UrbanDesign
and management

Development Plan – Aberline Estate

185 Aberline Road & 104, 126 & 140 Wangoom Road, Warrnambool

March 2014

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7

WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

Land Development | Project Management | Planning | Urban Design | Civil Engineering

Quality Assurance Record

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1. Introduction

Urban Design and Management Pty Ltd (UDM) acts for Aberline Pty Ltd (client), owner of the subject land at 185 Aberline Road and 104, 126 and 140 Wangoom Road, Warrnambool. We seek approval of a Development Plan as required under the Development Plan Overlay, Schedule 7 (DPO7) within the Warrnambool Planning Scheme to facilitate the residential development of the land.

The subject site is 41.68ha in area, largely undeveloped and has previously been used for agricultural purposes. A number of dwellings and outbuildings occupy the site along Wangoom Road, with the remainder generally vacant. The site falls towards the south-west and has a significant interface to Russells Creek.

New and existing residential development adjoins the site to the west and south; Kings College Christian School borders the western boundary of the site and farming zoned land is located to the east of the site.

Warrnambool Planning Scheme Amendment C77 applied the DPO7 to the subject land. The DPO7 applies to all land in the North East Warrnambool Growth Area. The subject site forms part of Cell C in this Growth Area.

This report responds to the objectives and requirements of DPO7 and forms the Development Plan (DP) for this site. The DP outlines the development objectives and vision for the land including the proposed development layout, proposed development densities, the treatment of the Russells Creek interface, including stormwater management treatments, and design guidelines for dwellings located in sensitive areas.

DPO7 requires that Development Plans be consistent with the North East Warrnambool Structure Plan 2007 (refer to Section 4.7 of this report) and must include and comprise the following to the satisfaction of the Responsible Authority:

- Site Analysis (refer to Section 3 of this report);
- Development Layout including roads, public open space and other features of a subdivision (refer to Section 5.1);
- Adequate and usable public open space, and pedestrian linkages along Russells Creek (refer to Section 5.2);
- Conservation, heritage or archaeological significance (refer to Section 5.3);
- Housing types (refer to Section 5.4);
- Community interaction, safety and surveillance (refer to Section 5.5);
- Transport network (refer to Section 5.6);
- Landscape Master Plan (refer to Section 5.7);
- Water Sensitive Urban Design and stormwater collection (refer to Section 5.8);
- Biodiversity (refer to Section 5.9);
- Design guidelines (refer to Section 5.10);
- Infrastructure (refer to Section 5.11); and
- Review period (refer to Section 5.12).

2. Site & Context Description

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2.1. Development Plan area

The DP area comprises the following land parcels:

- Lot 1 on TP 914315 (140 Wangoom Road, Warrnambool);
- Lot 1 on TP 22718 (104 Wangoom Road, Warrnambool);
- Lot 1 on TP 213249 (185 Aberline Road, Warrnambool); and
- Lots 1 and 2 on PS 606802 (126 Wangoom Road, Warrnambool).

All Certificates of Title are included as Attachment A to this report. The DP area is referred to as Aberline Estate.

Figure 1 - Development Plan area

Each title contains a Section 173 Agreement relating to the Development Contribution payable upon development of the land.

The DP has a total area of approximately 41.68 hectares. A site analysis plan is included as Attachment B and includes the following key observations:

- A steady fall across the site from the north-east (Wangoom / Aberline Road intersection) to the south-east. The fall plateaus midway through the site through to Russells Creek;
- The DP area's western boundary is formed by Russells Creek. The site analysis plan identifies areas subject to flooding (combination of Land Subject to Inundation Overlay (LSIO) and the Urban Floodway Zone (UFZ) as identified in the Warrnambool Planning Scheme and Warrnambool Planning Scheme Amendment C77, and land known to be affected by the 1% AEP

floodline). Approximately 2.17ha of the site is subject to flooding and is considered to be encumbered land;

- The majority of the site is vacant with dwellings and outbuildings located adjacent to Wangoom Road. All of these are to be removed. The remainder of the site is vacant; and
- Planted windrows exist along the boundary lines of Lot 1 on PS 606802. These will ultimately be removed.

Figure 2 - Site Analysis Plan

2.2. Background Reports

2.2.1. Cultural Heritage Management Plan, Urban Colours Arts Pty Ltd, June 2011

A Cultural Heritage Management Plan (CHMP) has been prepared and approved for the site and is included as Attachment C to this report. Key observations include:

- The absence of a permanent waterway within the activity area decreases the potential sensitivity of the activity area;
- Research on neighbouring land in the same landform has indicated that the area has been disturbed through agricultural and pastoral activities and the archaeological potential of the area is low;
- The south-eastern corner of the site falls within 200m of a waterway;
- It is considered that the activity area retains low to moderate potential for the location of Aboriginal cultural heritage in the form of surface and sub-surface stone artefact scatters;
- Due to the history of tree clearance there is low potential for the location of scarred trees within the activity area;
- The absence of soft sandy deposits suggests little potential for the presence of Aboriginal human burial places;

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- No Aboriginal cultural heritage or areas identified as likely to contain Aboriginal cultural heritage were identified during the complex assessment of the activity area; and
- No specific cultural heritage management activities are required.

2.2.2. Traffic Impact Assessment, O'Brien Traffic, December 2013

O'Brien Traffic has completed a Traffic Impact Assessment (TIA) for the site and it is included as Attachment D to this report. Key observations regarding existing site conditions include:

- Aberline Road is a local road under the control of Warrnambool City Council. It currently comprises a mixture of sealed and compacted gravel surfaces. The intersection with Wangoom Road is controlled by a give way sign and forms a staggered T-intersection with Wiggs Lane;
- Wangoom Road is a major road under the control of Warrnambool City Council. It consists of a two lane sealed carriageway without shoulders. Alongside the site the carriageway width is 6.5-6.6m. West of the site service roads exist on both sides;
- Traffic volume data indicates that both of these roads are operating well within their capacities; and
- There are no existing bus services that run in the vicinity of the subject site.

The TIA also assesses the proposed development and this is further discussed in Section 4.7 of this report.

2.3. Surrounds

A number of residential estates exist in the area including those developed on the west side of Russells Creek. This DP area has an interface with 'Marrakai' to Russells Creek. A shared path, wetland and playground area have been constructed within Marrakai, together with a boulevard road allowing dwellings to front the new open space.

Directly south of Marrakai is Kings College which also has an interface to Russells Creek. This interface, however, mainly comprises fields and some vegetation with no formal areas directly abutting the creek.

Further residential development lies south of Kings College and this has a limited active interface with Russells Creek with most dwellings backing onto it. A small area of open space at its north-eastern corner provides access from the estate to a further shared path which runs south to Whites Road.

Russells Creek estate is currently being developed to the direct south of the DP area. Road connections being developed within this estate will be continued through this DP area. Improvements being made to Aberline Road through this development will also be continued through this DP area.

Land east of Aberline Road is used for rural purposes. It may be utilised for urban purposes in the future.

Land north of Wangoom Road is used for rural living purposes.

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3. Planning Policy Framework

This section of the report briefly outlines the key planning and Council policies that influence the DP.

3.1. State Planning Policy Framework (SPPF)

The following clauses of the State Planning Policy Framework (SPPF) are considered relevant to the

Clause 11.02-2 Supply of urban land seeks to ensure a sufficient supply of land is available for residential, commercial, retail, industrial, recreational, institutional and other community uses.

Clause 11.02-3 Structure Planning seeks to facilitate the orderly development of urban areas by requiring the preparation of the appropriate strategic plans. This objective can be achieved through the preparation of the appropriate strategic plans, including development plans.

Clause 11.03-1 Open space planning seeks to assist creation of a diverse and integrated network of public open space commensurate with the needs of the community.

Clause 15.01-1 Urban design seeks to create urban environments that are safe, functional and provide good quality environments with a sense of place and cultural identity.

Clause 15.01-2 Urban design principles seeks to achieve architectural and urban design outcomes that contribute positively to local urban character and enhance the public realm while minimising detrimental impact on neighbouring properties. The guidelines in ResCode (Clauses 54-56) assist to achieve this objective.

Clause 15.01-3 Neighbourhood and subdivision design seeks to ensure the design of subdivisions achieves attractive, liveable, walkable, cycleable, diverse and sustainable neighbourhoods.

Clause 15.01-4 Design for safety seeks to improve community safety and encourage neighbourhood design that makes people feel safe.

Clause 16.01-4 Housing diversity seeks to provide for a range of housing types to meet increasingly diverse needs.

Clause 18.02-1 Sustainable personal transport seeks to promote the use of sustainable personal transport.

Clause 18.02-2 Cycling seeks to integrate planning for cycling with land use and development planning and encourage as alternative modes of travel.

Clause 18.02-4 Management of the Road system seeks to manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure.

Clause 19.03-2 Water supply, sewerage and drainage seeks to plan for the provision of water supply, sewerage and drainage services that efficiently and effectively meet State and community needs and protect the environment.

Clause 19.03-3 Stormwater seeks to reduce the impact of storm water on bays and catchments.

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3.2. Local Planning Policy Framework (LPPF)

3.2.1. Municipal Strategic Statement (MSS)

The MSS contains Council's vision for the development of Warrnambool. The Strategic Framework Plan in Clause 21.01 identifies the site as being within the north east corridor of Warrnambool and able to provide short and medium term integrated residential development. Clause 21.05 follows this, identifying the north east corridor as one of Warrnambool's primary greenfield development areas.

Clause 21.06-1 identifies Russells Creek as an intermittent creek that is generally in poor condition. Despite its current condition, it is considered that Russells Creek has very good potential to be improved and to provide amenity values that would benefit the many residential properties in its catchment. Specific objectives exist within this clause to control urban run-off, establish public reserves, and generally improve the environs of Russells Creek.

The same clause identifies numerous flood plains within the city area and the need to maintain the integrity of these existing urban floodways. Russells Creek has been identified as one of these urban floodways with areas of Land Subject to Inundation (LSIO) and the Urban Floodway Zone (UFZ) identified along its length.

3.2.2. Local Planning Policies

Clause22.02-1 **'Urban Floodway Local Policy' applies to those areas designated as Urban Floodway** Zone and Land Subject to Inundation. The policy seeks to identify potential flood hazards and provide a sound basis for the future development and use of land considered liable to be at risk of flooding.

3.3. Zones

Planning Scheme Amendment C77 included most of the land within the Residential 1 Zone (R1Z), with portions along Russells Creek included within the Urban Floodway Zone (UFZ).

Residential 1 Zone

The R1Z provides for residential development at a range of densities with a variety of dwellings to meet the housing needs of all households.

A planning permit will be required to subdivide land and will need to meet the requirements of Clause 56. A planning permit will be required to construct or extend a dwelling on a lot less than 300sqm in area.

Urban Floodway Zone

The UFZ identifies waterways, major floodpaths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.

A planning permit is required to subdivide land and for the use and development of land for a utility installation.

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3.4. Overlays

Planning Scheme Amendment C77 included most of the land within the Design and Development Overlay, Schedule 4 (DDO4) and the Development Plan Overlay, Schedule 7 (DPO7). Part of the site along Russells Creek is also included in the Land Subject to Inundation Overlay (LSIO).

Design and Development Overlay, Schedule 4 (DDO4)

The purpose of DDO4 is to ensure that new single dwellings are compatible with the existing scale and character of adjoining dwellings and of the area, and to ensure that the height and visual bulk of single dwellings are acceptable in the neighbourhood setting.

A permit is required to subdivide land and construct a dwelling greater than 7m in height.

Development Plan Overlay, Schedule 7 (DPO7)

The objectives of the DPO7 have been outlined at Section 2 of this report.

Land Subject to Inundation Overlay (LSIO)

The purpose of the LSIO is to identify land in a flood storage or flood fringe area affected by the 1 in 100 year flood or any other area determined by the floodplain management authority.

A planning permit is required to subdivide land and to construct a building and carry out works.

3.5. Particular Provisions

The following clauses of the Particular Provisions are considered relevant to the proposed DP.

Clause 52.01 'Public Open Space Contribution and Subdivision' requires that 'a person who proposes to subdivide land must make a contribution to the council for public open space in an amount specified in the schedule to this clause'. The schedule to Clause 52 does not specify an amount for the subject land so the public open space contribution defaults therefore to the requirements of the Subdivision Act 1988, being up to 5%.

Clause 52.17 'Native vegetation' requires a permit to remove, destroy or lop native vegetation, including dead native vegetation. Clause 52.17-6 sets out a list of exemptions, including planted vegetation. Planted vegetation includes vegetation that has been planted or grown as a result of direct seeding for crop raising, extensive animal husbandry, aesthetic or amenity purposes, including agroforestry, shelter belts, woodlots, street trees, gardens or the like.

Clause 56 'Residential Subdivision' seeks to create liveable and sustainable neighbourhoods and urban places with character and identity and to achieve residential subdivision outcomes that appropriately respond to the site and its context. Key considerations include:

- Liveable and sustainable communities
- Lot design
- Urban landscape
- Access and mobility management
- Integrated water management
- Site management
- Utilities

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Future planning permits will address the requirements in detail, however the DP has regard to the principles of Clause 56 and provides for a variety of lot sizes, accessible open space and a road network that is legible and safe.

3.6. General Provisions

The following clauses of the General Provisions are considered relevant to the subject site.

Clause 65 Decision Guidelines

Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:

- The matters set out in Section 60 of the Act.
- The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.
- The purpose of the zone, overlay or other provision.
- Any matter required to be considered in the zone, overlay or other provision.
- The orderly planning of the area.
- The effect on the amenity of the area.
- The proximity of the land to any public land.
- Factors likely to cause or contribute to land degradation, salinity or reduce water quality.
- Whether the proposed development is designed to maintain or improve the quality of storm water within and exiting the site.
- The extent and character of native vegetation and the likelihood of its destruction.
- Whether native vegetation is to be or can be protected, planted or allowed to regenerate.
- The degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard.

3.7. North East Warrnambool Structure Plan 2008

The North East Growth Area Structure Plan identifies the subject land as within the current 15 year demand, and to be developed to provide conventional density residential lots. Key elements of the Structure Plan relevant to the subject land include:

- Wangoom and Aberline Roads are to be developed as collector roads;
- A boulevard road is to be provided along the Russells Creek interface;
- Open spaces are to be provided along Russells Creek and central to the subject land. Spaces are to be connected via pedestrian pathways; and
- A wetland bio-filter is to be located within an area of open space adjacent to Russells Creek

The Structure Plan does not state a specific development density for the area though anticipates an overall yield of approximately 1600 lots across the whole structure plan area.

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4. Development Plan

4.1. Development Layout

The DP is included as Attachment E and includes the following key features:

- A net residential development area of approximately 29ha;
- Linear road layout that continues the connections currently being developed to the south in Russells Creek Estate. Key road connections are also provided through to Aberline Road and Wangoom Road;
- A strong emphasis on the Russells Creek corridor including identification of open space areas and the aligning of key estate entry roads to provide long view corridors. These entry roads are identified on the DP;
- A creek corridor which largely contains the LSIO. The encumbered flood areas, equating to approximately 2.34ha, are punctuated with areas of unencumbered open space. These unencumbered open spaces equate to approximately 0.95ha or 2% of the site.
- The incorporation of an innovative and best practice stormwater management system designed to achieve best practice water quality outcomes with a smaller development footprint and high amenity outcomes;
- The creation of a creekside boulevard with dwellings addressing the creek to provide a high level of passive surveillance and natural activity;
- The creation of a new shared pathway system that will link with that proposed in Russells Creek Estate to provide a continuous link between Whites Road and Wangoom Road on the eastern side of Russells Creek.

Figure 3 - Development Plan

4.2. Land Budget

The Development Plan indicative land budget is provided below.

DEVELOPMENT ANALYSIS		
30/10/13		SCP 7
TOTAL SITE AREA	41.68 ha	
ENCUMBERED LAND	2.34 ha	
Wetland components above LSIO	0.09 ha	
Wetland below LSIO	0.67 ha	
LSIO excluding Wetland	1.58 ha	
NET DEVELOPABLE AREA	39.34 ha	%NDA
Public Open Space	0.95 ha	2%
Adjacent to Creek	0.44 ha	
Adjacent to Wetland	0.29 ha	
Wetland Surrounds above LSIO	0.22 ha	
Roads	9.46 ha	24%
Residential	28.93 ha	74%
Development Yield	503 lots	
Density	12.79 dw/ha	

Note:
1. Layout & lot yield to be confirmed
2. Direct access to Aberline Road
3. All of site has potential for medium density development subject to Council approval.

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Table 1 - Development Analysis

Key features of the Development Analysis include:

- All of the site has the potential for medium density development subject to further Council approval. This is included as a note on the Development Plan included in Attachment E;
- The site has an approximate overall yield of 503 lots;
- A diversity of lot sizes will be provided across the estate. Lot sizes closer to Russells Creek will generally be of a smaller average size (i.e. between 400sqm and 600sqm in area). Lot sizes through the centre and eastern portions of the site will generally be larger (i.e. greater than 600sqm in area). The sizes generally reflect the proximity of the lots to Russells Creek and the amenity and open spaces provided along this key link; and
- It is estimated that the development density across the estate will be approximately 12.79 dwellings per hectare.

4.3. Open Space and Pedestrian Linkages

Approximately 3.29ha, or 7.8%, of the site will be provided as public open space. This space comprises three key components:

- Land encumbered by the LSIO associated with the proposed wetland system (approximately 0.76ha);
- Land encumbered by the LSIO only (approximately 1.58ha); and
- Unencumbered public open space (approximately 0.95ha).

The unencumbered public open space is provided in five areas, with four on the eastern side of Russells Creek and the other on the western side adjacent to Kings College.

The Landscape Master Plan is further discussed in Section 5.7 and recommends the development of several of these spaces and inclusion of a creek crossing to facilitate access between Marrakai and this DP area.

In accordance with Clause 3.6.1(a) of the Section 173 Agreements registered on each title in this DP area, a monetary contribution of 3% of the value of the total net Developable Hectares of the Subject Land must be paid to Council for the purposes of public open space.

The key pedestrian linkage within this DP area is the provision of a shared path along the boulevard road. This path will link to the proposed path in the Russells Creek Estate to the south and provide a continuous shared path between Wangoom Road and Whites Road. This path has the ability to increase the length of the existing Russells Creek Trail.

Internal to the site, footpaths will be provided within road reservations to link to the Russells Creek Trail. These will be designed and provided in accordance with Clause 56 of the Warrnambool Planning Scheme.

4.4. Conservation, heritage or archaeological sites of significance

There are no known sites of conservation, heritage or archaeological significance within the DP area. There are no world or natural heritage properties, Ramsar sites or threatened ecological communities within the study area.

The CHMP completed for the site found that the activity area retains low to moderate potential for the location of Aboriginal cultural heritage in the form of surface and sub-surface stone artefact scatters. It also finds that due to the history of tree clearance on the site there is low potential for the existence of scarred trees. The CHMP provides a series of contingencies should Aboriginal cultural heritage be discovered during works.

With regards to environment, the protection of the riparian vegetation and water quality of Russells Creek is of importance. Water Sensitive Urban Design and stormwater collection is further discussed at Section 5.8.

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4.5. Housing types

The DP identifies all of the land as suitable for residential purposes. Housing densities are not shown on the DP though a note is included stating that 'all land within this DP area is potentially suitable for medium and higher density housing types subject to further Council approval'. It is estimated that the development density across the estate will be approximately 12.79 dwellings per hectare.

The subdivision concept plan to be prepared for the planning permit application will contain areas of medium density housing focussed on areas close to Russells Creek and which therefore have a high level of amenity and access to the public open space network.

It is likely that the majority of housing within the DP area will be single dwellings and this particular housing type will be encouraged in the north-eastern quarter of the site. This area will likely be developed in a similar manner to newer residential developments in Warrnambool where larger lot frontages, single storey dwellings and well landscaped private spaces create a strong character. These areas, however, are not being explicitly identified in the DP which recognises that all lots are potentially suitable for medium and higher density housing types subject to Council approval.

4.6. Community interaction, safety and surveillance

A high level of community interaction, safety and surveillance will be achieved along Russells Creek by development fronting this open space area. This will compliment the passive surveillance already achieved along this space by the Marrakai development. The boulevard road along Russells Creek will create an active interface to this open space with abutting dwellings to be designed to properly address these areas.

Lots will also directly address Wangoom Road (via a service road) and Aberline Road, providing active interfaces and a high level of passive surveillance.

4.7. Transport network

The transport network provided within the DP area is based on a linear grid to improve legibility and provide high levels of accessibility. Key features include:

- Continuation of the service road to Wangoom Road;
- Continuation of direct lot access to Aberline Road;
- Creation of two key entry roads – the north-south entry road from Wangoom Road, and the east-west entry road from Aberline Road. These roads junction at a key area of public open space, creating a positive visual cue and community focal point;
- In addition to the key entry roads, two smaller road connections are provided to both Wangoom Road and Aberline Road;
- All three proposed road connections from Russells Creek Estate are continued through into this DP area providing a high level of connectivity between the two developments; and
- Continuation of the boulevard road along Russells Creek, creating a positive interface to this landscape together with a high level of passive surveillance.

The TIA included in Attachment D assesses the proposed development plan layout and provides the following key comments and recommendations.

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Traffic generation & direction

- The likely maximum daily traffic generation is expected to be in the order of 5,030 vehicle trips per day; and
- The substantial majority of trips would be generated to/from the south and south-west towards the Warrnambool town centre and other major employment centres. Based on this 40% of trips in and out of the site are expected to be via the collector road to Wangoom Road, and 30% via the collector road to Aberline Road.

Carrying capacity

- Both Aberline and Wangoom Roads are expected to operate well within their carrying capacity even with the additional traffic anticipated from this development;
- The developments new intersections with Aberline and Wangoom Roads will operate very well as unsignalised intersections, similar to others in the area;
- Based on estimated future traffic volumes, it is recommended that a Type CHR right-turn lane / Type BAL left-turn treatment be constructed at the Wangoom Road intersection, with provision made for bicycle lanes each side as per Marakai.

Similarly, a Type BAR right-turn treatment / Type BAL left-turn treatment is recommended for the Aberline Road intersection.

- Both of these intersections are to be provided and funded in accordance with the Section 173 Agreements registered on title.
- Degrees of Saturation at both intersections would be very low, and average queue lengths are anticipated to be all less than one car; and
- Safe Intersection Sight Distances and Minimum Gap Sight Distances can be provided for all intersections on both Wangoom and Aberline Roads.

Road profiles

- With the exception of the single Access Lane proposed to be provided within the estate, it is proposed that all roads will adhere to the minimum requirements set out in the Infrastructure Design Manual for an Access Street. This will provide a 16m wide reservation width, a 7.5m wide carriageway and a 3.5m wide verge. Parking provision can be made within the carriageway on both sides of the street, and footpaths will be provided on both sides of the street.

Footpaths & shared paths

- All streets will be provided with footpaths on both sides; and
- A shared path will be provided along the western side of Russells Creek and will have a minimum width of 2.5m. A further shared path will be provided within the service road to Wangoom Road with an indicative profile for this road shown in Figure 4, with a final shared path to be provided on the south side of the east-west collector road connecting Russells Creek to Aberline Road. This shared path is to fit within the proposed 18m wide reservation. The indicative alignment of all shared paths are shown on the DP.

Intersections to Aberline Road

Intersection spacing

Section 12.5.4 of the IDM states that the spacing of intersections should comply with the requirements of the Planning Scheme. Clause 56.06-7 of the Warrnambool Planning Scheme specifies that street blocks should generally be between 120 and 240 metres in length and generally between 60 metres to 120 metres in width. The Aberline Road intersections are spaced approximately 85 metres apart, which is within the acceptable block spacing range.

Intersection treatments

The predominate right-turn movement will be traffic exiting the subdivision into Aberline Road (i.e. people travelling towards the town centre). Conversely, the right-turn entry volumes from Aberline Road will be very low. This is highlighted in Figure 5 (original in TIA report included as Attachment D).

As discussed in the TIA, there are no special mitigating treatments required to accommodate these voluments. SIDRA analysis confirms that the intersections will operate exceptionally well as standard T-instersections (95th percentile queue of no more than 1 car for the busiest Aberline Road intersection, based on 10 year volumes).

A roundabout offers no practical advantage to intersection performance at these T-intersections. Whist traffic islands can provide benefits for pedestrians, it is anticipated that pedestrian volumes would be relatively low and traffic islands therefore of limited benefit.

It is noted on the DP that the east-west collector road and Aberline Road intersection is to be designed to provide for the provision of future Traffic Management Works. A roundabout with future development east of Aberline Road is the preferred design outcome.

General

- Speed control devices may be required on some street blocks longer than 240m. These devices can be determined as permit conditions later in the development process. A modified T-intersection should also be provided where the Collector Road changes direction; and
- Approximately 95% of lots will be located within 400m of a potential future bus route along Aberline and Wangoom Roads.

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Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

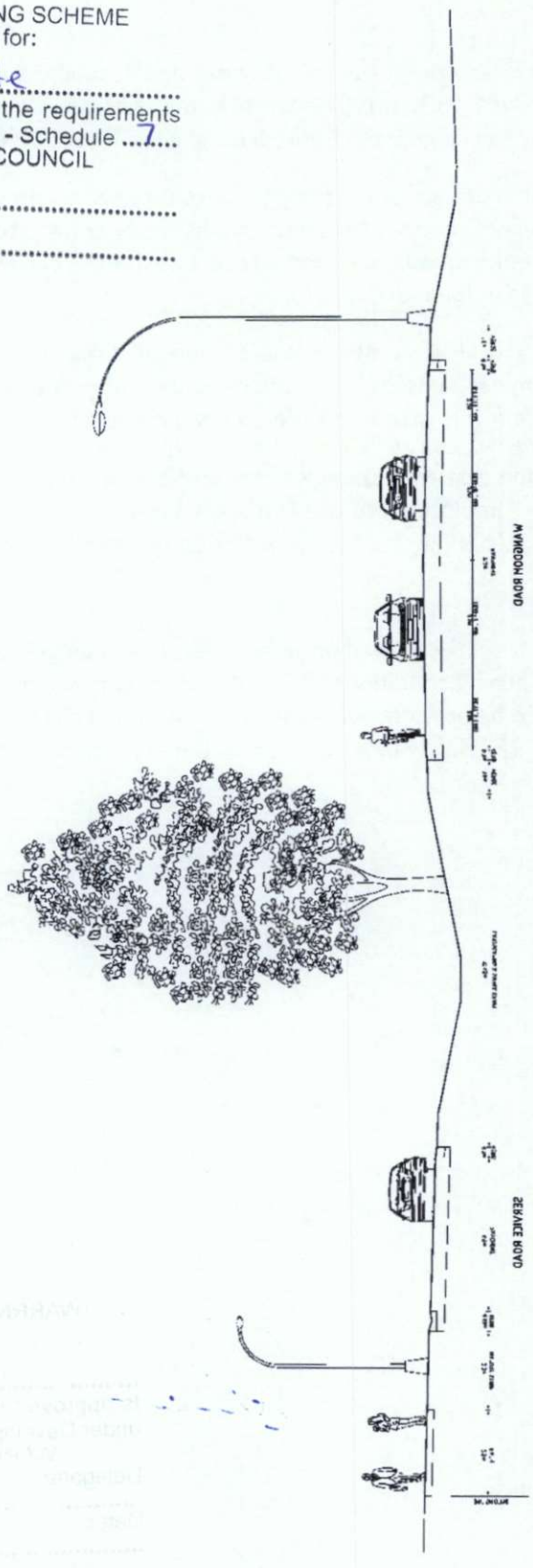

Figure 4 - Indicative Wangoom Road cross-section

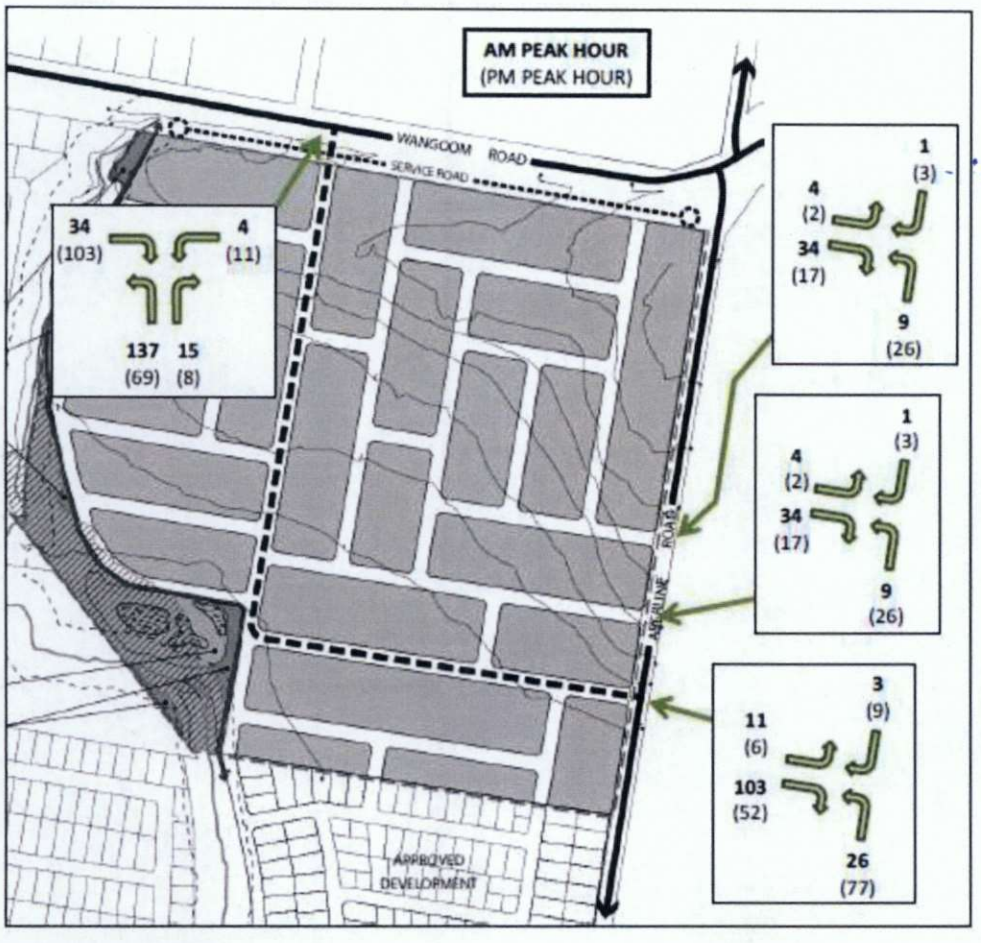

Figure 5 - Estimated peak hour traffic distribution

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
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WARRNAMBOOL CITY COUNCIL
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Date: 24 April 2014

4.8. Landscape Master Plan

A Landscape Master Plan has been prepared for the DP area and is included as Attachment F.

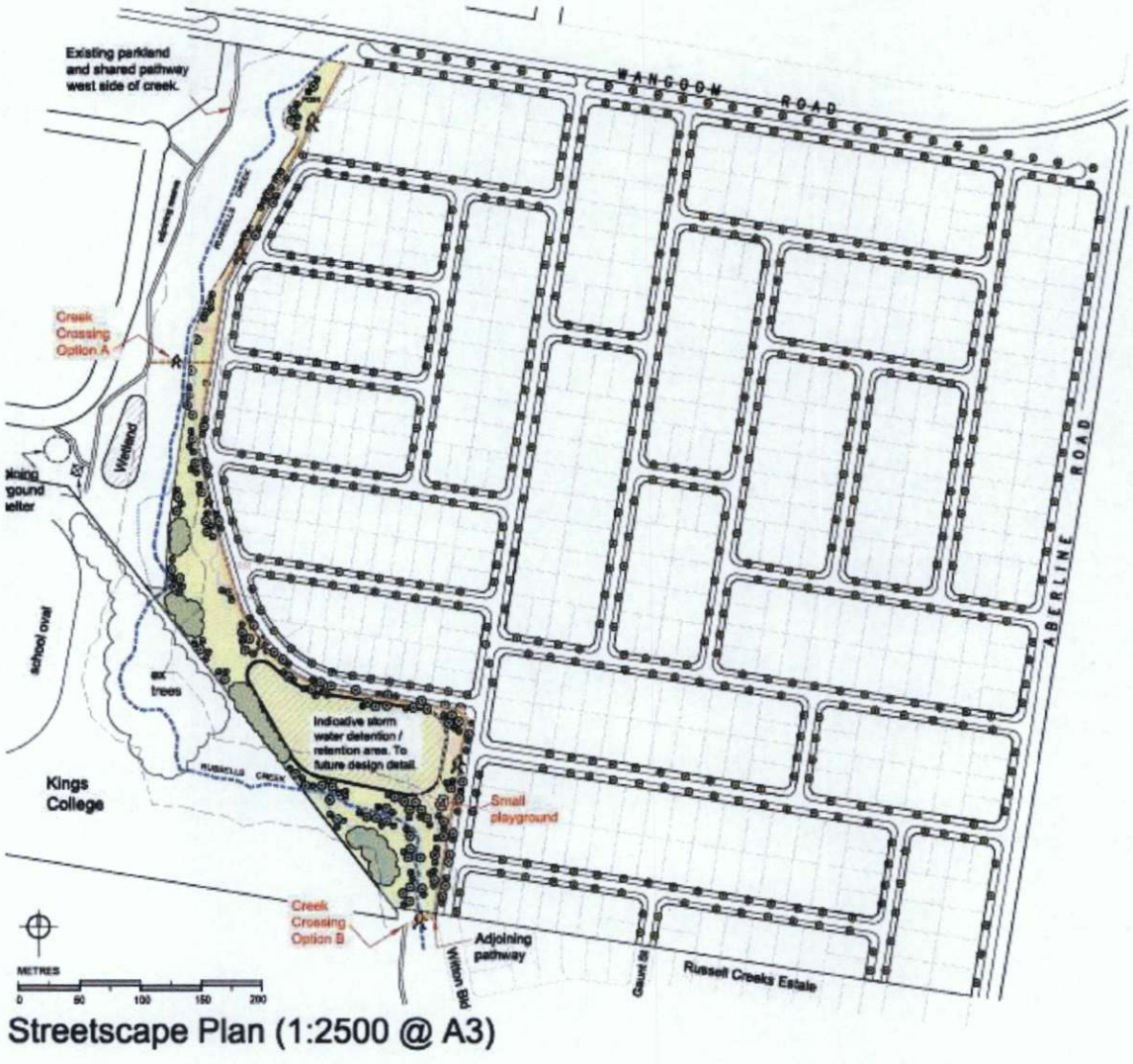


Figure 6 - Landscape Master Plan

Its key features include:

- Continuation of a 2.5m wide shared pathway proposed to the south in Russells Creek Estate. This pathway will run parallel to the open space and boulevard road north through to Wangoom Road;
- A creek crossing linking this DP area with Marrakai and its adjoining shared path, wetland and playground and shelter;
- A small playground located adjacent to the Biofilta wetland area;
- A second creek crossing to the south of the wetland area to link with the existing shared path on the west side of Russells Creek;
- Street trees are to include Australian Native and Exotic trees selected for suitability to the local conditions. These may include: *Platanus orientalis* (Oriental Plane Tree), *Pyrus calleryana*

"Capital" (Ornamental Pear), ***Pyrus calleryana "Chanticleer"*** (Ornamental Pear), *Quercus palustris* (Pin Oak) and ***Ulmus parvifolia "Todd"*** (Chinese Elm);

- Key planting themes for the creek reserve focus on developing broad open areas with scattered native tree planting as open woodland, maintaining creek lines in their natural state, maintaining open and permeable places for passive surveillance and user comfort;
- Planting of the creek line will be limited to the DP area, with the balance of planting off-site to the west to be undertaken by others. Proposed species for the creek reserve include: *Acacia implexa* (Lightwood), *Acacia melanoxylon* (Blackwood), *Acacia pycnantha* (Golden Wattle), *Acacia mearnsii* (Black Wattle) *Acclocasuarina verticillata* (Drooping Sheoak), *Banksi marginata* (Silver Banksia), *Bursaria spinosa* (Sweet Bursaria), *Eucalyptus pauciflora niphophila* (Snow Gum), *Eucalyptus leucoxylon* (Yellow Gum), *Eucalyptus ovata* (Swamp Gum), *Eucalyptus viminalis* (Manna Gum), and *Eucalyptus yarraensis* (Yarra Gum); and
- Stormwater management is shown indicatively on the landscape master plan and is subject to future detailed design.

4.9. Water Sensitive Urban Design and stormwater collection

Rodger Constructions engaged Cardno, in association with Biofilta Pty Ltd, to prepare a Site Based Stormwater Management Plan for the DP area. The Stormwater Management Plan is included as Attachment G and demonstrates how the development will manage stormwater runoff in terms of stormwater quantity and quality.

A Biofilta Pty Ltd system has been proposed for the development to filter and remove pollutants and sediment from the stormwater runoff before it leaves the site and enters Russells Creek. The purpose of selecting the Biofilta system approach is due to its robust methodology of capturing and removing sediment and pollutants from stormwater in a simple and spatially efficient manner.

The project includes a high degree of innovation and has recently been granted significant funds from the Office of Living Victoria in recognition of this. It seeks to provide fit for purpose 'raw water' into the Wannon Water collection pipeline for integrated water management into the town drinking water treatment plant. Modelling has shown that the Biofilta System will provide up to three times the volume of stormwater than a previously proposed separate roof water harvesting scheme.

Stormwater flood detention will also be provided within the Biofilta System with the addition of a retarding basin and controlled outflow structure such that the peak flow from the development is no more than the peak flow predevelopment for the 1 in 10 and 1 in 100 year ARI storm events.

In addition to meeting the best practice objectives for stormwater treatment, the water sensitive design features will provide an integrated visual and environmental amenity which is sympathetic to the design intent of the DP area and will provide a lasting and sustainable community asset with local irrigation needs met by the Biofilta System.

The proposed treatment system is shown on the DP and is located in the site's south-western corner adjacent to Russells Creek. The majority of the system is located within the LSIO, though part of the wetland system is located outside of this.

The Biofilta system utilises the principles of biofiltration to treat stormwater runoff, though is able to reduce the footprint of the treatment train whilst maintaining a high quality of treatment. This has benefited the DP site allowing a higher percentage of the site being able to be used for residential purposes.

The Biofilta system will include a sediment basin with an area of 500sqm in which all low flow stormwater will be diverted from the developed catchment upstream. Stormwater will flow from the sediment basin to a proposed floating wetland, from which it will be pumped to the bioretention basin.

The floating wetland will have an approximate area of 500sqm. Stormwater will be pumped from the centre of the floating wetland to the proposed planter bed which will be of a similar size. Filtered water from the planter bed will be directed to a reuse tank for the purposes of sustainability of the planter bed in times of low rainfall. The reuse tank has been sized to ensure the health of the plants for up to two months without rainfall.

Overflow from the reuse tank will flow to a carbon filter for further treatment. A proposed pump will then transfer the treated water to the existing 450mm diameter non-drinking water gravity collection main which will be collected by the local water authority, Wannon Water, at a central treatment facility off-site.

4.10. Biodiversity

The long term pastoral use of the land has compromised any biodiversity on the land. Council have accepted this approach for other landholdings in the area (e.g. Cove and Toohey/Marrakai) and have advised they would adopt the same position for the remaining Cell C land.

4.11. Design guidelines

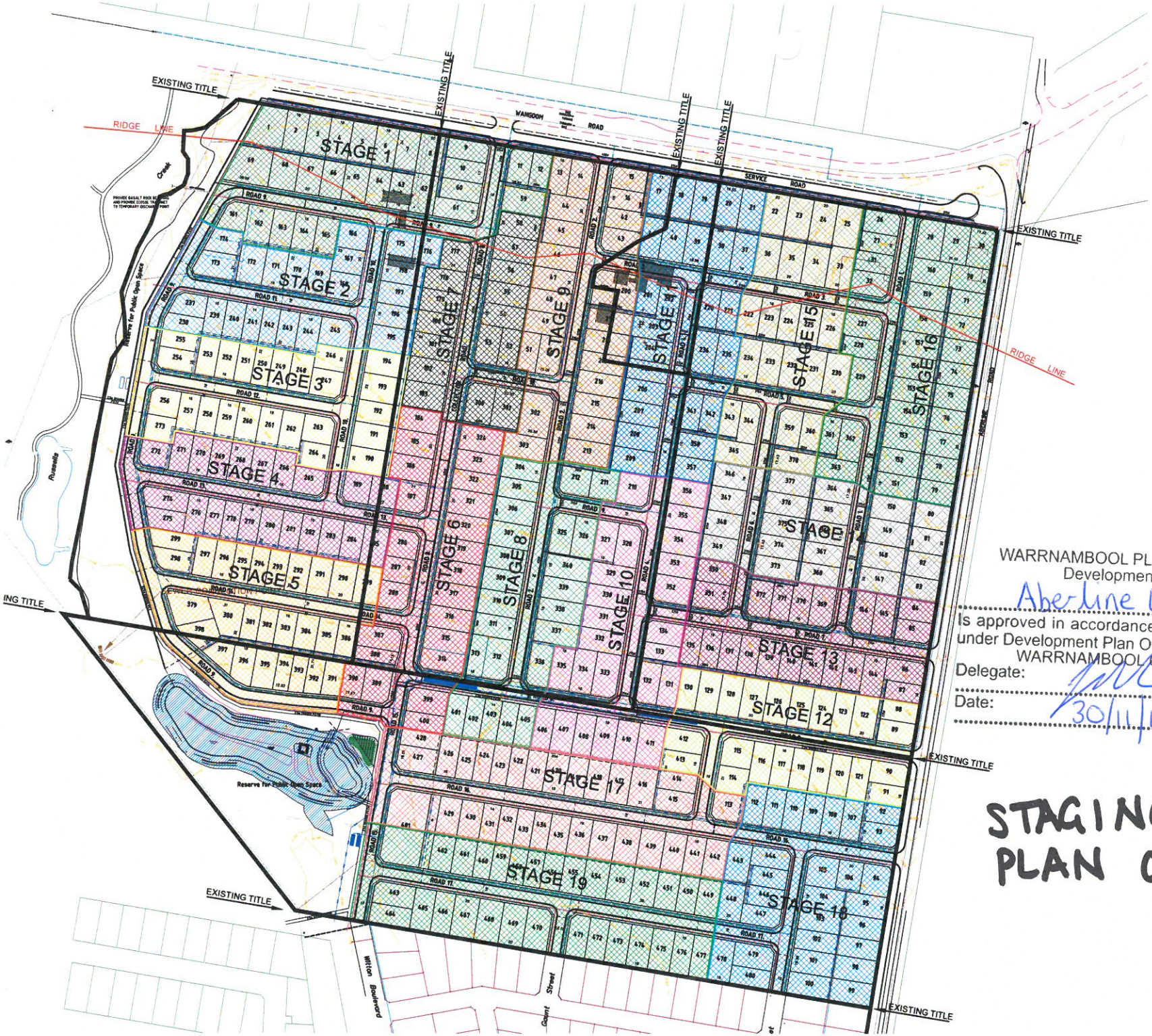
Lots fronting Russells Creek are located in sensitive areas and require consideration of building heights, roof materials and colours and siting of dwellings. Key considerations include:

- House orientation – houses must face Russells Creek and present an identifiable entrance to the boulevard road. Where possible, houses should be sited so that habitable rooms and private open spaces face northwards to receive maximum solar efficiency;
- Building height – the maximum building height is 7.0 metres above the natural surface level of the ground directly below it. Buildings higher than this will require separate planning approval from Council;
- Slope considerations – houses and garages should be sited and designed to take advantage of the natural slope conditions of the DP area. Embankments should not exceed a slope of 1 in 5. Retaining walls are preferred to steep embankments and should be kept to a maximum height of 900mm; and
- External fixtures – clothes lines, garden sheds, external hot water services and ducted heating units must not be visible from the site.

4.12. Infrastructure

4.12.1. Provision of services

- Reticulated sewerage will be serviced by an existing sewer main running along the west boundary of the overall land area;
- Stormwater will be managed as set out in Section 5.8;
- Reticulated water will be serviced off a 225 main that will run north up the west side of Aberline Rd until the Aberline/Wangoom Rd intersection where it will then run west on the south side of Wangoom Rd;
- Communications and gas will be provided to the site as relevant;



WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 30/11/16.

STAGING PLAN ONLY

X23

- Power is being provided from Wangoom Rd with the main high voltage line running down the west side of Aberline Rd down to Russells Creek Estate, providing access to the DP site along the way.

1.1.1. Staging

An indicative staging direction plan is included as Attachment H.

The staging direction plan is influenced by the existing title boundaries within the DP area and the early staging of the lots adjacent to Aberline Road and Russells Creek.

thus constructed.

Council will be constructing Aberline Road to provide access to Stage A. The developer will then construct a temporary service road along the Wangoom Road frontage to provide additional access to this stage. This temporary access will be formalised at a later stage. Stage A also includes the construction of the east-west collector road with the north-south collector road access from Wangoom Road to be provided in Stage B.

Early staging of development along Russells Creek in Stage B will enable the works along the creek to commence, providing the development with the advantage of the early provision of parks, open spaces and amenity.

Stage lot yields range from 45 through to 78 and are likely to be slightly modified as the development progresses. Further detailed staging will be supplied as part of the planning permit process. The basic fundamentals of the staging direction plan, however, will be retained.

1.1.2. Provision and funding of physical infrastructure

Development contributions have been agreed between Council and all landowners through separate Section 173 Agreements. Schedule 1 of the Agreement outlines the specific development contributions to be made which includes:

- Roads – Wangoom Road, Aberline Road, Boiling Down Road and Gateway Road;
- Bridges – Aberline Road bridge structure at Russells Creek;
- Intersections – Wangoom Road, Aberline Road, Gateway Road and Mortlake Road;
- Planning; and
- Open Space – linear open space works.

1.1.3. Timing of works

The timing of works will be determined by the Section 173 Agreement and in consultation with Council.

1.2. Review Period

The DPO can be removed via a Planning Scheme Amendment once the implementation of the development has been completed.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 26 February 2015

WARRNAMBOOL CITY COUNCIL
DATE RECEIVED
17 FEB 2015
PLANNING OFFICE

- Power is being provided from Wangoom Rd with the main high voltage line running down the west side of Aberline Rd down to Russells Creek Estate, providing access to the DP site along the way.

4.12.2. Staging

An indicative staging plan is included as Attachment H.

The staging plan is influenced by the existing title boundaries within the DP area and the early staging of the lots adjacent to Russells Creek.

SUPERSEDED

Stage 1 includes the construction of the access from Wangoom Road, with the construction of the collector road access from Aberline Road to be provided in Stage 4. Commencement of the development along Russells Creek also logically extends Warrnambool's existing residential areas to the east, following the development of Marakai. Commencing along Russells Creek also enables the works along the creek to commence early, providing the development with the advantage of the early provision of parks, open spaces and amenity.

Stage lot yields range from 45 through to 78 and are likely to be slightly modified as the development progresses. The basic fundamentals of the staging plan, however, will be retained.

4.12.3. Provision and funding of physical infrastructure

Development contributions have been agreed between Council and all landowners through separate Section 173 Agreements. Schedule 1 of the Agreement outlines the specific development contributions to be made which includes:

- Roads – Wangoom Road, Aberline Road, Boiling Down Road and Gateway Road;
- Bridges – Aberline Road bridge structure at Russells Creek;
- Intersections – Wangoom Road, Aberline Road, Gateway Road and Mortlake Road;
- Planning; and
- Open Space – linear open space works.

SUPERSEDED

4.12.4. Timing of works

The timing of works will be determined by the Section 173 Agreement and in consultation with Council.

4.13. Review Period

The DPO can be removed via a Planning Scheme Amendment once the implementation of the development has been completed.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7

WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

5. Planning Scheme Assessment

The tables below provide a detailed assessment of the Aberline Estate against the requirements of the Warrnambool Planning Scheme:

Table 2 - Planning Scheme Assessment

State Planning Policy Framework	
Clause 11 Settlement	The site is within the R1Z and is surrounded by residential development to the south and west. As previously mentioned in this report, the site is well serviced by existing infrastructure and is a perfect opportunity for further residential development. The Aberline Estate Development Plan provides a sound planning framework and will facilitate future planning permits for residential development.
Clause 14 Natural Resource Management	Russells Creek provides a natural drainage function which will be improved by the proposal. The construction of the Biofilta system will collect and treat the stormwater.
Clause 15 Built Environment and Heritage	Connections to Russells Creek Estate and Marrakai (via pedestrian walkway) facilitate strong connectivity. These linkages form a linear function for pedestrians and cyclists. Entry roads have been designed to capture view lines towards Russells Creek. Newly created open spaces are provided along Russells Creek to promote passive surveillance and useable spaces. Aberline Estate creates a safe and walkable neighbourhood and will enhance the North-East Warrnambool area. There are no places of European heritage on the site and a CHMP has already been completed.
Clause 16 Housing	A range of product mix will provide more housing choice and address housing affordability in a growing area. Medium density housing is possible across the site though will be particularly encouraged in locations that have close proximity to public open space.
Clause 18 Transport	The proposed layout of the subdivision will facilitate the movement of both pedestrians and cyclists throughout the site, using both the shared path network along Russells creek and the road network.
Clause 19 Infrastructure	The site is well served by existing infrastructure and there are no servicing constraints that will inhibit the residential development of the land.

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Local Planning Policy Framework

The vision for the proposed development seeks to integrate within the surrounding residential character, whilst creating new opportunities for increased residential densities and housing choice.

The future dwellings in the development will front onto the open space corridor. The site is well serviced by existing infrastructure connections.

The proposed road network links seamlessly to the existing road connections that connect to the site.

General and Particular Provisions

Clause 52.01 Public Open Space Contribution	The proposed development will provide 2% of unencumbered public open space with an additional 3% to be provided as a monetary contribution in accordance with Clause 3.6.1(a) of the Section 173 Agreements registered on each title in this DP area.
Clause 52.17 Native Vegetation	The long term pastoral use of the land has compromised any biodiversity on the land. Council have accepted this approach for other landholdings in the area (e.g. Cove and Toohey/Marrakai) and have advised they would adopt the same position for the remaining Cell C land. In relation to the planted native windrows, these trees are exempt from requiring a planning permit to remove them in accordance with Clause 52.17-6.
Clause 56 Residential Development	The design of the development is in accordance with the requirements of Clause 56. A detailed assessment against Clause 56 will be provided to Council as part of a future planning permit application for subdivision.
Clause 65 Decision Guidelines	The proposed development facilitates an orderly extension of existing residential development in accordance with the North-East Warrnambool Structure Plan.

WARRNAMBOOL PLANNING SCHEME
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Aberline Estate

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WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

6. Conclusion

This report has summarised how the Aberline Estate Development Plan complies with the requirements of the Warrnambool Planning Scheme.

The subject site is in an excellent location with close proximity to all required facilities, as recognised by the North East Warrnambool Structure Plan 2008. It essentially completes the residential neighbourhood often referred to as 'Cell C' and compliments the existing Marrakai development and developing Russells Creek Estate by providing road connectivity, enhancing their existing adjacent park spaces, and improving linear connectivity along Russells Creek.

Russells Creek and its natural drainage function will be enhanced by the proposal with the construction of the innovative Biofilta wetlands area as part of the development in addition to providing a key local focus point. Russells Creek provides a range of public open space opportunities for the development and will connect to the existing spaces provided within Marrakai, providing an overall extended net community benefit. The retention of the drainage corridor, coupled with open space, provides a unique residential amenity for future residents in this development, which will become the focus of the estate.

The proposed road network connects seamlessly with the existing connector roads of Wangoom Road and Aberline Road. New road entrances for the site will be created from each with full turning movements available. Minor intersection upgrades will be required for the Wangoom Road entrance. The development also extends the proposed road connections from Russells Creek Estate, including the key boulevard road along Russells Creek. These local connections improve overall accessibility and legibility for residents.

The landscape master plan shows that the development will provide substantial improvements to the condition of the natural environment of the DP area. Further details will be provided as part of further planning permit applications but the information contained herein provides sufficient indication for Council at a concept level. The landscape master plan has focussed on the assets of Russells Creek and the creation of new tree lined local streets.

The mandatory public open space contribution is made via a mixture of a 2% 'land' contribution along Russells Creek and a 3% 'monetary' contribution in accordance with the requirements of the Section 173 Agreements.

In conclusion, the Aberline Estate Development Plan complies with the requirements of DPO7 and other relevant provisions of the Warrnambool Planning Scheme and warrants Council support.

WARRNAMBOOL PLANNING SCHEME
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WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

7. Attachments

A. Certificate of Title

B. Site Analysis Plan

C. Cultural Heritage Management Plan

D. Traffic Impact Assessment

E. Development Plan

F. Landscape Master Plan

G. Stormwater Management Plan

H. Staging Plan

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule ...7....

WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

Attachment A

Certificate of Title

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

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WARRNAMBOOL CITY COUNCIL

Delegate:

Date: 24 April 2014

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09837 FOLIO 907 Security no : 124047583671W
Produced 01/10/2013 03:45 pm

LAND DESCRIPTION

Lot 1 on Plan of Subdivision 213249N.
PARENT TITLE Volume 09799 Folio 748

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
ABERLINE ESTATE PTY LTD of 790 HOPKINS HIGHWAY BUSHFIELD VIC 3281
AH640444J 29/11/2010

ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AH640445G 29/11/2010
BENDIGO AND ADELAIDE BANK LTD
VARIATION OF MORTGAGE AJ942655T 02/10/2012
TRANSFER OF MORTGAGE AK260557L 28/03/2013

CAVEAT AK437427R 29/06/2013
Caveator
MARPHI PTY LTD
Capacity CHARGEE
Date of Claim 25/06/2013
Lodged by
HALL & WILCOX
Notices to
HALL & WILCOX of LEVEL 30 600 BOURKE STREET MELBOURNE VIC 3000

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan or imaged folio set out under DIAGRAM LOCATION below.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule ...?...
WARRNAMBOOL CITY COUNCIL
Delegate: .....
Date: 24 April 2014

DIAGRAM LOCATION

SEE LP213249N FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AK437427R	CAVEAT	Registered	29/06/2013

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 185 ABERLINE ROAD WARRNAMBOOL VIC 3280

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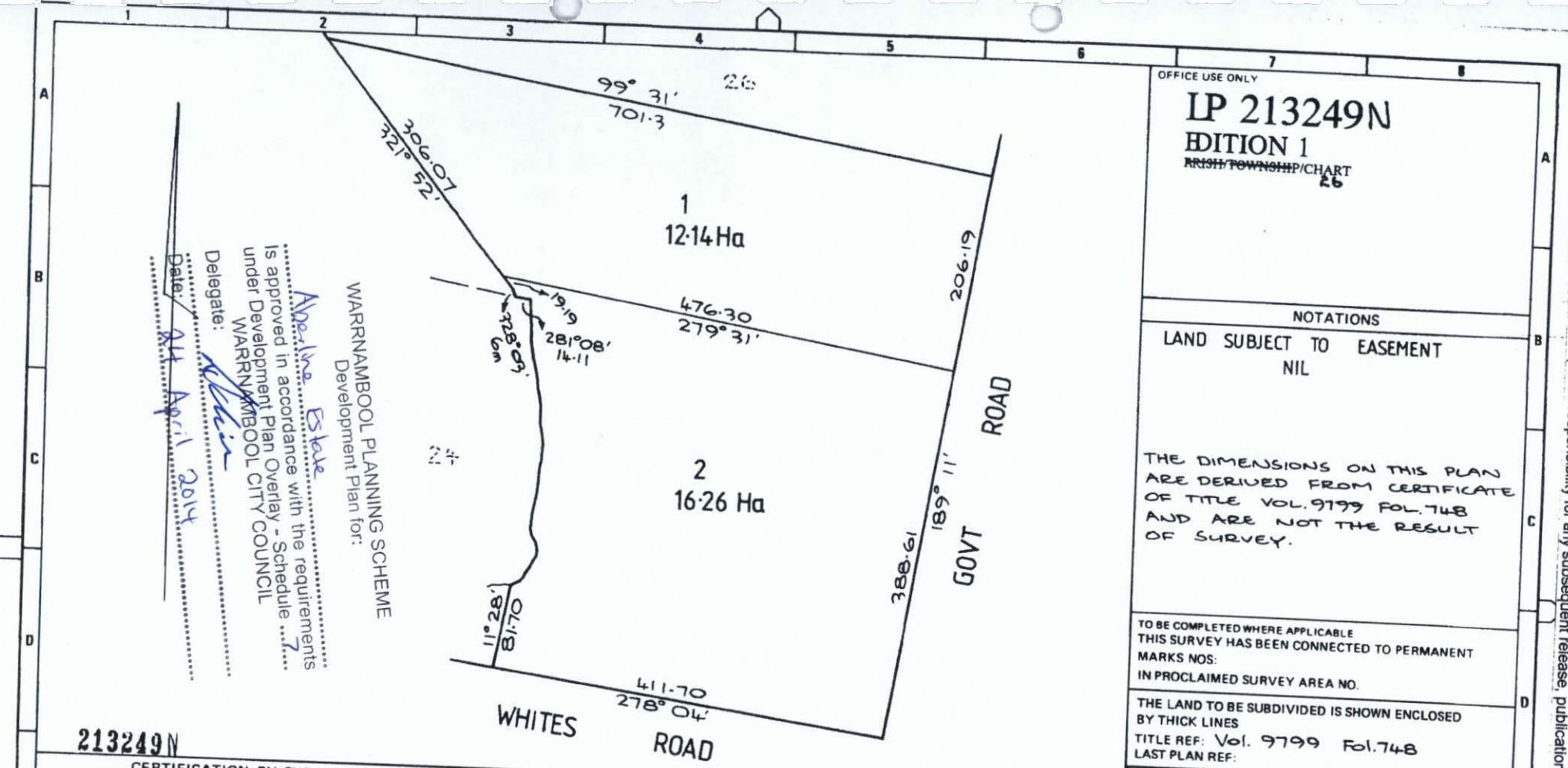

OFFICE USE ONLY

LP 213249N

EDITION 1

~~PARISH/TOWNSHIP~~/CHART 26

NOTATIONS

LAND SUBJECT TO EASEMENT
NIL

THE DIMENSIONS ON THIS PLAN ARE DERIVED FROM CERTIFICATE OF TITLE VOL. 9799 FOL. 748 AND ARE NOT THE RESULT OF SURVEY.

TO BE COMPLETED WHERE APPLICABLE
THIS SURVEY HAS BEEN CONNECTED TO PERMANENT MARKS NOS:
IN PROCLAIMED SURVEY AREA NO.

THE LAND TO BE SUBDIVIDED IS SHOWN ENCLOSED BY THICK LINES
TITLE REF: Vol. 9799 Fol. 748
LAST PLAN REF:

PLAN OF SUBDIVISION

COUNTY VILLIERS
PARISH WANGOOM
SECTION A
PARTS OF CROWN ALLOTMENTS 25 & 27

PARISH 2
CHART No. 26

NUMBER OF SHEETS IN PLAN 1
NUMBER OF THIS SHEET 1

SCALE 0 40 80 160 240
LENGTHS ARE IN METRES

ORIGINAL SCALE 1:4000
SHEET SIZE A3

OFFICE USE ONLY
LP213249N
VICTORIA

CERTIFICATION BY SURVEYOR

I PAUL D. CROWE OF 64 THOMPSON ST. HAMILTON CERTIFY THAT THIS PLAN CORRECTLY REPRESENTS THE INFORMATION OBTAINED BY ME FROM THE SOURCES INDICATED HEREON

Date: 20 - 6 - 1988

Licensed Surveyor, *Surveyors Act 1978*.

AMENDMENTS

PAUL D. CROWE
LICENSED SURVEYOR
64 THOMPSON ST.
HAMILTON PH. 055 724 795

SURVEYORS REF 87/317

CERTIFICATE OF MUNICIPAL CLERK

MUNICIPALITY COUNCIL REF.

CERTIFICATE A

THIS PLAN ACCORDS WITH A PLAN
- SEALED BY THE COUNCIL UNDER SECTION 569B OF THE LOCAL GOVERNMENT ACT 1958 ON
- CONFIRMED BY THE PLANNING APPEALS BOARD ON
- AND A REQUIREMENT/NO REQUIREMENT PURSUANT TO SECTION 569E OF THE LOCAL GOVERNMENT ACT 1958 HAS BEEN MADE

DATE MUNICIPAL CLERK

CERTIFICATE B

THIS PLAN ACCORDS WITH A PLAN EXEMPTED FROM SUBDIVISION (3) OF DIVISION (9) OF PART XIX OF THE LOCAL GOVERNMENT ACT 1958 BY
- THE COUNCIL ON
- THE PLANNING APPEALS BOARD ON

DATE MUNICIPAL CLERK

OFFICE USE ONLY

PLAN APPROVED
AT
ON 10.10.88

(ASSISTANT) REGISTRAR OF TITLES

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm

ONLY CERTIFICATE A OR CERTIFICATE B TO BE COMPLETED
- DELETE WORDS NOT APPLICABLE

VOLUME 10603 FOLIO 798

Security no : 124047557944L
Produced 30/09/2013 12:00 pm

LAND DESCRIPTION

Lot 1 on Title Plan 022718P.
Created by Application No. 087682D 31/08/2001

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
ROBERT GERARD LEAHY
GAIL PATRICIA LEAHY both of 48 EASTERN BEACH ROAD GEELONG VIC 3220
AJ153868Y 25/08/2011

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

Warning as to Dimensions
Any dimension and connecting distance shown is based on the description of the land as contained in the General Law Title and is not based on survey information which has been investigated by the Registrar of Titles.

DIAGRAM LOCATION

SEE TP022718P FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 104 WANGOOM ROAD WARRNAMBOOL VIC 3280

DOCUMENT END

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

Imaged Document Cover Sheet

The document following this cover sheet is an imaged document supplied by LANDATA®, Land Victoria.

Document Type	**plan**
Document Identification	**TP022718P**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**30/09/2013 11:59**

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
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WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

EDITION 1	TITLE PLAN	TP22718P

Location of Land
Parish: WANGOOM
Township:
Crown Allotment: 26 (PT)
Section: A
Crown Portion: -

LTO base record: SDMB-C (RURAL)
Last plan Reference:
Title Reference:
Depth Limitation: NIL

Notations

Warning as to dimensions :
Any dimension and connection distance shown is based on the description of the land as contained in the General Law Title and is not based on survey information which has been investigated by the Registrar of Titles.

Easement Information

E - Encumbering Easement R - Encumbering Easement (ROAD) A - Appurtenant Easement

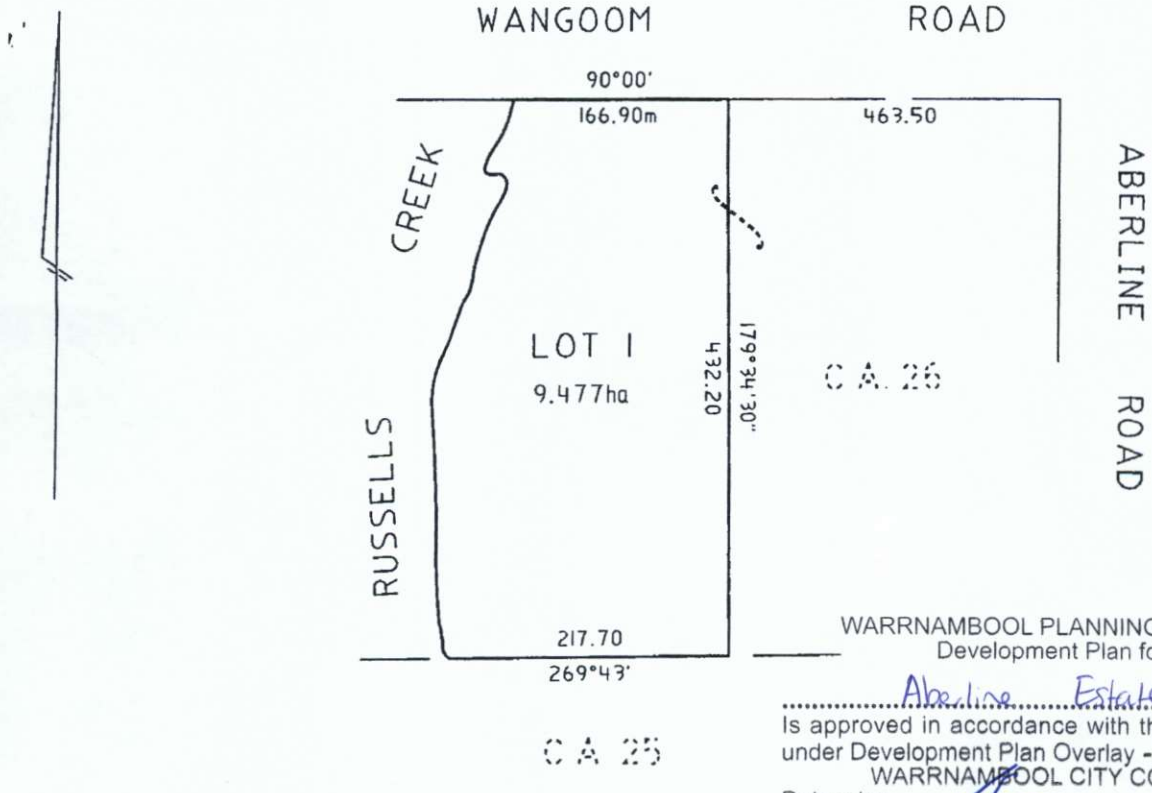
Easement Reference	Purpose/Authority	Width	Origin	Land benefitted/In favour of
NIL				

THIS PLAN HAS BEEN PREPARED BY LAND REGISTRY, LAND VICTORIA FOR TITLE DIAGRAM PURPOSES

Checked by .....

Date 12. 9. 2001

Assistant Registrar of Titles



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Delegate: .....
Date: 24 April 2014

LENGTHS ARE IN METRES	NOT TO SCALE	SHEET SIZE A3	DEALING CODE: 14

DEALING No: AP87682D

Sheet 1 of 1 Sheets

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11028 FOLIO 848 Security no : 124047558599Y
Produced 30/09/2013 12:16 pm

LAND DESCRIPTION

Lot 1 on Title Plan 914315Q.
Created by Application No. 116434S 17/09/2007

REGISTERED PROPRIETOR

Estate Fee Simple
Joint Proprietors
JOAN BARBARA PORTER of 89 RYOT STREET WARRNAMBOOL VIC 3280
DARRYL EDWARD RAYMOND PORTER of 140 WANGOOM ROAD WARRNAMBOOL VIC 3280
AJ088648A 25/07/2011

ENCUMBRANCES, CAVEATS AND NOTICES

CAVEAT AJ756492H 27/06/2012
Caveator
RODGER PROPERTIES PTY LTD
Capacity PURCHASER/FEE SIMPLE
Lodged by
MADDENS LAWYERS
Notices to
MADDENS LAWYERS of 1A LIEBIG STREET WARRNAMBOOL VIC 3280

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

Warning as to Dimensions
Any dimension and connecting distance shown is based on the description of the land as contained in the General Law Title and is not based on survey information which has been investigated by the Registrar of Titles.

DIAGRAM LOCATION

SEE TP914315Q FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 140 WANGOOM ROAD WARRNAMBOOL VIC 3280

DOCUMENT END

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Abeline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7

WARRNAMBOOL CITY COUNCIL

Delegate:

Date: 24 April 2014

TITLE PLAN

EDITION 1 | TP914315Q

LOCATION OF LAND

PARISH: WANGOOM
TOWNSHIP:
SECTION: A
CROWN ALLOTMENT: 26 (PT)
CROWN PORTION:
LAST PLAN REFERENCE:
DERIVED FROM:
DEPTH LIMITATION: NIL

NOTATIONS

WARNING AS TO DIMENSIONS:
ANY DIMENSION AND CONNECTING DISTANCE SHOWN IS BASED ON THE DESCRIPTION OF THE LAND CONTAINED IN THE GENERAL LAW TITLE AND IS NOT BASED ON SURVEY INFORMATION WHICH HAS BEEN INVESTIGATED BY THE REGISTRAR OF TITLES.

EASEMENT INFORMATION

E - ENCUMBERING EASEMENT. R - ENCUMBERING EASEMENT (ROAD). A - APPURTENANT EASEMENT.

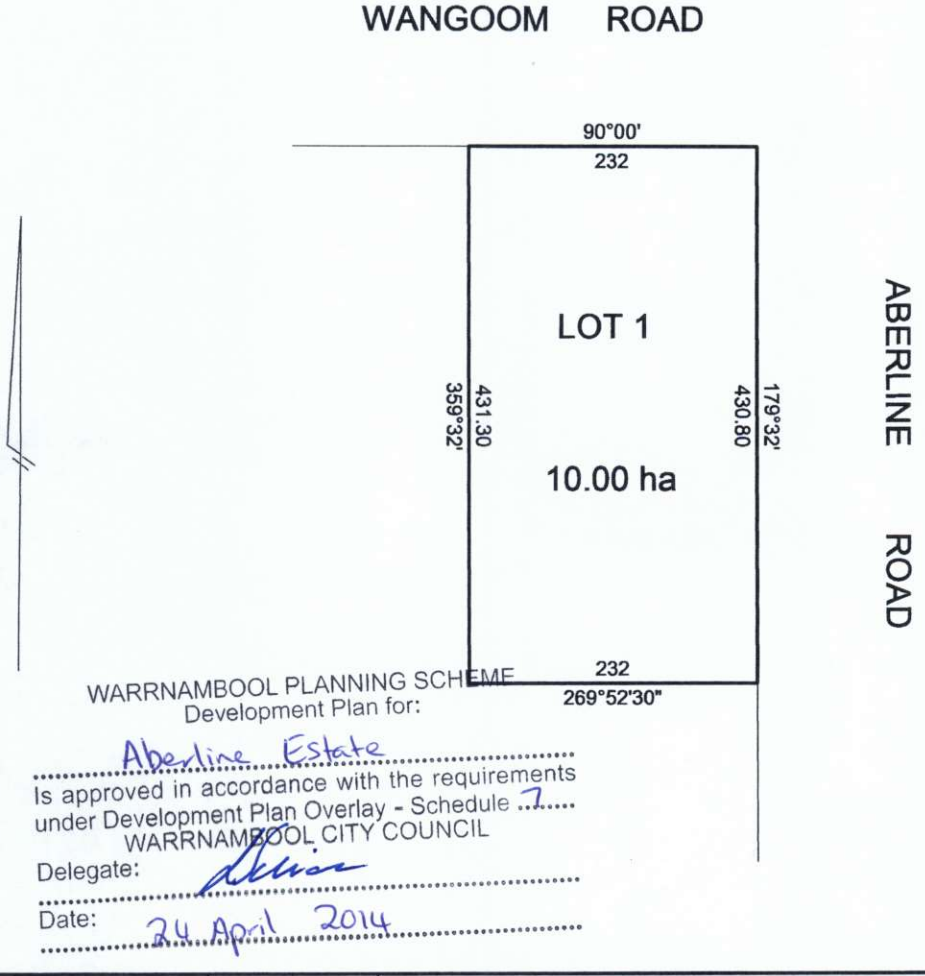
Easement Reference	Purpose / Authority	Width (Metres)	Origin	Land benefited / In favour of

THIS PLAN HAS BEEN PREPARED BY LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES

Checked by: PRT

Date: 17/9/2007

Assistant Registrar of Titles



WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

LENGTHS ARE IN METRES	SCALE	DEALING / FILE No: AP116434S	DEALING CODE: 14
	—	GOVERNMENT GAZETTE No:	SHEET 1 OF 1

Certificate type: titles Matter: 13004

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11076 FOLIO 767 Security no : 124047557653B
Produced 30/09/2013 11:53 am

LAND DESCRIPTION

Lot 1 on Plan of Subdivision 606802K.
PARENT TITLE Volume 10646 Folio 671
Created by instrument PS606802K 20/06/2008

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
HRCP PTY LTD of 790 HOPKINS HIGHWAY BUSHFIELD VIC 3281
AJ953614W 08/10/2012

ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AJ953615U 08/10/2012
BENDIGO AND ADELAIDE BANK LTD
TRANSFER OF MORTGAGE AK261015U 28/03/2013

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987
AF305052R 30/08/2007

DIAGRAM LOCATION

SEE PS606802K FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: WANGOOM ROAD WARRNAMBOOL VIC 3280

DOCUMENT END

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

Certificate type: titles Matter: 13004

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11076 FOLIO 768 Security no : 124047557851M
Produced 30/09/2013 11:58 am

LAND DESCRIPTION

Lot 2 on Plan of Subdivision 606802K.
PARENT TITLE Volume 10646 Folio 671
Created by instrument PS606802K 20/06/2008

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
HRCP PTY LTD of 790 HOPKINS HIGHWAY BUSHFIELD VIC 3281
AJ953614W 08/10/2012

ENCUMBRANCES, CAVEATS AND NOTICES

MORTGAGE AJ953615U 08/10/2012
BENDIGO AND ADELAIDE BANK LTD
TRANSFER OF MORTGAGE AK261015U 28/03/2013

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987
AF305052R 30/08/2007

DIAGRAM LOCATION

SEE PS606802K FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: WANGOOM ROAD WARRNAMBOOL VIC 3280

DOCUMENT END

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

PLAN OF SUBDIVISION

STAGE NO /

LR use only **EDITION 1**

Plan Number **PS606802K**

Location of Land

Parish: of Wangoom

Township: ———

Section: A

Crown Allotment: 26 (pt)

Crown Portion: ———

Title References: C/T Vol. 10646 Fol. 671

Last Plan Reference: Lot 1 on TP804145D

Postal Address: (at time of subdivision) Wangoom Road Warrnambool Vic. 3280

MGA94 Co-ordinates: (Of approx. centre of plan) E 632 300 N 5 753 100 Zone 54

Council Certification and Endorsement

Council Name: Warrnambool City Council Ref: 1/07

1. This plan is certified under section 6 of the Subdivision Act 1988.

~~2. This plan is certified under section 11(7) of the Subdivision Act 1988. Date of original certification under section 6 / /~~

~~3. This is a statement of compliance issued under section 21 of the Subdivision Act 1988.~~

Open Space

(i) A requirement for public open space under section 18 Subdivision Act 1988 ~~has~~ / has not been made

~~(ii) The requirement has been satisfied~~

~~(iii) The requirement is to be satisfied in stage~~

Council Delegate

~~Council seal~~

Date 24/4/2007

Re-certified under section 11(7) of the Subdivision Act 1988

Council Delegate

Council seal

Date / /

Vesting of Roads or Reserves

Identifier	Council/Body/Person
NIL	NIL

Notations

Staging: This ~~is~~ / is not a staged subdivision
Planning Permit No. P2006-158

Depth Limitation: Does not apply.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7.
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

Survey:- This plan is ~~/ is not~~ based on survey
This survey has been connected to permanent marks no(s). 189, 192, 194, 203, 373, 393, 597 & 599
In proclaimed Survey Area no. 23

Easement Information

Legend: E - Encumbering Easement or Condition in Crown Grant in the Nature of an Easement or other Encumbrance
A - Appurtenant Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of

LR use only
Statement of Compliance / Exemption Statement
Received ✓
Date 21/9/07

LR use only
PLAN REGISTERED
TIME 3:29 PM
DATE 26/6/2008
L.J White
Assistant Registrar of Titles

SHEET 1 OF 2 SHEETS

ROD BRIGHT & ASSOCIATES PTY LTD
LICENSED SURVEYORS
26 MURRAY STREET COLAC 3250
TEL 5231 4883 ACN 007 206 975

LICENSED SURVEYOR (PRINT) ANTHONY EDWARD BRIGHT
SIGNATURE ..... DATE 15/12/2006
REF 06-33 VERSION

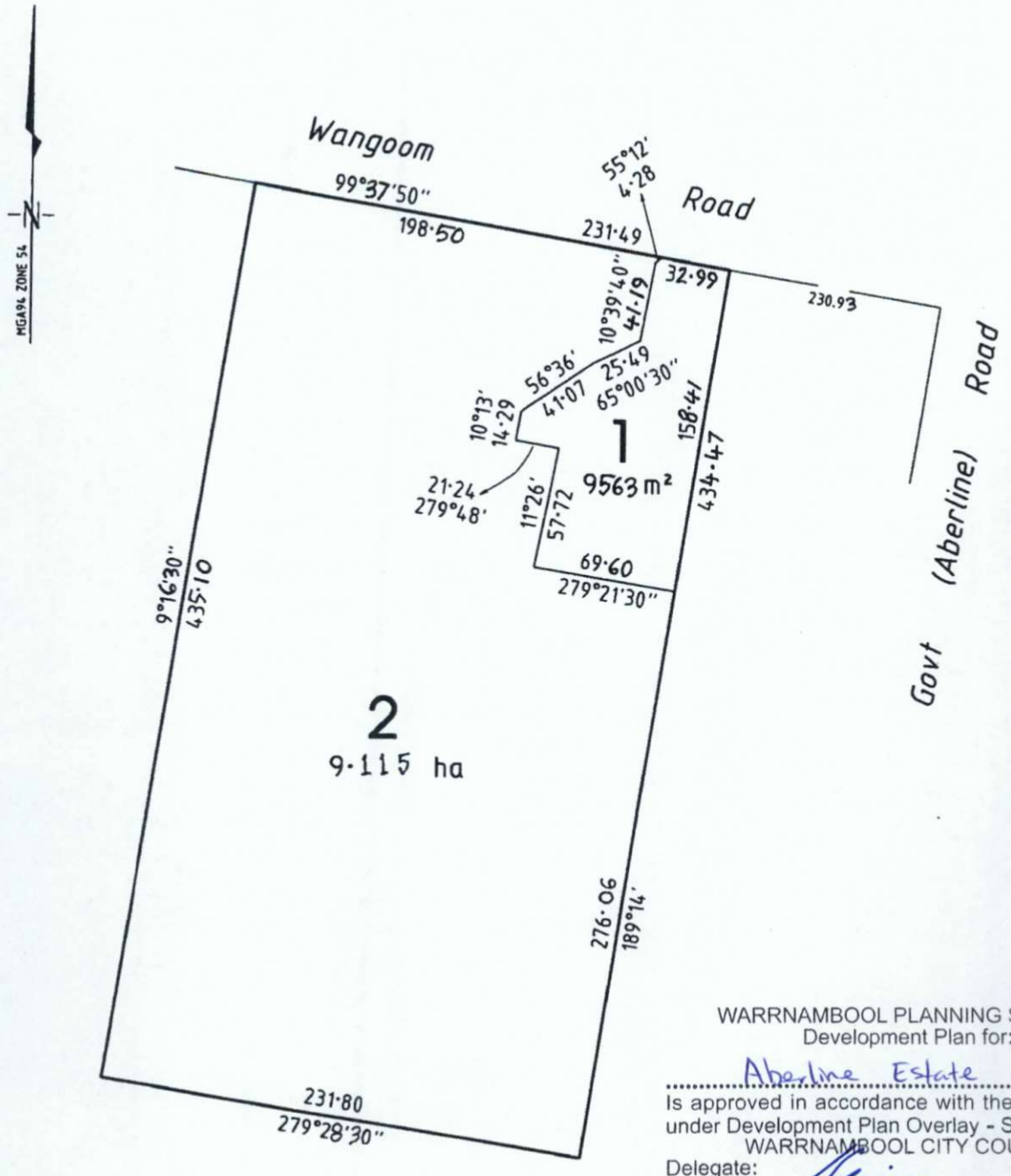
DATE 24/4/2007
COUNCIL DELEGATE SIGNATURE

Original sheet size A3

PLAN OF SUBDIVISION

Stage No.

Plan Number **PS606802K**



WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule ...7...

WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

ROD BRIGHT & ASSOCIATES PTY LTD
LICENSED SURVEYORS
26 MURRAY STREET COLAC 3250
TEL 5231 4883 ACN 007 206 975

ORIGINAL		SCALE	LICENSED SURVEYOR (PRINT) ANTHONY EDWARD BRIGHT	Sheet 2 of 2 sheets
SCALE 1.2000	SHEET SIZE A3	20 0 20 40 60 80 LENGTHS ARE IN METRES	SIGNATURE ..... DATE 15/12/2006	DATE / /
			REF 06-33 VERSION	COUNCIL DELEGATE SIGNATURE
				Original sheet size A3

OFFICE OF TITLES A.M.Bu. VICTORIA

AF305052R
30/08/2007 $97 173

Application by Responsible Authority, Relevant Authority, Referral Authority or Council for the making of a recording of an agreement

Section 181(1) Planning and Environment Act 1987

Lodged by:

Name: Tait Leishman Taylor
Phone: (03) 5560 2100
Address: 121 Kepler Street, Warrnambool 3280
Ref: Thomas Lindsey:71140
Customer Code: 1638Q

The authority or council having made an agreement requires a recording to be made in the Register for the land.

Land:
Certificate of Title Volume 10646 Folio 671

Authority or council
WARRNAMBOOL CITY COUNCIL

Section and Act under which agreement made:
Section 173 of the Planning and Environment Act 1987

A copy of the agreement is attached to this application

Dated:

Signed:

THE COMMON SEAL of WARRNAMBOOL CITY COUNCIL was hereunto affixed in the presence of:

.....
Chief Executive Officer
Its duly authorised delegate

LINDSAY A MERRITT
CHIEF EXECUTIVE
WARRNAMBOOL CITY COUNCIL

In the presence of:
Wendy Clark
.....
Witness

Q:\71140\008.DOC

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

AF305052R
30/08/2007 $97 173

TAIT LEISHMAN TAYLOR
LAWYERS

RESPONSIBLE AUTHORITY **WARRNAMBOOL CITY COUNCIL**

THE OWNER **DENISE PATRICIA COLLESS**

LAND AFFECTED **Wangoom Road, Warrnambool**

DATED 7th August **2007**

AGREEMENT PURSUANT TO SECTION 173 PLANNING & ENVIRONMENT ACT

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

REGISTRATION PARTICULARS

A Memorandum of this agreement was lodged in the Office of Titles pursuant to Section 181 of the Planning & Environment Act 1987 on ___/___/20___

DEALING NO. .....

WARRNAMBOOL
Incorporating
West Coast Conveyancing
121 Kepler Street,
(P.O. Box 311)
Warrnambool, 3280
Tel: (03) 5560 2100
Fax: (03) 5561 4567
E-Mail: taits@taits.com.au
Internet: www.taits.com.au

MORTLAKE
118 Dunlop Street,
(P.O. Box 1)
Mortlake, 3272
Tel: (03) 5599 2504
Fax: (03) 5599 2036

PORT FAIRY
38 Bank Street,
(P.O. Box 114)
Port Fairy, 3284
Tel: (03) 5568 1402
Fax: (03) 5568 2498

TERANG
99 High Street,
(P.O. Box 114)
Terang, 3264
Tel: (03) 5592 1666
Fax: (03) 5592 1811

WEST COAST CONVEYANCING
A DIVISION OF TAIT LEISHMAN TAYLOR

AF305052R

30/08/2007 $97 173

WARRNAMBOOL CITY COUNCIL

PLANNING & ENVIRONMENT ACT

- and -

AGREEMENT PURSUANT TO SECTION 173

DENISE PATRICIA COLLESS

AFFECTED LAND: Wangoom Road, Warrnambool

being the land described in Certificate of Title Volume 10646 Folio 671 ("the land")

THIS AGREEMENT is made on the 7th day of August 2007

BETWEEN:

The Responsible Authority: **WARRNAMBOOL CITY COUNCIL**

of 25 Liebig Street, Warrnambool ("the Council")

The Owner: **DENISE PATRICIA COLLESS**

of Wangoom Road, Warrnambool ("the Owner")

WHEREAS

1. The Owner owns the land ("the land").
2. The land is affected by the provisions of the Warrnambool Planning Scheme ("the Scheme").
3. The Council is the responsible authority under the Planning & Environment Act 1987 ("the Act") for the purposes of the Scheme.
4. The Council on October 20, 2006 issued planning permit No. P2006-158 ("the subdivision permit") allowing the Owner to subdivide the land into two lots in accordance with the plans prepared by Rod Bright and Associates and endorsed by the responsible authority ("the subdivision plan") and subject to the conditions stated in the permit.
5. The subdivision permit is subject to conditions including the following:

   "Prior to the issue of a statement of compliance, the landowner must enter into an agreement pursuant to Section 173 of the *Planning and Environment Act* 1987, and register the agreement on the title of the subject site pursuant to Section 181 of the *Planning and Environment Act* 1987. The agreement will include the following to the satisfaction of the responsible authority.

   (i) No further subdivision of lots 1 and 2 shown on the endorsed plan shall be approved, which creates a smaller lot for an existing dwelling. This provision shall cease if the subject site is rezoned and is no longer zoned farming (or its equivalent zone as determined by the responsible authority.)

   All costs associated with the preparation, lodgement and registration of the agreement must be met by the landowner"

6. The parties enter this agreement in satisfaction of this condition of the subdivision permit.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

BY THIS AGREEMENT IT IS AGREED AND COVENANTED:

1. OPERATION

1.1. This agreement is made pursuant to Section 173 of the Act.

1.2. This agreement shall come into force on execution by both parties.

1.3. The covenants of this agreement shall run with the land.

AF305052R
30/08/2007 $97 173

2. INTERPRETATION

2.1. LOT

In this agreement "lot" means any and each lot shown on the subdivision plan.

2.2. OWNER

In this agreement the word "Owner" unless the contrary intention appears shall be deemed to include DENISE PATRICIA COLLESS her successors assigns and transferees and the obligations imposed on and assumed by DENISE PATRICIA COLLESS shall be binding on the successors transferees purchasers mortgagees assigns of DENISE PATRICIA COLLESS and any person obtaining possession of the whole or part of the land as if each of those successors separately executed this agreement; and

If the Owner holds the land in a trust capacity, "Owner" shall include the beneficiaries of the trust in relation to which it holds such land. Where such trust relationship exists the Owner in executing this agreement does so intending to assume not only personal liability, but also to bind the trust for which it acts as trustee.

If the Owner is constituted by more than one person any obligation imposed by this agreement on the Owner shall be imposed on those persons jointly and severally.

2.3. COUNCIL

In this agreement the word "Council" shall include the Council's successors and its successors as responsible authority for Planning control in the area in which the land is situate.

2.4. In this agreement, unless the context otherwise requires:

2.4.1. Words denoting the singular number shall include the plural and vice versa.

2.4.2. Words denoting any gender shall include all genders.

2.4.3. Where a word or phrase is defined, other parts of speech and grammatical forms of that word or phrase shall have corresponding meanings.

2.4.4. Words denoting natural persons shall include corporations and vice versa.

2.4.5. References to clauses and schedules are to clauses of and schedules to this agreement.

2.4.6. Headings are for convenience only and do not affect interpretation.

2.4.7. References to any party to this agreement or any other agreement or instrument shall include the party's successors and permitted assigns.

2.4.8. Reference to any agreement or instrument shall be also to such agreement or instrument as amended, novated, supplemented, varied or replaced from time to time.

2.4.9. References to any legislation or to any provision of any legislation shall include any modification or re-enactment of that legislation and any legislative provision substituted for, and all regulations and statutory instruments issued under such legislation or provision.

2.4.10. References to dollars and "$" shall be taken as referring to amounts in Australian currency.

2.4.11. As the case may be, a reference to a right or obligation of any two or more persons confers that right, or imposes that obligation, jointly and severally.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

3. NO FURTHER SUBDIVISION

No further subdivision of lots 1 and 2 as shown on the endorsed plan shall be approved, which creates a smaller lot for an existing dwelling.

4. RE-ZONING OF THE LAND

The covenants of this agreement shall cease to apply to any part of the land which is re-zoned and is no longer zoned Farming Zone (or its equivalent zone as determined by Council).

5. REGISTRATION

The parties shall do all things necessary to enable the Council to register this agreement pursuant to Section 181 of the Act.

6. DISCLOSURE

The Owner shall not sell mortgage or part with possession of the land or any part of it without first disclosing to its successors the existence and the nature of this agreement.

7. COSTS OF AGREEMENT

The Owner forthwith on demand shall pay to the Council the Council's costs and expenses (as between the solicitor and own client) of and incidental to this agreement and of anything consequent on it or in furtherance of it.

8. NOTICES

Any notice required under this agreement may be served by delivering it to the Owner at its last known address within the rating records of the Council. Any notice posted shall be deemed to have been served at the expiration of twenty-four hours from the time of posting.

9. SUCCESSORS BOUND

Without limiting the operation or effect which this agreement has apart from this sub-clause, the Owner shall ensure that its successors:-

9.1. Give effect to and do all acts and sign all documents which are required of them to give effect to this agreement; and

9.2. Execute under seal a deed agreeing to be bound by the terms of this agreement.

The obligation imposed on the Owner by sub-clause 1 of this clause shall cease for such time as there appears in the register book at the office of the Registrar of Titles a memorandum of this agreement.

10. DEFAULT

If the Owner fails to comply with this agreement the Council may serve on the Owner or on the owner of a lot in respect of which there has been failure of compliance a notice in writing specifying the works, matters and things ("the Remedial Works") in respect of which the relevant owner is in default. If such default continues for thirty days after the service of such notice the Council by its employees or contractors may enter upon the land and cause the Remedial Works to be done.

A notice served on the Owner pursuant to this clause may set out the costs (as estimated by the Council) of carrying out the Remedial Works. If the Owner does not comply with the notice within thirty days the Council may serve on the Owner a demand in writing for the amount of the estimated costs. The amount then shall become a debt due and payable by the relevant owner to the Council.

As soon as practicable after the completion of the Remedial Works the Council shall certify the actual costs of the Remedial Works. The difference between a sum paid to the Council as the estimated costs, and the actual costs, shall be paid by the relevant owner to the Council or if there is excess, repaid by the Council to the relevant owner.

11. ENFORCEMENT

11.1. The operation of this clause is suspended until and unless the Council has served a notice under the "Default" clause.

11.2. The Owner forthwith on demand shall pay to the Council the cost and expenses, including building costs, of and incidental to the Council exercising its powers under this agreement.

11.3. The Owner licenses the Council through its employees and contractors at any reasonable time by appointment to enter upon any part of the land for the purposes of giving effect to this agreement.

12. RELEASE

On a person ceasing to own any part of the land that person shall be released from the obligations of that person as an owner under this agreement, save to the extent that any right has arisen against such owner prior to such cessation.

13. FURTHER DOCUMENTATION AND ACTION

Each of the parties shall sign and execute all such further documents and deeds and do all acts and things as the other party reasonably shall require for giving effect to this agreement.

14. DISPUTE

If any dispute or difference arises between the parties with respect to the interpretation of this agreement, or its application, such dispute or difference shall be determined by a person appointed by the parties by agreement, or failing agreement, by a person qualified in the area of the dispute or difference and appointed by the Secretary as defined in the Act.

EXECUTED AS A DEED.

THE COMMON SEAL of **WARRNAMBOOL CITY COUNCIL** was hereunto affixed in the presence of:)

.....

Chief Executive Officer
Its duly authorised delegate

LINDSAY A MERRITT
CHIEF EXECUTIVE
WARRNAMBOOL CITY COUNCIL

In the presence of:

Wendy Clark
.....
Witness

SIGNED by **DENISE PATRICIA COLLESS**)

in the presence of:)

Witness: .....

.....

AF305052R
30/08/2007 $97 173

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate
.....
Is approved in accordance with the requirements under Development Plan Overlay - Schedule ...7...
WARRNAMBOOL CITY COUNCIL
Delegate: .....
Date: 24 April 2014

Attachment B

Site Analysis Plan

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 17
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

No.	REVISION	DATE	DRAFTED	DESIGNED	APPROVED

Principal:
Aberline Pty Ltd

Urban Design and management
Urban Design and Management Pty Ltd
PO Box 351 Sunbury 3429
Phone: +61 3 9971 6300| Fax: +61 3 9971 6399
Office 1, Level 1, 114 Evans Street, Sunbury, VIC, 3249
Project Management | Land Development | Civil Engineering | Planning | Urban Design

Drawn: S Hill
Designed: S Hill
Checked:
Approved:
Date: 12 September 2013

Site Analysis Plan
Development Plan - Aberline Estate

Drawing No: SCP
Revision: A
Sheet No: 01 of 01
0 15 30m

Attachment C

Cultural Heritage Management Plan

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

104–140 Wangoom Road and 185 Aberline Road Warrnambool

Cultural Heritage Management Plan Number: 11591

SPONSOR: Graeme Rodger

CULTURAL HERITAGE ADVISOR: Annette Xiberras

AUTHORS: Steven O'Reilly and Renee McAlister

DATE: 22 June 2011

URBAN COLOURS ARTS PTY LTD, CULTURAL HERITAGE CONSULTANTS
10 McNeill Court, Lara, VIC 3212
bunjilin@bigpond.com | (03) 5282 3991 | 0410 440 464

Title page

104–140 Wangoom Road and 185 Aberline Road, Warrnambool

Cultural Heritage Management Plan Number: 11591

Activity size:	Medium
Assessment:	Desktop, Standard and Complex
Sponsor:	Graeme Rodger
Cultural Heritage Advisor:	Annette Xiberras
Authors:	Steven O'Reilly and Renee McAlister
Date:	22 June 2011

Front page photo shows activity area east from SP 57

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate: .....
Date: 24 April 2014

Aboriginal Heritage Act 2006
Section 65

Cultural Heritage Management Plan - Notice of Approval

I, Monique Dawson, Deputy Director, Aboriginal Affairs Victoria, acting under authority delegated to me by the Secretary, Department of Planning and Community Development, hereby approve the cultural heritage management plan referred to below.

104-140 WANGOOM ROAD AND 185 ABERLINE ROAD WARRNAMBOOL

Cultural Heritage Management Plan number: 11591

Sponsor: Rodger Construction Pty Ltd (ABN 94 638 505 087)

Cultural Heritage Advisors: Ms Annette Xiberras
[Urban Colours Arts Pty Ltd, Cultural Heritage Consultants]

Authors: Mr Steven O'Reilly and Ms Renee McAlister
[Urban Colours Arts Pty Ltd, Cultural Heritage Consultants]

Cover Date: 22 June 2011

Pages: 110 numbered pages

Received for Approval: 22 June 2011

Pursuant to s.65(6) of the Act this cultural heritage management plan takes effect upon the granting of this approval.*

Signed: .....
MONIQUE DAWSON

Dated: 7/7/11

* This notice of approval should be inserted after the title page and bound with the body of the management plan.

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule ....7...
WARRNAMBOOL CITY COUNCIL
Delegate: .....
Date: 24 April 2014

© Urban Colours Arts Pty Ltd, Cultural Heritage Consultants, 2011

Executive Summary

This mandatory Cultural Heritage Management Plan (CHMP) has been sponsored by Mr Graeme Rodger of Rodger Construction and prepared by Urban Colours Arts Pty Ltd, Cultural Heritage Consultants (UCACHC). The authors of this plan are Steven O'Reilly (B.Sc.) and Renee McAlister (B.A. Hons). Neil Dudley (B.A. Hons) supervised all field surveys and sub-surface testing (see Appendix 4 for details of qualifications of all personnel who worked on this CHMP).

The Activity

It is proposed to develop the activity area as a residential housing estate. Proposed plans consist of 353 residential lots and associated roads, parks, reserves and miscellaneous infrastructure, services and landscaping

It is anticipated that the following activities will be undertaken during the construction process.

- Topsoil stripping to subsoil where necessary, predominantly in areas of road construction;
- Deep trenching into subsoils (up to approximately 1 m) to install utilities and services to each lot – including sewers, water and storm water;
- Landscaping works impacting on topsoil deposits outside defined road corridors;
- Residential construction works;
- Concreting works, including driveways, paths and patios;
- Other works as may be required for residential subdivision and building construction.

The Location

The activity area is located at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool on Lot 1 TP 22718, Lot 2 PS 606802, Lot 1 PS 606802, Lot 1 TP 914315 and Lot 1 LP 213249.

The subject land is bound by Wangoom Road to the north, Aberline Road to the east, a drainage easement to the west and farm land to the south (Figure 3). The city of Warrnambool is located approximately 263 km south-west of Melbourne. The activity area is located within the local government area of the City of Warrnambool and the Parish of Wangoom (Figure 1; Table 1). The land is owned by Rodger Constructions. The subject land is 41.5 hectares in area and is currently unoccupied (Figure 2).

The RAP

At the beginning of the preparation of this CHMP, no Registered Aboriginal Party (RAP) group existed for the activity area. The following Indigenous stakeholder groups had applied for RAP status:

- Framlingham Aboriginal Trust
- Kuuyang Maar Aboriginal Corporation
- Ella Maar Aboriginal Corporation

On 11 June 2010 the Aboriginal Heritage Council declined the Framlingham Aboriginal Trust's application for the area including the activity area at Warrnambool. Consultation with Kuuyang Maar and Ella Maar was undertaken for this CHMP.

As there is no appointed RAP group for the land within which the activity area is located the Notification of Intent (NoI) was sent to Aboriginal Affairs Victoria (AAV) on 31 January 2011 (Appendix 1). AAV notified the Sponsor of receipt of the NoI on 1 February 2011 and allocated the CHMP number 11591.

The Assessment Undertaken

The Aboriginal Heritage Regulations 2007 indicate there is a section of the activity area that is located within a specified area of cultural heritage sensitivity. Part of the activity area is located within 200 m of Russell Creek. Areas within 200 m of a waterway are identified as areas of cultural heritage sensitivity under the Act (r.23(1)). Subject to Regulation 23(2), if any part of the land within 200 m of a waterway has been subject to significant ground disturbance, that part is not an area of cultural heritage sensitivity (AHR 2007:13). The land within the activity area has been subject to disturbance in the form of clearing and grazing; however the extent of disturbance across the entire activity area is unknown.

Poor ground surface visibility at the time of the field survey prevented a full assessment of the nature of disturbance within the activity area.

A high impact activity is defined as an activity that would result in significant ground surface disturbance and involves a use of land specified in the Regulations. The subdivision of land into three or more lots is considered a high impact activity under Regulation 46(1) (AHR 2007:25).

The proposed works will involve various levels of surface and sub-surface disturbance across the activity area and therefore have the potential to impact any surface or sub-surface Aboriginal archaeological sites within the activity area.

The methodology was developed to meet the requirements for a complex cultural heritage assessment and comprised the following process:

A desktop assessment: analysis of the results of background research comprising a search of the Victorian Aboriginal Heritage Registry (VAHR), a review of the ethno-history applicable to the activity area and a review of the environment, geology and geomorphology of the activity area and its surrounding landscape.

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A standard ground surface assessment: analysis of the results of a ground surface survey of the activity area.

- A complex assessment, comprising sub-surface excavation of 1 x 1m test pits and 40 x 40cm shovel pits within the activity area.
- Report: analysis of the results of the fieldwork and the desktop assessment, including recommendations and contingency plans.

Results of the Assessment

Desktop Assessment Summary

The desktop review has provided salient information from which areas of Aboriginal archaeological potential may be predicted and further tested through standard and complex assessment.

The absence of a permanent waterway within the activity area decreases the potential sensitivity of the activity area; research on neighbouring land in the same landform has indicated that the area has been disturbed through agricultural and pastoral activities and the archaeological potential of the area is low. The Aboriginal Heritage Regulations (2007) defines land within 200 m of a waterway as culturally heritage sensitive and the south eastern corner of the activity area falls under this classification.

A review of previously registered sites in the geographic region indicates a strong concentration of sites on the banks of the Merri River and along the coastline. The landscape away from the coastline has been less intensively surveyed or subject to sub-surface archaeological testing and therefore site prediction models are more limited; however on current information it appears that Aboriginal archaeological sites are most likely to occur on the margins of large swamps and on or close to the banks of major streams such as the Merri River. The most commonly occurring site types in these areas are stone artefact scatters, often containing shell remains as well. Low density stone artefact scatters are identified on the Basalt Plains away from permanent water sources perhaps indicating more transient use of this landform.

The review of ethnographic evidence highlights the economic and cultural importance of both coastal and freshwater resources. In addition, the importance of the coastline and coastal hinterland further to the south is also emphasised.

The prior land use within the activity area has been limited to initial clearing, ploughing and grazing and while surface and upper deposits to approximately 30 cm can be expected to have been subject to disturbance, there is no evidence to suggest significant sub-surface disturbance has occurred within the activity area.

Based on the desktop review it is considered that the activity area retains low to moderate potential for the location of Aboriginal cultural heritage in the form of surface and sub-surface stone artefact scatters.

Due to the history of tree clearance there is low potential for the location of scarred trees within the activity area. The absence of soft sandy deposits suggests little

potential for the presence of Aboriginal human burial places. Zones of sensitivity are detailed in Figure 6.

The geomorphological review and review of previously registered Aboriginal places indicates that any sites identified are likely to date to the mid to late Holocene.

Standard Assessment Summary

The lack of cultural material identified during the Standard Assessment is considered to reflect the lack of ground surface visibility rather than being an accurate reflection of past Aboriginal use or occupation.

The observations made during the ground surface survey, combined with the information gathered during the Desktop Assessment, indicate that the activity area contains Aboriginal cultural sensitivity. The Standard Assessment confirmed the presence of landforms of low to moderate Aboriginal cultural heritage potential, being the land within 200m of Russell Creek in the south-eastern section of the activity area. The entire activity area is considered to have low to moderate potential for the location of Aboriginal cultural heritage places in areas that have not been subject to prior disturbance due to its location adjacent to a minor drainage line immediately west of the activity area. On this basis, a Complex Assessment was deemed necessary.

Complex Assessment Summary

Sub-surface testing was conducted in the activity area in areas of potential sensitivity that are to be impacted by the proposed activity and where poor ground surface visibility inhibited a comprehensive assessment of the Aboriginal cultural heritage sensitivity during the standard assessment. The results of the sub-surface testing indicate that the activity area has not been subject to major sub-surface disturbance. No Aboriginal cultural heritage materials, features or potentially sensitive deposits were identified in any of the excavations within the activity area (Appendix 2 Table 5 and Appendix 3 Photographs).

The results are considered to reflect the very low impact of prior Aboriginal occupation of the activity area. The activity area is located within an unnamed alluvium landform that lies on sheetflow basalt. The proximity of the activity area to Russell Creek would suggest that Aboriginal cultural material may be present. However, the density of previously registered Aboriginal places closer to the Merri River to the north-west and the coastline to the south indicate more intensive utilisation of these parts of the region. It is likely that the activity area was used in a transitory and less intensive fashion, leaving fewer material cultural remains.

The results of the complex assessment lead to an assessment that the activity area has very low potential for containing Aboriginal cultural material.

Recommendations

No Aboriginal cultural heritage or areas identified as likely to contain Aboriginal cultural heritage were identified during the complex assessment of the activity area at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool. No specific cultural

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heritage management activities are required, however a series of contingencies are provided for the possible discovery of Aboriginal cultural heritage during works (Section 10).

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1. Introduction

This mandatory Cultural Heritage Management Plan (CHMP) has been sponsored by Mr Graeme Rodger of Rodger Construction and prepared by Urban Colours Arts and Cultural Heritage Consultants Pty Ltd (UCACHC). The authors of this plan are Steven O'Reilly (B.Sc.) and Renee McAlister (B.A. Hons). Neil Dudley (B.A. Hons) supervised all field surveys and sub-surface testing (see Appendix 4 for details of qualifications of all personnel who worked on this CHMP).

1.1 *Location of the Activity Area*

The activity area is located at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool on Lot 1 TP 22718, Lot 2 PS 606802, Lot 1 PS 606802, Lot 1 TP 914315 and Lot 1 LP 213249.

The subject land is bound by Wangoom Road to the north, Aberline Road to the east, a drainage easement to the west and farm land to the south (Figure 3). Warrnambool is located approximately 263 km south-west of Melbourne. The activity area is located within the local government area of the City of Warrnambool and the Parish of Wangoom (Figure 1; Table 1). The land is owned by Rodger Construction. The subject land is 41.5 hectares in area and is currently unoccupied (Figure 2).

1.2 *Reason for Preparing a Cultural Heritage Management Plan*

The Aboriginal Heritage Regulations 2007 indicate there is a section of the activity area that is located within a specified area of cultural heritage sensitivity. Part of the activity area is located within 200 m of Russell Creek. Areas within 200 m of a waterway are identified as areas of cultural heritage sensitivity under the Act (r.23(1)). Subject to Regulation 23(2), if any part of the land within 200 m of a waterway has been subject to significant ground disturbance, that part is not an area of cultural heritage sensitivity (AHR 2007:13). The land within the activity area has been subject to disturbance in the form of clearing and grazing; however the extent of disturbance across the entire activity area is unknown.

Poor ground surface visibility at the time of the field survey prevented a full assessment of the nature of disturbance within the activity area.

A high impact activity is defined as an activity that would result in significant ground surface disturbance and involves a use of land specified in the Regulations. The subdivision of land into three or more lots is considered a high impact activity under Regulation 46(1) (AHR 2007:25).

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The proposed works will involve various levels of surface and sub-surface disturbance across the activity area and therefore have the potential to impact any surface or sub-surface Aboriginal archaeological sites within the activity area.

This CHMP presents the results of a desktop assessment, a standard assessment and a complex assessment of the activity area. The content and structure of this report follow the format recommended in the Guide to Preparing a Management Plan (Victorian Government 2006).

1.3 *RAP Responsible for the activity area*

At the beginning of the preparation of this CHMP, no Registered Aboriginal Party (RAP) group existed for the activity area. The following Indigenous stakeholder groups had applied for RAP status:

- Framlingham Aboriginal Trust
- Kuuyang Maar Aboriginal Corporation
- Ella Maar Aboriginal Corporation

On 11 June 2010 the Aboriginal Heritage Council declined the Framlingham Aboriginal Trust's application for the area including the activity area at Warrnambool. Consultation with Kuuyang Maar and Ella Maar was undertaken for this CHMP.

As there is no appointed RAP group for the land within which the activity area is located the Notification of Intent (NoI) was sent to Aboriginal Affairs Victoria (AAV) on 31 January 2011 (Appendix 1). AAV notified the Sponsor of receipt of the NoI on 1 February 2011 and allocated the CHMP number 11591.

1.4 *Aims of the Assessment*

The aims of the assessment are:

- To determine the location, nature and distribution of Aboriginal Places within the activity area based on collated existing data, a ground surface survey and sub-surface testing
- An objective assessment of the cultural and scientific significance of any Aboriginal Places within the activity area, and on local or regional Aboriginal archaeological values
- To determine whether Aboriginal Places can be avoided by the proposed activity through design or management
- To develop a framework for managing Aboriginal Places prior to, during and subsequent to the proposed activity at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool.

The CHMP has been undertaken according to the 'Guide to Preparing Cultural Heritage Management Plans' (AAV 2007).

1.5 *Personnel Involved*

The Cultural Heritage Advisor for this CHMP is Annette Xiberras. Annette has a vast knowledge and understanding of the Aboriginal cultural heritage of Victoria. Annette is a Wurundjeri Elder who has worked in Aboriginal archaeology and cultural heritage for more than twenty years. She has qualifications in Aboriginal archaeology and in natural resources and environment management (see Appendix 4).

Neil Dudley supervised the standard and complex field Assessments. Neil acquired a Bachelor of Archaeology (Honours) degree from La Trobe University, Victoria in 2008 and has been participating in the cultural heritage profession since 2002. He has wide-ranging fieldwork experience in Aboriginal and historical archaeology (see Appendix 3).The Indigenous field assistant for this project was Adrian Dow. Ella Maar was represented in the field by Steve Clarke and John Clarke and Kuuyang Maar was represented in the field by Tom Clarke.

Details of the qualifications of the main personnel involved in preparing this CHMP are listed in Appendix 4.

1.6 *Report Submission*

As there is no RAP for the area within which the activity area is located the CHMP was submitted to the Secretary Department of Planning and Community Development on 7 June 2011 (Section 65 *Aboriginal Heritage Act 2006*).

