




Response to Schedule 8 to the Surf Coast Shire Development Plan

1095 Horseshoe Bend Road, Torquay



PLANNING ENVIRONMENT ACT 1987
 SURF COAST PLANNING SCHEME

THE DEVELOPMENT ~~USE~~ ^{PLAN} IS DEEMED SATISFACTORY
 PURSUANT TO 9.43.04 OF THE SCHEME

Signed 

for and on behalf of the Council of the Surf Coast Shire

Date: 2 / 8 / 16 Sheet No. of sheets.

TGM Group Pty Ltd
 GP:003134-01
 Amended May 2016

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1. INTRODUCTION

The following report has been prepared in response to Schedule 8 of the Development Plan Overlay of the Surf Coast Shire Planning Scheme for land at 1095 Horseshoe Bend Road, Torquay.

This report illustrates an urban design approach that accords with design principles of the Torquay North Outline Development Plan and is in general accordance with Torquay-Jan Juc Structure Plan 2007 as required by Schedule 8 to the Development Plan Overlay.

This urban design approach also importantly demonstrates an integrated subdivision design concept to achieve a seamless transition from this subdivision to the proposed surrounding precinct and to established residential areas.

A key feature of this subdivision is the adopted sustainable design approach that will facilitate safe and logical access to encourage walking and cycling opportunities via an expansive integrated open space network and appropriate road design that promotes low speed vehicular use throughout the subdivision.

The subdivision also features an integrated stormwater management network that encapsulates contemporary water sensitive urban design features including rain water gardens and extensive wetlands which will also function as an attractive visual landscape feature.

The proposed design also demonstrates a cooperative innovative approach to satisfy the wishes of the Surf Coast Shire and the Torquay Community for the development of a residential precinct that will continue to enhance the Torquay – Jan Juc urban coastal flavour whilst incorporating sustainable innovative design elements to establish an outstanding residential precinct designed to meet the future needs of the Torquay Community and beyond.

2. BACKGROUND

On 30 April 2009 land at 1095 Horseshoe Bend Road together with land at 1445 Surf Coast Highway and 90 & 110 South Beach Road Torquay was rezoned from Farming Zone to Residential 1 Zone as part of Planning Scheme Amendment C43 of the Surf Coast Shire Planning Scheme. The entire area subject to this amendment is known as the Torquay North Residential Precinct.

Planning Scheme Amendment C43 also introduced Schedule 8 to the Development Plan Overlay over the Torquay North Residential Precinct to provide a framework for the future orderly development of this land. Amendment C43 also applied an Environmental Overlay over part of the subject land however this overlay has now been removed.

Planning Scheme Amendment C37 was introduced into the Surf Coast Shire Planning scheme to implement a number of strategic planning studies that will affect the future use and development of Torquay and Jan Juc including the Torquay- Jan Juc Structure Plan 2007. This structure plan is supported by the Torquay North Outline Development Plan 2008 which together provides the strategic support and broad planning principles for the future development and use of the Torquay North Residential Precinct.

In June 2009 an over arching planning report was submitted for the overall development plan of Torquay North Residential Precinct which has addressed the above matters. The following report constitutes the balance of information required specifically regarding the future development of 1095 Horseshoe Bend Road Torquay in response to the relevant provisions of Schedule 8 to the Development Plan Overlay.

3. SITE CHARACTERISTICS

3.1 SITE ANALYSIS

The site at 1095 Horseshoe Bend Road is a greenfield site that had previously been utilised for the propagation of flowers and rural produce. The site generally gently falls to the south east where it is proposed to develop a combined retardation basin, wetland and open space area. The site is somewhat devoid of any prominent features except for a large rural dam located on the north western boundary of the site and a retardation basin located along the south eastern edge which contributes to the management of stormwater runoff from the adjoining properties to the south by subject to a formal agreement.

3.2 SITE LOCATION

The site is located to the north of Torquay and forms the eastern parcel of the land recognised as the Torquay North Residential Precinct. The site adjoins Horseshoe Bend Road to the west and vacant rural land which is also part of the Torquay North Residential Precinct that extends to the Surf Coast Highway. This site is also directly north of the existing established residential development and west of the Sands residential and golf course development. Land adjoining the north boundary of the site is rural land currently zoned for farming purposes.

The site is located approximately 3kms from Torquay central and 1.3 kms from Fishermans Beach directly to the south.

3.3 SITE CONTEXT

The site is one of three major parcels of land recognised as the Torquay North Residential Precinct and is zoned as Residential 1 zone land. The site is also recognised as being within the Torquay Urban Growth Boundary as part of the Torquay-Jan Juc Structure Plan 2007 and land proposed for rezoning as part of the Torquay North Outline Development Plan which constitutes the current northern extent of residential 1 zone land in Torquay.

The proposed residential development of the site enables a contiguous development of residential land to the north and west of existing established residential precincts within Torquay with the major access route from the Surf Coast Highway.

3.4 VEGETATION ASSESSMENT

The site was subject to a native vegetation assessment conducted by Mark Trengove Ecological Services (Appendix B) who assessed that the site is degraded and overwhelmingly consists of exotic vegetation with scattered occurrence of locally common indigenous species only. The vegetation was assessed against the States Native Vegetation Management Framework and was considered to be of no significance. Thus the assessment did not identify any native vegetation on site worthy of retention.

3.5 CULTURAL HERITAGE ASSESSMENT

A Desktop Archaeological Assessment was undertaken by Terra Culture Heritage Consultants (Appendix C) to determine the Aboriginal heritage values of the subject site. The summary of management recommendations concluded that:

'The subdivision of the property will not harm any previously identified Aboriginal cultural heritage values. Recommendations are given with regard to actions required in the event that Aboriginal cultural heritage is identified at a later date.'

3.6 ENVIRONMENTAL ASSESSMENT

A preliminary environmental site assessment was conducted by Noel Arnold and Associates to determine the existence and level of contaminants for the entire Torquay North Residential Precinct as required by the Environmental Overlay affecting this land.

The report concluded that:

'The area of the site known by this report as the Broad Acre area exhibits a negligible risk of contamination to land as no point sources of potential contamination were identified, no historical information indicated potential contamination sources and soil sampling and analysis did not indicate exceedences of the standard residential use health investigation level'

The report also concluded that:

'Dieldrin levels reported across the broad acre area of the site are consistent with dieldrin levels reported in other nearby sites and based on findings of a nearby environmental audit, do not preclude standard residential land use.'

Based on these findings the level of contaminants found as a result of this investigation should not limit the intended residential use and development of the subject site.

It is understood that Council is already in receipt of this report. The Environmental Overlay has now been removed.

4 DESIGN RESPONSE

4.1 OVERVIEW

The proposed Development Plan Design Response (Appendix A) demonstrates a comprehensive contemporary design approach that features both innovative design and sustainability elements that will establish this residential precinct as a highly desirable and livable high quality urban residential precinct.

Overall the design response will also provide for a wide range of residential opportunities to accommodate the residential expectations and needs of the broader Torquay community.

The Overall design accords with the preferred design responses as identified in the Outline Development Plan for the Torquay North Urban Growth Area which include:

1. Maintain and enhance the distinct surfing identity and coastal character of Torquay-Jan Juc.
2. Promote a strong sense of community and belonging, with enhanced connectivity and attractive community spaces.
3. Promote ageing in place through planning for a diversity of housing types responsive to existing and future needs of the community.
4. Promote energy efficiency and wise resource use as a legacy of coastal living.

The development plan features a substantial open space reserve which will integrate with the proposed drainage reserve and a similar linear reserve proposed west of Horseshoe Bend Road that extends through the precinct. The reserve will enable promotion of the open space coastal theme of Torquay, and in addition, provides substantial community space for community building opportunities. The integrated landscape design of this reserve will be undertaken as part of the statutory planning requirements to the satisfaction of Council in consultation with the developments to the west.

The development plan has been amended at the north western corner of the subject land to provide a lot of approximately 3612m² for a proposed Childcare Centre on the corner of Horseshoe Bend Road and Pintail Drive. A Childcare Centre at this site is considered to be ideally located to provide convenient access to drop-off or pick-up children for those residents entering or exiting the estate. The site is also considered to be an appropriate size to establish a Childcare Centre, car parking and landscaping which

will be subject to a future planning permit application. The use and development of a Childcare Centre in the General Residential Zone 1 requires a planning permit under Clause 32.08-1 Section 2 Permit Required and under Clause 32.08-6 Buildings and works associated with a Section 2 use.

The overall subdivision layout and design also integrates with existing character of the surrounding residential precinct and provides opportunity for a diverse housing choice to satisfy a wide variety of community needs. The majority of lots are appropriately located to encourage solar efficiency and are of sufficient size to ensure sustainable solar outcomes can be achieved.

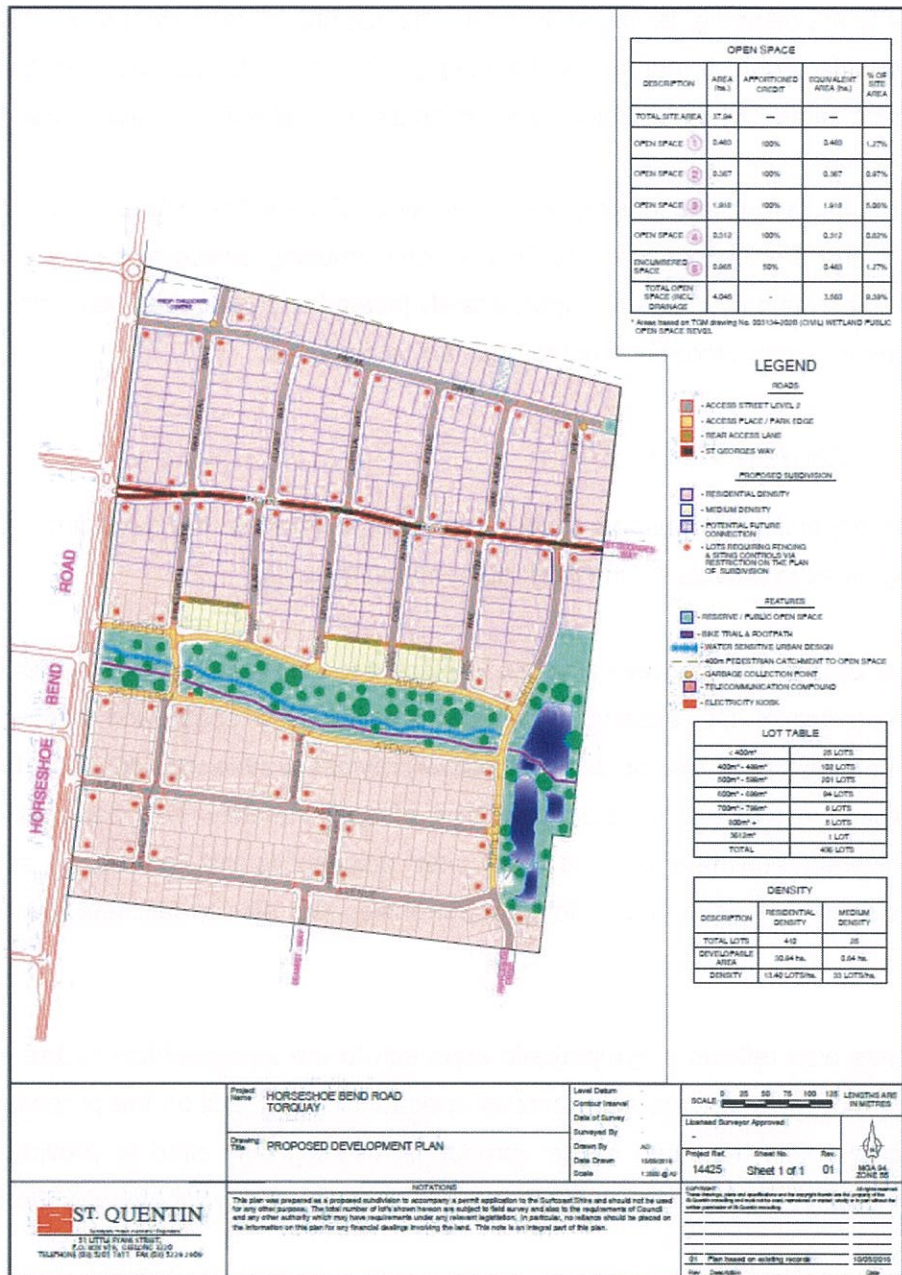
4.2 SUBDIVISION DESIGN

The overall design response will provide a range of lot sizes to promote the development of a variety of residential dwelling types to provide for the differing community needs.

The proposed lot sizes and designs have also been selected to seamlessly integrate with the established neighbourhood character of the existing residential areas to the south and east. The attached Development Plan (Appendix A) also as depicted below provides a table that identifies the lot range and overall density based on the total development area of approximately 37.9 hectares. The Medium density lots add diversity and have been logically sited adjacent to the linear open space reserve to provide for recreational and community building opportunities and also to facilitate future solar efficient housing.

The design response also reflects a sympathetic approach to the topographical nature of the land and will provide for lots that will maximise solar access opportunities. In addition the proposed the drainage network incorporated within the open space corridor is also logically sited to provide flows into the drainage reserve along the south eastern boundary which is the lowest point of the property.

The amended development plan to allow the establishment of a lot capable of facilitating the development of a Chilcare Centre entails the creation of one lot from a proposed five residential lots as part of Stage 9. This amendment does not change the overall approved subdivision design.

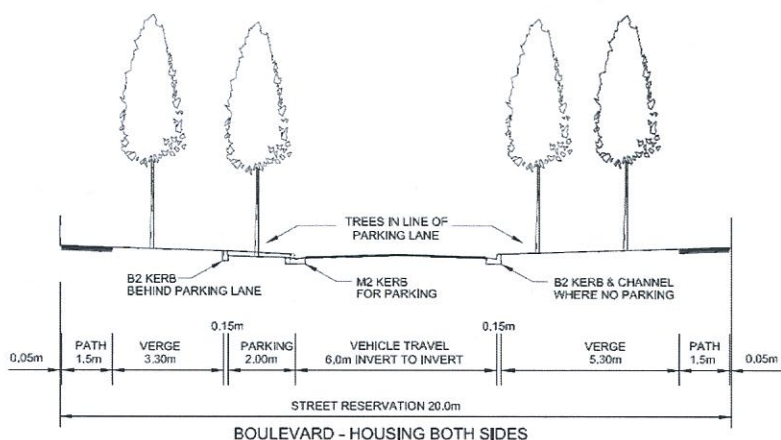


4.3 ROAD DESIGN

The road design of the subdivision is based on a grid concept pattern which establishes certainty and conformity to provide for easy, convenient, predictable and safe vehicular access.

The road design also incorporates interest and innovation with the incorporation of a boulevard style road along the eastern boundary adjoining the wetlands open space areas which will provide significant and attractive visual interest. The design also features four different road types to facilitate the varying access demands throughout the subdivision. These are :

- Access Street Level 1 which forms the primary local road network.
- Access Place proposed to sited adjacent to reserves.
- Laneway specifically required adjacent to lots designated for future medium density development.
- Boulevard to provide the main entry point road into the subdivision.



The road designs and road types (Appendix D) have been selected as recommended by TTM Consulting in consultation with the Surf Coast Shire. A Staging Plan (Appendix A) is also attached which indicates the likely sequential construction of Horseshoe Bend Road. In addition, it is our preference to coordinate the construction of Horseshoe Bend Road with developers to the west.

4.4 MOVEMENT AND TRANSPORT

The overall subdivision pattern is designed to promote low speed vehicular use and encourage pedestrian use via the local road network and designated shared path incorporated as part of the open space reserve.

A key feature of the road network is the number of access opportunities from Horseshoe Bend Road to disperse traffic congestion and to provide localised access points into the subdivision. This feature will also contribute in reducing traffic speeds. In addition, the road network off Horseshoe Bend Road has been sited to integrate with the proposed residential developments to the west as designed by TTM consulting.

4.5 INTEGRATION

The overall design of this subdivision embraces an integrated approach to provide logical and safe connectivity to existing residential areas and proposed urban development to the west.

The proposed road pattern will ensure safe and convenient vehicular access from Horseshoe Bend Road and access points both to the east and south adjoining the existing residential precincts. The overall design also includes possible future road connections to the north should this land be subject to future development.

The other significant integration feature is the proposed east/west linear open space reserve that will serve as the primary walking and cycling path that will integrate with a similar reserve that will be developed to the west. In addition the subdivision will incorporate footpaths on both sides of all streets to promote walking throughout this residential precinct.

4.6 OPEN SPACE

A key feature of the design response is the significant area set aside for public open space as indicated in the linear park overall landscape concept plan in Appendix F. The overall open space concept features a dedicated linear east/west open space corridor which will primarily serve as an exclusive pedestrian bicycle link designed to integrate with a similar reserve to the west of the precinct. The incorporation of this feature will promote walking and riding and healthy living opportunities consistent with contemporary community health policies.

The proposed indicative landscape concept design also features an interactive planting approach by utilising a mix of indigenous, landscape and food production trees to create an interactive habitat to reintroduce native fauna and to encourage human use and activity in the reserve.

The reserve will also function as a significant area for passive recreational activities and will be logically sited adjoining medium density lots to encourage interaction and community building opportunities. Its intended use and linear design adjoining the medium density lots will also importantly provide opportunity for causal surveillance from the adjacent residential development.

