment, Water, Heritage & the Arts. Australian Government, Canberra.
- Ecology and Heritage Partners (2011) Flora and fauna assessment, and net gain investigations of the proposed Yallourn Golf Course re-development Newborough, Victoria. Prepared for Monash Views Pty Ltd.

APPENDICES

APPENDIX 1: SURVEY METHODS

A1.1 Flora Survey Methods

Flora survey are described in section 2.4.1 and were conducted under the terms of a research permit/permit to take protected flora issued by the Department of Sustainability and Environment under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975*.

A1.2 Terrestrial Fauna Survey Methods

Standard survey techniques were used during fauna survey. This assessment for the current survey was limited observation only during daylight hours. Other

Fauna survey has been conducted under the terms of a research permit issued by the Department of Sustainability and Environment under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975*. The research permit number is 10006240, expiry date 9 May 2015.

Biosis Research Pty. Ltd. conducts fauna survey within Standard Operating Procedures (SOPs) approved by the Wildlife and Small Institutions Animal Ethics Committee of the Department of Primary Industries (Biosis Research 2010). A copy of these SOPs is available on request.

Other survey methods are described by EHP (2011).

APPENDIX 2: FLORA

Notes to tables:

EPBC Act: CR - Critically Endangered (EPBC Act) EN - Endangered (EPBC Act) VU - Vulnerable (EPBC Act)	DSE 2005a: e - endangered v - vulnerable r - rare
L - listed as threatened under FFG Act	P - protected under the FFG Act (public land only)
## - Native species outside natural range	Noxious weed status: SP State prohibited species RP Regionally prohibited species RC Regionally controlled species RR Regionally restricted species
Source of record: Year – Victorian Biodiversity Atlas 2010 # - DSEWPaC database (accessed June 2012) 2012 – current assessment ‡ species predicted to occur by Biosis Research based on natural distributional range and suitable habitat despite lack of records in the databases searched	

A2.1 Flora species recorded from the study area

A list of flora recorded from the study area is provided in EHP (2011).

In addition to these species, Small St. John Wort *Hypericum gramineum*, Wiry Spear-grass *Austrostipa muelleri*, Small Poranthera *Poranthera microphylla* and Stiped Wallaby-grass *Austrodanthonia racemosa* were recorded during additional habitat hectare assessments. None of these additional species are rare or threatened at state or national level.

The following high threat weed species were also recorded within habitat zones: White Clover *Trifolium repens*, Large Quaking Grass *Briza maxima*, Kikuyu *Pennisetum clandestinum*, Freesia *Freesia* sp., Cocksfoot *Dactylis glomerata*, Capeweed *Arctotheca calendula*, Cape Wattle *Acacia elata* and Paspalum *Paspalum dilatatum*.

A2.2 Significant flora species

Table A2.2. Significant flora species recorded / predicted to occur within 5 km of the study area.

Scientific Name	Common Name	Conservation Status			Most recent database record	Habitat description	Likely Occurrence in Study Area	Rationale for likelihood ranking
		EPBC	DSE	FFG				
<i>Dianella amoena</i>	Matted Flax-lily	EN	e	L,P	#	The Matted Flax-lily is a rhizomatous plant which forms loose mats to 5 metres wide (Carr and Horsfall 1995). It is found in lowland grassland and grassy woodland habitats, on well drained to seasonally waterlogged fertile sandy loam to heavy cracking clays (Carr and Horsfall 1995)	Low	Poor examples only of some modified grassy vegetation.
<i>Prasophyllum frenchii</i>	Maroon Leek-orchid	EN	e	L,P	#	This orchid occurs in a variety of grassland and grassy woodland environments throughout southern Victoria.	Negligible	No habitat present.
<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass	VU			2001	This stoloniferous perennial grass inhabits swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria (Walsh and Entwisle 1994).	Low	Some dams present although these contain little native vegetation. No other habitat present.
<i>Eucalyptus strzeleckii</i>	Strzelecki Gum	VU	v	L,P	#	Forests and swampy woodland around South Gippsland.	Low	Some habitat present although not optimal. Swamp Gums within

Scientific Name	Common Name	Conservation Status			Most recent	Habitat description	Likely Occurrence	Rationale for likelihood ranking
							vicinity of proposed impact inspected and none fitted this species.	
<i>Xerochrysum palustre</i>	Swamp Everlasting	VU	v	L,P	#	Grows in sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils (Walsh & Entwisle 1999). Scattered and rare due to habitat loss for agriculture (Walsh & Entwisle 1999; DSE Action Statement No. 229 2008)	Negligible	No habitat present.
<i>Pterostylis lustra</i>	Small Sickle Greenhood		e	L,P	1500	Apparently confined to <i>Leptospermum lanigerum</i> swamps and stream on black, peaty alkaline soils (Duncan et al. 2010).	Negligible	No habitat present.
<i>Eucalyptus fulgens</i>	Green Scentbark		r		2004	Grows in a variety of forests and woodlands in ranges east of Melbourne and in South Gippsland.	Present	Several individuals and expected to have once been relatively common within the landscape.
<i>Sowerbaea juncea</i>	Rush Lily		r		1853	Waterlogged sandy soils in lowland wet heathland (FIS 2011).	Negligible	No habitat present.
<i>Acacia howittii</i>	Sticky Wattle		r	P	2002	Forests and woodland in the central highlands and South Gippsland.	Low	Some habitat present although not recorded during surveys.

Scientific Name	Common Name	Conservation Status			Most recent	Habitat description	Likely Occurrence	Rationale for likelihood ranking
			r	P				
<i>Caladenia aurantiaca</i>	Orange-tip Finger-orchid		r	P	1942	Near coastal lowland forest and heathy woodland (Backhouse and Jeanes 2006)	Medium	Some habitat present where it may occupy Lowland Forest during suitable conditions.
<i>Caladenia vulgaris</i>	Slender Pink-fingers		r	P	2004	Scattered throughout southern Victoria in heathy woodland (Backhouse and Jeanes 2006)	Medium	Some habitat present where it may occupy Lowland Forest during suitable conditions.
<i>Chiloglottis jeanesii</i>	Mountain Bird-orchid		r	P	2002	Damp, shaded moist foothill and montane forest (Backhouse and Jeanes 2006)	Medium	Some habitat present where it may occupy Lowland Forest during suitable conditions.
<i>Desmodium varians</i>	Slender Tick-trefoil		k		2003	Slender Tick-trefoil grows in a broad range of vegetation types, but it is generally associated with rocky outcrops and escarpments.	Medium	Some habitat present where it may occupy Lowland Forest or Swampy Woodland during suitable conditions.
<i>Acacia leprosa</i> var. <i>graveolens</i>	Common Cinnamon-wattle		k	P	1940	Scattered in southern Victoria in a variety of foothill forests.	Low	Some habitat present although not recorded during surveys.

Scientific Name	Common Name	Conservation Status			Most recent	Habitat description	Likely Occurrence	Rationale for likelihood ranking
<i>Caladenia australis</i>	Southern Spider-orchid		k	P	1947	Grows in heath, heathy woodland and lowland forest (Jeanes and Backhouse 2006). Due to the age of the record and changes in relevant taxonomy, it is uncertain which taxon this record applies to.	Low	May occupy Lowland forest although no recent records to confirm presence of <i>Caladenia australis</i> s.s.

APPENDIX 3: FAUNA

Notes to tables:

EPBC Act: EX - Extinct CR - Critically Endangered EN - Endangered VU - Vulnerable CD - Conservation dependent	DSE 2007a: ex - extinct cr - critically endangered en - endangered vu - vulnerable nt - near threatened dd - data deficient rx - regionally extinct L - listed as threatened under FFG Act
* - introduced species ** - pest species listed under the CaLP Act	
Source of record: Year – record from within 10km on Victorian Biodiversity Atlas # - DSEWPaC database (accessed on 12.06.2012) 2012 – record from current assessment ‡ species predicted to occur by Biosis Research based on natural distributional range and suitable habitat despite lack of records in the databases searched	

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

A3.1 Fauna species recorded from the study area

Table A3.1. Fauna recorded from the study area during the present assessment (Biosis Research 2012) and previous assessment (Ecology and Heritage Partners 2005).

Status	Scientific Name	Common Name	EHP (2005)	BR (2012)
	Birds			
	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	✓	
	<i>Acanthiza lineata</i>	Striated Thornbill	✓	
	<i>Acanthiza nana</i>	Yellow Thornbill	✓	
	<i>Acanthiza pusilla</i>	Brown Thornbill	✓	
*	<i>Acridotheres tristis</i>	Common Myna	✓	
	<i>Alisterus scapularis</i>	Australian King-Parrot	✓	✓
	<i>Anas superciliosa</i>	Pacific Black Duck		✓
	<i>Anthochaera carunculata</i>	Red Wattlebird	✓	✓
	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	✓	
	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	✓	
	<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-Cockatoo	✓	
*	<i>Carduelis carduelis</i>	European Goldfinch	✓	
	<i>Chenonetta jubata</i>	Australian Wood Duck		✓
	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	✓	✓
	<i>Cormobates leucophaeus</i>	White-throated Treecreeper	✓	
	<i>Corvus coronoides</i>	Australian Raven	✓	
	<i>Corvus mellori</i>	Little Raven	✓	✓
	<i>Cracticus torquatus</i>	Grey Butcherbird	✓	✓
	<i>Cracticus tibicen</i>	Australian Magpie	✓	✓
	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	✓	
	<i>Dicaeum hirundinaceum</i>	Mistletoebird	✓	
	<i>Eolophus roseicapilla</i>	Galah	✓	✓

Status	Scientific Name	Common Name	EHP (2005)	BR (2012)
	<i>Eopsaltria australis</i>	Eastern Yellow Robin		✓
	<i>Falco berigora</i>	Brown Falcon	✓	
	<i>Falco cenchroides</i>	Nankeen Kestrel	✓	
	<i>Grallina cyanoleuca</i>	Magpie-lark	✓	✓
	<i>Hirundo neoxena</i>	Welcome Swallow	✓	✓
	<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	✓	
	<i>Lichenostomus leucotis</i>	White-eared Honeyeater	✓	✓
	<i>Lichenostomus virescens</i>	Singing Honeyeater		✓
	<i>Malurus cyaneus</i>	Superb Fairy-wren		✓
	<i>Manorina melanocephala</i>	Noisy Miner	✓	
	<i>Melithreptus lunatus</i>	White-naped Honeyeater	✓	
	<i>Neochmia temporalis</i>	Red-browed Finch	✓	
	<i>Pachycephala pectoralis</i>	Golden Whistler	✓	
	<i>Pardalotus punctatus</i>	Spotted Pardalote	✓	
	<i>Pardalotus striatus</i>	Striated Pardalote	✓	
*	<i>Passer domesticus</i>	House Sparrow	✓	
	<i>Petroica boodang</i>	Scarlet Robin	✓	
	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	✓	
	<i>Phylidonyris pyrrhoptera</i>	Crescent Honeyeater	✓	
	<i>Platycercus elegans elegans</i>	Crimson Rosella	✓	✓
	<i>Platycercus eximius</i>	Eastern Rosella	✓	✓
	<i>Psophodes olivaceus</i>	Eastern Whipbird	✓	
	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird	✓	
	<i>Rhipidura albiscarpa</i>	Grey Fantail	✓	✓
	<i>Rhipidura leucophrys</i>	Willie Wagtail	✓	
	<i>Strepera graculina</i>	Pied Currawong	✓	
	<i>Strepera versicolor</i>	Grey Currawong		✓
*	<i>Streptopelia chinensis</i>	Spotted Turtle-Dove	✓	
*	<i>Sturnus vulgaris</i>	Common Starling	✓	✓
*	<i>Turdus merula</i>	Common Blackbird	✓	✓
	<i>Vanellus miles</i>	Masked Lapwing	✓	
	<i>Zosterops lateralis</i>	Silvereye	✓	
	Mammals			
**	<i>Lepus europeus</i>	European Hare	✓	
**	<i>Oryctolagus cuniculus</i>	European Rabbit	✓	✓
	<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum	✓	
	<i>Rattus fuscipes</i>	Bush Rat	✓	
	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	✓	
	<i>Trichosurus vulpecula</i>	Common Brushtail Possum	✓	
**	<i>Vulpes vulpes</i>	Red Fox	✓	
	Reptiles			
	<i>Lampropholis delicata</i>	Delicate Skink	✓	
	<i>Lampropholis guichenoti</i>	Garden Skink	✓	✓
	Frogs			
	<i>Crinia signifera</i>	Common Froglet	✓	✓
	<i>Limnodynastes peronii</i>	Striped Marsh Frog	✓	
	<i>Litoria ewingii</i>	Southern Brown Tree Frog	✓	
	<i>Litoria verreauxii</i>	Verreaux's Tree Frog	✓	
	Invertebrates			
	<i>Engaeus</i> spp.	Burrowing Crayfish		✓

A3.2 Significant fauna species

Table A3.2. Significant fauna species recorded, or predicted to occur, within 10 km of the study area. Fauna species in these tables are listed in alphabetical order within their taxonomic group.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
National Significance								
Birds								
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	en	L	2008/#	Low	Waterbodies do not contain sufficient vegetation cover.	Occurs in wetlands with tall, dense vegetation where it forages in shallow water at the edges of pools or waterways. Prefers permanent freshwater habitats, particularly when dominated by sedges, rushes and reeds.
<i>Lathamus discolor</i>	Swift Parrot	EN	en	L	2001/#	Low	Preferred feeding trees (DSE 2003) not present on site.	Migrates to south-east mainland Australia during the winter months where it prefers dry, open eucalypt forests and woodlands, especially box-ironbark forest in north-central Victoria. Has also been recorded in urban parks, gardens, street trees and golf courses with flowering trees and shrubs.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Anthochaera phrygia</i>	Regent Honeyeater	EN	cr	L	#	Low	Sufficient habitat not present on site	Inhabits dry woodlands and forests dominated by box and ironbark eucalypts. Distribution currently restricted to the Chiltern Box-Ironbark National Park in northern Victoria following severe range contraction and population decline.
<i>Rostratula australis</i>	Australian Painted Snipe	VU	cr	L	#	Low	Waterbodies do not contain sufficient vegetation cover.	Occurs in shallow terrestrial freshwater wetlands, including lakes and swamps, waterlogged grassland or saltmarsh. Also uses modified habitats such as pasture, sewage farms, dams and irrigated areas. Roosts and loafs on the ground under clumps of lignum or dense ground cover.
<i>Sternula nereis</i>	Fairy Tern	VU	en	L	#	Negligible	Habitat not present on site	Fairy Terns inhabit coastal environments including intertidal mudflats, sand flats and beaches. Nests above high-water mark on sandy shell-grit beaches.
Mammals								
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	EN	en	L	#/1962	Low	Substantial habitat loss since previous records.	The Spot-tailed Quolls have been known to inhabit many forested areas including rainforest, wet eucalypt forest and River Red Gum woodlands as well as numerous records in

