



Leopold Sub Regional Activity Centre

Development Plan: Southern Expansion Site

June 2015

JOANNE VAN SLAEGEN
..... of Greater Geelong City Council approve this Development Plan with its annexed documents (164... pages) as the Development Plan prepared to the satisfaction of the Responsible Authority and applying to the land subject to DPO with the meaning of clause 43.04 of the Planning Scheme.

Joanne Sl
Signature
13/07/2015
Date

CITY OF GREATER GEELONG
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Introduction

This document assembles plans and supporting documentation to form an overarching Development Plan for the Southern Expansion Site of the Leopold Sub Regional Activity Centre, as required pursuant to the Development Plan Overlay Schedule 30 ('DPO30') of the City of Greater Geelong Planning Scheme. This Development Plan has been prepared on behalf of Novion Property Group.

The Development Plan provides for a built form, land use and movement framework that any future planning permit application must generally be consistent with and outlines the broad parameters for the development of the site.




More specifically, the DPO30 applies to land at:

- 641-659 Bellarine Highway which includes the existing shopping centre, and 621-639 Bellarine Highway (known collectively as the 'southern expansion site' and the land in the ownership of Novion Property Group); and
- 92-100 Melaluka Road, Leopold (the 'northern expansion site').


A plan illustrating the extent of DPO30 is provided as Figure 1.

FIGURE 1 – EXTENT OF DPO30



-  Southern Expansion Site (Subject of this Development Plan)
-  Northern Expansion Site (Under separate ownership & subject to separate Development Plan)
-  DPO30 Area

The DPO schedule permits separate Development Plans to be prepared, submitted and approved for the southern and northern expansion sites. The material lodged as part of this Development Plan relates to the southern expansion site only. The northern site is within different ownership. As required by the schedule, this Development Plan does demonstrate how future development on the southern expansion site will be integrated with the northern expansion site.

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The Development Plan as currently prepared does not seek to utilise all of the 'shop' floorspace permitted via the schedule to the Commercial 1 Zone or the Development Plan Overlay. It is anticipated that at the time when customer demand and market conditions support additional floorspace above that illustrated in this Development Plan, a new Plan will be prepared and lodged with Council for approval.

Pursuant to the requirements of DPO30, this Development Plan is supported by:

- An Urban Design Masterplan and Development Plan, prepared by Clarke Hopkins Clarke ('CHC') and dated June 2015; including the following:
 - An overarching development plan for the site;
 - A staging plan;
 - A public art plan;
 - Urban design analysis plans; and
 - Concept sketches and elevations.
- A Traffic Management Plan, prepared by GTA (May 2015).
- A Flooding, Stormwater and Drainage Management Plan, prepared by Cardno (May 2015).
- Landscape Masterplan, prepared by Formium (April 2015).

These specialist reports have informed this Development Plan and, as required by DPO30, will be endorsed to form part of it.

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1 The Southern Expansion Site Development Plan

1.1 OVERVIEW

The Development Plan embraces the principles that are embedded in the wealth of strategic work that has been undertaken to identify the Leopold Gateway Plaza as an appropriate location for a sub-regional activity centre. This strategic work includes, but is not limited to: the Geelong Retail Strategy, the Leopold Structure Plan and the Leopold Sub Regional Activity Centre Urban Design Framework. Based on this strategic framework, the Development Plan has been prepared to deliver land use and urban design outcomes that will:

- Deliver a sub-regional centre of sufficient scale and critical mass to serve residents and visitors across the wider Bellarine Peninsula.
- Provide a diversity of uses and major retail operators that is appropriate for the scale and offer that should be provided by a sub-regional scale centre.
- Provide a pedestrian and movement design response that delivers 'main street' and 'boulevard' connections that link together the focal hubs of the development.
- Ensure that the future development of the northern expansion site can be fully integrated into the southern site in terms of vehicular and pedestrian connections, land uses, site layout and stormwater/drainage capacity.
- Enhance safe legible connections between the proposed activity centre and the wider Leopold community.
- Address and respond to the locational qualities of the subject site (e.g. edge of town location).
- Provide an appropriate response to built-form, streetscape and landscape treatment, movement and car parking, pedestrian requirements and water sensitive urban design treatments.
- Deliver and appropriate stormwater and drainage strategy that ensures that any impact of the development does not adversely affect important wetlands to the south of the subject site.
- Ensure integration with informal recreation opportunities of the Gateway Reserve Sanctuary, the Leopold Memorial Recreation Reserve and the wider activity centre area.
- Facilitate an attractive, memorable, human scale retail and pedestrian environment.

The Development Plan provides a response to the requirements of DPO30, which underpins the urban design and development concept for the expansion of the Gateway Plaza Shopping Centre - a copy of DPO30 is contained as Appendix A. In particular, this Development Plan responds to the key requirements of DPO30 in considering:

- The 'general consistency' of the Development Plan with Clause 4.0 of DPO30 (the Leopold Sub Regional Activity Centre Concept Plan) and the objectives of Leopold Sub Regional Activity Centre Urban Design Framework.
- The extent to which the proposed development provides integration with existing development (as part of the southern expansion site) and future development on the northern expansion site at 92-100 Melaluka Road.
- Specialist technical work required as part of the DPO Schedule, including the following overarching documents:
 - A Development Plan and Urban Design Masterplan (Appendix B);
 - A Traffic Management Plan (Appendix C);

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- A Flooding Stormwater and Drainage Management Plan (Appendix D);
- A Landscape Masterplan (Appendix E);

These requirements are addressed in accordance with DPO30 and summarised in more detail in the remainder of this report.

1.2 ACCORDANCE WITH DPO30

The aim of DPO30 is to ensure that development generally occurs in accordance with the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework ('UDF'). It specifically states that:

"A Development Plan must be generally consistent with the Leopold Sub Regional Activity Centre Concept Plan in Clause 4.0 and the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework 2011 (page10)"

The consistency of the Development Plan with these requirements is demonstrated in more detail below.

1.2.1 CONSISTENCY WITH CONCEPT PLAN

The Concept Plan illustrated in Clause 4.0 of DPO30 provides a site layout for the subject site, containing a range of land uses typically found in subregional activity centres. This Concept Plan is illustrated in Figure 2.

In an overlay context, it is considered that the concept plan is relatively prescriptive in nature. We understand this concept reflects a specific Lascorp development scheme (approved under Planning Permit 944/2012). Notwithstanding this, the Development Plan prepared can be considered 'generally consistent' with this concept plan and the underlying development objectives; expressly noted in the Concept Plan and espoused in other strategic documents.

FIGURE 2 – DPO30 / CLAUSE 4.0 – LEOPOLD SUB-REGIONAL ACTIVITY CENTRE CONCEPT PLAN



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1.3 THE DEVELOPMENT PLAN

The Development Plan, presented at Appendix B and illustrated below in Figure 3, presents the overarching Development Plan for the southern expansion site.

FIGURE 3 – LEOPOLD SUB REGIONAL ACTIVITY CENTRE DEVELOPMENT PLAN



It is considered the Development Plan is 'generally consistent' with the DPO Concept Plan in terms of land use and floorspace, site layout and access as detailed below:

LAND USE AND FLOORSPACE

The Concept Plan contained in DPO30 has been based on a previous development scheme. As illustrated in the Concept Plan, the Development Plan provides for the Leopold Sub-Regional activity centre to incorporate a range of land uses.

The Concept Plan envisages that the southern expansion site will be dominated by 'Retail, food and drink' uses. The Concept Plan also indicates other uses are appropriate, including bulky goods and hardware uses which fit within the broader definition of 'Retail Premises' under the nesting diagrams contained in Section 75.11 of the planning scheme. Whilst the Concept Plan arguably assigns certain uses to certain general locations, under the Commercial 1 Zone the majority of the uses expected in a sub-regional shopping centre are Section 1, No Permit Required uses. These land uses not requiring a permit include: bulky goods/restricted retail premises, hardware/trade supplies, office uses (including medical centre), hotel/tavern, accommodation and shop uses.

The Department Practice Note 'Applying the Incorporated Plan and Development Plan Overlays' (January 2003) makes the scope of discretion clear:

Neither the IPO nor the DPO can change the scope of the discretion provided in the zone applying to the land. They cannot be used to 'schedule in' or 'schedule out' a permit requirement. If a use is 'as of right' in the zone, the overlay cannot introduce a permit requirement. If a use is prohibited in the zone, the overlay cannot remove that prohibition. If a use requires a permit under the zone, the overlay cannot exempt it from the need for a permit.

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If 'as of right' uses in the zone could frustrate the objectives of the plan or prohibited uses in the zone are needed to implement the plan, a different zone will be necessary.

Whilst the identification of a range of uses across the site is useful in understanding the likely composition of proposed centre, the Concept Plan cannot prohibit uses from being sited in specific locations – unless they are uses requiring a permit (Section 2) or prohibited in the Commercial 1 Zone.

The Schedule to the Commercial 1 Zone prescribes that the maximum permissible floor area (m2) for shop (other than restricted retail premises) for the southern expansion site (defined in the scheme as the Bellarine Gateway Plaza, 621-639 and 641-659 Bellarine Highway, Leopold) is 30,000sq.m. This is supported by the detail of the Overlay, which states the Urban Design Masterplan must show:

The total amount of "shop" leasable floor space (other than restricted retail premises) limited to a total of 35,000 square metres within the area covered by this overlay including: no more than 30,000 square metres of shop on the existing and southern expansion sites; and no more than 5,000 square metres of shop on the northern expansion site.