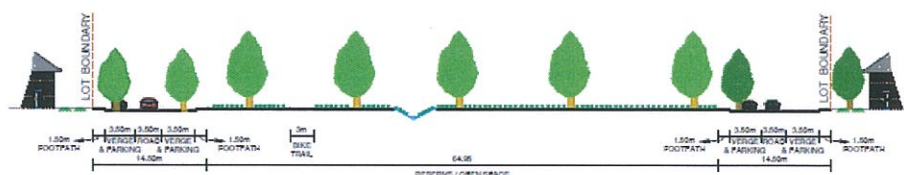
The reserve will also incorporate part of the proposed stormwater network which will flow via a grassed swale through the linear reserve to an adjoining wetland and retarding basin reserve located in the south east corner of the site. It is proposed that this reserve will incorporate wetlands and open space areas which will also provide an attractive environment for family friendly recreational activities. This open space area will also establish an attractive landscaped visual feature of this residential development and be subject to a detailed landscape plan prior to construction.

Open space opportunities also exist to the south west of the subject site where a sports field is established and extensive sporting grounds and community facilities are also proposed for future development directly to the west of the subject site. In summary the proposed subdivision is in easy walking distance to open space opportunities.

4.7 LANDSCAPING

As illustrated in the attached linear park overall landscape concept plan – Appendix F, the landscape design will feature a complimentary planting theme of indigenous, feature and food production trees to establish an ‘integrated habitat’ for biodiversity and human use.

The trees will frame a number of open space (play areas) and a central playground. In addition a key feature of this reserve will be serpentine linear shared trail that will act as the primary link within the reserve and to provide east/west access. The proposed landscaping will also feature treatments to reflect the Torquay coastal character as indicated on the overall landscape concept.



4.8 UTILITIES

The proposed subdivision will utilise contemporary technologies to accord with Council’s sustainability targets to reduce the ultimate environmental impact of this development.

Stormwater Management (Appendix E – Utilities & Site Management Report)

As advised the proposed open space reserve will also act as the main conveyance of storm water through the subdivision and will also provide some treatment to storm water which will ultimately flow into the proposed drainage reserve which is proposed to provide a treatment function via a wetlands system and detention.

The proposed storm water drainage concept was considered by GHD in their Report for Stormwater Masterplan – Torquay North Technical Report December 2010 and accords with the Stormwater Masterplan for Torquay North in Appendix E of that report.

Further drainage design detail will be provided at the detailed design stage of the subdivision in accordance with best practice standards of the WSUD guidelines.

Site Management (Appendix E – Utilities & Site Management Report)

The construction of the proposed subdivision will be subject to an approved construction management plan prior to the commencement of development to ensure that any potential off-site environmental issues are appropriately managed to the satisfaction of the Surf Coast Shire.

Recycled Water (Appendix E – Utilities & Site Management Report)

The proposed subdivision will also incorporate the use of recycled water via the installation of a third pipe.

**APPENDIX A – PROPOSED DEVELOPMENT PLAN &
STAGING PLAN**



OPEN SPACE				
DESCRIPTION	AREA (ha.)	APPORTIONED CREDIT	EQUIVALENT AREA (ha.)	% OF SITE AREA
TOTAL SITE AREA	37.94	-	-	
OPEN SPACE ①	0.483	100%	0.483	1.27%
OPEN SPACE ②	0.367	100%	0.367	0.97%
OPEN SPACE ③	1.918	100%	1.918	5.06%
OPEN SPACE ④	0.312	100%	0.312	0.82%
ENCUMBERED SPACE ⑤	0.965	50%	0.483	1.27%
TOTAL OPEN SPACE (INCL. DRAINAGE)	4.045	-	3.563	9.39%

* Areas based on TGM drawing No. 003134-202B (CIVIL) WETLAND PUBLIC OPEN SPACE REV03.

LEGEND

- ROADS**
- ACCESS STREET LEVEL 2
 - ACCESS PLACE / PARK EDGE
 - REAR ACCESS LANE
 - ST GEORGES WAY
- PROPOSED SUBDIVISION**
- RESIDENTIAL DENSITY
 - MEDIUM DENSITY
 - POTENTIAL FUTURE CONNECTION
 - LOTS REQUIRING FENCING & SITING CONTROLS VIA RESTRICTION ON THE PLAN OF SUBDIVISION
- FEATURES**
- RESERVE / PUBLIC OPEN SPACE
 - BIKE TRAIL & FOOTPATH
 - WATER SENSITIVE URBAN DESIGN
 - 400m PEDESTRIAN CATCHMENT TO OPEN SPACE
 - GARBAGE COLLECTION POINT
 - TELECOMMUNICATION COMPOUND
 - ELECTRICITY KIOSK

LOT TABLE	
< 400m ²	25 LOTS
400m ² - 499m ²	102 LOTS
500m ² - 599m ²	201 LOTS
600m ² - 699m ²	94 LOTS
700m ² - 799m ²	8 LOTS
800m ² +	5 LOTS
3612m ²	1 LOT
TOTAL	436 LOTS

DENSITY		
DESCRIPTION	RESIDENTIAL DENSITY	MEDIUM DENSITY
TOTAL LOTS	410	25
DEVELOPABLE AREA	30.94 ha.	0.64 ha.
DENSITY	13.40 LOTS/ha.	33 LOTS/ha.

Project Name	HORSESHOE BEND ROAD TORQUAY	Level Datum	-
Contour Interval	-	Date of Survey	-
Surveyed By	-	Drawn By	AD
Date Drawn	10/05/2016	Scale	1:2500 @ A2

SCALE 0 25 50 75 100 125 LENGTHS ARE IN METRES

Licensed Surveyor Approved

Project Ref. 14425 Sheet No. 1 of 1 Rev. 01

MGA 94 ZONE 55

NOTATIONS

This plan was prepared as a proposed subdivision to accompany a permit application to the Surfcoast Shire and should not be used for any other purpose. The total number of lot's shown hereon are subject to field survey and also to the requirements of Council and any other authority which may have requirements under any relevant legislation. In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land. This note is an integral part of this plan.

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01	Plan based on existing records	10/05/2016
Rev	Description	Date

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* Areas based on TGM drawing No. 003134-202B (CIVIL) WETLAND PUBLIC OPEN SPACE REV03.



LEGEND

- ROADS**
- ACCESS STREET LEVEL 2
 - ACCESS PLACE / PARK EDGE
 - REAR ACCESS LANE
 - ST GEORGES WAY
- PROPOSED SUBDIVISION**
- RESIDENTIAL DENSITY
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Project Name: HORSESHOE BEND ROAD TORQUAY
 Drawing Title: PROPOSED STAGE PLAN
 Level Datum: -
 Contour Interval: -
 Date of Survey: -
 Surveyed By: -
 Drawn By: AD
 Date Drawn: 10/05/2016
 Scale: 1:2500 @ A2

SCALE 0 25 50 75 100 125 LENGTHS ARE IN METRES

Licensed Surveyor Approved: -

Project Ref: 14425 | Sheet No: Sheet 1 of 1 | Rev: 01

MG A 94 ZONE 55

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APPENDIX B – NATIVE VEGETATION ASSESSMENT

Vegetation of
1090 Horseshoe Bend Road Torquay

A Report to
TGM Group Pty Ltd

Prepared by
Mark Trengove Ecological Services

May 17 2009

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Introduction

1.1 Project Background

This Report has been commissioned by TGM Group Pty Ltd to assess the occurrence and significance of any remnant indigenous vegetation and to discuss any implications for vegetation removal at 1090 Horseshoe Bend Rd, Torquay.

1.2 Aims

The aims of the study are to -

- Determine the extent of any native vegetation that exists in the study area.
- Describe the vegetation of the study area including vegetation species and vegetation communities (EVCs).
- Discuss the implications for any proposed vegetation removal.

1.3 Study Area

The study area is the footprint of the proposed residential development at 1090 Horseshoe Bend Rd, Torquay, located within the Surfcoast Shire.

The study area is within the Otway Plains Bioregion (DNRE 2002), which is located within in the Corangamite Catchment Management Authority area.

The site appears to have been disturbed in the past, probably due previous and current agricultural land use. However the site carries some localised areas of scattered indigenous vegetation. The vegetation of the site can be described as predominately exotic vegetation with occasional indigenous species (*see* Map 1).

1.4 Area of Potential Impact

For the purposes of this report, the area of potential impact is the footprint of the residential sub-division and the associated impacts of the proposed development. This area is shown on Map 1.

2.0 METHODOLOGY

2.1 Taxonomy

Scientific names for plants follow the Census of Vascular Plants of Victoria (Walsh and Stasjic 2007). Common names for plants follow the Flora of Victoria Volumes 2-4 (Walsh and Entwisle 1994-1999).

2.2 Literature and Database Review

Relevant literature and databases, including data within the Flora Information System (FIS) And Victorian Wildlife Atlas of the Department of Sustainability and Environment (DSE) and the Technical Support Maps for Local Government Authorities (DSE 2003) were reviewed.

2.3 Field Survey

The study area was inspected on foot on the 16th of May 2009 by the report author.

General observations were made on the vegetation and habitat quality of the study area. A list of all indigenous and dominant exotic vascular plant species was compiled. The location of any significant vegetation was mapped.

2.4 Limitations

The survey was conducted in autumn, a time of year when most indigenous species should be visible. Due to the predominately degraded nature of the study area, the site inspection is considered to be adequate to assess the ecological values of the site. As a result there are not considered to be any limitations to this study.

2.5 Defining Significance

A number of criteria are applied in order to assess the significance of flora species and vegetation communities. The definition of the criteria is detailed in Appendix 1.

3.0 Results

3.1 Ecological Vegetation Classes (EVC)

EVCs are the primary level of classification of vegetation communities within Victoria. An EVC contains one or more plant (floristic) community, and represents a grouping of vegetation communities with broadly similar ecological attributes. Classification of EVCs in this report follows Oates and Toranto (2002).

The pre-1750 EVC mapping of the study area undertaken by DSE (DSE website) indicates that the study area and immediate surrounds were comprised of EVC 175: Grassy Woodland.

This report finds that parts of the study area are comprised of partially intact native vegetation that may accord with EVC 175: Grassy Woodland.

The bioregional conservation status of EVC 175: Grassy Woodland is 'Endangered' (DSE 2004). Endangered is defined as an EVC where less than 10% of pre-european extent remains (DNRE 2002).

3.2 Flora

The study area consists of degraded and overwhelmingly exotic vegetation with scattered occurrences of locally common indigenous species.

The indigenous vegetation consists of young regrowth of Golden Wattle, aquatic species associated with the existing modified farm dams and a narrow strip of Thatch Saw-sedge, Clustered Sword-sedge, Coast Tea-tree and Coast Beard-heath adjacent to the Horseshoe Bend Road Roadside Reserve. (*see* Table 1).

The dominant exotic species are Flax-leaf Broom, Boxthorn and pasture grasses (*see* Table 2). The majority of the study area is under intensive agriculture and is currently bare of vegetation.

3.3 Plant Species

The vegetation of the study area consists of a total of 13 indigenous vascular plant species.

Table 1 Indigenous Plant Species and Status

Botanical Name	Common Name	S	1	2	3	4	5	6
<i>Acacia pycnantha</i>	Golden Wattle	Local		*		*		
<i>Bolboschoenus sp</i>	Club-rush	Local	*					
<i>Eleocharis acuta</i>	Common Spike-rush	Local			*			
<i>Ficinia nodosa</i>	Knobby Club-rush	Local			*			
<i>Gahnia radula</i>	Thatch Saw-sedge	Local						*
<i>Juncus sp</i>	Rush	Local	*		*		*	
<i>Juncus subsecundus</i>	Finger Rush	Local			*			
<i>Lepidosperma congestum</i>	Clustered Sword-sedge	Local						*
<i>Lepileana cylindrocarpa</i>	Long-fruited Water-mat	Local	*					
<i>Leptospermum laevigatum</i>	Coast Tea-tree	Local						*
<i>Leucopogon parviflorus</i>	Coast Beard-heath	Local						*
<i>Lythrum hysoppifolia</i>	Small-flowered Loosestrife	Local	*		*			
<i>Typha domingensis</i>	Cumbungi	Local			*		*	

Status: Local – Local conservation significance

Location (*): 1 Dam 1
 2 Linear extension
 3 Dam 2
 4 Eastern area
 5 Dam 3
 6 Horseshoe Bend Road

(see Map 1)

Table 2 Dominant Exotic Plant Species

Botanical Name	Common Name
<i>Genista linifolia</i>	Flax-leaf Broom
<i>Phalaris aquatica</i>	Canary-grass
<i>Arctotheca calendula</i>	Capeweed
<i>Agrostis capillaris</i>	Brown-top Bent

3.4 Condition of the Native Vegetation

The site supports predominately exotic vegetation with only scattered occurrences of locally common indigenous species that have not been accorded 'EVC' or 'scattered tree' status, as they do not achieve benchmark criteria. The vegetation is of negligible conservation significance. The Golden Wattles are all even aged, young regrowth.

The narrow strip of Thatch Saw-sedge, Clustered Sword-sedge, Coast Tea-tree and Coast Beard-heath appears to occur (in some parts at least) on the Horseshoe Bend Roadside Reserve as well as on the study area.

Six of the indigenous species, Cumbungi, Small-flowered Loosestrife, Common Spike-rush, Finger-Rush, Rush and Long-fruited Water-mat are located in the existing dam areas (*see* Map 1). The farm dams are relatively small, modified, degraded and is isolated from other areas of habitat. Therefore the habitat values of the farm dam are considered to be low.

3.5 Significant Species

No species of National, State or Regional conservation significance were recorded during this study.

All 13 indigenous species are all considered to be of Local conservation significance.

Refer to Table 1.

4 State- Native Vegetation Management Framework

4.1 Net Gain

Net Gain is the Victorian Government's framework for achieving native vegetation gains across the state. The framework is defined in the document *Victorian Native Vegetation Management - A Framework for Action* (DNRE 2002) and is achieved in conjunction with Regional Native Vegetation Plans, prepared by the local Catchment Management Authorities.

Net Gain is described as 'the outcome for native vegetation and habitat where overall gains are greater than overall losses and where individual losses are avoided where possible. Losses and gains are determined by a combined quality/quantity measure and over a specified period of time. Gains may be either required offsets for permitted clearing actions or as a result of land holder and Government assisted efforts that are not associated with clearing' (DNRE 2002).

The stated goal of the framework is to achieve:

A reversal, across the whole landscape, of the long-term decline in the extent and quality of native vegetation, leading to a Net Gain (DNRE 2002).

The three-step approach to net gain is to:

- avoid adverse impacts, particularly through vegetation clearance
- if impacts cannot be avoided, minimize impacts through appropriate consideration in the planning process
- identify appropriate offset options (DNRE 2002).

4.2 Habitat Hectares

Habitat Hectares is an accounting method for measuring habitat quality and quantity that has been developed by DSE for Net Gain Assessment. The habitat hectares approach is site based. Each site, or patch, consists of one EVC and one vegetation condition class. It is therefore uniform within limits. This is referred to as a *Habitat Zone*.

Each Habitat Zone has a *habitat score* of between 0 and 100, with extensive intact vegetation having a theoretical score of 100. The habitat score has ten components: large trees, tree canopy cover, understorey, weediness, recruitment, organic litter, logs, patch size, neighbourhood context and distance to core area.

Each Habitat Zone has a *habitat hectare value*, where the habitat score is multiplied by the area in hectares. For example, 6 ha of vegetation with a habitat score of 50 equals 3 habitat hectares. Under the Native Vegetation Management Framework (DNRE 2002) habitat hectares are calculated only where the understorey is at least 25% of the benchmark for that particular EVC or where groups of at least three trees

exist with a canopy of greater than 20% of the relevant benchmark . These sites are referred to as *patches* in Net Gain Terminology.

Trees over mainly exotic understoreys (less than 25% of the benchmark) are not assessed using habitat hectares, instead they are assessed as individual trees.

Habitat hectares is also the unit of measurement used to calculate offsets under net gain.

4.3 Trees

Under the Native Vegetation Management Framework (NRE 2002), any large old canopy trees that are proposed to be removed are subject to protection/and or recruitment offsets, depending upon the characteristics of the site.

Scattered trees, that is, trees that exist without an indigenous understorey, are also assessed under the Framework.

Within the Otway Plains Bioregion, EVC 175: Grassy Woodland has *Eucalyptus* spp over 70 cm DBH (diameter at breast height) and *Allocasuarina* spp over 40 cm DBH as 'large' trees.

4.4 Area of EVC Vegetation

The current survey results show that no areas or 'patches' of native vegetation are present across the site.

4.5 Area of Scattered Trees

The current survey results show that no scattered or large old trees are present across the site.

5 Implications

Utilizing the Framework criteria, the study area vegetation of the site is assessed as being of **No Conservation Significance**. This rating is determined due to the combination of the low site habitat score and the EVC 'Endangered' bioregional status.

Although EVC 175: Grassy Woodland is classed as 'Endangered' in Victoria, the vegetation of the study area is not of sufficient quality to create any implications for the relevant State (Native Vegetation Management Framework) legislation.

Therefore, under the State Framework, no responses to the proposal are required.

Within the local area the site is considered to be of **Low Local Conservation Significance**. This is due to the following factors:

- The scattered occurrence of locally common indigenous species only.
- The overwhelmingly degraded and exotic vegetation.
- The presence of modified and degraded wetland habitat (the existing farm dams) that are considered likely to provide habitat for locally common indigenous wildlife species only.

Therefore the proposal is deemed to have only a negligible local impact upon biodiversity conservation.

It is recommended that locally occurring indigenous species be utilized in the amenity landscaping works associated with the development. This would provide an adequate compensation for the loss of the existing indigenous vegetation.

There are not considered to be any limitations to this study.