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								drier habitat types. Considered to be locally extinct in much of agricultural Victoria, it has rarely been recorded in widely scattered locations across the State in recent years.
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot	EN	nt	L	#	Negligible	Habitat extremely fragmented in its extent and quality is low.	Typically occurs in heathland, shrubland, heathy forest and woodland habitat across southern Victoria.
<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo	VU	en	L	#	Negligible	Habitat not present on site	Widespread in coastal and near-coastal areas in Victoria and the Grampians. Utilise a variety of wet forest and wet scrub habitats, usually those developed on sandy loam soils with dense understorey vegetation.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	VU	cr	L	#	Negligible	Habitat not present on site	Currently known only from the tributaries of the Snowy River in East Gippsland and the Grampians in the west. Found in rainforest gullies, wet and dry sclerophyll forest, and open woodlands. Prefers rock faces with large tumbled boulders, ledges and caves and areas that are relatively open and receiving direct sunlight for much of the day.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	VU	vu	L	#	Low	No records of the species within 10km. However mature trees	Utilises a wide range of habitats from lowland rainforest in East Gippsland and coastal

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
							may provide marginal foraging habitat.	Stringybark forests to agricultural land and suburban gardens, with permanently established colonies in Melbourne, Geelong and Mallacoota.
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	VU	vu	L	#	Negligible	Habitat extremely fragmented in its extent and quality is low.	Inhabits a variety of habitats along the coast of south-eastern Australia, including coastal heath, heathy woodland and coastal scrub habitats with a high density of leguminous ground plants (Braithwaite and Gullan 1978).
<i>Pseudomys fumeus</i>	Smoky Mouse	EN	cr	L	#	Negligible	Habitat extremely fragmented in its extent and quality is low.	Disjunct Victorian distribution with populations in the Snowfields, Eastern Highlands, East Gippsland, Otway Range and the Grampians. Recorded from a variety of vegetation communities ranging from coastal heath and heathy woodland in East Gippsland to subalpine heath and dry forest. The understorey vegetation is typically dominated by heathy shrubs.
Frogs								
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	VU	vu	L	#	Negligible	Habitat not present on site	Prefers hanging swamps on sandstone shelves adjacent to perennial non-flooding creeks. Can also occur within shale outcrops within sandstone

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								formations. Known from wet and dry forests and montane woodland.
<i>Litoria raniformis</i>	Growling Grass Frog	VU	en	L	1982/#	Low	Waterbodies do not contain sufficient vegetation cover	Occupies a variety of permanent and semi-permanent water bodies generally containing abundant submerged and emergent vegetation, within lowland grasslands, woodlands and open forests.
Fish								
<i>Prototroctes maraena</i>	Australian Grayling	VU	vu	L	1998/#	Negligible	Habitat not present on site	A diadromous species which spends most of its life in freshwater within rivers and large creeks. Juveniles inhabit estuaries and coastal seas. Adults occur in freshwater habitats, typically rivers and streams with cool, clear waters and gravel substrates, but occasionally also in turbid waters.
<i>Galaxiella pusilla</i>	Dwarf Galaxias	VU	vu	L	2000/#	Medium	Some suitable habitat present on site	Occurs in relatively shallow still or slow flowing water bodies including streams, wetlands, drains, that in many instances are ephemeral and partially dry up over summer. Typically requires abundant marginal and aquatic vegetation.
Invertebrates								

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Synemon plana</i>	Golden Sun Moth	CR	cr	L	#	Negligible	Habitat not present on site	This small diurnal moth inhabits grassy woodlands and grasslands. Once thought to be a specialised species inhabiting grasslands dominated by Wallaby-grasses, it is now recognised that this species can occur in exotic grasslands dominated by Chilean Needle Grass <i>Nassella neesiana</i> .
State Significant								
Birds								
<i>Coturnix ypsilophora</i>	Brown Quail		nt		2000	Low	Fringing wetland habitat is extremely fragmented in its extent and quality is low.	Found in a variety of habitats including grasslands, croplands, heaths, rainforest edges, and woodlands. Habitat is generally wet with tall, rank ground vegetation in stands of reeds or rushes usually fringing freshwater wetlands and floodplains. Can occur on road verges provided paddocks are nearby and occasionally recorded from suitable habitat in semi-urban areas.
<i>Phalacrocorax varius</i>	Pied Cormorant		nt		2000	Low	Waterbodies of insufficient quality to support species.	Mainly inhabits marine environments and coastal waters including beaches, coastal lagoons, estuaries and rock platforms. Also found in

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								terrestrial wetlands with open expanses of permanent water including rivers, inland lakes and billabongs.
<i>Chlidonias leucopterus</i>	White-winged Black Tern		nt		2000	Negligible	Habitat not present on site	A seasonal migrant that occurs in coastal, subcoastal and terrestrial wetlands including bays, estuaries, swamps and floodplains. Majority of records in Victoria are from the Gippsland Lakes and the western shoreline of Port Phillip Bay.
<i>Chlidonias hybrida</i>	Whiskered Tern		nt		2001	Negligible	Habitat not present on site	A breeding migrant to Australia from September to March where it occurs in wetlands, lakes, swamps, rivers, and other water bodies with submerged and emergent vegetation such as grasses, sedges, reeds and rushes. Rarely recorded along rivers or creeks.
<i>Gelochelidon nilotica</i>	Gull-billed Tern		en	L	1978	Negligible	Habitat not present on site	Usually occurs on shallow terrestrial wetlands, less often using sheltered embayments, estuaries, tidal mudflats and beaches. In Australia mainly breeds in inland areas following major flooding events.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Sternula albifrons</i>	Little Tern		vu	L	2000	Negligible	Habitat not present on site	This bird is mostly recorded in sheltered coastal environments, including bays, lagoons and estuaries. Nests on sandy substrates containing much shell-grit, which provides good camouflage for their eggs.
<i>Larus pacificus</i>	Pacific Gull		nt	I	1998	Negligible	Habitat not present on site	Occurs along sandy and, less often, rocky coasts usually in areas protected from ocean swells, such as bays estuaries and lagoons. Breeds in a variety of coastal habitats including rocky outcrops, small hillocks, ridges, sides of cliffs and sometimes low-lying beaches. Sometimes occur up to 10 kilometres inland, especially at rubbish tips and wetlands.
<i>Pluvialis fulva</i>	Pacific Golden Plover		nt		1998	Negligible	Habitat not present on site	A migratory shorebird that usually occurs in small flocks and occupies a range of coastal habitats including mudflats, sandflats rocky shores and saltmarsh.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Gallinago hardwickii</i>	Latham's Snipe		nt		2007	Low	Waterbodies do not contain sufficient vegetation cover.	A migrant to Australia from July to April occurring in a wide variety of permanent and ephemeral wetlands. Prefers open freshwater wetlands with nearby cover, but also recorded on the edges of creeks and rivers, river-pools and floodplains. Forages in soft mud at edge of wetlands and roosts in a variety of vegetation around wetlands including tussock grasslands, reeds and rushes, tea-tree scrub, woodlands and forests.
<i>Plegadis falcinellus</i>	Glossy Ibis		nt		2001	Low	Marginal habitat on site.	Glossy Ibis are usually found foraging in wet pasture environments and low lying wetland areas. This species is only rarely recorded in Victoria. Prefers freshwater wetlands especially permanent or ephemeral water bodies on floodplains but also found in sheltered coastal environments.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Platalea regia</i>	Royal Spoonbill		vu		2007	Low	Waterbodies do not contain sufficient vegetation cover.	Often seen around permanent and ephemeral waters in the arid interior of east Australia foraging in shallow waters. Prefers terrestrial wetlands and wet grassland areas, particularly large expanses of water such as lakes, swamps or lagoons. Also utilises rivers for its feeding activities and has regularly been recorded in coastal habitats such as estuaries, inlets and intertidal mudflats.
<i>Egretta garzetta</i>	Little Egret		en	L	1999	Low	Waterbodies do not contain sufficient vegetation cover.	Occupies a wide range of wetlands and typically prefers the shallows of wetlands for foraging activities. Occasionally they will forage in small waterways or wet grassland areas.
<i>Ardea intermedia</i>	Intermediate Egret		cr	L	1978	Low	Waterbodies do not contain sufficient vegetation cover.	Breeds in flooded or fringing trees alongside wetlands.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Ardea modesta</i>	Eastern Great Egret		vu	L	2007	Low	Waterbodies do not contain sufficient vegetation cover.	Usually found in terrestrial wetland, estuarine and wet grassland habitats particularly permanent well-vegetated water bodies but also use freshwater meadows, channels and larger dams. Forages by wading on shallow open water, generally avoiding dry or deeply flooded areas preferring moist, low-lying, poorly drained pasture, especially near hollows and ditches and where tussocks of long grass are present. Uses estuarine mudflats as summer-autumn or drought refuges.
<i>Anas rhynchos</i>	Australasian Shoveler		vu		2007	Low	Waterbodies are too small and do not contain sufficient vegetation cover.	Prefers large, permanent lakes and swamps with deep water, stable conditions and abundant aquatic vegetation. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams. Forages in open water but nests in densely vegetated freshwater wetlands, where fringing vegetation may be an important habitat feature.
<i>Aythya australis</i>	Hardhead		vu		2006	Low	Waterbodies are too small and do not	A mainly aquatic species preferring large, deep

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
							contain sufficient vegetation cover.	freshwater environments with abundant aquatic vegetation, including slow moving areas of rivers. Also occurs in brackish wetlands and can be found in deep dams and water storage ponds. Occasionally in estuarine and littoral habitats such as salt pans, coastal lagoons and sheltered inshore waters. Avoids main streams or rivers, except in calm reaches where aquatic flora is developed.
<i>Oxyura australis</i>	Blue-billed Duck		en	L	2007	Low	Waterbodies are too small and do not contain sufficient vegetation cover.	A largely aquatic species preferring deep, large permanent wetlands with stable conditions and abundant aquatic vegetation, including Melaleuca swamps. Occurs less commonly on river frontages, billabongs and flooded depressions. It is a secretive bird, rarely venturing far from dense vegetative cover in wetland areas.
<i>Biziura lobata</i>	Musk Duck		vu		2001	Low	Waterbodies are too small and do not contain sufficient vegetation cover.	A largely aquatic species preferring deep water on large, permanent swamps, lakes and estuaries with abundant aquatic vegetation. Often occurs in areas of dense vegetated cover within a

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								wetland. Less commonly recorded in small or shallow waters, such as billabongs, sewage ponds, freshwater rivers and densely vegetated farm dams.
<i>Circus assimilis</i>	Spotted Harrier		nt		1977	Negligible	Not within frequented distributional range.	Inhabits open and wooded country of inland and sub-inland Australia, where they hunt over flat or undulating country with low vegetation cover. Most common over the Murray Valley with occasional visits to coastal Victoria.
<i>Accipiter novaehollandiae</i>	Grey Goshawk		vu	L	2000	Medium	Potential foraging habitat within forested and open areas within study area.	Occurs in forests and woodlands of coastal and subcoastal areas, with abundant hunting perches. Nest sites generally in the canopy of mature dense forest dominated by <i>Eucalyptus cypellocarpa</i> . Less often recorded hunting over open areas, such as floodplains, farmland or urban areas (i.e. parks, gardens and golf courses).
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		vu	L	2007	Negligible	Habitat not present on site	Occurs in marine habitats and terrestrial wetlands along or near coastal areas in eastern Victoria, particularly around large open wetlands such as deep freshwater swamps,

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								lakes, reservoirs and billabongs. Uses tall trees in or near water for breeding.
<i>Falco subniger</i>	Black Falcon		vu		2000	Medium	Potential foraging, roosting and nesting habitat within study area.	Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria, though can be forced into more coastal areas by droughts and subsequent food shortages. Occurs in woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Hunts mostly over open plains and undulating land with large tracts of low vegetation.
<i>Ninox strenua</i>	Powerful Owl		vu	L	1997	Medium	Potential foraging habitat within forested areas.	Prefers tall open sclerophyll forest and woodlands and requires large, hollow-bearing eucalypts for breeding. While the species has been recorded from a wide range of woodland habitats, preferred habitat typically contains a dense understorey and suitable roost trees with a dense canopy cover. The species is more commonly associated with large tracts of continuous forest, but will sometimes occur in more fragmented landscapes including suburban parklands although rarely, if

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
								ever, breeds in these areas.
<i>Ceyx azureus</i>	Azure Kingfisher		nt		1916	Negligible	Habitat not present on site	Azure Kingfishers are found in association with well vegetated freshwater wetlands and slow-flowing creeks and rivers, including artificial wetlands and drains, of open riverine or swamp forest or woodland environments and occasionally among mangroves in sheltered coastal areas.
<i>Chalcites osculans</i>	Black-eared Cuckoo		nt		1999	Negligible	Not within frequented distributional range.	Typically occupies open vegetation communities such as open eucalypt woodlands and shrublands in lower rainfall areas. In Victoria, mainly found north of the Great Dividing Range and in Western Victoria.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Melanodryas cucullata</i>	Hooded Robin		nt	L	1999	Low	Woodland is fragmented in its extent.	Occupies lightly timbered habitats such as eucalypt or acacia dominated woodlands and shrublands. Prefers areas with plenty of dead and fallen timber which provide perching points for foraging activities. This species has previously been recorded in the local area and could potentially utilise woodland and forest habitat within the study area on occasion.
<i>Cinclosoma punctatum</i>	Spotted Quail-thrush		nt		1977	Low	Forest is fragmented in its extent.	Occurs in drier forests, woodlands and scrub of south eastern Australia. Prefers areas with leaf litter, branches, rocks and tussocks. Often found on the sunny side of dry ridges.
<i>Chthonicola sagittata</i>	Speckled Warbler		vu	L	2001	Negligible	Habitat not present on site.	Inhabits dry woodlands with tussocks. Favours habitat containing rocks and branches for foraging and refuge.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (south-eastern ssp.)		nt		2000	Low	Not within frequented distributional range.	Often observed feeding on insects as it spirals up trees or when hopping along the ground or on fallen litter. Generally inhabits open eucalypt forests, woodlands and mallee, often where there are stands of dead trees.