The DPO schedule also makes reference to staging of future development and requires:

- *The creation of a "main street" strip along Melaluka Road as part of the first stage of development of the activity centre;*
- *Stage 1 of the expansion generally as indicated in the Concept Plan in Clause 4.0 with the amount of leasable "shop" floor space no greater than 23,000 square metres.*

An indicative allocation of floorspace proposed by this Southern Expansion Site Development Plan is set out below in Table 1. This table illustrates shop floorspace in the order of 18,350sq.m – well within the maximum floorspace prescribed for 'shop' within the C1Z and the DPO for the total development.

It is anticipated that when future floorspace beyond these forecasts are required for the southern expansion site, a further Development Plan would be prepared.

TABLE 1 – DEVELOPMENT PLAN INDICATIVE FLOORSPACE ALLOCATION

LAND USE	EXISTING (SQ.M)	TOTAL POST-DEVELOPMENT (SQ.M)
Shop (Supermarket and Retail)	4,539	18,350
Restricted Recreation (Gymnasium)	-	351
Food and Drink	736	2,283
Office	421	1,692
Hardware / Restricted Retail / Landscape Gardening	-	12,500
TOTAL	5,696	35,336

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SITE LAYOUT AND ACCESS

The proposed Development Plan is considered to be 'generally consistent' with the concept plan in terms of the site layout and access arrangements by providing:

- Larger format retail stores at the north eastern and north western boundary of the site.
- A range of smaller speciality stores to enclose larger retail uses along the Melaluka Road frontage and internally through the site.
- A 'main street' retail strip frontage, comprising speciality retail / food and drink shops along the northern extent of Melaluka Road. This provides an opportunity to integrate with a similar main street frontage required by the Development Plan schedule as part of the northern expansion site.
- A town square directly abutting Melaluka Road, surrounded by a range of tenancies and a primary east-west pedestrian boulevard which provides an internalised mall linkage through the centre of the site.
- Pedestrian and vehicular linkages between the southern and northern expansion sites, noting the new east-west road to link from Clifton Avenue and Melaluka Road will serve primarily a back of house/loading function.
- Pedestrian and vehicular access points on Melaluka Road, Clifton Avenue and the Bellarine Highway in line with the Concept Plan.
- The creation of a mid-block north-south pedestrian connection to link the southern and northern expansion sites.
- Car parking provided along the south east and south west boundaries of the site, with limited parking also provided to Melaluka Road.
- The Development Plan shows the shift of the bus interchange from its location on the southern expansion site currently to a paired stop configuration on Melaluka Road. This changed location allows for a more centralised access to the bus stops from the northern and southern expansion sites and the Leopold Memorial Park and its associated sporting facilities on the eastern side of Melaluka Road.

1.3.1 CONSISTENCY WITH THE UDF OBJECTIVES

This Development Plan and suite of supporting documents will facilitate a commercial development that will be diverse, connected, sustainable and in character with the surrounding area. Table 2 confirms the application of the Development Plan against the objectives of the Leopold Sub Regional Activity Centre UDF.

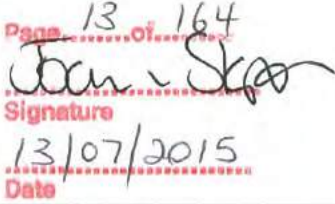
TABLE 2 – CONSISTENCY WITH LEOPOLD UDF OBJECTIVES

UDF OBJECTIVE	DEVELOPMENT PLAN RESPONSE
<p>Sustainability</p> <p>Develop a landscape strategy that establishes a 'green' infrastructure to link existing and future open spaces and recreation nodes throughout Leopold, and that provides outdoor shade in urban areas during the summer.</p> <p style="text-align: right;"> Page 10 of 164 <i>John - Spear</i> Signature 13/07/2015 Date </p>	<p>The Landscape Masterplan prepared by Formium establishes a landscape strategy that provides green links within the site and responds to the landscape character of external sites, including the northern expansion site and the Gateway Recreation Reserve to the south of the Bellarine Highway.</p> <p>The Landscape Plan shows landscaping along all four of the site's frontages. We note that in consultation with VicRoads, no landscaping is proposed within the road</p>

UDF OBJECTIVE	DEVELOPMENT PLAN RESPONSE
	<p>reserve.</p> <p>Together with the architectural design response, the Development Plan seeks the introduction of weather protection/canopies to provide shelter to shoppers.</p>
<p>Provide for compact urban form that encourages pedestrian and cycling within, to and from the Leopold Sub Regional Activity Centre.</p>	<p>The Development Plan provides the flexibility for an application to provide a compact urban form, which provides key pedestrian movement corridors into and within the site. The Development Plan also demonstrates how the development will link into the regional bike path that exists along Melaluka Road.</p> <p>The new pedestrian crossing over Melaluka Road will encourage pedestrian and cycling connectivity to the Leopold Memorial Park to the east of the centre.</p> <p>Planning permits will require the provision of cycling infrastructure for both staff and customers.</p>
<p>Establish water sensitive urban design initiatives to that reduce peak flows and runoff from urban development, while continuing to enhance the biodiversity and aesthetic values of the Leopold Sub Regional Activity Centre through water capture and reuse.</p>	<p>A range of WSUD initiatives are proposed to manage stormwater, drainage and runoff on the site. These are set out in the accompanying Flooding, Stormwater, Drainage and Management Plan.</p>
<p>Provide guidelines for future development that seek to minimise energy use and waste associated with buildings and their uses.</p>	<p>Strategies to minimise waste and energy use would be incorporated into development stages.</p>
<p>Establish a legible edge to Leopold's urban environment through an appropriate landscape structure that recognises the urban / rural boundary.</p>	<p>The Development Plan provides a legible landscaped edge which provides an appropriate response to the rural interface, providing avenue trees and a bioswale along the Clifton Avenue boundary (see Landscape Plan).</p>
<p>Protect and enhance ecological values within the Leopold Sub Regional Activity Centre area by ensuring that future development contributes positively to landscape and nature values.</p>	<p>The Development Plan provides a landscape and drainage/stormwater response that is sensitive to the surrounding area, including important wetland reserves to the south of the site.</p>
<p>Character and Identity</p>	
<p>Provide for the growth of the Leopold Activity Centre as a regional centre and gateway to Leopold that provides for a variety of commercial and recreation activities within a sustainable, high amenity environment.</p>	<p>The Development Plan will facilitate the scale and types of uses that are characteristic of a sub-regional centre. The concept sketches, masterplan principles and landscape masterplan provide the framework for the development of a high quality and amenity environment.</p> <p>The DPO schedule requires that the Stage 1 expansion is no greater than 23,000sq.m of shop floorspace, whilst allowing an ultimate centre of up to 30,000sq.m of shop floorspace (other than restricted retail premises) thereby</p>

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UDF OBJECTIVE	DEVELOPMENT PLAN RESPONSE
	<p>clearly supporting a staged development.</p> <p>The Development Plan as presented shows both a Stage 1 (detailed) and Stage 2 (conceptual) response, however neither utilise all the floorspace allocation. It is proposed that the Development Plan would be updated at later stages when there is market demand for more retail development.</p>
<p>Establish an attractive community plaza within the LSRAC, with a strong relationship to surrounding land uses, including the adjoining Recreation Reserve.</p>	<p>The development provides an attractive community plaza through the creation of a landscape plaza and built form around the plaza illustrated in the Development Plan as having larger articulated corner elements to create a clear visual entrance/gateway.</p> <p>The location of the paired bus stops on Melaluka Road, connected via a signalised pedestrian crossing to the community plaza will enhance the access to the recreation reserve.</p>
<p>Integrate landscape, recreation and commercial uses to provide for a unique, vibrant urban environment that is both functional and an attractive place for people to work and visit.</p>	<p>The concept sketches, masterplan principles and landscape masterplan provide the framework for the development of a vibrant urban environment. The underlying Commercial 1 Zoning supports a range of activities that can be introduced to the precinct.</p>
<p>Provide for built form that adds positively to the character of Leopold's western gateway and complements the surrounding landscape and existing built character of the town.</p>	<p>The concept sketches provide an indication of the quality of built form that will be facilitated, including high quality public spaces, landscaping and the incorporation of public art.</p>
<p>Connectivity and Accessibility</p>	
<p>Place emphasis on the development of safe, legible pedestrian and cycle routes and opportunities to enhance public transport networks:</p> <p style="text-align: right;"> <i>Page 12 of 164</i> <i>Juan - Sean</i> Signature <i>13/07/2015</i> Date </p>	<p>The Development Plan ethos emphasises the use of pedestrian links, cycle connectivity and public transport (along Melaluka Road). The location of new bus stops on Melaluka Road has been developed in consultation with Public Transport Victoria. Access to the far (eastern) bus stop will be via a signalised pedestrian crossing.</p> <p>The Development Plan allows for a range of east-west and north-south pedestrian connections, noting it is our expectation that the E-W access road is primarily a 'back of house' space and therefore pedestrian movement on this road is not encouraged. Pedestrians will however be encouraged to move within the southern expansion site and linkages to the northern expansion site are provided for both at Melaluka Road and mid-block.</p>