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Appendix 1 Assessing Conservation Significance

Conservation significance is assessed at a range of scales, including global, international, national, state, regional and local. Criteria used for determining the conservation significance of flora and fauna at national to local scales are presented below for botanical conservation significance.

National botanical significance applies to an area when it supports one or more of the following attributes:

A population of at least one nationally threatened plant species listed by Briggs and Leigh (1996) or plant species listed on the schedules to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

A nationally threatened ecological community listed on the schedules of the *Environment Protection and Biodiversity Conservation Act 1999*.

State botanical significance applies to an area when it supports one or more of the following attributes:

A population of at least one plant species threatened in Victoria, as listed by Gullan et al. (1990), NRE (2000a) or more recently in the unpublished records of the Flora Information System (NRE), or on the schedules to the Victorian *Flora and Fauna Guarantee Act 1988*.

An ecological community considered threatened in Victoria through its listing on the schedules of the *Flora and Fauna Guarantee Act 1988*.

Regional botanical significance applies to an area that supports one or more of the following attributes:

Supports a population of one or more regionally depleted species defined in a valid regional assessment of biodiversity (eg. Regional Native Vegetation Plan, Environment Conservation Council Report or Comprehensive Regional Assessment documents).

An ecological vegetation class that is considered endangered or vulnerable in a particular bioregion (based on Conn 1993 and the Regional Native Vegetation Plan), in which case the area is of **High Regional** significance.

An ecological vegetation class that is considered depleted in a particular bioregion (based on Conn 1993 and the Regional Native Vegetation Plan), in which case it is of **Regional** significance.

Local botanical significance applies to all remnant native vegetation that does not meet the above criteria. In much of Victoria, and in particular on the Bellarine Peninsula, native vegetation has been so depleted by past clearing and disturbance that all remaining vegetation must be considered to be of at least local conservation significance.

Map 1 Vegetation Locations

APPENDIX C – DESKTOP ARCHAEOLOGICAL ASSESSMENT

1095 Horseshoe Bend Road, Torquay
Desktop Archaeological Assessment

Sponsor: TGM Group Pty Ltd

Cultural Heritage Advisor: John Hyett (B. A. Hons)

Report Prepared by: John Hyett and Sarah Hayes

November 2008



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EXECUTIVE SUMMARY

TerraCulture Pty Ltd has been commissioned by TGM Group Pty Ltd to conduct a desktop archaeological assessment of a property at 1095 Horseshoe Bend Road, Torquay (Map 1). Torquay is located on the coast approximately 78 kilometres south-west of Melbourne, and the subject land consists of 37.8 ha to the east of Torquay. The land is to be sub-divided into 400 residential allotments with associated roads and services.

A Cultural Heritage Management Plan was not required by the *Aboriginal Heritage Act 2006*. In accordance with the *Aboriginal Heritage Regulations 2007*, the subject land does not fall within an area of Cultural Heritage Sensitivity. Therefore, a Cultural Heritage Management Plan (CHMP) was not required.

Project Aims

Following discussions with TerraCulture, it was agreed that an archaeological desktop investigation of the Aboriginal heritage values of the property would be undertaken comprising background research. This desktop study was designed to identify known cultural heritage values and high potential landforms on the subject land.

Summary Results of the Assessment

The background research conducted for the project indicated that Aboriginal cultural heritage places in the Torquay area were most likely to be located within coastal dunes or adjacent to waterways. These places were predominantly artefact scatters and shell deposits. The subject land comprises flat land on the coastal hinterland. Previous assessments of the hinterland have not identified any Aboriginal cultural heritage. In addition, pastoral and agricultural activities on the land since European settlement have significantly altered the landscape and potentially destroyed any existing heritage values.

Summary of Management Recommendations

The sub-division of the property will not harm any previously identified Aboriginal cultural heritage values. Recommendations are given with regard to actions required in the event that Aboriginal cultural heritage is identified at a later date.

ACKNOWLEDGEMENTS

TerraCulture Pty Ltd would like to thank the following people for their assistance with this project:

Chris Marshall TGM Group

The following TerraCulture staff produced this report:

Sarah Hayes	Project Archaeologist, Research, Report Writing
Jasma Walker	Background Research (AAV Heritage Registry)
Paul Bazalicki	Mapping
Catherine Webb	Editing and Quality Control

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1.0 INTRODUCTION

1.1 Preamble

This assessment is for the proposed sub-division and development of the property at 1095 Horseshoe Bend Road, Torquay. TerraCulture Pty Ltd was commissioned by TGM Group on behalf of GDV Developments Pty Ltd to conduct a desktop assessment.

The *Aboriginal Heritage Regulations 2007* require a CHMP to be conducted if the activity area is within an area defined as being of cultural heritage sensitivity and the activity is a high impact activity. The subdivision of land into three or more lots is a high impact activity under regulation 46 of the *Aboriginal Heritage Regulations 2007* if at least three lots can be used for a dwelling and the area of at least three of the lots is less than 8 ha. However, the activity area does not meet any of the definitions of an area of cultural heritage sensitivity under the *Regulations* and therefore any CHMP would be a voluntary CHMP under section 45 of the *Aboriginal Heritage Act 2006*.

This assessment was prepared by John Hyett (Cultural Heritage Advisor) and Sarah Hayes (Project Archaeologist). John has a Bachelor of Arts (Honours) degree in archaeology and seven years experience in conducting archaeological assessments, both Aboriginal and Historical, in Victoria and southern New South Wales. Sarah has recently commenced work with TerraCulture and has a PhD in archaeology.

1.2 The Activity Area

The activity area consists of approximately 37.8 ha of land at 1095 Horseshoe Bend Road, Torquay (SPI D PS522136 Parish of Puebla, Surf Coast Shire) (see Map 1). Torquay is located on the coast approximately 78 kilometres south-west of Melbourne.

1.3 The Owners/Occupiers of the Land

The activity area is owned by GDV Developments Pty Ltd.

1.4 Registered Aboriginal Parties

The *Aboriginal Heritage Act 2006* requires consultation with any Registered Aboriginal Parties (RAPs) registered under act. At the time of the desktop study there was no RAP listed for the area. The AAV website listed two applicants for status as RAPs, the *Wathaurong Aboriginal Co-operative Ltd* and the *Wathaurong Aboriginal Corporation*.

If there is no RAP for the area at the time a Notice of Intent is lodged, any future CHMP will be evaluated by the Secretary of the Department of Victorian Communities under the provisions of Section 65 (1) (b) (i) of the *Aboriginal Heritage Act 2006*.

2.0 PROPOSED ACTIVITIES

2.1 Description of the Proposed Activities

The proposed activity consists of the subdivision of the land into approximately 400 residential lots with associated services and road works.

2.2 Extent of the Activity Area Covered by this Assessment

The entire 37.8 ha of the activity area as outlined in section 1.2 above is covered by this desktop assessment (see Map 1).

2.3 Documentation of Consultation

As this report consists of a desktop assessment only, no notice of intent was required for this desktop assessment and no representatives of the RAP applicants were involved in the study.

'composed of typical calcareous dunes that rise to 20m above the beach. They are irregular and lie above a Tertiary sedimentary base of limestone and marl. The back dunes are the highest while the foredunes are low and end abruptly at the beach, with pronounced cliffing toward the northern end. There is a deep swale between the foredunes and backdunes. The modern dunes overlie Pleistocene dune calcarenites, which in the northern half is frequently exposed at a high level between the fore and back dunes.'

Behind the main dune ridge, the hinterland is characterised by low-lying ground and extensive saltmarshes associated with Thompsons Creek, and more immediately with Mullet Creek, which is a small tributary of the former. Parts of the former wetland are being developed as the Torquay Sands Resort. Prior to this development the area was used to graze livestock.

Further inland to the north, the low-lying ground merges with rolling sand hills, which have been cleared of their natural vegetation, and which are being farmed.

Geologically, Newer Volcanics dominate the hinterland of Torquay. The sands associated with the Thompsons Creek saltmarshes are also extensive and dune sands are also common. In accordance with its proximity to the Otway's proper, the Eastern View Formation occurs at the northern end of Horseshoe Bend Road.

3.2.2 Climate and Rainfall

Torquay is characterised by warm summers and cool winters. Rainfall is determined by the Otway Ranges, which causes moisture in the prevailing south westerly winds to fall as rain. Average annual rainfall decreases from west to east along the coastline. The average rainfall at Lorne is 840mm (Vose *et al.* 1987:9); Torquay is presumed to experience similar levels to this.

Torquay's climate provided no constraints to the Aboriginal settlement of the area in terms of the seasonal movement of people or the location of habitation sites. Similarly, nor did the climate provide any constraints to the European settlement of the area; although as noted previously, much of the area was not settled until the 20th century.

3.2.3 Flora and Fauna

The native flora and fauna of the Torquay region has been dramatically reduced and modified since European settlement, mostly due to farming and development.

The local vegetation is dominated by coastal woodland, which often occurs as patches surrounded by paddocks. Most of the land in the area has been cleared of native vegetation and is mostly covered in pasture grasses. Vegetation along creeks in the area includes indigenous Wattle and Eucalypt trees as well as introduced hawthorn and gorse bushes. The creek itself is overrun with bull rushes. Land to the east is cleared grazing paddocks, while land to the west has been almost completely developed into retail areas and local housing.

3.3 Aboriginal Pre-Contact History

By at least 40,000 years BP, if not before, all parts of the Australian continent (Sahul) had been colonised by Aboriginal people (Frankel 1995:15). This colonisation included the south-eastern corner of the continent. Aboriginal people have interacted with the land over a very long period of time and left behind countless traces of their lives.

The ways Aboriginal people adapted to climatic changes during the late Pleistocene and Holocene periods are difficult to determine without a more detailed chronology and other palaeoenvironmental and archaeological evidence. Certainly, these changes would have affected the demography of Aboriginal groups and the timing, duration and reasons for occupying different parts of Victoria. Some aspects of the local landscape may have remained constant, such as the local hydrology and by extension, the importance of major creeks as the principal source of water. Other features like vegetation would have evolved with changes in climate and sea levels. In contrast, there is significant evidence of Aboriginal occupation in the Late Holocene period across Victoria.

In Victoria, there are few Aboriginal cultural heritage places with late Pleistocene dates south of the Great Dividing Range (Coufts 1978 152). There is little chance that any previously identified

numbers of which he caught by constructing a weir built from sticks and rushes. The exact location of this weir is unknown but occurs some way up the river. Apart from the roots and fish, Buckley mentions yams, gum (possibly *Acacia*), possums, Kangaroos, wombats, snakes, lizards, rodents and wild dogs as commonly eaten. Buckley rarely mentions the eating of shellfish.

Buckley's accounts are supported by observations made later of the *Bengalat balug* clan (e.g. Addis in Clark 1990: 295) and describe the occupation of the coast during the summer, with subsistence based on hunting, shell fishing and tuber collection.

3.3.3 *Wada wurrung* Hunting and Gathering

As with clan organisation and religious beliefs, little is known about *Wada wurrung* settlement patterns and technology. It can be assumed that they were mobile hunters and gatherers whose clans (in this case *Wada wurrung balug*) occupied a specific range over which they moved for subsistence requirements, trading and social obligations. Foods that were seasonally abundant, such as eels, would have been important, as they would have allowed for the coalescing of large numbers of people during which social obligations could be met.

3.4 European History

The European colonisation of Victoria brought continuous and traumatic change to the Aboriginal population (Coutts 1981: 97). European sealers and explorers were visiting the coast of Victoria from the first years of the nineteenth century and came into contact with Aboriginal people. These encounters were sometimes violent, and the Aboriginal population began to suffer from the effects of European diseases (Coutts 1981: 97).

A first attempt at European settlement was made by David Collins, with marines, convicts and free settlers, at Sorrento in 1803. Lack of fresh water and fear of the Boon wurrung people meant that the settlement lasted only months (Brown-May and Swain 2005: 673). In the mid-1830s the permanent European settlement of Victoria commenced with the arrival of the first squatters. A treaty was signed in 1835 by John Batman and elders of the Wurrundjeri to exchange supplies of basic goods for the provision of 600,000 acres of land (Kociumbas 1992: 190-191). By 1838 squatters had moved into large areas of Victoria.

Squatters who usurped large tracts of land from the resident Aboriginal people for the purpose of grazing livestock typify the early European settlement of rural areas in Victoria. Spreadborough and Anderson (1983: ix) discuss the 'squatting expansion' between 1834 and 1860, noting that '...it was the early squatters who were permitted to become 'free' selectors, choosing and learning about their land with a fair degree of independence from official control'. The first decade of this expansion saw squatters taking up land across Victoria, but particularly on the plains north of Melbourne and running west to Geelong (Spreadborough & Anderson 1983: Figure 1, x).

After European settlement began, the death rate in Aboriginal communities increased rapidly (Shaw 1996: 20). Disease was not the only plight of the Aboriginal people in Victoria. Pastoral settlers displaced Aboriginal people from their land and encounters between settlers and Aboriginal people were often confused and violent (Broome 2005: 14). Displaced Aboriginal people, particularly from areas on Melbourne's fringe, often sought European food in Melbourne, and camped around the area as the city grew (Broome 2005: 15, 20-21). European settlement had a significant and long term impact on Aboriginal people across Victoria.

3.4.1 European Settlement in Torquay

The Greater Geelong area was first inhabited by squatters after 1836 when pastoral runs were taken up following a period of intense exploration and survey. The area between the Barwon River and Corio Bay was surveyed in late 1838 for the township of Geelong and the first lots were sold in February 1839. These land sales forced squatters south toward the coastline, to land previously considered unappealing. Here they claimed large pastoral holdings on land from the Barwon River south to the coast. A report of an exploration party in the *Port Philip Gazette* in 1939 described the land '...from the Barrabool Hills to the sea to be utterly unavailable, being one of entire scrub...' (Wynd 1992: 9).

sensitive for Aboriginal heritage material.

Entrance Reserve at Whites Beach (Marshall 2001)

In September 2001, Brendan Marshall conducted a survey at the rear of the dunes along Whites Beach, approximately 1 kilometre east of the township of Torquay and south east of the current study area. Among other developments, the survey area contained an existing storm water pond, carpark and road. A single Aboriginal archaeological site was identified during the survey (Whites Beach 3 7721-0488). This site was an isolated stone artefact located on the northern bank of the storm water pond, approximately 500 metres from the foreshore. The area had experienced extensive disturbance, reducing the likelihood of finding any *in situ* archaeological material. It was concluded that the presence of the artefact '... indicates the general sensitivity of the survey area for Aboriginal archaeological material and it is likely that further isolated stone artefacts will be uncovered during the development...'

Torquay to Black Rock Sewer Pipeline (Marshall 2003)

Marshall and Collins undertook an archaeological desktop investigation into the Torquay to Black Rock Sewer Pipeline on behalf of Barwon Water, which was supplemented by a field inspection. The study identified areas of potential archaeological significance along three possible routes for the proposed Sewer Pipeline. As a stand-alone desktop investigation, the study was not required to survey and identify sites, but rather considered previous investigations where sites had been identified. Marshall considered that because of the impact of residential development on the northern side of the Breamlea Primary Dune, intact Aboriginal archaeological sites were more likely to occur on the southern side between the foreshore and dune ridge. Marshall noted the presence of over 100 Aboriginal archaeological sites between Torquay and Black Rock, of which over half occur within the Breamlea study area. Marshall considered that the combination of available resources including drinking water from the fresh water Thompson's Creek, and a reliable food source, in the form of shellfish from Bass Strait, made the Breamlea dunes a likely site for Aboriginal habitation.

'The Quays', Torquay (Muir 2004)

Muir (2004) conducted a survey of approximately 59 ha at 1170 Horseshoe Bend Road, Torquay south of the current activity area. The study area was gently sloping land currently used for grazing and agricultural cultivation. In spite of relatively good ground visibility, no Aboriginal cultural heritage places were found. The lack of places was attributed to the distance of the land from waterways and the shoreline, and the considerable disturbance caused by pastoral and agricultural activities.

3.5.2 Victorian Aboriginal Heritage Register

A search of Victorian Aboriginal Heritage Register (VAHR) showed that 90 Aboriginal cultural heritage places lie within a five-kilometre radius of the activity area. Within this area the majority of places (60%) are shell deposits with most of the remainder being stone artefact scatters, some combined with earth features. There is one scarred tree and one stone feature (fish trap). Most of the sites are associated with the coastal dunes or with watercourses such as Spring Creek or Deep Creek. The number of places reduces significantly within a two-kilometre radius, there being only nine registered sites within that area (Table 1). Within two-kilometres the sites consist of six shell deposits and three artefact scatters all within the coastal dune system. No Aboriginal cultural heritage places have previously been recorded within the activity area.

Table 1: Aboriginal Archaeological Sites within two kilometres of the Activity Area

VAHR Site ID	Place Name	Place Type	Approx. Location in Relation to Activity Area
7721-0100	Whites Beach BPAS 6	Shell Deposit	1km south
7721-0303	Whites Beach 2	Artefact Scatter	2km south west
7721-0304	Torquay Tip 1	Shell Deposit	1.5km south east
7721-0305	Torquay Tip 2	Shell Deposit	1.75km south east
7721-0405	Esplanade 1	Shell Deposit	1.5km east
7721-0406	Esplanade 2	Artefact Scatter	1.5km east
7721-0407	Esplanade 3	Shell Deposit	1km south east
7721-0488	Whites Beach 3	Artefact Scatter	1km south
7721-0491	Whites Beach 4	Shell Deposit	2km south east

4.0 MANAGEMENT RECOMMENDATIONS

This report shows that the 1095 Horseshoe Bend Road, Torquay property does not contain the landforms, such as shoreline and waterways, which are usually associated with Aboriginal cultural heritage places in the Torquay area.