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2. Activity Description

It is proposed to develop the activity area as a residential housing estate. Proposed plans consist of 353 residential lots and associated roads, parks, reserves and miscellaneous infrastructure, services and landscaping.

It is anticipated that the following activities will be undertaken during the construction process.

- Topsoil stripping to subsoil where necessary, predominantly in areas of road construction;
- Deep trenching into subsoils (up to approximately 1 m) to install utilities and services to each lot – including sewers, water and storm water;
- Landscaping works impacting on topsoil deposits outside defined road corridors;
- Residential construction works;
- Concreting works, including driveways, paths and patios;
- Other works as may be required for residential subdivision and building construction.

The proposed works will involve various levels of surface and subsurface disturbance across the entire activity area and there is a high possibility that any archaeological sites present within the topsoil will be harmed during the construction process. Areas where surface soils are subject to earthmoving will directly impact any surface Aboriginal sites, such as scatters of stone tools, and any mature gums that are removed may impact a scarred tree site. Overall, the construction of a residential subdivision has a very high adverse impact on intact archaeological sites unless mitigation measures are adopted. Adverse impact can generally be minimised through design and site/area management.

3. Extent of Activity Area

The activity area comprises a total of 41.5 hectares located immediately southwest of the intersection of Wangoom and Aberline Roads, Warrnambool. The subject land is bound by Wangoom Road to the north, Aberline Road to the east, a drainage easement to the west and farm land to the south (Figure 3). The land is undulating, with a rise to the north east and a moderate slope down to the south west (Plates 1 to 5).

There are several existing structures within the activity area, consisting of three locations with houses, sheds and associated driveways and gardens in the northeast of the area. The activity area is divided into several paddocks marked by fence lines. The entire activity area has been extensively cleared and there are no mature indigenous trees or shrubs. Pastoral grasses extend across the activity area(Plates 1 to 6).

The highest elevation within the activity area is 38.8m asl on the north-eastern boundary of the activity area and the lowest elevation is 20.5m asl in the south-western section of the activity area, close to the drainage reserve (Table 4).

This CHMP is applicable for the entire activity area at the corner of Aberline Road and Wangoom Road, Warrnambool as detailed in Figures 1 and 2.

Table 1: Cadastral information

Cadastral Information	Description
Address	104–140 Wangoom Road and 185 Aberline Road
Location	Warrnambool
Local Government Authority	City of Warrnambool
Parish	Wangoom
Zone	54
Plan number	1 TP22718 2 PS 606802 1 PS606802 1TP914315 1 LP213249

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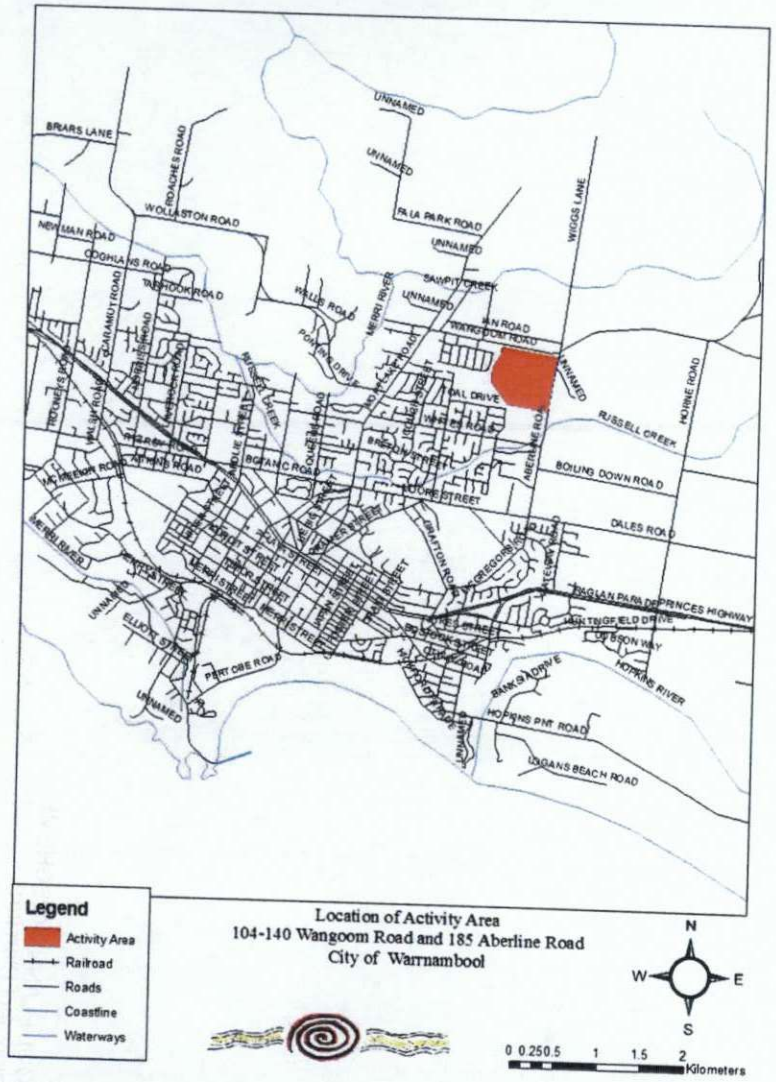

Figure1: Location of activity area

Figure 2: Activity area, showing existing conditions

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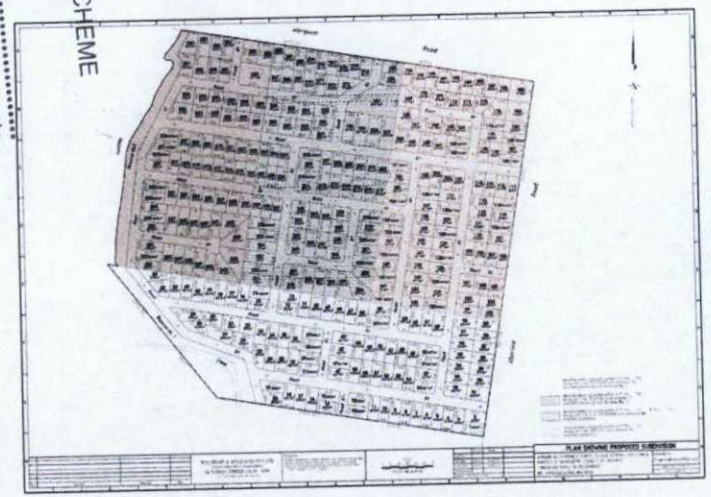

Figure 3: Proposed activity area – areas of impact (supplied by the Sponsor)

4. Documentation of Consultation

4.1 *Consultation in relation to the assessment*

As there is no appointed RAP group for the land within which the activity area is located the Notification of Intent (NoI) was sent to Aboriginal Affairs Victoria (AAV) on 31 January 2011 (Appendix 1). AAV notified the Sponsor of receipt of the NoI 1 February 2011 and allocated the CHMP number 11591.

The Kuuyang Maar Aboriginal Corporation and Ella Maar Aboriginal Corporation are RAP applicant groups for the land including the activity area and were consulted with throughout the course of the CHMP. The Gunditj Mirring Traditional Owners Aboriginal Corporation were not include in the initial consultation, due to an administrative error, but were consulted subsequent to the field assessments.

Initial notification of the project and request for representatives to participate in fieldwork was sent to each group on 8 February 2011.

5. Participation in the conduct of the assessment

The Kuuyang Maar and Ella Maar have been consulted throughout the process of this CHMP including consultation and participation in all facets of the Standard and Complex Assessment. Steve Clarke and John Clarke represented Ella Maar and Tom Clarke represented Kuuyang Marr during the Standard and Complex components of the plan (Table 2).

Table 2: RAP applicant participation in Field Assessment

Dates	RAP Applicant Group	Person	Activity
21 February 2011	Ella Maar Aboriginal Corporation	Steve Clarke	Ground surface survey (Standard Assessment) Sub-surface testing (Complex Assessment)
22 – 23 February 2011	Ella Maar Aboriginal Corporation	John Clarke	Sub-surface testing (Complex Assessment)
28 February 2011	Ella Maar Aboriginal Corporation	Steve Clarke	Sub-surface testing (Complex Assessment)
1 March – 4 March 2011	Kuuyung Maar Aboriginal Corporation	Tom Clarke	Sub-surface testing (Complex Assessment)

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5.1 *Consultation in relation to the recommendations*

The results of the Standard and Complex Assessment were discussed in the field with the RAP Applicant representatives. The RAP Applicant representatives indicated they were satisfied with the level of investigation, which thoroughly examined the activity area for the presence of Aboriginal cultural heritage, and that no further recommendations regarding Aboriginal cultural heritage were required for the activity area providing the standard set of contingencies were provided for in the management plan. In addition, following the standard and complex assessments, Gunditj Mirring provided the following statement of significance:

> *Gunditjmara people recognize and respect our ancestor's spiritual and physical association with the land. Many thousands of years have seen many thousands of Gunditjmara people walk, live and work the land.*
>
> *"The Creation Ancestors gave us a kinship system linking people to all things and the cultural responsibility to look after them. We have always understood the natural diversity of our Country and our traditional ancestral knowledge is a vital part of us and the management of our rich environment', as quoted by Gunditjmara Elders.*
>
> *This association has left the Gunditjmara people with a legacy, connection, obligation and responsibility for country that is an ongoing cultural inheritance.*
>
> *By walking together, learning together, growing together and working together we, as will our descendants, protect and care for Gunditjmara Country.*

5.2 *Summary of outcomes of consultation*

Consultation with the Ella Maar Aboriginal Corporation and the Kuuyang Maar Aboriginal Corporation was conducted throughout the course of the preparation of this CHMP. A summary of the outcomes of the consultation is provided below.

- An on-site meeting at the conclusion of the Standard Assessment determined that due to poor ground surface visibility, the potential sensitivity of the landscape and the nature of the proposed works, a complex assessment must take place within the activity area.
- An on-site meeting at the conclusion of the Complex Assessment was held to discuss the results of the Complex Assessment. It was determined that the area had been extensively tested, that there were no areas of Aboriginal cultural heritage potential and there were no further requirements with regard to Aboriginal cultural heritage within the activity area at Wangoom and Aberline Roads, Warrnambool.

6. Desktop Assessment

In accordance with s.53 (2) of the Act, a desktop assessment was conducted on the activity area. This included a search and analysis of the Aboriginal Affairs Victoria Heritage Registry, an ethno-history of the activity area and surrounds (where available) and a review of the geology and landforms of the activity area.

6.1 *Search of the Victorian Aboriginal Heritage Register*

Steven O'Reilly accessed the VAHR on 1 February 2011. A search was conducted for previously registered Aboriginal places and prior Aboriginal cultural heritage assessments within a 5 km radius of the activity area.

6.2 *The Geographic Region*

In accordance with Regulation 57 (1) (b), research into the Aboriginal cultural heritage of the geographic region of which the activity area forms a part has been assessed (AHR 2007: 31).

An understanding of the geology and environment is fundamental to understanding the pre-Contact context of Indigenous land use and settlement. It is also important to understand the changes that have occurred to the environment since Contact, as these have direct implications for site preservation and location.

The activity area is located on the corner of Wangoom Road and Aberline Road, Warrnambool. Warrnambool is a coastal city in south-western Victoria located approximately 225 km south-west of Melbourne.

The activity area falls within the Western Volcanic Plains Geomorphic unit, which stretches from Melbourne to the South Australian border. The volcanic plain is characterised by flat to undulating ground intercepted by volcanoes. The activity area is characterised by flood basalt, bordered on the south by Russell Creek and to the north-west by Merri River; waterways that have incised a path through the basalt.

According to the Department of Primary Industry website (Figure 4), the activity area is located in unnamed sheetflow basalt that is overlain by the Holocene and late Pleistocene dune sequences. This sedimentary unit is identified as unnamed alluvium that contains buckshot gravel, red clay and volcanic rocks that originate from weathered volcanic materials (Luebbers 2010: 13). This material is mostly derived from eruptions that occurred 2 to 4.5 million years ago, however sporadic volcanic activity has occurred through the Pleistocene, possibly as recently as about 7240 years ago (Cochrane et. al. 1995:81). The age of the sheetflow basalt within the activity area is unknown, although the youngest potential date is during the period when Aboriginal people were present.

To the south of the activity area the main regional landform for the Warrnambool area is a complex of large-scale calcarenite and calcareous aeolianite beach and dune ridges

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that were formed by a succession of high sea stands in the mid-to-late Pleistocene (Cook et al, 1977, Brown and Stephenson 1999).

The dune system comprises parallel WNW–NW-trending ridges that are separated by inter-dune alluvial flats that extend across the coastal plain of south-western Victoria and well into South Australia (Kenley 1971). Boutakoff(1963) originally proposed the term Bridgewater Formation for South Australia to describe these Pleistocene deposits, but recognition of distinct formations within aeolianites in the Warrnambool area by Gill (1988) gave rise to the use of the term Bridgewater Group for the region.

Warrnambool is the sea-exit point for Hopkins River and Merri River. Warrnambool is a mix of coastal area, swampy area and the larger Volcanic plain that makes up large portions of the Western District.

6.2.1 Climate

The Land Conservation Council of Victoria defines the activity area as being situated within the Corangamite region. Being situated between 37.4° and 38.9° south latitude, the region experiences a temperate climate with dominant westerly winds, variable cloud, moderate precipitation and cool temperatures (Website 1). The annual average rainfall is c. 726 mm at Warrnambool and the average annual temperatures range between 5.1 °C and 23.5 °C (Website 2). Proximity to the coastline affects variation in climate throughout the region and this is demonstrated with higher rainfall near coastal areas, decreasing as one moves inland.

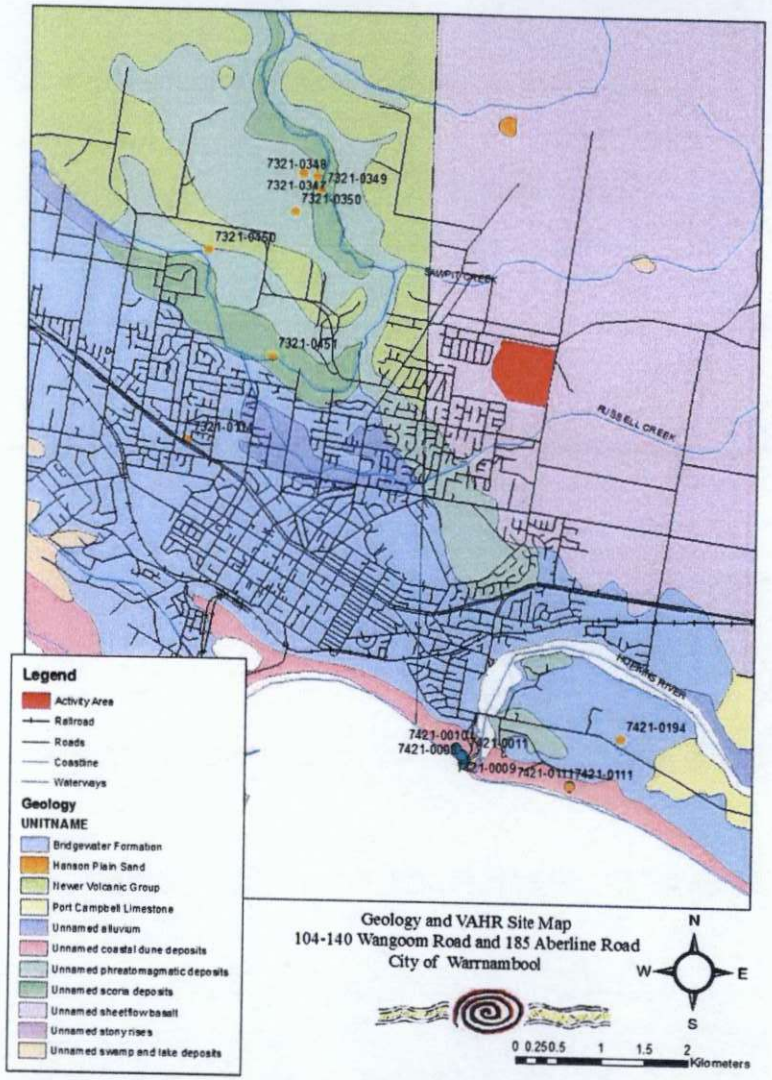

Figure4: VAHR Site Map, geographic region and Geology of the surrounding region

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6.2.2 Native Vegetation and Fauna

The landscape around the activity area in 1750 has been classified as Plains Woodlands or Forests; an open eucalypt woodland to 15 m tall, occupying poorly drained fertile soils on flat or gently undulating plains (EVC 55). The understory would have consisted of a few sparse shrubs and a species-rich grassy layer. Vegetation pre-dating contact would have comprised grasslands of Kangaroo Grass, Wallaby Grasses and Spear Grasses. Vegetation including several varieties of Wattle, Blue Heronsbill, Pussytails and Common Everlasting would also have grown in the area (LCC Report 1976:63). The grassland grades into dry open forest which would have contained stands of Manna Gum. At contact, when the forests extended further, this would have provided a habitat for koalas, as well as macropods and other ground dwelling animals (LCC Report 1976:70). The plant species found in the woodlands would have been utilised by the local Aboriginal people. These species included the Cherry Ballart and Kangaroo Apple, which have edible fruit as well as a large variety of herbs, greens and roots (Natural Resources and Environment 2008). The seeds, leaves, tubers and flowers of other plants may have been used, such as the Australian Native Leek, Myrnong and Cumbungi (Coutts 1976).

This region would have been a resource-rich area in pre-contact times. The grassy plains were home to macropods and other animals, which provided an abundant food source. Kelly Swamp, to the south, would have provided a range of land and marine plant and animal resources. The Merri River and its numerous tributaries provided a reliable source of fresh water and associated resources. The proximity of the coast allowed easy access to marine resources (Schell 1990:9) Most of the native vegetation in the area has been cleared for agricultural and pastoral purposes.

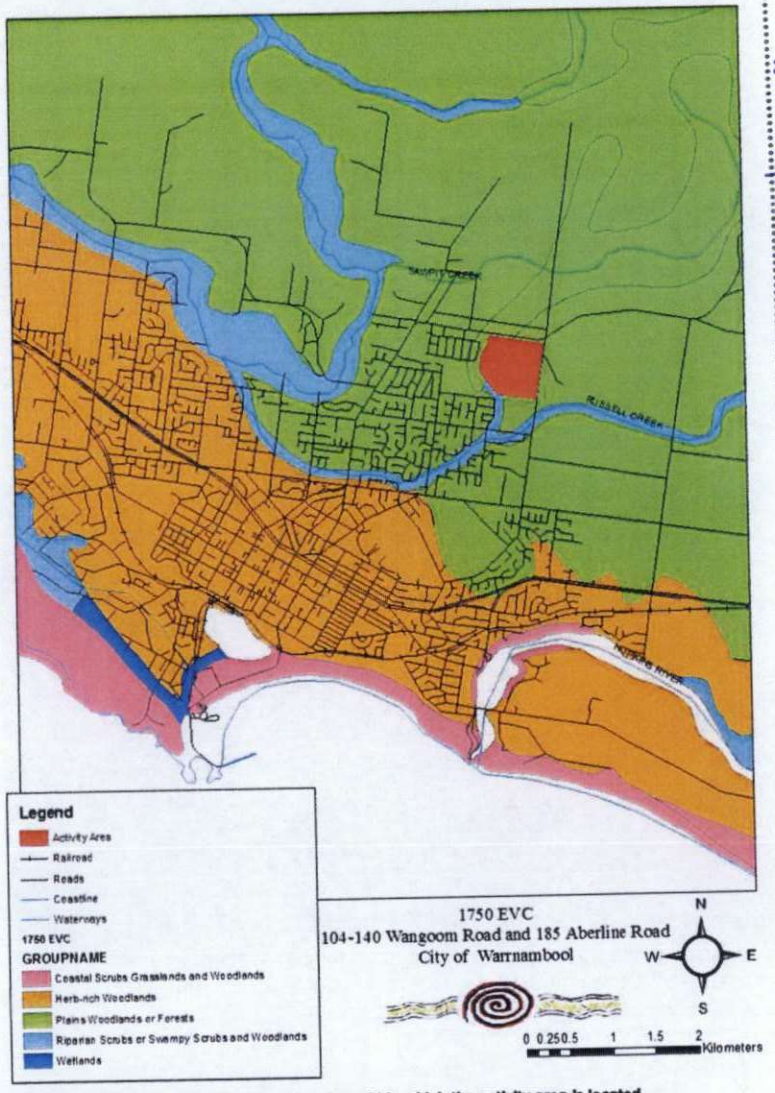

Figure5: Pre-1750s biodiversity map of region within which the activity area is located

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6.3 *Aboriginal Places in the Geographic Region*

The Victorian Aboriginal Heritage Register (VAHR) was accessed on 1 February 2011 by Steven O'Reilly. A review of the VAHR at Aboriginal Affairs Victoria (AAV) shows that there are no previously registered Aboriginal heritage sites within the activity area, and that the western edge of the activity area has previously been subject to ground survey for Aboriginal archaeological sites (Schell 2007).

There are 16 previously registered sites within a 5 km radius of the activity area. These sites comprise Shell Deposits (6), Artefact Scatters (10), and an Earth Feature. Many of the sites comprise a mix of shell and stone flakes. The majority of sites are located along the coastline or along the Merri River. There are no previously registered Aboriginal places within the geographic region within which the activity area is located. The closest sites to the activity area are located along the Merri River, approximately 2 km west of the activity area. This site VAHR7321-0451 consists of three silcrete artefacts exposed through ploughing located on a flood plain near Merri River.

Table 3: Previously recorded Aboriginal places within a 5 km radius of the activity area.

VAHR_ID	Name	Location	Type	Description
7321-0114	WARRNAMBOOL 1	Inland, vacant allotment, ploughed paddock	Artefact Scatter	Isolated quartz core on surface near a pile of rubble and a citizen reported a buried abalone shell deposit 1.8 m beneath the surface of a garage.
7321-0347	ROACHE 1	Ploughed paddock adjacent Merri River	Artefact Scatter	Waste flake, surface find
7321-0348	ROACHE 2	Ploughed paddock adjacent Merri River	Artefact Scatter	Isolated silcrete flake
7321-0349	ROACHE 3	Ploughed paddock adjacent Merri River	Artefact Scatter	Isolated chert flake
7321-0350	ROACHE 4	Ploughed paddock adjacent Merri River	Artefact Scatter	Isolated quartz flake
7321-0403	BUSHFIELD 1	literary reference	Earth Feature	Midden containing animal bones – kangaroo, wallaby, possum, Tasmanian devil, bandicoot, rat and dog
7321-0450	WOLLASTON ROAD 1	Lower slope of volcanic plain near Merri River	Artefact Scatter	Site exposed through rabbit burrowing activity, 1 silcrete flake
7321-0451	WOLLASTON ROAD 2	Floor plain adjacent Merri River	Artefact Scatter	Artefacts exposed through recent plough activity, 1 silcrete core, 2 silcrete flakes
7421-0006	HOPKINS MOUTH 1 POINT RITCHIE	Dune located at mouth of Hopkins River on beach	Shell Deposit	Midden containing many burnt shells
7421-0007	HOPKINS MOUTH 2	Rock platform located at mouth of Hopkins River on	Artefact Scatter	Dense scatter of shells on dune on edge of rock platform

		beach		
7421-0008	HOPKINS MOUTH 3	Dune located at mouth of Hopkins River on beach	Shell Deposit	Many burnt shells in black sand layer, at least two stratified layers visible in midden
7421-0009	HOPKINS MOUTH 4	Dunes on beach near mouth of Hopkins River	Shell Deposit	Dense scatter of shells in dune and flakes of flint
7421-0010	HOPKINS MOUTH 5	Dunes on beach near mouth of Hopkins River	Shell Deposit	Shell scatter and flakes of grey flint. Shells mainly subninella and limpets
7421-0011	HOPKINS MOUTH 6	Dunes on beach near mouth of Hopkins River	Shell Deposit	Burnt shell stratified in layer of black sand
7421-0111	HOPKINS LOOKOUT 1	Crest of Hill, Hopkins Lookout	Shell Deposit/Artefact Scatter	Scatter of shell and quartz eroding out of dune
7421-0194	HOPKINS POINT 1	Agricultural land on lowland plain between coast and Hopkins River	Artefact Scatter	1–4 flint flakes and burnt clay lump

6.4 *Previous work in the Geographic Region*

The results of prior archaeological studies relevant to and/or conducted in the vicinity of the present activity area, along with the current regional model of site distribution, are presented in this section. This information is reviewed in order to assess the archaeological sensitivity of the activity area and to inform the methodology of the field assessment program.

6.4.1 Regional Investigations

Lance (1991) produced a report called the ***Proposed Allansford–Portland Gas Pipeline: Further Archaeological Studies*** for the Gas and Fuel Corporation of Victoria. This report details the methodology and findings of a detailed program of archaeological work at various locations along the proposed route of the natural gas pipeline from Allansford to Portland to the north-east of the current activity area. A survey was conducted in 1990, however ground surface visibility was very poor, and it was recommended that further investigation be carried out in locations of high archaeological sensitivity along creeks and riverbeds including Merri River, Manifold Creek, Moyne River, Back Creek, Eumeralla River, Fitzroy River and Surrey River.

Two new sites were recorded. VAHR 7421-0156 is a surface scatter of stone artefacts located on the southern bank of the Merri River. This site comprises a relatively dense scatter of flaked stone artefacts; these were made from a number of raw materials including: quartz, quartzite, basic volcanic stone, silcrete, porcellanite and fossiliferous chert. The artefact types include flakes, flaked pieces and cores, with many of the quartz pieces having been produced using a bipolar technique. VAHR 7221-0716 is located on a disturbed sand dune on the western side of Portland. This second site is a

small surface scatter of flaked stone artefacts, comprising four artefacts and several fragments of fossiliferous chert, all of which had been affected by heat spalling, suggesting that it have been disposed in either a Aboriginal fire or damaged by a bush fire. However this site has been largely disturbed by the construction of a roadway and is of minimal archaeological value. The pipeline route is inland above Warrnambool and Koroit and all areas investigated were at least 10 km north of the coastline.

Du Cros and Associates (1993) conducted **An Archaeological Survey of Two Areas Adjacent to the Merri River, Warrnambool.** Du Cros surveyed two areas prior to development of the Warrnambool Golf Club and the Sewage Treatment Plant. Both these survey areas are adjacent the Merri River and within 1 km of the coastline. They are approximately 7 km south-west of the current activity area. During the survey one Aboriginal site was located. VAHR 7321-0404 is a midden site and surface artefact scatter interpreted as being of high significance due to its good condition, contents and structure.

McNiven and Russell (1995) produced a report called *Warrnambool District Telecom Optical Fibre Cable Routes (Killarney–Killarney T.O., Allansford–Nirranda, & Cobden–Simpson): An assessment of the potential impact on cultural heritage sites* for Telecom Australia. This report details the desktop study on potential impact to cultural heritage sites along proposed optical fibre cable routes in the southern region of western Victoria. Information on known site types was gathered and used to form a predictive model for the broader region, based on comparative environmental factors. The most detailed research in the local region has focused on coastal areas around Warrnambool. Large midden sites containing a range of faunal materials including shellfish, seals, macropods, possums and fish are commonly found. Stone artefacts in the region are made from a range of raw materials (flint, silcrete, basalt, quartz and sandstone) and include grindstones and a range of retouched implements, including woodworking tools). Bone points have also been found (McNiven& Russell 1995: 9). Neither grinding groves, rock art sites, quarries, rock wells nor scarred trees have been recorded for the wider study area. The authors propose that most sites in the region are less than 5000 years old, possibly even less than 2000 years old; this conclusion takes into account the environmental damage caused by erosion and widespread deforestation. The predictive model developed indicates that the most likely site types to be located in the non-coastal regions are stone artefact scatters. These are most likely to be found in sand dunes, around the margins of swamp and lakes, or on river terraces.

Heritage Consulting Australia (2001) produced a Cultural Heritage Assessment of the *Southern Gas Pipeline (Victorian Section)* for NSR Environmental Consultants Pty Ltd and GPU Australia. The focus of this study is Victorian section of the then proposed GPU GasNet Southern Gas Pipeline section running from the Iona Gas Plant (north of Port Campbell) to the South Australian border. The study had two phases: a desktop review and a field survey. The desktop research revealed eight Aboriginal sites within 500 m of the proposed pipeline. Despite being hampered by extremely poor ground surface visibility the fieldwork identified 10 new Aboriginal archaeological sites. Based on the

background research and the results of the field survey 27 areas of moderate to high archaeological potential were identified. These areas are located along waterways, around the edges of swamps and lakes and in coastal dune environments.

6.4.2 Local Investigations

There are a number of local Aboriginal archaeological investigations that are relevant to this assessment.

Rhodes and Tulloch (1995) conducted an archaeological survey along a 3 km section of a proposed Princes Highway deviation between Dennington and Illowa. Dennington is approximately 6.5 km west of the activity area and Illowa is 5 km west of Dennington. No Aboriginal or post contact sites were located; however surface visibility was uniformly poor and the entire area had suffered extensive ground surface disturbance that is likely to have destroyed any Aboriginal sites. The authors concluded that Aboriginal sites are more likely to be found in coastal regions, swamp borders and near waterways than in the undulating basalt plains landform. However the results may reflect the historical focus of archaeological survey along coastal areas as well as the land use history of the inland areas that have been subject to extensive agricultural activity.

Schell (1995) carried out *An Archaeological Survey of the Hopkins River* for the Framlingham Aboriginal Trust and Aboriginal Affairs Victoria. The Hopkins River is just east of Warrnambool, approximately 3 km south of the current activity area. The aim of this survey was to document and establish present threats to eel traps and other sites. Previous archaeological research in the Western District has emphasised the importance of river and swamp environments. Sites recorded along Hopkins River include oven mounds, eel traps and stone circles (believed to be the base of shelters). These sites reflect the importance of aquatic plant and animal resources in the traditional Aboriginal economy.

Paynter and Rhodes (2005) prepared an archaeological assessment for **Wollaston Road, Warrnambool.** This study area is located approximately 3 km west of the current activity area. This area is located on a floodplain and bordered by the Merri River, as is the current activity area. This survey was constrained by the participants not being allowed access to all properties in the study area. Aerial photographs were used to identify areas of potential ground visibility and the desktop assessment indicated sensitive zones. In areas were access was constrained, a windscreen survey from roads was conducted; in other areas pedestrian surveys were carried out. The majority of the areas inspected on foot were densely vegetated paddocks resulting in extremely poor surface visibility. Two Aboriginal places were located including an isolated silcrete artefact (VAHR 7321-0450) and three silcrete artefacts (7321-0451). Both places were located near Merri River.

Schell (2007) conducted an archaeological assessment for the **Wangoom Road Sewer Extension.** The study area is a 1 km sewer extension on the north-east outskirts of Warrnambool and runs along the western edge the current activity area. The field survey was undertaken across the entire alignment. All surface exposures were

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inspected, but overall ground surface visibility was extremely low (<5%). No Aboriginal sites were located during the survey this result is attributed to both the poor visibility and the highly disturbed nature of the ground surface, with extensive earth moving works, clearing and ploughing activities throughout the entire study area.

Matic (2008) produced a Cultural Heritage Management Plan for the Russell Creek Roof Water Harvesting Pipeline, Warrnambool, Victoria (CHMP 10495). The study area was located along Russell Creek through an area of residential development and pastoral land, approximately 0.7 km south of the current activity area. The field survey was hampered by extremely low levels of ground surface visibility, however significant ground surface disturbance was noted. A complex assessment consisting of 28 shovel probes revealed no Aboriginal cultural material and confirmed that the area had been subject to high levels of disturbance.

Luebbers (2009) produced a Cultural Heritage Management Plan for the **Midfield Biodiesel Development Project Warrnambool Victoria (CHMP 10931).** This area is located on the Merri Estuary and a coastal dune system, approximately 7 km south-west of the current activity area. An analysis of geomorphology, historic aerial photography and historical land use indicated that the proposed development zone has been heavily modified over the years through flooding, rapid large-scale vegetation loss, deep deflation basins and active leeward faces of transgressive dunes with steep avalanche slopes indicating unstable sedimentary conditions. It was concluded that any surviving Aboriginal culture material would be submerged below the wetland sediments, possibly as much as 6 m below the surface.

Luebbers (2010) produced a CHMP for **Cove Land Developments – Russell Creek Residential Estate – Aberline Road and Whites Road Warrnambool,** Victoria (CHMP 11029). This activity area is located immediately south of the current activity area in the land used for the same agricultural and pastoral activities. The desktop assessment concluded that the activity area contained potential for Aboriginal archaeological material due to its proximity to Russell Creek, however heavy vegetation cover in the activity area prevented effective surface survey. The complex assessment comprised of a single 1x1m test pit near Russel Creek and 17 2x1m mechanical test pits. No Aboriginal material was located during this study and all land forms within the activity area were tested. This report concluded that the heritage content of the activity area was very low or non-existent.

Dugay-Grist and McAlister (2010) produced a CHMP for **Harrington Road Drainage Basin Warrnambool (CHMP 11321).** This activity area is located approximately 6.5 km west of the current activity area. The desktop assessment established that the absence of a permanent waterway within the activity area decreased the potential sensitivity of the area, however its location within the Bridgewater dune formation meant the area had some archaeological potential. The standard assessment confirmed that the activity area contained dune formations and the rises on the property were deemed sensitive. The complex assessment determined that the activity area had not been subject to major subsurface disturbance and two new Aboriginal archaeological places were identified. VAHR 7321-0471 and VAHR 7321-0472 are both small stone artefact

scatters. VAHR 731-0471 is an isolated artefact, an angular fragment of crystal quartz and VAHR 7321-0472 contains two flakes of coastal flint and one quartz fragment. All artefacts located were found in the top 20 cm of soil and had been subject to ploughing disturbance.

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6.4.3 Summary

The results of the previous local and regional studies can be used to construct a predictive site model for the geographic region and activity area.

Previous studies indicate that archaeological sites are most likely to occur on coastal beaches, and coastal hinterlands, on the margins of large swamps and on or close to the banks of major streams such as the Merri River. The most commonly occurring site types in these areas are shell middens, usually in combination with surface scatters of stone artefacts. Burials also occur in coastal sand dunes.

Sites are less likely to occur on the undulating basalt plains of the region. The apparent lack of sites on this landform may be a product of intensive agricultural land use, which would have destroyed most Aboriginal sites. However, a lack of systematic regional survey across all landforms within the broader region limits a full interpretation of the results.

The activity area is located within the within the undulating basalt plains. Russel Creek is located 200 m to the south of the activity area and Merri River is located approximately 1.4 km to the west. Zones within 200 m of a creek are deemed to be areas of cultural heritage sensitivity and as such, the south-eastern corner of the property is an area of cultural heritage sensitivity with moderate potential.

Land to both the south and the west of the activity area has been subject to archaeological survey (Schell 2007; Luebbers 2010) and in both cases no Aboriginal material has been located and the land has seen the same kind of usage patterns as the activity area and recorded as having been disturbed. Based on the disturbance caused by agricultural and pastoral activities, the distance from the creeks and previous surveys in the area, this activity area has low archaeological potential.

No dates of occupation have been obtained from sites within the local area. However, most sites will have been formed in the recent past (1,000–4,000 years) based on context and technology.

The implications of the review of previously registered places and prior studies within the geographic region are:

- There are no previously recorded Aboriginal cultural heritage sites located within the activity area and the activity area has not been subject to prior ground surface survey.
- Previously registered Aboriginal places are concentrated within 200 m of waterways, along coastal beaches and coastal hinterlands, on the margins of swamps and adjacent to the banks of major streams.
- The most common archaeological place types in this region are stone artefact scatters; often associated with shell middens.
- Most stone artefact scatters will be small scatters or isolated artefacts.

- Dominant stone artefact types will be waste flakes, flakes and a small component of formal tool types that will include microliths. These artefacts will be manufactured from silcrete, quartz and chert.
- Aboriginal stone quarry sites will not be located within the activity area due to lack of source material.
- The activity area is considered to have low to moderate potential for surface and sub-surface stone artefact scatters within areas that have not been subject to significant prior ground disturbance.

6.5 *Historical and ethno-historical accounts in the geographic region*

Archaeological evidence suggests that Aboriginal people have occupied south-eastern Australia for at least 40,000 years BP (Flood 1995: 284–7). One of the oldest dated archaeological sites in Victoria is at Keilor in Melbourne where charcoal from a hearth excavated in 1973 has been dated to 31,000 years BP (Flood 1995: 286). The information used to establish pre-settlement Aboriginal spatial organisation is mostly based on observations made by Europeans during the initial period of contact and subsequent settlement of the activity area (see Barwick 1984; Clark 1990; Goulding 1998 in LCC 1991: 14–32; Presland 1994).

The people who occupied the activity area have been identified by Clark (1990:54–55) as the *Tarerergundidj* in the *Dhauwurd wurrung* language area (also referred to as *Gundidjmara)*. Clans speaking the *Dhauwurd wurrung* language managed the country in an area bounded by the Hopkins River in the east, the Glenelg River in the West and the Wannon River in the north (Clark 1990:54).

The clan name '*Tarerer*' referred to a large swamp between the Merri River and Tower Hill, probably the area known as Kelly's Swamp today (Clark 1990: 55,78). Previous archaeological work (see Section 5.3 above) has demonstrated that both Kelly's Swamp and Tower Hill contain significant Aboriginal occupation sites. The Tarerer Swamp was described by Robinson in 1841 as a place where large gatherings of coastal clans occurred when whales were present along the coastline (Clark 1990: 78). Tower Hill is also known as a place of traditional religious significance to clans in the area. In April 1841, the clan head of the *Tarerergundidj* was described to Robinson as a man named Wone.der.rac. (Presland 1977:62)

Aboriginal clans in the Western District lived a hunter-gatherer lifestyle, moving from one locality to another to make use of seasonal resources, trading opportunities and to meet ritual and kinship obligations. Ethno-historical records suggest that in some seasons Aboriginal people of the Western District lived a more settled life than Aboriginal people in other areas of south-east Australia. These beliefs are based on the presence and observations of shelters and 'villages' in the Western District (Schell 1995:8).

Thomas received a description of a 'village' near Caramut from a local informant:

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There was on the banks of the creek between 20 and 30 huts of the form of a beehive or sugar loaf, some of them capable of holding a dozen people ... These buildings were all made of a circular form, closely worked and then covered with mud *(Cited in Williams 1984: 174).*

Robinson observed the presence of many huts in Western Victoria (Clark 1988:19; Presland 1977:36, 38, 73, 85). He records that in the stony rises there were "plenty of huts of dirt and others built of stones" (Clark 1988:19). However, whether these huts or villages were inhabited on a permanent or semi-permanent basis, or were returned to seasonally is not known.

Critchett (1992) theorises that Tower Hill Lake was an important meeting place for different clan groups and speculates that ceremonial and trading activities took place there. The freshwater source, combined with mixed deposits of cultural heritage material (indicating domestic activity) and the number of burial sites in the region supports her theory.

The diet of the Western District Aboriginal people consisted of a wide range of mammals, fish, birds, plant food and fungi (Dawson 1881:18-22; Lourandos 1980:112). Ethno-historical accounts suggest the daisy yam was a staple plant food, being available year round, although less palatable in early winter (Gott 1983: 6-8).

Dawson (1881) refers to a gum which was used by the Aboriginal people near the Hopkins River; his reference reflects how the distribution and availability of a food source was affected by the arrival of the Europeans:

Another kind of manna, also called *buumbuul*, is deposited in considerable quantities by the large dark coloured cicadae on the stems of white gum trees near the River Hopkins. The natives ascend the trees and scrape off as much as a bucketful of waxen cells filled with a liquid resembling honey, which they mix with gum dissolved in cold water and use as a drink. They say that, in consequence of the great increase of opossums, caused by the destruction of the wild dog, they never get any *buumbuul* now, as the opossums eat it all *(Dawson 1881:21).*

The grassy plains were home to macropods and other animals, which provided an abundant food source. Kelly Swamp, to the south, would have provided a range of land and marine plant and animal resources. The Merri River and its numerous tributaries provided a reliable source of fresh water and associated resources. The proximity of the coast allowed easy access to marine resources (Schell 1995:9).

Eels were seasonally exploited and would have been an important food source in the autumn months. There are numerous accounts of eel fishing and trapping and the eel trapping infrastructure remains in some places including along the Hopkins River (Schell, 1995: 9).

Plants such as myrnong, bracken and tree ferns provided staple foods for Aboriginal people, while medicines could be made from species such as Black Wattle (*Acacia mearnsii*), and the wood or bark from Silver Wattle (*Acacia dealbata*) could be used to manufacture implements. The grasses and water reeds, paperbark trees and Eucalypts

all provided raw material for baskets and bark and wooden implements. The bark from stringy bark (*yangoro*) and mountain ash (*yowork*) was selected for the manufacture of bark canoes. Apart from the manufacture of implements and access to food and medicinal resources, the bark from these trees would also have been removed for other ceremonial and social non-utilitarian purposes. The roots (rhizomes or tubers) of the Cumbungi (*Typhaorientalis*), Water ribbon (*Triglochinprocerum*) and Common Reed (*Phragmitesaustralis*) were harvested and cooked in earth ovens (Gott&Conran 1991: 8-9). In the case of the Cumbungi, after being cooked, the centre part of the rhizome was knotted then chewed to extract starch and the remaining fibre was used for string (Gott&Conran 1991: 8). These resources would have existed within or adjacent to the activity area.

Some stone resources used by Aboriginal people in the past would have been available in locations near the present activity area. Silcrete, flint and quartz were favoured stone materials for the manufacture of stone implements. These materials would have been readily available from nearby sources. Quartz pebbles were widely available in river beds, beaches and alluvial deposits. Flint was readily available in the form of nodules originating from undersea Miocene limestones which could be collected on the beaches. Basalt was used occasionally as it was in plentiful supply along the volcanic plains, but not a preferable material as it is harder to work with due to its porous nature (Walkington and Lance 1987). The most important raw material used in the manufacture of axes was greenstone. There are accessible source points for this material, the most well-known being Mount William, near Lancefield (Coutts 1981:102).

The Aboriginal population of Western Victoria was estimated to be around 3500; after contact, disease, conflict and denial of access to land and resources reduced these numbers dramatically (Lourandos 1983:89). From 1839–1849 the British Government established an Aboriginal Protectorate to mediate between Aboriginal communities and European colonists, with George Augustus Robinson employed as the Chief Protector of Aborigines. Four Assistant Protectors were employed and each assigned jurisdiction over an area. C. W. Sievwright was assigned to the Western District in 1841 (Cannon 1983: 365).

In 1850 William Gray, the Commissioner of Crown Lands for Portland Bay, provided a census of the Aboriginal population in the district. He recorded 20 adult males, 15 adult females and four children (Clark 1990:45). In 1858, a select Committee of the Legislative Council was appointed to inquire into the condition of Aboriginal people in the State. Reports from squatters in the area estimated that the Aboriginal population in the area had been reduced by 75 per cent during the 1840s and 1850s (Clark 1990:197–8).

Violence between Aboriginal groups and European pastoralists was common throughout the region. Aboriginal people were forced off their traditional lands with many squatters prohibiting Aboriginal people access to their runs (Clark 1998b: 153–155). There are extensive reports of 'guerilla warfare; between Aboriginal people and squatters and their employees throughout the 1840s (Critchett 1990). There are stories

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of Aboriginal people using the stony rises around Eumeralla River as a base for attacking the European settlers who had dispossessed them. This conflict has been called the Eumeralla War (Clark 1989).

Aboriginal people in search of food and other basic items began living on the fringes of Warrnambool, where government rations were available from 1860 onwards (Clark 1990:40). These people were moved to the Framlingham Aboriginal Mission when it opened in 1861. This Aboriginal reserve covered 3500 acres near the Hopkins River, a large section of land that included the Framlingham forest, the only forested area in the region. In 1867 the Board decided to close Framlingham and move the inhabitants to the new station at Lake Condah, however the people living on the mission refused to leave and successfully protested: Framlingham was reopened in 1869.

In 1877, a census conducted by the police listed 69 Aborigines at the Framlingham Aboriginal Station (Barwick 1971: Table 20:2). The number of people at Framlingham represents the gathering together of people at the station rather than an increase in population, as the total Aboriginal population of south-western Victoria decreased from 727 in 1863 to 236 in 1877. By 1863 the Aboriginal population of Victoria was less than 2000, or 13% of the estimated pre-European Aboriginal population (Barwick 1971:288).

The decline of the Aboriginal population in the area following European contact can be attributed to a number of causes: racial conflict, disease, dispossession of land and depletion of traditional food sources (Lourandos 1983:89).

In 1886, the introduction of the *Aboriginal Act* meant that only people considered as full-blooded, or half-blooded people over 35 years of age were allowed to remain on the Mission Stations. This led to a decreased labour force on the stations and an increase in fringe-dwelling Aboriginal people in the Melbourne region (Presland 2001: 105, 107).

In 1890 the Colonial government reserved an area of 582 acres for the use of Aboriginal people at Framlingham, but refused to staff the station, or provide assistance such as teachers, equipment and livestock. In the 1930s public concern was raised regarding conditions of the Aboriginal people at Framlingham. Under mounting pressure the government agreed to build an additional twelve cottages and a school was opened and residents were given weekly rations. There were multiple attempts to close Framlingham over the years, however the residents remained strongly attached to their land and defeated attempts to remove them.

In 1970, under the Aboriginal Lands Act, Framlingham was handed to the Framlingham Trust and resumed operation under Aboriginal ownership and management. In the 1980s, Land Rights claims were issued for 1,000 acres of the Framlingham Forest surrounding the Mission Station. This continued from 1980–87 when the land was handed over to the Kirrae Whurrong Aboriginal Corporation at Lake Condah and Framlingham. Aboriginal people still live on the mission land and continue to manage the land there (Website 3).

A Registered Aboriginal Party has yet to be appointed for the area within which the activity area is located; however the current RAP applicants are the Kuuyang Maar Aboriginal Corporation and Ella Maar Aboriginal Corporation.

6.6 *Landforms and/or Geomorphology of the Activity Area*

The activity area is located within the within the undulating basalt plains landform. Russel Creek is located 200 m to the south of the activity area and Merri River is located approximately 1.4 km to the west (Figure 1).

The activity area has been cleared of remnant native vegetation and is currently covered with pastoral grasses and used for grazing and agricultural purposes (Figure 2).

6.7 *Land Use History*

Visits by sealers to the coastal regions of south-west Victoria may have begun as early as the late 18th Century. These visits appear to have been almost entirely restricted to the coastal area. Periodic visits by whalers may have begun as early as 1810. The first shore-based whaling station appears to have been that of William Dutton, who established a station at Portland in 1828 (Townrow 1997:11).

Thomas Mitchell's account of his explorations of 'Australia Felix' provided a significant impetus to the movement of squatters to the west and south-west of Victoria. As details of his travels became known there was a rapid influx of settlers to the region. Edmund Henty established his settlement at Portland in 1834 (Kiddle 1963:31). From 1837 onwards squatting runs were rapidly established throughout the region. Occupation of the country progressed from several directions at once – overland from the north, from Melbourne and Geelong in the east and Portland in the west (Powell 1996). During the 1850–1860 gold rush the European population of Victoria dramatically increased, with demand for land being particularly great among men returning from the diggings. This resulted in widespread clearance of land for sheep grazing and agriculture. This in turn destroyed many traditional hunting areas and led to conflict with Aboriginal people (Powell 1996).

Commercial lime-burning operations were established in the 1870s, exploiting limestone sources and timber used to fuel the kilns (Harrington 2000:53). Forest clearance and timber production saw the widespread use and destruction of forests. Sawmills were introduced in the mid-19th Century near timber sources with timber harvesting on Crown land being unrestricted (LCC 1996:61).

The activity area is currently used for farming, pastoral and agricultural activities. The urban development around the activity area has begun in the last two decades. Locals have reported that the paddocks closest to the creek can be often boggy in wet conditions (Luebbers 2010: 13).

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6.8 *Conclusions from the Desktop Assessment*

The desktop review has provided salient information from which areas of Aboriginal archaeological potential may be predicted and further tested through standard and complex assessment.

The absence of a permanent waterway within the activity area decreases the potential sensitivity of the activity area; research on neighbouring land in the same landform has indicated that the area has been disturbed through agricultural and pastoral activities and the archaeological potential of the area is low. The Aboriginal Heritage Regulations (2007) defines land within 200 m of a waterway as culturally heritage sensitive and the south-eastern corner of the activity area falls under this classification.

A review of previously registered sites in the geographic region indicates a strong concentration of sites on the banks of the Merri River and along the coastline. The landscape away from the coastline has been less intensively surveyed or subject to sub-surface archaeological testing and therefore site prediction models are more limited. However on current information it appears that Aboriginal archaeological sites are most likely to occur on the margins of large swamps and on or close to the banks of major streams such as the Merri River. The most commonly occurring site types in these areas are stone artefact scatters, often containing shell remains as well. Low density stone artefact scatters are identified on the Basalt Plains away from permanent water sources, perhaps indicating more transient use of this landform.

The review of ethnographic evidence highlights the economic and cultural importance of both coastal and freshwater resources. In addition, the importance of the coastline and coastal hinterland further to the south is also emphasised.

The prior land use within the activity area has been limited to initial clearing, ploughing and grazing and while surface and upper deposits to approximately 30 cm can be expected to have been subject to disturbance, there is no evidence to suggest significant sub-surface disturbance has occurred within the activity area.

Based on the desktop review it is considered that the activity area retains low to moderate potential for the location of Aboriginal cultural heritage in the form of surface and sub-surface stone artefact scatters.

Due to the history of tree clearance there is low potential for the location of scarred trees within the activity area. The absence of soft sandy deposits suggests little potential for the presence of Aboriginal human burial places. Zones of sensitivity are detailed in Figure 6.

The geomorphological review and review of previously registered Aboriginal places indicates that any sites identified are likely to date to the mid to late Holocene.

Figure6: Areas of sensitivity within the activity area

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7. Standard Assessment

This section outlines the aims, methods and results of the pedestrian ground surface survey of the activity area undertaken on 21 February 2011.

7.1 *Standard Assessment Methodology*

The aims of the field assessment were to determine the nature, distribution and significance of Aboriginal cultural heritage in locations to be impacted by the proposed activity. The field survey was undertaken to establish whether any Aboriginal cultural heritage was visible, and if locations likely to contain Aboriginal cultural heritage were present. The desktop assessment had indicated that there are no previously registered Aboriginal places located within the activity area and that the activity area has not been subject to prior ground surface survey.

The field survey was undertaken on 21 February 2011. The archaeological field program was supervised by Neil Dudley (Archaeologist), with field assistance from Adrian Dow (Aboriginal field assistant) and Steve Clarke (Ella Maar).

The field survey involved an examination of the property via pedestrian transects to identify surface exposures for visible Aboriginal cultural heritage and visually assess the general archaeological sensitivity of landforms in the activity area. The pedestrian survey was undertaken by systematic sampling with five people walking linear transects 5 m apart. The pedestrian transects were undertaken within each paddock or property separately due to limited gate access and the presence of electric fences.

It became immediately apparent that dense grass coverage and vegetation would reduce ground surface visibility over the majority of the activity area. Therefore the strategy was changed to focus on areas of potential exposure within the activity area, for example, areas of erosion beneath fence lines and gates.

Given the size of the activity area (41.5 hectares) all visible surface exposures were inspected; however these were limited and ground surface visibility was very low (<1%) in most areas due to thick pastoral grass cover and weed species.

7.2 *Results of Ground Survey*

A major obstacle encountered by the Standard Assessment was poor ground surface visibility due to dense pastoral grass cover, which obscured the original ground surface throughout most of the activity area.

No oral history relevant to the activity area was provided by the RAP applicant groups or the field representatives.

The Standard Assessment did not identify any new Aboriginal places in the activity area. There were no mature Indigenous trees located within the activity area and therefore no Aboriginal scarred trees were identified in the activity area. No cave, rock shelter or cave entrance was identified within the activity area.

7.3 *Conclusions from the Ground Survey*

The lack of cultural material identified during the Standard Assessment is considered to reflect the lack of ground surface visibility rather than being an accurate reflection of past Aboriginal use or occupation.

The observations made during the ground surface survey, combined with the information gathered during the Desktop Assessment, indicate that the activity area contains Aboriginal cultural sensitivity. The Standard Assessment confirmed the presence of landforms of low to moderate Aboriginal cultural heritage potential, being the land within 200 m of Russell Creek in the south-eastern section of the activity area. The entire activity area is considered to have low to moderate potential for the location of Aboriginal cultural heritage places in areas that have not been subject to prior disturbance due to its location adjacent to a minor drainage line immediately west of the activity area. On this basis a Complex Assessment was deemed necessary.

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Figure7: Ground Survey Coverage

8. Complex Assessment

Sub-surface testing (a complex assessment) was carried out for this assessment because the desktop assessment determined that Aboriginal cultural heritage was likely to occur in sub-surface deposits in the activity area and poor ground surface visibility during the standard assessment prohibited a comprehensive assessment of the potential for Aboriginal cultural heritage within the activity area.

The complex assessment was required to determine the presence or absence of Aboriginal cultural material, in locations deemed likely to contain Aboriginal cultural heritage that would be impacted by the activity. On this basis, the complex assessment targeted the landforms of greatest sensitivity that were to be impacted by the proposed activity, avoiding areas of significant prior disturbance.

Fieldwork was conducted from 21–23 February and 28 February to 4 March 2011. The sub-surface testing was supervised by Neil Dudley (Archaeologist), with assistance from Adrian Dow (field assistant), Steve Clarke (Ella Maar), John Clarke (Ella Maar) Tom Clarke (Kuuyang Maar) Peter Gleeson (Rodgers Construction) and Steve Hartley (Rodgers Construction).

Aims of the sub-surface testing

The aims of the complex assessment were to:

- record the sub-surface stratigraphic composition of the landform and investigate a representative sample of sub-surface sediments
- identify any undisturbed sub-surface deposits
- use shovel pit excavation to provide improved sample size and investigate the extent of sub-surface disturbance
- determine whether sediments to be impacted are culturally sensitive
- enable an accurate scientific significance assessment to be made.