UDF OBJECTIVE	DEVELOPMENT PLAN RESPONSE
<p>Establish and enhance pedestrian, cycle and vehicle connections between the Leopold Sub Regional Activity Centre, Memorial Recreation Reserve, Gateway Sanctuary, the Leopold community hub site, Leopold Primary School, and existing and future residential areas.</p>	<p>The Development Plan ethos emphasises the use of pedestrian links, cycle connectivity and public transport (along Melaluka Road); linking the site to important community and recreation facilities across Leopold.</p> <p>The introduction of the signalised pedestrian crossing as part of Stage 1 enhances the pedestrian and cycle connections at the earliest opportunity.</p>
<p>Provide for filtered permeability throughout the Leopold Sub Regional Activity Centre, enhancing pedestrian, cycle and mobility scooter access throughout the development and minimising walking time to public transport.</p> <p style="text-align: center;">  Page 13 of 164 Signature 13/07/2015 Date </p>	<p>The Development Plan enshrines pedestrian permeability across the southern expansion site, including pedestrian links to all major access points and the provision for main street/mall connections within the site.</p> <p>The plan allows for linkages both at Melaluka Road and mid-block and the new public transport stops has been designed to respond to the broader precinct requirements rather than just the southern expansion site alone.</p>
<p>Provide for a safe, legible connection with the Bellarine Rail Trail, providing potential for regional cycle connections with the Leopold Sub Regional Activity Centre.</p>	<p>The site connects to the Bellarine Rail Trail, via Melaluka Road. End of trip facilities will form part of the planning permit application process for future development proposals as required by the Planning Scheme.</p>
<p>Social and Cultural Wellbeing</p>	
<p>Provide for a variety of commercial land uses within the Leopold Sub Regional Activity Centre that provide for local needs and contribute to ongoing employment opportunities within Leopold and the surrounding area.</p>	<p>The Development Plan will facilitate the scale and types of uses that are characteristic of a sub-regional centre; which will facilitate significant new employment opportunities for the local population. The Development Plan will facilitate the introduction of new key anchor tenants and the increased floorspace elevates this centre beyond a neighbourhood retail facility.</p>
<p>Provide for built form that contributes to public safety through active frontages and a strong relationship with the public domain.</p>	<p>The Development Plan provides for active frontages, public spaces and main street connections across the site; ensuring that these spaces create activity, vibrancy and a strong relationship between the land uses on site.</p> <p>A key public focal points is the civic plaza to Melaluka Road.</p>
<p>Provide for a Leopold Sub Regional Activity Centre community space that acts as a meeting place and attracts people of all ages to gather and interact, without compromising the viability of the Leopold Community Hub.</p>	<p>The Development allows for active public spaces where people can gather and relax. There is scope for these places to become a new 'town square' or plaza to foster active uses. When specific uses to be added to the tenancy mix (post the planning permit approval stage), any desire by the Council to be represented in the mix of uses will be done in the understanding of the potential</p>

UDF OBJECTIVE	DEVELOPMENT PLAN RESPONSE
	impact on the Leopold Community Hub as Council's primary focus for community uses.
Ensure that future development protects and enhances views to the surrounding landscape.	The landscape plan allows for landscaping to the perimeter of the site but it is not proposed to be a barrier. The landscaping to be approved under subsequent planning permits will ensure visual permeability to the surrounding landscape.

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2 Supporting Plans and Documentation

A series of plans and reports have been prepared to support the Development Plan and satisfy the requirements of DPO30. A summary of each of these requirements is provided below.

2.1 URBAN DESIGN MASTERPLAN

An Urban Design Masterplan has been prepared by Clarke Hopkins Clarke (CHC) and is contained as Appendix B to this Development Plan. It provides a series of plans including:

- A Development Plan which provides details of:
 - Urban design analysis sketches that provide an overview of the potential for the land.
 - Proposed land uses, car parking, vehicle, pedestrian and cycling access, public spaces, and infrastructure. The indicative floorspace allocations are contained in Table 1.
 - A pedestrian based main street treatment along Melaluka Road for the southern expansion site that creates the opportunity to link with the future development on the northern expansion site. (Note the discussion under Landscape Masterplan also provides for the main street to link to the northern expansion site)
 - Interaction with the future northern expansion site not only at the Melaluka Road frontage but also at the east-west road interface and through a proposed mid-block access point.

The Development Plan, as discussed in this report, limits total amount of shop leasable floorspace (other than restricted retail premises) permitted on the southern expansion site to less than 30,000sq.m.

- Concept sketches and plans showing elevations of building frontages to all streets and public spaces and provided and these illustrate:
 - A high standard of design treatment and activation of frontages to the public realm along the Bellarine Highway, Melaluka Road and along an internal mall boulevard.
 - High quality building designs which define the western gateway to Leopold and the Bellarine Peninsula.
 - Active elevations with a variety of material where they are visible from the public realm.
 - Elevations which are sympathetically treated by a combination of window openings, projections and recessions, and the use of different materials.
 - The use of awnings and shade canopies to provide pedestrian protection from inclement weather.
 - The use of public art work in accordance with Council's Public Art Strategy.

2.2 TRAFFIC MANAGEMENT PLAN

A Traffic Management Plan has been prepared by GTA Consultants and is contained as Appendix C to this Development Plan. It takes into account the potential for development on both the southern and northern expansion sites having regard to VicRoads requirements, and provides:

- Proposed car parking provision, indicative design of access, service roads and intersections, bicycle routes, bicycle parking and arrangements for loading and unloading of vehicles.
- Plans and cross sections of the central east-west road showing staging and pedestrian friendly treatments.

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- Plans and cross sections of the 'main street' treatment of Melaluka Road including traffic calming measures, pedestrian crossing points and vehicle access into the activity centre having regard to the Memorial Reserve Masterplan.
- Traffic modelling for projected traffic flows.
- Details of upgrades required to the surrounding road system (Bellarine Highway, Melaluka Road and Clifton Avenue).
- Accessible and integrated public transport facilities for people of all abilities.

2.3 FLOODING, STORMWATER AND DRAINAGE MANAGEMENT PLAN

A Flooding, Stormwater and Drainage Management Plan has been prepared by Cardno and is contained as Appendix D to this Development Plan. It takes into account the potential for development on both the southern and northern expansion sites and demonstrates:

- That the development will have 'no adverse impact' elsewhere (post-development).
- The proposal has a drainage and flood mitigation design that manages upstream flows affecting the site and caters for any loss of onsite storage;
- The approximate size and location of all on and off site drainage system components.
- Measures to minimise inundation around the basin on the south side of the Bellarine Highway.
- Access, maintenance and power supply arrangements for the basin on the south side of the Bellarine Highway.

2.4 LANDSCAPE MASTERPLAN

A Landscape Masterplan has been prepared by Formium and is contained as Appendix E to this Development Plan. It provides a landscape framework for the site and future integration with the northern expansion site which includes:

- Details of landscaping, including along street frontages and access roads, within car parks and along buffer areas to adjoining properties.
- Details of the proposed treatment of existing native vegetation (noting that only one existing tree is being retained and this tree is located within the Council road reserve).
- Details of all hard landscaping treatments such as street furniture and paving.
- A consistency in the proposed landscape treatment along the frontage to Melaluka Road. Formium have indicated the following trees as examples of the street tree or feature theme trees that could be planted as part of the Melaluka Road main street treatment:

– Brachychiton rupestre (Bottle Tree)	– Lagerstroemia indica 'Biloxi'
– Tristaniopsis laurina 'Luscious'	– Quercus coccinea (Scarlet Oak)
- Treatments along Clifton Avenue that provide a sympathetic interaction with the rural interface. Again Formium have indicated the following trees as examples of the street tree and theme trees for the Clifton Avenue interface:

– Eucalyptus scoparia (Wallangara White Gum)	– Angophora costata (Smooth barked apple)
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FIGURE 4 – INDICATIVE DETAIL OF MELALUKA ROAD, MAIN STREET TREATMENTS



2.5 ECONOMIC IMPACT

The strategic and economic justification for the expansion of Leopold as a sub-regional shopping centre has been well established in the Geelong Retail Strategy (2006) and the Economic Impact Assessment for the Future Expansion of the Leopold Gateway Plaza (2012 and updated in August 2013). Given the recent preparation of the August 2013 Economic Impact Assessment, undertaken specifically for the site, it is considered that this represents an up to date analysis of the current demand for floorspace within the proposed Leopold sub-regional shopping centre.

The Geelong Retail Strategy initially recognised Leopold as an appropriate location for a sub-regional shopping centre, stating that:

In view of the current proposal for a neighbourhood centre at Leopold, the Strategy recommends that an investigation be made of the potential or otherwise for this site to be the location for a new sub-regional centre. In preliminary terms, Leopold may be an appropriate site in the medium-term for further retail development for the following reasons:

- *The site offers the potential for retail and associated expansion in view of available vacant land (although Council engineers indicate flooding and drainage constraints may exist).*
- *The site would serve the entire Bellarine Peninsula and would reduce the travel requirement of Bellarine residents to access this type of centre (compared with a centre at say, Newcomb).*
- *The site at Leopold is located 8.5km from Central Geelong, and would not be expected to undermine Central Geelong's core primary catchment, although the potential for adverse trading impacts would have to be the subject of an economic impact assessment if and when any development proposal for a sub-regional centre at Leopold is put forward for Council consideration.*

- *By around 2016, the forecast population on the Bellarine Peninsula should support subregional retail facilities without having an undue adverse effect on retailing in Central Geelong (although this will be determined by the Retail Planning Assessment Criteria at the appropriate time).*

The 2012 and 2013 (update) Economic Impact Assessment, prepared by MacroPlan Dimasi, sought to provide an independent assessment of the demand and market scope for a proposed expansion to the existing Gateway Plaza. The EIA concludes that:

An expansion of Gateway Plaza to sub-regional status will greatly enhance the shopping choice for local residents and visitors to the region, with significant improvements in the available range of food and non-food retail facilities. The expansion of Gateway Plaza will also contribute to the local economy through increased employment, both during the construction phase and ongoing at the centre once it has opened. The expansion of Gateway Plaza may have some impact on other retailers in the region, though the assessed impacts are considered to be reasonable and would not threaten the ongoing viability of any existing retailers.

The work completed by Macroplan on behalf of the proponent of the Amendment to facilitate the future development of the Leopold Activity Centre was peer reviewed by Mr Tim Nott on behalf of the Council. Mr Nott's evidence made the following commentary in relation to impacts on other centres:

In estimating the effects of the expanded Gateway Plaza, I have judged that the impact on a particular centre will be inversely proportional to its distance from Gateway (that is, the smaller the distance the bigger the impact) and that impacts will also be experienced more by centres with a higher proportion of non-food sales (generally the larger centres which compete for sales in clothing, furniture, and recreational and household goods). Intuitively, we should expect the new Gateway Plaza to compete most strongly with other regional and sub-regional centres and with the closest centres providing full scale supermarket services (page 16).