The proposed activity will not harm any previously identified Aboriginal cultural heritage values; therefore there are no other management recommendations.

4.1 Contingency Planning for the Discovery of Previously Unknown Aboriginal Cultural Heritage

If Aboriginal cultural heritage is found during work associated with the sub-division, a Cultural Heritage Advisor should take the lead role in investigating, reporting and facilitating an appropriate outcome in accordance with the relevant contingency plans. The advisor should also be responsible for facilitating the involvement of the *Wathaurong* Aboriginal Co-operative Ltd and the *Wathaurong* Aboriginal Corporation in the on-site investigation and assessment of the significance of the Aboriginal cultural heritage.

- A person making such a discovery will immediately suspend any relevant works at the location and within 50 metres of the relevant find.
- The person shall contact a Cultural Heritage Advisor, and in consultation with this Advisor in order to prevent any further disturbance, the location will be isolated by a fence, safety webbing, or other suitable barrier. Works may recommence outside this 50 metre area of exclusion.
- The Cultural Heritage Advisor will evaluate the Aboriginal cultural heritage and complete appropriate documentation to register the Aboriginal cultural heritage place with AAV.
- In accordance with Division 4 of the *Aboriginal Heritage Act 2006*, an application for a permit to disturb the Aboriginal cultural heritage place must be made to AAV.
- Work may recommence within the 50 metre buffer when and if the permit to disturb is granted.

In the case of the discovery of human remains, the procedures stated in the **Contingency Plan for the Discovery of Skeletal Remains** included in this plan must be followed.

4.2 Contingency Plan for the Discovery of Human Remains

If any suspected human remains are found during any activity, works must cease. The Victoria Police and the State Coroner's Office should be notified immediately. If there are reasonable grounds to believe that the remains are Aboriginal, the Department of Sustainability and Environment's Emergency Coordination Centre must be contacted immediately on 1300 888 544. This advice has been developed further and is described in the following 5 step contingency plan. Any such discovery at the activity area must follow these steps.

1. Discovery:

- If suspected human remains are discovered, all activity in the vicinity must **stop** to ensure minimal damage is caused to the remains; and,
- The remains must be left in place, and protected from harm or damage.

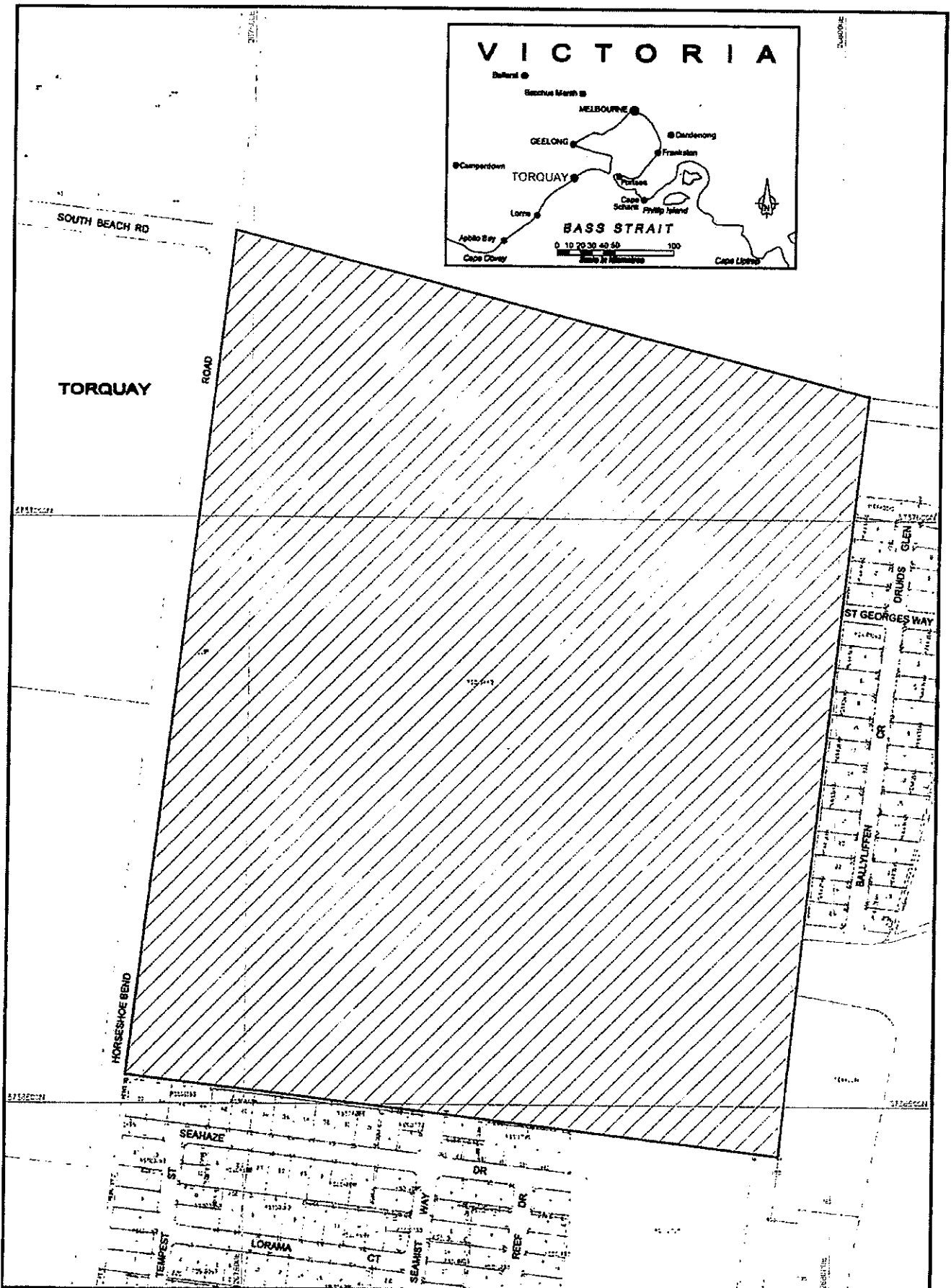
2. Notification:

- 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

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Map



KEY	
	Activity Area

SURF COAST SHIRE

0 50 100 150
Scale in metres

Terra Culture

Heritage Consultants
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Hawthorn, 3178
VICTORIA
Ph. 08 9488 4884
Fax. 08 9481 2878

Drawn: P.B.
Datum: GDA84
Date: 24/11/08
Height: AHD
Format: A3

**1086 HORSESHOE BEND RD
TORQUAY
PROPOSED SUBDIVISION
ACTIVITY AREA**

Drawing No.: Base Map.dwg

MAP 1: Showing Activity Area.

Glossary

Glossary of Terms

The following glossary presents definitions for words and terms that may have been used in the preceding TerraCulture report. Archaeological site types or specific stone artefact types that have counterparts elsewhere in the world are usually defined according to their known or inferred use in Aboriginal Australia. The definitions of some terms are based on common usage or convention rather than literal meaning. Italicised words within any definition have also been separately defined.

Aboriginal: Referring to Indigenous people and their descendants who occupied Australia at the time of European colonisation.

Aboriginal Archaeology: The scientific study of the material remains of past Indigenous peoples. Aboriginal archaeology covers both the *pre-contact* (also known as prehistoric) and the *post-contact* period.

Aboriginal Archaeological Site: A location with material evidence of past activity by Indigenous people. Activities such as the manufacture and use of stone artefacts have a recognisable archaeological signature. Other activities will have little or no material consequences and are regarded as being archaeologically invisible.

Aboriginal Archaeological Site Types: Aboriginal archaeological sites can be classified into generic types according to their context, fabric and probable function. Aboriginal Affairs Victoria currently recognises some 10-site types including stone artefact scatters, shell middens and scarred trees.

Aboriginal Artefact Scatter: A collection of Aboriginal artefacts usually distributed across the surface of the ground. Stone artefacts are a common component and can be found in association with organic remains, shell, ochre and charcoal. Artefact scatters are the material remains of past Aboriginal use of a location and are generally referable to technological and economic behaviour. They are also called surface scatters.

Aboriginal Burial: Aboriginal interment consisting of human skeletal remains. Aboriginal burials occur in a wide range of forms and physical contexts and may be found with grave goods.

Aboriginal Historic Place: Aboriginal historic places are the locations of events, places or place names that were recorded in historical documents or in oral tradition during the *post contact period*. Unlike Aboriginal archaeological sites, Aboriginal historic places do not necessarily retain any physical evidence of any former structures, activities or specific events.

Angular Flake: Irregularly flaked piece.

Anvil: A flat stone used as a platform in the manufacture of stone artefacts (bi-polar flaking) or in the processing of foods, ochre and other materials. With bipolar flaking the *core* is rested on the anvil and struck with a *hammer stone* creating a *flake*. Use leaves small circular depressions (pitting) on the anvil surface usually towards the centre. Anvil stones are often recovered as broken halves; the break being across the centre line of the stone where there has been most wear.

Archaeology: Conventionally, the scientific study of the material remains of past human activity.

Artefact: Any object created or modified by humans.

Artefact Scatter: A collection of artefacts usually distributed across the surface of the ground.

Assemblage: Archaeological term used to describe a collection of artefacts associated by a particular

place or time and assumed to have been generated by a single group of people. An assemblage can be made from different *artefact* types.

Axe Blank: A stone that has been shaped through the removal of *flakes* but not yet sharpened.

Axe Grinding Groove: Oval shaped indentations in stony outcrops that are the result of grinding during the manufacturing and sharpening of *ground edge* axes. These indentations are usually but not exclusively formed in sandstone outcrops and can occur singly or in multiples. *Axe-grinding* grooves are typically found close to water, which appears to have been used to maintain the sandstone's abrasiveness.

Backed Blade: A stone blade that has been retouched along one of its lateral margins to prepare the edge for hafting.

Basalt: Igneous volcanic rock that can be used to make *stone artefacts*. Basalt is common in western Victoria where there has been recent volcanic activity.

Before Present (BP): referring to years before present, which for radiocarbon dating is arbitrarily fixed at 1950.

Bi-polar Flaking: The process of manufacturing stone artefacts through the use of a hammer and anvil. A *core* is struck with a hammerstone while resting on an anvil, detaching angular *flakes* that display bruising or crushing at either end.

Blade: A *flake* that is at least twice as long as it is wide.

Bulb of Percussion: A rounded protrusion on the interior surface of a *flake* caused when the *core* is struck with the *hammerstone*. The bulb is located below the striking platform and allows the identification of the orientation of the *flake*. The bulb of percussion is often considered the best evidence for a human agency in the manufacture of a stone *flake*.

Bulbar Scar: A small scar or removal of stone on the *bulb of percussion*.

Ceramics: Generic term used to describe *historical* artefacts that are made from ceramic material.

Chert: A hard fine-grained sedimentary rock high in silica and commonly used in the manufacture of stone artefacts.

Civic: A term used to describe historic structures or material culture relating to past government or public activity e.g. town hall, public parks or gardens.

Classification: The ordering of archaeological material according to age, type, fabric or other criteria.

Coastal Flint: Geologically, flint is a type of chert. A coastal form is found in limestone reefs along the Victorian and South Australian coastlines and is often detached as nodules on the roots of kelp and subsequently washed up on beaches. The appearance of the flint varies but is often fine grained with larger white intrusions and a thick outer *cortex* or crust and is blue to cream in colour. Coastal flint is often the dominant rock type in stone artefact sites on or near the Victorian coast.

Contact Site: General term used to describe an *Aboriginal archaeological site* that shows the use of European (non-Indigenous) materials such as artefacts made with glass, metal or ceramic. Contact sites are usually considered to be the result of activities performed at or before the time of permanent European settlement.

Context: Refers to the place of artefacts or archaeological features with regards to time and space.

Core: A piece of stone from which other stone artefacts are made. In *freehand flaking* the *core* would be struck with a *hammerstone* removing *flakes* and other fragments of stone often referred to as *debitage*.

Core Tool: A *core* displaying signs of use.

- Core Tool and Scraper Tradition:** Aboriginal stone artefacts belonging to the core tool and scraper tradition include core tools, large steep edged scrapers, round flat scrapers and notched implements. These assemblages are believed to pre-date the *Small Tool Tradition*.
- Cortex:** The weathered external surface of a stone. Cortex often identifies the origins and original form of flaked stone, e.g. river pebbles.
- Cultural Heritage:** The consequences of humanity including its relationship with the natural environment that are ascribed significance and considered to be worth preserving.
- Debitage:** Fragments of stone that are generated during the manufacture and maintenance of *stone artefacts*. These fragments may or may not display the typical characteristics of flaked stone.
- Deposit:** A term used to describe buried archaeological material.
- Desktop Study:** Investigation of the known or potential cultural heritage values according to the landform type, historical records and other archival material and the results of previous archaeological investigations.
- Domestic Assemblage:** A collection of historical artefacts generated by or associated directly with past household activity e.g. *ceramic* plates, bottles and cutlery, food refuse.
- Dry Stone Wall:** A wall that has been constructed using stone without any binding material. Dry stone walls take on many different forms and vary according to stone type and function. In western Victoria they are assembled with basalt stones collected from the surface of paddocks.
- Excavation:** The systematic removal of archaeological deposits using archaeological techniques.
- Fabric:** A synonym for original material.
- Feature:** A notable formation or structure (conventionally immovable) discovered during *excavation*.
- Fish trap:** A structure made from stone, wood or reeds intended to guide fish or eels into a confined space to be collected or speared. Often constructed perpendicular to the main channel of a creek or river, or in the intertidal zone of estuaries, bays and oceans.
- Flake:** A piece of stone detached by percussion or pressure from a *core*. The flake will usually display characteristic features such as a *platform* and *bulb of percussion*. The *core* will display a negative flake scar. These features assist in distinguishing between stone that has been altered through human agency and that which has been naturally shaped.
- Flake Tool:** A flake that has been shaped through the removal of other smaller flakes (*retouched*) or shows evidence of use (*use wear*).
- Freehand Flaking:** A technique of manufacturing or shaping stone artefacts whereby a hand-held stone is hit directly with the hammerstone, also hand-held.
- Grinding Stone:** Stone with a flat surface used as a mortar in the processing of food or other hard materials through pounding, crushing or grinding. Grinding stones are identifiable by the presence of wear in the form of shallow depressions and pitting.
- Ground Edge Axes:** Stone axes that are commonly oval or round in shape and that have edges formed by grinding and sharpening. Ground edge axes were attached (*hafted*) to wooden handles using resin or other binding material. Axes from Mount William a large quarry near Lancefield in Victoria are known to have been traded in the form of *axe blanks* over long distances (see *axe grinding groove* and *axe blanks*).
- Ground Exposure:** A measure of the quantity of sediment that would normally be buried beneath a modern land surface.
- Ground Visibility:** A term used to describe the area of the ground's surface that is visible during archaeological field surveys. Effective ground visibility refers to the actual area of ground visible during a field survey calculated as the area of ground inspected multiplied by the percentage of ground visibility.
- Hafting:** The process of attaching a stone artefact onto a wooden handle.
- Hammerstone:** A stone that has been used to strike a *core* to create a *flake*, often causing pitting or other wear on the stone's surface.
- Hearth:** Fireplace often recognised archaeologically through the presence of charcoal or burnt (discoloured) ground. Historical hearths are usually associated with brick or stone structures.
- Historical Archaeological Site:** The material remains or other physical evidence of activity associated with the *post-contact* period; including portable artefacts and structural features of former buildings.
- Historical Archaeology:** The study of artefacts and archaeological features relating to the *post-contact* period.
- Holocene:** The geological period covering the last 10,000 years BP.
- Hornfels:** A dark grey, fine grained rock formed from mudstones and shales.
- Industry:** A single class of artefacts that are consistent in their form and that can be credited to a single group of people.
- Industrial Archaeology:** *Archaeology* concerned with the material consequences of industrial activity.
- In situ:** In its original place.
- Layer:** A recognisable band of material of varying thickness.
- Limestones:** Carbonate-rich sedimentary rocks that are formed through the accumulation of organic remains.
- Manuport:** An object that is unmodified but has been transported to its find location by humans.
- Makers Marks:** Marks that have been etched, engraved or printed onto the surface of mass manufactured goods, including glasswares and ceramics.
- Maritime Archaeology:** The archaeological investigation of shipwrecks, piers, jetties and other maritime structures.
- Microoliths:** Small stone artefacts. In Australia microoliths such as *backed blades* are often associated with *assemblages* from the late prehistoric period after ca 6000 years BP.
- Monitoring (see watching brief)**
- Mound:** Aboriginal mounds consist of ground that is artificially elevated above the natural levels. Thought to be a consequence of repeated occupation at the same location particularly through the use of earth ovens, mounds can contain a wide range of artefactual material including burials. Mounds that have all but been destroyed are recognisable through changes in the colour and composition of the ground, especially the presence of charcoal.
- Platform:** Face of *core* that is struck by a *hammerstone*, leaving remnants on both the *core* and the resultant *flake*.
- Pleistocene:** The geological period equivalent to the last ice age and preceding the *Holocene* from ca 2 million to 10,000 years ago. The late Pleistocene commonly refers to the last 40,000 years BP.
- Post-contact Period:** The time after contact between Aboriginal peoples and Europeans. Also referred to

as the historic period. In Victoria the post-contact period begins in early 1800s.

Posthole: A hole that has been dug into the ground to house a post. Postholes are often filled with stone or other packing material (more recently concrete).

Post Deposition: After deposition; term commonly used with reference to factors affecting the preservation of artefacts and archaeological features.