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Stagonopleura guttata</i>	Diamond Firetail		vu	L	2000	Negligible	Habitat not present on site.	Occurs mostly in the lowlands and foothills in the north of Victoria. It has specific habitat requirements, which include grassy woodlands with tree cover for refuge and an undisturbed ground layer with grasses.
Mammals								
<i>Dasyurus viverrinus</i>	Eastern Quoll		rx	L	1900	Negligible	Considered regionally extinct.	The species is now restricted to Tasmania and is considered to be extinct from mainland Australia.
<i>Phascogale tapoatafa tapoatafa</i>	Brush-tailed Phascogale		vu	L	1967	Low	Substantial habitat loss since previous records. Insufficient hollows within forested areas.	Prefers open forest with sparse ground cover and abundant tree hollows used as den sites. Favours box, ironbark and Stringybark eucalypts, though sometimes found in wet forest of <i>Eucalyptus cypellocarpa</i> and <i>E. radiata</i> . Highly territorial, home ranges vary from 20-100 hectares.
<i>Miniopterus schreibersii</i>	Common Bent-wing Bat			L	1971	Medium	Wooded areas provide foraging habitat. No roosting sites within study area.	Occurs in woodlands and forests near large natural wetlands, river basins and agricultural areas in south-west Victoria, roosting in caves, mine adits or road culverts. Dispersal from the maternity roosts from April to March.
Reptiles								

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
<i>Lissolepis coventryi</i>	Swamp Skink		vu	L	2007	Medium	Suitable habitat occurs along drainage lines.	Occupies swamp scrub habitat in cool, temperate, low-lying wetlands and swamp margins with a dense shrub layer, particularly in near-coastal areas ranging from the Mt Gambier region in the west, across southern Victoria to just beyond the NSW border to the east. Often associated with stands of paperbark and tea-tree, suitable habitat occurs along rivers, lakes, swamp margins and estuarine areas, usually in heathy or scrubby areas.
<i>Pseudemoia rawlinsoni</i>	Glossy Grass Skink		nt		2008	Medium	Suitable habitat occurs along drainage lines.	Primarily associated with damp environments like drainage lines, soaks and the margins of creeks, though can also inhabit the fringes of coastal saltmarshes. Dense vegetation including rank grass, reeds and sedges, provide the moist microenvironments in which the species has been recorded most frequently.
Frogs								
<i>Pseudophryne semimarmorata</i>	Southern Toadlet		vu		1982	Low	Marginal habitat occurs in intact forested areas of high leaf litter. However extensive targeted surveys within	Occupies a variety of habitats in south-eastern Australia, such as open forests, lowland woodlands and heathlands where adults shelter beneath

Scientific Name	Common Name	Conservation Status			Most recent record	Likely occurrence in study area	Rationale for likelihood ranking	Habitat description
		EPBC	DSE	FFG				
							the Moe region have failed to locate this species within 7km of the study site (Craig Cleeland pers. comm.).	leaf litter and other debris in moist soaks and depressions.
Fish								
<i>Macquaria ambigua</i>	Golden Perch		vu	I	1988	Not assessed	NA	Occurs primarily in warm, turbid, sluggish, inland rivers and their associated backwaters and billabongs. Naturally occurs north of the Great Dividing Range, in the Murray-Darling River system.
Invertebrates								
<i>Tanjistomella verna</i>	Caddisfly		cr		1987	Not assessed	NA	N/A
<i>Engaeus</i> spp.	Burrowing Cray		nt,vu,en,cr		#	High for at least one species	Some Burrowing Cray holes were observed during the current assessment. Suitable habitat is present.	Data for the distribution of <i>Engaeus</i> sp. is lacking for many parts of Victoria. There are several threatened species of Burrowing Cray which are known by Biosis Research to occur within the region.

A3.3 Migratory species (EPBC Act listed)

Table A3.3. Migratory fauna species recorded or predicted to occur within 10 km of the study area.

Scientific Name	Common Name	Most recent record
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	2008
<i>Anas clypeata</i>	Northern Shoveler	1999
<i>Anthochaera phrygia</i>	Regent Honeyeater	#
<i>Apus pacificus</i>	Fork-tailed Swift	2001
<i>Ardea modesta</i>	Eastern Great Egret	2007
<i>Arenaria interpres</i>	Ruddy Turnstone	1998
<i>Bubulcus ibis</i>	Cattle Egret	2001
<i>Calidris ruficollis</i>	Red-necked Stint	2000
<i>Chlidonias leucopterus</i>	White-winged Black Tern	2000
<i>Gallinago hardwickii</i>	Latham's Snipe	2007
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	2007
<i>Hirundapus caudacutus</i>	White-throated Needletail	1982
<i>Leipoa ocellata</i>	Malleefowl	#
<i>Limosa lapponica</i>	Bar-tailed Godwit	1998
<i>Monarcha melanopsis</i>	Black-faced Monarch	2000
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	2000
<i>Plegadis falcinellus</i>	Glossy Ibis	2001
<i>Pluvialis fulva</i>	Pacific Golden Plover	1998
<i>Rhipidura rufifrons</i>	Rufous Fantail	2007
<i>Rostratula australis</i>	Australian Painted Snipe	#
<i>Sternula albifrons</i>	Little Tern	2000
<i>Tringa nebularia</i>	Common Greenshank	2000
<i>Tringa stagnatilis</i>	Marsh Sandpiper	1999

APPENDIX 4: NET GAIN

A4.1 Tree Data

Table A4.1 Summary of Large Old Trees and possible losses. Trees numbers are shown on Figure 2.

Tree number	Retain / remove	Size Class	Standing / fallen	Species
1	Retain	LOT	Standing	<i>Eucalyptus consideriana</i>
2	Remove	LOT	Standing	<i>Eucalyptus fulgens</i>
3	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
4	Retain	LOT	Standing	<i>Eucalyptus fulgens</i>
5	Fallen	LOT	Fallen	-
6	Remove	LOT	Standing	<i>Eucalyptus obliqua</i>
7	Retain	LOT	Standing	<i>Eucalyptus fulgens</i>
8	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
9	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
10	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
11	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
12	Retain	LOT	Standing	<i>Eucalyptus obliqua</i>
13	Retain	LOT	Standing	<i>Eucalyptus radiata</i>
14	Fallen	LOT	Fallen	-
15	Retain	LOT	Standing	<i>Eucalyptus radiata</i>
16	Retain	LOT	Standing	<i>Eucalyptus ovata</i>
17	Fallen	LOT	Fallen	-
18	Remove	LOT	Standing	<i>Eucalyptus ovata</i>
19	Retain	LOT	Standing	Not recorded
44	Retain	LOT	Standing	Not recorded
45	Retain	LOT	Standing	Not recorded

Tree number	Retain / remove	Size Class	Standing / fallen	Species
46	Retain	LOT	Standing	Not recorded
47	Retain	LOT	Standing	Not recorded
48	Retain	LOT	Standing	Not recorded
49	Retain	LOT	Standing	Not recorded
50	Retain	LOT	Standing	Not recorded
51	Retain	LOT	Standing	Not recorded
52	Retain	LOT	Standing	Not recorded
53	Retain	LOT	Standing	Not recorded
54	Retain	LOT	Standing	Not recorded
55	Retain	LOT	Standing	Not recorded
56	Retain	LOT	Standing	Not recorded
57	Retain	LOT	Standing	Not recorded
58	Retain	LOT	Standing	Not recorded
72	Retain	LOT	Standing	Not recorded
80	Retain	LOT	Standing	Not recorded
81	Retain	LOT	Standing	Not recorded
82	Retain	LOT	Standing	Not recorded
83	Retain	LOT	Standing	Not recorded
89	Retain	LOT	Standing	Not recorded
90	Retain	LOT	Standing	Not recorded
91	Retain	LOT	Standing	Not recorded
111	Retain	LOT	Standing	Not recorded
112	Retain	LOT	Standing	Not recorded
113	Retain	LOT	Standing	Green Scent-bark
117	Retain	LOT	Standing	Green Scent-bark
118	Retain	LOT	Standing	Green Scent-bark
119	Retain	LOT	Standing	Green Scent-bark

Trees without species recorded are provided as such from Ecology Partner (2005) map data.

A4.2 Net Gain Offset Calculations

Source: DSE Net Gain Calculator (<http://www.dse.vic.gov.au/DSE/nrence.nsf/LinkView/74DC19C326C445BECA2571AE00037FC0B32D42FB223C7345CA25712B0007130A>)

The following Net Gain offset calculations have been conducted using the vegetation quality assessment data (refer Section 5.1.1) and the DSE Net Gain Calculator. Copies of the results from the Net Gain Calculator are presented here.

Site code (number) / Habitat Zone ID (letter)		a			b			c			d			e			f			g			h			i					
Land tenure		freehold																													
Property Size		>=10 Ha																													
Patch Size		< 5 ha / >=5ha <20ha																													
Zone type		Offset (Stat Planning)																													
Proposal type		Remnant patch																													
Security arrangement		Registered on-title agreement or crown land equivalent																													
Bioregion		Gippsland Plain																													
EVC name		SW			SW			SW			SW			LF			LF			RScr			LF			LF					
BCS		E			E			E			E			V			V			V			V			V					
EVC standardiser		1			1			1			1			1			1			1			1			1			1		
		Max	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha		
Scores	Large Trees	10	3	na	3	na	3	na	3	na	0	na	3	na	6	na	6	na	6	na	0	na	0	na	0	na	0	na			
	Tree Canopy Cover	5	5	0.5	0	5	0.5	0	5	0.5	0	0	0	5	0.5	0	5	0.5	0	5	0.5	0	3	0.3	0.4	0	0	0			
	Understorey	25	15	1.5	2.5	15	1.5	2.5	15	1.5	2.5	10	1	2.5	15	1.5	2.5	10	1	2.5	10	1	2.5	10	1	2.5	10	1	2.5		
	Lack of Weeds	15	6	2	6	2	2	2	7	2	6	2	2	2	2	2	2	2	2	2	4	2	7	2	7	2	2				
	Recruitment	10	5	0.5	2	5	0.5	2	3	0.3	2	5	0.5	2	5	0.5	2	5	0.5	2	5	0.5	2	5	0.5	2	5	0.5	2		
	Organic Litter	5	3	0.3	2	5	0.5	0	5	0.5	0	3	0.3	2	5	0.5	0	5	0.5	0	5	0.5	0	5	0.5	0	3	0.3	2		
	Logs	5	3	3.4	0	3	3.4	0	2	2.4	0	2	2	0	3	3.4	0	3	3.4	0	3	3.4	0	3	3.4	0	2	2	0		
	Standardised Site Condition	75	40		42		35		27		42		36		36		36		36		30		27		27		27				
	Landscape Context	25	7		7		6		7		5		2		2		2		2		2		2		2		2				
HabHa Score	100	47		49		41		34		47		38		38		38		38		32		29		29		29					
Subtotal of gains			6.2	8.5		6.4	6.5		5.2	6.5		3.8	8.5		6.4	6.5		5.9	6.5		5.9	6.5		5.7	6.9		3.8	8.5			
Standardised Sum Main + Impr Gain/Ha			14.7			12.9			11.7			12.3			12.9			12.4			12.4			12.6			12.3				
Prior Mgt Gain/Ha			4.7			4.9			4.1			3.4			4.7			3.8			3.8			3.2			2.9				
Security Gain/Ha			4.7			4.9			4.1			3.4			4.7			3.8			3.8			3.2			2.9				
Total Gain/Ha			24.1			22.7			19.9			19.1			22.3			20			20			19			18.1				
Size of habitat zone (Ha)			3.29			0.4			1.15			0.7			0.3			0.4			0.3			1.04			0.1				
TOTAL GAIN (HHa)			0.79			0.09			0.23			0.13			0.07			0.08			0.06			0.2			0.02				

LF = Lowland Forest, RScr = Riparian Scrub SW = Swampy Woodland

V = Vulnerable, E = Endangered

Site code (number) / Habitat Zone ID (letter)		j	k			l			m			n			o			p			q			r			s					
Land tenure		freehold																														
Property Size		>=10 Ha																														
Patch Size		<5 ha																														
Zone type		Offset (Stat Planning)																														
Proposal type		Remnant patch																														
Security arrangement		Registered on-title agreement or crown land equivalent																														
Bioregion		Gippsland Plain																														
EVC name		RScr			SW			LF			LF			LF			LF			SW			LF			LF						
BCS		V			E			V			V			V			V			E			V			V						
EVC standardiser		1.25			1			1			1			1			1			1			1			1						
Scores	Max	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	Current condition	Maintenance gain/ha	Improvement gain/ha	
	Large Trees	10	na	na	4	na	4	na	4	na	3	na	0	na	0	na	4	na	3	na	4	na	3	na	4	na	5	na				
	Tree Canopy Cover	5	3	0.6	0.4	3	0.6	0.4	2	0.4	0.4	5	1	0	4	0.8	0	0	0	0	3	0.6	0.4	5	1	0	3	0.6	0.4	5	0.5	0
	Understorey	25	10	1	2.5	15	1.5	2.5	10	1	2.5	10	1	2.5	5	0.5	0	5	0.5	0	5	0.5	0	10	1	2.5	15	1.5	2.5	10	1	5
	Lack of Weeds	15	4	2	6	2	6	2	6	2	7	2	2	2	6	2	6	2	4	2	4	2	7	2	6	2	9					
	Recruitment	10	5	0.5	2	5	0.5	2	5	0.5	2	0	0	2	0	0	0	5	0.5	0	5	0.5	0	3	0.3	2	5	0.5	2	6	0.6	4
	Organic Litter	5	5	0.5	0	5	0.5	0	3	0.3	2	5	0.5	0	2	0.2	2	5	0.5	0	3	0.3	2	5	0.5	0	5	0.5	0	5	0.5	0
	Logs	5	na	na	na	2	2.4	0	2	2.4	0	0	0.4	0	2	2.4	0	0	0	0	0	0.4	0	0	0.4	0	2	2.4	0	2	2.4	0
	Standardised Site Condition	75	34			40			32			30			15			21			24			33			40			42		
	Landscape Context	25	2			3			2			2			7			3			2			2			3			18		
HabHa Score	100	36			43			34			32			22			24			26			35			43			60			
Subtotal of gains			2.6	6.9		5.5	6.9		4.6	8.9		2.9	6.5		3.9	4		1.5	2		2.3	4.4		3.2	6.5		5.5	6.9		5	13	
Standardised Sum Main + Impr Gain/Ha		11.88			12.4			13.5			9.4			7.9			3.5			6.7			9.7			12.4			18			
Prior Mgt Gain/Ha		3.6			4.3			3.4			3.2			2.2			2.4			2.6			3.5			4.3			6			
Security Gain/Ha		3.6			4.3			3.4			3.2			2.2			2.4			2.6			3.5			4.3			0			
Total Gain/Ha		19.08			21			20.3			15.8			12.3			8.3			11.9			16.7			21			24			
Size of habitat zone (Ha)		0.13			0.66			0.8			0.3			2			0.3			0.5			0.14			0.14			0.1			
TOTAL GAIN (HHa)		0.02			0.14			0.16			0.05			0.25			0.02			0.06			0.02			0.03			0.02			

LF = Lowland Forest, RScr = Riparian Scrub SW = Swampy Woodland

V = Vulnerable, E = Endangered

A5. Glossary

Items marked with an asterisk (*) are cited from DSE (2007b).