The Nott evidence was based on the proposal for a double discount department store based centre. The evidence indicated a concern with the extent of impact based on a double DDS centre and indicated:

In my view, a single DDS centre at Leopold would be sufficient to satisfy demand in the trade area in the medium term and would have less impact on the regional network. A single large DDS, two large supermarkets and a range of specialty shops could be accommodated in a centre with a total floorspace of less than 23,000 sq m as shown below (page 19).

The Development Plan as now before Council includes a total centre of some 22,836sq.m of shop floorspace – consistent with the Nott analysis.

The Novion Development Plan response also includes an allowance for 12,500sq.m of restricted retail floorspace (hardware/restricted retail/landscape gardening). We note that it is accepted that restricted retail floorspace and particularly hardware stores, trade at a lower turnover per square metre rate than shop floorspace. We further note that the maximum GLA expressed for the shopping centre in the schedule to the Commercial 1 Zone expressly excludes restricted retail premises floorspace. Whilst this may not have formed an express consideration in the existing EIA for the centre, the provision of bulky goods floorspace was considered, albeit peripherally, as part of the peer review undertaken.

The 2013 Nott Assessment confirms that in terms of potential impact:

"Development of genuine bulky goods retailing would have little negative impact on the Geelong CBD which supplies a substantially different range of goods and services" (page 22).

The DPO schedule puts Council in an interesting position in that you are required to seek an EIA for new or expanded retail floorspace and yet by virtue of the Commercial 1 Zoning and assuming the new proposal is below the floorspace cap in the schedule to the zone, no permit for the USE of the land for shop uses or restricted retail/bulky goods is required.

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We confirm that future development of shop floorspace at the Leopold Shopping Centre will need to retain consistency with the requirements of the DPO schedule and consequently a new or updated economic impact assessment will be required.

As discussed above, the existing Economic Impact Assessment for the Leopold Gateway Shopping Centre, together with the Peer Review assessment are considered 'current' in order to satisfy the requirements of the DPO Schedule.

2.6 STAGING

A Staging Plan has been prepared by CHC and is contained as part of Appendix B of this Development Plan. It illustrates how the development is proposed to be delivered including as required by the DPO Schedule:

- The delivery of 'main street' strip along Melaluka Road is created as part of the first stage of development of the southern expansion site.
- Stage 1 of the southern expansion site is generally in accordance with the DPO Concept Plan in providing an amount of leasable 'shop' floor space no greater than 18,350 square metres.
- The plan illustrates that significant development on the southern expansion site as part of a Stage 1 Development. This includes the expansion of the current shopping centre and associated related infrastructure including carparking, road intersections as detailed in the Traffic Report and the stormwater management system as detailed in the Flooding, Stormwater and Drainage Management Plan. In respect of stormwater management we confirm that works as part of Stage 1 will not only account for the drainage requirements of the expanded southern site, but also allow for future development of the northern expansion site.
- The plans show that the stage 1 development will be created as an attractive and user friendly centre providing comprehensive access arrangements, landscape treatments, pedestrian connections and building frontage treatments. By providing the bulk of future shop floorspace in Stage 1, subsequent stages will benefit from the established onsite infrastructure.

The staging plan is prepared as an indicative guide to the future development of the Leopold Sub Regional Activity Centre. It is not intended to preclude any minor interim stages from occurring between Stage 1 and the final development where they are necessary. This approach is essential in retaining flexibility as the development comes forward.

Importantly, the Stage 1 Development Plan allows for key elements of the Development Plan to be implemented. In particular, the DPO schedule requires that the Melaluka Road main street strip forms part of the next stage of development of the southern expansion site. The Development Plan provides for this.

Rightly, the DPO schedule recognises that the total shop floorspace now permitted under the Commercial 1 Zoning at 30,000sq.m for the southern development site should not be provided all at once. The schedule expressly requires that a Stage 1 development only include up to 23,000sq.m of shop floorspace. These measures require a staged approach to development – an approach that will allow the centre to grow immediately beyond its neighbourhood retail role into providing for the sub-regional retail needs of the community. However, it also recognises that the market is not mature enough to support 30,000sq.m of floorspace immediately.

The Development Plan response prepared for Novion allows a significant increase in shop floorspace to create the Melaluka Road main street and enhance the east-west internal mall. The Stage 2 response allows for further development of the shopping centre, including the sleaving of the western external wall of the shopping centre to create a secondary 'main street' experience mid-block.

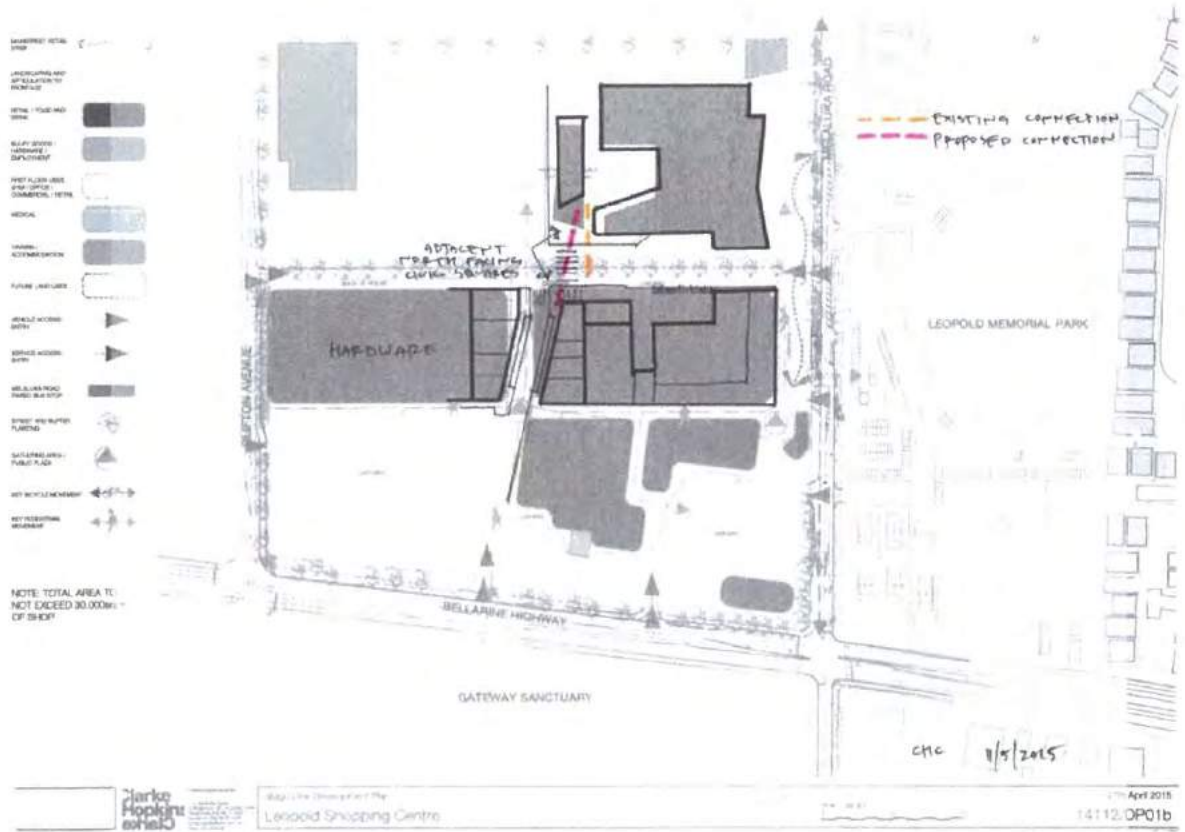
At the time when the Northern Expansion site is developed the mid-block connection is proposed to be built out with retail shopfronts. The Stage 2 Development Plan documentation allows for this staged approach.

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We have prepared a sketch plan (Figure 5) to illustrate how the mid-block connection may work assuming the northern land is developed as suggested in correspondence from the landowner in May 2015.

Should the northern land be developed as illustrated in the Clarke Hopkins Clarke sketch plan (dated 11/5/2015), then the southern land owner would create the north-south link angled to connect to the northern civic square. We note that any development of the northern expansion site is subject to rezoning and the granting of a planning permit and the sketch below is provided only to show a possible integration of the sites.

FIGURE 5 – SKETCH PLAN SHOWING POTENTIAL NORTH-SOUTH MID-BLOCK CONNECTION



However, if the northern land is not developed as illustrated on the CHC sketch then an alternative linkage between the two landholdings may be required to be considered. In this regard we believe the development plan staging plan provides sufficient flexibility for either the angled option presented in the sketch plan or another option to be contemplated and remain 'generally in accordance'.

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Appendix A

Schedule 30 to the DPO & Checklist of Response

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SCHEDULE 30 TO THE DEVELOPMENT PLAN OVERLAY

Shown on the planning scheme map as **DPO30**

LEOPOLD SUB REGIONAL ACTIVITY CENTRE

This schedule applies to land at 641-659 Bellarine Highway, Leopold (the existing shopping centre), 621-639 Bellarine Highway, Leopold (the "southern expansion site") and 92-100 Melaluka Road, Leopold (the "northern expansion site").

The aim of the schedule is to ensure development occurs generally in accordance with the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework 2011, and to coordinate the expansion of the centre across the three properties outlined above.