Pre-contact Period: The time period before contact between Aboriginal peoples and Europeans. In Victoria this ends with permanent European settlement.

Quartz: A hard mineral that varies from white to blue in colour and in transparency from opaque to clear.

Quartzite: A metamorphic rock formed through the 'recrystallisation of quartz rich sandstone'.

Radiocarbon Dating: Radiometric dating technique for establishing the age of organic (carbon) remains based on the rate of decay of the radioactive isotope carbon 14 (C14).

Retouch: Secondary modifications to stone artefacts such as trimming or resharpening. Retouch often indicates use of a stone flake and therefore its identification of an actual tool (cf waste flake)

Rock Art, Aboriginal: Aboriginal artworks on rock surfaces such as paintings, stencils, etchings and engravings.

Rock Well Aboriginal: A natural depression that may have been augmented through the removal of rock and from which water was collected.

Ruin: what remains of a former historic structure.

Salvage Excavation: The systematic documentation and recovery of an archaeological site prior to its destruction. Also known as rescue archaeology.

Sandstone: Sedimentary rocks that consist mostly of quartz.

Scarred Trees, Aboriginal: Trees that were used as a source of bark to make canoes and other items. Bark was cut using a stone axe and then levered from the sapwood leaving a scar. The bark around the edge of this scar is called regrowth. Natural scarring is common on some trees and is often difficult to distinguish from scars made by Aborigines during the pre-contact period.

Scarred Trees, Historic: Bark continued to be used by Aborigines and Europeans alike during the post-contact period for roofing, trail blazes, mile markers etc.

Scraper: A stone tool made on a flake or core with steep retouch along one or more edges.

Shell Middens (Marine or Coastal and Freshwater): The remains of shellfish that were gathered and eaten by Aboriginal people. They may also contain other stone artefacts, charcoal and ash, and the bones of vertebrate prey. Burials are also known to occur in shell midden deposits. Aboriginal shell middens are often confused with natural shell deposits.

Shipwreck: The remains of a ship.

Silcrete: A highly silicious rock formed by the replacement of a parent rock (commonly sandstone) by silica in solution.

Small Tool Tradition: Aboriginal stone artefacts belonging to the small tool tradition are characterised by heavily retouched microliths and backed implements and are presumed to be a mid to late Holocene development.

Sondage: Small deep pit to test stratigraphy, usually used within a larger test pit.

Spit: arbitrary quantity of excavated ground.

Stratigraphy: A geological term used to describe the sequence of vertical layers and deposits that comprise an archaeological site.

Stone Arrangement, Aboriginal: Locations where Aboriginal people have positioned rocks to form shapes or patterns. In Victoria, stone arrangements are an uncommon site type.

Stone Artefacts, Aboriginal: Stones that have been modified or used by Aboriginal people.

Stone Quarry, Aboriginal: Sources of stone used for the purpose of manufacturing stone artefacts.

Subject Land: The area that is under investigation. Also referred to as the study area.

Subsurface Testing: The testing for buried archaeological material through manual or mechanical excavation.

Survey, Pedestrian: The act of looking for archaeological material. Also known as foot survey.

Taphonomy: The study of how archaeological sites are formed.

Toe Holds, Aboriginal: Small scars on the trunks and branches of trees which are a result of the removal of bark to form notches to facilitate climbing.

Usewear: The wear displayed on the surface of an artefact as a result of its use.

Waste Flake: An unmodified and unused flake.

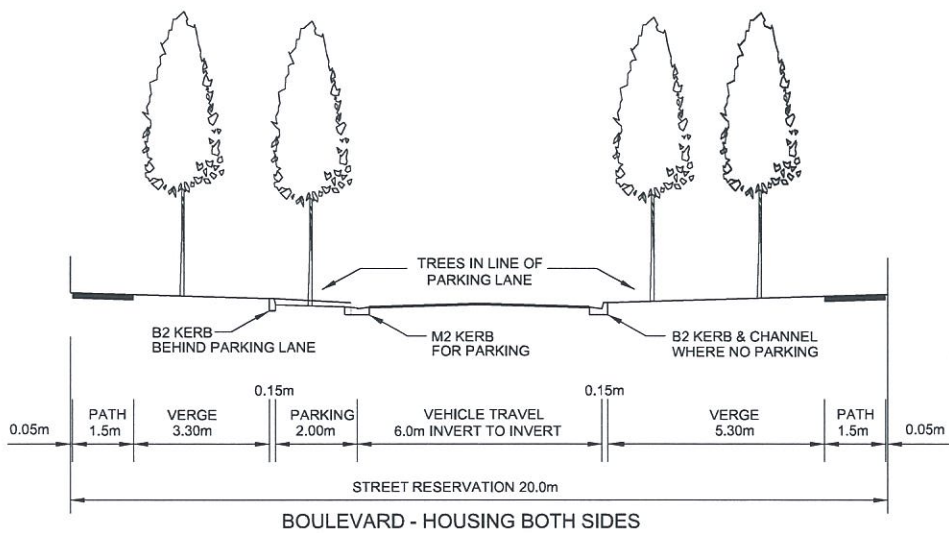
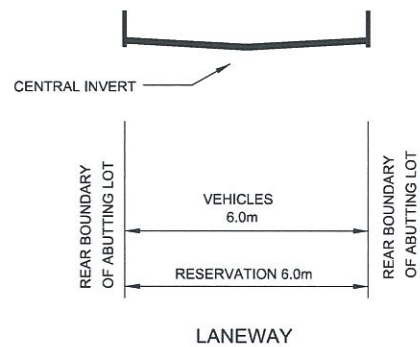
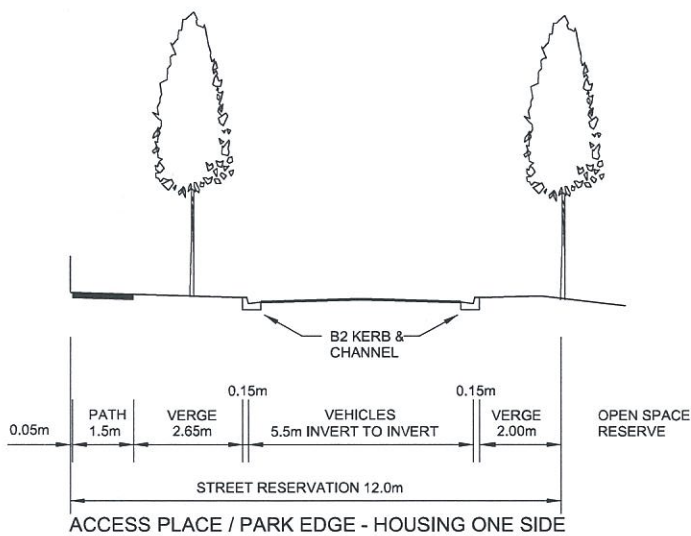
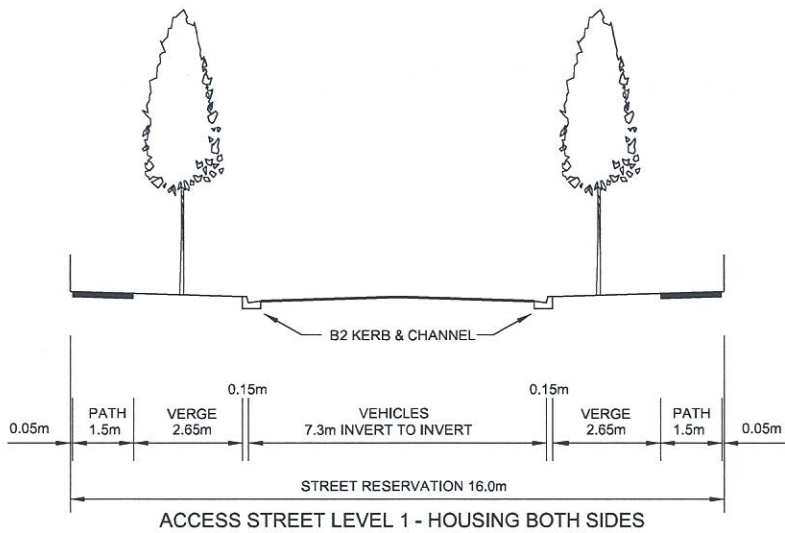
Watching Brief: The monitoring of earthworks or other forms of disturbance at the location of a known archaeological site or of a landform considered sensitive for artefacts or other archaeological material. A watching brief is often a condition of a grant of Consent to disturb or destroy an archaeological site. Also known as monitoring.

Windscreen Survey: Field survey based on observations made from a vehicle. Also known as a drive-through survey (cf pedestrian survey).

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APPENDIX D – ROAD TYPES

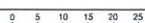


Issue	Appd	Date	Comments
A	DJH	09/05/11	Original Issue


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HORSESHOE BEND ROAD
PRECINCT
SURF COAST SHIRE
COUNCIL
STREET TYPOLOGIES 1

Scale 
 1:1,000 @ A3

Drawing No : 6930321
 Sheet No : 1 Issue : A

APPENDIX E – UTILITIES & SITE MANAGEMENT REPORT



1095 HORSESHOE BEND ROAD,
TORQUAY.

SURF COAST PLANNING SCHEME

SCHEDULE 8 TO THE DEVELOPMENT PLAN
OVERLAY RESPONSE

- Utilities
- Site Management

ENGINEERS, SURVEYORS & PLANNERS

DOCUMENT STATUS

Version	Document type	Reviewed by	Approved by	Date Issued
V1 Draft	Report	AW		22.01.10
V2 Final	Report	AW /CM	PP	15.02.10
V3 Final	Report	AW /CM	PP	20.05.11
V3.1 Final	Report	AW /CM	PP	30.06.11
V3.2 Final	Report	AW/CM	PP	16.08.11

PROJECT DETAILS

Project Name:	1095 Horseshoe Bend Road, Torquay. Schedule 8 To The Development Plan Overlay Response
Client	GDV Developments Pty Ltd,
Client Project Manager	Peter Preece
Report Author	Alex Wilks
TGM Reference:	GP-003134-02
Date:	12 th January 2010

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APPENDICES

Appendix A – Proposed Development Plan

Appendix B – Initial Staging Plan

Appendix C – Storm Water - Overland Flow Path Plan

1 INTRODUCTION

This report has been prepared to inform the development of 1095 Horseshoe Bend Road Torquay in response to Schedule 8 to the Development Plan Overlay of the Surf Coast Planning Scheme of the infrastructure requirements and construction constraints and to identify opportunities to deliver state of the art environmental sustainable storm water management outcomes consistent with the vision for the Torquay North Residential Precinct.

This report specifically undertakes to:-

- ❖ Detail an integrated approach to storm water system management and design.
- ❖ Ensure that the peak discharge of storm water is not detrimental to the surrounding area.
- ❖ Designate floodways and areas subject to inundation to ensure appropriate management and treatment of storm water.
- ❖ Minimise the effects of development on the existing downstream lakes and wetland system.
- ❖ Provide an assessment of the capability and availability of existing services to accommodate the proposed development.
- ❖ Identify storm water infrastructure requirements.
- ❖ Identify likely upgrades to occur to facilitate the development of this area of the Torquay North Residential Precinct.
- ❖ Identify Site Management issues and methods of mitigation.
- ❖ Identify Environmental impacts and methods of mitigation.

1.1 BACKGROUND

On 30 April 2009 land at 1095 Horseshoe Bend Road together with land at 1445 Surf Coast Highway and 90 & 110 South Beach Road Torquay was rezoned from Farming Zone to Residential 1 Zone as part of Planning Scheme Amendment C43 of the Surf Coast Shire Planning Scheme. The entire area subject to this amendment is known as the Torquay North Residential Precinct.

Planning Scheme Amendment C43 also introduced Schedule 8 to the Development Plan Overlay over the Torquay North Residential Precinct to provide a framework for the future orderly development of this land. Amendment C43 also applies an Environmental Overlay over part of the subject land.

Planning Scheme Amendment C37 to the Surf Coast Shire Planning scheme seeks to implement a number of strategic planning studies that will affect the future use and development of Torquay and Jan Juc including the Torquay- Jan Juc Structure Plan 2007. This structure plan is supported by the Torquay North Outline Development Plan 2008 which together provides the

strategic support and broad planning principles for the future development and use of the Torquay North Residential Precinct. Planning Scheme Amendment C37 is currently under the consideration of the Minister for Planning.

In June 2009 an over-arching planning report was submitted for the overall development plan of Torquay North Residential Precinct which has addressed the above matters. Therefore this report containing the Stormwater Management Plan, Sustainable Lighting, and Construction Management Plan constitutes the balance of information required regarding the future development of 1095 Horseshoe Bend Road Torquay in response to the relevant provisions of the Surf Coast Planning Scheme in particular Schedule 8 to the Development Plan Overlay.

1.2 SITE LOCATION

The site is located to the north of Torquay and forms the eastern parcel of the land recognized as the Torquay North Residential Precinct. The site adjoins Horseshoe Bend Road to the west which separates 1095 Horseshoe Bend Road from vacant rural land which is also part of the Torquay North Residential Precinct that extends west to the Surf Coast Highway.

This site is also directly north of the existing established residential development and west of "The Sands" residential and golf course development. Land adjoining the north boundary of the site is rural land currently zoned for farming purposes.



Figure 1 - Torquay North Residential Precinct

The site is located approximately 3kms from Torquay central and 1.3 kms from Fishermans Beach to the south.

1.3 SITE CONTEXT

The site is one of three major parcels of land recognized as the Torquay North Residential Precinct and is zoned as Residential 1 Zone land. The site is also recognised as being within the Torquay Urban Growth Boundary as part of the Torquay-Jan Juc Structure Plan 2007 and land proposed for rezoning as part of the Torquay North Outline Development Plan which constitutes the current northern extent of residential 1 zone land in Torquay.

The proposed development of the site enables a contiguous development of residential land to the north and west of existing established residential precincts within Torquay with the major access route from the Surf Coast Highway.

1.4 CURRENT SITE CONDITIONS

The site at 1095 Horseshoe Bend Road is a "Greenfield" site that had previously been utilised for the propagation of flowers and rural produce. The site generally gently falls to the south east where it is proposed to develop a combined retardation basin, wetland and open space area. The site is somewhat devoid of any prominent features except for the existing farm dam located on the north western boundary of the site and a storm water retardation basin and treatment facility located along the south eastern edge which contributes to the management of stormwater runoff from adjoining "Seahaze Estate" developed to the south and is currently subject to a formal agreement between the land owners and Council for the discharge of stormwater from that site into 1095 Horseshoe Bend Road.



Figure 2 - Existing Detention Basin

1.5 SITE OWNERSHIP

The Property known as 1095 Horseshoe Bend Road is a single title owned by GVD Developments

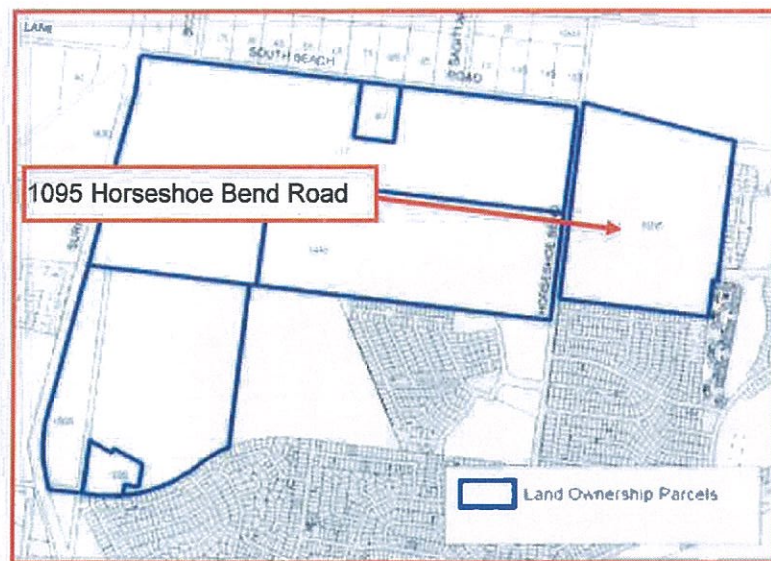


Figure 3 – Torquay North Ownership Plan

1.6 PROPOSED DEVELOPMENT PLAN

A development plan has been drafted that supports the overall design principles in relation to the land use concept for land east of Horseshoe Bend Road.

This concept plan shows the following;

- A public open space reserve and linear parkland that will form part of the drainage reserve for the subject site;
- High Density Developments located adjacent to the proposed external access and fronting the public open space reserve and linear parkland.



Figure 4 – Proposed Development Plan

An enlargement of Figure 4 – Proposed Development Plan Figure 4 – Proposed Development Plan is contained in Appendix A – Proposed Development Plan.

It is proposed to develop the area in a number of stages commencing in the south with a frontage to Horseshoe Bend Road with internal access being provided by the construction of "connector" roadways. Development will then proceed eastwards along the southern boundary, when constructed; Stage 2 will provide alternative access via Seamist Way.



Figure 5 – Proposed Staging Plan

An enlargement of Figure 5 – Proposed Staging Plan is contained in Appendix B – Initial Staging Plan

2 STORM WATER MANAGEMENT PLAN

2.1 BACKGROUND

On 27th March 2003 WBM Oceanics made a submission on behalf of GDV Developments, in response to a Storm Water Management Plan for the Torquay North Residential Precinct, proposed by Council. This submission suggested the adoption of a number of assumptions regarding the runoff from this catchment. Council replied on 3rd April 2003 accepting the assumptions as presented in the submission were reasonable.