8.1 *Methodology of the sub-surface testing*

Excavation test pits of seven 1 x 1 m test pits (TP) and ninety-one 40 x 40 cm shovel test pits (STP) were undertaken during sub-surface testing. The 1 x 1 m test pits were excavated to examine the soil profile and to identify any Aboriginal cultural heritage within the activity area in a controlled manner. The STPs were undertaken to determine the archaeological sensitivity of sub-surface deposits, the extent of any Aboriginal cultural heritage, and any significant changes in stratigraphy.

The location of the TPs and STPs were based on topography, areas of potential sensitivity for Aboriginal cultural heritage and the location of works scheduled for the activity area. In addition, the proposed methodology was discussed with the Kuuyang Maar and Ella Maar field representatives prior to the commencement of fieldwork.

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The 1 x 1 m test pits were located on elevated areas in the central, northern and northern-eastern sections of the activity area (TP02-05), and on the lower-lying landscape to the south and west (TP01, TP06 and TP07), to investigate the stratigraphy of the different landforms and topography present within the activity area. Hand-excavated deposits were initially excavated in arbitrary 5 cm spits. As clear stratigraphic units became apparent, excavation continued according to the stratigraphic unit (Table 4). The excavation continued to sterile deposit or to a maximum depth of approximately one metre. As noted in the desktop assessment, the age of the basalt flows that have weathered to produce the sterile clay encountered at the base of these excavations is not known. It was not possible with the current investigations to excavate through the basalt flow to determine if these basalts have covered or destroyed any prior land surfaces and associated buried material.

Ninety-one shovel test pits were also excavated, extending the area sampled within the activity area and to test the extent of sub-surface disturbance. The areas of sub-surface excavations are illustrated in Figure 8. The stratigraphic composition of the test pits and shovel test pits are detailed in Table 4 and Figures 9a to 9g. During the sub-surface testing, site plans and maps were inspected, photographs of the activity area were taken, and detailed notes were made. Test pit and shovel test pit locations were marked on plans provided and their locations recorded with a differential GPS unit. All excavated deposits were 100 per cent sieved through 5 mm wire sieves.

TP01 was located within the area of cultural heritage sensitivity in the southeast of the activity area within 200 m of Russell Creek. TP06 and TP07 were located in the lower west of the activity area close to an unnamed drainage line and dam. TP02 and TP03 were located at higher elevations north of TP01 along the eastern boundary of the activity area. TP04 was located on elevated ground in the central part of the activity area while TP05 was close to the northern boundary of the activity area (Figure 8).

No obstacles were encountered during the sub-surface testing at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool (sch.2 cl.9 Aboriginal Heritage Regulations 2007).

8.2 *Results of the sub-surface testing excavation*

A total of seven 1 x 1 m test pits (TP01-TP07) and ninety-one 40 x 40 cm shovel test pits were excavated within the activity area (Table 4 and Appendix 2 Table 5). No Aboriginal cultural heritage remains or potentially sensitive deposits were identified during the Complex Assessment.

Table 4: Details of Excavation Areas

Pit No. and area	Landform	Profile description	Aboriginal cultural heritage material present
TP01 1 x 1m	Alluvial flats	**Unit 1: 0–100mm** Very dark grey moist silty clay with small basalt floaters, sparse worms and gravel.	Nil.

Pit No. and area	Landform	Profile description	Aboriginal cultural heritage material present
		pH 7.0 Munsell: 10YR 3/1 **Unit 2: 100–280mm** Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth, sparse worms, roots and charcoal flecks throughout. pH 6.0 Munsell: 10YR 3/2 **Unit 3: 280–380mm** Dark brown slightly moist clay. Sparse gravel, natural sterile clay base. pH 6.5 Munsell: 10YR 3/3	Nil. Nil.
TP02 1 x 1m	Top of rise	**Unit 1: 0–100mm** Very dark brown compacted clayey silt. Many basalt floaters (up to 100mm) throughout. pH 8.0 Munsell: 10YR 2/2 **Unit 2: 100–300mm** Very dark brown loose silty sand. Many large basalt floaters throughout. pH 8.0 Munsell: 10YR 2/2 **Unit 3: 300–350mm** Very dark brown compact clay. Sterile clay base with *in-situ* large basalt floaters. pH 8.0 Munsell: 10YR 2/2	Nil. Nil. Nil.
TP03 1 x 1m	mid slope, undulating hills	**Unit 1: 0–80mm** Black compact silty sand. pH 7.5 Munsell: 10YR 2/1 **Unit 2: 80–200mm** Very dark greyish brown compact silty sand. Occasional basalt floaters, worms and gravel throughout. pH 7.0 Munsell: 10YR 3/2 **Unit 3: 200–250mm** Very dark greyish brown compact clay. Sterile clay base with *in-situ* large basalt floaters on southern side of pit. pH 7.0 Munsell: 10YR 3/2	Nil. Nil. Nil.
TP04	mid slope, undulating	**Unit 1: 0–90mm**	Nil.

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Pit No. and area	Landform	Profile description	Aboriginal cultural heritage material present
1 x 1m	hills Flat ground	Very dark greyish brown compact silty sandy. Gravel at bottom of spit. pH 6.5 Munsell: 10YR 3/2 **Unit 2: 90–310mm** Very dark greyish brown compact silty sand. Gravel, up to 30mm dia., increasing with depth. pH 7.0 Munsell: 10YR 3/2 **Unit 3: 310mm +** (Unexcavated) Sterile clay base with gravel inclusions.	Nil.
TP05 1 x 1m	Top of rise	**Unit 1: 0–70mm** Very dark greyish brown compact silt. Grass roots. pH 6.0 Munsell: 10YR 3/2 **Unit 2: 70-300mm** Dark greyish brown compact silt. Occasional basalt floaters. Gravel increasing with depth. pH 6.0 Munsell: 10YR 4/2 **Unit 3: 300mm +** (Unexcavated) Sterile clayey silt base with gravel and large basalt floaters.	Nil. Nil. Nil.
TP06 1 x 1m	level plain	**Unit 1: 0–100mm** Dark greyish brown compact fine sand. pH 6.0 Munsell: 10YR 4/2 **Unit 2: 100–180mm** Dark greyish brown compact coarse sand. Sparse gravel, increasing with depth. pH 6.5 Munsell: 10YR 4/3 **Unit 3: 180–260mm** Dark greyish brown compact sandy silt. pH 6.5 Munsell: 10YR 4/3 **Unit 4: 260–310mm** Dark greyish brown compact coarse sand. Dense gravel, sparse charcoal increasing with depth. pH 6.5 Munsell: 10YR 4/3 **Unit 5: 310mm +**	Nil. Nil. Nil.

Pit No. and area	Landform	Profile description	Aboriginal cultural heritage material present
		(Unexcavated) Sterile clay base.	
TP07 1 x 1m	level plain	**Unit 1: 0–80mm** Very dark greyish brown compact fine sand. pH 6.0 Munsell: 10YR 3/2	Nil.
		Unit 2: 80–210mm Very dark greyish brown compact silty sand. Gravel, increasing with depth. pH 6.0 Munsell: 10YR 3/2	Nil.
		Unit 3: 210–260mm Very dark greyish brown compact coarse sand. Gravel, increasing with depth. pH 6.5 Munsell: 10YR 3/2	Nil.
		Unit 4: 260mm+ (Unexcavated) Sterile clay base.	

8.2.1 Stratigraphy

TP01 was located within the identified area of cultural heritage sensitivity in the southeast of the activity area, within 200 m of Russell Creek (Figure 8). The sub-surface stratigraphy comprised very dark grey moist silty clay to 10 cm with sparse worms and gravel noted throughout this deposit. Unit 2 was very dark greyish brown silty sand then extended below 10 cm to approximately 28 cm. Gravel fragments continued throughout this deposit. Unit 3 from 28 cm comprised dark brown clay with sparse gravel after excavating a further 10 cm this was identified as natural clay base (Table 4, Plate 7, Figure 9a). No Aboriginal cultural heritage materials, deposits or features were identified in TP01.

TP02 was located on the rise in the north-eastern section of the activity area, immediately south of an area containing a house and associated structures and gardens (Figure 8). The stratigraphy comprised very dark brown compacted clayey silt to approximately 10 cm with basalt floaters throughout. Very dark brown silty sand with many large basalt floaters then extended down to 30 cm over a very dark brown sterile clay base also with basalt floaters present (Table 4, Plate 8, Figure 9b). No Aboriginal cultural heritage materials, deposits or features were identified in TP02.

TP03 was located on a rise on the eastern boundary of the activity area between TP01 and TP02. The sub-surface stratigraphy comprised black compact silty sand to approximately
8 cm, overlying very dark greyish brown silty sand with some basalt floaters that extended down to a very dark brown sterile clay base with large basalt floaters at

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approximately
20 cm (Table 4, Plate 9, Figure 9c). No Aboriginal cultural heritage materials, deposits or features were identified in TP03.

TP04 was located on the edge of a flat rise in the centre of the activity area. The sub-surface stratigraphy comprised very dark greyish brown compact silty sand to approximately 9 cm, overlying very dark greyish brown compact silty sand with gravel increasing with depth that extended down to a sterile clay base with gravel inclusions at approximately 31 cm (Table 4, Plate 10, Figure 9d). No Aboriginal cultural heritage materials, deposits or features were identified in TP04.

TP05 was located on the top of a rise on the northern boundary of the activity area. The sub-surface stratigraphy comprised very dark greyish brown compact silt to approximately
7 cm, overlying very dark greyish brown compact silt with occasional basalt floaters and with gravel increasing with depth. A sterile clay base with gravel and large basalt floaters was encountered at approximately 30 cm (Table 4, Plate 11, Figure 9e). No Aboriginal cultural heritage materials, deposits or features were identified in TP05.

TP06 was located on the lower western part of the activity area, west of TP04. The sub-surface stratigraphy comprised dark greyish brown compact fine sand to approximately 10 cm, overlying dark greyish brown compact coarse sand to 18 cm with gravel increasing with depth. Dark greyish brown compact silty sand extended down to 26 cm overlying dark greyish brown compact coarse sand to 31 cm where a sterile clay base was encountered (Table 4, Plate 12, Figure 9f). No Aboriginal cultural heritage materials, deposits or features were identified in TP06.

TP07 was located close to the drainage reserve on the lower north western part of the activity area adjacent to Wangoom Road. The sub-surface stratigraphy comprised very dark greyish brown compact fine sand to approximately 8 cm, overlying dark greyish brown compact silty sand to 21 cm with gravel increasing with depth. Very dark greyish brown compact coarse sand extended down to 26 cm where a sterile clay base was encountered (Table 4, Plate 13, Figure 9g). No Aboriginal cultural heritage materials, deposits or features were identified in TP07.

The STP stratigraphy varied depending on the location of the STP, consisting generally of deposits of silty sand, sandy silt or silt over clay often with large basalt floaters at depths of between 20 and 55 cm in elevated locations (Appendix 2 Table 5, Appendix 3 Photographs).

Plate 1: TP01 end of excavation. Scale showing 20cm increments.

Plate 2: TP02 end of excavation. Scale showing 20cm increments.

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Plate 3: TP03 end of excavation. Scale showing 20cm increments.

Plate 4: TP04 End of excavation. Scale showing 20cm increments.

Plate 5: TP05 End of Excavation Scale showing 20cm increments.

Plate 6: S TP06 End of excavation. Scale showing 20cm increments.

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Plate 7: TP04 End of excavation. Scale showing 20cm increments.

Figure8: Location of Test Pits and Shovel Test Pits within the Activity Area

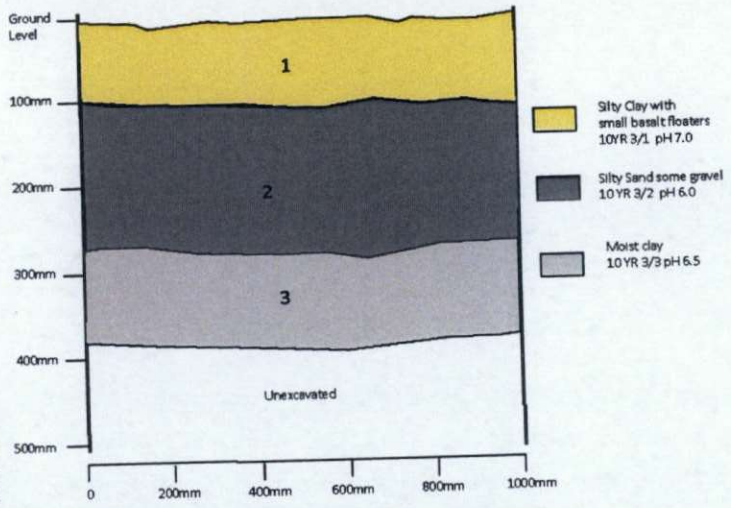

Figure 9a: Stratigraphic Section TP01

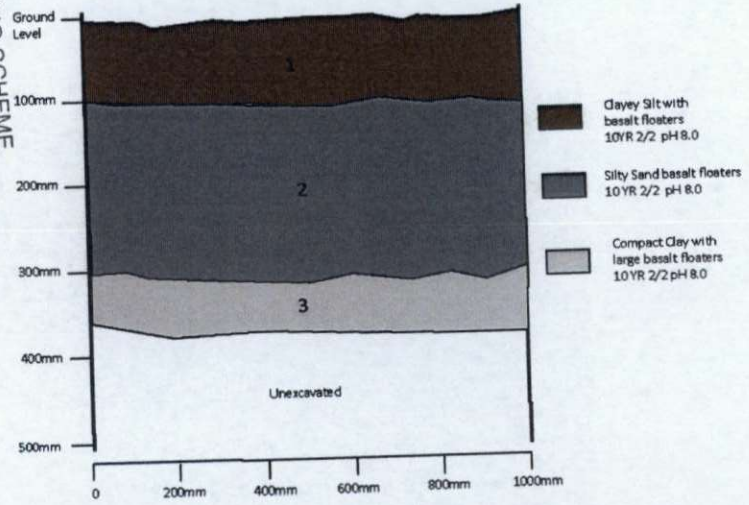

Figure 9b: Stratigraphic section TP02

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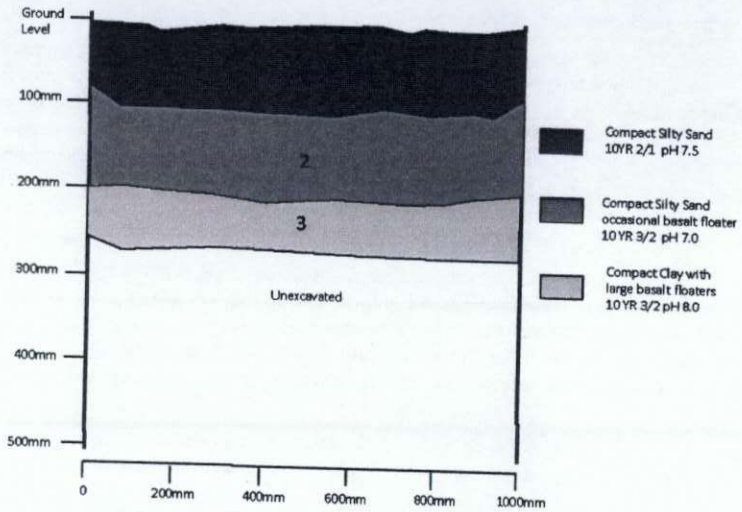

Figure 9c: Stratigraphic Section TP03

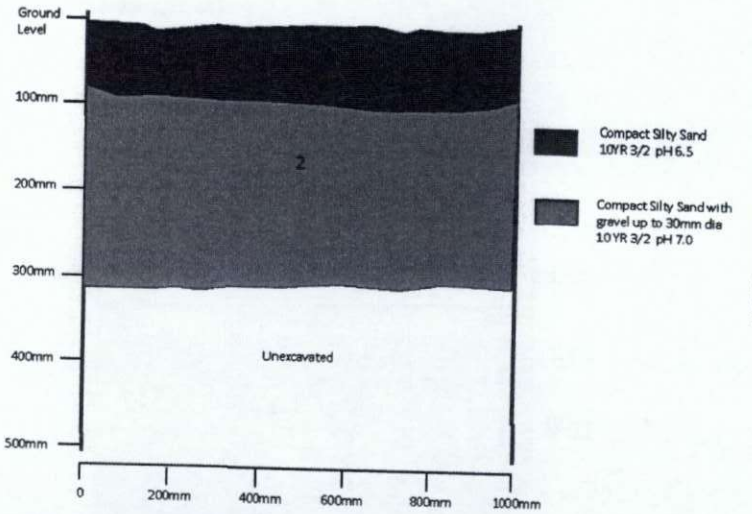

Figure 9d: Stratigraphic Section TP04

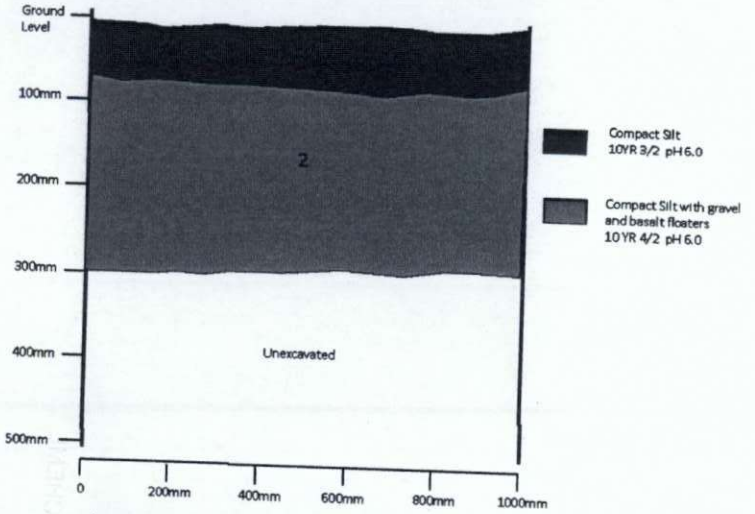

Figure 9e: Stratigraphic Section TP05

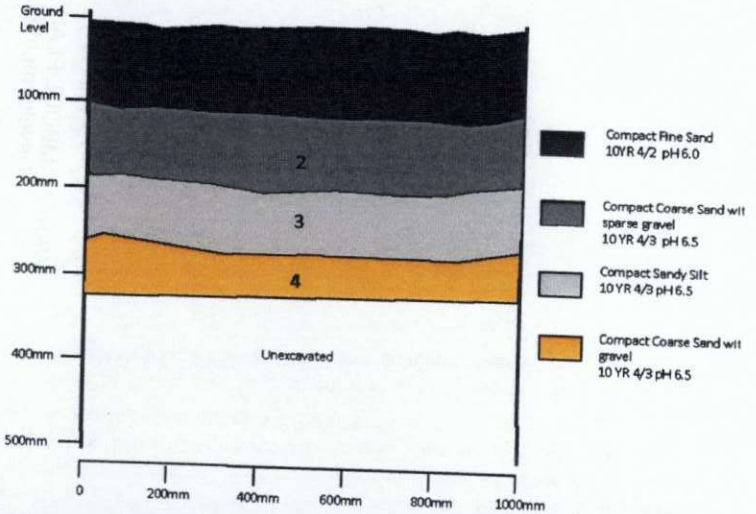

Figure 9f: Stratigraphic Section TP06

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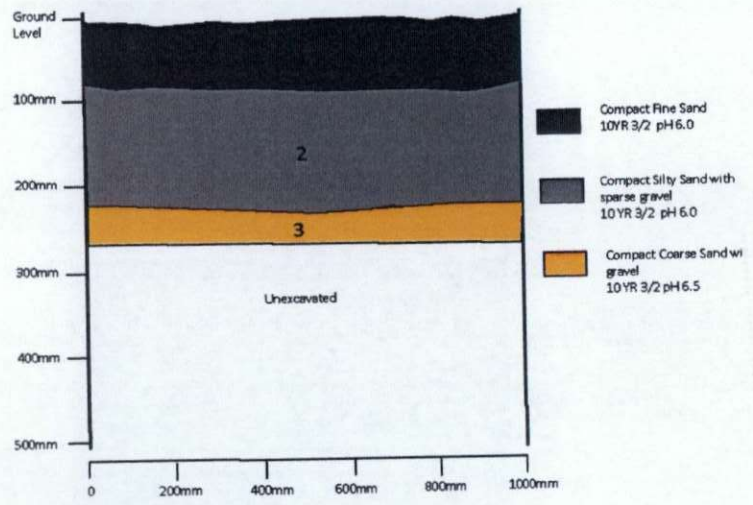

Figure 9g: Stratigraphic Section TP07

8.3 *Conclusions from the sub-surface testing*

The undeveloped land contained within 104–140 Wangoom Road and 185 Aberline Road, Warrnambool can be confirmed as an area of low Aboriginal cultural heritage sensitivity.

This is despite a number of factors indicating its potential sensitivity for containing Aboriginal heritage sites. Key among these factors is the geographical location of the area, within 200 m of a permanent waterway. Floodplains adjacent to waterways such as the Russell Creek are well documented as places which were selected by Aboriginal people in undertaking subsistence activities.

Sub-surface testing was conducted in the activity area in areas of potential sensitivity that are to be impacted by the proposed activity and where poor ground surface visibility inhibited a comprehensive assessment of the Aboriginal cultural heritage sensitivity during the standard assessment. The results of the sub-surface testing indicate that the activity area has not been subject to major sub-surface disturbance. No Aboriginal cultural heritage materials, features or potentially sensitive deposits were identified in any of the excavations within the activity area (Appendix 2 Table 5 and Appendix 3 Photographs).

The results are considered to reflect the very low impact of prior Aboriginal occupation of the activity area. The activity area is located within an unnamed alluvium landform

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that lies on sheetflow basalt. The proximity of the activity area to Russell Creek would suggest that Aboriginal cultural material may be present. However, the density of previously registered Aboriginal places closer to the Merri River to the north west and the coastline to the south indicate more intensive utilisation of these parts of the region. It is likely that the activity area was used in a transitory and less intensive fashion, leaving fewer material cultural remains.

The results of the complex assessment lead to an assessment that the activity area has very low potential for containing Aboriginal cultural material.

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9. Consideration of section 61 matters – Impact Assessment

This section assesses the potential for the proposed activity to impact on Aboriginal cultural heritage.

No Aboriginal cultural heritage materials, features or potentially sensitive deposits were identified in any of the tested locations within the activity area (Plates 7 to 13, Appendix 3 Plates 14 to 17).

The conclusion from this assessment, combined with the results of the desktop and standard assessment, is that the activity area contains low to very low cultural heritage sensitivity. It is therefore concluded that future ground disturbing activities are unlikely to impact Aboriginal cultural heritage within the activity area which is proposed for subdivision at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool.

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Part 2 | Cultural Heritage Management Recommendations

Note: These recommendations become compliance requirements once this Cultural Heritage Management Plan is approved.

10. Specific Cultural Heritage Management Requirements

No Aboriginal cultural heritage or areas identified as likely to contain Aboriginal cultural heritage were identified during the complex assessment of the activity area at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool. No specific cultural heritage management activities are required, however a series of contingencies are provided for the possible discovery of Aboriginal cultural heritage during works (Section 11).

11. Aboriginal Cultural Heritage Management Contingencies

11.1 *Contingency Aboriginal Cultural Heritage Sites*

If any Aboriginal cultural heritage sites are located during the proposed works at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool the following actions must be undertaken:

- All works within 25 m of the relevant discovery area must cease immediately and if necessary protective fencing erected around the relevant area.
- The person making the discovery shall immediately notify the Cultural Heritage Advisor, relevant RAP applicant group/s and the nominated project delegate for the sponsor.
- While works are suspended the nominated project delegates and the heritage advisor must evaluate the Aboriginal cultural heritage.
- An appropriately qualified heritage advisor must be engaged to record the findings and advise on possible management strategies (see 10.5: Contingency plan regarding non-compliance).

A Cultural Heritage Advisor and representative of the RAP applicant group/s will inspect the site within 48 hours of being notified. If determined to be Aboriginal cultural heritage the Cultural Heritage Advisor will notify Aboriginal Affairs Victoria. During this inspection the management of any Aboriginal cultural heritage will be discussed and agreed to. If the Aboriginal cultural heritage is determined to be significant (i.e. intact cultural deposit) the Cultural Heritage Advisor and RAP applicant group/s may require site protection measures. If this is not possible a sample salvage excavation may be required to obtain adequate data prior to works proceeding.

The Cultural Heritage Advisor (with the approval of RAP applicant group/s) will advise the site supervisor when suspended construction works can proceed.

Failure of parties to reach an agreed course of action will be classed a dispute (see 10.4)

Work may recommence within the 25 m buffer when:

- Appropriate protective measures have been undertaken
- The relevant records for the Aboriginal cultural heritage have been completed by the heritage advisor
- Any dispute has been resolved.

The heritage advisor, the sponsor and the RAP applicant group/s must ensure that all these measures are followed and that legal obligations and requirements are complied with at all times.

In the situation that salvage is required in the event of unexpected cultural heritage in uncovered during the activity then the following process/methodology will be applied:

- The soil from each spit will be placed in a bucket within the square, weighed and then deposited directly into one of the four sieves operating. All soil (100%) will be sieved through 5 mm sieve screens. All soils are to be sieved down to the wet plasticine lens. The archaeologist will make a judgement call on the depth of excavations based on whether a number of sterile spits have been excavated and what type of stratigraphy is present. Excavations will continue to at least 100 cm in depth. At the completion of each spit basal photographs will be taken and excavation sheets will be completed, noting changes in stratigraphic horizons (soil colour and texture), rocks, gravel and other materials not of cultural origin. Munsell (soil colour) and pH levels will also be taken. Sieving will be conducted at a reasonable distance from the excavation area to avoid backfilling of the square. Disturbance around the excavation areas will be kept to a minimum, with only the excavator and excavation recorder present while soil extraction is in progress.
- Upon the completion of the excavation, stratigraphic horizons will be identified and profiles of two of the trench walls (north perspective and east perspective) will be drawn to provide a concise schematic representation of the stratigraphy

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as well as to complement the photographs and relate stratigraphic horizons to excavation notes and descriptions.

- Following this, the trenches will be backfilled to the requirements of the developer and the satisfaction of the Aboriginal field assistants.
- All artefacts will be bagged with date, spit number and site name clearly labelled. An extensive analysis of any collected material will be conducted at a location to be decided upon by the Aboriginal field assistants and the cultural heritage advisors.
- A detailed artefact analysis will be conducted by the archaeologist and the cultural heritage advisor. Analysis methodology will be formalised at a later date; however, it is expected that analysis of artefacts will be concerned with the presence or absence of striking platforms, bulbs of percussion, termination types, raw material type, number of negative flake scars, artefact types, type of reduction technique, edge damage etc. Length, width and weight scales will also be recorded and conjoining analysis will also be undertaken. Use-wear analysis will be conducted using either X20 or X40 magnification on a stereomicroscope. Images of any edge damage or use-wear will be provided and detailed in the salvage report. This will facilitate determinations of which type of stone raw materials were used at the site, the type of artefact technologies manufactured from them and what function (if any) the artefacts may have performed. Artefact types and attributes will be identified using Holdaway and Stern (2004) and artefact terminology will derive from the same source.
- The archaeological material located will be curated and stored appropriately; this is a matter for discussion between the cultural heritage advisor and the relevant Aboriginal community.
- If sufficient samples can be recovered during the salvage program, then any charcoal or other datable material should be collected in the appropriate manner and submitted for radiocarbon (C14) dating. If no charcoal samples are available then soil (sand) samples will be acquired for Optically Stimulated Luminescence (OSL) dating. The cost of this testing is to be met by the Sponsor. Collection of these samples will follow recommendations by Dr Alan Hogg from the Laboratory at the University of Waikato. This institution is very prompt (7 days if necessary) with their determinations and very competitively priced when compared with other dating laboratories. The dating of charcoal samples is priced at NZ $475 a sample. Dates can be obtained from charcoal samples of 1 g; however, an 8–10 g sample is deemed optimal. Any faunal remains that may be excavated can also be utilised for dating purposes. The minimum sample weight for C14 radiometric dating of bone is 50 g, with the ideal sample weight being 100–200 g. For smaller samples of charcoal or faunal skeletal remains, AMS (Accelerator Mass Spectrometry) dating is also available. In this case the minimum sample size for charcoal is 100 mg, while for bone it is 1.0–5.0 g.

- A summary review of the information gathered will be given to all stakeholders. Copies of all reports associated with the salvage program will be lodged with Aboriginal Affairs Victoria. This should be completed 60 days after the completion of the salvage excavations.

11.2 *Contingency Aboriginal Cultural Heritage Material*

Any Aboriginal cultural heritage recovered or salvaged during works at 104–140 Wangoom Road and 185 Aberline Road, Warrnambool would ordinarily remain the property of the RAP applicant group/s. The custody and management of Aboriginal cultural heritage during the course of the activity should comply with the requirements established by the Aboriginal Heritage Act 2006 and be assigned according to the following order of priority: the RAP; any relevant registered native title holder; any relevant native title party; relevant Aboriginal person with traditional or familiar links; and Aboriginal body with historical or contemporary links; the owner of the land; Museum of Victoria.

For this activity area it will be the responsibility of the cultural heritage advisor to:

- Catalogue the Aboriginal cultural heritage;
- Label and package the Aboriginal cultural heritage with reference to provenance;
- Arrange storage of the Aboriginal cultural heritage in a secure location together with copies of the catalogue and assessment documentation.

Contact details for the Department of Planning and Community Development are:

The Secretary
The Department of Planning and Community Development
GPO Box 2392
Melbourne
Vic 3001
Phone: 1800 762 003
Fax: 9208 3292

11.3 *Contingency Human Burials*

If any suspected human burial remains are exposed at any stage of the proposed development, then all works must cease and Victoria Police and the State Coroners Office should be notified immediately. If there are reasonable grounds to believe that the remains may be Aboriginal, the Department of Sustainability and Environment's Emergency Coordination Centre must be contacted immediately on 1300 888 544.

The following contingency plan is provided in the event of any such discovery within the activity area.

11.3.1 Discovery

All activity in the vicinity of the suspected human remains must cease to ensure minimal damage to the remains.

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The remains must be left in place and protected from harm or damage.

11.3.2 Notification

The State Coroner's Office and Victoria Police must be notified immediately. The State Coroner's Office may be contacted at any time on **1300 309 519**.

If there are reasonable grounds to suspect the remains may be Aboriginal, the Department of Sustainability and Environment's Emergency Coordination Centre must be contacted on **1300 888 544.**

The details of the location and nature of the human remains must be provided to the relevant authorities.

If it is confirmed by these authorities that the discovered remains are Aboriginal skeletal remains, the person responsible for the activity must report the existence of human remains to The Secretary (DPCD) in accordance with s. 17 of the Act.

11.3.3 Impact Mitigation or Salvage

The Secretary, after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal human remains, will determine the appropriate course of action as required by s.18(2)(b) of the Act.

Note: In consultation with any relevant RAP applicant group/s, a sponsor may consider incorporating a contingency plan to reserve an appropriate area for reburial of any recovered human remains that may be discovered during the activity. This may assist the Secretary in determining an appropriate course of action.

11.3.4 Curation and Further Analysis

The treatment of human remains must be in accordance with the direction of the Secretary and in accordance with s.18 (2) (b) *Aboriginal Heritage Act 2006*.

11.3.5 Reburial

Any reburial site(s) must be fully documented by an experienced and qualified archaeologist, clearly marked, and all details provided to Aboriginal Affairs Victoria (AAV).

Appropriate management measures must be implemented to ensure that the remains are not disturbed in the future.

Do not touch or otherwise interfere with the remains, other than to safeguard them from further disturbance.

Do not contact the media.

11.4 *Contingency Dispute Resolution*

Should any or all parties have any concerns regarding non-compliance with this CHMP, they are advised to immediately consult with the cultural heritage advisor and with the RAP, RAP applicant group/s and Aboriginal Affairs Victoria.

11.5 *Contingency Non Compliance with the Cultural Heritage Management Plan*

Although no further archaeological investigation has been recommended in this CHMP, it is possible that cultural heritage material may be uncovered during the proposed works. In order to inform the sponsor of their legal responsibilities in regards to cultural heritage management, specific legislative requirements are provided below.

In addition, a checklist referring to matters that must be complied with under the CHMP is included in Appendix 5.

The monetary value of all listed penalties is current at the time of writing.

Aboriginal Cultural Heritage

Causing harm to Aboriginal cultural heritage is an offence under the *Aboriginal Heritage Act 2006*. Under section 81, the Minister may order a cultural heritage audit to be carried out if there is reason to believe that the sponsor has contravened, or is likely to contravene, the recommendations contained in this CHMP.

Part 3 PROTECTION OF ABORIGINAL CULTURAL HERITAGE

Division 1 Protection from harm

s.27 Harming Aboriginal Cultural Heritage Unlawful

(1) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage;

and

b) at the time the act was committed the person knew that the thing harmed was Aboriginal cultural heritage.

(2) A person who is guilty of an offence under subsection (1) is liable to a penalty not exceeding:

a) in the case of a natural person, 1800 penalty units or $198 216.00;

b) in the case of a body corporate, 10,000 penalty units or $1 101 200.00.

(3) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage; and

b) at the time the act was done the person was reckless as to whether the thing harmed was Aboriginal cultural heritage.

(4) A person who is guilty of an offence under subsection (3) is liable to a penalty not exceeding:

a) in the case of a natural person, 1200 penalty units or $132 144.00;

b) in the case of a body corporate, 6000 penalty units or $660 720.00.

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(5) A person is guilty of an offence if:

a) the person knowingly does an act that harms Aboriginal cultural heritage; and

b) at the time the act was done the person was negligent as to whether the thing harmed was Aboriginal cultural heritage.

(6) A person who is guilty of an offence under subsection (5) is liable to a penalty not exceeding:

a) in the case of a natural person 600 penalty units or $66 072.00;

b) in the case of a body corporate, 3000 penalty units or $330 360.00.

(7) An offence under this section is an indictable offence.

Note: the provisions of Division 12 Part 1 of the *Crimes Act 1958* (which deal with attempts) apply to indictable offences against this Act.

s. 28 Doing an act likely to harm Aboriginal cultural heritage unlawful

A person is guilty of an offence if:

The person knowingly does an act that is likely to harm Aboriginal cultural heritage; and

At the time the act was done the person knew that the act was likely to harm Aboriginal cultural heritage.

A person who is guilty of an offence under subsection (1) is liable to a penalty not exceeding:

In the case of a natural person, 1200 penalty units or $132 144.00;

In the case of a body corporate, 6000 penalty units or $660 720.00.

An offence under this section is an indictable offence.

Note: the provisions of Division 12 Part 1 of the *Crimes Act 1958* (which deal with attempts) apply to indictable offences against this Act.

Division 4 Aboriginal Places and Objects

s. 24 Reporting discovery of Aboriginal places and objects

(1) This section applies if:

a) a person discovers an Aboriginal place or object; and

b) the person knows that the place or object is an Aboriginal place or object.

(2) The person must report the discovery to the Secretary as soon as practicable unless, at the time of making the discovery, the person has reasonable cause to believe that the Register contained a record of the place or object.

Penalty: In the case of a natural person, 60 penalty units or $6 607.20;

In the case of a body corporate, 300 penalty units or $33 036.00.

If a discovery of an Aboriginal place or object is made in the course of works being carried out on any land, the person in charge of the works is deemed for the purposes of this section to be the person who discovered the place or object.

Provision for Review

Review of this plan can be undertaken at any time by project delegates representing the sponsor and the RAP applicant group/s, or an agreed independent reviewer, to ensure that all parties are complying with the terms of the plan.

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WARRNAMBOOL CITY COUNCIL
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Date: 24 April 2014

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Website 1:
http://www.land.vic.gov.au/DPI/Vro/coranregn.nsf/pages/corangamite_climate

Website 2:
http://www.bom.gov.au/climate/averages/tables/cw_090172.shtml

Website 3:
http://www.abc.net.au/missionvoices/framlingham/significant_events/default.htm

Appendix 1 Notice of Intent

Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the *Aboriginal Heritage Act* 2006

This form can be used by the Sponsor of a Cultural Heritage Management Plan to complete the notification provisions pursuant to s.54 of the *Aboriginal Heritage Act* 2006 (the 'Act').

SECTION 1 – Sponsor Information

Name of Sponsor: Graeme Rodger

Business Name: Rodger Constructions.

Postal Address: P.O. Box 493 Warrnambool VIC 3280.

Telephone Number: (03) 5565 4444 Fax number: (03) 55 654454.

Mobile: 0417 328 898.

Email Address: doreen@rcon.com.au

SECTION 2 – Description of proposed activity and location

- Provide a project name: Aberline Estate.
- List the relevant municipal district/s (ie. Local Council or Shire): Warrnambool City Council.
- Clearly identify the proposed activity for which the cultural heritage management plan is to be prepared (ie. mining, road construction, housing subdivision):
  Housing subdivision.
- Clearly identify the area (such as listing cadastral information, attaching a copy of a title search, or indicating the street address):
  See attached map 104-140 Wangoom Rd and 185 Aberline Rd.
- **Attach a map** (to scale, with a north arrow and indicating the municipal district - if any) that clearly identifies the area and boundaries in respect of which the cultural heritage management plan is to be prepared.
  - Please ensure the map refers to existing roads and features, rather than proposed roads and features
  - Please ensure the map has the activity area outlined on it.
  - The map should have a legend, north arrow, scale, at least 3 readily identifiable geographical locations (such as road intersections, parcel boundaries, or road/river crossings), and should state the map's projection.

SECTION 3 – Cultural Heritage Advisor

If you would like a Cultural Heritage Advisor (a person who has the qualifications or experience [or both] required under section 189 of the Act) notified of the status of this Cultural Heritage Management Plan, please provide the following details for that person:

Annette Kiberras (*Name*) Urban Colour Arts. (*Company (if any)*) burajilin@bigpond.com (*Email address*)

SECTION 4 – Expected start and finish date for the cultural heritage management plan

Start date: / / Finish date: / /

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SECTION 5 – Why are you preparing this Cultural Heritage Management Plan?

☐ A Cultural Heritage Management Plan is required by the Aboriginal Heritage Regulations 2007

What is the High Impact Activity listed in the regulations? _____

Is any part of the activity in an area of cultural heritage sensitivity, as listed in the regulations? YES / NO (*Please Circle*)

☐ Other reasons (Voluntary)

☐ An Environmental Effects Statement is required

☑ A Cultural Heritage Management Plan is required by the Minister for Aboriginal Affairs

SECTION 6 – List the relevant registered Aboriginal parties (if any)

This section should only be completed where there is a registered Aboriginal party in relation to the Plan

Kuyang Mear.
Gunditj Mirring
Ella Mear.

SECTION 7 – Signature of Sponsor

I certify that to the best of my knowledge and belief that the information supplied is correct and complete.

Signed: GRA per Graeme Rodger (*Sponsor*) Date: 21 / 1 / 11

SECTION 8 – Notification Checklist

☐ Ensure appropriate attachment/s are completed and attached to this notification (see section 2 of this form).

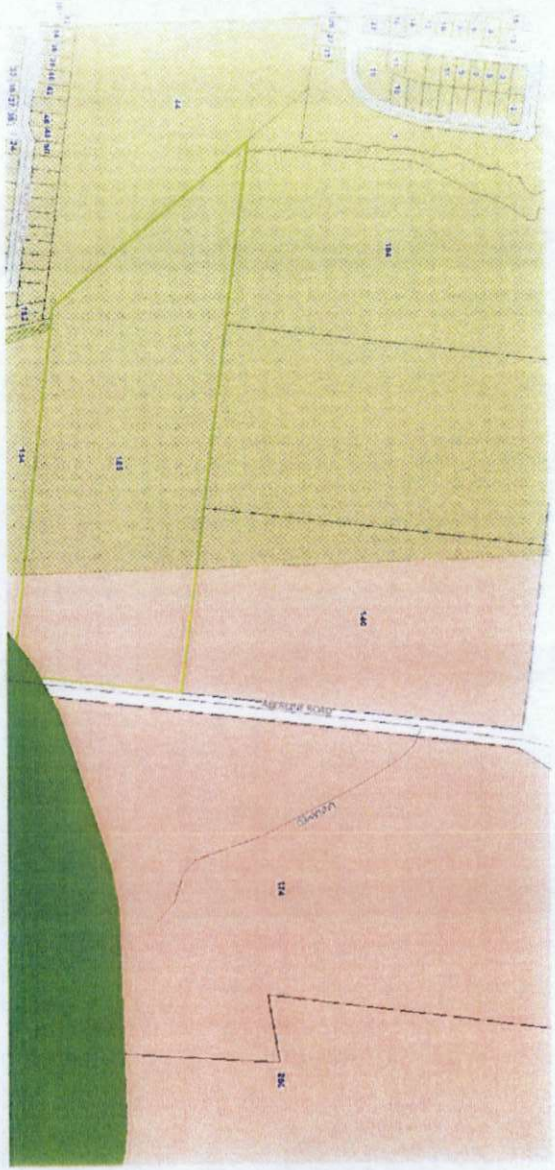
Please ensure this notice and all attached items are sent to the:

Deputy Director
Aboriginal Affairs Victoria
Department of Planning and Community Development
GPO Box 2392
MELBOURNE VIC 3001

Email: vahr@dpcd.vic.gov.au

Notes:

- Ensure that any relevant registered Aboriginal party/s is also notified. A copy of this notice may be used for this purpose. (A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan)
- In addition to notifying the Deputy Director and any relevant registered Aboriginal party/s, a sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice may be used for this purpose.



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Appendix 2 Tables

Table 5: Shovel Test Pit details

Shovel Probe Number	Context 1	Depth Range mm	Munsell and pH	Context 2	Depth Range mm	Munsell and pH	Context 3	Depth Range mm	Munsell and pH	Artefacts	Overlying a base of
1	Very dark grey moist silty clay with small basalt floaters.	0–120	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth.	120–250	pH 6.0 Munsell: 10YR 3/2	Dark brown slightly moist clay. Sparse gravel, natural sterile clay base.	250-320	pH 6.5 Munsell: 10YR 3/3	No	Clay
2	Very dark grey moist silty clay with small basalt floaters.	0–100	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand with basalt floaters up to 150mm	100–400	pH 6.0 Munsell: 10YR 3/2				No	Clay
3	Very dark grey moist silty clay with small basalt floaters.	0–80	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand with basalt floaters up to 300mm	80–200	pH 6.0 Munsell: 10YR 3/2				No	Clay
4	Very dark grey moist silty clay with small basalt floaters.	0–80	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand with basalt floaters up to 300mm	80–420	pH 6.0 Munsell: 10YR 3/2				No	Clay with basalt Floaters
5	Black loose clayey silt with basalt floaters up to	0–250	10YR2/1 pH 8.5	Very dark greyish brown loose silt with basalt floaters	250–480	10YR3/2 pH 7.5				No	Layer of basalt floaters

	150mm										
6	Black loose clayey silt with basalt floaters up to 150mm	0-150	10YR2/1 pH 8.5	Very dark greyish brown loose silt with basalt floaters	150-400	10YR3/2 pH 7.5	Yellowish brown loose coarse sand (decomposing sandstone)	400-550	10YR5/8 pH 8.5	No	Densely packed sandstone nodules up to 150mm
7	Black loose clayey silt with basalt floaters up to 150mm	0-100	10YR2/1 pH 8.5	Yellowish brown compacted coarse sand (decomposing sandstone)*	100-270	10YR5/8 pH 8.5	Brown compacted clay with basalt floaters	270-380	10YR3/3 pH 8.0	No	Clay with basalt Floaters
8	Very dark greyish brown compact clay	0-100	10YR3/2 pH 8.0	Very dark brown compact clayey silt	100-280	10YR2/2 pH 7.5				No	Dense basalt floaters
9	Very dark grey moist silty clay with small basalt floaters.	0-100	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth.	100-350	pH 6.0 Munsell: 10YR 3/2				No	Clay
10	Dark Greyish brown compact sandy silt	0-100	10YR4/2 pH 7.5	Very dark greyish brown compact sandy silt with dense gravel inclusions	100-360	10YR3/2 pH 7.0				No	Clay with gravel inclusions
11	Very dark grey moist silty clay with small basalt floaters.	0-100	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth.	100-250	pH 6.0 Munsell: 10YR 3/2				No	Clay with gravel inclusions
12	Dark Greyish brown compact sandy silt	0-100	10YR4/2 pH 7.5	Very dark greyish brown compact sandy silt with dense gravel inclusions	100-330	10YR3/2 pH 7.0				No	Clay with gravel inclusions
13	Dark Greyish brown compact	0-80	10YR4/2	Very dark greyish brown compact sandy silt with	80-280	10YR3/2				No	Clay with gravel

	sandy silt		pH 7.5	dense gravel inclusions		pH 7.0					inclusions
14	Very dark grey moist silty clay with small basalt floaters	0-80	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth.	80-400	pH 6.0 Munsell: 10YR 3/2				No	Clay with gravel inclusions
15	Very dark grey moist silty clay with small basalt floaters	0-140	pH 7.0 Munsell: 10YR 3/1	Very dark greyish brown slightly moist silty sand. Increasingly gravelly with depth.	140-200	pH 6.0 Munsell: 10YR 3/2				No	Clay with gravel inclusions
16	Dark Greyish brown compact sandy silt	0-100	10YR4/2 pH 7.5	Very dark greyish brown compact sandy silt with dense gravel inclusions	100-320	10YR3/2 pH 7.0				No	Clay with gravel inclusions
17	Dark Greyish brown compact sandy silt	0-100	10YR4/2 pH 7.5	Very dark greyish brown compact sandy silt with dense gravel inclusions	100-340	10YR3/2 pH 7.0				No	Clay with gravel inclusions
18	Very dark greyish brown compacted silty sand	0-100	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	100-350	10YR3/3 pH 7.0				No	Clay with gravel inclusions
19	Very dark greyish brown compacted silty sand	0-80	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	80-250	10YR3/3 pH 7.0				No	Clay with gravel inclusions
20	Very dark greyish brown compacted silty sand (low lying wet area)	0-80	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel (down to water table)	80-250	10YR3/3 pH 7.0				No	Clay with gravel inclusions (water)

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21	Very dark greyish brown compacted silty sand	0–100	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	100–250	10YR3/3 pH 7.0				No	Clay with gravel inclusions
22	Very dark greyish brown compacted silty sand	0–150	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	150–400	10YR3/3 pH 7.0				No	Clay with gravel inclusions
23	Very dark greyish brown compacted silty sand	0–80	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	80–400	10YR3/3 pH 7.0				No	Clay with gravel inclusions
24	Very dark greyish brown compacted silty sand	0–100	10YR3/2 pH 7.0	Dark brown compacted clay with dense gravel	100–350	10YR3/3 pH 7.0				No	Clay with gravel inclusions
25	Very dark brown compacted silty sand	0–100	10YR2/2 pH 7.0	Very dark brown compacted clayey silt	10YR2/2 pH 5.5					No	Clay with gravel inclusions
26	Very dark greyish brown compacted fine sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–250	10YR2/2 pH 7.0				No	Clay with gravel inclusions
27	Very dark greyish brown compacted fine sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–300	10YR2/2 pH 7.0				No	Clay with gravel inclusions
28	Very dark greyish brown compacted fine sand	0–150	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	150–380	10YR2/2 pH 7.0				No	Clay with gravel inclusions
29	Very dark greyish brown compacted fine sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–320	10YR2/2 pH 7.0				No	Clay with gravel inclusions
30	Very dark greyish brown	0–80	10YR3/2	Very dark greyish brown	80–250	10YR2/2				No	Dense layer of basalt with

	compacted fine sand		pH 6.5	compacted silty sand with basalt floaters		pH 7.0					clay infilling cracks
31	Very dark greyish brown compacted fine sand	0–100	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand with dense gravel	100–40	10YR2/2 pH 7.0				No	Clay with gravel inclusions
32	Very dark greyish brown compacted fine sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–300	10YR2/2 pH 7.0				No	Clay with gravel inclusions
33	Very dark grey compact sandy silt	0–80	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	80–250	10YR3/1 pH 7.0				No	Clay
34	Very dark grey compact sandy silt	0–80	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	80–250	10YR3/1 pH 7.0				No	Clay
35	Very dark grey compact sandy silt	0–80	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	80–300	10YR3/1 pH 7.0				No	Clay
36	Very dark grey compact sandy silt	0–80	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	80–270	10YR3/1 pH 7.0				No	Clay
37	Very dark grey compact sandy silt	0–40	10YR3/1 pH 7.0	Layer of decomposing basalt floaters	40–100	N/A	Black compacted clayey silt	100-270	10YR2/1 pH 7.0	No	Clay
38	Very dark greyish brown compacted fine sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–350	10YR2/2 pH 7.0				No	Clay
39	Very dark grey compact	0–80	10YR3/1 pH 7.0	Very dark grey compact clay with gravel	80–280	10YR3/1 pH 7.0				No	Clay

	sandy silt			inclusions							
40	Very dark greyish brown compacted fine sand	0–50	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	50–380	10YR2/2 pH 7.0				No	Clay with gravel inclusions
41	Very dark grey compact sandy silt	0–50	10YR3/1 pH 7.0	Black compacted clayey silt	50–260	10YR2/1 pH 7.0				No	Clay with basalt
42	Very dark grey compact sandy silt	0–50	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	50–250	10YR3/1 pH 7.0				No	Clay with basalt
43	Brown compacted clay with tile fragments and plastic	0–50	10YR4/3 pH 8.0	Black compacted silty sand with plastic and metal (rusty nail?)	50–370	10YR2/1 pH 8.5				No	Clay
44	Very dark grey compact sandy silt	0–40	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	40–370	10YR3/1 pH 7.0				No	Clay and basalt
45	Very dark grey compact sandy silt	0–40	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions and basalt floaters	40–370	10YR3/1 pH 7.0				No	Clay and basalt
46	Very dark grey compact sandy silt	0–50	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	50–200	10YR3/1 pH 7.0				No	Clay and basalt
47	Very dark grey compact sandy silt	0–50	10YR3/1 pH 7.0	Very dark grey compact clay with gravel inclusions	50–250	10YR3/1 pH 7.0				No	Clay and basalt
48	Vey dark greyish brown compacted	0–150	10YR3/2 pH 6.5	Very dark greyish brown compacted silty	150–430	10YR3/2 pH 7.0				No	Clay

	silty sand Comment: With grass roots – ground appears very disturbed			sand Comment: gravel throughout and increasing with depth							
49	Vey dark greyish brown compacted silty sand	0–150	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand Comment: gravel throughout and increasing with depth	150–400	10YR3/2 pH 7.0				No	Clay
50	Vey dark greyish brown compacted silty sand	0–60	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	60–200	10YR3/2 pH 7.0				No	Clay
51	Vey dark greyish brown compacted silty sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–250	10YR3/2 pH 7.0				No	Clay
52	Vey dark greyish brown compacted silty sand	0–30	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	30–180	10YR3/2 pH 7.0				No	Clay with basalt Floaters
53	Vey dark greyish brown compacted silty sand	0–40	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	40–300	10YR3/2 pH 7.0				No	Clay with basalt Floaters
54	Vey dark greyish brown compacted silty sand	0–50	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	50–280	10YR3/2 pH 7.0				No	Clay
55	Vey dark greyish brown compacted	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty	80–350	10YR3/2 pH 7.0				No	Clay

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	silty sand			sand							
56	Vey dark greyish brown compacted silty sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–380	10YR3/2 pH 7.0				No	Clay
57	Vey dark greyish brown compacted silty sand	0–100	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	100–400	10YR3/2 pH 7.0				No	Clay
58	Vey dark greyish brown compacted silty sand	0–400	10YR3/2 pH 6.5	Dense Gravel Layer	400–450		Vey dark greyish brown compacted silty sand	450-550	10YR3/2 pH 7.0	No	Clay
59	Vey dark greyish brown compacted silty sand	0–80	10YR3/2 pH 6.5	Very dark greyish brown compacted silty sand	80–250	10YR3/2 pH 7.0				No	Clay
60	Vey dark greyish brown compacted silty sand	0–100	10YR3/2 pH 6.5	Very dark grey compacted silty sand Comment: large, up to 150mm basalt floaters throughout	100–400	10YR3/1 pH 7.5				No	Clay
61	Vey dark greyish brown compacted silty sand	0–100	10YR3/2 pH 6.5	Very dark grey compacted silty sand Comment: large, up to 150mm basalt floaters throughout	100–400	10YR3/1 pH 7.5				No	Clay
62	Very dark brown loosely compacted clayey silt Comment:	0–150	10YR2/1 pH 8.0	Black loosely compacted clay with basalt floaters	150–500	10YR2/1 pH 8.0				No	Basalt

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	Soil is more organic than previous soils										
63	Black friable clayey silt Comment: Grass roots throughout, soil is wet	0–70	10YR2/1 pH 7.5	Black friable clay with basalt floaters	70–400	10YR2/1 pH 6.5	Dark brown compact clayey silt	400-	10YR3/3 pH 7.0	No	Clayey silt
64	Dark brown friable silty sand Comment: Inside front yard of corner house	0–100	10YR3/3 pH 8.5	Black	100–300	10YR2/1 pH 9.0					Pit contained a sheet of corrugated material over a possible sewer. Excavations halted
65	Dark greyish brown weakly compacted fine sand Comment: Inside front yard of second house west of Aberline Road	0–80	10YR4/2 pH 7.5	Dark greyish brown compact sandy silt Comment: sparse small tree roots throughout.	80–280	10YR4/2 pH 7.5				No	Clay with gravel inclusions
66	Dark greyish brown weakly compacted fine sand	0–100	10YR4/2 pH 7.5	Dark greyish brown compact sandy silt Comment: sparse small tree roots throughout.	100–360	10YR4/2 pH 7.5				No	Clay
67	Dark greyish brown weakly compacted fine sand	0–80	10YR4/2 pH 7.5	Dark greyish brown compact sandy silt Comment: small	80–320	10YR4/2 pH 7.5				No	Clay

				basalt floaters.							
68	Dark greyish brown weakly compacted fine sand	0–70	10YR4/2 pH 7.5	Dark greyish brown compact sandy silt Comment: small basalt floaters.	70–300	10YR4/2 pH 7.5				No	Clay
69	Dark greyish brown weakly compacted fine sand	0–80	10YR4/2 pH 7.5	Dark greyish brown compact sandy silt	80–280	10YR4/2 pH 7.5				No	Clay with gravel inclusions
70	Dark greyish brown compact silt	0–100	10YR4/2 pH 7.0	Greyish brown compact medium sand Comment Gravel increasing with depth	100–330	10YR5/2 pH 7.0				No	Clay
71	Very dark greyish brown compact silty sand	0–250	10YR3/2 pH 6.5	Dark brown compact clayey silt Comment: clay increasing with depth	250–380	7.5YR3/2 pH 6.5				No	Clay
72	Very dark greyish brown compact coarse sand	0–100	10YR3/2 pH 6.5	Very dark greyish brown compact silty sand Comment: gravel increasing with depth	100–350	10YR3/2 pH 6.5				No	Clay with gravel inclusions
73	Grey compact sandy silt	0–100	10YR5/1 pH 6.0	Dark grey compact coarse sand	100–350	10YR4/2 pH 6.5	Dark yellowish brown compact silty sand	350-400	10YR4/4 pH 6.5	No	Clay
74	Very dark brown compact clayey silt (Wet)	0–80	10YR2/2 pH 6.5	Black compact clayey silt (Wet)	80–270	10YR2/1 pH 6.5	Very dark greyish brown compact clay. Comment: wet with gravel inclusions	270-330	10YR3/2 pH 6.5	No	Clay

75	Dark greyish brown compact fine sand	0–100	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	100–280	10YR3/2 pH 6.5				No	Clay with gravel inclusions
76	Dark greyish brown compact fine sand	0–100	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	100–250	10YR3/2 pH 6.5				No	Clay
77	Dark greyish brown compact fine sand	0–100	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	100–330	10YR3/2 pH 6.5				No	Clay
78	Dark greyish brown compact fine sand	0–70	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	70–210	10YR3/2 pH 6.5				No	Clay
79	Very dark grey compact medium sand	0–100	10YR3/1 pH 6.5	Black compact clayey silt Comment: Gravel inclusions increasing with depth	100–350	10YR2/1 pH 7.0				No	Clay
80	Dark greyish brown compact fine sand	0–80	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	80–300	10YR3/2 pH 6.5				No	Clay with gravel inclusions
81	Dark greyish brown compact fine sand	0–100	10YR4/2 pH 6.5	Very dark greyish brown compact fine sand	100–300	10YR3/2 pH 6.5				No	Clay with gravel inclusions
82	Very dark greyish brown compact silt	0–100	10YR3/2 pH 6.5	Very dark greyish brown compact coarse sand	100–320	10YR3/2 pH 7.0	Brown compact clayey sand	320-370	10YR4/3 pH7.0	No	Clay
83	Dark greyish brown compact medium sand	0–100	10YR4/2 pH 6.5	Very dark greyish brown compact coarse sand Comment:	100–250	10YR3/2 pH 6.5	Brown compact coarse sand	250-370	10YR4/3 pH7.0	No	Clay

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.....24 April 2014.....