1.0 Requirement before a permit is granted

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Before a Development Plan has been approved by the responsible authority, a permit may be granted for:

- Any buildings and works associated with the use of the land for agriculture;
- Minor extensions or alterations to existing buildings and associated works including no more than 500 square metres of additional leasable floor space at the existing shopping centre;
- New uses, signage, alterations to access to the Road Zone, and use of land to sell or consume liquor, on the existing shopping centre land only;
- Building and works, use of land for an office and restricted recreation facility (gymnasium), car parking waiver and removal of native vegetation where generally in accordance with planning permit 944/2012 (including any amendment to that permit) which applies to the existing shopping centre and southern expansion sites.

2.0 Conditions and requirements for permits

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A permit must contain conditions or requirements which give effect to the provisions and requirements of the approved Development Plan.

Before any permit (including permit 944/2012) is granted which would result in an activity centre expansion of greater than 500 square metres of leasable floor space the owner must enter into an agreement (s) with Council pursuant to Section 173 of the *Planning and Environment Act 1987* in relation to contributions (including works in kind) towards key infrastructure including:

- A new signalised intersection at Clifton Avenue and Bellarine Highway;
- Upgrades to Melaluka Road and Clifton Avenue adjoining the site;
- Construction of the new central east-west street and the northern service road;
- Extensions and improvements to the existing, off-site footpath and shared pathway network; and
- Off site stormwater management systems.

3.0 Requirements for development plan

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A Development Plan must be generally consistent with the Leopold Sub Regional Activity Centre Concept Plan in Clause 4.0 and the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework 2011 (page10).

Separate development plans may be prepared, submitted and approved for the southern and northern expansion sites but must show how development may be integrated across both sites.

A Development Plan must include:

An overall **Urban Design Masterplan** which includes:

- Proposed land uses, car parking, vehicle, pedestrian and cycling access, public spaces, and infrastructure;
- A breakdown of floor space allocation for different land uses including shop, food and drink, restricted retail, office and trade supplies;
- The total amount of "shop" leasable floor space (other than restricted retail premises) limited to a total of 35,000 square metres within the area covered by this overlay including: no more than 30,000 square metres of shop on the existing and southern expansion sites; and no more than 5,000 square metres of shop on the northern expansion site;
- A pedestrian based, main street treatment along Melaluka Road that is consistent for both the southern and northern expansion sites;
- Concept sketches and plans showing elevations of building frontages to all streets and public spaces, including:
 - *A high standard of design treatment and activation of frontages to the public realm in particular Bellarine Highway and Melaluka Road;*
 - *High quality building design for the south west corner of the site as the western gateway to Leopold and the Bellarine Peninsula;*
 - *Avoidance of elevations that are blank and clad in a single material where they are visible from the public realm.*
 - *Elevations of significant size broken down through a combination of window openings, projections and recessions, and the use of different materials;*
 - *The use of awnings and shade canopies to provide pedestrian protection from inclement weather (excluding car park areas);*
 - *The use of public art work in accordance with Council's Public Art Strategy.*

A **Traffic Management Plan** that takes into account likely development on both the southern and northern expansion sites, has regard to any VicRoads requirements and includes:

- Proposed car parking provision, indicative design of access, service roads and intersections, bicycle routes, bicycle parking and arrangements for loading and unloading of vehicles;
- Plans and cross sections of the central east-west road showing staging and pedestrian friendly treatments;
- Plans and cross sections of the "main street" treatment of Melaluka Road including traffic calming measures, pedestrian crossing points and vehicle access into the activity centre having regard to the Memorial Reserve Masterplan;
- Traffic modelling showing how the projected traffic flows would be catered for;
- Details of upgrades required to the surrounding road system (Bellarine Highway, Melaluka Road and Clifton Avenue), including road cross sections and intersection layouts;
- Accessible and integrated public transport facilities for people of all abilities.

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A detailed **Flooding, Stormwater and Drainage Management Plan** that is cognisant of catchment boundaries, takes into account likely development on both the southern and northern expansion sites and includes:

- Reference to, but not restricted to, the following documents:
 - *WSUD Engineering Procedures: Stormwater, CSIRO Publishing, 2005;*
 - *Clause 34.03 including decision guidelines relating to drainage and flooding in Clause 65 of the Greater Geelong Planning Scheme;*
 - *City of Greater Geelong Stormwater Management Plan, 2002*
 - *Melbourne Water Guidelines for Development in Flood Prone Areas 2003*
 - *Royal Lifesaving Society – guidelines concerning safety in an around open water bodies to ensure adequate safety measures are built into the design.*
- A Drainage Feasibility Study;
- A Water Quality Impact Report;
- A Flood Impact Report;

The above technical reports must include the following elements:

- The principle of 'no adverse impact' elsewhere (post-development) must be followed within the work undertaken for the above technical reports;
- A drainage and flood mitigation design that manages upstream flows affecting the site and caters for any loss of onsite storage;
- Approximate size and location of all on and off site drainage system components;
- Measures to minimise inundation around the basin on the south side of the Bellarine Highway;
- Access, maintenance and power supply arrangements for the basin on the south side of the Bellarine Highway.

A **Landscape Masterplan** that shows consistency with any development plan approved for an adjoining expansion site and includes:

- Details of landscaping across the activity centre including along street frontages and access roads, within car parks and along buffer areas to adjoining properties;
- Details of the proposed treatment of any existing native vegetation;
- Details of all hard landscaping treatments such as street furniture and paving;
- A consistent landscape treatment along the frontage to Melaluka Road.

An **Economic Impact Assessment** for any new or expanded provision of retail floorspace that includes:

- A demonstration that there is sufficient retail demand for any new floor area without unacceptable impact on existing centres (including Central Geelong) and the retail hierarchy;
- A new or updated assessment for any new stages of development prepared at the time the expansion is proposed;
- Reference to, but not restricted to, the following documents:
 - *City of Greater Geelong Retail Strategy 2006 (or subsequent updates).*
 - *Assessment Criteria for Retail Planning Applications at Clause 22.03 of the Planning Scheme (or subsequent updates and revisions).*

A **Staging Plan** that includes:

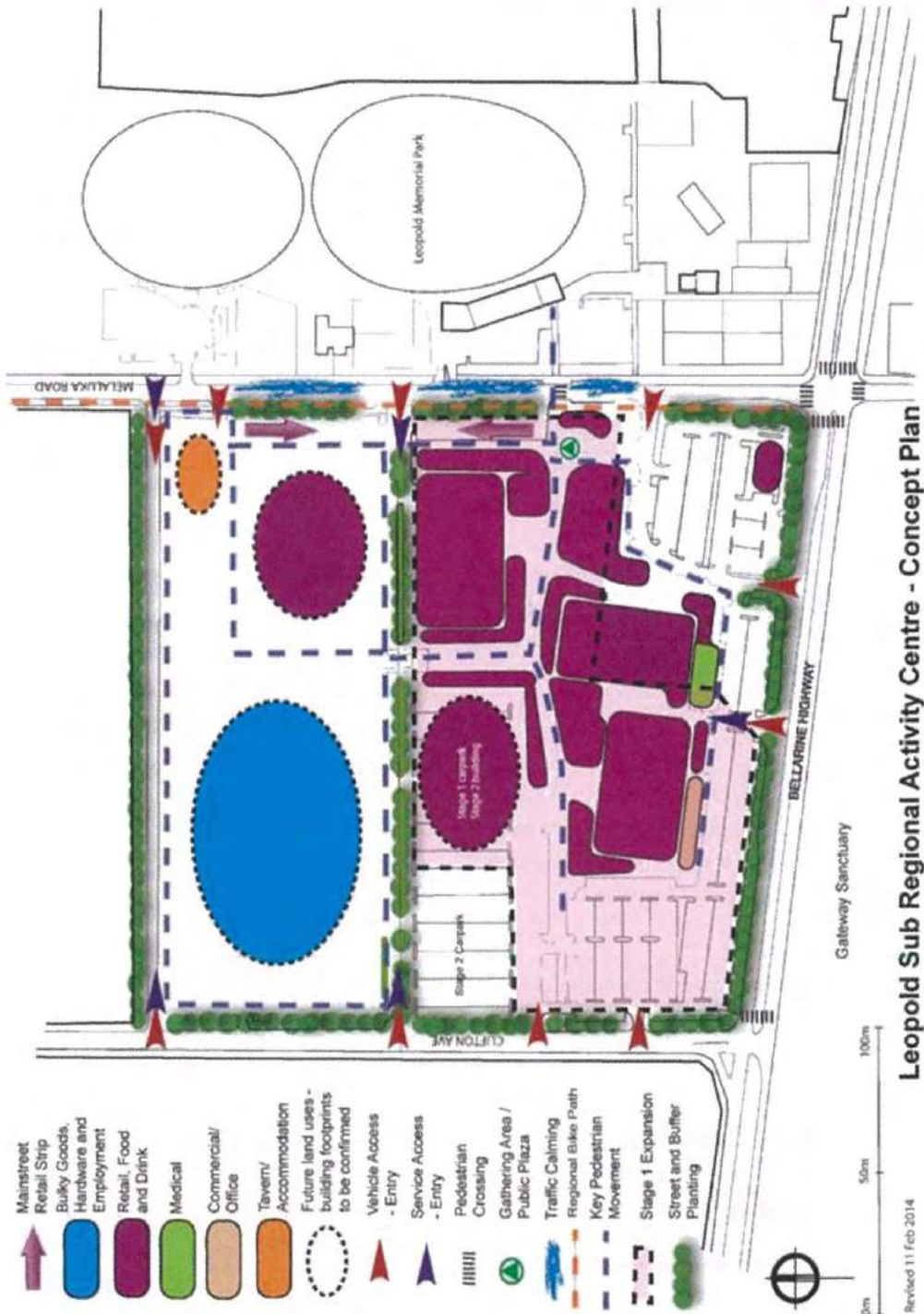
GREATER GEELONG PLANNING SCHEME

- The creation of a "main street" strip along Melaluka Road as part of the first stage of development of the activity centre;
- Stage 1 of the expansion generally as indicated in the Concept Plan in Clause 4.0 with the amount of leasable "shop" floor space no greater than 23,000 square metres.
- Information relating to the timing of construction of new activity centre buildings (shops, offices etc) and related infrastructure such as car parking, road intersections, access streets and stormwater management systems;
- Plans that show how the activity centre will function at each stage of its development as an attractive and user friendly centre including, but not limited to: interim carparking and access arrangements, landscape treatments, pedestrian connections and building frontage treatments.