The agreed assumptions were that:

- The flood retardation facility is to be designed to discharge flows from 1095 Horseshoe Bend Road at rates equivalent to the pre-development flow rate.
- That flows from the upstream catchment will be limited to pre-development flow rates and water quality will meet best practice treatment objectives via upstream basins and WSUD elements at the time of the development of those catchments.
- Flows from the upstream catchment will enter 1095 Horseshoe Bend Road at one point on Horseshoe Bend Road approximately 300metres from the southern boundary.
- Flows from the north of 1095 Horseshoe Bend Road will be contained within the continuation of South Beach Road, and therefore no allowance for these flows is to be provided.

Further to the above an agreement was reached between the owners of 1095 Horseshoe Bend Road and the owner of Seahaze Estate which allowed "Seahaze" to drain and construct a detention basin and treatment facility within 1095 Horseshoe Bend Road.

The area of the Seahaze Estate being drained and provided for within 1095 Horseshoe Bend Road is approximately 8.9 ha.

2.2 GENERAL

The purpose of this section is to address the Flooding, Storm Water and Drainage requirements required in Schedule 8 of the Development Plan Overlay to the Surf Coast Planning Scheme to ensure that the discharge of stormwater, contamination levels and velocity of flows from the development of the site are minimised and will not have an adverse effect on the existing lake and wetland system downstream of the site.

This section also considers the impact of the development and details how storm water will be collected and treated within the subdivision prior to discharge into "The Sands" wetland and lake system and subsequently Bass Strait.

This report addresses the drainage of the site once developed into residential allotments with the road network layout as presented [Figure 4 – Proposed Development Plan](#)

Drainage in the subdivision will comprise of an underground piped network to cater for the 10 yr ARI (Average Recurrence Interval – 10% Annual Exceedance Probability), with major flows comprising of the 100 yr ARI (1% AEP) storm event to be catered for predominately via overland flows along the street network and Linear Parkland. Consideration is also given to Water Sensitive Urban Design (WSUD) requirements to achieve current best practice pollutant reduction levels.

By the incorporation of "best practice" WSUD principles into the development design it is expected that the stormwater generated from the site can be managed by the inclusion of a combination of wetlands, grassed swale within the linear reserve, buffer strips, detention basins, underground pipes and suitable outfall structures. These measures will minimise the need to provide solutions that may contain ongoing maintenance issues and costs.

2.3 CURRENT SITE CONDITIONS

The site comprises approximately 37.94 hectares of moderately undulating land, currently used for grazing/ cropping.

The site generally falls to the south east towards the existing retardation basin and treatment facility that discharges into the "The Sands" Amenity Lake 1.

The flows from the upstream catchment enter the site from the west at a point approximately one third of the lands frontage to Horseshoe Bend Road from the southern boundary. The storm water flows across the land via a number of depressions / dams along an ill-defined channel entering the "Seahaze" retardation basin and treatment facility prior to discharging into "The Sands" Amenity Lake 1.



Figure 6 - "The Sands" Amenity Lake 1 Inlet Weir

2.4 STORM WATER MANAGEMENT STRATEGY CONSIDERATIONS

2.4.1 WATER REUSE STRATEGIES - RECYCLED EFFLUENT

Adjacent to the site is a recycled water main that runs along the northern boundary of the site then along Horseshoe Bend Road. This main is a 200mm diameter PVC main and conveys class C recycled water from the large recycled water storage dam to the north east of the site to the sports ground located to the south west. This Class C recycled water is not suitable for domestic use.

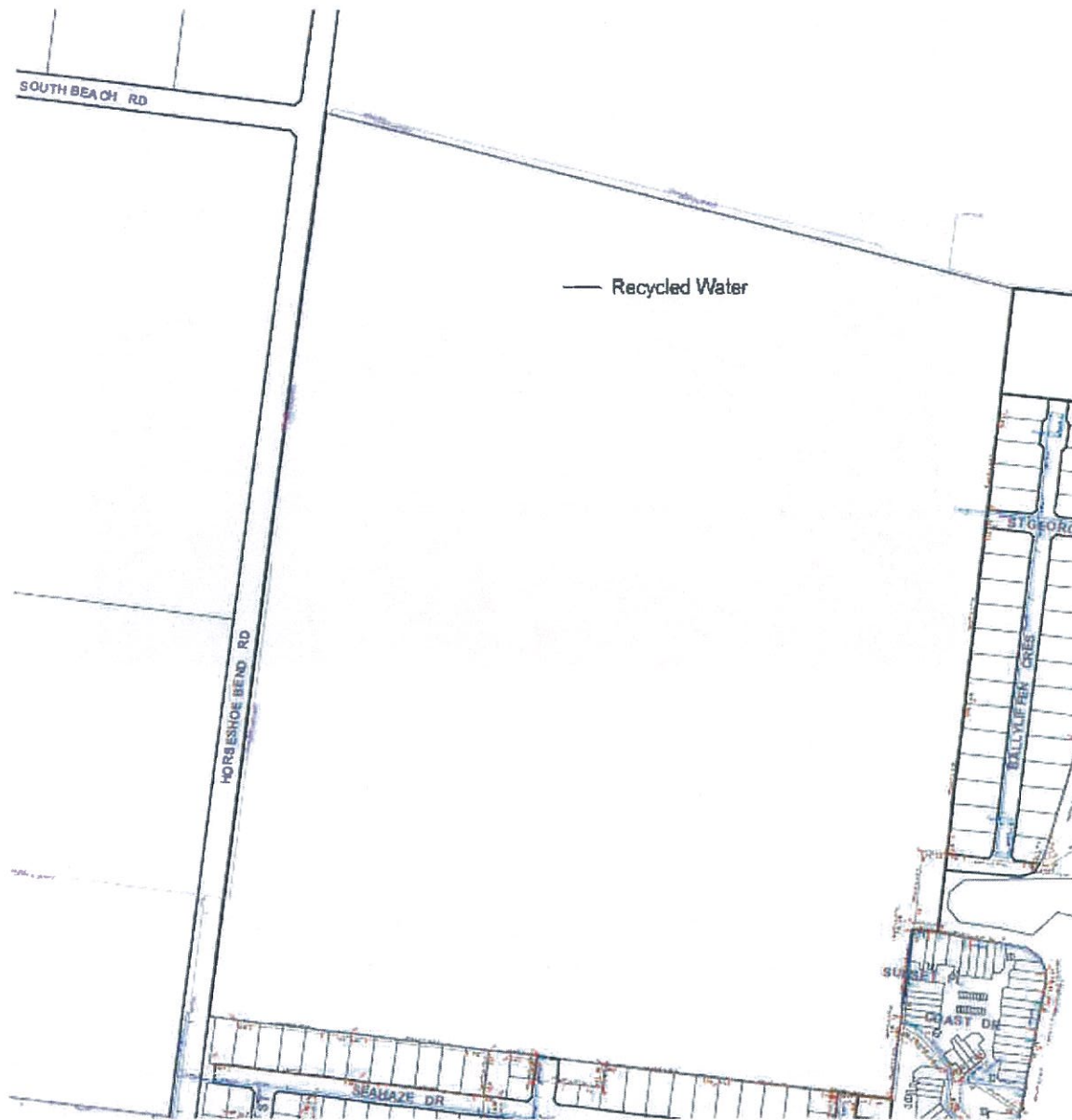


Figure 7 - Recycled Water Mains

2.4.2 WATER REUSE STRATEGIES - STORM WATER REUSE

Although the majority of residences are likely to utilise individual onsite storm water reuse, (this may not be regulated) a conservative approach to the storm water system design has been adopted to ensure adequate capacity is provided within the system to accommodate frequent storm events where storage capacity may not be available.



Figure 8 - Existing Detention Basin

2.5 PROPOSED STORMWATER MANAGEMENT STRATEGY

2.5.1 CONCEPTUAL DRAINAGE DESIGN

A conceptual drainage design has been prepared for the proposed development site that operates in a similar manner to the existing catchment. Refer to [Appendix C – Storm Water - Overland Flow Path Plan](#)

This conceptual design utilises a single primary catchment that drains to the existing detention basin that discharges to "The Sands" Amenity Lake 1. This catchment will collect, treat and provide detention to ensure that the developed flows from 1095 Horseshoe Bend Road are equal to the pre-developed flows for storm events up to and including the 1 in 100 year ARI, prior to discharge into the major drainage paths i.e. "The Sands" Amenity Lake 1.

Flows from approximately 47.1 ha (37.9ha from 1095 Horseshoe Bend Road and 8.9ha from Seahaze Estate) will be directed via a network of underground pipes towards the east of the site to a detention basin that ultimately discharges into "The Sands" Amenity Lake 1.

The detention basin and treatment facility for 1095 Horseshoe Bend Road will receive flows from the Seahaze Estate with both the inlet and outlet flood levels constrained by the existing infrastructure.

The hydraulic constraints are:

- Minimum water level of RL 5.0; and
- Maximum water level of RL 6.5 for the 1 in 100 ARI design flood event.
- Storage Volume
- Maximum discharge

2.6 POLLUTION CONTROL

The wetlands concept design has taken into consideration the objectives outlined in the "*Urban Stormwater: Best Practice Environmental Management Guidelines Supporting Sustainable Urban Water Management*" to achieve reductions in annual loadings for specific pollutants:

The target reductions for specific pollutants are:

- 80% reduction in total suspended solids
- 45% reduction in total nitrogen
- 45% reduction in total phosphorus
- 70% reduction in gross pollutants

The drainage layout has been designed based on a conventional piped drainage network, discharging flows from the 3 month ARI event into wetlands with the larger flows bypassing the detention basin at the downstream end of the catchment. It is acknowledged that during detailed design the use of buffer strips and grassed swales may be adopted within the roadways. This would reduce the area required by the wetlands to treat the storm water to the required targets. The buffer strips and grassed swales have not been included in this report, as the available areas to install these buffer strips and grassed swales can only be determined during the detailed design phase.

2.6.1 DESIGN METHODOLOGY

For the purpose of sizing the individual Water Sensitive Urban Design (WSUD) elements a wetland option was adopted, due to its capability to be incorporated into the base of the detention basins which are also required for each catchment, and as they are located at the extreme low point of the catchment, can capture the largest volume of storm water possible for treatment and potential re-use. While other methods (such as buffer strips and grassed swales) of WSUD are possible in the development and can be adopted, the extent of these elements can only be determined during the detailed design phase. Dependent on the extent that these alternative methods are utilised, the area required for the wetlands could be reduced significantly.

The publication "*WSUD Engineering Procedures: Stormwater (CSIRO, 2005)*", identifies indicative areas required for wetland systems expressed as a percentage of the impervious area within the catchment. For the Greater Geelong region this percentage is nominated as 2.4% of impervious area. However this is dependent of the extended detention depth available to store

the storm water runoff for extended periods of time. In the 2.4% example, this is based on an extended detention depth of up to 750mm above the normal water level.

For a 300mm detention depth an area equal to approximately 3.5% of the impervious area of the developed site is required for wetlands. For the calculations, the impervious percentage of 70% of the site was adopted.

The inlet basin (sedimentation basin) was initially sized based on achieving 90% capture of the 125µm sized particle. This was increased during the verification process to approximately 10% of the wetland area size. This forms part of the permanent pool volume and does not increase the overall wetland size. The depth of the wetlands has been increased to allow for storage and reuse of captured flows for re-use on the public open space.

Following the preliminary sizing of the wetland treatment areas, the system was modelled in the software package MUSIC, to verify the treatment model, with slight adjustments made to achieve the required treatment targets.

The treatment details and pollutant reduction levels that are associated with the area of wetland required to reduce the key pollutants below the targeted values are tabulated below.

Details	Design Values
Catchment Area (Pervious & Impervious)	47.1 [#] ha
Wetland Treatment Area	6,500 m ²
Inlet Basin Volume	1,000 m ³
Extended Detention Depth	0.50 m
Total Suspended Solids (reduction)	80.3 %
Total Phosphorus (reduction)	71.2 %
Total Nitrogen (reduction)	54.7 %
Gross Pollutants (reduction)	94.6 %

[#] includes 8.9ha external catchment

Note: Total Nitrogen is normally the determining criteria for sizing WSUD measures.

Figure 9 - Wetland Design Details

It should be noted that the areas nominated for the wetlands are the water surface area only, and additional land will be required to construct batters and provide maintenance access around the perimeter. This increase in area will vary dependent on the shape and height of the wetlands

compared to the surrounding landscape. As mentioned earlier in this report, it will be possible to accommodate a significant proportion of the wetland treatment in the base of the detention basins required to serve each catchment. The extent that this can be achieved is dependent on the volume required for the detention basin and the water depth to be achieved, which in turn determines the area of the detention basin.

2.7 FLOW MITIGATION

The increasing use of rainwater tanks and the availability of a 3rd pipe system for outdoor watering and toilet reuse can impact on the flows expected within the stormwater system. The installation of rainwater tanks could be expected to decrease volumes of runoff generated from the site, however no reduction has been included in the concept design to allow for scenarios when two storm events occur in quick succession, with the first storm filling the available rainwater tanks storage prior to the second storm or the connection to a 3rd pipe system.

2.7.1 DESIGN METHODOLOGY

Along with the need to treat storm water generated onsite within the catchment to the treatment targets to current best practice, it is also necessary to attenuate flow rates back to pre-development rates to prevent increased flood heights due to the more efficient drainage conveyance systems post-development compared to the pre-development condition. This is generally achieved via the use of detention basins to restrict outflows back to the pre-development rate.

The wetlands will attenuate lower intensity rainfall events as they are designed to capture the 3 month storm event which accounts for 90% of all storm events and gradually output this flow over 72 hours to allow time for treatment in removal of pollutants. Even during larger storm events such as the 1 in 1yr ARI significant attenuation will be provided by the wetland system. Rainwater tanks on the individual houses will also attenuate flows, however these must be assumed to be full during the larger rainfall events as the volume available in the tanks cannot be guaranteed. For flows larger than this, up to the 1 in 100 year ARI event, a larger volume is required to store the storm runoff until it can be discharged at the pre-development rate. This will be stored via the use of detention basins onsite.

For calculation of the pre-development flow rate for each catchment, the time of concentration for the peak storm event in that catchment needs to be determined. Both Australian Rainfall & Runoff and VicRoads provide guidance on calculating this time based on the same formula (units are different between publications):

$$T_c \text{ (hrs)} = 7.92437 A \text{ (ha)}^{0.38}$$

Given that the site has good fall, this may prove to be conservative, however this is the accepted method of calculating time of concentration in Victoria. The time of concentration provides a

method of calculating the intensity of the peak 100 year rainfall events for that catchment. Combined with the area of the catchment, and the coefficient of runoff for the pre-developed catchment ($C_{100} = 0.33$) provides the pre-development outflow allowed from the catchment. Once compared to the post-development runoff generated with a larger area of impermeable surfaces, and a shorter time of concentration due to more efficient flow paths (pipes), the peak volume that needs to be stored can be easily calculated

Once the volume has been calculated, the area required for the basin can be determined. This is a function of the depth available for the flood storage, with deeper basins requiring less area for the same volume. However there is a limit of the depth available for storage. For public safety and maintenance, the embankments/ batters of the basin should be no steeper than 1 in 6, meaning that for every 1 metre in depth required, 6 metres in width are required. If this is significantly above or below the existing level, this land requirement is increased to cater for the outside of the batters; e.g. 1m high embankment above ground = 6m batter outside + 6m batter inside + 3m top of embankment = 15m of horizontal land lost. This is then duplicated at the other end of the basin. As mention prior in 2.5.1 the hydraulic constraints are that are to be considered are:

- Minimum water level of RL 5.0; and
- Maximum water level of RL 6.5 for the 1 in 100 ARI design flood event.

2.8 OVERLAND FLOW PATHS

The site can be considered as two discrete sections in relation to overland flow paths, The northern and southern side of the linear parkland and public open space. This linear parkland not only provides the connection to the western part of the drainage catchment across Horseshoe Bend Road it also allows for the overland flows to be directed to this location reducing the flows that would normally flow along roads.

The flow paths are clearly defined, with small sections that may require refinement in the detailed design phase to ensure adequate capacity where small isolated low points can be removed by providing underground 100 yr pipes for short sections.



Figure 10 - Overland Flow Paths

An enlargement of Figure 10 is contained in Appendix C – Storm Water

2.9 EROSION PREVENTION

Within the internal road layout, all flows up to and including the 1 in 10 yr ARI event will be captured via the underground drainage network, eliminating the availability of runoff to generate erosion in the vast (greater than 98%) of rainfall events. Flows larger than this will be contained within the road reserve, with the majority of the flow component being contained within the road pavement, with a hard impermeable surface preventing scouring due to the flows. Overland flows including those pre-development flows from west of Horseshoe Bend Road that are not directly entering a detention basin/ wetland will be captured into a shallow grassed/ vegetated swale running east west through the public open space, sized to limit flow velocity to less than 1.5m/s and complying with Melbourne Water's velocity /depth safety criteria, directing the flows to the basin. Refer to the typical swale cross section below.

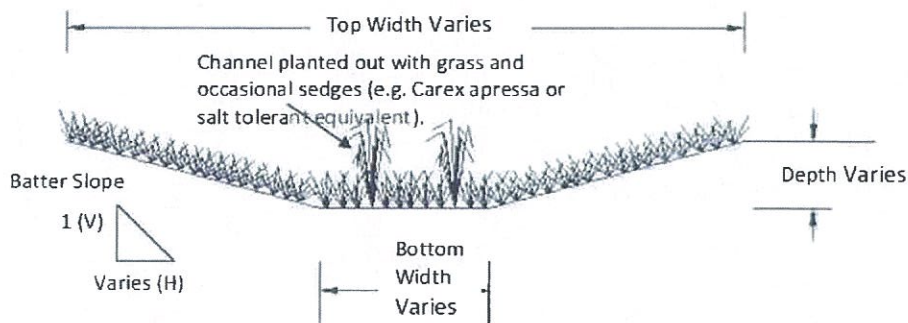


Figure 11 – Typical Swale

2.9.1 PROTECTION OF BASIN OUTFALL

Outfall structures should be designed to ensure that the supported ecosystem should be protected with property designed energy dissipation structures that minimise the velocities at each outfall to 1.5m/s. A typical energy dissipation / outfall structure is depicted in Figure 13.