Benchmark*

A standard vegetation –quality reference point, dependent on vegetation type, which is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long undisturbed state of the same vegetation type.

Biodiversity*

The variety of all life-forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems of which they form a part. The Framework applies this definition to those native species indigenous to or expected to visit the site.

Biodiversity Interactive Map (BIM)

Web based interactive map available on the DSE website that provides information on the biodiversity of Victoria and displays flora and fauna data from the Victorian Biodiversity Atlas.

Bioregion*

Biogeographic areas that capture the patterns of ecological characteristics in the landscape or seascape, providing a natural framework for recognising and responding to biodiversity values. A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.

Bioregional conservation status (of an EVC)*

A state-wide classification of the degree of depletion in the extent and/or quality of an Ecological Conservation Class (EVC) within a bioregion in comparison to the State's estimation of its pre-1750 extent and condition. The assessment takes account of how commonly it originally occurred, the current level of depletion due to clearing, and the level of degradation of condition typical of remaining stands. There are 6 classes: Presumed Extinct, Endangered, Vulnerable, Depleted, Rare and Least Concern as

described on page 51 of the Framework (NRE 2002).

Conservation status (see Bioregional conservation status)

Degraded treeless vegetation*

Vegetation that is neither a wetland, a remnant patch nor scattered tree(s).

DBH (Diameter at Breast Height)*

The diameter of the main trunk of a tree measured 1.3 m above ground level.

Ecological Vegetation Class (EVC)*

A type of native vegetation classification that is described through a combination of its floristic, life form and ecological characteristics, and though an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups of the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.

EVC (see Ecological vegetation class)*

Forb

A herbaceous flowering plant that is not a graminoid (grass, sedge or rush).

Gain*

An increase in the extent and/or quality of a site either by management or maintenance commitments and actions.

Gain Target*

The amount of gain that needs to be achieved to offset a loss measured in habitat hectares.

Habitat hectare*

A site based measure of quality and quantity of native vegetation that is assessed in the context of the relevant native vegetation.

Habitat score*

The score assigned to a habitat zone that indicates the quality of the vegetation relative to the ecological vegetation class benchmark – sum of the site condition score and landscape context score, usually expressed as a percentage or on a scale of 0 to 1.

Habitat zone*

A discrete area of native vegetation consisting of a single vegetation type (EVC) within an assumed similar quality. This is the base spatial unit for conducting a habitat hectare assessment. Separate *Vegetation Quality Assessments* (or habitat hectare assessments) are conducted for each habitat zone within the designated assessment area.

Improvement gain*

This is gain resulting from management commitments beyond existing obligations under legislation to improve the current vegetation quality. Achieving improvement gain is predicated on maintenance commitments being already in place. For example, control of any threats such as grazing that could otherwise damage the native vegetation must already be agreed. Typical actions leading to an improvement gain include reducing or eliminating environmental weeds, enhancement planting or revegetation over a 10-year management period. If the vegetation is to be used as an offset, a commitment to maintain the improvement gain (i.e. no subsequent decline in quality) will be required in perpetuity.

Indigenous vegetation*

The type of native vegetation that would have normally been expected to occur on the site prior to European settlement.

Large Old Tree (LOT)*

A tree with a DBH equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.

Like-for-like*

These are part of the criteria for determination of an offset and provide a direct link between the loss and the offset gain, in terms of vegetation type or landscape function. There are more specific requirements for higher conservation significance vegetation and more flexible requirements for lower significance.

Maintenance Gain*

This is gain from commitments that contribute to the maintenance of the current vegetation quality over time (i.e. avoiding any decline). Includes foregoing certain entitled activities that could otherwise damage or remove native vegetation, such as grazing or firewood collection. Also typically requires a commitment to ensure no further spread of environmental weeds that may otherwise result in the loss of vegetation quality over time. If the vegetation is to be used as an offset, a commitment to maintain the vegetation quality will be required in perpetuity.

Medium Old Tree (MOT)*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a large old tree.

Native (indigenous) vegetation*

Native vegetation is plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses (as defined in Clause 72 of the planning scheme).

Net Gain*

Where, over a specified area and period of time, losses of native vegetation and habitat, as measured by a combined quality-quantity measure (habitat-hectare), are reduced, minimised and more than balanced by commensurate gains.

Net outcome*

The result of applying conservation significance criteria to protection, investment and offset decisions. This results in a range of outcomes from short term losses for Low conservation significance to substantial net gain for Very High conservation significance. For offsets, the Framework (Table 6) specifies a multiplier on the calculated loss (in habitat hectares) to achieve the net outcome. This is graded according to conservation significance.

Offset Management Plan (OMP)

A document which sets out the requirements for establishment, protection and management of a Net Gain offset site.

Old tree*

A tree with a DBH equal to or greater than 0.75 of the large tree diameter as specified in the relevant EVC benchmark. Includes medium old trees and large old trees (see separate definitions). Some Regional Native Vegetation Plans additionally define very large old trees (1.5 times large tree diameter).

Offset*

A native vegetation offset is any works, or other actions to make reparation for the loss of native vegetation arising from the removal or destruction of native vegetation. The gains achieved must be permanent and ongoing, and linked to a specific clearing site. See also on-site offset and third-party offset.

On-site offset*

An offset located on the same property as the clearing.

Third-party offset*

An offset located on a property owned by a person other than the landowner who incurs the native vegetation loss being offset.

Patch (see Remnant Patch)

Prior management gain

This gain acknowledges actions to manage vegetation since State-wide planning permit controls for native vegetation removal were introduced in 1989.

Property Vegetation Plan*

A plan which relates to the management of native vegetation within a property, and which is contained within an agreement made pursuant to section 69 of the Conservation, Forests and Lands Act 1987.

Protection (of a tree)*

An area with twice the canopy diameter of the tree(s) fenced and protected from adverse impacts: grazing, burning and soil disturbance not permitted, fallen timber retained, weeds controlled, and other intervention and/or management if necessary to ensure adequate natural regeneration or planting can occur.

Recruitment*

The production of new generations of plants, either by allowing natural ecological processes to occur (regeneration etc), by facilitating such processes such as

regeneration to occur, or by actively revegetating (replanting, reseeding). See Revegetation.

Remnant patch or patch*

An area of vegetation, with or without trees, where native plants constitute more than 25% of the total understorey plant cover (bare ground is not included); or an area of treed vegetation where the density of the trees is such that canopy tree cover is at least at benchmark canopy cover.

Remnant vegetation*

Native vegetation that is established or has regenerated on a largely natural landform. The species present are those normally expected in that vegetation community. Largely natural landforms may have been subject to some past surface disturbance such as some clearing or cultivation (or even the activities of the nineteenth century gold rushes) but do not include man-made structures such as dam walls and quarry floors.

Revegetation*

Establishment of native vegetation to a minimum standard in formerly cleared areas, outside of a remnant patch.

Scattered trees*

Canopy trees within an area where total understorey plant cover comprises at least 75% of weeds or non-native plants and the overall canopy cover for a group (i.e. Three or more trees) is less than 20%.

Section 173 agreements*

A management agreement primarily between a landowner and the responsible authority according to section 173 of the Planning and Environment Act 1987.

Security Gain

This is gain from actions to enhance security of the on-going management and protection of native vegetation at the offset site, either by entering into an on-title agreement (for example under Section 173 of the *Planning and Environment Act 1987*), or by locating the offset on land that has greater security than the clearing site, or by transferring private land to a secure public conservation reserve.

Small tree*

A tree with a DBH equal to or greater than 0.25 of the large tree diameter in the relevant EVC benchmark but less than the DBH for a medium old tree.

sp.

Species (one species).

spp.

Species (more than one species).

Supplementary planting

Establishment of overstorey and/or understorey plants within a remnant patch. Typically includes the planting or direct-seeding of understorey life forms.

Taxon (plural taxa)

A term used to describe any taxonomic unit. This term is typically used when referring broadly to any scientifically recognised species, subspecies or variety.

Understorey*

Understorey is all vegetation other than mature trees – includes immature trees, shrubs, grasses, herbs, mosses, lichens and soil crust. It does not include dead plant material that is not attached to a living plant. More information on understorey life forms is set out in the Vegetation Quality Assessment Manual (DSE 2004).

Vegetation Quality Assessment

The standard DSE method for assessing remnant patches of vegetation. Details of the method are outlined in the Vegetation Quality Assessment Method (DSE 2004). The results of the assessment are expressed in habitat hectares. Also referred to as a 'habitat hectare assessment'.

Very Large Old Tree (VLOT)

A tree with a DBH of at least 1.5 times that of the large tree DBH as specified in the relevant EVC benchmark.

15 Appendix 12 – Scoping Assessment

Water Technology - 2 August 2012

2nd August 2012

Mr Scott McJannet

Millar | Merrigan
2/126 Merrindale Drive
CROYDON VIC 3136

Our Ref: 1779_L02v01_Hydrology_Study.docx

Dear Scott,

Monash Views – Stage 1 - Scoping Assessment

This letter report outlines the results of our preliminary hydrological investigations for the proposed residential development adjacent to the Yallourn Golf Club, Newborough referred to as Monash Views (the subject site). This document refers to the updated Millar Merrigan concept plan **15890 T1 Version 2** (Millar Merrigan drawing reference) dated 25/05/2012 In accordance with the Water Technology brief, our investigations included the following tasks:

- A site inspection;
- Review of relevant data (hydrologic/survey etc.) for the site;
- Review of site survey plans and making a preliminary assessment of drainage issues on the site;
- Review of proposed development plans for the site; and
- Preparation of a brief report describing the main water quality/drainage issues on the site, describing the constraints that these issues may place on development, discussing the way in which the proposed development may fit into these constraints, and making recommendations as to what further work should be carried out as part of the detailed assessments and setting out the associated timing and budget. Issues relating to water quantity (drainage) and quality (stormwater) management will be assessed.

This scoping study is based on the following:

- Site inspection conducted by Stephen Reynolds;
- Discussions with West Gippsland CMA; and
- Review of proposed development plans.

Background

Water Technology understands that a parcel of land bound by Monash Road to the northwest, Coach Road to the south and the Yallourn Golf Club to the east is proposed for development. This development will involve a redistribution of the Yallourn Golf club boundaries with some of the current golf club land becoming residential lots and a portion of the new development being converted to a golf course. This land is located directly east of the town of Newborough. It is understood that the Monash Views development corresponds to Lot 9P2 and a portion of Lot 9P1 (hereafter referred to as the subject site), and is the focal point of this study. Ultimately for this development to be realised a detailed Surface Water Management Strategy (SWMS) focused on the proposed development plan layout will be required.

The subject site is not impacted by either LSIO or FO planning schemes (refer **Figure 2**) but contains three small designated waterways (part of the Sandy Creek catchment) within its boundaries. These three waterways meet downstream of the subject site in Sandy Creek before they discharge into Lake Narracan. The waterway known as Sandy Creek follows the western parcel boundary (Lot 9P2) before joining with the southern waterway on the site, flowing under Monash road through a single culvert arrangement.

The southern waterway on the site flows from the south east to the northwest before joining with Sandy Creek and flowing under Monash road. The central designated waterway has two branches in its top reaches which combine just inside the subject site and flow along the lot boundary between 9P1 and 9P2 land parcels before flowing under Monash road (via a culvert) and into Sandy creek.

The proposed development (as shown in Figure 4) involves modification to some of the flow paths of the designated waterways and areas inside the WGCMA preferred 30m buffer zone, and will involve changes to natural drainage conditions. Consequently an appropriately detailed hydrology scoping study is required for the subject site that provides surface water treatment and storage for the future post-development environment.



Figure 1 Location of development site (Google Maps 2011)

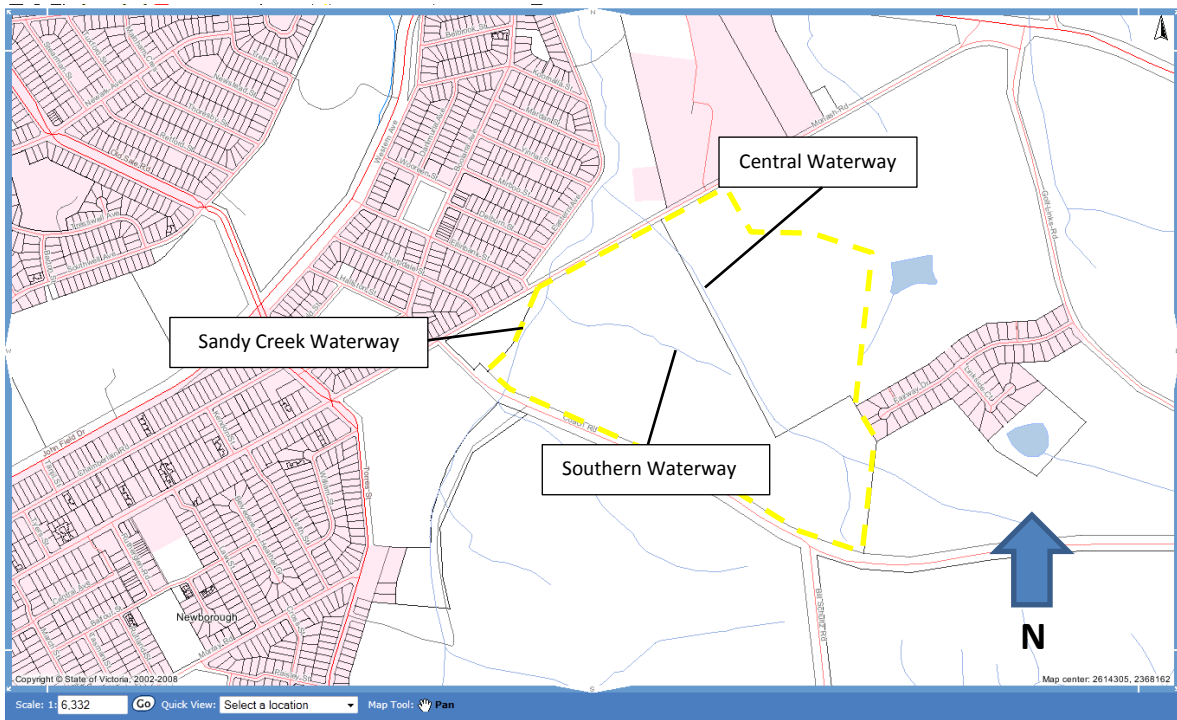


Figure 2 Contributing designated waterways (DSE 2011)

The topography of the existing site and existing overland flow paths are shown in **Figure 3**