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4.0 Leopold Sub Regional Activity Centre Concept Plan
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DPO 30 REQUIREMENTS FOR DEVELOPMENT PLAN	LOCATION IN SUBMITTED MATERIAL
An overall Urban Design Masterplan which includes:	Refer the CHC package of plans, dated June 2015.
<ul style="list-style-type: none"> ▪ Proposed land uses, car parking, vehicle, pedestrian and cycling access, public spaces, and infrastructure; 	Refer CHC plans and specifically the Southern Expansion Site Development Plan
<ul style="list-style-type: none"> ▪ A breakdown of floor space allocation for different land uses including shop, food and drink, restricted retail, office and trade supplies; 	Refer Table 1 of Urbis report.
<ul style="list-style-type: none"> ▪ The total amount of "shop" leasable floor space (other than restricted retail premises) limited to a total of 35,000 square metres within the area covered by this overlay including: no more than 30,000 square metres of shop on the existing and southern expansion sites; and no more than 5,000 square metres of shop on the northern expansion site; 	<p>The CHC development plan includes a notation: <i>Total area to not exceed 30,000 of shop.</i></p> <p>The ability to increase floorspace above 30,000sq.m of shop uses may also be restricted through the schedule to the Commercial 1 Zone.</p>
<ul style="list-style-type: none"> ▪ A pedestrian based, main street treatment along Melaluka Road that is consistent for both the southern and northern expansion sites; 	The CHC Southern Expansion Site Development Plan and the Landscape Indicative Plan show the role and function of Melaluka Road as a main street.
<ul style="list-style-type: none"> ▪ Concept sketches and plans showing elevations of building frontages to all streets and public spaces, including; 	
<ul style="list-style-type: none"> – <i>A high standard of design treatment and activation of frontages to the public realm in particular Bellarine Highway and Melaluka Road:</i> 	The CHC plans show indicative elevations demonstrating the high standard of design treatment to be applied to the subject site. The activation of Melaluka Road is a key stage 1 deliverable. This Development Plan does not seek significant expansion of the centre towards Bellarine Highway.
<ul style="list-style-type: none"> – <i>High quality building design for the south west corner of the site as the western gateway to Leopold and the Bellarine Peninsula;</i> 	Neither this Development Plan nor the Concept Plan show built form in the south western corner of the site. However, the plan does not preclude this as a future staged outcome.
<ul style="list-style-type: none"> – <i>Avoidance of elevations that are blank and clad in a single material where they are visible from the public realm.</i> 	The CHC indicative elevations show a variety of materials and colours and the creation of entry canopies and other structures to break up the façade presentations to the public realm. Whilst we consider the facades to the new east-west road are not in the public realm we note that the indicative elevations still seek to present an architectural response that is interesting and broken up by a mix of materials/colours.
<p style="text-align: center;"> Page 27 of 164 <i>Joan - Skapan</i> Signature 13/07/2015 Date </p>	
<ul style="list-style-type: none"> – <i>Elevations of significant size broken down through a combination of window openings, projections and recessions, and the use of different materials;</i> 	As a retail centre, glazing/windows are a large part of the façade presentation. The CHC elevations show the potential presentation of the new built form.

DPO 30 REQUIREMENTS FOR DEVELOPMENT PLAN

LOCATION IN SUBMITTED MATERIAL

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- The use of awnings and shade canopies to provide pedestrian protection from inclement weather (excluding car park areas);

The Key Nodes/Public Art detail prepared by CHC illustrates the use of articulated screening to the 'back of house' areas fronting the east-west road. This will assist in breaking up the elevations along this perimeter.

- The use of public art work in accordance with Council's Public Art Strategy

The Key Nodes/Public Art detail prepared by CHC illustrates the extensive future use of canopies/weather protection to external elevations. In particular, this demonstrates the strength of weather protection to be applied to the Melaluka Road frontage and the civic space.

The Key Nodes/Public Art detail prepared by CHC illustrates the future addition of public art both in terms of a sculptural entry boulevard fronting Bellarine Highway and the addition of public art to the civic precinct. We anticipate that planning permits will require the development of Public Art to be done in consultation with the Council.

A **Traffic Management Plan** that takes into account likely development on both the southern and northern expansion sites, has regard to any VicRoads requirements and includes:

Please refer to GTA Traffic Management Plan dated May 2015.

- Proposed car parking provision, indicative design of access, service roads and intersections, bicycle routes, bicycle parking and arrangements for loading and unloading of vehicles;

The GTA report and particularly the concept functional layout plan illustrates the location of carparking, the access points and the revised intersections required under Stage 1. Details on bicycle routes is provided in Section 5.1.1 of the GTA report with bicycle parking to be a detail at the planning permit stage to respond to the location of new floorspace. Loading and unloading arrangements are detailed at Section 5.3.

- Plans and cross sections of the central east-west road showing staging and pedestrian friendly treatments;

This is detailed at Section 6.1.3 of the GTA report.

- Plans and cross sections of the "main street" treatment of Melaluka Road including traffic calming measures, pedestrian crossing points and vehicle access into the activity centre having regard to the Memorial Reserve Masterplan;

This is detailed at Section 6.1.2 of the GTA report.

- Traffic modelling showing how the projected traffic flows would be catered for;

This is detailed in Section 7 of the GTA Report.

- Details of upgrades required to the surrounding road system (Bellarine Highway, Melaluka Road and Clifton Avenue), including road cross sections and intersection

This is detailed in Section 6.1.2 of the GTA Report (cross sections) and Section 7.4 (changes to the surrounding road network). We note that no cross

DPO 30 REQUIREMENTS FOR DEVELOPMENT PLAN	LOCATION IN SUBMITTED MATERIAL
layouts;	section has been provided for Bellarine Highway as no changes to the current cross-section is proposed.
<ul style="list-style-type: none"> ▪ Accessible and integrated public transport facilities for people of all abilities. 	GTA's report at Section 6.4 details the new paired bus stops on Melaluka Road. Discussions with PTV have confirmed the requirement for future works associated with the new bus stop locations to be compliant with the Disability Discrimination Act – Disability Standards for Accessible Public Transport 2002.
<p>A detailed Flooding, Stormwater and Drainage Management Plan that is cognisant of catchment boundaries, takes into account likely development on both the southern and northern expansion sites and includes:</p>	Refer to the Cardno Report dated May 2015.
<p>Reference to, but not restricted to, the following documents:</p> <ul style="list-style-type: none"> ▪ WSUD Engineering Procedures: Stormwater, CSIRO Publishing, 2005; ▪ Clause 34.03 including decision guidelines relating to drainage and flooding in Clause 65 of the Greater Geelong Planning Scheme; ▪ City of Greater Geelong Stormwater Management Plan, 2002 ▪ Melbourne Water Guidelines for Development in Flood Prone Areas 2003 ▪ Royal Lifesaving Society – guidelines concerning safety in an around open water bodies to ensure adequate safety measures are built into the design. 	<p>The Cardno report confirms the documents listed were considered in relation to the development of the Flooding, Stormwater and Drainage Management Plan.</p> <p style="text-align: right;"> <i>Page 29 of 164</i> <i>Jan - Sh</i> Signature 13/07/2015 Date </p>
<ul style="list-style-type: none"> ▪ A Drainage Feasibility Study; 	Refer Chapter 5 of the Cardno Report
<ul style="list-style-type: none"> ▪ A Water Quality Impact Report; 	Refer Chapter 6 of the Cardno Report
<ul style="list-style-type: none"> ▪ A Flood Impact Report; 	Refer Chapter 4 of the Cardno Report
<ul style="list-style-type: none"> ▪ The above technical reports must include the following elements: 	
<ul style="list-style-type: none"> – The principle of 'no adverse impact' elsewhere (post-development) must be followed within the work undertaken for the above technical reports; 	This is an underlying principle in the post-development drainage scenario as detailed in the Cardno report.
<ul style="list-style-type: none"> – A drainage and flood mitigation design that manages upstream flows affecting the site and caters for any 	This has been addressed in the Cardno report.

DPO 30 REQUIREMENTS FOR DEVELOPMENT PLAN	LOCATION IN SUBMITTED MATERIAL
loss of onsite storage;	
<ul style="list-style-type: none"> – Approximate size and location of all on and off site drainage system components; 	This has been addressed in the Cardno report.
<ul style="list-style-type: none"> – Measures to minimise inundation around the basin on the south side of the Bellarine Highway; 	This has been addressed in the Cardno report.
<ul style="list-style-type: none"> – Access, maintenance and power supply arrangements for the basin on the south side of the Bellarine Highway 	This has been addressed in the Cardno report. Further detail with respect to the drainage reserve is also separately detailed in a Section 173 Agreement to be executed between Novion and City of Greater Geelong.
<p>A Landscape Masterplan that shows consistency with any development plan approved for an adjoining expansion site and includes:</p>	
<ul style="list-style-type: none"> ▪ Details of landscaping across the activity centre including along street frontages and access roads, within car parks and along buffer areas to adjoining properties; 	This is provided in the Formium Landscape Indicative Plan L1, Rev E.
<ul style="list-style-type: none"> ▪ Details of the proposed treatment of any existing native vegetation; 	We note that no native vegetation on the subject site is being retained. Vegetation (river red gums) to be removed is shown on the landscape plan. The retained river red gum is located on the Council road reserve. Whilst Novion considered retaining additional existing trees, this was not possible given the location of many of them would have impacted the broader principle of creation of the Melaluka Road main street. We note the design of the Melaluka Road carparking will need to be cognisant of the tree protection zone for the retained tree. Other native trees are also in locations where future built form had been identified.
<ul style="list-style-type: none"> ▪ Details of all hard landscaping treatments such as street furniture and paving; 	The landscape indicative plan seeks to ensure high quality landscape treatments to clearly delineate plaza spaces and entries. The use of modular and coloured concrete paving is supported across the southern expansion site.
<ul style="list-style-type: none"> ▪ A consistent landscape treatment along the frontage to Melaluka Road. 	It is important that for the Melaluka 'main street' to work across the southern and northern expansion sites a consistency of street tree theming and paving is preferred. The discussion under Landscape Masterplan indicates the likely palette of vegetation and paving to be utilised.