In the case for 1 Horseshoe Bend Road the outfall currently exists in a form that is suitable to control and minimise damage to the downstream ecosystem. See Figure 6 - "The Sands" Amenity Lake 1 Inlet Weir

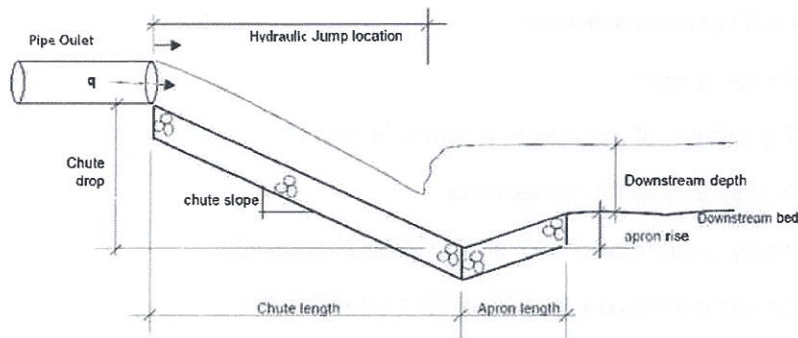


Figure 12 – Typical Outfall / energy dissipation structure



Figure 13 - "The Sands" Amenity Lake 1 Inlet Weir

2.10 LAND TO BE SET ASIDE FOR DRAINAGE PURPOSES

Due to the need to implement flow mitigation and storm water quality treatment works prior to stormwater generated onsite entering the "Sands" lake system, land will need to be set aside as either interim drainage areas or permanent drainage reserves.

Determining exact areas can only be completed at the detailed design phase, as the area to be set aside depends on numerous factors including;

- Depth of basin available
- Shape of basin
- Topography of site (height of embankments)
- Access to area for maintenance
- Ability to utilize basins for dual function as wetlands
- Central grassed swale drain in the Linear Reserve
- Provision of alternative treatments i.e. buffer strips and grassed swales

Given that at this stage of the overall development the above information is only known in general terms, for the purposes of determining an area to be set aside for drainage purposes can only be estimated. As noted in earlier sections, there may be the ability to combine the detention basin areas with the wetland treatment areas, however for the basis of the table following they have been left separately. It is anticipated that this dual function can be adopted and therefore this report should not be used to dictate areas to be set aside at a later time.

Based on the preliminary WSUD calculations the, the total area required for wetlands is 6,500m² and a detention basin of 3,100m². In total an area of 9,600m² is required if the areas are provided independently. The development plan provides for / depicts for an area of approximately 8,000m²

For this development the required wetland area of 6,500m² will be provided by a central grassed swale drain in the Linear Reserve, or within the base of the detention basin, all of which will reduce the area required, allowing the area required to be less than shown on the development plan.

Additional to this trial area for the basin itself is a need to provide additional area along the top perimeter of all embankments 3 metre wide for ongoing maintenance. Also the area taken up with the external face of the embankment also needs to be included. This is estimated at half the basin depth, at it is assumed that half the basin will be in cut and the other half in fill. For a 2 metre deep basin, this equates to an additional width of 6m, which with added to the 3m maintenance area equals 9 metre width around the perimeter of the basin. This has been included into the detention basin area required.

3 SUSTAINABLE LIGHTING

Traditionally residential development in conjunction with the Surf Coast Shire and Powercor provided mercury vapour lamps for the street lighting needs. While these lamps have proved reliable for street lighting in the past, it is now recognised that there are a number of alternative technologies that meet the new Australian Standards and Authority approvals but provide significantly reduced energy consumption and associated greenhouse gas emissions.

By adopting alternative light types either Compact Fluorescents (CF) or Linear Fluorescents (T5) it is possible to reduce energy consumption and the associated green house gasses. For example the

"The Fluorescent (model T5) consumes about 30 watts of electricity compared with about 96 watts by the traditional mercury vapour light. It also accounts for about one third of the greenhouse gas emissions through its lower power consumption.

At this time these options of approved lights is limited and do not fit all decorative light poles.



Figure 14 – 42 Watt Compact Fluorescent (CF42)



Figure 15 - T5 (2x24Watt) Linear Fluorescent

Other options are available such as solar power lights that could be utilised for the street lighting and bike / pedestrian paths. If this type were to be utilised approval would be required from Powercor.

4 SITE MANAGEMENT

4.1 CONSTRUCTION ACCESS

It is intended that access to the site during the initial construction will be from Horseshoe Bend Road via an existing temporary access track located along the southern boundary of the site. During the final stages of construction of stage 1 this access track will be abandoned and access will be gained through the southern roadway (access street level 1) being constructed as part of the initial stages. This southern roadway will provide the access to the southern section of the property. The construction entrance will be relocated to the northern entrance (Boulevard) to the development during latter stages of development.

4.2 ENGINEERING ASSESSMENT OF ASSETS

An engineering assessment of the proposed site identifies that the main asset that may be impacted on by the construction activities of the site is Horseshoe Bend Road

Impacts identified to be considered include:

- Existing Traffic
- Turning movements of large vehicles
- Damage to existing Pavement
- Drainage
- Other services

4.3 EXISTING TRAFFIC USING HORSESHOE BEND ROAD

Advanced warning signs are to be erected to warn users of Horseshoe Bend Road of entering and turning traffic. Additional warning signs are to be erected in South Beach Road warning users of "Road Works on Side Road"

4.4 DRAINAGE

The existing roadside drainage in Horseshoe Bend Road will be replaced with an underground system as part of the development.

4.5 TURNING MOVEMENTS

The proposed access to Horseshoe Bend Road has been designed to allow the turning movements of trucks permitted to enter residential streets under council's Local Laws. The temporary access is of the same width as the proposed access road and all vehicles will be able to maneuver on and off the site safely with minimal impact to the existing roadway.

4.6 ROADWAY

To minimise the transportation of foreign material onto Horseshoe Bend Road from the site the access road will be constructed of approximately 200mm of FCR compacted into an all weather unsealed roadway suitable for heavy vehicles

The site supervisor will monitor the roads for foreign matter and take remedial action if it is excessive and a danger to road users. I.e. Cleaning of road, halting vehicles leaving site.

4.7 OTHER SERVICES

Other Authority's services are and will be located in Horseshoe Bend Road. These services will be located underground and as the temporary entrance will be the final entrance all services will be protected in accordance with the Authorities requirements prior to the construction of temporary access tracks.

The appointed Contractor shall satisfy himself as to the locations of all structures or services or other property that will be encountered or affected in the performance of the Contract. Any services damaged by the Contractor or his representatives shall be repaired at the Contractor's expense.

4.7.1 STRUCTURES

The Contractor shall with every care and skill support and protect all buildings, walls, fences or other structures and all services and property which may, unless so protected, be damaged as a result of the execution of the Works.

4.7.2 PRIVATE SERVICES

The Contractor shall take every precaution necessary for the protection of private services during the course of the Contract and, should any such service pipe be damaged, the Contractor shall immediately:

- Notify the Householder(s) affected of the damage to the service;
- Contact the Wannon Water and advise of the damage and arrange for the turning off of the supply, and;
- Arrange repair of the service by properly qualified and licensed personnel.

4.7.3 PUBLIC UTILITIES

Protection of Existing Services

The Contractor shall provide all works necessary to avoid interruption or damage to all public utilities such as drains, gas mains, electricity supply mains, water mains, wastewater mains, sewer mains, telecommunication cables and natural or artificial water courses. At least three days prior to commencing excavation of each section of the Works, the Contractor shall check with the local authorities controlling all the various public utilities and, by site investigation,

locate all public utilities in the way of, or which may be affected in any way, by the Works of the Contract.

Before making any excavation within 2 metres of a pole carrying overhead wires, the Contractor shall give at least three days notice to the appropriate controlling authority to arrange any temporary supports or other safety measures to protect its assets as it may consider necessary.

The Contractor shall make himself fully aware of the relevant public utility's requirements regarding use of cranes/construction equipment beneath the overhead wires – clearances, notifications, etc.

Alterations to Public Utilities

Where, to carry out the works of the Contract, it is found necessary to remove, divert or alter any existing drain, gas main, electricity supply main, water main, wastewater main, sewer main, telecommunication cable or conduit or other public utility beyond the control of the Principal, the Contractor shall give a minimum of three days notice in writing of his requirements to the Superintendent, who will arrange for the alteration of such public utility as may be necessary. The Contractor shall clear around and lay bear such public utility, which shall be cut, removed, diverted or relaid by the responsible authority. For any excavation or other work necessitated by the relocation of existing public utilities, the Contractor shall be paid at the appropriate scheduled rates for the work carried out by the Contractor.

The Contractor shall be responsible for any damage to public utilities caused by his operations. The cost of alterations to public utilities necessary for reasons other than damage by the operations of the Contractor will be borne by the Principal.

4.8 DAMAGE TO ASSETS

In the event that damage occurs to existing assets, including fencing of native and indigenous areas that are to be retained contact will be made with the appropriate asset owners to instigate remedial repairs and the site contractor will put in place appropriate warning signage or barricading as necessary.

4.9 CONSTRUCTION STAFF PARKING

A site office and compound will be located within the site to the north of the access road with sufficient area to accommodate staff car parking.

4.10 HOURS / DAYS OF CONSTRUCTION

Hours of operation for the construction of the site will be:

Monday to Friday:	7.00am to 5.00pm
Saturdays:	7.30 am to 5.00 pm
Sundays:	No work

5 ENVIRONMENTAL MANAGEMENT

5.1 CONTROL OF RAINWATER RUNOFF

The Contractor shall at all times keep the works free of water during construction and shall be responsible for the disposal of such water. The Contractor shall control surface runoff from the site of the works to prevent scouring of surrounding areas.

5.2 DRAINAGE

The Contractor shall not under any circumstances:

- Discharge any drainage, flushing or other waters into any existing sewer;
- Discharge any polluted water from the Site into any drain or watercourse.

5.3 FIRE PREVENTION

The Contractor shall take adequate fire protection measures during the carrying out of the works and comply with all statutory requirements of the Country Fire Authority and any other authority and shall take action to prevent the damage to or destruction by fire of vegetation, or buildings during the works.

5.4 FIRE HAZARD

The Contractor shall during the performance of the Contract make arrangements to the satisfaction of the Superintendent for the protection of the Works and of adjoining property against fire. The Contractor shall comply with any direction to remove such surplus materials and take such steps to reduce fire risk as the Superintendent may make from time to time.

The Contractor shall ascertain restrictions on welding and other work processes applying on days of Total Fire Ban and shall comply with any such restrictions.

5.5 CONSTRUCTION COMPOUND

The location of the site compound will be chosen by the appointed contractor with regard to:

- Proximity of existing residential properties.
- Access to compound from Horseshoe Bend Road
- Availability of services
- Access to stages being constructed
- Prevailing wind direction
- Location of water courses
- Location of any native or indigenous vegetation that is to be retained

5.6 SITE CLEANLINESS

An onsite secure area / cage will be provided to contain all waste which is able to be windblown. The site supervisors will be responsible to contain/ remove and collect any windblown material

5.7 DUST SUPPRESSION

To minimise the potential for dust, removal of vegetation will be limited to the development area and access tracks. The site supervisor will visually monitor for dust at all times and if required arrange for watering of the site / locations where dust is being created. In severe situation work will cease until remedial action has been undertaken or conditions improve

5.8 MATERIAL STORAGE

The storage of materials will generally be at the site compound, however some materials will be delivered directly to the site of use, this storage will be short term only. Where materials such as topsoil, pavement and bedding materials are stockpiled on site measures such as silt fencing and catch drains are to be provided to prevent sediment laden water entering the drainage system or erosion. Prior to the removal of stockpiled material from the site, including topsoil a proposed cartage route must be approved by Council.

Topsoil is to remain "in situ" and protected from erosion where ever possible, however where it is to be removed it is to be stockpiled and re-used on the site following the completion of works. Where top soil is to be removed from site an approved cartage route is to be used

5.9 CONTRACTOR RESPONSIBILITIES

All work on the site will be undertaken in a manner that will minimise impact to the environment.

The Contractor, when appointed, shall submit an Environment Management Plan within 28 days of the date of the Letter of Acceptance. The plan shall indicate measures that will be taken to minimise the effect of the Works on the environment.

The plan shall include measures to address the following where applicable:

- Soil erosion and sediment control;
- Discharge to water courses;
- Noise;
- Waste materials including corrosion residual;
- Air quality including dust control from abrasive blasting;
- Watercourse crossings;
- Excavation and spoil material;
- Damage to vegetation;
- Chemical handling and storage;

- Spillage of fuel;
- Interruption to services;
- Historical, cultural and archaeological sites;
- Hazardous substances;
- Sewerage spills;
- Control and spread of noxious weeds and,
- Other identified environmental impacts;

The Contractor shall comply with all relevant legislation including EPA policy, local laws and Australian Standards and this Specification. In particular, all work shall be at least in accordance with guidelines set out in the following publications:

- "Environmental Guidelines for Major Construction Sites", EPA (1995)
- "Construction Techniques for Sediment Pollution Control", EPA. (1991)
- "Guidelines for Minimising Soil Erosion and Sedimentation from Construction Sites in Victoria", Soil Conservation Authority (1979).
- "Control of Erosion on Construction Sites", MJ Ransom, SCA, (1987).
- "Interim Guidelines for Control of Noise from Industry in Country Victoria N3/89", EPA.



APPENDIX A – PROPOSED DEVELOPMENT T PLAN

OPEN SPACE				
DESCRIPTION	AREA (ha.)	APPORTIONED CREDIT	EQUIVALENT AREA (ha.)	% OF SITE AREA
TOTAL SITE AREA	37.94	—	—	
OPEN SPACE ①	0.483	100%	0.483	1.27%
OPEN SPACE ②	0.367	100%	0.367	0.97%
OPEN SPACE ③	1.918	100%	1.918	5.06%
OPEN SPACE ④	0.312	100%	0.312	0.82%
ENCUMBERED SPACE ⑤	0.965	50%	0.483	1.27%
TOTAL OPEN SPACE (INCL. DRAINAGE)	4.045	-	3.563	9.39%

* Areas based on TGM drawing No. 003134-202B (CIVIL) WETLAND PUBLIC OPEN SPACE REV03.



LEGEND

ROADS

- ACCESS STREET LEVEL 2
- ACCESS PLACE / PARK EDGE
- REAR ACCESS LANE
- ST GEORGES WAY

PROPOSED SUBDIVISION

- RESIDENTIAL DENSITY
- MEDIUM DENSITY
- POTENTIAL FUTURE CONNECTION
- * - LOTS REQUIRING FENCING & SITING CONTROLS VIA RESTRICTION ON THE PLAN OF SUBDIVISION

FEATURES

- RESERVE / PUBLIC OPEN SPACE
- BIKE TRAIL & FOOTPATH
- WATER SENSITIVE URBAN DESIGN
- 400m PEDESTRIAN CATCHMENT TO OPEN SPACE
- GARBAGE COLLECTION POINT
- TELECOMMUNICATION COMPOUND
- ELECTRICITY KIOSK

LOT TABLE	
< 400m ²	25 LOTS
400m ² - 499m ²	102 LOTS
500m ² - 599m ²	201 LOTS
600m ² - 699m ²	94 LOTS
700m ² - 799m ²	8 LOTS
800m ² +	5 LOTS
3612m ²	1 LOT
TOTAL	436 LOTS

DENSITY		
DESCRIPTION	RESIDENTIAL DENSITY	MEDIUM DENSITY
TOTAL LOTS	410	25
DEVELOPABLE AREA	30.94 ha.	0.64 ha.
DENSITY	13.40 LOTS/ha.	33 LOTS/ha.

Project Name HORSESHOE BEND ROAD TORQUAY

Drawing Title PROPOSED DEVELOPMENT PLAN

Level Datum -
 Contour Interval -
 Date of Survey -
 Surveyed By -
 Drawn By AD
 Date Drawn 10/05/2016
 Scale 1:2500 @ A2

SCALE 0 25 50 75 100 125 LENGTHS ARE IN METRES

Licensed Surveyor Approved -
 Project Ref. 14425
 Sheet No. 1 of 1
 Rev. 01



NOTATIONS

This plan was prepared as a proposed subdivision to accompany a permit application to the Surfcoast Shire and should not be used for any other purpose. The total number of lot's shown hereon are subject to field survey and also to the requirements of Council and any other authority which may have requirements under any relevant legislation. In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land. This note is an integral part of this plan.

ST. QUENTIN
 Surveyors - Town Planners - Engineers
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01	Plan based on existing records	10/05/2016	
Rev	Description	Date	

SURVEYING



APPENDIX B – INITIAL STAGING PLAN

OPEN SPACE				
DESCRIPTION	AREA (ha.)	APPORTIONED CREDIT	EQUIVALENT AREA (ha.)	% OF SITE AREA
TOTAL SITE AREA	37.84	—	—	
OPEN SPACE ①	0.483	100%	0.483	1.27%
OPEN SPACE ②	0.367	100%	0.367	0.97%
OPEN SPACE ③	1.918	100%	1.918	5.06%
OPEN SPACE ④	0.312	100%	0.312	0.82%
ENCUMBERED SPACE ⑤	0.965	50%	0.483	1.27%
TOTAL OPEN SPACE (INCL. DRAINAGE)	4.045	-	3.563	9.39%

* Areas based on TGM drawing No. 003134-202B (CIVIL) WETLAND PUBLIC OPEN SPACE REV03.