				Sparse basalt floaters, sparse charcoal							
84	Dark grey compact coarse sand	0–30	10YR4/1 pH 7.0	Yellowish brown compact clay Comment: Sparse charcoal	30–200	10YR5/4 pH 7.0				No	Clay
85	Greyish brown compact medium sand	0–40	10YR5/2 pH 7.0	Dark greyish brown compact medium sand Comment: Sparse basalt, sparse charcoal	30–250	10YR4/2 pH 6.5	Very dark greyish brown compact silt	250-380	10YR3/2 pH7.0	No	Clay
86	Dark greyish brown compact medium sand Comment: sparse basalt floaters	0–50	10YR4/2 pH 6.5	Very dark greyish brown compact silt Comment: basalt floaters increasing with depth	50–350	10YR3/2 pH7.0				No	Clay
87	Dark greyish brown compact medium sand Comment: sparse basalt floaters	0–50	10YR4/2 pH 6.5	Very dark greyish brown compact silt Comment: basalt floaters increasing with depth	50–400	10YR3/2 pH7.0				No	Clay
88	Dark greyish brown compact medium sand	0–50	10YR4/2 pH 6.5	Very dark greyish brown compact silt	50–300	10YR3/2 pH7.0				No	Clay
89	Very dark greyish brown compact silt	0-100	10YR3/2 pH 6.5	Very dark greyish brown compact sandy silt	100-300	10YR3/2 pH 6.0	Dark brown compact clay	300-350	10YR3/3 pH 7.0	No	Clay
90	Very dark greyish brown	0-100	10YR3/2 pH 6.5	Very dark greyish brown compact	100-300	10YR3/2 pH 6.0	Dark brown compact clay	300-350	10YR3/3 pH 7.0	No	Clay

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	compact silt			sandy silt							
91	Very dark greyish brown compact silt	0-100	10YR3/2 pH 6.5	Very dark greyish brown compact sandy silt	100-250	10YR3/2 pH 6.0	Dark brown compact clay	250-300	10YR3/3 pH 7.0	No	Clay

Table 6: Grid co-ordinates of test pits and shovel pits

NAME	NORTHING	EASTING	ELEVATION
TP01	5752585	632561.0	
TP02	5753106	632634.0	38.8
TP03	5752817	632591.0	30.5
TP04	5752954	632414.3	27.9
TP05	5753217	632326.9	34.6
TP06	5753000	632119.4	27.1
TP07	5753304	632086.8	33.1
SP01	5752661	632581.0	
SP02	5752720	632598.0	
SP03	5752756	632606.0	
SP04	5752833	632614.0	
SP05	5752878	632619.0	
SP06	5752966	632642.0	
SP07	5753045	632651.0	
SP08	5753083	632661.0	
SP09	5752620	632555.4	25.0
SP10	5752626	632506.0	24.7
SP11	5752637	632457.1	24.7
SP12	5752647	632407.6	23.5

SP13	5752657	632357.7	23.3
SP14	5752662	632311.0	
SP15	5752677	632260.2	22.6
SP16	5752689	632210.4	22.7
SP17	5752702	632160.5	20.5
SP18	5752721	632069.9	22.4
SP20	5752819	632079.5	21.2
SP22	5752800	632177.7	22.3
SP23	5752789	632226.0	22.1
SP24	5752778	632276.8	22.5
SP26	5752751	632373.1	24.0
SP27	5752737	632421.2	25.3
SP28	5752727	632521.6	22.1
SP29	5752720	632570.5	27.4
SP30	5752767	632578.3	28.2
SP31	5752840	632494.4	27.2
SP32	5752730	632476.0	
SP33	5752848	632444.2	27.1
SP34	5752855	632395.7	25.6
SP34	5752943	632462.4	29.8
SP35	5752945	632462.4	29.5
SP36	5752935	632505.8	29.0
SP37	5752925	632555.7	31.7
SP38	5753012	632620.5	37.6
SP39	5753023	632572.5	34.7
SP40	5753030	632522.8	32.9

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SP41	5753041	632475.3	29.9
SP42	5753151	632447.5	36.3
SP43	5753141	632497.2	38.8
SP44	5753134	632544.0	35.2
SP45	5753124	632593.9	38.1
SP46	5753247	632464.2	35.5
SP47	5753255	632508.5	35.9
SP48	5752847	632343.0	
SP49	5752858	632288.0	
SP50	5752874	632248.0	
SP51	5752876	632216.0	
SP52	5752992	632213.0	
SP53	5752984	632254.0	
SP54	5752976	632299.0	
SP55	5759681	632348.0	
SP56	5753061	632405.0	
SP57	5753067	632351.0	
SP58	5753080	632293.0	
SP59	5753091	632224.0	
SP60	5753179	632309.7	33.7
SP61	5753189	632246.0	
SP62	5753232	632559.1	37.3
SP63	5753223	632658.9	38.0
SP64	5753223	632670.0	
SP65	5753258	632415.5	28.2
SP66	5753268	632365.8	34.4

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SP67	5753275	632316.1	33.3
SP69	5753290	632224.7	33.2
SP70	5752896	632147.5	25.8
SP71	5752899	632098.1	23.3
SP72	5752906	632047.5	22.5
SP73	5752914	631997.9	22.2
SP74	5752922	631949.6	22.8
SP75	5753020	631970.1	24.2
SP76	5753013	632018.3	26.1
SP77	5753005	632068.0	26.9
SP78	5752994	632167.8	26.5
SP79	5753095	632183.1	28.5
SP80	5753105	632134.2	28.0
SP81	5753110	632084.7	28.6
SP82	5753116	632034.2	27.0
SP83	5753118	631983.7	27.4
SP84	5753215	632002.0	28.6
SP86	5753198	632100.4	30.3
SP87	5753197	632151.1	31.5
SP88	5753186	632194.9	34.5
SP89	5753296	632165.0	34.1
SP90	5753306	632115.7	33.3
SP91	5753308	632044.0	
SP98	5753284	632267.1	33.1

Appendix 3 Photographs

Complex assessment

Plate 8: STP 01 end of excavation

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bunjilin@bigpond.com | (03) 5282 3991 | 0410 440 464

Plate 9: STP 48 End of excavation

Plate 10: STP 60 End of excavation

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Plate 11: View west from STP 85

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Appendix 4 Qualifications of personnel involved in this CHMP

Annette Xiberras

Cultural Heritage Advisor

Grad Dip, Natural and Cultural Resource Management (Deakin)

Wurundjeri Elder

Annette has been working in the field of Aboriginal cultural heritage since 1989. Her long career in this area has seen her gain numerous formal qualifications in Cultural Heritage Management, and has allowed her to work with some of Victoria's leading archaeological experts. Annette's status as an acknowledged Wurundjeri Elder, and her links with other Victorian Indigenous communities, mean that she has a unique standing and authority within the field of Aboriginal Cultural Heritage Management in Victoria.

Annette's most recent experience has been in preparing Cultural Heritage Management Plans in the Metropolitan Melbourne, Westernport, Mornington Peninsula and Gippsland Regions through her consultancy, Urban Colours Arts and Cultural Heritage Consultants Pty Ltd, including:

- residential housing developments
- road infrastructure
- pipeline route developments
- urban developments
- mixed use zone developments
- waterway rehabilitation works
- national and state park management projects
- major infrastructure developments

Fields of competence

- Aboriginal archaeological surveys, sub-surface testing and excavation
- field excavation and supervision

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- project management
- Aboriginal, community and client liaison
- material culture analysis
- cultural heritage management plan composition

Recent employment

2007 – present

Managing Director, Urban Colours Arts and Cultural Heritage Consultants

2004 – 2005

Cultural Heritage Officer, Central Victoria Program, Aboriginal Affairs Victoria

1999 – 2004

Regional Manager, Kulin Nations Cultural Heritage Organisation

Education

1994–1995

Archaeological and cultural heritage training

Northern Metropolitan Institute of TAFE

2005–2006

Graduate Diploma, Natural and Cultural Resource Management

Deakin University, Institute of Koori Education

Recipient of Pratt Foundation Scholarship

Selected Aboriginal cultural heritage projects and experience

Rivendale Estate, Drouin – Cultural Heritage Management Plan

Tooradin Airfield Helicopter Hangar – Cultural Heritage Management Plan

1040 Glasscocks Road, Cranbourne – Cultural Heritage Management Plan

Mt Shamrock Quarry Extension, Pakenham – Joint Contractors (with Biosis Research), Archaeological Salvage Operation

Bend Road, EastLink – Archaeological Field Assistant, Wurundjeri Tribe Lands and Cultural Heritage Council Inc

Mt William, Sunbury Rings, BullumBullum – Site preservation, restoration and education of future generations

Steven O'Reilly

Archaeologist

Bachelor of Science, Australian National University, 1988.

Steven has a wide range of private consulting and public sector experience, providing professional assessments and advice on Aboriginal heritage for over 20 years. He has extensive experience in Aboriginal archaeology and cultural heritage management in various parts of Australia.

Steven has experience in all facets of cultural heritage management including the management of archaeological survey, testing and salvage programs, artefact analysis, Indigenous consultation, professional advice, formal presentations and the preparation of reports, records and contingency plans.

Steven has extensive knowledge and understanding of legislative requirements and administrative procedures to determine the level of assessment or investigation required for a project and advise clients on their legal responsibilities and obligations. He has implemented the assessment, investigations and liaison required to enable clients to obtain approvals and sign off for their projects.

Fields of competence

- Project management
- Liaison with clients, Aboriginal communities and government authorities
- Provide professional advice on Aboriginal Heritage Assessments
- Background research and report writing
- Aboriginal archaeological survey, sub-surface testing and excavation
- Undertake data and artefact analysis
- Manage research and field staff
- Supervise on-site monitoring staff
- Develop cultural heritage management plans and procedures to ensure compliance with appropriate legislation
- Communication with all stakeholders to resolve client issues and ensure project objectives are met

Renee McAlister

Archaeologist

Bachelor of Arts, Honours (Archaeology) La Trobe University (2004–09)

Renee has an Honours degree in Archaeology and a double major in Archaeology and History, specialising in Australian history and archaeology. Renee has been working as an archaeologist since completing her university degree and prior to that worked on a range of excavations as a volunteer – equating to two years experience as an archaeologist. She has excellent research skills and excellent time management skills.

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She has gained a wide range of field experience working on both historical and Aboriginal Sites. Renee has a sound understanding of cultural heritage legislation, Heritage Victoria and AAV procedures and processes and has authored Cultural Management Plans and Due Diligence Assessments. Renee is a GIS Specialist, using ArcGIS and produces all maps required for CHMP's and Site Cards.

Recent employment

2008 - Heritage Insight at Dandenong.

2008 - Dig International at site of Ned Kelly's last stand, Glenrowan and Pentridge Village (Pentridge Prison), Coburg.

2009 – present – Urban Colours Arts Cultural Heritage Consultants on a wide variety of Aboriginal sites

2010 – present – Grist Archaeology Heritage Management – on a wide variety of archaeological projects.

Neil Dudley

Archaeologist

Bachelor of Archaeology, Honours, La Trobe University (2002–08)

Neil has an Honours degree in Bachelor of Archaeology, only those students averaging over 70% were eligible to study exclusively archaeological subjects. This allowed for a thorough grounding in Australian archaeology, ranging from Aboriginal through to historical. During the seven years which Neil studied, primarily as a part-time student, he participated in numerous volunteer and professional archaeological excavations and surveys.

These projects were wide-ranging and include the Little Lonsdale Street historical excavation, the Moorna Town historical excavations and the Bend Road, Keysborough Aboriginal excavation project. He also participated in overseas surveys and excavations in Nasca, Peru and Nuemark Nord, Germany as part of his professional development.

Neil has acquired broad fieldwork experience and assisted in over 50 archaeological reports and CHMPs, working for several companies as a sub-contractor. This experience has given him a high degree of competency in fieldwork methods employed in Australia and overseas. He has also acted as field director for the Point Nepean project, which involved approximately 100 days of field work, often utilising student volunteers. More recently Neil has authored several CHMPs.

Recent employment

2010–present
Urban Colours Arts Cultural Heritage Consultants

2002–2010
Sub-contractor for: Christine Williamson, Andrew Long and Associates, Kayandel Archaeological Services, Lieden University (Netherlands), La Trobe University, Tardis Enterprises, Dr Vincent Clark, Kelleher and Nightingale, Austral Archaeology and River Junction Archaeology.

Education

2002–2008
Bachelor of Archaeology, Honours, La Trobe University

Relevant Qualifications/Licenses

Excavator Operator, DLI Australian License
Construction Industry Basic Induction Training (Red Card)
Train Track Awareness Level 1
Four-Wheel Drive Experience
Remote Area Experience

Paula Brennan

Copyeditor

BA, Monash University, Grad. Dip. Publishing and Editing,RMIT

Paula is an editor with more than ten years' experience.

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Appendix 5 Checklist for Compliance

Checklist for compliance with the Cultural Heritage Management Plan

Date: __/____/____

Name: _____ Position: _____

CHMP NO: _____ Title: _____

Period of time covered by checklist: _____

Check YES/NO boxes and complete comments as appropriate

POINT	TASK	YES	NO	COMMENTS
1	Has the CHMP being approved			
2	Is there a designated contact person for dealing with Aboriginal cultural heritage issues? Name of contact person:			
3	Has a map been prepared that shows the location of sites within the activity area?			N/A
4	Has the map referred to in Point 3 been distributed to all on-site workers?			N/A
5	Have all on-site workers (including contractors) undergone an induction session on Aboriginal cultural heritage that included information on the recommendations contained in the CHMP: The archaeology of the activity area Legislative responsibilities to Aboriginal cultural heritage The identification of Aboriginal cultural heritage Protocols to be followed if Aboriginal cultural heritage is uncovered during works(as			

	stated in the contingency plans Protocols to be followed if skeletal remains are uncovered during works?			

MANAGEMENT OF ABORIGINAL CULTURAL HERITAGE FOUND DURING THE ACTIVITY.
Where appropriate, this section should be completed with the assistance of the Cultural Heritage Advisor.

CONTINGENCY PLANS FOR THE DISCOVERY OF ABORIGINAL CULTURAL HERITAGE

POINT	TASK	YES	NO	COMMENTS
6	Has any previously unrecorded Aboriginal cultural heritage been uncovered during works? If YES, complete Points 7 to 18			
7	Was the designated contact person for dealing with Aboriginal cultural heritage issues immediately notified of the discovery?			
8	Did all works cease within a 25 metre radius buffer of the identified Aboriginal cultural heritage?			
9	Was this buffer clearly marked with safety webbing or other highly visible marker?			
10	Was the Cultural Heritage Advisor notified within 24 hours of the discovery?			
11	Was the Secretary of the Department of Planning and Community Development notified within 24 hours of the discovery?			
12	Did the Cultural Heritage Advisor notify the RAP applicant group/s of the discovery and invite them to inspect the site within 2 working days of notification?			
13	Did the Cultural Heritage Advisor inspect the discovery within 2 working days of notification?			
14	Did the Cultural Heritage Advisor determine that the discovery was a new site that required registration with the VAHR? If YES, complete Points 17 to 20			
15	Did the RAP applicant group/s, in consultation with the Cultural Heritage Advisor and land manager, provide the land manager with recommendations to be followed in the management of the identified Aboriginal cultural heritage within 5 working days of the site inspection?			
16	Have any recommended measures been implemented?			
17	Have new or updated site record cards for the discovery been submitted to AAV?			
18	Were further archaeological investigations required? If YES, complete Point 19			
19	Were any further investigations overseen by an appropriately qualified archaeologist and representatives of the RAP applicant group/s?			

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CONTINGENCY PLANS FOR ABORIGINAL CULTURAL MATERIALS

POINT	TASK	YES	NO	COMMENTS
20	Have any Aboriginal cultural materials identified on the property been returned to the RAP applicant group/s?			
21	If harm to the discovered Aboriginal cultural heritage could not be avoided have the cultural heritage advisor and representatives of the RAP or RAP applicants undertaken a salvage excavation?			
22	In the case of a salvage program taking place has he following being addressed. Has the salvage program taken place in accordance with R61? Has the Cultural Heritage Advisor completed new or updated site records for the VAHR? Has the Cultural Heritage Advisor			

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	catalogued and analysed the found cultural material? Has a report been produced detailing the results of the salvage excavation and analysis of cultural material and been lodged with AAV or the RAP applicant group/s? Has the Cultural Heritage Advisor arranged for the custody of the cultural heritage material to be passed on to the most appropriate person/group as listed in Section 9.2?			
23	Has the Cultural Heritage Advisor: catalogued the Aboriginal cultural heritage? appropriately packaged and labeled the Aboriginal cultural heritage? consulted with the RAP applicant group/s to arrange secure storage of the Aboriginal cultural material and associated documentation?			

CONTINGENCY PLANS FOR THE DISCOVERY OF HUMAN SKELETAL REMAINS

POINT	TASK	YES	NO	COMMENTS
24	Have any human skeletal remains been uncovered during works? If YES, complete Points 25 to 30			
25	Was the designated contact person for dealing with Aboriginal cultural heritage issues immediately notified of the discovery?			
26	Did all activity in the vicinity cease immediately?			
27	Were the Coroner's Office and Victoria Police notified of the discovery of the remains?			
28	Was the DSE Emergency Co-ordination Centre notified of the discovery of the remains?			
29	Were the remains identified as Aboriginal? If YES, complete Points 31 to 34.			
30	Did the designated contact person report the discovery of the remains to the Secretary of the Department of Planning and Community Development?			
31	Was the course of action established by the Secretary of the Department of Planning and Community Development implemented?			
32	If the remains were reburied, was the location of the reburial documented by a qualified archaeologist and the details provided to AAV?			
33	Were appropriate management measures implemented to ensure that the remains are not disturbed in the future?			

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CONTINGENCY PLANS FOR REVIEWING COMPLIANCE WITH THE CHMP

POINT	TASK	YES	NO	COMMENTS
34	Has communication been maintained between the Sponsor, Cultural Heritage Advisor and RAP applicant group/s?			
35	Have changes in contact details been circulated to all parties?			
36	Were any queries or issues dealt with immediately?			
37	Was last fortnight's checklist for compliance with the Cultural Heritage Management Plan completed?			

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38	Was last fortnight's checklist for compliance with the Cultural Heritage Management Plan circulated to the Cultural Heritage Advisor and the RAP applicant groups?			

CONTINGENCY PLANS FOR DISPUTE RESOLUTION

POINT	TASK	YES	NO	COMMENTS
39	Were these disputes referred to AAV?			
ADDITIONAL COMMENTS				
SIGNATURES				
Signature of person who completed this checklist:		Signature of designated contact person for dealing with Aboriginal cultural heritage issues:		

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Appendix 6 Scientific Assessment

Table 7: Description of Scientific Ratings

Rating description	Rating	Description
Site contents. The site contents refer to all material and organic remains present that are the result of past human behaviour or that are associated with past human behaviour or that can shed light on past human behaviour. Site contents also refer to the structure of the site including its size, the distribution or patterning of material remains within the site, the presence of any stratified deposits and the rarity of the material remains. The site condition affects its site significance and sites are assessed on the basis of the degree to which they have been disturbed.	0	No cultural material
	1	Small number of artefacts or a limited range of cultural materials with no evident stratification.
	2a	A large number, but limited range, of cultural materials and (or)
	2b	Some intact stratified deposits
	3a	A large number of a diverse range of cultural materials and (or)
	3b	A largely intact stratified deposit and
	3c	Surface spatial patterning of cultural materials that still reflects the way in which the materials were deposited.
Site condition. The site condition refers to the degree of disturbance that has affected the cultural heritage site.	0	Site destroyed
	1	Site in a deteriorated condition and with a high degree of disturbance but some cultural materials remain
	2	Site in a fair-to-good condition, but with some disturbance
	3	Site in an excellent condition, with little or no disturbance.

Representativeness. The representativeness refers to the local or regional distribution of a particular site type and is assessed on whether the site is common, rare or unique in a given region. The assessments of representativeness are hence subjective and constantly changing as they are biased by the current knowledge of the distribution and numbers of archaeological sites in a region. This varies from place to place depending on the extent of previous archaeological research. Consequently, a site which is assigned low significance values for contents and condition, but a high significance value for representativeness, can only be regarded as significant in terms of current knowledge of the local or regional archaeology. Any such site should be subject to further reassessment as additional archaeological research is undertaken. Assessment of representativeness also takes into account the contents and condition of a particular site. For example, in any region there may only be a limited number of sites of any type that have suffered minimal disturbance. Such sites would therefore be given a high significance rating for representativeness, even though they are a common occurrence in the region (Bowdler 1981: 12, 123–133).	1	Common occurrence
	2	Occasional occurrence
	3	Rare occurrence
Overall scientific significance. Overall scientific significance ratings for sites based on a cumulative score for site contents, site integrity and representativeness are given as follows:	1–4	Low scientific significance
	5–7	Moderate scientific significance
	8–9	High scientific significance

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Appendix 7 Glossary

Archaeology: The study of the material remains of the human past.

Archaeological site: A place/location of either Aboriginal or non-Aboriginal origin that contains material remains relating to the human past

Artefact: Any product made by human hands or caused to be made through human actions.

Artefact scatter: A surface scatter of stone artefacts is defined as being the presence of items of cultural material within a given area.

Backed blade (geometric microlith): Backing is the process by which one or more margins contain consistent retouch opposite to the sharp working edge. A backed blade is a blade flake that has been abruptly retouched along one or more margins opposite the sharp working edge. Backed pieces include backed blades and geometric microliths. Backed blades are a feature of the Australian Small Tool Tradition dating from between 5,000 and 1,000 years ago in southern Australia (Mulvaney 1975).

Blade: A long parallel sided flake from a specially prepared core. Blade flakes retain observable and complete fracture planes, platform, lateral margins and termination and are twice as long as they are wide. A broken blade is any stone artefact retaining partial diagnostic features of a blade.

Bipolar: A core or a flake which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms often indicate that the flake has come off a heavily worked core.

BP: Before Present. The present is defined as 1950.

Core: An artefact from which flakes have been detached using a hammerstone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake.

Cortex: Original or natural (unflaked) surface of a stone. This may be further divided into nodule, pebble and terrestrial cortex indicating the original source of the material.

Ethnography: The scientific description of living cultures.

Flake

Broken Flake : Any stone retaining partial diagnostic features of a flake

Complete/Whole Flake: An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core), platform, termination and bulb of percussion.

Distal Flake: Any flake on which the breakage removes the platform but retains the termination

Proximal Flake: Any flake on which the breakage removes the termination but retains the platform.

Primary flake: The first flakes struck off a core in order to create a platform from which other flakes can then be struck.

Secondary flaking/retouch: Secondary working of a stone artefact after its manufacture. This was often done to resharpen stone tools after use, or in the production of formal tool types such as blade flakes and scrapers.

Focal platform: This is a term used to describe the shape of the platform on a flake. A focal platform is narrower than the body of the flake. Focal platform flakes are produced when flakes are struck off near the edge of the platform on a core.

Geometric microlith: Artefacts less than 80 mm in maximum dimension which are backed at one or other end, sometimes at both ends, and sometimes on one lateral margin as well, the result being a form that is symmetrical around its transverse axis.

Hammerstone: A cobble or cobble fragment exhibiting pitting and abrasion as a result of percussion.

Hearth: Usually a sub-surface feature found eroding out of a river or creek bank or in a sand dune – it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

Historic site: Sites/areas that contain extant (standing) remains of pre-1950 non-Aboriginal occupation. Historic sites may or may not also contain archaeological remains (Aboriginal and/or historic).

Holocene, recent or postglacial period: The time from the end of the Pleistocene Ice Age (c. 10,300 BP) to the present day.

Implement: A general term for tools, weapons etc. made by people.

Microlith: Small (1–3 cm long) stone tools with evidence of retouch. Includes 'Bondi Points' segment, scrapers, backed blades, triangles and trapezoids.

***In situ*:** Refers to cultural material that is discovered as being undisturbed and considered to be in its original context. That is, material which, when identified is considered to be in the same location as when the site was abandoned.

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Lithic: Anything made of stone.

Pleistocene: The dates for the beginning and end of the Pleistocene generally correspond with the last Ice Age. That is from 3.5 to 1.3 million years ago. The period ends with the gradual retreat of the ice sheets, which reached their present conditions around 10,300 BP.

Retouch: **Scalar:** Shallow scale like scars on margin with feather terminations, usually small rounded scars.

Step: Small, abrupt flake scars on margin, with step terminations.

Rock shelter/cave: These are sites that are located within a rock shelter/overhang or cave. The archaeological deposits within such sites can vary considerably but are often predominantly lithic. Depending on their location, the archaeological deposits may also include midden deposits of shellfish, fish or terrestrial fauna. Due to the often undisturbed deposits at these sites, they are potentially very valuable sites and are generally considered of high scientific significance. Instances where rock shelter sites also possess artwork on the stone walls are considered rock shelters/art sites combined.

Scarred tree: Scars on trees may be the result of removal of strips of bark by Aborigines for the manufacture of utensils, canoes or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds for climbers after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to being naturally made by branches falling off etc. is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some regrowth has occurred around the edges of the scar, and no holes or knots are present in the heartwood.

Silcrete: A sedimentary rock that is 'formed through the impregnation of a sedimentary layer with silica of quartz grains in a matrix of either amorphous or fine-grained Silica' (Holdaway& Stern 2004:24)

Stratigraphy: Layering.

Stone Artefact: A piece of stone that has been formed by Aboriginal people to be used as a tool or is a by-product of Aboriginal stone tool manufacturing activities. Stone artefacts can be flaked such as points and scrapers or ground such as axes and grinding stones.

Scraper: A tool used for scraping. A flake with one or more margins of continuous retouch.

Thumbnail scraper: A small flake with a convex scraper edge, shaped like a thumbnail and located opposite the flake's platform.

Raw material: Organic or inorganic matter that has not been processed by people.

Use-wear: Tiny flakes or chips that have been broken off the edges of a stone artefact during use.

REFERENCES

Aboriginal Affairs Victoria	1997	*Guidelines for Conducting and Reporting upon Archaeological Surveys in Victoria*. AAV, Melbourne.
Mulvaney, DJ	1975	*The Prehistory of Australia*. Harmondsworth, Penguin.
Holdaway, S & N Stern	2004	*A Record in Stone: the Study of Australia's Flaked Stone Artefacts*. Museum Victoria and Aboriginal Studies Press, Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra.

Appendix 8 Site Gazetteer

VAHR No.	Type	Primary Grid Reference (GDA 94 MGA 55)	Size

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Attachment D

Traffic Impact Assessment

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PROPOSED RESIDENTIAL SUBDIVISION

Aberline Road, Warrnambool

December 2013

TRAFFIC IMPACT ASSESSMENT

Client:
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1. INTRODUCTION

O'Brien Traffic has been engaged by Rodger Constructions Pty Ltd to undertake a traffic engineering assessment of a proposed residential subdivision on the land located on the south-western corner of the intersection between Aberline & Wangoom Roads, Warrnambool.

This report is an update of an earlier report by O'Brien Traffic which was based on a different subdivision layout and canvassed matters only relating to external vehicle access and traffic impact. This revision also addresses matters relating to the internal layout of the subdivision.

In the course of preparing this report:

- A plan of the proposed subdivision has been examined (Development Plan Rev H prepared by Weir & Co. dated November 2013);
- The subject site and surrounding area has been inspected (for a second time); and
- The traffic implications of the proposal have been assessed.

2. EXISTING CONDITIONS

2.1 Location and Land Use

The subject site is located on the south-western corner of Aberline Road and Wangoom Road in Warrnambool, as indicated in **Figure 1** overleaf.

The land is zoned *Residential 1* under the Warrnambool Planning Scheme and is currently vacant with the exception of three dwellings and a small business premises.

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Figure 1: Location of subject site

2.2 Surrounding Land Use

To the west of the site is a recently developed residential subdivision known as the Marrakai Estate, and King's College. More established residential areas are located further south whilst to the north are a small number of dwellings along Wangoom Road. Land to the east is largely farmland. The land adjacent to the south is in the early stages of construction for a new residential subdivision named Russell Creek Estate with 150 lots in total.

The Warrnambool central business district is located approximately 3.5 km to the south-west.

According to the *North East Warrnambool Structure Plan* dated June 2008, the land to the north of Wangoom Road and west of Wiggs Lane may one day be redeveloped as a mix of conventional density residential and rural living.

2.3 Road Network

Aberline Road is a local collector road under the control of Warrnambool City Council. It runs between Wangoom Road in the north and Moore Street in the south.

The first 200m south of Wangoom Road consists of a driveable surface approximately 6.5m wide, comprising approximately 4m of sealed pavement and the remainder as compacted gravel. The surface then changes to compacted gravel approximately 6 – 6.3 m wide. The shoulders of both sections are loose gravel.

The gravel section continues to the southern boundary of the subject site where thereafter the road has recently been reconstructed as part of works for a new residential subdivision adjacent the subject site. The carriageway width is 9.7m, narrowing to 7.3m at the entrance to Russell Creek Estate (Rawlings Road) and becoming 9.1m at Whites Road. The new subdivision features lots with direct access to Aberline Road.

The intersection with Wangoom Road is controlled by a give way sign, and forms a staggered T-intersection with Wiggs Lane (a gravel road with very little land use).

The speed limit until recently was 80km/h from Wangoom Road to Whites Road, after which it becomes 60km/h. However, the 60km/h speed limit has recently been extended north of Whites Road for approximately 500m. Presumably this is to ensure a safer road environment for the Russell Creek Estate to the south.

Aberline Road in the vicinity of the site is shown in **Photos 1** and **2**

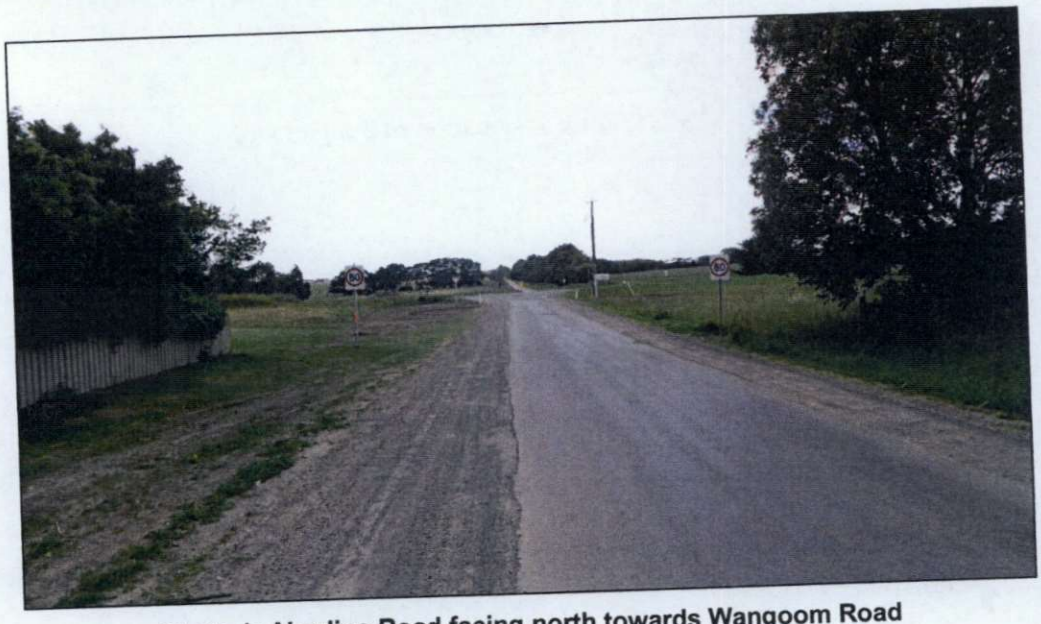

Photo 1: Aberline Road facing north towards Wangoom Road

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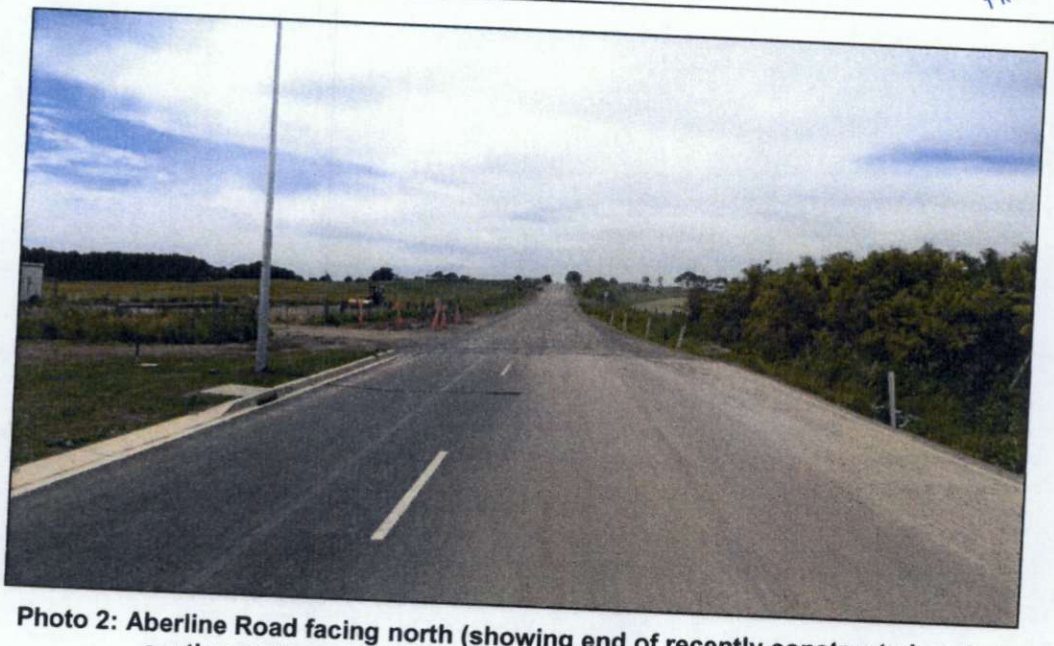

Photo 2: Aberline Road facing north (showing end of recently constructed sealed section at the southern boundary of the subject site)

Wangoom Road is a major road under the control of Warrnambool City Council. It runs between Blacks Lane in the north-east and Hopkins Highway in the south-west.

It consists of a two lane sealed carriageway without shoulders. Alongside the subject site the carriageway width is 6.5 – 6.6 m.

West of the site there is a length of service road on the north side as well as a newly constructed service road on the south side.

The intersection of Wangoom Road and Hopkins Highway has recently undergone a safety improvement upgrade. It features vehicle turn lanes.

The speed limit from Hopkins Highway to approximately 200 m after Aberline Road is 80 km/h, after which it becomes 100 km/h.

Wangoom Road in the vicinity of the site is shown in **Photos 3** and **4**.

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Photo 3: Wangoom Road facing east

Photo 4: Wangoom Road facing west

2.4 Existing Traffic Volumes

Traffic volume data for Aberline and Wangoom Roads has been obtained from Warrnambool City Council and is summarised in **Table 1**.

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Road	Date of Count	Average Weekday Volume	AM Peak Hour Volumes	PM Peak Hour Volumes
Aberline Rd *btw Wangoom Rd and Whites Rd*	24th – 31st Aug 2011	519 vpd (two-way)	8am – 9am 15 vph NBD 28 vph SBD	4pm – 5pm 28 vph NBD 28 vph SBD
Aberline Rd *btw Moore St & Mitchell St*	Aug 2011	2,345 vpd (two-way)	n/a	n/a
Wangoom Rd *150m west of Horne St (1.6km east of Aberline Rd)*	11th – 18th Sep 2013	1,032 vpd (two-way)	8am – 9am 30 vph EBD 48 vph WBD	4pm – 5pm 50 vph EBD 53 vph WBD
Wangoom Rd *150m west of Goodwin St (1.1km west of Aberline Rd)*	27th Jun 2013 – 7th July 2013	2,177 vpd (two-way)	8am – 9am 65 vph EBD 141 vph WBD	5pm – 6pm 117 vph EBD 94 vph WBD

Table 1: Traffic Volume Data

The data indicates that both these roads are operating well within their capacities.

2.5 Casualty Crash History

VicRoads 'CrashStats' database was used to assess the casualty crash history of the sections of Aberline and Wangoom Roads in the vicinity of the site, for the past five years of available data (up to 31 December 2013).

In this period three crashes were recorded which are summarised in **Table 2**.

Date / Time	Conditions	Injury Level	Description
Wed 15/2/12 11:10am	Day, Dry	Other	Southbound vehicle was stationary at the intersection of Wangoom Road and Wiggs Lane. The driver pulled out on to the road to travel south along Aberline Road, and collided with a cyclist travelling west along Wangoom Road.
Sat 6/3/10 4:45am	Dark, Wet	Serious	Driver of vehicle with four passengers travelling north on Aberline Road (approx. 500m south of Wangoom Road) lost control after performing 'fish-tails' and rolled vehicle onto its roof.
Thurs 16/10/08 11:52am	Day, Dry	Other	Driver of vehicle travelling south on Aberline Road overcorrected in gravel and spun out of control. Vehicle hit a white post, entered a ditch backwards and rolled.

Table 2: Casualty Crashes on Aberline Road

It is evident that there is no pattern to any of the crashes and both Wangoom and Aberline Road have a very safe record in the vicinity of the subject site.

2.6 Public Transport

No existing bus services operate in the vicinity of the subject site. However, a new bus network is currently proposed by Public Transport Victoria. The draft plan shows that the nearest services would operate along Whites Road and Aberline Road (south of Whites Road) which is approximately 400m to the south of the subject site

3. THE PROPOSAL

It is proposed to construct a residential subdivision with a yield of 503 lots.

Vehicle access is proposed via:

- Three intersections to Aberline Road;
- One intersection to Wangoom Road; and
- Three road links into the new subdivision Russell Creek Estate currently under construction to the south.

Lots fronting Aberline Road would be accessed directly while lots fronting Wangoom Road would be accessed from a new two-way service road within the existing road reservation. The service road would be accessed off the internal collector road that intersects with Wangoom Road and not directly via Wangoom Road (as is similarly the case at the Marrakai Estate to the west).

This report makes recommendations for the design of the intersections to Wangoom and Aberline Roads.

4. TRAFFIC GENERATION, DISTRIBUTION & IMPACT

4.1 Traffic Generation

In the calculation of traffic generation, it has been assumed that up to 10 vehicle trips would be generated per household per day (based on the rate specified by VicCode). This is liable to be conservative as the proposed lots are generally medium density.

The likely maximum daily traffic generation is therefore in the order of 5,030 vehicle trips per day.

Typically in the order of 10 percent of these trips (i.e. up to 503 vehicle trips) would occur in each of the AM and PM hours.

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4.2 Traffic Distribution

Given the location of the site on the northern fringe of Warrnambool, the substantial majority of trips would be generated to/from the south and south-west towards the town centre and other major employment centres, such as the Gateway Plaza Shopping Centre. To travel in these directions, motorists would either head south along Aberline Road or west along Wangoom Road and then south along Hopkins Highway.

Based on this, the estimated percentage distribution of traffic at each access point is as shown in **Figure 2**.

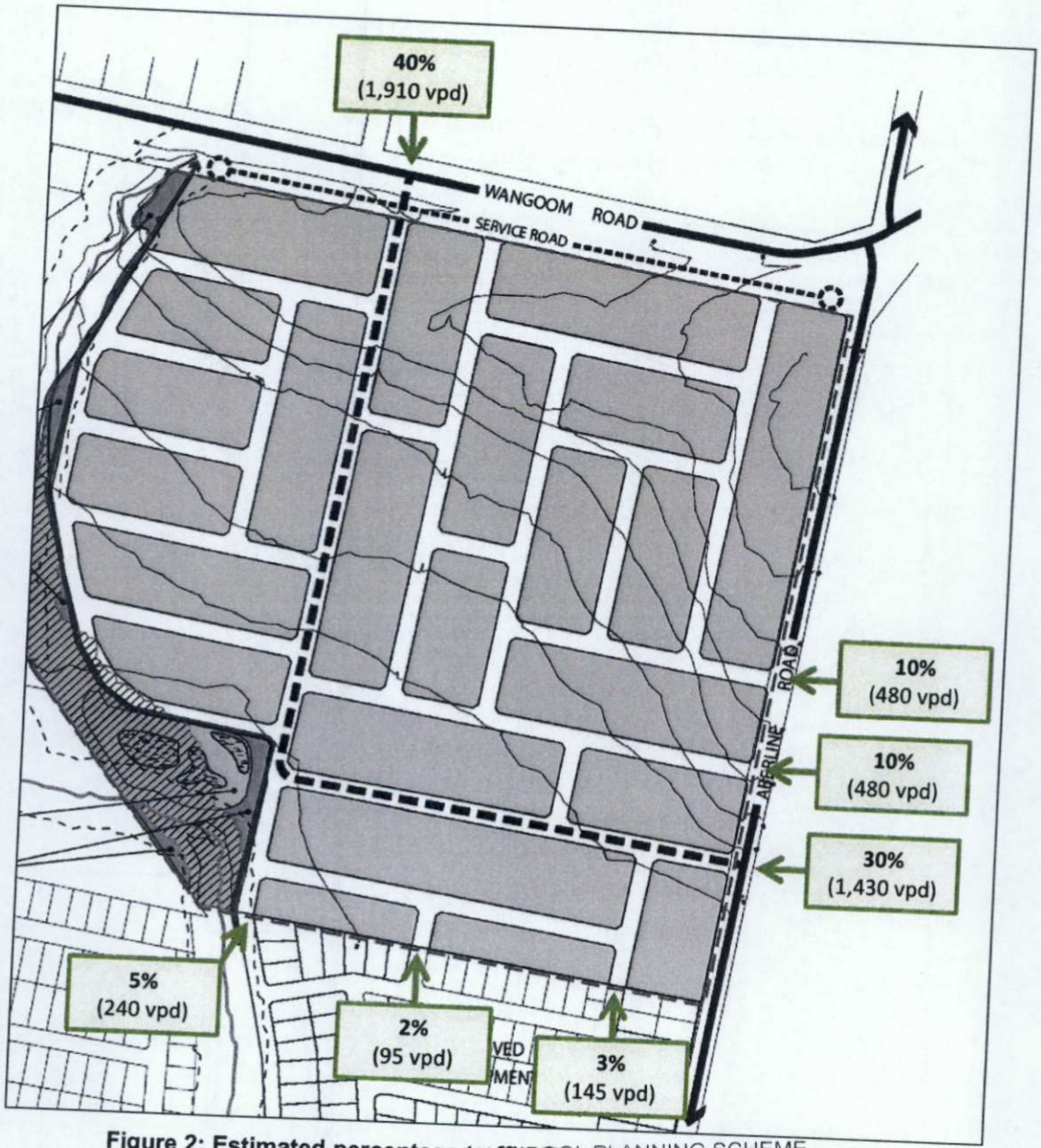

Figure 2: Estimated percentage traffic distribution and daily volumes

Note that these percentages are to be applied to the estimated 477 lots with internal access only (i.e. excluding those lots directly fronting Aberline Road).

We further estimate that:

- On Wangoom Road, 90% of trips are generated to/from the west and 10% to/from the east;
- On Aberline Road, 90% of trips are generated to/from the south and 10% to/from the north; and
- As is typically the case for residential land use, in the AM peak hour 20% of trips are inbound and 80% are outbound, whilst in the PM peak hour 60% of trips are inbound and 40% are outbound.

Based on this, the estimated vehicle turning movements in the AM and PM peak hours at each access point are as shown in **Figure 3**.

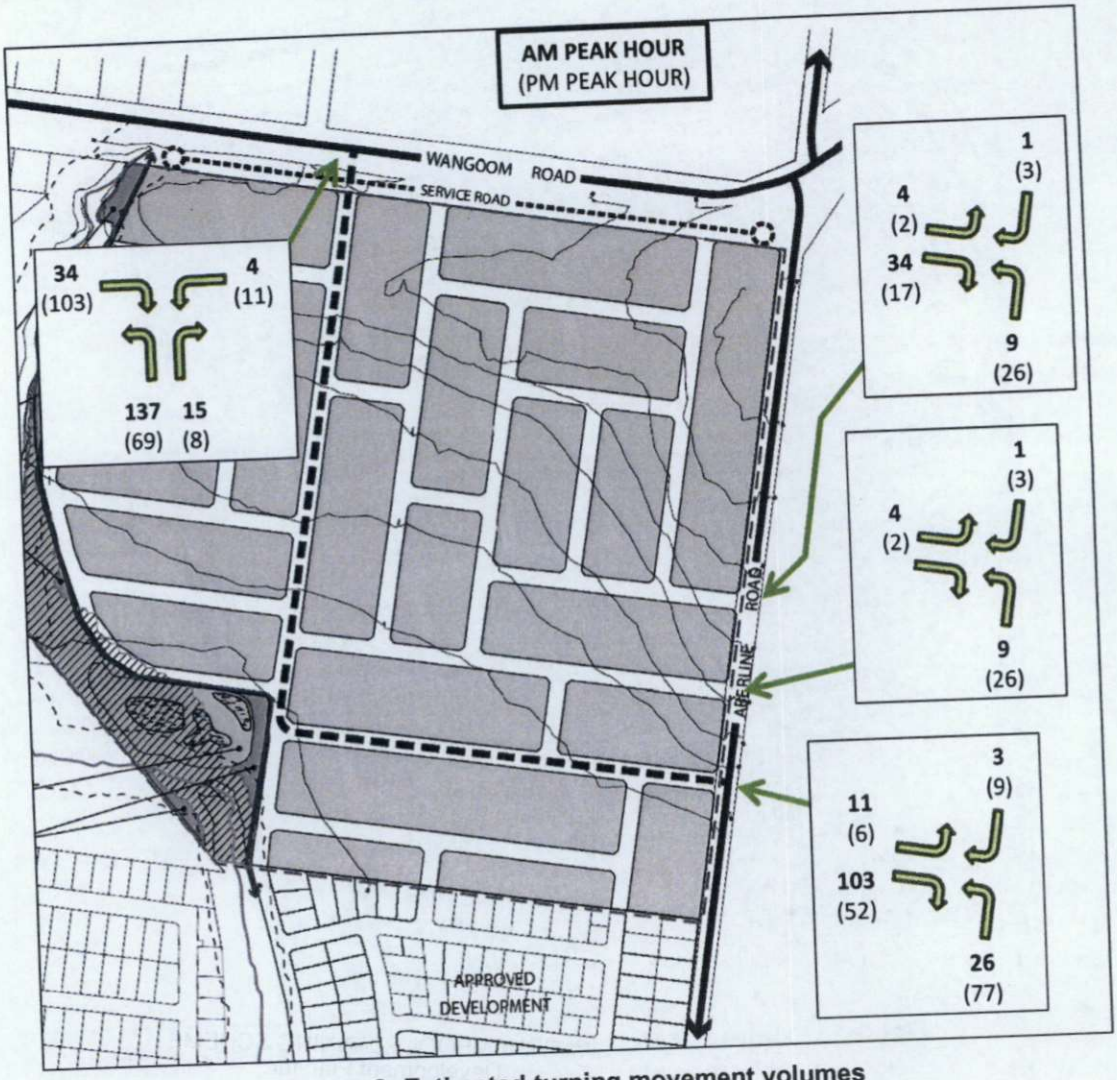

Figure 3: Estimated turning movement volumes

From these estimated turning movements, the estimated peak additional daily traffic volumes are:

- Wangoom Road – up to 1,717 vpd occurring to the west of the subject site.
- Aberline Road – up to 2,147 vpd occurring to the south of the subject site.

4.3 Traffic Impact

4.3.1 Aberline Road

The traffic volume data indicates that Aberline Road in the vicinity of the site carries on average 519 vpd, and further south (between Moore Street and Mitchell Street) it carries 2,345 vpd.

Adding the traffic from the subject site (2,147 vpd) brings the volume to 2,666 vpd in the vicinity of the subject site and 4,492 vpd further south. If all the traffic from the future subdivision to the south also travelled down Aberline Road (albeit unlikely), this would bring the figure up to 5,992 vpd (based on 150 lots equating to 1,500 vpd).

The figure is within the range of 3,000 vpd to 7,000 vpd specified in Clause 56.06 of the Planning Scheme for a 'Connector Street – Level 2', that is a street which *"connects access places and access streets through and between neighbourhoods"*.

4.3.2 Wangoom Road

The traffic volume data indicates that Wangoom Road west of the site carries in the order of 2,176 vpd and east of the site it carries approximately 1,024 vpd.

Adding the traffic from the subject site increases the above figure to 3,893 vpd. This will increase once the Marakai Estate is fully developed but not substantially (it is estimated that the Marakai Estate is 75% occupied).

This volume is significantly less than the typical capacity of 15,000 vehicles per day for a two-lane major road. It is also within the range of 3,000 vpd to 7,000 vpd specified in Clause 56.06 of the Planning Scheme for a 'Connector Street – Level 2'.

5. INTERSECTION TREATMENTS

5.1 Intersection Designs

Based on the existing and anticipated traffic volumes it is clear that that the intersections with Aberline and Wangoom Roads would operate very well as unsignalised intersections, similar to others in the area.

To ensure an appropriate level of safety, *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* includes warrants for the provision of vehicle turn lanes, which are based on the estimated traffic volumes.

It is therefore necessary to make an estimate of the future through volumes on Wangoom Road and Aberline Road in the long-term (typically 10 years). Based on the assumption that the land to the north of Wangoom Road will one day be redeveloped as residential (as per the *North East Warrnambool Structure Plan*), and allowing general future growth, a conservative estimate of the 2023 volumes has been made – refer **Table 3**.

Road	AM Peak Hour		PM Peak Hour	
	Existing Volumes	Estimated 2023 Volumes at Subject Site	Existing Volumes	Estimated 2023 Volumes at Subject Site
Wangoom Rd	30 vph / 65 vph EBD* 48 vph / 141 vph WBD*	250 vph EBD 350 vph WBD	50 vph / 117 vph EBD* 53 vph / 94 vph WBD*	300 vph EBD 300 vph WBD
Aberline Rd	15 vph NBD 28 vph SBD	100 vph NBD 150 vph SBD	28 vph NBD 28 vph SBD	150 vph NBD 150 vph SBD

* (volume west of Horne St) / (volume west of Goodwin St)

Table 3: Estimated future through volumes on Wangoom Rd & Aberline Rd

Based on these volumes and the estimated turning volumes (refer **Figure 3**), the Austroads guide requires:

Wangoom Road: Type CHR right-turn lane / Type BAL left-turn treatment

Aberline Road: Type BAR right-turn treatment / Type BAL left-turn treatment

It is noted that type BAR/BAL treatments are the minimum specified treatment for all intersections in the Austroads guide.

At Wangoom Road it is recommended that the intersection be constructed with the required treatments. Provision should also be made for bicycle lanes each side (as per the Marakai Estate), and it is noted this would also provide space for left-turn movements from Wangoom Road into the subject site.