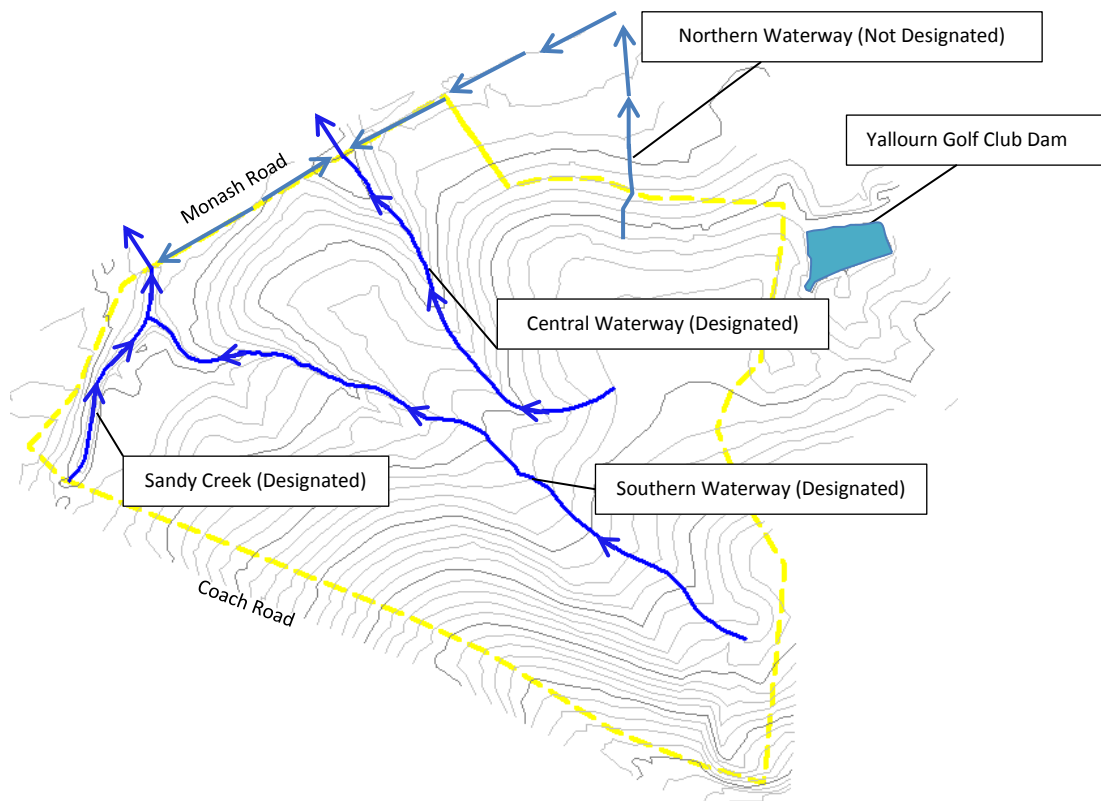


Figure 3 Existing topography and drainage paths (Base contour map: Build Eng, 2011)

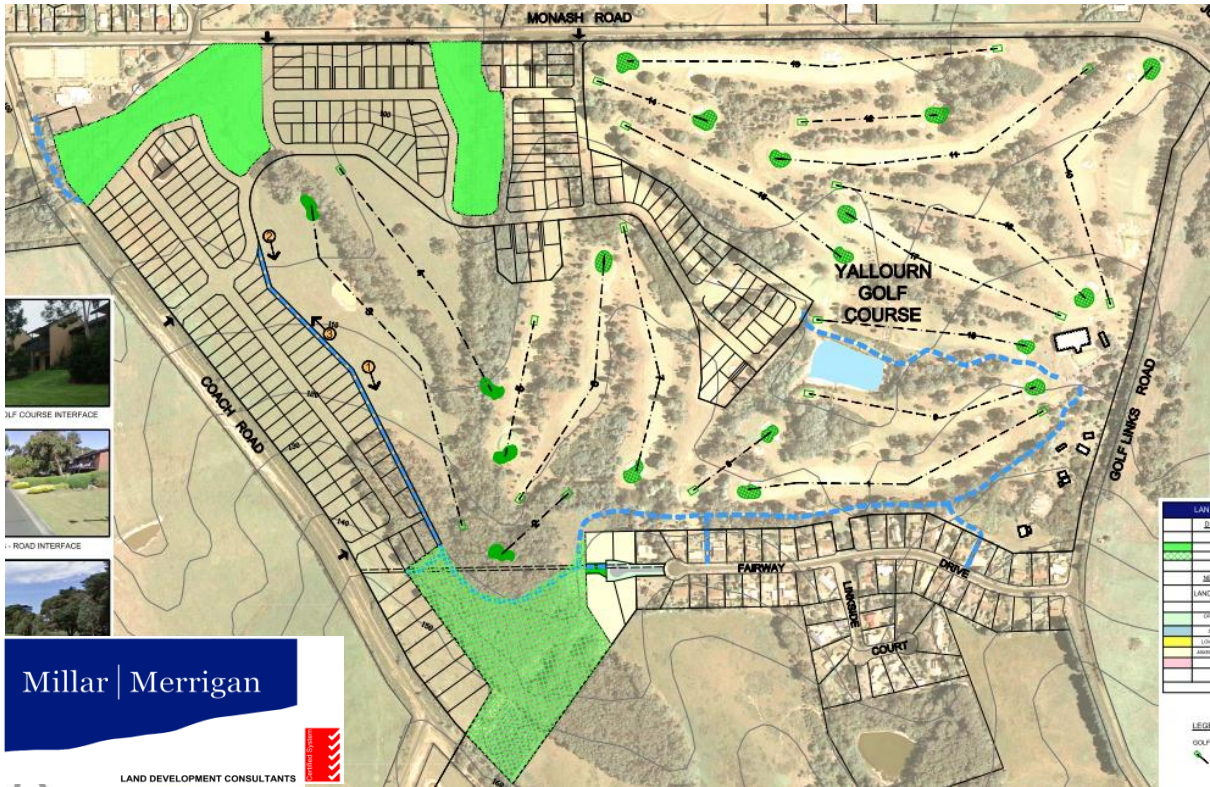


Figure 4 Proposed Development Concept Plan (Millar Merrigan 2012)

Pre-development and post development flows

Pre-development Hydrology

Under existing conditions site specific flows follow three main drainage paths (as shown in **Figure 3**).

The southern portion of the site drains into the designated waterway within its catchment, flowing in a northwest direction before joining with Sandy Creek and flowing under Monash Road. The southern catchment is the largest (~33.7Ha) within the subject site. The central catchment is smaller (~13.7Ha) than the southern catchment and drains in a similar direction. It also flows under Monash Road approximately 330m north east (of the southern catchments discharge point) along the road. It flows under the road through a ~450mm single culvert (to be confirmed with survey).

The northern most drainage line is relatively small (~6.8Ha) and flows through the Yallourn golf course before it discharges into a drain running along the upstream side of Monash Road. This drain then flows in a south westerly direction to the same culvert that carries the central catchment flows underneath Monash Road.

Pre development hydrology was determined using the Rational Method (refer **Table 1**) in accordance with recommended procedures outlined in Australian Rainfall & Runoff (AR&R, 1987), peak flow estimates for the north, central and south portions of the site are shown in **Table 1**. **Figure 5** shows the drainage paths of the various sections of the subject site.

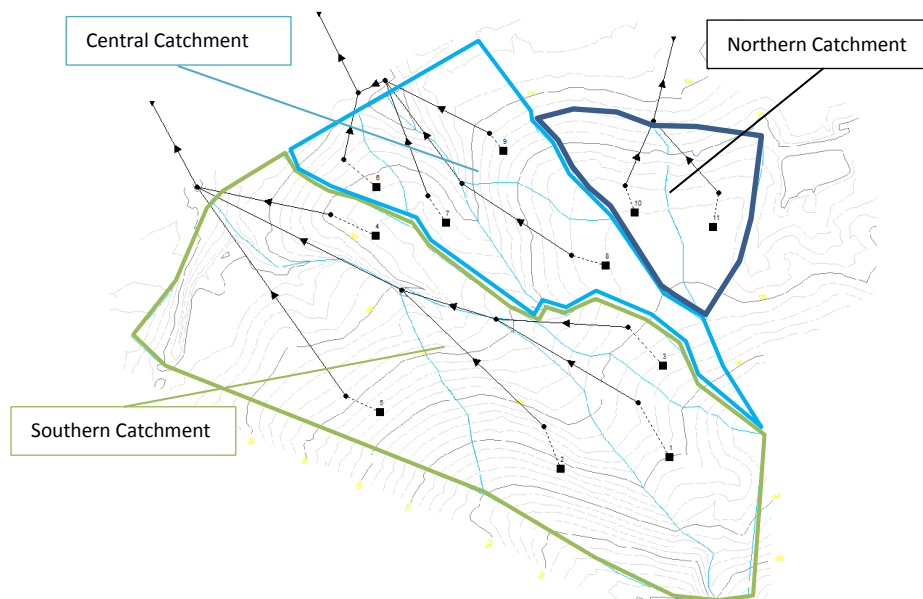


Figure 5 Existing Conditions – Natural flow paths and relative catchments

Table 1 Pre development flow comparison (Rational Method Estimates)

100 year ARI Storm Event			
	South Portion of Site	Central Portion of site	North Portion of Site
Pre development flows (m ³ /s)	2.106	0.752	0.598

Post-development Hydrology

Under developed conditions site specific flows are expected to generally follow similar drainage paths to existing conditions. Catchment boundaries show changes, altering the total area drained. Flows will likely sheet over the site following the impervious road network in the 100 year event with a small portion routed through storm water infrastructure.

The most significant change to the system under post development conditions is seen in the northern catchment, where flows have been split into two separate catchments (northern catchment 1 and 2) as shown in **Figure 5**.

Flows from northern catchment 1 discharge into the drain running along Monash road (as per pre-development conditions) while flows from northern catchment 2 are proposed to be treated (low flows) before being directed into the Yallourn golf club dam approximately 100m east of the catchment.

The proposed development will increase peak flows on site as a result of increases in the impervious area. The increase in paved surface (impervious) areas was estimated using the proposed average residential block sizes and layouts as shown in **Figure 5**.

Post development hydrology was determined using the Rational Method (refer Table 2) in accordance with recommended procedures outlined in Australian Rainfall & Runoff (AR&R, 1987), peak flow estimates for the north and south portions of the site are shown in **Table 2**. **Figure 3** shows the drainage paths of the northern and southern sections of the subject site.

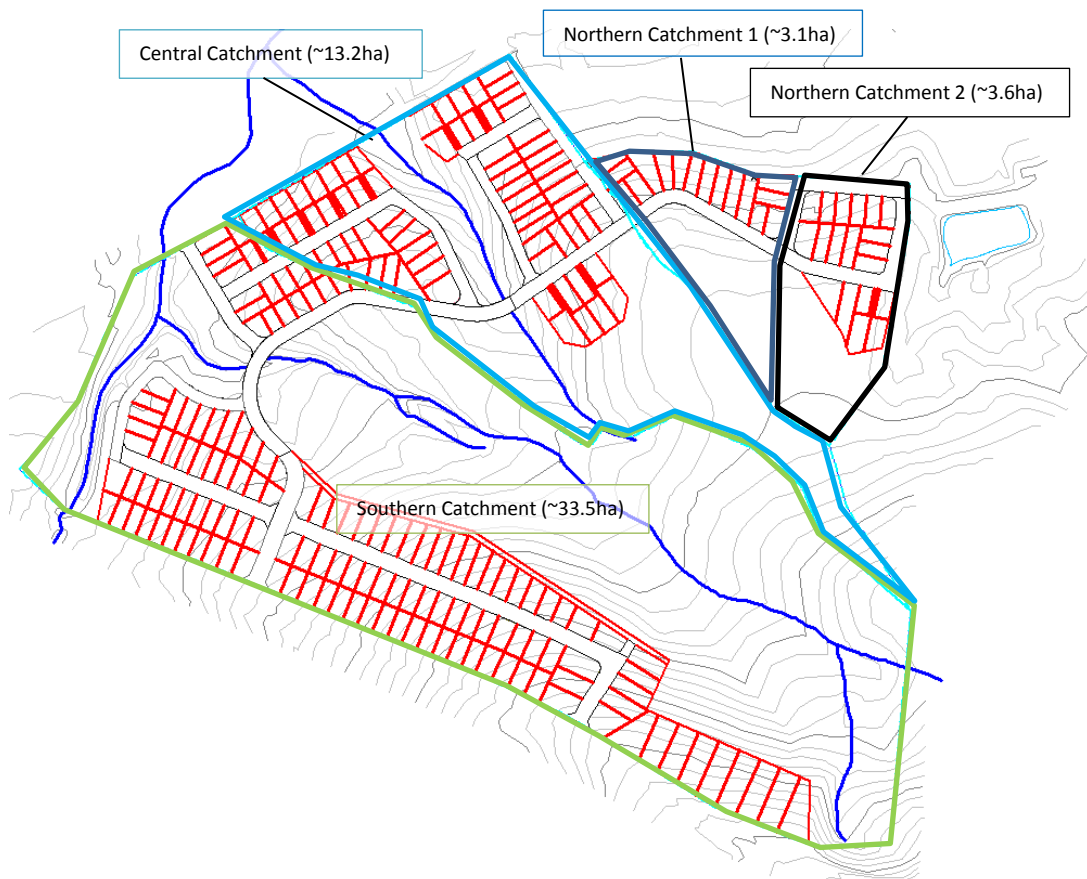


Figure 6 Development concept layout (Millar Merrigan 2012)

Table 2 Post development flow comparison (Rational Method Estimates)

100 year ARI Storm Event				
	South Portion of Site	Central Portion of site	North Portion of Site Catchment 1	North Portion of Site Catchment 2
Post development flows (m ³ /s)	3.951	1.771	0.454	0.532

Potential Mitigation Options

Based on the Rational Method assessment, the fully developed (un-mitigated) scenario for the subject site will result in an 87% increase in off site flows in the southern portion of the site, 135% increase in off site flows in the central portion of the site and 64% increase in off site flows in the northern portion of the site. The current configuration of the Yallourn Golf Club dam is assumed to be appropriately sized to attenuate flows from the northern catchment 2. Retarding basins or similar attenuation features (discussed below) are proposed to reduce peak 100 year flows from the other three catchments on site.

The attenuation features were approximately sized for this hydrology scoping study using Boyd's (1980) storage formula and the results compared against industry 'rule of thumb' estimates. Boyd's method becomes more accurate at estimating required storages as the size of the catchment increases. Given the proposed nature of the development, Boyd's method this approach is considered appropriate for the current scope. Individual detailed basin / wetland storage volume modelling using runoff-routing software is appropriate for the future detailed SWMS investigation.