LEGEND

- ROADS**
- ACCESS STREET LEVEL 2
 - ACCESS PLACE / PARK EDGE
 - REAR ACCESS LANE
 - ST GEORGES WAY
- PROPOSED SUBDIVISION**
- RESIDENTIAL DENSITY
 - MEDIUM DENSITY
 - POTENTIAL FUTURE CONNECTION
 - LOTS REQUIRING FENCING & SITING CONTROLS VIA RESTRICTION ON THE PLAN OF SUBDIVISION
- FEATURES**
- RESERVE / PUBLIC OPEN SPACE
 - BIKE TRAIL & FOOTPATH
 - WATER SENSITIVE URBAN DESIGN
 - 400m PEDESTRIAN CATCHMENT TO OPEN SPACE
 - GARBAGE COLLECTION POINT
 - TELECOMMUNICATION COMPOUND
 - ELECTRICITY KIOSK

LOT TABLE	
< 400m ²	25 LOTS
400m ² - 499m ²	102 LOTS
500m ² - 599m ²	201 LOTS
600m ² - 699m ²	94 LOTS
700m ² - 799m ²	8 LOTS
800m ² +	5 LOTS
3612m ²	1 LOT
TOTAL	436 LOTS

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DEVELOPABLE AREA	30.94 ha.	0.64 ha.
DENSITY	13.40 LOTS/ha.	33 LOTS/ha.

Project Name **HORSESHOE BEND ROAD TORQUAY**

Drawing Title **PROPOSED STAGE PLAN**

Level Datum -
 Contour Interval -
 Date of Survey -
 Surveyed By -
 Drawn By AD
 Date Drawn 10/05/2016
 Scale 1:2500 @ A2

SCALE 0 25 50 75 100 125 LENGTHS ARE IN METRES

Licensed Surveyor Approved
 Project Ref. **14425** Sheet No. **1 of 1** Rev. **01**
 MGA 94 ZONE 55

NOTATIONS

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01	Plan based on existing records	10/05/2016
Rev	Description	Date

SURVEYING



APPENDIX C – STORM WATER

❖ *OVERLAND FLOW PATH PLAN*

GRASSED SWALE
FLOW PATH DIRECTION



PLAN A -
STORMWATER MANAGEMENT PLAN

Rev: 02

HORSESHOE BEND ROAD, TORQUAY

TGM GROUP
Geelong
Level 1, 27-31 Myers Street
Geelong Vic. 3220
Ph: (051) 5202 4600
Fax: (051) 5202 4631



Drawn by JCC8154 (Horseshoe Bend Road, Torquay) D1-020mg
File Name: 0001-01-020mg.dwg

MELBOURNE GEELONG BALLARAT BALLINA

**APPENDIX F – LINEAR PARK INDICATIVE OVERALL
LANDSCAPE PLAN**

APPENDIX G – CLAUSE 56 ASSESSMENT

Clause 56 – Residential Subdivision (60 + Lots)
Assessment
 1095 Horseshoe Bend Road, Torquay
 Multi Lot Development Staged Subdivision



CLAUSE	COMMENT
<p>56.02-1 STRATEGIC IMPLEMENTATION OBJECTIVE</p> <p>To ensure that the layout and design of a subdivision is consistent with and implements any objective, policy, strategy or plan for the area set out in this scheme.</p>	<p>Complies – The proposed subdivision is in-accordance with the concept lot layout plan contain in the Response to Schedule 8 to the Development Plan Overlay and integrates with the surrounding residential development.</p>
<p>56.03-1 COMPACT AND WALKABLE NEIGHBOURHOODS OBJECTIVES</p> <p>To create compact neighborhoods that are oriented around easy walking distances to activity centers, schools and community facilities, public open space and public transport.</p> <p>To allow easy movement through and between neighborhoods for all people.</p>	<p>Complies – The proposed subdivision features a significant linear open reserve which is located running east west through the subdivision and is within short walking distance of all lots. The land is also within short distance to the proposed major community and recreational facilities as part of the Torquay North Development. Public transport is also available along Horseshoe Bend Road.</p>
<p>56.03-2 ACTIVITY CENTRE OBJECTIVE</p> <p>To provide for mixed-use activity centers, including neighborhood activity centres, of appropriate area and location.</p>	<p>Complies – Most of these facilities are proposed external to this estate however the Development Plan has been amended to show a proposed Childcare Centre located at the north west corner of the estate.</p>
<p>56.03-3 PLANNING FOR COMMUNITY FACILITIES OBJECTIVE</p> <p>To provide appropriately located sites for community facilities including schools, libraries, preschools and childcare, health services, police and fire stations, recreation and sports facilities.</p>	<p>Complies – Most of these facilities are planned nearby outside the subject land. However the subject land will provide a significant linear open space and has been amended to provide a Childcare Centre site..</p>
<p>56.03-4 BUILT ENVIRONMENT OBJECTIVE</p> <p>To create urban places with identity and character.</p>	<p>Complies – The overall design has been planned to accord with the Torquay Coastal Character via the variety of lot sizes with some generous traditional size lots and a mix of smaller lots. The landscape design will incorporate landscape features that mimic coastal themes and features of Torquay. These are illustrated on the overall design concept of the DPO response.</p>

CLAUSE	COMMENT
<p>56.03-5 NEIGHBOURHOOD CHARACTER OBJECTIVE</p> <p>To design subdivisions that respond to neighbourhood character.</p>	<p>Complies. The proposed character as expressed in the roadnetwork, open space reserve and lot areas aims to integrate with the existing Torquay Coastal Character. The future landscaping of the linear reserve provides an important opportunity to reinforce and enhance this character.</p>
<p>56.04-1 LOT DIVERSITY AND DISTRIBUTION OBJECTIVES</p> <p>To achieve housing densities that support compact and walkable neighbourhoods and the efficient provision of public transport services.</p> <p>To provide higher housing densities within walking distance of neighbourhood centres.</p> <p>To achieve increased housing densities in designated growth areas.</p> <p>To provide a range of lot sizes to suit a variety of dwelling and household types.</p>	<p>Complies – Lot sizes vary from under 400 sqm for medium density to lots over 800sqm providing housing diversity and choice. The overall lot sizes are indicated in the proposed Development Plan for Horseshoe Bend Road.</p> <p>Lots are appropriately orientated and are of adequate size to allow for the construction of dwellings and associated outbuildings. Lots are reasonably accessible to all required facilities such as public transport, community facilities centres and the like.</p> <p>Medium density lots are also proposed as part of this subdivision to achieve increased housing density and diversity.</p>
<p>56.04-2 LOT AREA AND BUILDING ENVELOPES OBJECTIVE</p> <p>To provide lots with areas and dimensions that enable the appropriate siting and construction of a dwelling, solar access, private open space, vehicle access and parking, water management, easements and the retention of significant vegetation and site features.</p>	<p>Complies – The lot range will be suitably dimensioned to allow for the construction of future dwellings, open space, vehicle access etc. The lots are of sufficient size to ensure maximum solar orientation to reduce the carbon footprint of this subdivision.</p>
<p>56.04-3 SOLAR ORIENTATION OF LOTS OBJECTIVE</p> <p>To provide good solar orientation of lots and solar access for future dwellings.</p>	<p>Complies – The lots are mostly north/south orientated and of sufficient size to ensure maximum solar orientation to reduce the carbon footprint of this subdivision. Medium density lots have been located north of the street to provide opportunities for solar access in addition to generous lot sizes, particularly those with southern orientation will also enable solar access.</p>
<p>56.04-4 STREET ORIENTATION OBJECTIVE</p> <p>To provide a lot layout that contributes to community social interaction, personal safety and property security.</p>	<p>Complies – The subdivision has been designed to promote walking and cycling and lot frontages have been located to provide surveillance on footpaths and adjacent to the linear open space reserve. The linear open space reserve has been located to encourage social interaction and community building opportunities. Corner lots will be subject to additional controls to ensure they appropriately address the streets.</p>

CLAUSE	COMMENT
<p>56.04-5 COMMON AREA OBJECTIVES</p> <p>To identify common areas and the purpose for which the area is commonly held.</p> <p>To ensure the provision of common area is appropriate and that necessary management arrangements are in place.</p> <p>To maintain direct public access throughout the neighbourhood street network.</p>	<p>N/A – There are no common areas proposed as part this subdivision.</p>
<p>56.05-1 INTEGRATED URBAN LANDSCAPE OBJECTIVES</p> <p>To provide attractive and continuous landscaping in streets and public open spaces that contributes to the character and identity of new neighbourhoods and urban places or to existing or preferred neighbourhood character in existing urban areas.</p> <p>To incorporate natural and cultural features in the design of streets and public open space where appropriate.</p> <p>To protect and enhance native habitat and discourage the planting and spread of noxious weeds.</p> <p>To provide for integrated water management systems and contribute to drinking water conservation.</p>	<p>Complies – Street planting will be undertaken in accordance with current Council Policy using species native to the area which will be of appropriate height and width once mature.</p> <p>The linear open space reserve will be a feature of this subdivision and will be landscaped to enhance the coastal character of Torquay. In addition the proposed wetlands and detention basin located in the south east will also provide a significant landscaped feature of this subdivision.</p> <p>Appendix F of the Development Plan illustrates the proposed layout and treatments of the Linear Open Space reserve which will contribute to the overall coastal character of Torquay.</p>
<p>56.05-2 PUBLIC OPEN SPACE PROVISION OBJECTIVES</p> <p>To provide a variety of open spaces with links to other open spaces and regional parks where possible.</p> <p>To ensure that public open space of appropriate quality and quantity is provided in convenient locations to meet the recreational and social needs of the community.</p> <p>To support active and healthy communities.</p>	<p>Complies – The open space provided is over the 10% open space requirement.</p> <p>The proposed linear open space reserve is centrally located within easy walking distance of all lots.</p>

CLAUSE	COMMENT
<p>56.06-1 INTEGRATED MOBILITY OBJECTIVES</p> <p>To achieve an urban structure where compact and walkable neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.</p> <p>To provide for walking (including persons with impaired mobility), cycling, public transport and other motor vehicles in an integrated manner.</p> <p>To contribute to reduced car dependence, improved energy efficiency, reduced greenhouse gas emissions and reduced air pollution.</p>	<p>Complies – The proposed open space network as illustrated in the broader indicative overall landscape concept for this land is in-accordance with the Open Space Plan as provided in the Response to Schedule 8 to the Development Plan Overlay.</p> <p>The indicative landscape concept illustrates the 400 metre walkable catchment to open space opportunities.</p> <p>The land is also within easy walking distance to public transport opportunities along Horseshoe Bend Road and local proposed local bus routes.</p> <p>A shared pathway is proposed within the linear open space reserve to provide for walking and cycling.</p> <p>The subdivision has been designed to reduce vehicular speeds and encourage pedestrian access.</p>
<p>56.06-2 WALKING AND CYCLING NETWORK OBJECTIVES</p> <p>To contribute to community health and well being by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.</p> <p>To provide safe and direct movement through and between neighbourhoods by pedestrians and cyclists.</p> <p>To reduce car use, greenhouse gas emissions and air pollution.</p>	<p>Complies – As above.</p>
<p>56.06-3 PUBLIC TRANSPORT NETWORK OBJECTIVES</p> <p>To provide an arterial road and neighbourhood street network that supports a direct, efficient and safe public transport system.</p> <p>To encourage maximum use of public transport.</p>	<p>Complies – The proposed road network has been designed to encourage local, direct access and encourage low speed vehicle use. Public transport is available along the nearby Horseshoe Bend Road.</p>
<p>56.06-4 NEIGHBOURHOOD STREET NETWORK OBJECTIVE</p> <p>To provide for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles using the neighbourhood street network.</p>	<p>Complies – Provision has been made for road connections to existing and proposed road networks. Footpaths will be constructed, as required, in accordance with Council requirements and specifications.</p> <p>The overall road and pedestrian network have been designed to provide for direct but safe access.</p> <p>In addition the linear open space reserve will incorporate the development of a shared pedestrian/cycle pathway.</p> <p>The proposed cross sections for each road type are indicated in Appendix D to this DPO response.</p>

CLAUSE	COMMENT
<p>56.06-5 WALKING AND CYCLING NETWORK DETAIL OBJECTIVES</p> <p>To design and construct footpaths, shared path and cycle path networks that are safe, comfortable, well constructed and accessible for people with disabilities.</p> <p>To design footpaths to accommodate wheelchairs, prams, scooters and other footpath bound vehicles.</p>	<p>Complies – Road pavements and footpaths will be constructed to Council current standards in relation to width, materials and specifications in order that the facilities are safely used by both all pedestrians and cyclists.</p> <p>The detail cross section of all road types is provided in Appendix D of the DPO.</p>
<p>56.06-6 PUBLIC TRANSPORT NETWORK DETAIL OBJECTIVES</p> <p>To provide for the safe, efficient operation of public transport and the comfort and convenience of public transport users.</p> <p>To provide public transport stops that are accessible to people with disabilities.</p>	<p>Complies – Public transport opportunities will be conveniently located along Horseshoe Bend Road and stops will be designed to provide access to all.</p>
<p>56.06-7 NEIGHBOURHOOD STREET NETWORK DETAIL OBJECTIVE</p> <p>To design and construct street carriageways and verges so that the street geometry and traffic speeds provide an accessible and safe neighbourhood street system for all users.</p>	<p>Complies – The new road network will be designed in accordance with Council requirements as contained in this Clause with kerb and channel and footpaths as required. The local road network has also been designed in consultation with Council and TTM Consulting.</p>
<p>56.06-8 LOT ACCESS OBJECTIVE</p> <p>To provide for safe vehicle access between roads and lots.</p>	<p>Complies – All lots will be provided with vehicle crossovers to Council's required specifications. The proposed road network has been designed in consultation with Council and TTM Consulting.</p>
<p>56.07-1 DRINKING WATER SUPPLY OBJECTIVES</p> <p>To reduce the use of drinking water.</p> <p>To provide an adequate, cost-effective supply of drinking water.</p>	<p>Complies – Water supply and sewerage will meet the requirements of the Barwon Water Authority.</p>
<p>56.07-2 REUSED AND RECYCLED WATER OBJECTIVE</p> <p>To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.</p>	<p>Complies – A third pipe to provide recycled water is proposed as part of the development of this subdivision.</p>

CLAUSE	COMMENT
<p>56.07-3 WASTE WATER MANAGEMENT OBJECTIVE</p> <p>To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.</p>	<p>Complies – The site will be connected to a waste water system as approved and maintained by Barwon Water.</p>
<p>56.07-4 URBAN RUN-OFF MANAGEMENT OBJECTIVES</p> <p>To minimise damage to properties and inconvenience to residents from urban run-off.</p> <p>To ensure that the street operates adequately during major storm events and provides for public safety.</p> <p>To minimise increases in stormwater run-off and protect the environmental values and physical characteristics of receiving waters from degradation by urban run-off.</p>	<p>Complies – A detention basin and wetlands are proposed to detain and treat stormwater prior to its release.</p> <p>The detention system will be developed consistent with current best practice design principles to ensure no off-site impacts.</p> <p>The management of storm water will be undertaken in-accordance with contemporary best practise policies.</p>
<p>56.08-1 SITE MANAGEMENT OBJECTIVES</p> <p>To protect drainage infrastructure and receiving waters from sedimentation and contamination.</p> <p>To protect the site and surrounding area from environmental degradation or nuisance prior to and during construction of subdivision works.</p> <p>To encourage the reuse of materials from the site and recycled materials in the construction of subdivisions where practical.</p>	<p>Complies – A detailed site management plan will be not available until such time as the civil works are put out to tender and the successful tenderer provides full details of site management and containment plans. Such information will be provided to Council when available prior to the commencement of construction works.</p>
<p>56.09-1 SHARED TRENCHING OBJECTIVES</p> <p>To maximise the opportunities for shared trenching.</p> <p>To minimise constraints on landscaping within street reserves.</p>	<p>Complies – Trenching will be shared where possible to minimise disruptions to the landscape.</p>
<p>56.09-2 ELECTRICITY, TELECOMMUNICATIONS AND GAS OBJECTIVES</p> <p>To provide public utilities to each lot in a timely, efficient and cost effective manner.</p> <p>To reduce greenhouse gas emissions by supporting generation and use of electricity from renewable sources.</p>	<p>Complies – The lots will be connected via underground electricity, telecommunications and gas in accordance with the relevant requirements of the supply/servicing agency.</p>

CLAUSE	COMMENT
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<p>56.09-3 FIRE HYDRANTS OBJECTIVE</p> <p>To provide fire hydrants and fire plugs in positions that enable fire fighters to access water safely, effectively and efficiently.</p>	<p>Complies – Fire hydrant/s will be provided to the requirements as specified by the CFA / MFB.</p>
<p>56.09-4 PUBLIC LIGHTING OBJECTIVE</p> <p>To provide public lighting to ensure the safety of pedestrians, cyclists and vehicles.</p> <p>To provide pedestrians with a sense of personal safety at night.</p> <p>To contribute to reducing greenhouse gas emissions and to saving energy.</p>	<p>Complies – Street lighting will be provided to the Council's specifications.</p>

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