Aberline Road is a lower-order road which will have a lower speed limit (60k/h) compared to Wangoom Road. A BAL would be provided as a matter of course and a BAR would be achieved if the new cross-section to the south is extended along the subject site (3.7m wide northbound traffic lane and a 6.0m wide southbound traffic lane, which allows southbound vehicles to pass vehicles waiting to turn right).

We are advised that funding arrangements for road upgrades in the area are the subject of Section 173 agreements.

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5.2 SIDRA Assessment

To confirm that the intersections would operate satisfactorily, a capacity assessment has been undertaken of the proposed Wangoom Road intersection and the southern intersection with Aberline Road (which would carry more traffic than the other two intersections), using *SIDRA Intersection 6*.

At the Wangoom Road intersection it has been assumed the intersection contains a right-turn entry lane and no dedicated left-turn lane. At the Aberline intersection it has been assumed that no turn lane facilities are provided.

The adopted intersection layouts and detailed SIDRA results are attached at **Appendix A**.

The key performance measure in SIDRA is the 'Degree of Saturation', being the ratio of volume to capacity. Previous versions of SIDRA categorised Degrees of Saturation as shown in **Table 3**. While it is noted that this classification system is no longer used by the latest version of SIDRA, it is still considered to give a useful description of the operation of an intersection.

Degree of Saturation	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

Table 4: SIDRA Degree of Saturation Categories

It can be seen from the detailed results that the Degrees of Saturation at both intersections would be very low, no more than 0.198 at Wangoom Road and no more than 0.154 at the Aberline Road intersection. Average queue lengths are all less than one car. It is hence clear that the intersections would operate extremely well.

5.3 Intersection Sight Distance

5.3.1 Sight Distance Requirements

Sight distance requirements are specified in *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*. The types of sight distance that must be provided in the design of all intersections includes:

- Approach Sight Distance (ASD) – *the minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection.*

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- Safe Intersection Sight Distance (SISD) – *The minimum distance which should be provided on the major road any intersection, and which provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point.*
- Minimum Gap Sight Distance (MGSD) – *The distance corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections.*

Our assessment of each is provided as follows.

5.3.2 Approach Sight Distance (ASD)

ASD is measured from the driver's eye height (1.1m) to 0.0m, which ensures the driver can see any line marking or kerbing at the intersection.

ASD on the minor road approaches would need to be provided for in the detailed design of the subdivision. The internal roads will have a speed limit of 50km/h in which case the minimum ASD requirement is 55m. Based on our inspection of the site's terrain we see no reason why this requirement won't or can't be achieved.

5.3.3 Safe Intersection Sight Distance (SISD)

SISD is measured from a driver's eye height of 1.1m to points 1.25m above the road, which represents drivers seeing the upper part of cars.

Wangoom Road has a speed limit of 80km/h and it is envisaged that will remain into the foreseeable future seeing as none of the proposed new residential lots along the southern side have direct access. Based on 80km/h the minimum SISD requirement for the proposed new intersection is 181m.

Inspection indicates that the road is flat and straight in the vicinity of the proposed access point, with well in excess of 181 m SISD available – see **Photos 5** and **6**.

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Photo 5: Wangoom Road facing east (at proposed access point)

Photo 6: Wangoom Road facing west (at proposed access point)

On Aberline Road the speed limit has recently changed from 80km/h to 60km/h adjacent Russell Creek Estate which is under construction to the south, matching the existing speed limit further south. We foresee this will be extended to Wangoom Road once the proposed subdivision is built given that lots will have direct access.

Based on 60km/h the minimum SISD requirement is 123m. Depending on how steep the road is, this requirement is either increased by between 2m and 11m (if Aberline Road is on a downgrade to the access point) or decreased by between 1m and 5m (if Aberline Road is on an upgrade to the access point).

Sight distance at each of the three proposed Aberline Road access points (termed 'southern', 'middle' and 'northern') is shown in **Photos 7 – 12** below.

Photo 7: Aberline Road facing north (at proposed southern access point)

Photo 8: Aberline Road facing south (at proposed southern access point)

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Photo 9: Aberline Road facing north (at proposed middle access point)

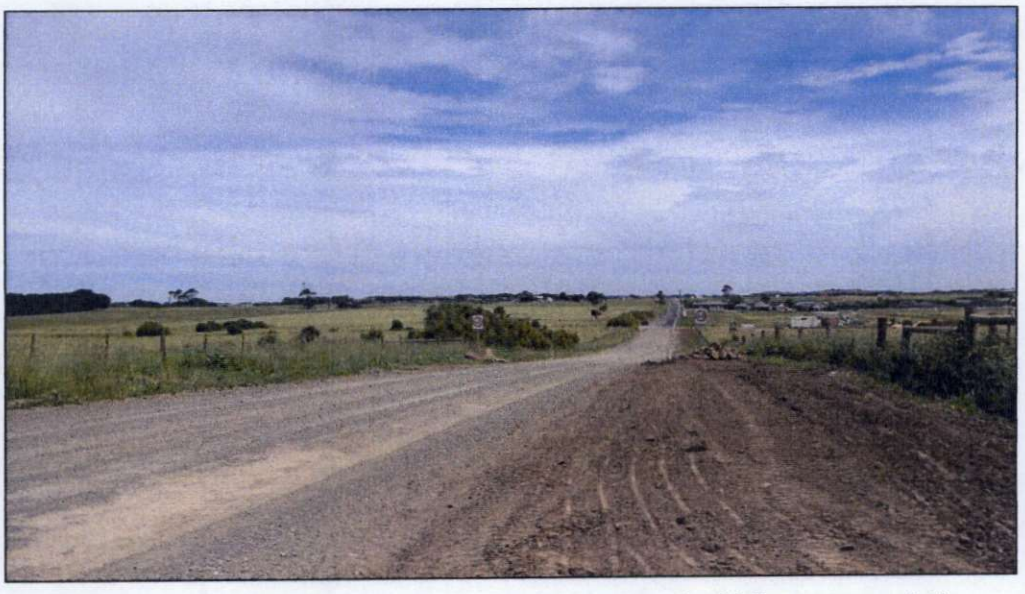

Photo 10: Aberline Road facing south (at proposed middle access point)

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Photo 11: Aberline Road facing north (at proposed northern access point)

Photo 12: Aberline Road facing south (at proposed northern access point)

The available SISD at the proposed middle and northern access points was determined to be clearly well in excess of the minimum requirements.

At the southern access point there is clearly more than adequate SISD to the south but it is less apparent to the north on account of a rise in the road – refer **Photo 7** (note: the road flattens out beyond the rise which means cars can be seen for a longer distance than what it appears in the photo). However, by utilising two poles at the required heights, the distance was determined to be approximately 160m which exceeds the minimum requirement (so long as the speed limit becomes 60km/h).

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5.3.4 *Minimum Gap Sight Distance (MGSD)*

Based on Table 3.4 of *Austroads Guide to Road Design Part 4A*, the critical acceptance gaps and MGSD requirements are as follows:

Wangoom Road Intersection

- Left-turn out of site: 5 secs / 111m
- Right-turn out of site: 5 secs / 111m
- Right-turn into site: 4 secs / 89m

Aberline Road Intersections

- Left-turn out of site: 5 secs / 83m
- Right-turn out of site: 5 secs / 83m
- Right-turn into site: 4 secs / 67m

Based on inspection these requirements are all clearly met. It is noted that the least available distance is at the proposed southern access point to Aberline Road (refer **Photo 7**). O'Brien Traffic took a sample of 10 gap times measured from the time a southbound vehicle first becoming largely visible to the time it passed the location of the proposed access point. The result was a range of 7.5 to 13.8 seconds and an average of 9.2 seconds. This is more than sufficient time for drivers to turn.

6. NEIGHBOURHOOD STREET NETWORK

6.1 Road Hierarchy

A plan of the proposed road hierarchy is provided in **Figure 4**.

The collector street will provide principal access through to Aberline and Wangoom Roads, and carry no more than 1,910 vehicles per day (refer **Figure 2**) with this peak volume occurring at the Wangoom Road access point. Traffic volumes along the collector street will drop further within the subject site.

The access lane will provide rear access to a small medium density site with 8 lots and carry no more than 80 trips per day.

All other internal roads will function as access streets and carry no more than 1,000 vehicles per day.

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Figure 4: Road Hierarchy

6.2 Road Cross Sections

Guidelines for road cross-sections can be found in both Clause 56.06 of the Planning Scheme and in the *Infrastructure Design Manual* (IDM), which we understand has been adopted by Warrnambool City Council. The latest IDM (Version 4 dated March 2013) sets out a range of street types and characteristics including maximum traffic volumes, carriageway widths, reserve widths, footpath provision etc.

The requirements applicable to the street types proposed are given in **Figure 5**.

Street Type	Indicative Maximum Traffic Volume	Carriageway Width	Minimum Reserve Width See Note 5 & 6	Minimum Verge Width	Parking Provision within Carriageway	Pedestrian / Cycle Provision within Road Reserve See Note 7	Kerbing
Access Lane (second road frontage)	300 veh/day	5.5m See Note 6.	As determined by turning movements		Yes one side	No footpath	Nil if concrete road with central drain or SM2 or modified SM2. See Note 3.
Access Street	1000 veh/day max	7.5m	16.0m	3.5m See Note 2.	Yes (both sides)	Footpath both sides. No separate cycle provision	B2, SM2 or modified SM2. See Note 3.
Collector/ Connector Street Level 1	3000 veh/day max	11.0m	24.0m	6.0m	Yes (both sides)	Shared path both sides	Barrier B2 Kerb outstands or splitters required at intersections and pedestrian crossing points

Figure 5: Extract of the applicable IDM street characteristics

The IDM specifies that a Collector Street Level 1 should carry a maximum of 3,000 vehicles per day and feature a minimum reserve width of 24m including a minimum carriageway width of 11m. However, from a traffic flow perspective this is unnecessary for a road that will carry at the very most 1,910 vehicles per day at the Wangoom Road exit (and much less for most of its length). It is also noted that Clause 56.06 specifies a road carrying between 1,000 and 2,000 vehicles per day as an Access Street – Level 1 which can feature a minimum reserve of 13m including a carriageway width of 5.5m (i.e. substantially less than the IDM requirements).

With the exception of the single Access Lane, it is recommended that all roads adhere to the minimum requirements set out in the IDM for an Access Street (refer **Figure 5**).

The specified carriageway width of 7.5m allows parking on both sides and a single traffic lane in-between (or two lanes of traffic when cars are parked on one side only). This will adequately accommodate the expected traffic flow as the subdivision is entirely residential and so heavy on-street parking demands won't occur.

We note that for aesthetic reasons a boulevard style entry at the Wangoom Road access point may be preferred (with a central median), similar to the Marakai Estate. If provided this need only contain a single traffic lane in each direction, which is confirmed by the results of the SIDRA assessment (refer **Section 5.1**).

The Access Lane is recommended to have a carriageway width of 6.4m (min). This will provide adequate manoeuvring space for any garages abutting it.

6.3 Emergency & Service Vehicle Access

Ambulance Victoria does not have any specific access requirements and Clause 56 of the Planning Scheme incorporates the access requirements of the Country Fire Authority. The recommended widths of the internal roads exceed Clause 56 requirements and so would adequately accommodate emergency vehicles.

Service vehicles (e.g. a typical 8.8m long garbage truck) would be adequately accommodated subject to ensuring the court bowls at the end of the service road have a minimum radius of 10m as per the IDM.

6.4 Footpaths and Cycle Paths

The IDM requires footpaths on both sides of each street. However, Clause 52.06 of the Planning Scheme allows streets carrying up to 1,000 vehicles per day to provide a footpath on one side only. It is recommended that footpaths be provided on one side of each street as a minimum, except for the collector street which should have a footpath on both sides.

A shared path is proposed along the creek reserve on the western side of the site. This should have a minimum width of 2.5m in accordance with the IDM.

The IDM does not require separate cycle provision on 'Access Streets'. The low internal traffic volumes would allow for safe cycling on the roadways.

6.5 Local Area Traffic Management

Guidance on controlling vehicle speeds can be sought from Clause 56.06 of the Planning Scheme, which recommends street blocks to be designed with a length of generally up to 240 metres. Some streets are longer than this and hence speed control devices are advised. These could take the form of speed humps, one lane slow points etc. It is recommended that speed control devices be installed to Council's satisfaction (this can be adopted as a permit condition).

It is also recommended that a modified T-intersection be constructed where the collector road changes direction to give priority to movements along the collector road (refer **Figure 6**).

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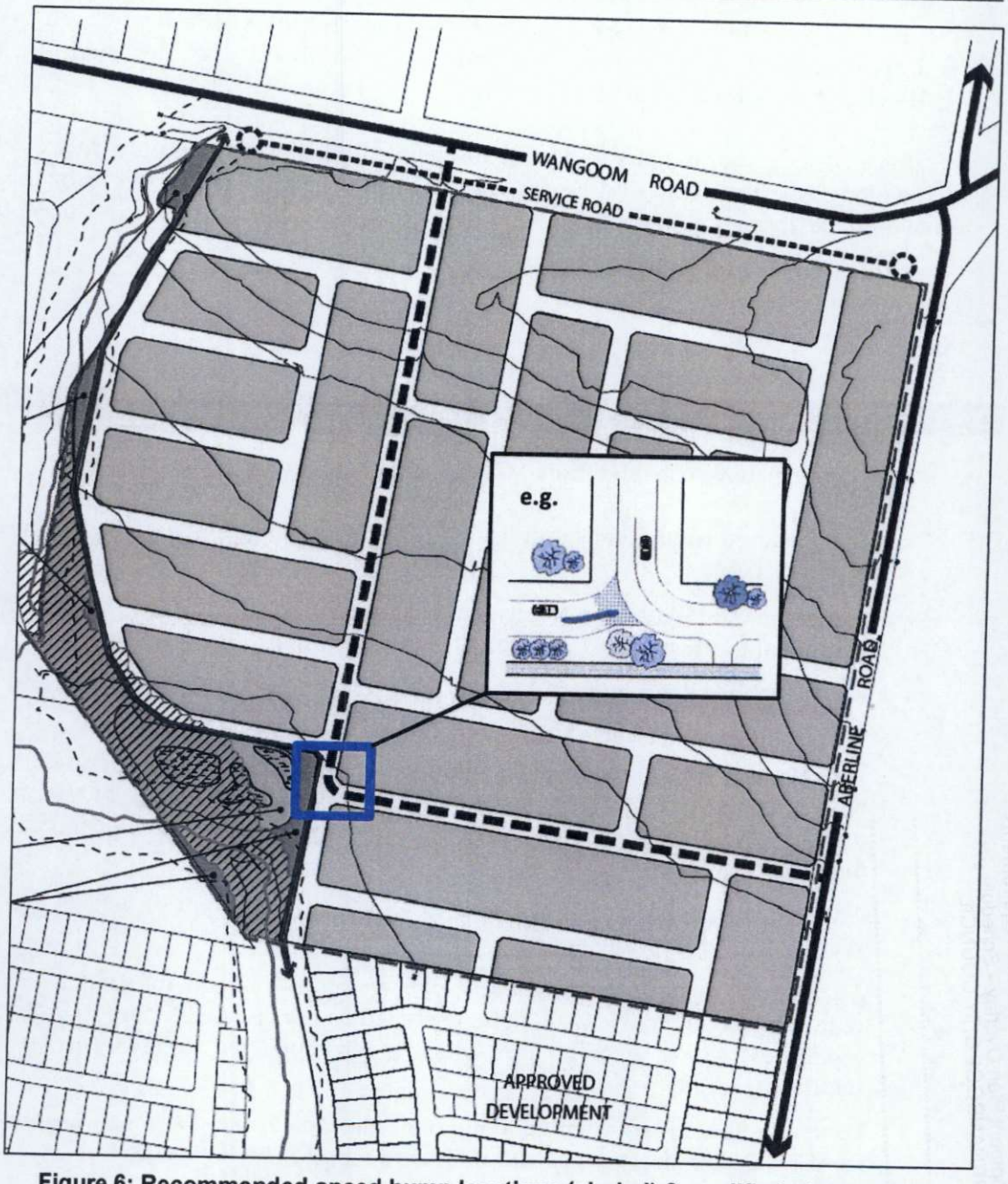

Figure 6: Recommended speed hump locations (circled) & modified t-intersection

7. PUBLIC TRANSPORT

The proposed subdivision triggers the requirements of Clause 52.36 of the Planning Scheme for referral of the application to the Director of Public Transport as the number of lots is equal to or greater than 60.

The document *Public Transport Guidelines for Land Use Development* prepared by the Department of Transport recommends neighbourhoods be designed so that dwellings are within 400m of a bus route.

It is envisaged that if a bus route was to operate in the vicinity in future, it would do so along Aberline Road and Warrnambool Road. In this case all but 23 of the lots would be located within 400m, equating to 95%. This is considered acceptable particularly in a rural city.

8. CONCLUSIONS

Based on the above considerations, we are of the opinion that:

- The proposed residential subdivision is anticipated to generate up to 5,030 vehicle trips per day;
- Wangoom and Aberline Roads have sufficient spare capacity to absorb the additional traffic volumes generated;
- The Wangoom Road intersection should be constructed with Type CHR and BAL turn facilities plus bicycle lanes;
- The Aberline Road intersections should be constructed as simple T-intersections with type BAL treatments (BAR treatments are unnecessary but would be provided if the existing road cross-section to the south is extended north along the subject site);
- Adequate sight distance is available at each proposed point of vehicle access to Wangoom and Aberline Roads;
- All internal roads (including the 'Collector Street') would function adequately with a carriageway width of 7.5m, designed as per an 'Access Street' in the IDM (except the single 'Access Lane' which is recommended to have a carriageway width of 6.4m);
- Footpaths should be provided along one side of each street as a minimum except for the collector street which should have a footpath on both sides;
- Traffic management treatments should be installed to control vehicle speeds to Council's satisfaction, and a modified T-intersection should be constructed where the collector road changes direction (refer **Figure 6**); and
- Approximately 95% of lots would be located within 400m of a potential future bus route which is considered satisfactory.

We therefore see, subject to the recommendations made in this report, that there are no traffic related grounds to prevent the proposed subdivision development proceeding.

Appendix A

SIDRA Results

WARRNAMBOOL PLANNING SCHEME
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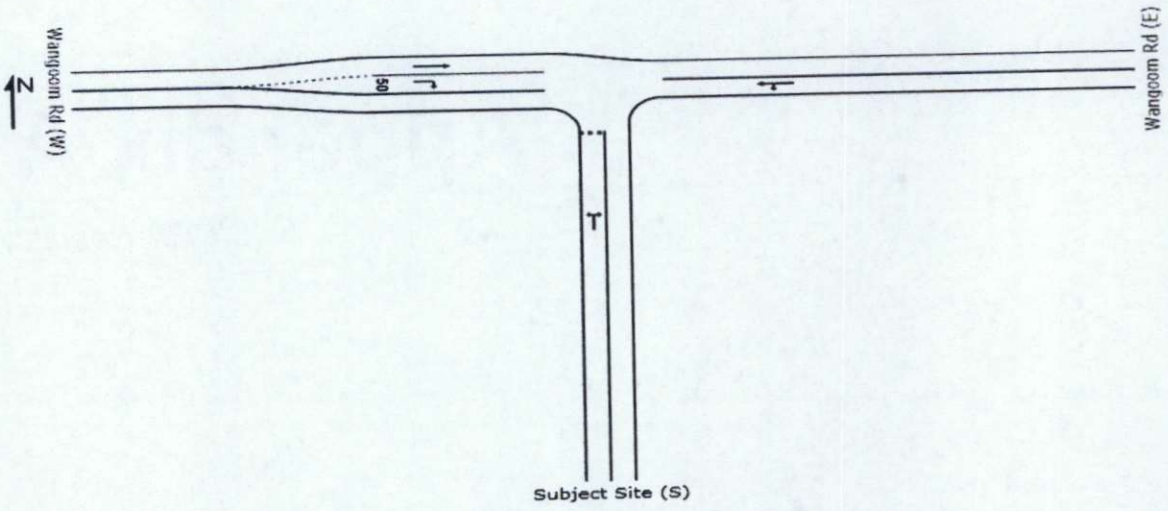

Figure A1: Modelled Intersection Layout – Proposed Wangoom Rd Access

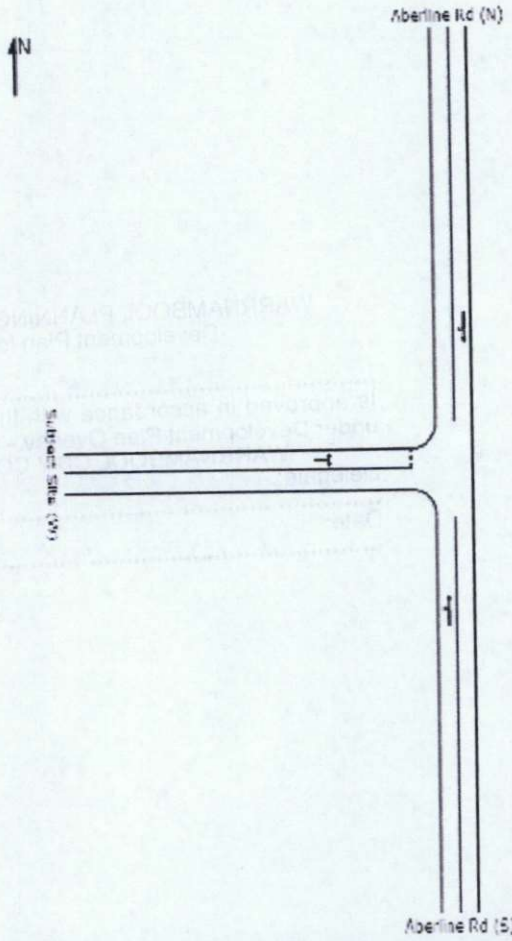

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Figure A1: Modelled Intersection Layout – Proposed Southern Aberline Rd Access

MOVEMENT SUMMARY

▽ Site: Wangoom Rd AM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Subject Site (S)											
1	L2	73	2.0	0.082	11.1	LOS B	0.3	2.2	0.44	0.71	49.1
3	R2	8	2.0	0.082	11.1	LOS B	0.3	2.2	0.44	0.71	49.1
Approach		81	2.0	0.082	11.1	LOS B	0.3	2.2	0.44	0.71	49.1
East: Wangoom Rd (E)											
4	L2	12	2.0	0.198	10.9	LOS B	0.0	0.0	0.00	0.04	79.1
5	T1	368	2.0	0.198	0.0	LOS A	0.0	0.0	0.00	0.04	79.1
Approach		380	2.0	0.198	0.4	NA	0.0	0.0	0.00	0.04	79.1
West: Wangoom Rd (W)											
11	T1	263	2.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.00	80.0
12	R2	108	2.0	0.064	11.2	LOS B	0.3	2.3	0.45	0.68	54.6
Approach		372	2.0	0.137	3.3	NA	0.3	2.3	0.13	0.20	71.2
All Vehicles		833	2.0	0.198	2.7	NA	0.3	2.3	0.10	0.18	71.4

Table A1: Movement Summary – Proposed Wangoom Rd Access (AM Peak Hour)

MOVEMENT SUMMARY

▽ Site: Wangoom Rd PM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Subject Site (S)											
1	L2	144	2.0	0.150	10.8	LOS B	0.6	4.4	0.42	0.71	49.3
3	R2	16	2.0	0.150	10.8	LOS B	0.6	4.4	0.42	0.71	49.3
Approach		160	2.0	0.150	10.8	LOS B	0.6	4.4	0.42	0.71	49.3
East: Wangoom Rd (E)											
4	L2	4	2.0	0.166	10.9	LOS B	0.0	0.0	0.00	0.02	79.6
5	T1	316	2.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.02	79.6
Approach		320	2.0	0.166	0.2	NA	0.0	0.0	0.00	0.02	79.6
West: Wangoom Rd (W)											
11	T1	316	2.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	79.9
12	R2	36	2.0	0.020	11.0	LOS B	0.1	0.7	0.40	0.64	54.8
Approach		352	2.0	0.164	1.1	NA	0.1	0.7	0.04	0.07	76.8
All Vehicles		832	2.0	0.166	2.6	NA	0.6	4.4	0.10	0.17	70.3

Table A2: Movement Summary – Proposed Wangoom Rd Access (PM Peak Hour)

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MOVEMENT SUMMARY

▽ Site: Aberline Rd AM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Aberline Rd (S)											
4	L2	27	2.0	0.070	8.2	LOS A	0.0	0.0	0.00	0.20	57.3
5	T1	105	2.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.20	57.3
Approach		133	2.0	0.070	1.7	NA	0.0	0.0	0.00	0.20	57.3
North: Aberline Rd (N)											
11	T1	158	2.0	0.084	0.3	LOS A	0.4	3.0	0.25	0.02	55.2
12	R2	3	2.0	0.084	8.8	LOS A	0.4	3.0	0.25	0.02	55.2
Approach		161	2.0	0.084	0.5	NA	0.4	3.0	0.25	0.02	55.2
West: Subject Site (W)											
1	L2	12	2.0	0.070	8.5	LOS A	0.2	1.3	0.19	0.66	47.9
3	R2	108	2.0	0.070	8.7	LOS A	0.2	1.3	0.19	0.66	47.9
Approach		120	2.0	0.070	8.7	LOS A	0.2	1.3	0.19	0.66	47.9
All Vehicles		414	2.0	0.084	3.3	NA	0.4	3.0	0.15	0.26	53.5

Table A3: Movement Summary – Proposed Aberline Rd Southern Access (AM Peak Hour)

MOVEMENT SUMMARY

▽ Site: Aberline Rd PM

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Aberline Rd (S)											
4	L2	81	2.0	0.126	8.2	LOS A	0.0	0.0	0.00	0.30	55.7
5	T1	158	2.0	0.126	0.0	LOS A	0.0	0.0	0.00	0.30	55.7
Approach		239	2.0	0.126	2.8	NA	0.0	0.0	0.00	0.30	55.7
North: Aberline Rd (N)											
11	T1	158	2.0	0.087	0.6	LOS A	0.5	3.3	0.36	0.05	53.2
12	R2	9	2.0	0.087	9.1	LOS A	0.5	3.3	0.36	0.05	53.2
Approach		167	2.0	0.087	1.1	NA	0.5	3.3	0.36	0.05	53.2
West: Subject Site (W)											
1	L2	6	2.0	0.037	8.6	LOS A	0.1	0.7	0.22	0.67	47.8
3	R2	55	2.0	0.037	8.8	LOS A	0.1	0.7	0.22	0.67	47.8
Approach		61	2.0	0.037	8.8	LOS A	0.1	0.7	0.22	0.67	47.8
All Vehicles		467	2.0	0.126	3.0	NA	0.5	3.3	0.16	0.26	53.7

Table A4: Movement Summary – Proposed Aberline Rd Southern Access (PM Peak Hour)

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Date: 24 April 2014

Attachment E

Development Plan

WARRNAMBOOL PLANNING SCHEME
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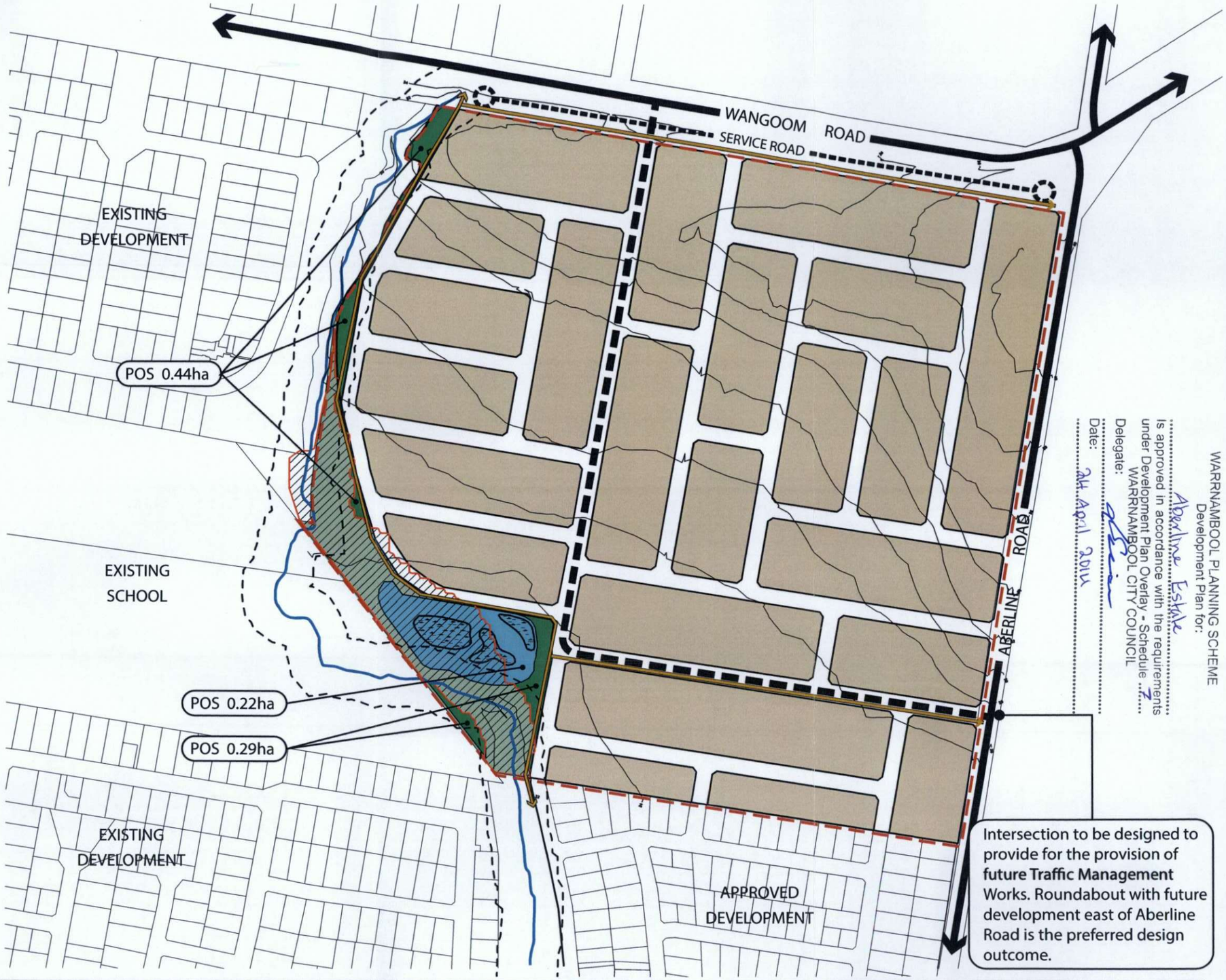
DEVELOPMENT ANALYSIS

30/10/13 SCP 7

TOTAL SITE AREA	41.68 ha	
ENCUMBERED LAND	2.34 ha	
Wetland components above LSIO	0.09 ha	
Wetland below LSIO	0.67 ha	
LSIO excluding Wetland	1.58 ha	
NET DEVELOPABLE AREA	39.34 ha	%NDA
Public Open Space	0.95 ha	2%
Adjacent to Creek	0.44 ha	
Adjacent to Wetland	0.29 ha	
Wetland Surrounds above LSIO	0.22 ha	
Roads	9.46 ha	24%
Residential	28.93 ha	74%
Development Yield	503 lots	
Density	12.79 dw/ha	

Note:
1. Layout & lot yield to be confirmed
2. Direct access to Aberline Road
3. All of site has potential for medium density development subject to Council approval.



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LEGEND

- Development Plan Area
- Russell's Creek
- 30m Creek Offset
- Land Subject to Inundation
- Indicative Wetland Design (Drainage Land)
- Wetland Components
- Encumbered Open Space
- Public Open Space (Unencumbered)
- Indicative Shared Path Alignment
- Residential
- Existing Road Network
- Proposed Internal Collector
- Proposed Service Road

Development Plan
Aberline Rd, Warrnambool

ref: WC201303
date: 16 April 2014
rev: J
drawn: HW

sheet no. 1 of 1

REV	DESCRIPTION	DATE	INIT
B	For Discussion	JUL 13	HW
C	For Discussion	JUL 13	HW
D	For Approval	JUL 13	HW
E	For Approval	JUL 13	HW
F	For Approval	JUL 13	HW
G	For Approval	SEP 13	HW
H	For Approval	NOV 13	HW
I	For Approval	MAR 14	HW
J	For Approval	APR 14	HW

4000 @ A3

0 40 80 120

LANDSCAPE & URBAN DESIGN
abn: 79 687 437 584

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site instigations and confirmation by survey.

Weir & Co.
design | construct | grow

Attachment F

Landscape Master Plan

WARRNAMBOOL PLANNING SCHEME
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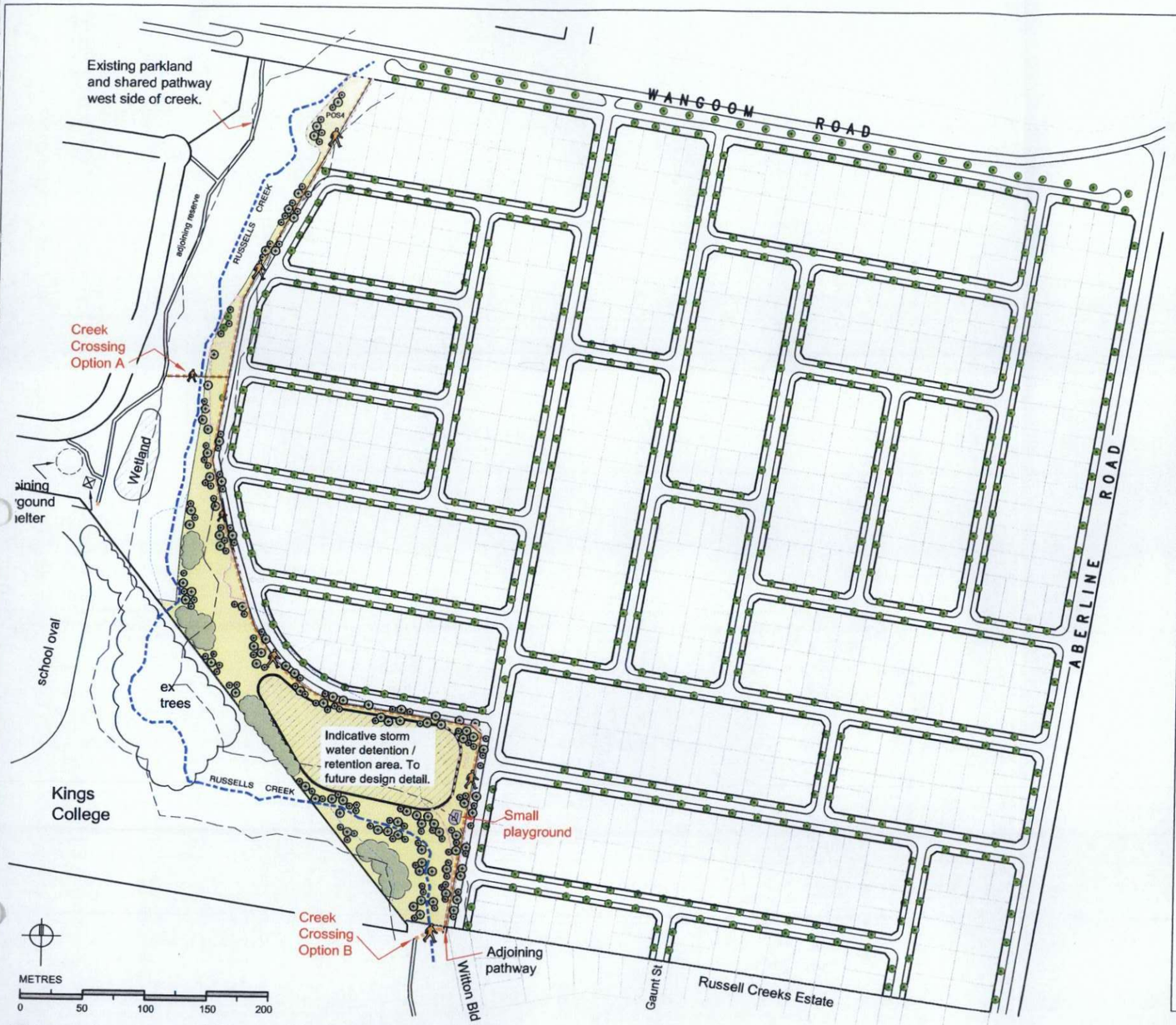


Streetscape Plan (1:2500 @ A3)

LANDSCAPE CONCEPT - NOTES

This plan has been prepared to show overall landscape themes for the treatment of street trees and the linear reserve (Russell Creek). The key Themes are as follows:

Street Trees: Street trees throughout are to include Australian Native trees and Exotic trees selected for suitability to the local conditions. Refer recommended tree list.

Linear Reserve: The Reserve runs the full length of the western edge of the site and includes Russell's Creek in part. The balance of the creek is located within an existing drainage reserve to the west. It is proposed that planting of the creek line will be limited to the subject site. The balance of planting off-site to the west to be undertaken by the relevant Authority. The useable areas (shown as POS) are limited because of flood inundation and the requirement for a large wetland. It is proposed to locate a simple shelter and small playground (as required by the 173 Agreement) in the middle section of the reserve where it is accessible to the majority of allotments, accessible by linkage to the western reserve and in close proximity to the community playground on the west side of he creek.

Recommendations: Key recommendations for the development of the reserve (including reference to clause: 3.3.2 of 173 Agreement) are:

- site leveling and grassing,
- pedestrian linkage across Russell's Creek (Option A) - link with existing recreational facilities on the west side of the creek,
- creek crossing (Option B) - Russell Creek's Estate
- a small playground (POS1),
- generous open space for active and passive play,
- local amenity and habitat,
- broad open areas with scattered native tree planting as open woodland,
- simple shared (pedestrian + bicycle) path network to complement linkages with pedestrian pathways within the estate,
- park seating as required,
- parking lighting as required,
- maintain creek lines in its natural state,
- maintain open and permeable places for passive surveillance and user comfort,
- storm water detention / retention (shown indicatively) subject to future detailed design and Council requirements.

PROPOSED SPECIES SELECTION

A. CREEK RESERVE

Acacia implexa (Lightwood)
Acacia melanoxylon (Blackwood)
Acacia pycnantha (Golden Wattle)
Acacia mearnsii (Black Wattle)
Allocasuarina verticillata (Drooping Sheoak)
Banksia marginata (Silver Banksia)
Bursaria spinosa (Sweet Bursaria)
Eucalyptus pauciflora niphophila (Snow Gum)
Eucalyptus leucoxylon (Yellow Gum)
Eucalyptus ovata (Swamp Gum)
Eucalyptus viminalis (Manna Gum)
Eucalyptus yarraensis (Yarra Gum)

STREET TREES

Platanus orientalis (Oriental Plane Tree)
Pyrus calleryana "Capital" (Ornamental Pear)
Pyrus calleryana "Chanticleer" (Ornamental Pear)
Quercus palustris (Pin Oak)
Ulmus parvifolia 'Todd' (Chinese Elm)

LEGEND

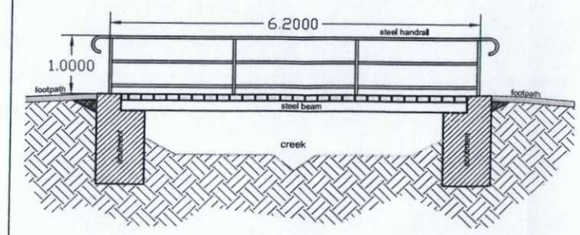
- Street Trees
- Woodland Planting - Reserve
- Mass Planting - Reserve
- Shared path 2.5mW
- POS — Passive open space
- Playground
- Land Subject to Inundation
- Creek line

ISSUE: Rev # 2 30122013

DHT CONSULTING PTY LTD
6/3 Peel Street, Ballarat
PO Box 2385 Bakery Hill Vic 3354
E david.turley@dhtconsulting.com.au
M 0417 351 253 T 03 5333 5942

davidturley LANDSCAPE ARCHITECTURE

Junior Playground (typical image)



Footbridge (Typical)

Footbridge (Typical)
- concrete abutments
- steel galvanized beams under
- heavy timber decking
- galvanized steel handrail

WARRNAMBOOL PLANNING SCHEME
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WARRNAMBOOL CITY COUNCIL
Designate
24 April 2014

REVISION - NOTE

1. Revised 09102013 delete shelter and barbeque; relocate small playground to POS1; show additional footbridge (Creek Crossing Option B).
2. Revised 30122013 show service road, add trees adj. wetlands, remove draft stamp.

For: Rodger Constructions Pty. Ltd.
Date: September 2013 (rev Dec)
Scale: 1:1000 @ A1
Drawn: DT
Drawing No: 13032-P01

Landscape Concept
Aberline Estate
Aberline Rd Warrnambool

Attachment G

Stormwater Management Plan

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Delegate:

Date: 24 April 2014

Cardno
Shaping the Future

Warrnambool
Stormwater Management Plan

Job Number: CG120567

Prepared for Rodger Constructions

19 December 2013

Cardno Victoria Pty Ltd
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Document Control

Version	Date	Description	Prepared	Reviewed	Principal Approval
V1	24 Oct 2012	Draft	DB	MN	
V2	07 Dec 2012	Submission to Council	DB	MN	MN
V3	13 Dec 2013	Design Revision	DB	MN	

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Delegate:
Dated 24 April 2014

1 Introduction

Rodger Constructions engaged Cardno, in association Biofilta Pty Ltd, to prepare a Site Based Stormwater Management Plan (SBSMP) for a proposed residential subdivision at Warrnambool. This report demonstrates the subdivision will manage stormwater runoff in terms of stormwater quantity and quality.

The site is bounded by Wangoom Road to the north, Aberline Road to the east, a proposed residential development site to the south and Russell Creek to the west.

A Biofilta Pty Ltd system has been proposed for the development to filter and remove pollutants and sediment from the stormwater runoff before it leaves the site and enters Russell Creek. The purpose of selecting the Biofilta system approach is due to its robust methodology of capturing and removing sediment and pollutants from stormwater in a simple and spatially efficient manner.

This project includes a high degree of innovation in that it seeks to provide fit for purpose "raw water" into the Wannon Water collection pipeline for integrated water management into the town drinking water treatment plant. Modelling has shown that the Biofilta System will provide up to 3 times the volume of stormwater than a previously proposed separate roof water harvesting scheme.

Stormwater flood detention will also be provided within the Biofilta System with the addition of a retarding basin and controlled outflow structure such that the peak flow from the development is no more than the peak flow predevelopment for the 1 in 10 and 1 in 100 year ARI storm events.

In addition to meeting the best practice objectives for stormwater treatment, the water sensitive design features will provide an integrated visual and environmental amenity which is sympathetic to the design intent of this estate and will provide a lasting and sustainable community asset with local irrigation needs met by the Biofilta System.

2 SITE CHARACTERISTICS

2.1 Location and Land Use

The proposed development site is located approximately 4km northeast of the town of Warrnambool. The site is bounded by Wangoom Road to the north, Aberline Road to the east, a proposed residential development site to the south and Russell Creek to the west.

The development has an area of 41.6ha and will consist of approximately 380 residential lots.

The total site is proposed to be developed as medium density detached residential dwellings.

The proposed development location is indicated below in Figure 1 below.

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Figure 1: Site Location & Schematic Development layout

3 Catchment Analysis

The XP Software program, XP SWMM 2011 (Stormwater & Wastewater Management Model) was selected to analyse the site hydraulic activities for pre and post development.

Key parameters used to construct the model are based on guidance from *Australian Rainfall and Runoff* (AR&R) as outlined below.

3.1 Loss Model

The model for pervious runoff assumes a 20mm initial loss and a continuing loss of 2.5mm/hr.

For impervious developed catchments, an initial loss of 1mm depth and zero continuing loss were assumed.

The loss models are considered to be within industry standard practice.

3.2 Rainfall Parameters

Rainfall flow and volumes were generated within the module for the 1 in 5 to 1 in 100 year Average Recurrence Interval (ARI) event.

The range of storm events modelled were based on the Australian Rainfall and Runoff (AR&R) standard unit hyetographs and give more accurate flow results than the Rational Method as the actual shape of the storm event is used rather than an assumed constant rainfall intensity for a given time of concentration.

Figure 2 shows the typical variation of the shape of storm events for different durations:

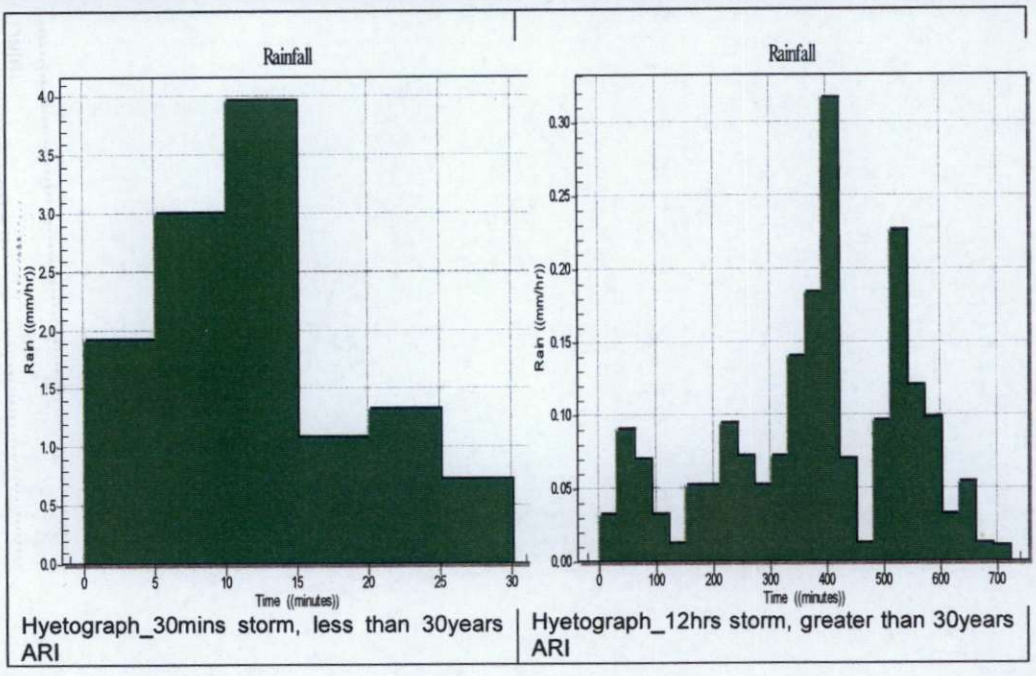

Figure 2: Standard Unit Hyetographs used in XPSWMM

Calculated flows are tabled in later sections of this report for the post development conditions.

The actual site hyetographs were computed by the hydraulic model by selecting the appropriate standard unit hyetographs and scaling the storm to suit the site via multipliers obtained from Intensity-Frequency-Duration curves in Figure 3.

The Laurenson Method was selected as the preferred means of calculating peak flows and runoff routing.

Intensities (Figure 3) were taken from the Bureau of Meteorology website for the location of the site.

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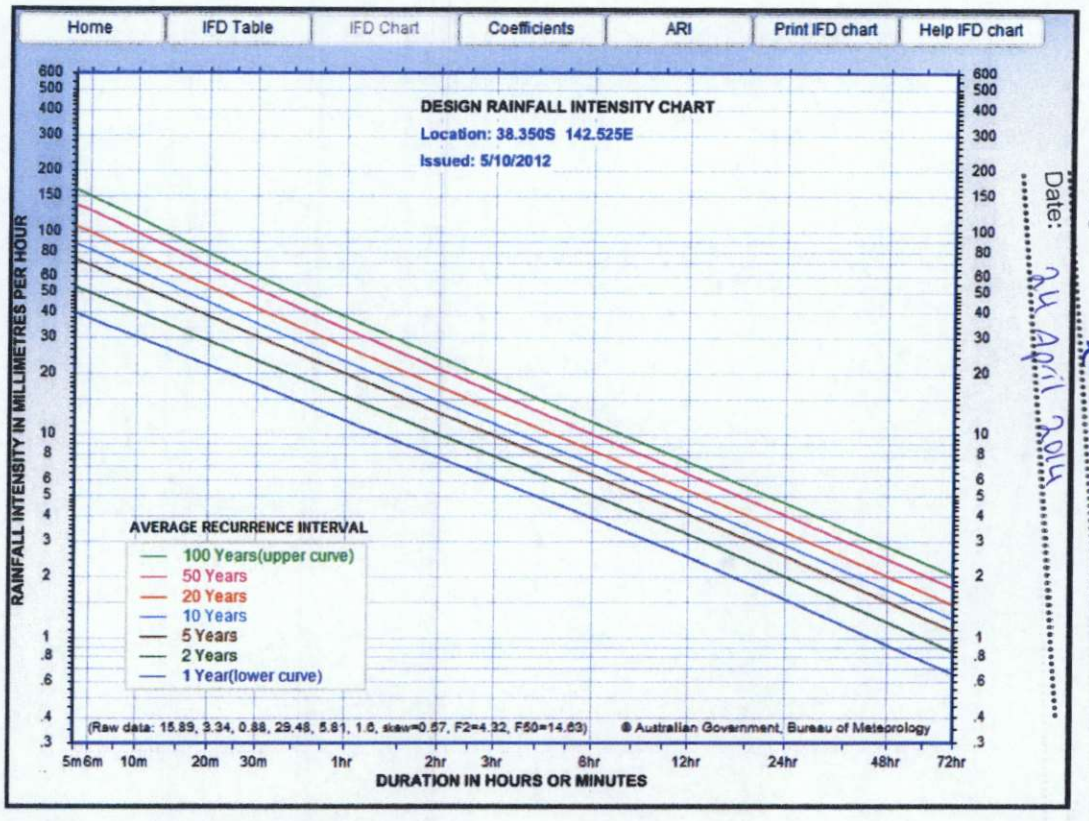

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Figure 3: Intensity-Frequency-Duration Table

3.3 Catchment Delineation

The site contains a number of distinct catchments defined by the proposed urban drainage network and direction of flow path.

3.3.1 Catchments

The proposed catchment delineation for post development is summarised in Table 1 and outlined in Figure 4. Under the proposed conditions, the stormwater network will convey runoff from the developed subcatchments to the proposed Biofilta water quality measures described below.

Catchments 1-4 are the developed residential areas of the site while Catchment 5 is the proposed location of the Biofilta system and surrounding open space.

Table 1: Proposed Subcatchments

Catchment	Area (ha)	Developed %Impervious
1	10.2	75
2	14.3	75
3	8.7	75
4	6.6	75
5	1.8	10
Total	**41.6**	

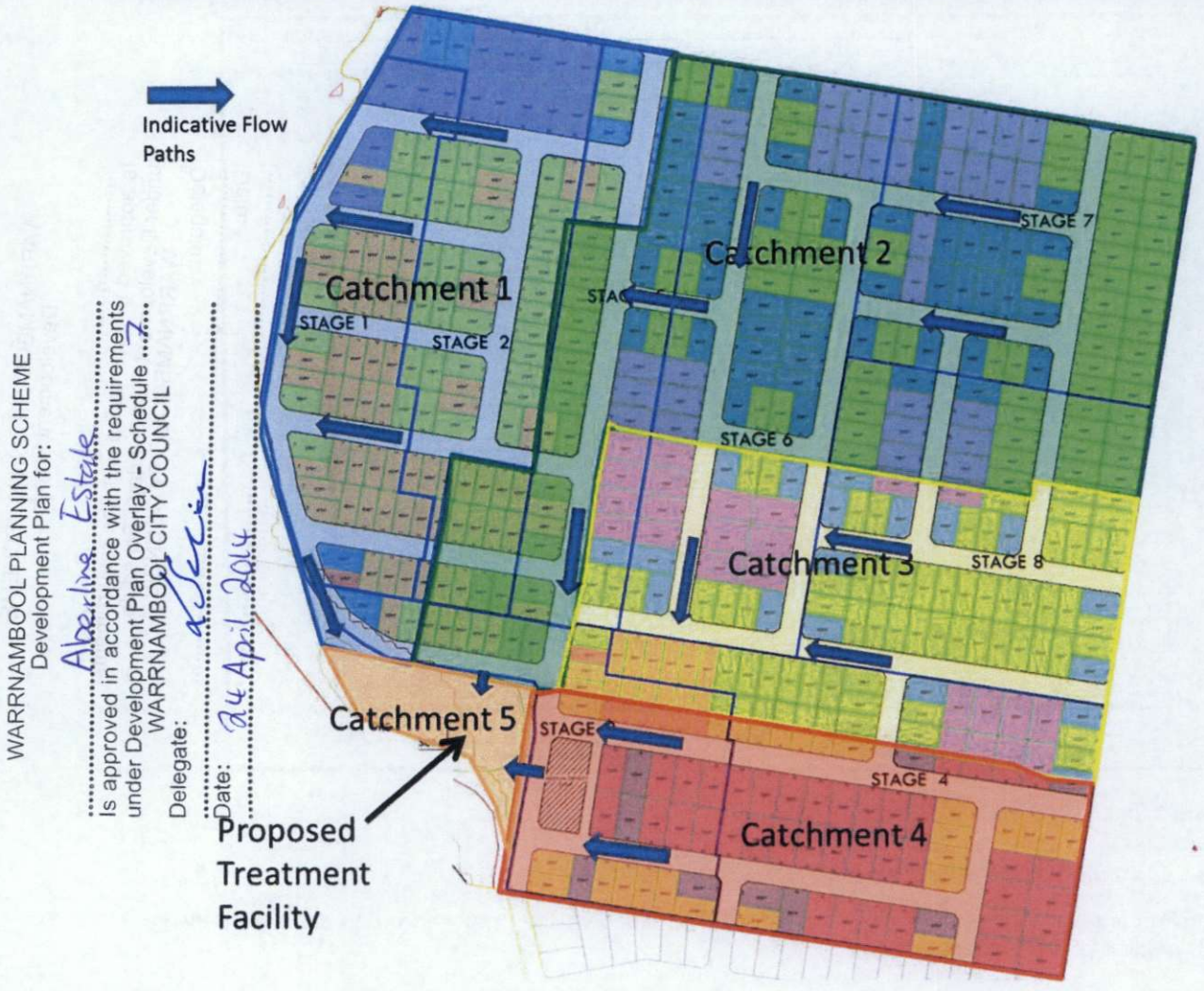

Figure 4: Proposed catchment delineation

3.4 Minor Flow Conveyance Objectives

Rainfall events up to the 1 in 5 year ARI will be conveyed through an underground pipe network throughout the developed sub-catchments. All flows from this network will be directed to the proposed sediment basin at the southwest of the site. Low flows, in the order of the 1 in 3 month ARI, will be detained within the sediment basin and floating wetland until such time that it is pumped to the proposed Biofilta planter bed.