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DPO 30 REQUIREMENTS FOR DEVELOPMENT PLAN	LOCATION IN SUBMITTED MATERIAL
<p>An Economic Impact Assessment for any new or expanded provision of retail floorspace that includes:</p>	
<ul style="list-style-type: none"> ▪ A demonstration that there is sufficient retail demand for any new floor area without unacceptable impact on existing centres (including Central Geelong) and the retail hierarchy; 	<p>This is discussed in Section 2.5 of the Urbis Report.</p>
<ul style="list-style-type: none"> ▪ A new or updated assessment for any new stages of development prepared at the time the expansion is proposed; 	<p>This is discussed in Section 2.5 of the Urbis Report.</p>
<ul style="list-style-type: none"> ▪ Reference to, but not restricted to, the following documents: <ul style="list-style-type: none"> – City of Greater Geelong Retail Strategy 2006 (or subsequent updates). – Assessment Criteria for Retail Planning Applications at Clause 22.03 of the Planning Scheme (or subsequent updates and revisions). 	<p>This is discussed in Section 2.5 of the Urbis Report.</p>
<p>A Staging Plan that includes:</p>	
<ul style="list-style-type: none"> ▪ The creation of a "main street" strip along Melaluka Road as part of the first stage of development of the activity centre; 	<p>Refer to the CHC Plan Southern Expansion Site Staging Plan.</p>
<ul style="list-style-type: none"> ▪ Stage 1 of the expansion generally as indicated in the Concept Plan in Clause 4.0 with the amount of leasable "shop" floor space no greater than 23,000 square metres. 	<p>The Staging Plan demonstrates Stage 1 will include less than 23,000 sq.m of shop floorspace (noting shop floorspace excludes restricted retail).</p>
<ul style="list-style-type: none"> ▪ Information relating to the timing of construction of new activity centre buildings (shops, offices etc.) and related infrastructure such as car parking, road intersections, access streets and stormwater management systems 	<p>This is detailed in Section 2.6 of the Urbis Report.</p>
<ul style="list-style-type: none"> ▪ Plans that show how the activity centre will function at each stage of its development as an attractive and user friendly centre including, but not limited to: interim carparking and access arrangements, landscape treatments, pedestrian connections and building frontage treatments. 	<p>This is detailed in Section 2.6 of the Urbis Report.</p>

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Appendix B

Development Plan and Urban Design
Masterplan

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Gateway Plaza Shopping Centre

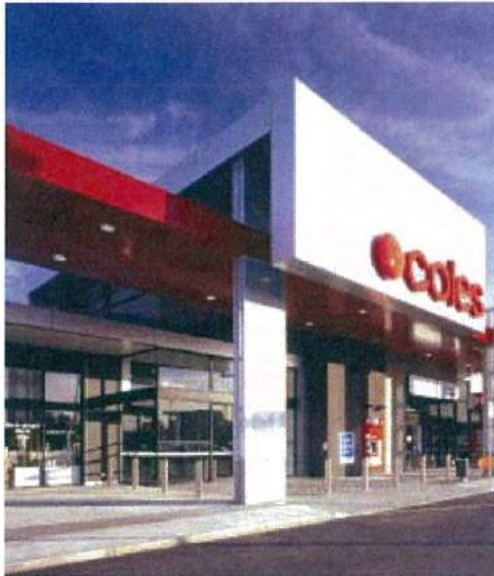
BELLARINE HIGHWAY, LEOPOLD

// Development Plan and Urban Design Masterplan

// Southern Expansion Site

// June 2015

Existing Centre



Built form

Look at forms that compliment existing Architecture



Melaluka Road Vista

Lack of gateway presence



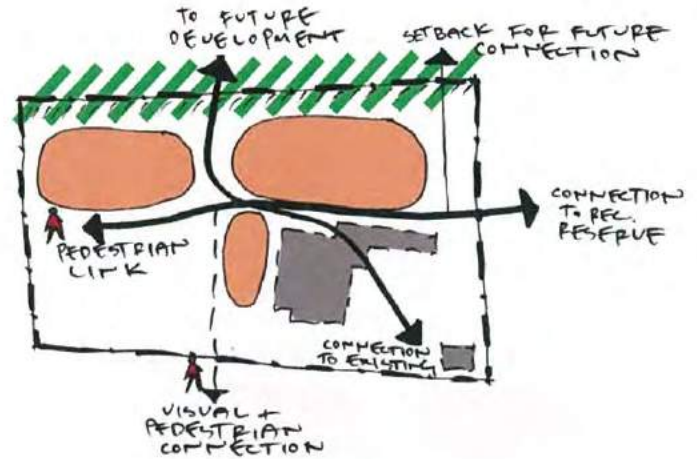
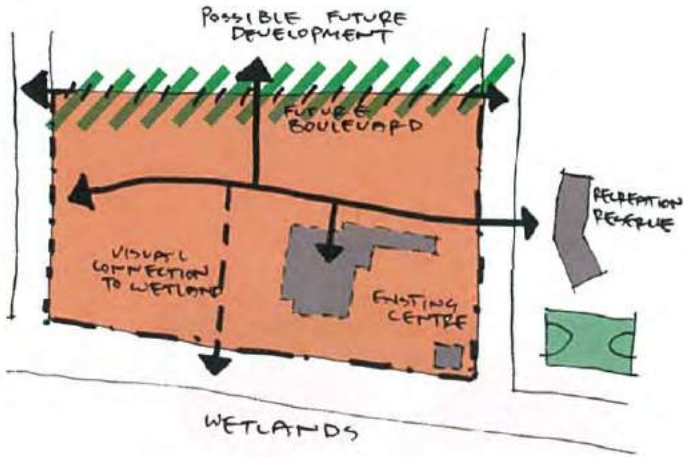
Bellarine Highway

Vistas to unused farmland. Needs consolidation of built form to create precinct.

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Urban Design Analysis Sketches

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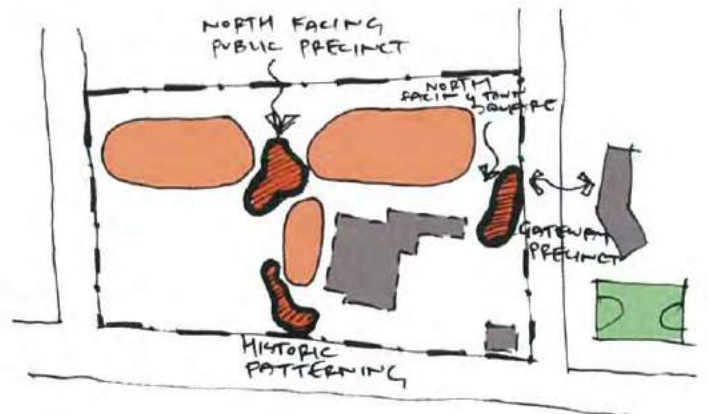
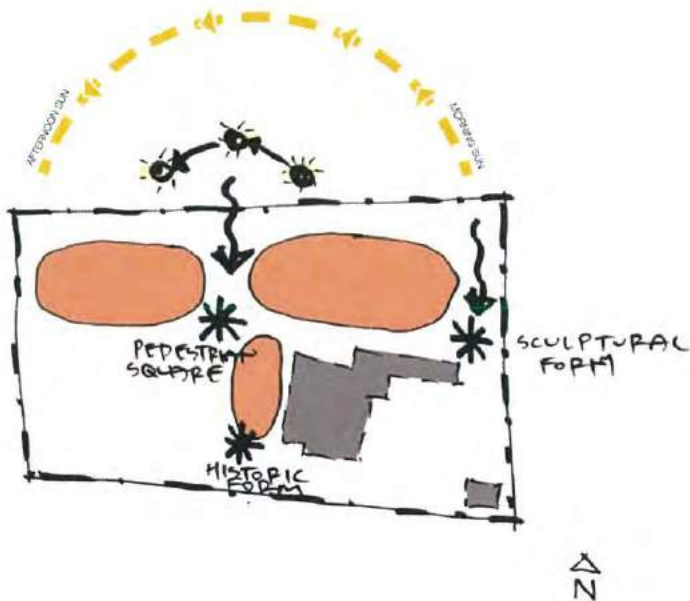


Urban Connections -

Both physical and visual connections to site surrounds have been explored within the design. A strong link to the recreation reserve and possible future development to the North are especially important, as these connections will help to consolidate the area and create a strong and vibrant urban precinct.

Urban Connections - Built Form Exploration -

The built form was dictated by the urban connections to surrounding parts of the site. This created a precinct which is not inwardly focused but embraces the surrounds of the site. A seamless connection to the existing supermarket was also created with internal and external connections.