Table 3 Preliminary sizing of retarding basins

	South Portion of Site	Central Portion of the site	North Portion of Site (Catchment 1)	North Portion of Site (Catchment 2)
Boyd's formula (1980)	~ 4,430 m ³	~ 1630 m ³	~ 170 m ³	~ 200 m ³
Rule of thumb (500m³/ ha of additional paved surface)	33.5Ha at 0.31 Fraction Impervious = 10.4Ha paved surface 10.4Ha x 500 = 5,200m ³	13.3Ha at 0.38 Fraction Impervious = 5.0Ha paved surface 5.0Ha x 500 = 2,500m ³	3.1Ha at 0.37 Fraction Impervious = 1.1Ha paved surface 1.1Ha x 500 = 550m ³	3.6Ha at 0.37 Fraction Impervious = 1.3Ha paved surface 1.3Ha x 500 = 650m ³
Recommended Flood storage	4,500 m ³	1,700 m ³	250 m ³	300 m ³

Attenuation features

With reference to **Figure 7** through **Figure 10**, the following attenuation strategies are proposed for the subject site:

Southern Catchment

It is proposed that Water Sensitive Urban Design (WSUD) features in the southern catchment will form a significant component of the flood attenuation system. **Figure 7** shows a possible location for the WSUD feature and a generic image of the combined attenuation and water quality system. Preliminary estimates indicate that a suitable wetland feature will account for around 2,000m³ of the required 4,500m³ of storage within the extended detention depth of the wetland; with the remainder of the required flood storage to be incorporated into a sedimentation / retarding basin immediately upstream of the wetland.

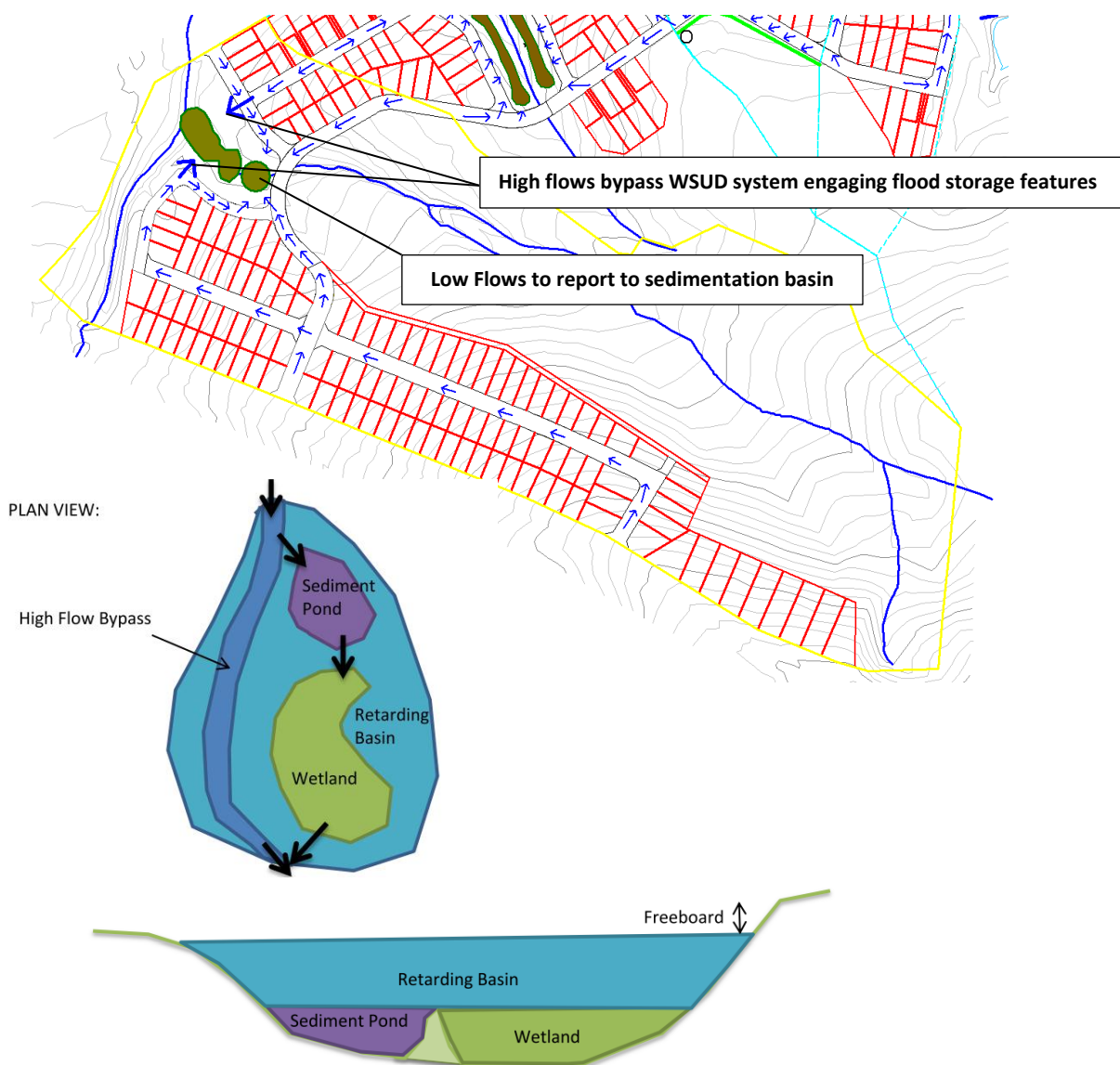


Figure 7 Southern Catchment attenuation features

Central Catchment

Catchment swales (estimated three to four swales in total) are recommended for flood attenuation in the central catchment section of the development. The swales will run along the length of the allocated reserve linking with key drainage paths (roads etc.), before discharging into the central waterway.

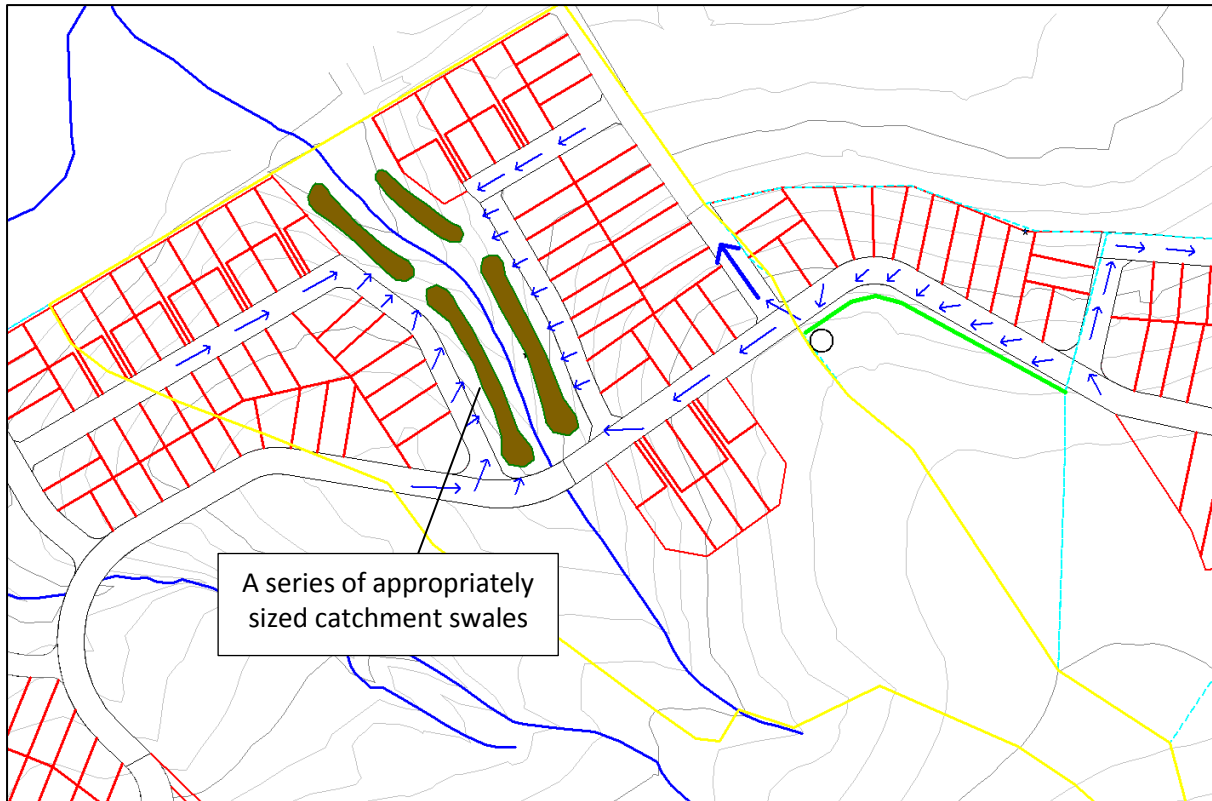


Figure 8 Central Catchment attenuation features

Northern Catchment 1

A catchment swale is recommended for flood attenuation in the northern catchment 1 section of the development. The swale will run along the length of the allocated reserve linking with key drainage paths (roads etc.), before discharging into the northern waterway.

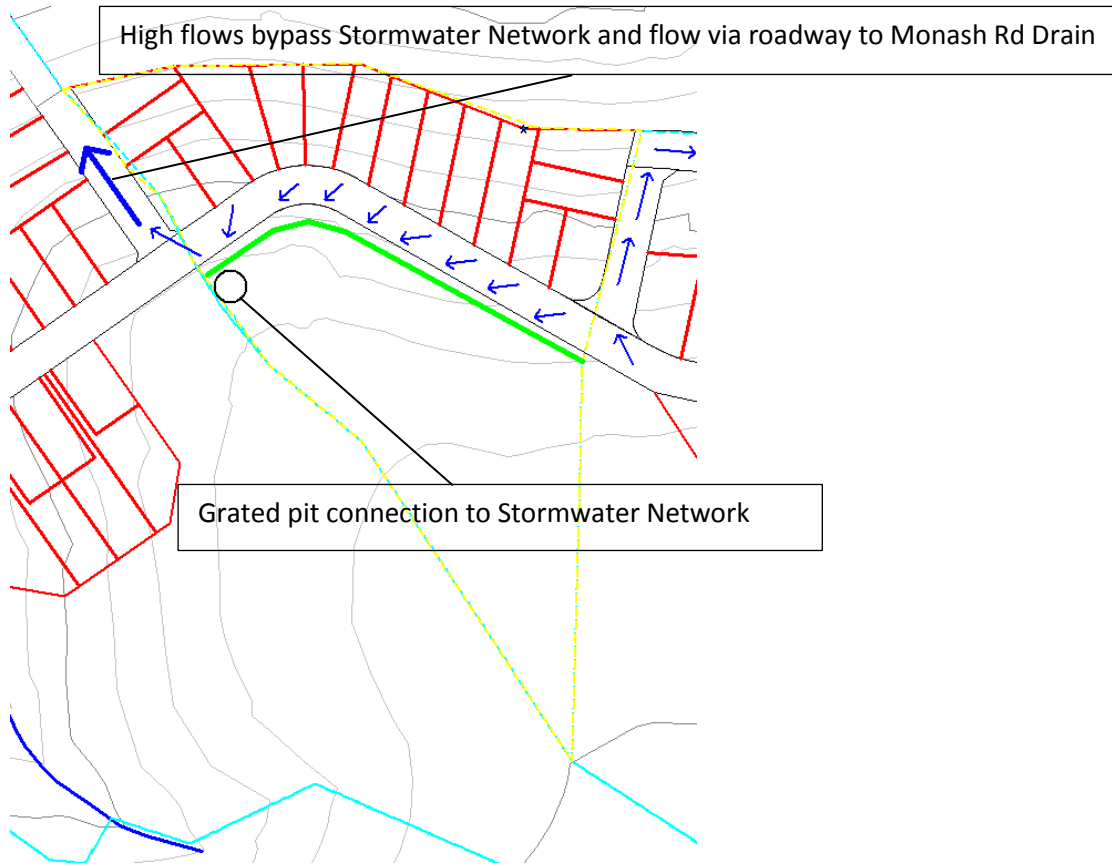


Figure 9 Northern Catchment 1 attenuation features

Northern Catchment 2

Runoff from this catchment is proposed to be attenuated in the Yallourn Golf Club dam. It is assumed that the Yallourn Golf Clubs dam will have sufficient free board to store the developed flows from the relatively small catchment. This will need to be confirmed during the development of the SWMS for the project in future.

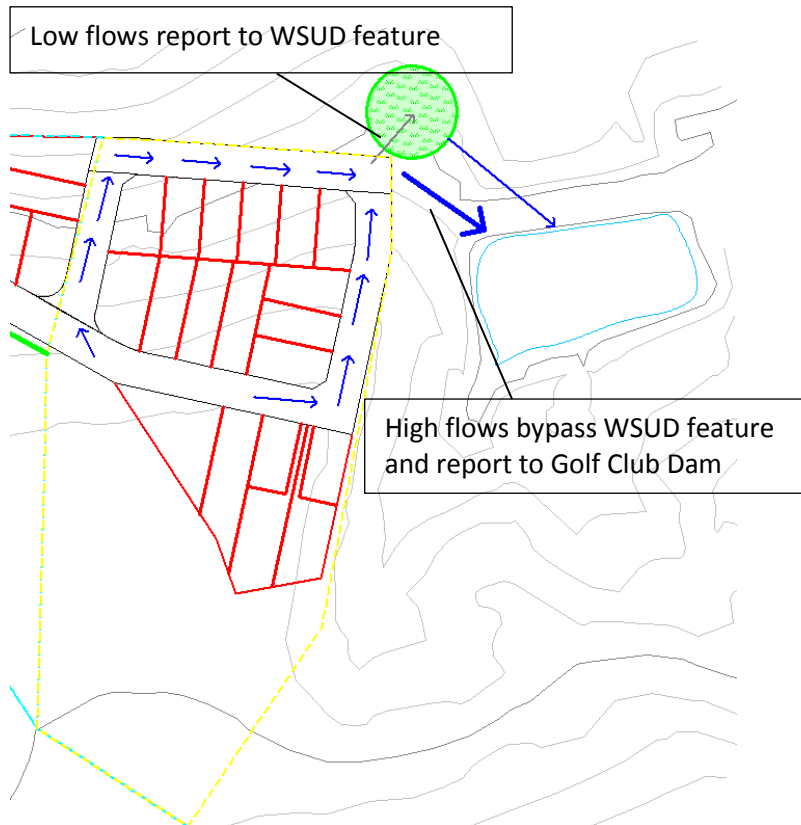


Figure 10 Northern Catchment 2 attenuation features

Water Quality Works

Water quality features are a requirement of the Monash Views development. Recommended water quality treatment options for the various sections of the site are displayed in **Figure 11**. Features discussed in this scoping study are general in nature and require final modelling in the future SWMS. Detailed WSUD analysis will be a component of the next phase of this project. Water quality features considered in this study aim to treat developed flows to best practice reduction targets as described by Melbourne Water and presented in **Table 4**.