Stormwater entering the sediment basin will be retarded within the basin and allowed to drain at a controlled rate to a water body with a floating wetland installed. The sediment basin will provide primary settlement of suspended solids not caught by the gross pollutant traps.

Flows in excess of the 1 in 3 month ARI will spill over a proposed weir from the sediment basin to Russell Creek. A small amount of detention will be provided within the sediment basin however is not considered to be a requirement of the design.

This arrangement allows for a smaller footprint of treatment facilities while offering a greater treatment performance. It also allows the suspended solids within the stormwater to be removed in the sediment basin prior to entering the bio-retention basin and therefore reducing maintenance requirements of the planter bed.

The Biofilta system and its water quality treatment train is discussed in greater detail in later sections of this report.

A typical arrangement of the Biofilta system is shown below in Figure 5. Functional design drawings are included in Annex 1.

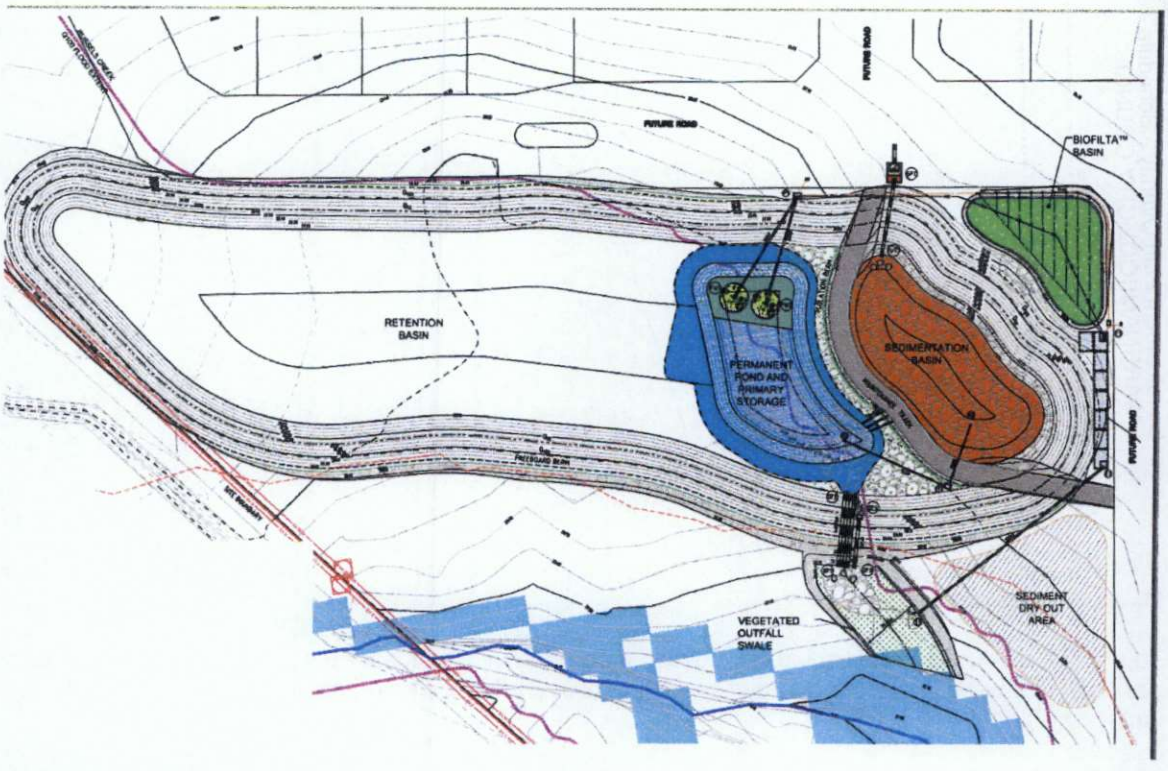

Figure 5: Biofilta Typical Detail

3.5 Major Flow Conveyance Objectives

Major flows exceeding the 5 year ARI and up to the 100 year ARI will be conveyed overland via the general road network towards the outlet of the developed.

Major flows will be detained onsite before being released to Russell Creek. The peak outflow flow rate from the site post development will be detained to the predevelopment level for the 1 in 10 year and 1 in 100 year ARI storm event.

Detention will be provided within the same footprint as the Biofilta System with the outlet controlled by a combination of a culvert and a high flow weir. 6,200m^3 of detention storage will be required prior to detain the 1 in 100 year ARI flow entering Russell Creek to predevelopment levels.

An overland flow path from the sediment basin to Russell Creek will be provided to cater for the expected peak 1 in 100 year ARI flow.

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4 Model Layout

The layout for the stormwater hydraulic model based on the delineated catchment areas is shown below:

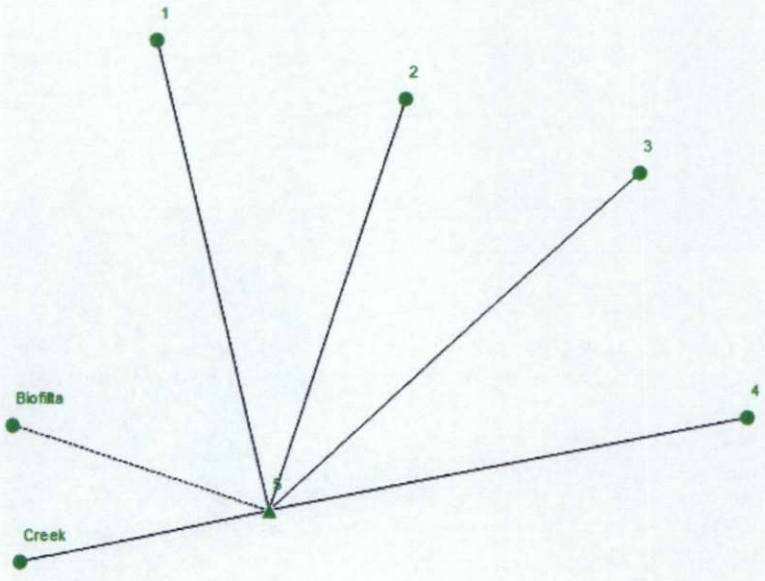

Figure 6: SWMM Model Layout

The model was used to determine flow routing for all storm scenarios for the 1 in 3 month and the 100 year ARI storm using parameters outlined in previous sections with durations from 10 minutes to 72 hours considered.

5 Stormwater Runoff Results

Attenuation of peak developed flows to the pre developed levels at the outlet of the site is not considered a requirement for this development. The time of concentration of stormwater flows is low compared to the upstream catchment of Russell Creek. Therefore the peak discharge of a given storm will pass away from the site prior to the peak flow from the upstream Russell Creek.

5.1 Pre development flows

Pre development flows were calculated using 100% pervious catchment area. Storm durations from 10 minutes to 72 hours were simulated.

The expected 1 in 10 year ARI peak discharge at the downstream end of the site is 1.35m^3/s.

The expected 1 in 100 year ARI peak discharge at the downstream end of the site is 2.35m^3/s. Figure 7 below is the outflow hydrograph from the site into Russell Creek.

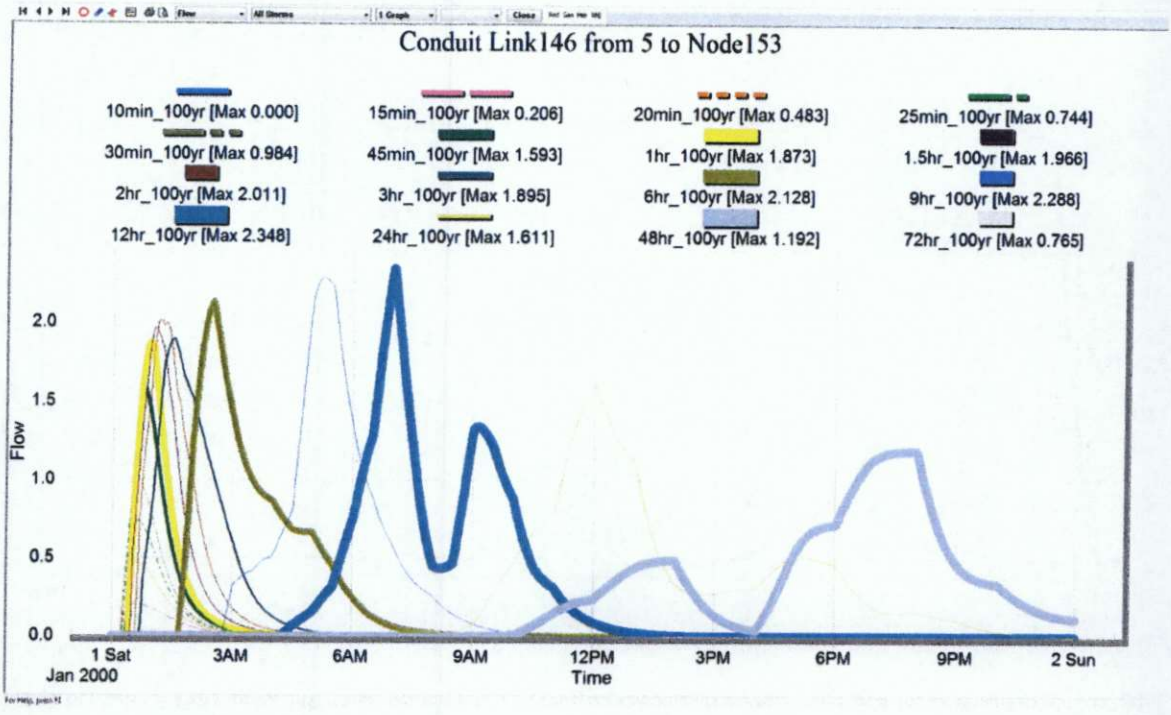

Figure 7: Pre-development Outflow

5.2 Post development flows

The 1 in 10 and 1 in 100 year ARI post development flows were calculated using fraction impervious values outlined in Section 3.3.1. The peak flows were attenuated using a combination of a reinforced concrete box culvert and a high flow weir, as outlined in Table 2.

Table 2: Retarding Basin Outlet Arrangement

Outlet Element	Size	Invert Level (m AHD)	Q_{10} Flow Rate (m^3/s)	Q_{100} Flow Rate (m^3/s)
Concrete Pipe	4x525mm Dia	22.00	1.31	1.99
Letter Box Opening Control Outlet Pit	900x150mm	22.66	0.00	0.25
Biofilta Pump	60l/s constant	22.00	0.06	0.06

The outflow hydrograph for the 1 in 100 year ARI is shown below in Figure 8.

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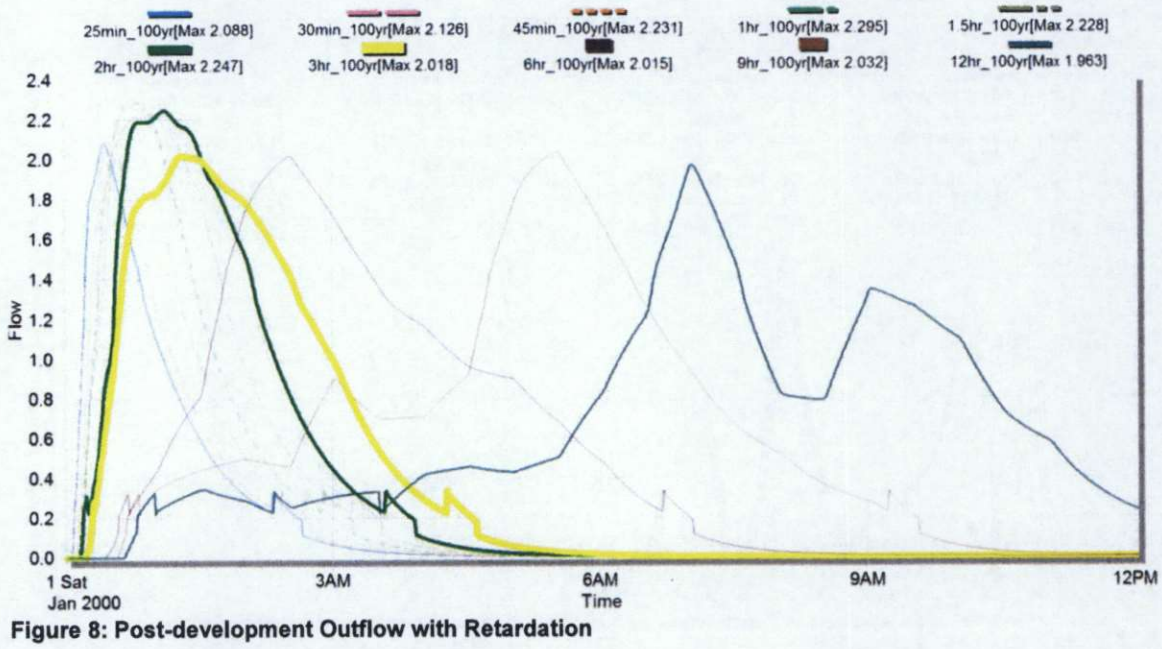

Figure 8: Post-development Outflow with Retardation

6,100m^3 of detention storage is required to detain the 1 in 100 year ARI event to no more than the pre-developed level. This volume has been included in the Biofilta design included in Annex 1. The total volume of detention has been provided below the existing surface level; therefore no flood plain storage for Russell Creek has been lost as a result of this design.

6 Stormwater Quality Treatment

Russell Creek lies to the west of the development and is the receiving water body for the development's stormwater runoff.

Water quality for the proposed development will be managed through a proposed Biofilta system, including a GPT, sediment basin, floating wetland and vegetated planter bed. The objective of the treatment measures is to meet best practice stormwater quality guidelines.

A summary of the targets are included in Table 3

Table 3: Water Quality Targets

Pollutant	Target
Total Suspended Solids (TSS)	80% removal
Total Phosphorus (TP)	45% Removal
Total Nitrogen (TN)	45% Removal
Gross Pollutants (GP)	90% Removal

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6.1 Stormwater Quality Modelling

Sizing of the treatment measures was based on the software program MUSIC V5, using the rainfall pattern from the Camperdown Pluviograph during 1957-2011. The overall treatment train is shown in Figure 9.

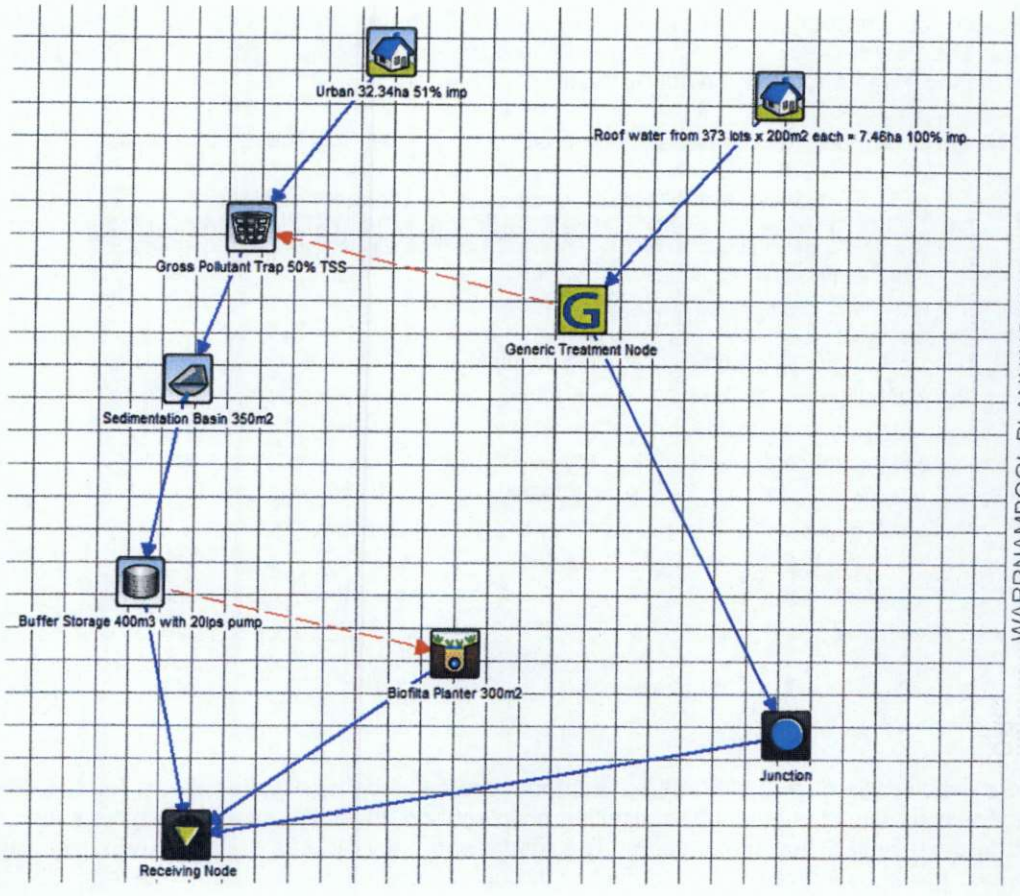

Figure 9: MUSIC Model Treatment Train

6.1.1 Model Setup

For modelling purposes, two catchments were used to represent the site assuming a total percentage imperviousness of 60%. A single catchment was utilised to represent the roof area of the individual dwellings while a separate catchment was used to represent the remaining catchment.

All flow up to the 1 in 1 year ARI storm event from the dwelling roofs only will be directed to a separate drainage network. This network will transfer this water to via gravity to an offsite treatment facility operated by the local water authority, Wannon Water. For the purposes of the MUSIC modelling, the total volume of this runoff is assumed to be removed from the model. The functional civil design will incorporate this feature where two parallel stormwater networks will exist.

Rainwater tanks have been excluded from the MUSIC modelling. It is assumed that rainwater tanks will not be compulsory within the development and therefore cannot be relied upon for water quality modelling. Any instillation of rainwater tanks for the purposes of reuse within the development will be advantageous with respect to stormwater quality runoff.

The Biofilta system is proposed to consist of a sediment basin, floating wetland and a vegetated planter bed. The sediment basin is designed to capture low flow from the catchment where it will be detained to allow the coarse sediment to settle out of the water column. The flow from the sediment

basin to the floating wetland will be conveyed via an orifice such that the stormwater runoff within the sediment basin is detained long enough to allow sediment removal.

Stored water within the floating wetland will be pumped to the vegetated planter bed in a controlled manner such that the capacity of the filter media is not exceeded. This pump rate is to be 60l/s.

Outflow from the planter bed will flow to an existing 450mm dia gravity main for non-potable reuse purposes. The treated water will flow via gravity to a treatment facility to be recycled through a 'third pipe' by the local water authority, Wannon Water.

MUSIC Model parameters for the bioretention basin used are detailed below in Table 4.

Table 4: MUSIC Model Parameters for Bioretention Node

Parameter		Default Value	Adopted Value
Saturated Hydraulic Conductivity (mm/hr)		100	180
TN Content of Filter Media (mg/kg)		800	600
Orthophosphate Content of Filter Media (mg/kg)		80.0	5.0
Total Suspended Solids K	K (m/yr) C* (mg/L)	8000 20.000	8000 20.000
Total Phosphorus	K (m/yr) C* (mg/L)	6000 0.130	6000 0.130
Total Nitrogen	K (m/yr) C* (mg/L)	500 1.400	500 1.400
Filter Media Soil Type		Loamy Sand	Sand
Number of CSTR Cells		3	3
Porosity of Filter Media		0.350	0.350

The bioretention node default of 80mg/kg orthophosphate content associated with a sandy loam filter media, results in phosphorus being the limiting pollutant and drives the size of the bioretention basin needed to meet Best Practice standards. The media and plants will be supplied by Biofilta Pty Ltd. Due to their low phosphorous sand, confirmed through independent testing conducted by SportsTurf Consultants, demonstrating a phosphorous content of 5ppm or 5mg/kg, this default has been substantially reduced.

Details of each element of the Biofilta System are included in Section 6.2 below.

6.1.2 Results

The MUSIC modelling results from the total development site are below in Table 5.

Table 5: Treatment Train Effectiveness for developed areas

Pollutant	*Reduction*
Total Suspended Solids (TSS)	89.6%
Total Phosphorus (TP)	74.0%
Total Nitrogen (TN)	57.3%
Gross Pollutants (GP)	100%

The treatment system presented in Figure 8 exceeds best practice guidelines for TSS, TP and TN removal.

6.2 Biofilta System

The Biofilta system is a proprietary product that utilises the principals of biofiltration to treat stormwater runoff. Biofilta is superior to traditional bio-retention basins in that it reduces the footprint of a treatment train while maintaining a high quality of treatment.

6.2.1 Sediment Basin

The Biofilta system will include a sediment basin with an area of 640m^2 in which all low flow stormwater will be diverted from the developed catchment upstream. The NTWL of the sediment basin is proposed to be 21.787m AHD. Stormwater will flow from the sediment basin to a proposed floating wetland. From the floating wetland, the stormwater will be pumped to the bioretention basin at a rate of 60l/s.

A typical detail of the sediment basin with an outlet structure is included in Figure 10 below. Typical details are included in Annex 1.

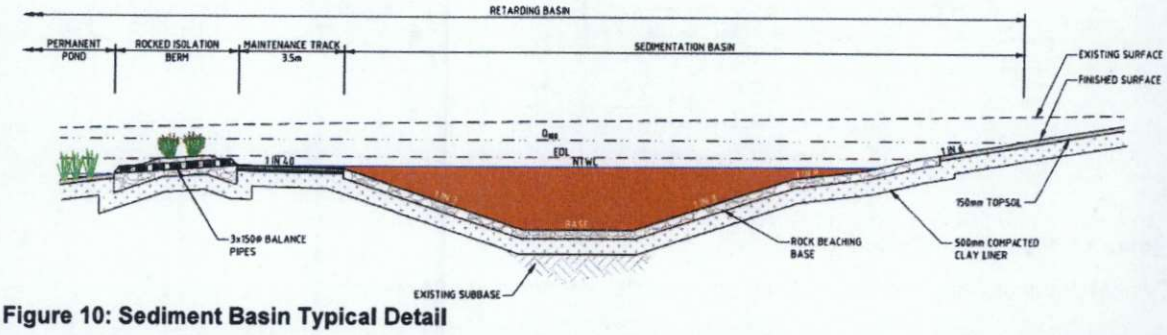

Figure 10: Sediment Basin Typical Detail

The outlet structure for the sediment basin will consist of orifices sized such that the flow rate allowed to pass is sufficient to allow the deposition of suspended solids.

6.2.2 Floating Wetland

The floating wetland will have a NTWL of 21.5m AHD an area of 500m^2.

Stormwater will be pumped from the centre of the floating wetland to the proposed planter bed at a rate of 20lps. The off take riser will be located within the centre of the floating wetland structure, with a submersible pump located with a pump well. The total available depth of drawdown within the wetland is 500mm.

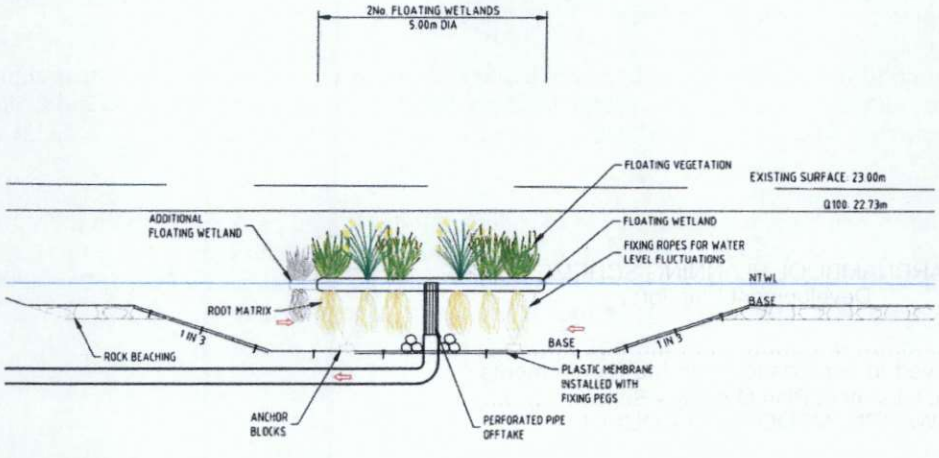

Figure 11: Floating Wetland Typical Detail

6.2.3 Planter Bed

The proposed planter bed will be 300m^2 and have a level of 23.4m AHD with a 300mm EDD. Water will be pumped to the planter bed at a rate of 20lps from the floating wetland.

Filtered water from the planter bed will be directed to a reuse tank, for the purposes of sustainability of the planter bed in times of low rainfall. The reuse tank is proposed to have a capacity of 77m^3. The stored water in this tank will be retained until such time that there has not bed sufficient rainfall within the catchment to keep the organic components of the system healthy. An automated system will engage a pump within the reuse tank and transfer water to the planter bed. The reuse tank has been sized to ensure the health of the plants for up to two months without rainfall.

A typical detail of the planter bed and reuse tank is shown in Figure 12 below.

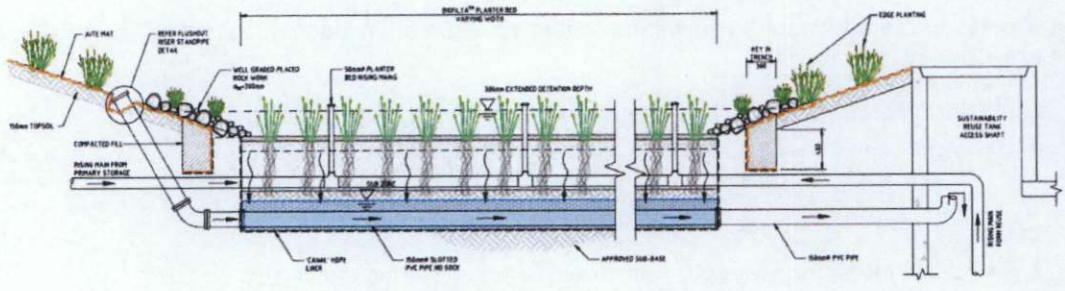

Figure 12: Planter Bed Typical Detail

Typical detail drawings of the Biofilta components are included in Annex 1.

7 Conclusion

The proposed development at Warrnambool contains innovative stormwater management and treatment which combines proven technology in a robust treatment train appropriate to the site.

Biofilta Pty Ltd have developed a treatment train and approach which Cardno have modelled using industry standard hydraulic modelling software and water quality software to meet all statutory requirements of quality and quantity management. The results indicate that the proposed System approach will meet water quality Best Practice standards.

The stormwater runoff from the development will be treated to remove suspended solids, phosphorus and nitrogen using a Biofilta system. The system has been designed to ensure that the removal of pollutants meets best practice guidelines.

Roof water runoff from individual dwellings will bypass all onsite stormwater quality infrastructure and be transferred directly to a Wannon Water treatment facility for reuse purposes located offsite. A parallel stormwater network will be designed into the street layout to facilitate the transfer of roof water runoff.

Flood attenuation has been provided on site to reduce the developed peak runoff to no more than the pre-developed levels. A volume of 6,100m^3 has been provided onsite to detain the 1 in 10 and 1 in 100 year ARI flood. The outlet arrangement of an 4x525mm dia culverts and a 900x150mm letter box opening weir have been provided to outlet the stormwater at a controlled rate.

Annex 1:
Functional Design Drawings

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WARRNAMBOOL CITY COUNCIL

Delegate: .....

Date: 24 April 2014

C77 LAND
WANGOOM ROAD, WARRNAMBOOL
FOR
RODGER CONSTRUCTIONS

WARRNAMBOOL PLANNING SCHEME
Development Plan for: Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate: [signature]
Date: 24 April 2014

GENERAL NOTES -

1. SURVEY

SURVEY DATUM — THESE PLANS ARE BASED UPON THE EXISTING CONDITIONS SURVEY PREPARED BY ....TBC....PL REF. NO. ....TBC....) LEVELS SHOWN ARE TO A.H.D.

SET OUT — THE CONTRACTOR SHALL SET OUT THE WORKS FROM THE NOMINATED DESIGN LINES, SURVEY BENCHMARKS AND CONTROL POINTS SHOWN ON THE PLANS AND TO THE SPECIFIED DETAILS. UPON REQUEST AN ELECTRONIC BASE PLAN OF THE CIVIL DRAWING CAN BE SUPPLIED.
WHERE CARDNO'S COMPUTER MODELS ARE UTILISED FOR SET OUT IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY THAT THE PROPOSED VERTICAL AND HORIZONTAL ALIGNMENT ARE CONSISTENT WITH THE INFORMATION SHOWN ON THE DRAWINGS. ANY DISCREPANCY SHALL BE REFERRED TO CARDNO PRIOR TO CONSTRUCTION.

DIMENSIONS — ALL DIMENSIONS ARE TO INVERT OF KERB OR OUTER EDGE OF LINEMARKING WHERE APPLICABLE.

REFERENCES PROTECTION — THE CONTRACTOR SHALL MAINTAIN AND PROTECT THE PEGS AND SURVEY MARKS FOR THE DURATION OF THE WORKS.

AS-CONSTRUCTED SURVEY — UPON COMPLETION OF THE CIVIL WORKS THE CONTRACTOR SHALL PROVIDE CERTIFIED AS-CONSTRUCTED PLANS OF THE WORKS AND AN AS-CONSTRUCTED SURVEY OF ALL COUNCIL DRAINAGE WORKS IN D SPEC FORMAT OR EQUIVALENT TO COUNCIL REQUIREMENTS.

2. EARTHWORKS

GENERAL — EARTHWORKS SHALL BE CARRIED OUT TO THE FINISHED SURFACE LEVELS SHOWN ON THE PLANS AND CROSS SECTIONS. CUT BATTERS SHALL NOT EXCEED 1 IN 6 AND FILL BATTERS SHALL NOT EXCEED 1 IN 6 SLOPE UNLESS INDICATED OTHERWISE.

GEOTECHNICAL DATA — REFER TO THE GEOTECHNICAL REPORT (NO. TBC.) PREPARED BY -TBC- FOR PAVEMENT RECOMMENDATIONS AND SOIL CONDITIONS.

SITE STRIP — THE CONTRACTOR SHALL STRIP ALL AREAS SUBJECT TO BULK EARTHWORKS , PAVEMENT CONSTRUCTION OR BUILDING WORKS OF ALL TOPSOIL AND OTHER DELETERIOUS MATERIAL.

SUBGRADE CONDITIONS — EXISTING SUBGRADES ARE _______________ THE SANDY/SILTY SUBGRADES IN PARTICULAR ARE SUSCEPTIBLE TO WATER PENETRATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN SITE GRADING AND DRAINAGE AND TO PROTECT AND MAINTAIN SUBGRADES IN A SUITABLE CONDITION (MIN. CBR ...) IN ORDER TO ACHIEVE THE COMPACTIONS SPECIFIED. SHOULD SUBGRADES BECOME SATURATED ANY UNSUITABLE MATERIAL IS TO BE REMOVED AND MADE GOOD WITH TYPE B GENERAL FILL AND/OR LIME/CEMENT STABILIZED AS REQUIRED IN ORDER TO MAINTAIN SUBGRADES. ALL SUBGRADES ARE TO BE PROOF ROLLED AND APPROVED PRIOR TO CONSTRUCTION OF PAVEMENTS AND/OR COMMENCEMENT OF FILLING.

COMPACTION TO AS1289 — THE CONTRACTOR SHALL OBTAIN 98% STANDARD MINIMUM DRY DENSITY COMPACTION ON ALL FINISHED SUBGRADES AND FORMATIONS.

FILLING — PRIOR TO THE COMMENCEMENT OF FILLING THE SITE SHALL BE STRIPPED AS NOTED. FILLING IS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE SPECIFICATIONS AND AS3798. APPROVED MATERIAL WON FROM SITE OR APPROVED COMPACTED FILL SHALL BE MOISTURE CONDITIONED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PRIOR TO BEING PLACED IN UNIFORM HORIZONTAL LAYERS OF 200mm MAXIMUM DEPTH AND COMPACTED AS SPECIFIED. ALL FINISHED SURFACES SHALL ACHIEVE A MINIMUM COMPACTION OF 98% STANDARD DRY DENSITY. COMPACTION TESTING OF ALL FILL SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF AS 3798.

INSPECTION & TESTING — THE CONTRACTOR SHALL INSTRUCT A NATA REGISTERED GEOTECHNICAL ENGINEER TO CARRY OUT LEVEL 2 SUPERVISION TESTING AND REPORTING IN ACCORDANCE WITH AS3798 AND AS1289 AND TO RELEVANT COUNCIL REQUIREMENTS FOR THIS PROJECT. THIS REQUIRES THE GEOTECHNICAL CONSULTANT TO UNDERTAKE THE SAMPLING AND TESTING ON SITE AS SPECIFIED IN ADDITION THEY ARE RESPONSIBLE FOR THE SELECTION TIMING AND LOCATION OF SAMPLING ON EACH VISIT. THE GEOTECHNICAL CONSULTANT SHALL PROVIDE TEST RESULT TO CARDNO AS THEY ARE TAKEN AND SUBMIT A COMPREHENSIVE FINAL REPORT TO TO CARDNO SATISFACTION PRIOR TO PRACTICAL COMPLETION. THE FREQUENCY OF TESTING SHALL BE IN ACCORDANCE WITH AS3798 TABLE 8.1 (ADOPTING WHICHEVER GIVES THE MOST TEST RESULTS)

SMALL DEVELOPMENTS
- 1 TEST PER 200 m² (DISTRIBUTED OVER AREA AND DEPTH)
- 1 TEST PER 200mm THICK LAYER PER 1000 m²
- 1 TEST PER LOT

LARGE DEVELOPMENTS
- 1 TEST PER 500 m² (DISTRIBUTED OVER AREA AND DEPTH).
- 1 TEST PER 200mm THICK LAYER PER 2500 m²
- 3 TESTS PER VISIT

REINSTATEMENT — THE CONTRACTOR SHALL REGRADE, SHAPE, TOPSOIL AND GRASS ALL ADJACENT EXISTING GRASSED AREAS THAT ARE DISTURBED OR ALTERED AS A CONSEQUENCE OF THE PROPOSED WORKS.

3. LANDSCAPING

LANDSCAPE AREAS — FOR DETAILS OF LANDSCAPE AREAS & FINISH, REFER TO LANDSCAPE ARCHITECT'S DRAWINGS.

PREPARATION — IN NEW LANDSCAPE AREAS ALL REDUNDANT PAVEMENT MATERIAL SHALL BE REMOVED & REINSTATED WITH CLEAN FILL TO 150mm BELOW FINISHED SURFACE LEVEL. UNLESS NOTED OTHERWISE ON THE LANDSCAPE PLANS, REINSTATEMENT OF A MIN 150mm OF CLEAN TOPSOIL SHALL BE PROVIDED TO ALL LANDSCAPE AREAS.

EXISTING — ALL EXISTING TREES IN THE VICINITY OF THE TRAFFICABLE AREAS THAT ARE TO BE RETAINED SHALL BE PRUNED, ROOTS CUT & SEALED WHERE THEY EXTEND BENEATH NEW WORKS, BY APPROPRIATELY QUALIFIED PERSONNEL. TREES TO BE REMOVED SHALL HAVE ALL ROOTS GRUBBED OUT AND BE MADE GOOD WITH COMPACTED FILL.

4. SITE CLEARANCE

DEMOLITION — ALL EXISTING REDUNDANT CONCRETE, PAVEMENT, SOIL, RUBBISH AND CONSTRUCTION DEBRIS SHALL BE TAKEN UP AND REMOVED FROM SITE.

CLEAN UP — PRIOR TO COMPLETION, THE CONTRACTOR SHALL ENSURE THE SITE OF WORKS IS TIDIED AND OBTAIN A CLEARANCE FROM THE SUPERVISING ENGINEER OR THE PROJECT MANAGER.

5. DRAINAGE

PIPES — DRAINAGE PIPES ABOVE 225ø TO BE MINIMUM OF CLASS 2 REINFORCED CONCRETE, FRCP OR SRCP (RUBBER RING JOINTED) UNLESS OTHERWISE SPECIFIED. DRAINAGE PIPES UP TO 225ø TO BE SEWER QUALITY UPVC (RUBBER RING JOINTED). COMPACTED CLASS 2 FCR BACKFILL SHALL BE INSTALLED TO PIPES UNDER ROAD PAVEMENTS AND BUILDING SLABS. TRENCHES IN LANDSCAPE AREAS CAN BE BACKFILLED WITH SELECTED CLAY FILL.

EXISTING PIPES — ALL EXISTING PIPES THROUGH EXISTING LANDSCAPE AREAS THAT WILL NOW BE BENEATH NEW ROAD PAVEMENT SHALL HAVE THE EXISTING BACKFILL REMOVED AND REPLACED WITH A CRUSHED ROCK BACKFILL COMPACTED TO 98% STANDARD.

PITS — DRAINAGE PITS TO BE CAST IN-SITU CONCRETE PITS AS DETAILED OR APPROVED PRECAST CONCRETE COMPLYING WITH THE RELEVANT AUSTRALIAN STANDARDS. ALL PITS DEEPER THAN 1.0m ARE TO BE PROVIDED WITH APPROVED STEP IRONS AT 300 MAX. CENTRES.

SET OUT — PIT LOCATIONS AND PIPE INVERT LEVELS ARE SPECIFIED ON THE PIT SCHEDULE IN DWG ....TBC.

6. TRAFFIC MANAGEMENT

GENERAL — TRAFFIC MANAGEMENT SHALL BE ARRANGED BY THE CONTRACTOR FOR THE DURATION OF THE WORKS IN ACCORDANCE WITH AUSTRALIAN STANDARD AS1742.3-2002 FOR CONSTRUCTION TRAFFIC MANAGEMENT AND TO THE SATISFACTION OF ALL PARTIES, INCLUDING THE PROVISION OF ALL NECESSARY SIGNAGE, LIGHTING AND BARRICADING. TRAFFIC FLOWS IN ALL ABUTTING ROADWAYS AND ACCESS TO THE SITE SHALL REMAIN UNIMPEDED FOR THE DURATION OF THE CONTRACT. A TRAFFIC MANAGEMENT PLAN FOR ANY EXTERNAL ROADWORKS SHALL BE SUBMITTED TO COUNCIL FOR APPROVAL A MINIMUM OF TWO WEEKS PRIOR TO COMMENCEMENT OF WORKS.

7. TESTING

DATA — THE CONTRACTOR SHALL SUPPLY WRITTEN TEST RESULTS FROM A NATA REGISTERED GEOTECHNICAL ENGINEER CONFIRMING COMPLIANCE WITH THE SPECIFICATIONS FOR ALL EARTHWORKS, CONCRETE WORKS AND PAVEMENTS LAYERS.

AUDIT — TEST RESULTS WILL BE REVIEWED BY THE SUPERINTENDENT AND WHERE SO REQUIRED ADDITIONAL TESTS WILL BE PROVIDED BY THE CONTRACTOR TO THE SUPERINTENDENTS SATISFACTION.

8. LINEMARKING

EXISTING — ALL REDUNDANT LINEMARKING SHALL BE PERMANENTLY REMOVED BY APPLICATION OF A SPRAY SEAL OR BY GRINDING.

GENERAL — LINEMARKING AND R.R.P.M'S ARE TO BE INSTALLED IN ACCORDANCE WITH THESE PLANS AND TO VICROADS SPECIFICATIONS. ALL PARKING BAYS TO BE FULLY LINEMARKED TO VICROADS STANDARDS AND SPECIFICATION. WIDTH OF CAR PARKING BAYS TO BE 2.60m WIDE EXCEPT FOR THE DISABLED PARKING BAYS WHERE THE WIDTH TO BE INCREASED TO 3.2 m WIDE UNLESS OTHERWISE NOTED.

INTERNAL WORKS — ALL LINEMARKING TO BE APPROVED LONG LIFE ROAD MARKING PAINT UNLESS OTHERWISE NOTED.

EXTERNAL WORKS — PARKING BAYS TO BE APPROVED LONG LIFE ROAD MARKING PAINT. LATERAL WORKS, PAVEMENT MARKINGS, ARROWS ETC. ARE TO BE COLD APPLIED PLASTIC TROWELLED INTO PLACE (DEGADUR, PLASTELINE OR EQUIVALENT) LONGITUDINAL LINEWORK TO BE EXTRUDED THERMAL PLASTIC MARKINGS.

9. SIGNAGE

GENERAL — ALL REGULATORY AND HAZARD DIRECTIONAL SIGNS TO BE INSTALLED IN CLASS 1 REFLECTIVE MATERIAL AND ALL WARNING SIGNS TO BE INSTALLED IN CLASS 2 REFLECTIVE MATERIAL TO APPROVED AUSTRALIAN STANDARDS. FOR TEMPORARY SIGNAGE DURING CONSTRUCTION WORKS, REFER TO VICROADS ROADWORKS SIGNAGE CODE.

EXISTING — WHERE NECESSARY, EXISTING TRAFFIC CONTROL SIGNS SHALL BE RELOCATED CLEAR OF PROPOSED WORKS. REDUNDANT SIGNS SHALL BE TAKEN UP AND REMOVED.

EXTENT — NEW TRAFFIC CONTROL SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE DRAWINGS AND THE RELEVANT SPECIFICATION.

10. SERVICES

EXISTING — ALL STATUTORY AUTHORITY SERVICES MUST BE MAINTAINED AND PROTECTED BY THE CONTRACTOR AT ALL TIMES UNLESS OTHERWISE SHOWN. EXISTING SERVICE LOCATIONS SHOWN HAVE BEEN OBTAINED FROM STATUTORY AUTHORITY RECORDS AND/OR SITE PLANS WHERE AVAILABLE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN AND ALL SERVICES SHOULD BE PROVEN ON SITE PRIOR TO THE COMMENCEMENT OF WORKS IN THEIR VICINITY.

CONTACTS — CIVIL CONTRACTOR TO CONTACT THE FOLLOWING AUTHORITIES FOR RELOCATION OF CABLES , U/G MAINS OR POLES WHERE REQUIRED.

UTILITY	OFFICE No.	EMERGENCY/AH No.
UNITED ENERGY	----	----
TELSTRA	----	----
ORIGIN ENERGY (GAS)	----	----
SOUTH EAST WATER	----	----
MELBOURNE WATER	----	----
CITY OF	----	----

— TBC

LIGHTING — FOR PROPOSED CARPARK LIGHTING WORKS REFER TO ELECTRICAL DRAWING NO. ____ BY ____. ALL ELECTRICAL WORKS AS DOCUMENTED ARE TO BE ALLOWED FOR INCLUDING ALL FITTINGS, CONDUITS, CABLE ETC. AND COORDINATION WITH THE CIVIL WORKS.

ADJUSTMENTS — ALL EXISTING PITS AND SERVICE FITTINGS THAT ARE TO REMAIN WITHIN THE PAVEMENT AREAS SHALL BE REBUILT TO MATCH PROPOSED LEVELS AND WHERE APPLICABLE FITTED WITH AN APPROPRIATE HEAVY DUTY, AUTHORITY APPROVED, COVER. ELSEWHERE EXISTING SERVICES SHALL BE ADJUSTED TO SUIT NEW ADJACENT LEVELS. THE RELEVANT AUTHORITY IS TO BE NOTIFIED PRIOR TO ANY WORKS ON THEIR ASSETS AND SERVICES ARE TO BE ADJUSTED BY OR TO THE RELEVANT AUTHORITY REQUIREMENTS.

PROPOSED SERVICES — REFER TO SEPARATE SERVICE DRAWINGS FOR PROPOSED LOCATION OF ELECTRICAL, SEWER, WATER, GAS & TELECOMMUNICATIONS SERVICES. SERVICE TRENCHES LOCATED UNDER PROPOSED PAVEMENTS INCLUDING VEHICLE CROSSINGS AND FOOTPATHS SHALL BE BACKFILLED WITH COMPACTED CLASS 2 FCR. (TRENCHES WHICH ENCROACH WITHIN 150mm OF THE EDGE OF PAVEMENT SHALL ALSO BE BACKFILLED WITH APPROVED FCR MATERIAL).

11. INSPECTIONS

GENERAL — ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION PROGRAMME TO THE SATISFACTION OF THE SUPERVISING ENGINEER AND SUBJECT TO PERIODICAL INSPECTION AND WRITTEN STAGED APPROVAL. ADDITIONAL INSPECTIONS CAN BE REQUESTED AT 24 HOURS NOTICE.

EXTERNAL — ALL WORKS IN ROAD RESERVATIONS SHALL REQUIRE WRITTEN APPROVAL OF THE COUNCIL'S SUPERINTENDENT AND ARE SUBJECT TO SEPARATE INSPECTIONS. SEVEN DAYS NOTICE TO BE GIVEN OF WORK COMMENCING. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY ROAD OPENING PERMITS AND AUTHORITY APPROVALS PRIOR TO COMMENCING WORKS.

12. PAVEMENTS

SAWCUTTING — ALL EXISTING PAVEMENT ADJACENT TO PROPOSED KERB OR PROPOSED JOINTS SHALL BE SAWCUT IN A NEAT LINE TO THE SATISFACTION OF THE SUPERVISING ENGINEER, AND TO HAVE 300mm OVERLAP. REFER TO STANDARD DETAILS.

TRENCHING — ALL TRENCHING WORKS IN EXISTING PAVEMENTS SHALL HAVE SAWCUT EDGES AND NEW PAVEMENT REINSTATED TO NEATLY MATCH EXISTING LEVELS.

REMAINING — EXISTING PAVEMENT AREAS THAT REMAIN, WHERE CRACKING IS EVIDENT SHALL BE SEALED WITH A PROPRIETARY BITUMINOUS PRODUCT TO THE MANUFACTURERS' SPECIFICATIONS.

CONCRETE JOINTING — SAWCUT OR TOOLED CONSTRUCTION JOINTS SHALL BE PROVIDED AT MAX. 2.0m CENTRES TO ALL FOOTPATHS OR PEDESTRIAN PAVING UNLESS NOTED OTHERWISE. A 19mm EXPANSION JOINT SHALL BE PROVIDED WHENEVER RIGID PAVEMENTS ABUT FIXED STRUCTURES OR AT MAX. 15m CENTRES TO FOOTPATHS.
DOWELLED SAWCUT AND CONSTRUCTION JOINTS SHALL BE PROVIDED TO ALL VEHICULAR PAVEMENTS AS DETAILED ON THE DRAWINGS, TYPICALLY NOT GREATER THAN 6.0m CENTRES AND JOINT SPACING SHALL ENSURE SLAB LENGTH (L) ≤1.5 SLAB WIDTH.

PAVEMENT TESTING — EACH ROAD PAVEMENT LAYER SHALL BE TEST FOR COMPACTION BY A NATA REGISTERED GEOTECHNICAL ENGINEER IN ACCORDANCE WITH AS1289 AND SHALL MEET THE FOLLOWING STANDARDS.

ASPHALT LAYERS	UP TO 50mm THICKNESS - 94% CHARACTERISTIC VALUE OF DENSITY RATIO
	GREATER THAN 50mm THICKNESS - 96% CHARACTERISTIC VALUE OF DENSITY RATIO
BASE LAYER	98% MODIFIED DRY DENSITY
SUB BASE LAYER	98% MODIFIED DRY DENSITY
SUB GRADE	98% STANDARD DRY DENSITY

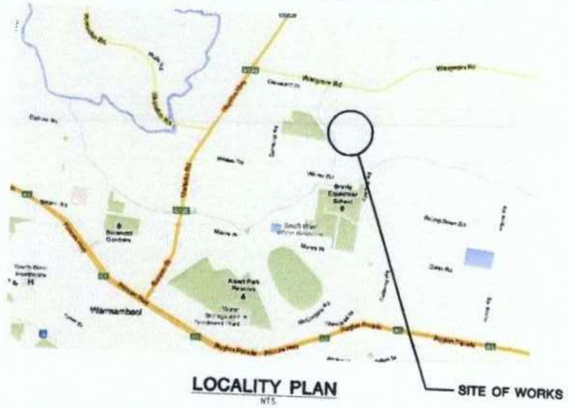
COMPACTION TEST RESULT SHALL BE FORWARDED TO THE SUPERINTENDENT AND COUNCIL'S SUPERVISING ENGINEER FOR APPROVAL PRIOR TO THE PLACEMENT OF SUBSEQUENT PAVEMENT LAYERS. TESTING RATES SHALL BE :
ARTERIAL ROADS 6 TESTS/LOT
OTHER 3 TESTS/LOT
A LOT SHALL BE THE SMALLER OF 5000m² OR ONE DAYS PRODUCTION.
WHERE SO REQUIRED, THE CONTRACTOR SHALL PROVIDE ADDITIONAL TEST TO THE SUPERINTENDENT'S SATISFACTION.

13. SPECIFICATIONS — ...TBC... SPECIFICATIONS SHALL BE USED AS THE GENERAL SPECIFICATION FOR ALL WORKS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF THE CURRENT SPECIFICATIONS, ALL RELEVANT STANDARD DRAWINGS AND ALL ASSOCIATED REVISIONS AND AMENDMENTS ETC.

14. CONTRACT CONDITIONS

GENERAL — ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 4000-1997 GENERAL CONDITIONS OF CONTRACT.

MAINTENANCE PERIOD — A ...TBC... MAINTENANCE PERIOD WILL APPLY TO THIS CONTRACT UNLESS NOTED OTHERWISE.