Table 4 Melbourne Water best practice performance objectives

Pollutant	Best Practice Performance Objective
Total Suspended Solids (kg/yr)	80%
Total Phosphorus (kg/yr)	45%
Total Nitrogen (kg/yr)	45%
Gross Pollutants (kg/yr)	70%

Southern catchment

Under developed conditions the southern catchment is the most significant in size and consequently requires more substantial water quality treatment features. Preliminary water quality modelling suggests that a sedimentation basin combined with a wetland and incorporation of the existing undeveloped natural buffer zone will be sufficient to treat developed flows to best practice levels. A sedimentation pond with surface area of $\sim 250\text{m}^2$, permanent pool volume of 125m^3 and extended detention depth of 0.5m combined with a wetland with surface area of $\sim 600\text{m}^2$, a permanent pool volume of 300m^3 and extended detention depth of 0.5m would treat the southern catchment flows to above best practice levels. These features would fit within the allowed reserve which links the southern waterway to Sandy Creek as shown in **Figure 11**.

Central catchment

A series of vegetated catchment swales (with a cumulative length of $\sim 270\text{m}$) have been proposed for water quality treatment in the central catchment. Preliminary water quality modelling suggests that this treatment alone would be insufficient to treat the catchment flows to best practice levels missing the nitrogen target by approximately 5% to 10%, the additional treatment required could be achieved by incorporating some small bio-retention features in the upstream segment of the catchment (e.g. rain-gardens or bio-swales). These features have not been modelled at this stage of the project and should be considered for the future SWMS.

Northern Catchment 1

A large vegetated catchment swale (approximately 120m long) has been recommended as the primary WSUD feature in this segment of the development. Preliminary water quality modelling suggests that this treatment alone would be insufficient to treat the catchment flows to best practice levels missing the target by approximately 5%, the additional treatment required could be achieved by incorporating some small bio-retention features in the upstream segment of the catchment (e.g. rain-gardens or bio-swales). These features have not been modelled at this stage of the project and should be considered for the future SWMS.

Northern Catchment 2

Under developed conditions a small section of the northern catchment (referred to as the northern catchment 2), has been assumed to report to the North East corner of the before flowing into the Yallourn Golf club dam. The WSUD feature considered appropriate for this catchment is a small nodal bio-retention system with grassed buffer section on its batters flowing into a vegetated core. A linear bio-retention system could be integrated into the road reserve if required (land budget constraints) but a nodal feature would be preferable at this site. Initial modelling suggests that this type of feature would be suitable to treat site flows but this would need to be confirmed in the future SWMS.

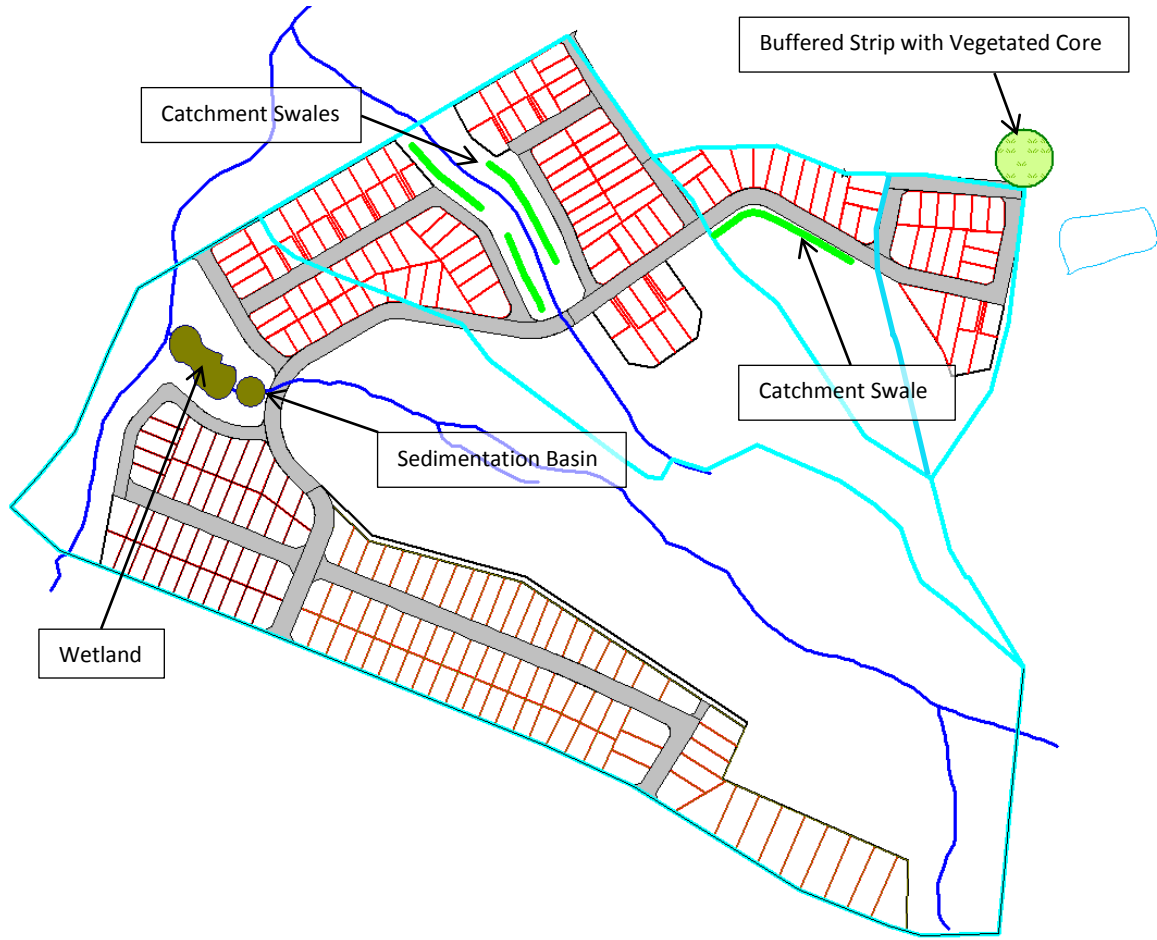


Figure 11 Conceptual water quality treatment features

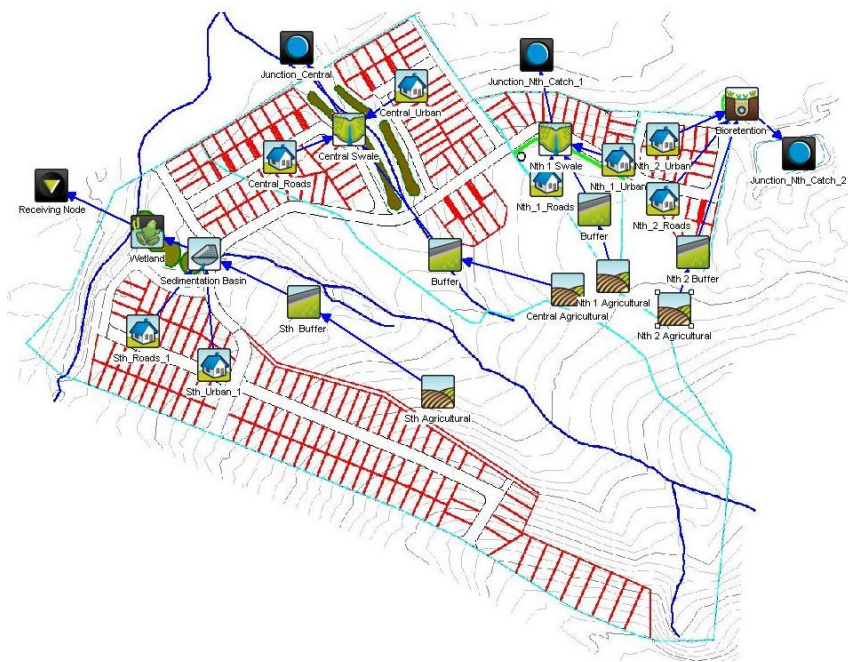


Figure 12 Preliminary MUSIC model conceptual layout

Potential WSUD Feature geometry

It is anticipated that the WSUD features described (refer **Figure 11**) would be suitable for the subject site. To obtain an appreciation of the required geometry to achieve the desired water quality treatment and 100 year ARI site flow attenuation, simple trapezoidal shaped features have been assumed. Pond, basin and swale geometries have been estimated with 1 in 6 side slopes.

Table 5 Preliminary conceptual geometry of WSUD and attenuation features

	South Sed. Basin	South Wetland	Central Swale	Nth Swale (Catchment 1)
Base Width (m)	10 m	37 m	1 m	1 m
Base Length (m)	10 m	80 m	270 m	120 m
Top Width (m)	16 m	94.4 m	13 m	13 m
Top Length (m)	16 m	51.4 m	282 m	132 m
Depth (m)	0.5 m	1.2 m	1.0 m	1.0 m
Volume (m ³)	86 m ³	4,645 m ³	1,945 m ³	894 m ³

Modification to Waterways

Any modifications to designated waterway features within a development typically will require the following steps to be followed:

- Consultation with the relevant Catchment Management Authority (CMA) - in this case the West Gippsland CMA;
- Calculation of relevant offset requirements as described by WGCMA - typically 150% offset in waterway areas for any affected buffer zones (assuming a 30m buffer);
- Completion of a Works on Waterways permit process – submitted to and approved by the WGCMA; and
- The development of a Surface Water Management Strategy (SWMS) and Waterway Management Plan (WMP).

Based on the updated development plans (provided by Millar Merrigan - **15890 T1 Version 2**) reviewed in this study, and following on-site discussions with Adam Dunn from the WGCMA, it is believed that this process would be achievable within the constraints of the current plans, subject to validation via the above listed steps.

Spatial analysis of the pre and post waterway reserves has been conducted to ascertain the impact of the proposed layout on WGCMA preferred buffer zones. In almost all cases the minimum WGCMA buffer requirements have been retained in the updated development concept plans. Two locations within the development include crossings over designated waterways. These works will need to be approved by the WGCMA via a formal works on waterways approval process. A graphical presentation of the analysis is provided in **Figure 13**.

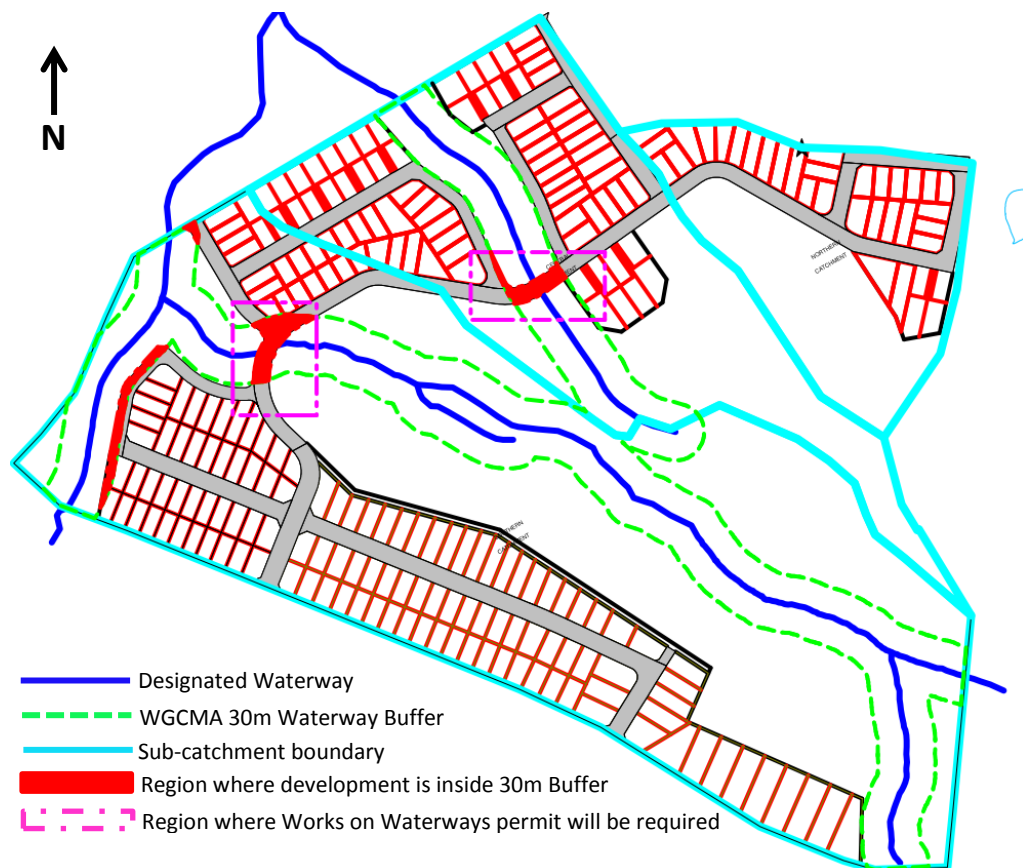


Figure 13 Waterway Buffer results

Conclusions on surface water management related development aspects

Using conceptual estimation formulas, we offer the following preliminary comments:

Southern portion of the subject site:

- Construct a 4,500m³ combined wetland / retarding basin feature in the waterway reserve of the site to mitigate post-development flows back to existing (pre-development) conditions; and
- To meet water quality targets, the wetland / retarding basin feature should be combined with a sedimentation basin 0.5 metres deep, with surface area of 250m² and a permanent pool volume of 125m³.

Central portion of the subject site:

- Construct a series of catchment swales with a cumulative volume of 1,700m³ within the waterway reserve of the site to mitigate post-development flows back to existing (pre-development) conditions; and
- Plant appropriate vegetation in the swale features to achieve water quality treatment, and if necessary, combine the swale water quality features with internal bio-retention features (e.g. rain gardens / bio-swales) to meet best practice water quality treatment targets.

North portion of the subject site (catchment 1):

- Construct a large catchment swale with a volume of at least 250m³ in the waterway reserve of the site to mitigate post-development flows back to existing (pre-development) conditions; and
- Plant appropriate vegetation in the swale feature to achieve water quality treatment, and if necessary, combine the swale water quality features with internal bio-retention features (e.g. rain gardens / bio-swales) to meet best practice water quality treatment targets.

North portion of the subject site (catchment 2):

- Construct a vegetated basin to treat and infiltrate site (low) flows before conveying them to the Yallourn Golf Club dam. Flows from significant events will bypass the WSUD feature and report directly to the Yallourn; and
- To achieve water quality treatment of site flows a small basin with grassed buffer section on its batters flowing into a vegetated core (a bio-retention feature) is recommended.

Discussion

- Flood attenuation volumes are estimates using Boyd's (1980) storage formula. Volumes will need to be refined with detailed hydrologic (runoff-routing) modelling in the future SWMS; and
- Preliminary water quality monitoring has been undertaken in this study. Best practice treatment has not been explicitly modelled, but preliminary modelling demonstrates that required pollutant reduction targets can be achieved within the site constraints of the development. The future SWMS will determine the final size and nature of WSUD features required.

Scope of future detailed assessment

Additional detailed modelling will be required to finalise the surface water management strategy for the development, and size the mitigation works following refinement of the site filling strategy. This work is expected to include:

- **Surface Water Management Strategy** – A more detailed assessment of surface water flows over the site and the likely impact on drainage and water quality. As a designated waterway is located on the site, it is anticipated that a SWMS will be required by the WGCMA that will include:
 - *Refine conceptual design of stormwater drainage scheme system (detailed civil design to be done by others);*
 - *Refine conceptual design of surface water retardation storage(s) to provide detailed design guidance to civil designers; and*
 - *Conceptual and detailed design of the proposed wetlands water quality treatment areas, including final MUSIC model runs to confirm that the proposed system will meet regulatory requirements.*

Given the existing work that has been undertaken, estimated cost to complete the SWMS is ~\$12.5k which will depend on final WGCMA / Shire requirements; and

- **Waterway Management** – As there is a designated waterway located on the site, it is anticipated that a Waterway Management Plan (WMP) will be required by the WGCMA. The WMP will be required to support the future application for a waterway works permit for the proposed engineering works on the designated waterways. The WMP will include:
 - *Design of best practice waterway management options and maintenance requirements to ensure the short and long term health and function of the designated waterways*

Estimated cost for a WMP is ~\$5k depending on WGCMA requirements.

It is proposed that separate detailed lump sum scopes be prepared by Water Technology to prepare the SWMS and any WMP that *may* be required, following completion of the engineering fill plan and confirmation of final lot layouts and sizes that may result from the recommendations of this scoping study.

Yours sincerely

Water Technology Pty Ltd



Stephen Reynolds

Senior Environmental Engineer

Stephen.Reynolds@watech.com.au

tel: 61 (03) 5152 5833

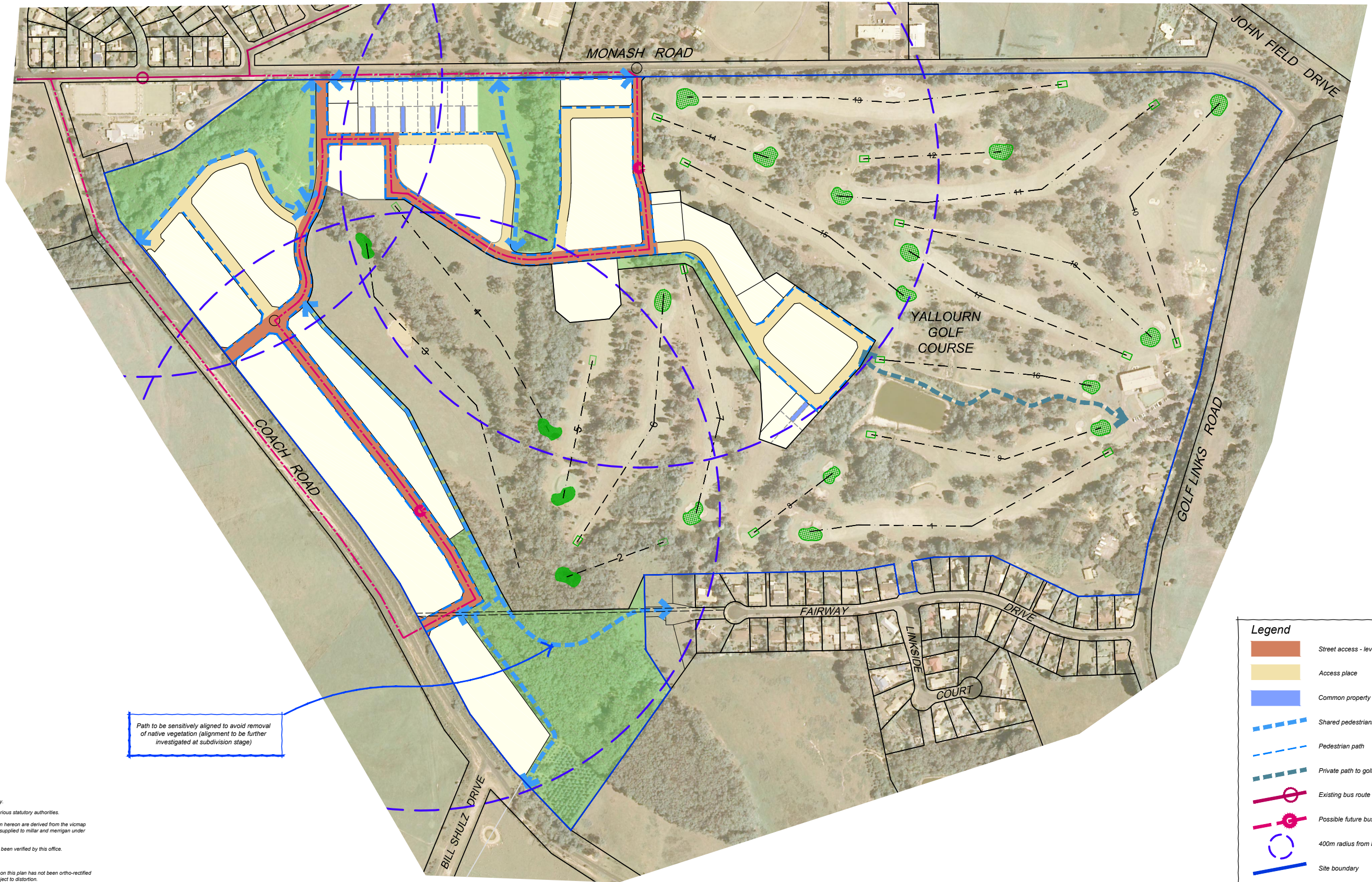
fax: 61 (03) 5152 5855

16 Appendix 13 – Latrobe City Council correspondence

Dated 5 January 2012

17 Appendix 14 – Movement Network Plan

Reference: 15890DP8



Path to be sensitively aligned to avoid removal of native vegetation (alignment to be further investigated at subdivision stage)

Legend

- Street access - level 1
- Access place
- Common property
- Shared pedestrian/cycle path
- Pedestrian path
- Private path to golf course
- Existing bus route & stop
- Possible future bus route & stop
- 400m radius from bus stop
- Site boundary

NOTE:
Dimensions hereon are subject to survey.
This plan is subject to the approval of various statutory authorities.
Property boundaries and contours shown hereon are derived from the vicmap digital property and contour information supplied to millar and merrigan under license agreement from land victoria.
The accuracy of this information has not been verified by this office.
Contour vertical interval 10 metres.
The aerial photograph shown as a base on this plan has not been ortho-rectified and the location of images shown is subject to distortion.
This plan was prepared using copies of certificates of title supplied by the principal.

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
© Millar & Merrigan Pty. Ltd.

No.	Revision Description	Drawn	CHK'd	Date
3	Amend layout	ME		19.2.2019
2	Add bus route to Coach Rd	ME		12.2.13
1	Submitted to Council	ME		01.01.2013

FOR APPROVAL

NBA Group Pty Ltd
89 Macaulay Street
Sale, 3850
m 0418 402 240
o (03) 5143 0340
f (03) 5143 1244
w www.nbagroup.com.au
e nick@nbagroup.com.au

NBAgroup
Planning & Implementing Success

Millar & Merrigan Pty Ltd
ACN 005 541 668
2125 Merrindale Drive Croydon
PO Box 247 Croydon Victoria 3136
t (03) 8720 9500
f (03) 8720 9501
w www.millarmerrigan.com.au
e admin@millarmerrigan.com.au

Millar | Merrigan

LAND DEVELOPMENT CONSULTANTS

Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design

SAI GLOBAL Quality ISO 9001

North

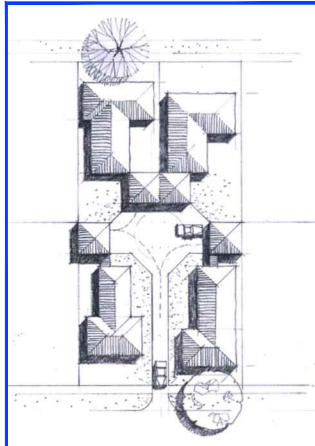
50 25 0 50 100
1:2500
Original sheet size A1

MOVEMENT NETWORK PLAN
TP10631U & PS701486M
MONASH ROAD, NEWBOROUGH 3825
LATROBE CITY COUNCIL

15890DP8
VERSION 3
SHEET 1 OF 1

18 Appendix 15 – Interface Plan

Reference: 15890DP9



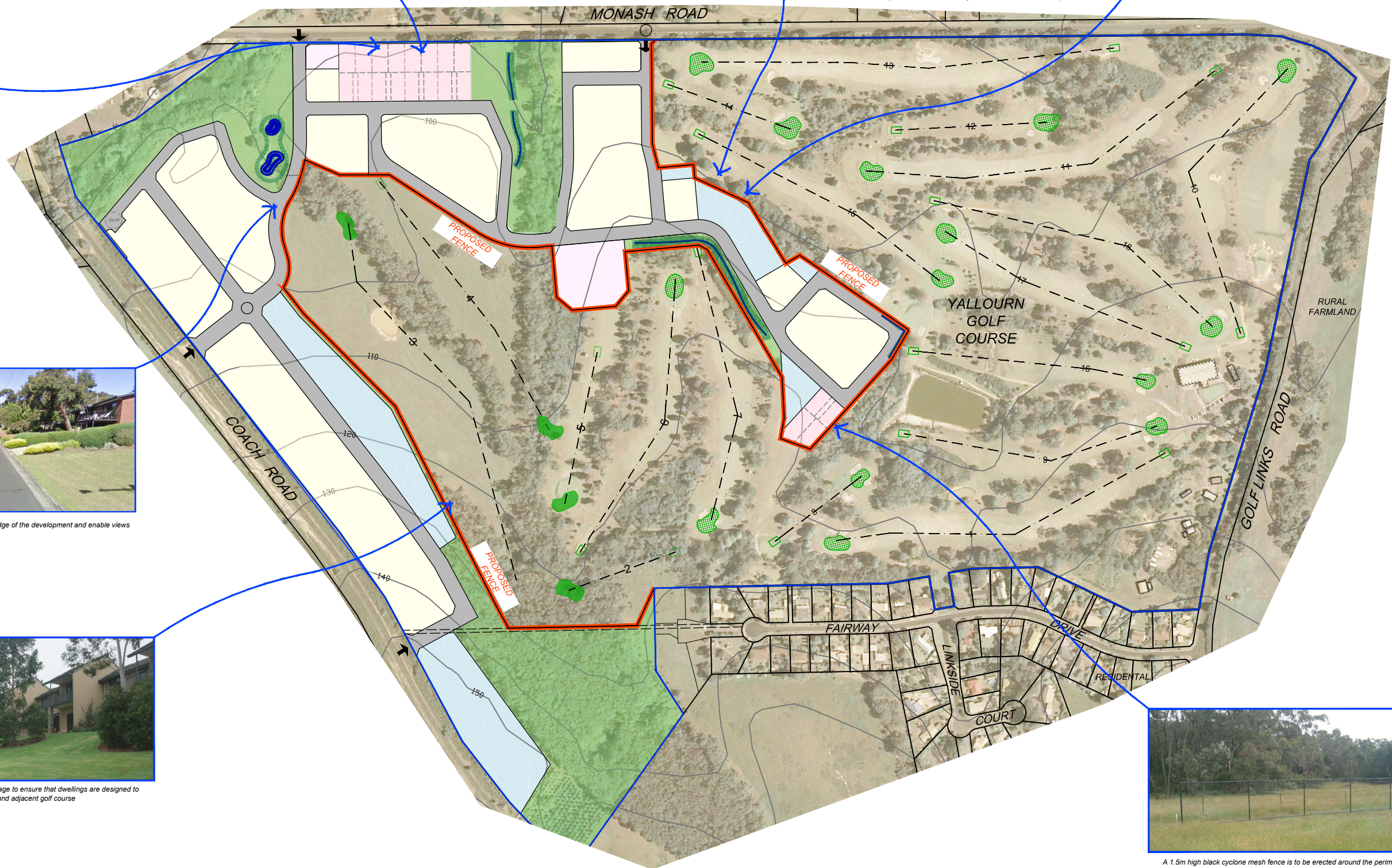
Cluster lots enable active facades to both frontages whilst restricting vehicular access to a single point that services four lots with a common access shaft



Design guidelines will ensure that rear dwellings of cluster lots will front Monash Road and gain pedestrian access from the proposed shared path network



Dwellings on lots that directly abut the golf course (ie. no footpath) will be permitted to have secluded open space to the rear given the screening vegetation offered within the golf course. Permeable fencing is to line the boundary to enable views of the golf course and a seamless open feel



Footpath lined streets, together with new fencing will define the edge of the development and enable views over the golf course



Design guidelines are to be employed at subdivision stage to ensure that dwellings are designed to overlook the shared path network and adjacent golf course



A 1.5m high black cyclone mesh fence is to be erected around the perimeter of the development area to define the boundary of the golf course

Millar & Merrigan authorize the use of this drawing only for the purpose described by the status stamp shown below. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.
© Millar & Merrigan Pty. Ltd.

No.	Revision Description	Drawn	CHK'd	Date
2	Amend development boundary	ME		19/02/2013
1	Submitted to Council	ME		03/01/2013

NBA Group Pty Ltd
93 Macalister Street
Sale, 3850
m 0418 402 240
o (03) 5143 0340
f (03) 5143 1244
w www.nbagroup.com.au
e nck@nbagroup.com.au



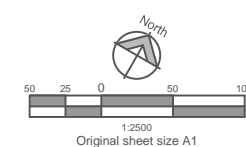
Millar & Merrigan Pty Ltd
ACN 005 541 668
2125 Merrindale Drive Croydon
PO Box 247 Croydon Victoria 3136
t (03) 8720 9500
f (03) 8720 9501
w www.millarmerrigan.com.au
e admin@millarmerrigan.com.au



Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design



SAI GLOBAL Quality ISO 9001



INDICATIVE INTERFACE TREATMENTS PLAN

TP10631U & PS701486M
MONASH ROAD, NEWBOROUGH 3825
LATROBE CITY COUNCIL

15890DP9
VERSION 2
SHEET 1 OF 1

FOR APPROVAL