LOCALITY PLAN
NTS

DRAWING REGISTER	
DRAWING NUMBER	DRAWING TITLE
CG120567-C01	LOCALITY PLAN, GENERAL NOTES AND DRAWING REGISTER
CG120567-C02	OVERALL LAYOUT PLAN
CG120567-C03	DETAIL PLAN - SHEET 1 OF 2
CG120567-C04	DETAIL PLAN - SHEET 2 OF 2
CG120567-C05	LONGITUDINAL SECTION
CG120567-C06	CROSS SECTION - SHEET 1 OF 2
CG120567-C07	CROSS SECTION - SHEET 2 OF 2
CG120567-C08	VEGETATED OUTFALL SWALE LONGITUDINAL AND CROSS SECTIONS
CG120567-C09	TYPICAL DETAILS - SHEET 1 OF 2
CG120567-C10	TYPICAL DETAILS - SHEET 2 OF 2

WARNING
BEWARE OF UNDERGROUND SERVICES
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WORK IN PROGRESS

Rev.	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
P2	05/10/12	TREATMENT AREA LAYOUT REVISED	AW	AW	MN
P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

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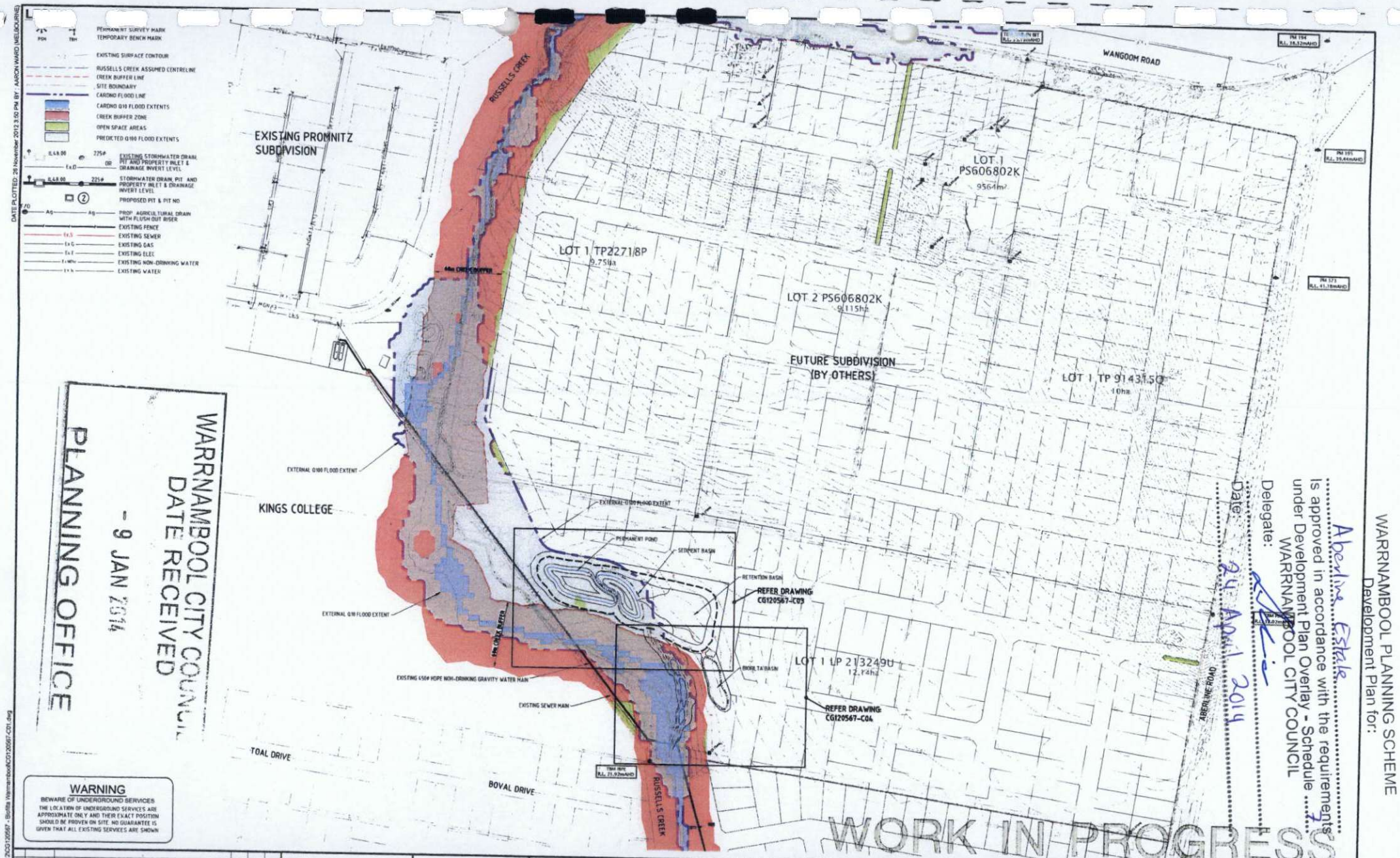
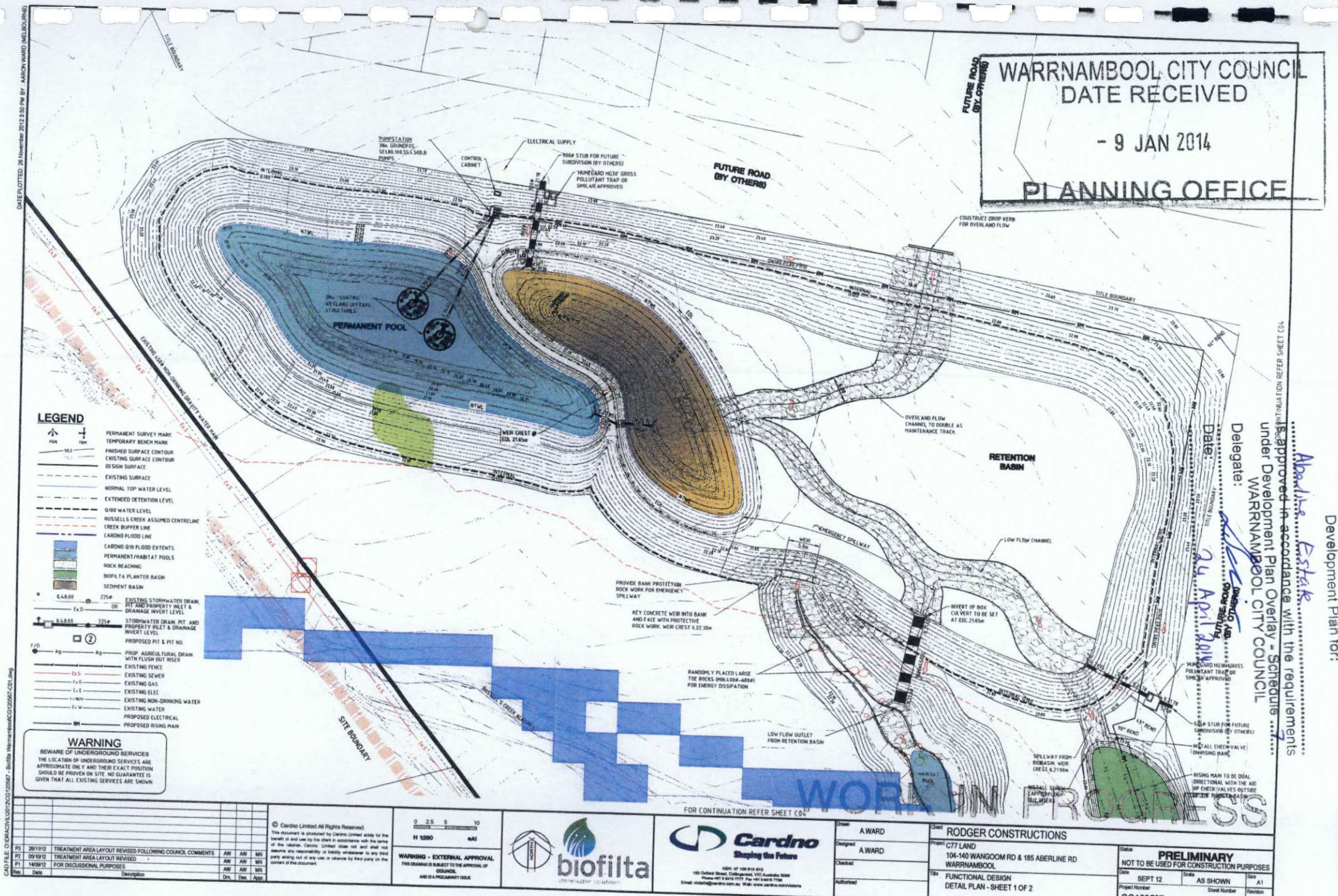
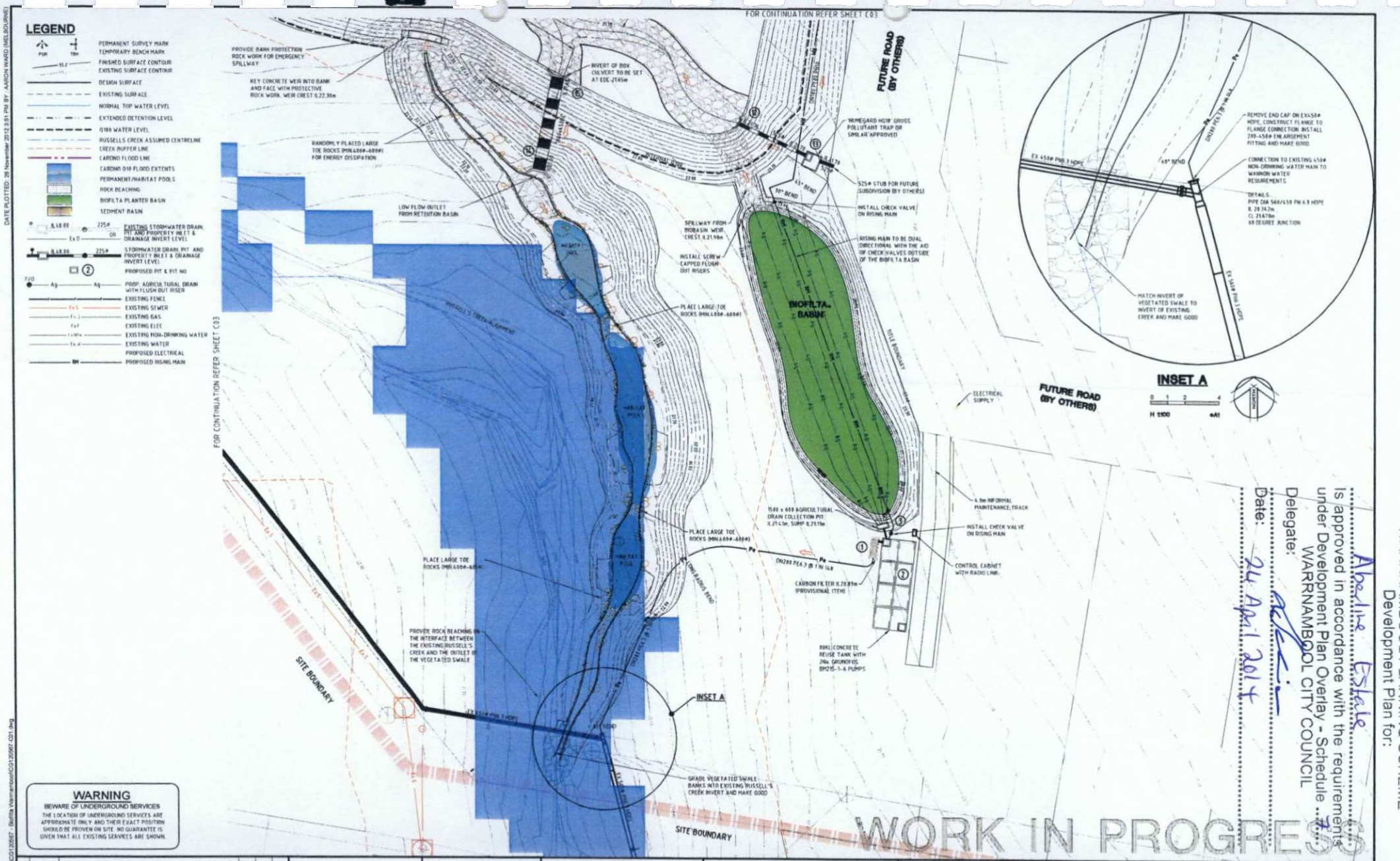
Drawn	A.WARD
Designed	A.WARD
Checked	
Authorised	
Client	RODGER CONSTRUCTIONS
Project	C77 LAND, 104-140 WANGOOM RD & 185 ABERLINE RD, WARRNAMBOOL
Title	FUNCTIONAL DESIGN, LOCALITY PLAN, NOTES AND DRAWING REGISTER
Status	PRELIMINARY — NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	SEPT 12
Scale	AS SHOWN
Size	A1
Project Number	CG120567
Sheet Number	C 01
Revision	P3







Rev.	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
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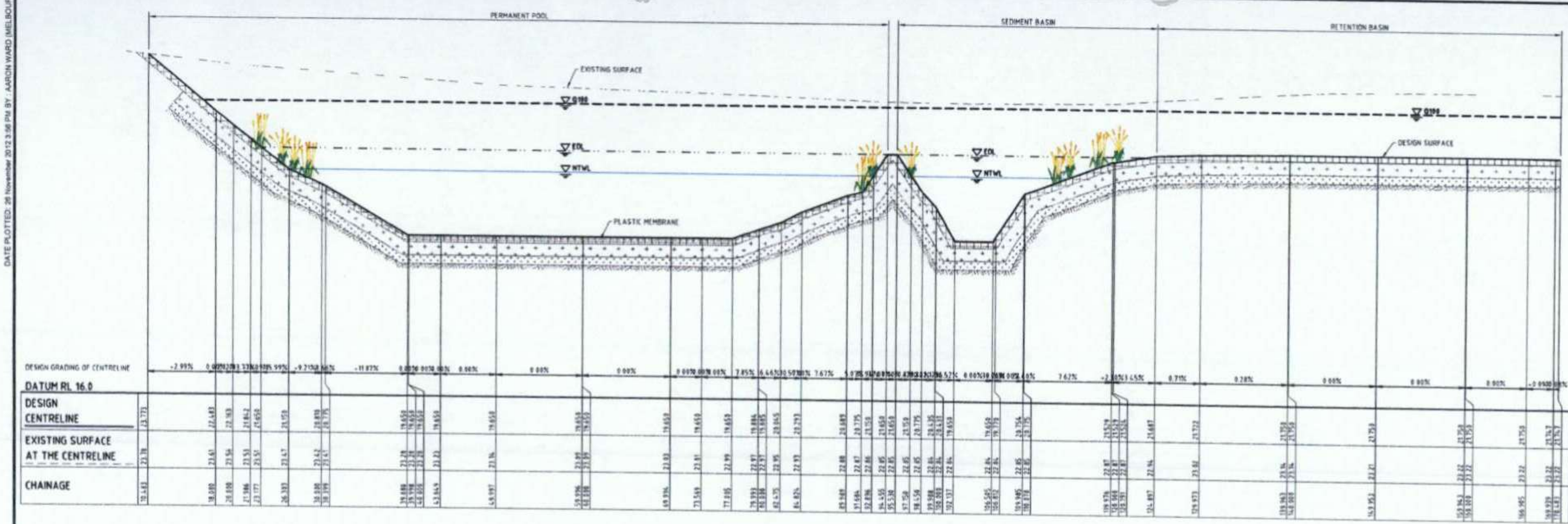
Drawn: A.WARD
Designed: A.WARD
Checked:
Authorised:

Client: RODGER CONSTRUCTIONS
Project: C77 LAND
104-140 WANGOOM RD & 185 ABERLINE RD
WARRNAMBOOL
Title: FUNCTIONAL DESIGN
DETAIL PLAN - SHEET 2 OF 2

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date: SEPT 12
Scale: AS SHOWN
Size: A1
Project Number: CG120567
Sheet Number: C 04
Revision: P3

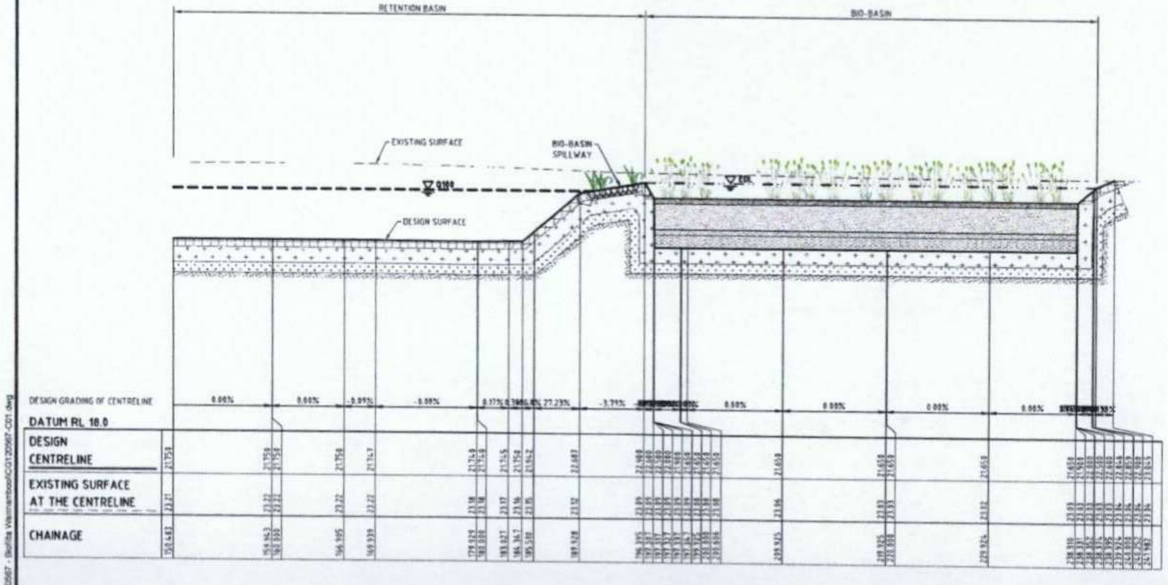
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule ... of the WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

WARRNAMBOOL PLANNING SCHEME
Development Plan for:



LEGEND

- DESIGN SURFACE
- EXISTING SURFACE
- NORMAL TOP WATER LEVEL
- EXTENDED DETENTION LEVEL
- Q100 WATER LEVEL
- BUILDING LINE
- EDL — EXTENDED DETENTION LEVEL
- NTWL — NORMAL TOP WATER LEVEL
- Q100 — SITE Q100 WATER LEVEL
- 150mm TOPSOIL OR ROCK BEACHING
- 300mm COMPACTED CLAY
- 200mm COMPACTED INSITU CLAY
- APPROVED SUB-BASE



WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 2
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

WARNING
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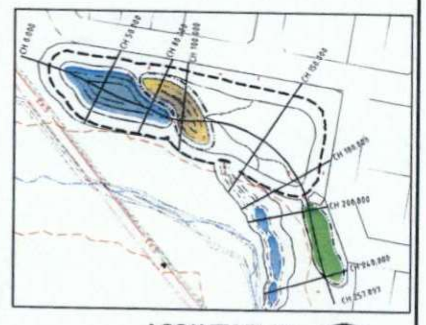

LOCALITY PLAN
SCALE 1:1500@A1

WORK IN PROGRESS

Rev	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
P2	05/10/12	TREATMENT AREA LAYOUT REVISED	AW	AW	MN
P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

H 1:250, V 1:50 @A1

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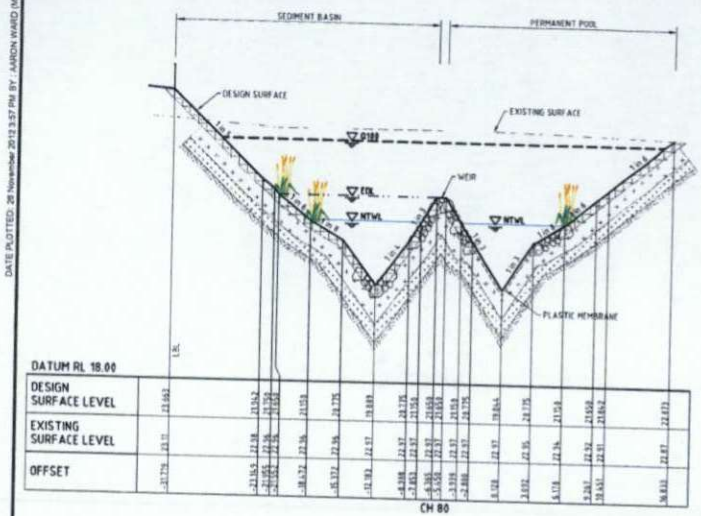
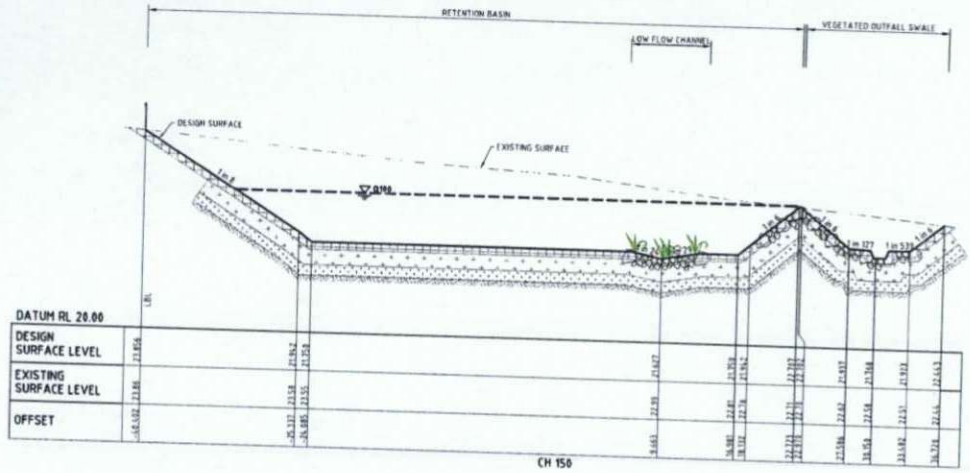
Drawn	A.WARD
Designed	A.WARD
Checked	
Authorised	
Client	RODGER CONSTRUCTIONS
Project	C77 LAND 104-140 WANGOOM RD & 185 ABERLINE RD WARRNAMBOOL
Title	FUNCTIONAL DESIGN LONGITUDINAL SECTION
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	SEPT 12
Scale	AS SHOWN
Size	A1
Project Number	CG120567
Sheet Number	C 05
Revision	P1

DATE PLOTTED: 26 November 2012 3:56 PM BY: AARON WARD (MELBOURNE)





LEGEND

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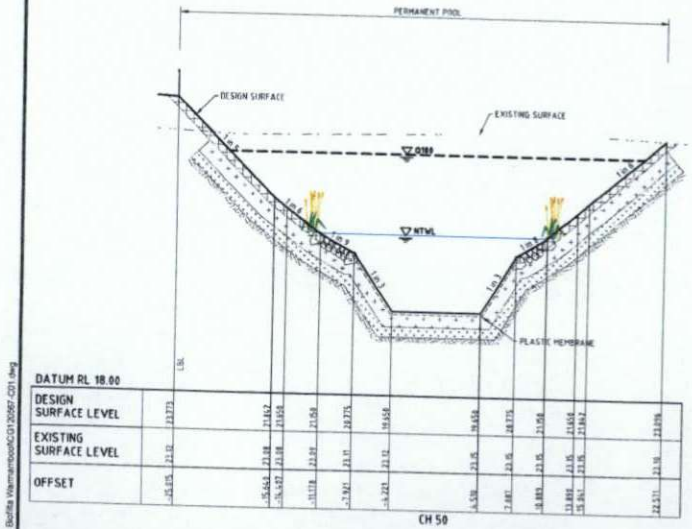

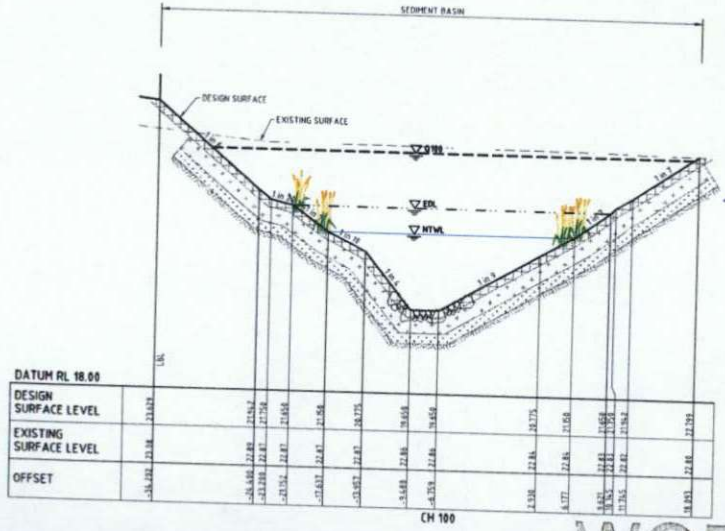

Approved Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule ..7..
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

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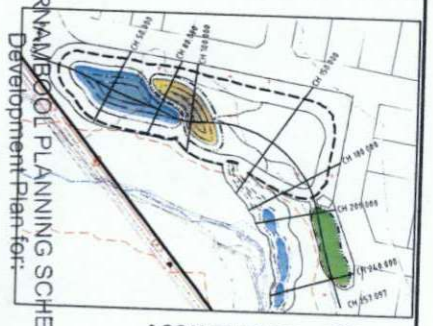
WARRNAMBOOL PLANNING SCHEME
Development Plan for:



LOCALITY PLAN
SCALE 1:5000@A1

WORK IN PROGRESS

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P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
P2	05/10/12	TREATMENT AREA LAYOUT REVISED	AW	AW	MN
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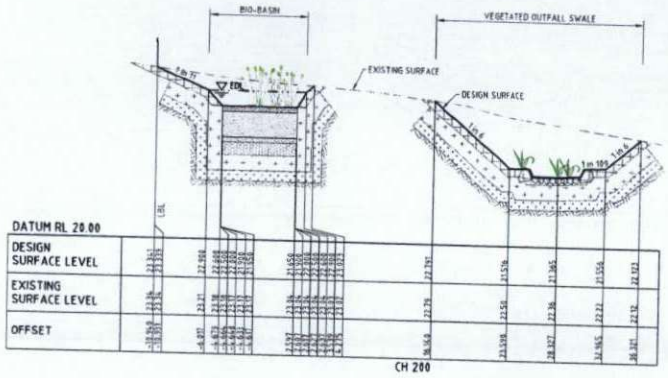
Drawn	A.WARD
Designed	A.WARD
Checked	
Authorised	

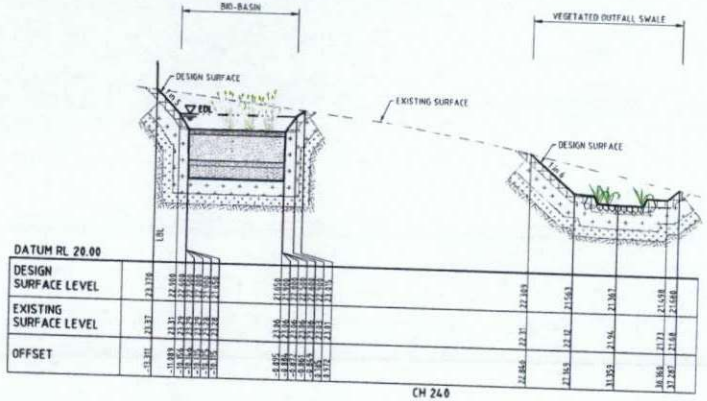
Client: RODGER CONSTRUCTIONS
Project: C77 LAND
104-140 WANGOOM RD & 185 ABERLINE RD
WARRNAMBOOL
Title: FUNCTIONAL DESIGN
CROSS SECTIONS - SHEET 1 OF 2

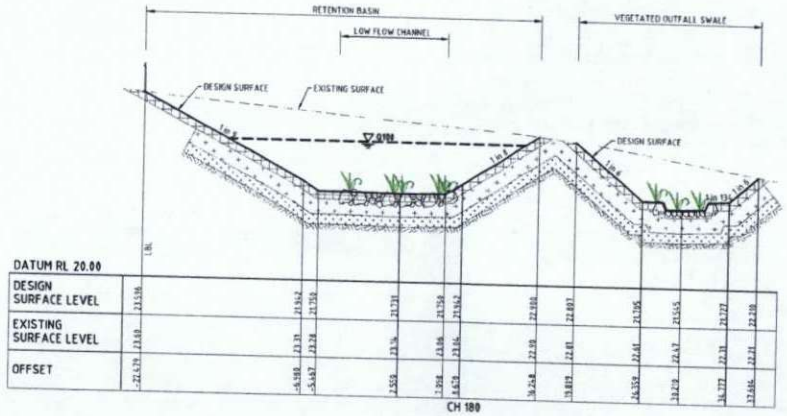
Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Date	Scale	Size
SEPT 12	AS SHOWN	A1
Project Number	Sheet Number	Revision
CG120567	C 06	P3

CAD FILE: O:\DRAC\VL\2012\CG120567 - Bofilta Warrnambool\C\120567-C01.dwg
DATE PLOTTED: 26 November 2012 3:57 PM BY - AARON WARD (MELBOURNE)





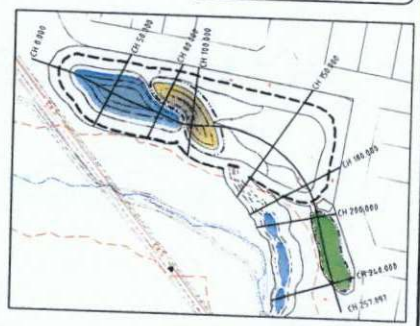


LEGEND

- DESIGN SURFACE
- EXISTING SURFACE
- NORMAL TOP WATER LEVEL
- EXTENDED DETENTION LEVEL
- Q100 WATER LEVEL
- BUILDING LINE
- EDL EXTENDED DETENTION LEVEL
- NTWL NORMAL TOP WATER LEVEL
- Q100 SITE Q100 WATER LEVEL
- 150mm TOPSOIL OR ROCK BEACHING
- 300mm COMPACTED CLAY
- 200mm COMPACTED INSITU CLAY
- APPROVED SUB-BASE

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014



LOCALITY PLAN
SCALE 1:5000@A1

CROSS SECTIONS

WORK IN PROGRESS

Rev.	Date	Description	Drn.	Dec.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
P2	05/10/12	TREATMENT AREA LAYOUT REVISED	AW	AW	MN
P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

0 2.5 5 10
0 0.5 1 2
H 1:250, V 1:50 @A1

WARNING - EXTERNAL APPROVAL
THIS DRAWING IS SUBJECT TO THE APPROVAL OF COUNCIL AND IS A PRELIMINARY ISSUE

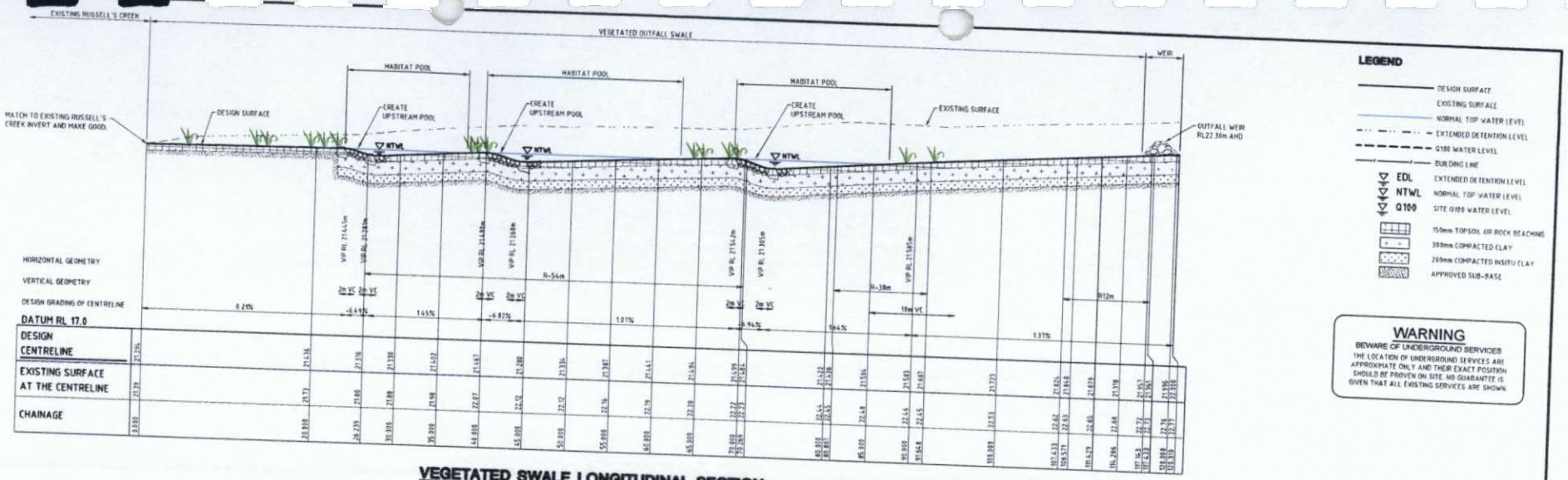
biofilta stormwater solutions

Cardno Shaping the Future
ABN: 47 106 610 913
150 Oxford Street, Collingwood, VIC Australia 3066
Phone +61 3 8415 7777 Fax +61 3 8415 7788
Email: victoria@cardno.com.au Web: www.cardno.com/victoria

Drawn: A.WARD
Designed: A.WARD
Checked:
Authorised:

Client: RODGER CONSTRUCTIONS
Project: C77 LAND
104-140 WANGOOM RD & 185 ABERLINE RD
WARRNAMBOOL
Title: FUNCTIONAL DESIGN
CROSS SECTIONS - SHEET 2 OF 2

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date: SEPT 12
Scale: AS SHOWN
Size: A1
Project Number: CG120567
Sheet Number: C 07
Revision: P3



VEGETATED SWALE LONGITUDINAL SECTION

LEGEND

- DESIGN SURFACE
- EXISTING SURFACE
- NORMAL TOP WATER LEVEL
- EXTENDED DETENTION LEVEL
- Q100 WATER LEVEL
- BUILDING LINE
- EDL EXTENDED DETENTION LEVEL
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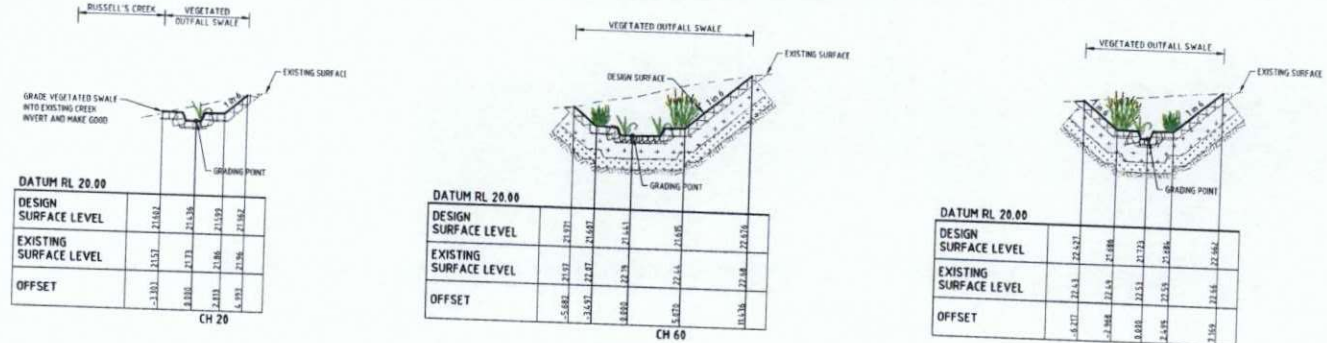

VEGETATED SWALE CROSS SECTIONS

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

WORK IN PROGRESS

Rev	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
P2	05/10/12	TREATMENT AREA LAYOUT REVISED	AW	AW	MN
P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

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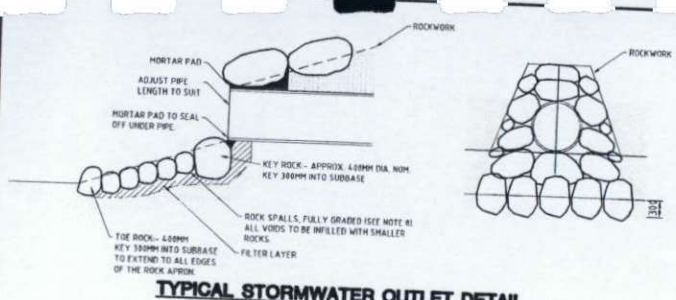
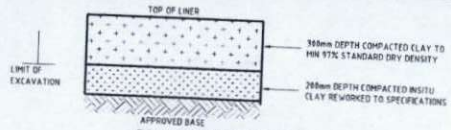
Email: victoria@cardno.com.au Web: www.cardno.com/victoria

Drawn	A.WARD
Designed	A.WARD
Checked	
Authorised	
Client	RODGER CONSTRUCTIONS
Project	C77 LAND 104-140 WANGOOM RD & 185 ABERLINE RD WARRNAMBOOL
Title	FUNCTIONAL DESIGN VEGETATED OUTFALL SWALE
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	SEPT 12
Scale	AS SHOWN
Size	A1
Project Number	CG120567
Sheet Number	C 08
Revision	P1

CAD FILE: O:\DRAC\VIL\30\120567\CG120567 - Biofilta Warrnambool\CG120567_C01.dwg
DATE PLOTTED: 26 November 2012 4:00 PM BY: AARON WARD (MELBOURNE)

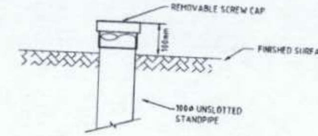


TYPICAL STORMWATER OUTLET DETAIL
NOT TO SCALE

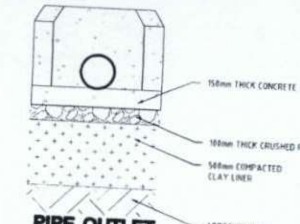


CLAY LINER DETAIL
NOT TO SCALE

NOTE:
1 - REFER GEOTECHNICAL REPORT No. TBC
2 - IDENTIFICATION OF CLAY TYPES TO BE DONE BY LEVEL 1 SUPERVISION FOR ALL EARTHWORKS.
3 - A - CLAY LINER TO BE SILTY/ SANDY CLAY.
B - FOR SEEPAGE PROTECTION, PERMEABILITY OF COMPACTED CLAY IS TO BE LESS THAN 1×10^{-7}cm/s.
C - MINIMUM TESTING REQUIREMENTS TO BE AS PER AS3789 GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS.
D - MINIMUM COMPACTION REQUIRED 97% STD DRY DENSITY.
4 - MATERIAL TO BE CONTROLLED TO A MOISTURE REQUIREMENT OF ±2% OF STD OMC. MATERIAL TO BE COMPACTED TO ACHIEVE 97% MAXIMUM DRY DENSITY.
5 - INSITU BASE MATERIAL TO BE TYNED TO 200m MIN DEPTH, MOISTURE CONDITIONED TO ±2% OF OMC AS PER NSP REPORT PRIOR TO COMPACTION.

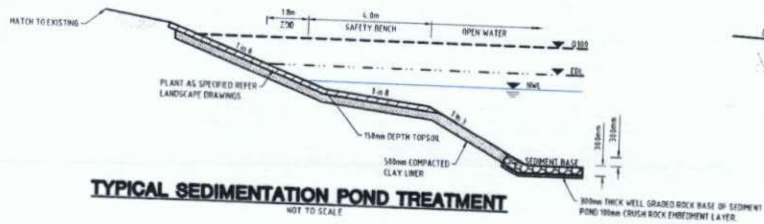


FLUSHOUT RISER STANDPIPE DETAIL
NOT TO SCALE

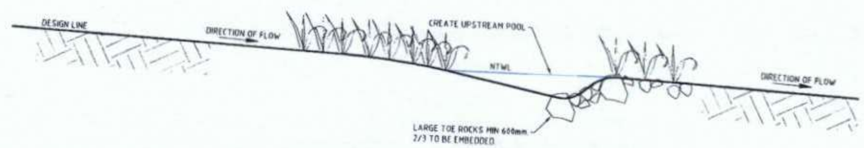


PIPE OUTLET
NOT TO SCALE

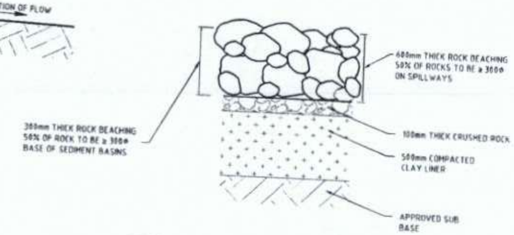
INFORMAL MAINTENANCE TRACK DETAIL
NOT TO SCALE



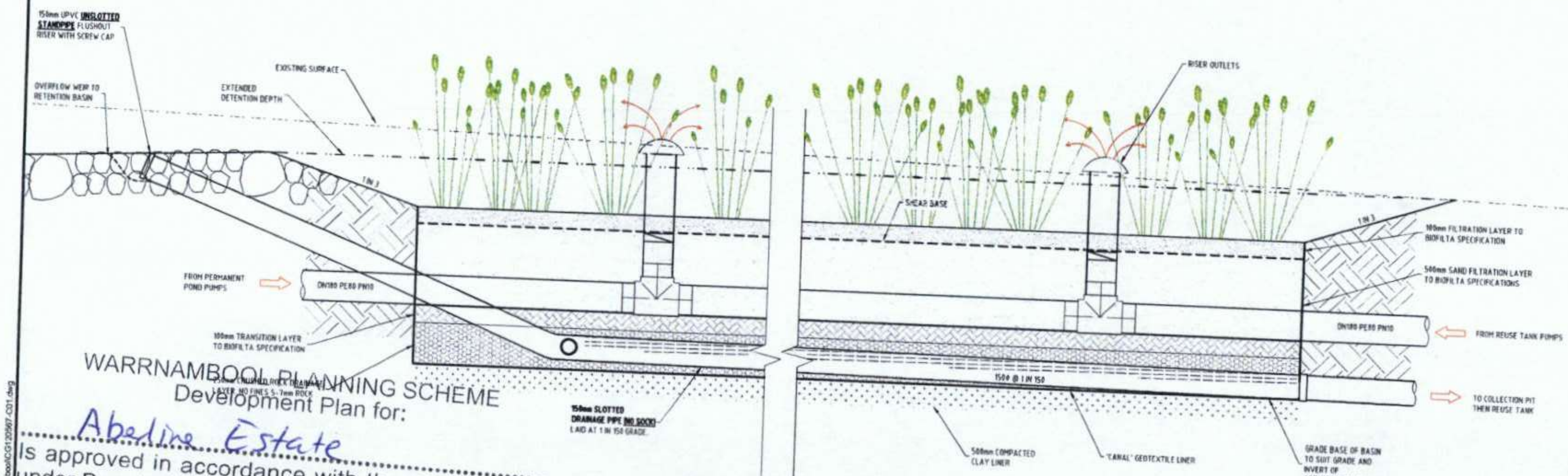
TYPICAL SEDIMENTATION POND TREATMENT
NOT TO SCALE



TYPICAL HABITAT POOL SECTION
NOT TO SCALE



ROCK BEACHING/ RIPRAP TYPICAL DETAIL
NOT TO SCALE



TYPICAL BIOFILTA BASIN SECTION
SCALE 1:50

BIORETENTION SPECIFICATION

1	BIORETENTION	SPECIFICATION
1.1	FILTER LAYER (MIN. 400mm)	THE FILTER MEDIA IS TO CONSIST OF A LAYER OF TRIPLE WASHED, FINE TO MEDIUM SAND WITH ORGANIC MATERIAL ADDED TO THE TOP 100mm TO SUPPORT PLANTS AND HOLD MOISTURE. THE DETAILED SPECIFICATIONS OF THIS FILTER LAYER ARE GIVEN BELOW: • TRIPLE WASHED SAND WITH SILT CONTENT < 5% BY WEIGHT • TOTAL NITROGEN (TN) < 600 mg/kg • ORTHOPHOSPHATE (PO43-) < 10 mg/kg • ORGANIC MATTER ADDED TO TOP 100mm TOGETHER WITH WATER RETENTION ADDITIVES. ORGANIC MATTER < 3% BY WEIGHT • SAND PARTICLE SIZE: FINE WITH D50 0.2mm • PH TO BE IN THE RANGE OF 5.5 TO 7.5 • HYDRAULIC CONDUCTIVITY 450 – 550 mm/hr • NO ADDITIONAL MULCH ADDED
1.2	TRANSITION LAYER (MIN. 100mm)	TRANSITION LAYER SHALL BE 100mm THICK AND CONSIST OF COARSE, WASHED SAND WITH PARTICLE SIZE OF 1 TO 2mm
1.3	DRAINAGE LAYER (MIN. 200mm)	DRAINAGE LAYER IS TO BE CLEAN, FINE GRAVEL, 2-5mm WASHED SCREENINGS COVERING AG LINES. COLLECTION PIPES TO BE 150mm AG LINE AT 2m CENTRES. NO FILTER SOCK
2	PLANTS	SPECIFICATION
		• LOCAL SPECIES OF PLANTS ARE TO BE USED, WITH AN APPROPRIATE SPECIES LIST TO BE AGREED UPON WITH THE CLIENT. THE PLANTING DENSITY SHALL BE A MINIMUM OF 16 PLANTS PER M2 AND DELIVERED TO SITE FULLY ESTABLISHED AFTER 6 MONTHS OF GROWTH PRIOR TO INSTALLATION
		• PLANT MATERIAL DELIVERED TO SITE SHALL BE FREE OF WEEDS
SUPPLIER FOR BIORETENTION MEDIA & PLANTS		
BIOFILTA PTY LTD – BRENDAN 0417198874		

WORK IN PROGRESS

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate: [signature]
Date: 24 April 2014

Rev.	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
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P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

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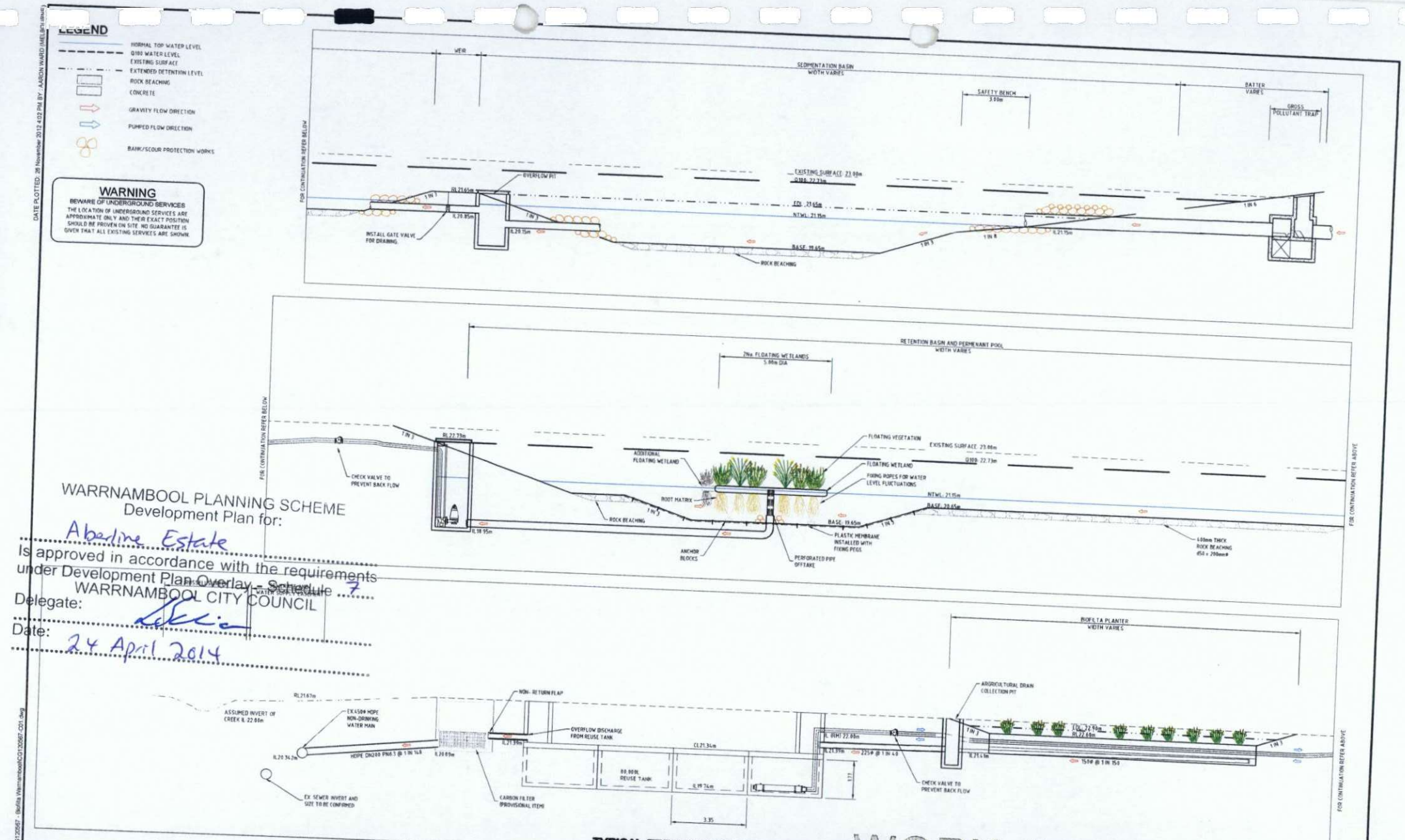
Drawn	A.WARD
Designed	A.WARD
Checked	
Authorised	
Client	RODGER CONSTRUCTIONS
Project	C77 LAND 104-140 WANGOOM RD & 185 ABERLINE RD WARRNAMBOOL
Title	FUNCTIONAL DESIGN TYPICAL DETAILS - SHEET 1 OF 2
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	SEPT 12
Scale	AS SHOWN
Size	A1
Project Number	CG120567
Sheet Number	C 09
Revision	P3

DATE PLOTTED: 26 November 2012 4:01 PM BY : AARON WARD (MELBOURNE)
CAD FILE: O:\DRACIVIL\2012\CG120567\CG120567 - Biofilta Warrnambool\CG120567-C01.dwg



WARRNAMBOOL PLANNING SCHEME
Development Plan for:
Aberline Estate
Is approved in accordance with the requirements
under Development Plan Overlay - Schedule 7
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 24 April 2014

TYPICAL TREATMENT LONGITUDINAL SECTION

WORK IN PROGRESS

Rev.	Date	Description	Drn.	Des.	Appr.
P3	26/11/12	TREATMENT AREA LAYOUT REVISED FOLLOWING COUNCIL COMMENTS	AW	AW	MN
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P1	14/09/12	FOR DISCUSSIONAL PURPOSES	AW	AW	MN

H 1:75 @A1

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Email: victoria@cardno.com.au Web: www.cardno.com/victoria

Drawn: A.WARD
Designed: A.WARD
Checked:
Authorised:

Client: RODGER CONSTRUCTIONS
Project: C77 LAND
104-140 WANGOOM RD & 185 ABERLINE RD
WARRNAMBOOL
Title: FUNCTIONAL DESIGN
TYPICAL DETAILS - SHEET 2 OF 2

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date: SEPT 12
Scale: AS SHOWN
Size: A1
Project Number: CG120567
Sheet Number: C 10
Revision: P3

CAD FILE: G:\PROJECTS\CG120567 - Biofilta Warrnambool\CG120567-C01.dwg
DATE PLOTTED: 26 November 2012 4:02 PM BY - AARON.WARD (MELBPV drivers)

Attachment H

Staging Plan

WARRNAMBOOL PLANNING SCHEME
Development Plan for:

Aberline Estate

Is approved in accordance with the requirements under Development Plan Overlay - Schedule 7

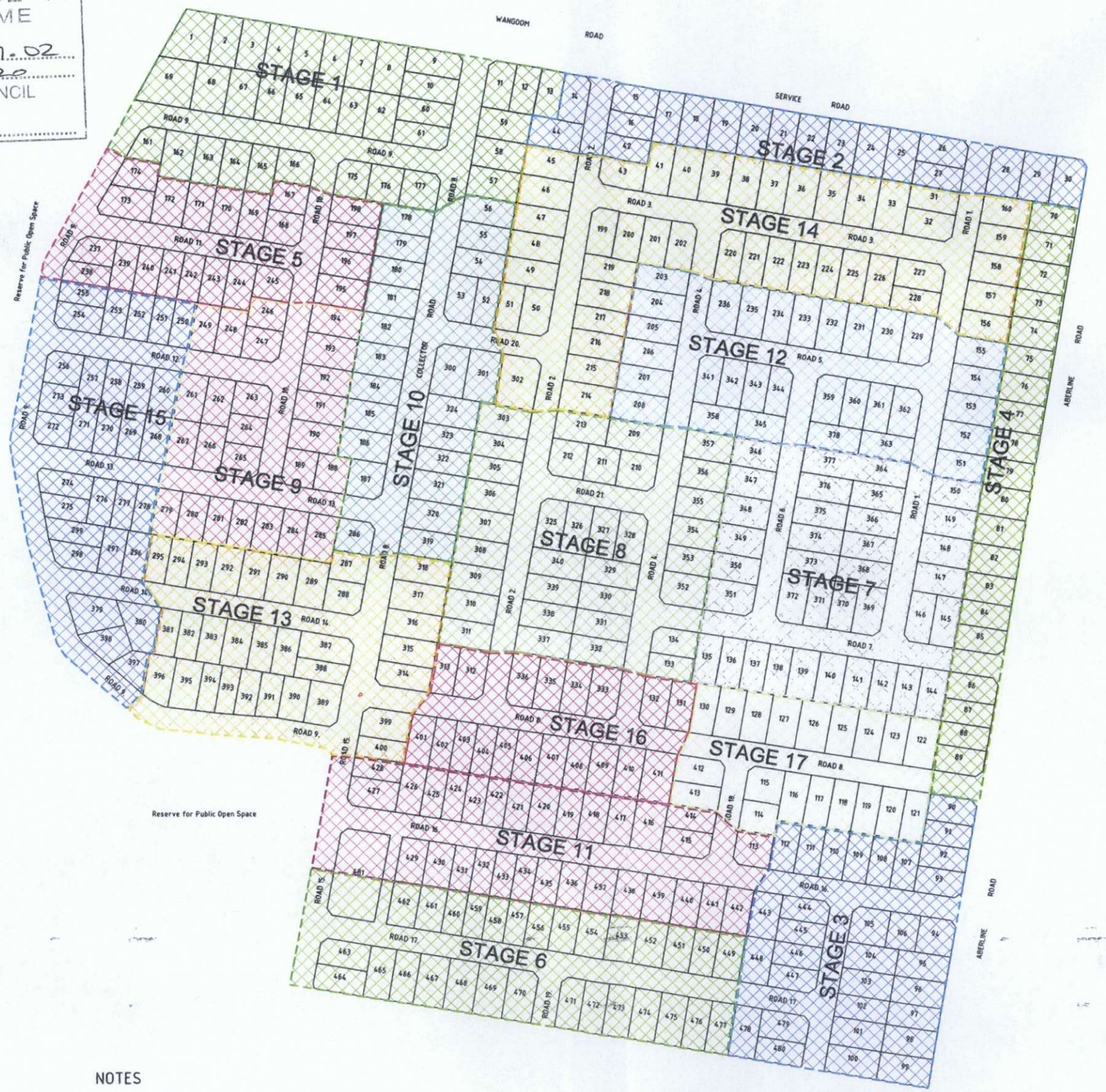
WARRNAMBOOL CITY COUNCIL

Delegate:

Date: 24 April 2014

AMENDED PLANS

WARRNAMBOOL 1/2
PLANNING SCHEME
Plans approved for
Permit P.P.2014-0037.02
on the 26-6-2020
WARRNAMBOOL CITY COUNCIL
Delegate
Signature



WARRNAMBOOL CITY COUNCIL
DATE RECEIVED
10 JUN 2020
PLANNING OFFICE

WARRNAMBOOL PLANNING SCHEME
Development Plan for:
ABERLINE ESTATE DP.
Is approved in accordance with the requirements under Development Plan Overlay - Schedule .....
WARRNAMBOOL CITY COUNCIL
Delegate:
Date: 26-6-2020

LEGEND

	(PROPOSED)	(EXISTING)
STORMWATER DRAIN / PIT		
SEWER	S	S
WATER	W	W
GAS	G	G
TELSTRA	T	T
ELECTRICITY	E	E
ROOFWATER HARVESTING	RWH	
KERB & CHANNEL		

NOTES

PLANNING PERMIT P2014-037

SERVICES LAYOUT IS INDICATIVE ONLY. SERVICES LOCATIONS WILL VARY WITH DETAIL DESIGN OF EACH STAGE.

PIPE SIZES ARE INDICATIVE ONLY. ACTUAL PIPE SIZES WILL VARY WITH DETAIL DESIGN.

ALL STORM WATER DRAINAGE TO BE EITHER SN8 HDPE OR PP CONFORMING TO AS 2566.1-1998

ALL DETAILS ARE INDICATIVE ONLY.
TYPICAL KERB PROFILE SM2-M. TYPICAL INTERSECTION KERB RETURN RADIUS 8m

ORIGINAL LAYOUT BY BRIAN CONSULTING Pty. Ltd.

REV	DATE	BY	APP	REVISION DESCRIPTION
B	4/06/2020	TB	PW	PM DESIGN, STG 3 & 4 MODIFIED
A	1/06/2020			APPROVED BRIAN CONSULTING PLAN

ENGINEER	TB
DESIGNER	TB
DRAWN	TB
CHECKED	PW
APPROVED	PW

PM DESIGN GROUP
MULTI DISCIPLINE CONSULTING ENGINEERS
4/227 KOROIT ST, WARRNAMBOOL. VIC. 3280
PHONE: (03) 5564 6888
FAX: (03) 5561 1850
WEB: www.pmdesign.com.au

PROJECT: NORTHERN EDGE ESTATE
OVERALL LAYOUT PLAN

PM PROJECT No. : W.ROD-12181

CLIENT: RODGERS CONSTUCTIONS

DWG No. : OLP 020 Sheet: 11 of 11

TITLE : OVERALL STAGING PLAN

REV: B