Node Points -

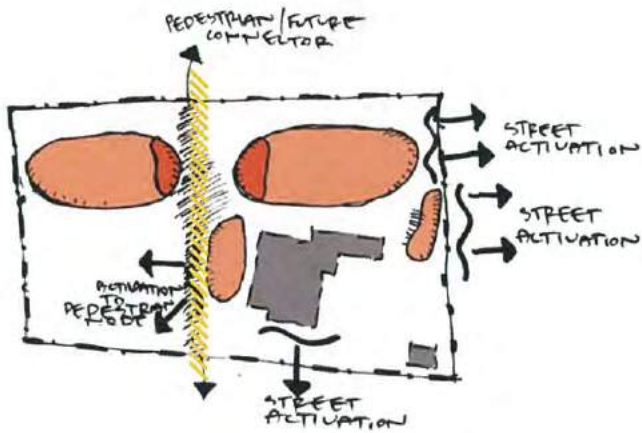
Node points; or points of interest within the built form, at key areas of the site will help to create visual interest and activity that is spread throughout the development. This will promote pedestrian activity as people will be willing to explore and interact with the built form.

Built Form Creation -

The amalgamation of the urban connections and node points help to sculpt the built form. Both of these elements embraces and encourages pedestrian movement which is the 'heart' of the development.

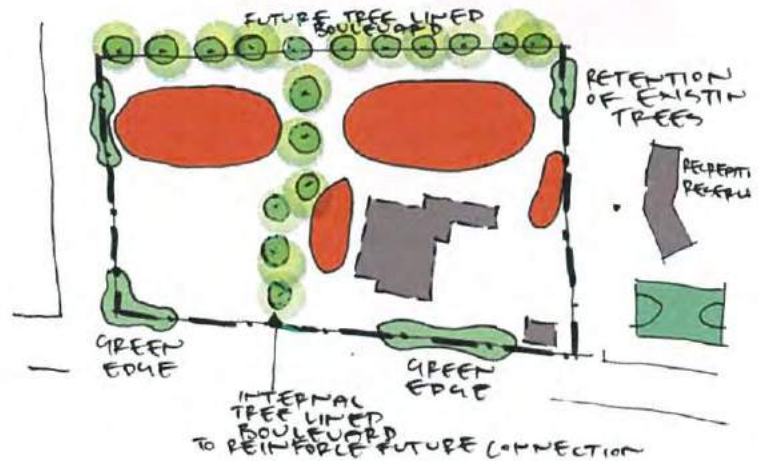
There is currently no town centre or 'heart' within the existing development or the recreation reserve. A new town centre and public precinct will be created that will provide a connection with the existing centre, recreation reserve and future development zone, whilst also providing a Northerly aspect. Outdoor dining and possible market stalls will be promoted within this area.

Urban Design Analysis Sketches



Active Edges -

Active edges to the extremities of the site, particularly Melaluka Road, will add life and interest to the development whilst also providing activation to the street. The active edges will be created by means of built form to the site boundary and maximising openings and glazing to these areas. Maximum activation has utilised along the North South connector spine also.



Green Edges -

Landscaped edges will provide a visual buffer to the development whilst also integrating the site into the surrounding landscape. A landscaped boulevard running North South will help to solidify the connection to the future Northern development as well as emphasising the creation of a pedestrian precinct.

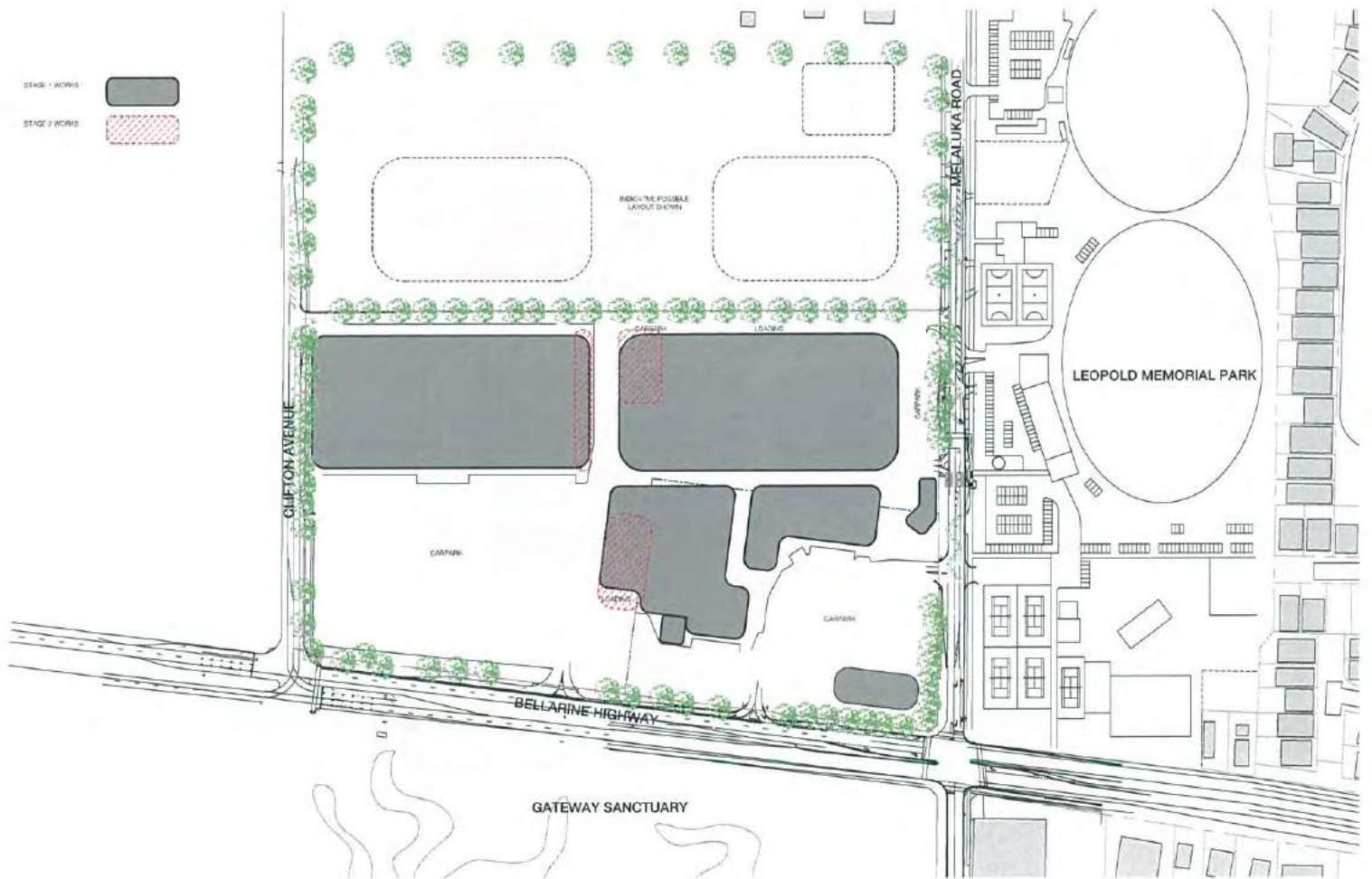
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Southern Expansion Site Development Plan



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Southern Expansion Site Staging Plan



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Key node massing studies - Gateway Creation

Activation to edges

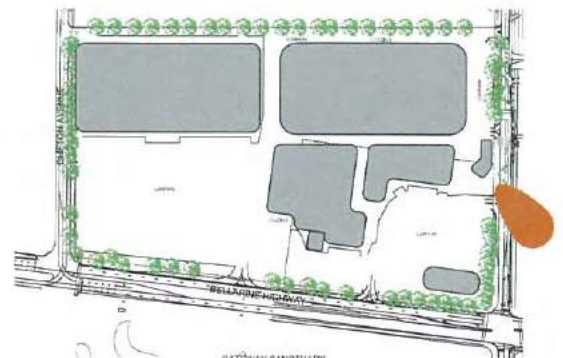
Integrated landscaping to reduce prevailing S/E winds and reduce wind tunnel effect

Larger articulated corner element to create gateway



Indicative Concept

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Key node massing studies - North / South connector

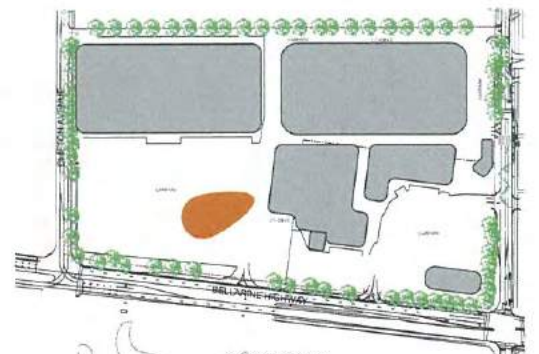
Sculptural entry boulevard:
- Art panels with graphic representation depicting elements significant to the Bellarine Peninsular. Final design to be confirmed.

Integrated landscaping to create boulevard



Indicative Concept

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Key node massing studies - Pedestrian Precinct

Smaller scale pedestrian elements

Activation to corners

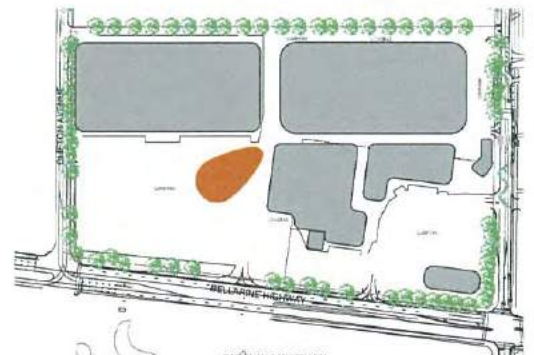
Raised pavement and landscaped areas to create pedestrianised precinct

Large light filled canopy to clearly identify entry



Indicative Concept

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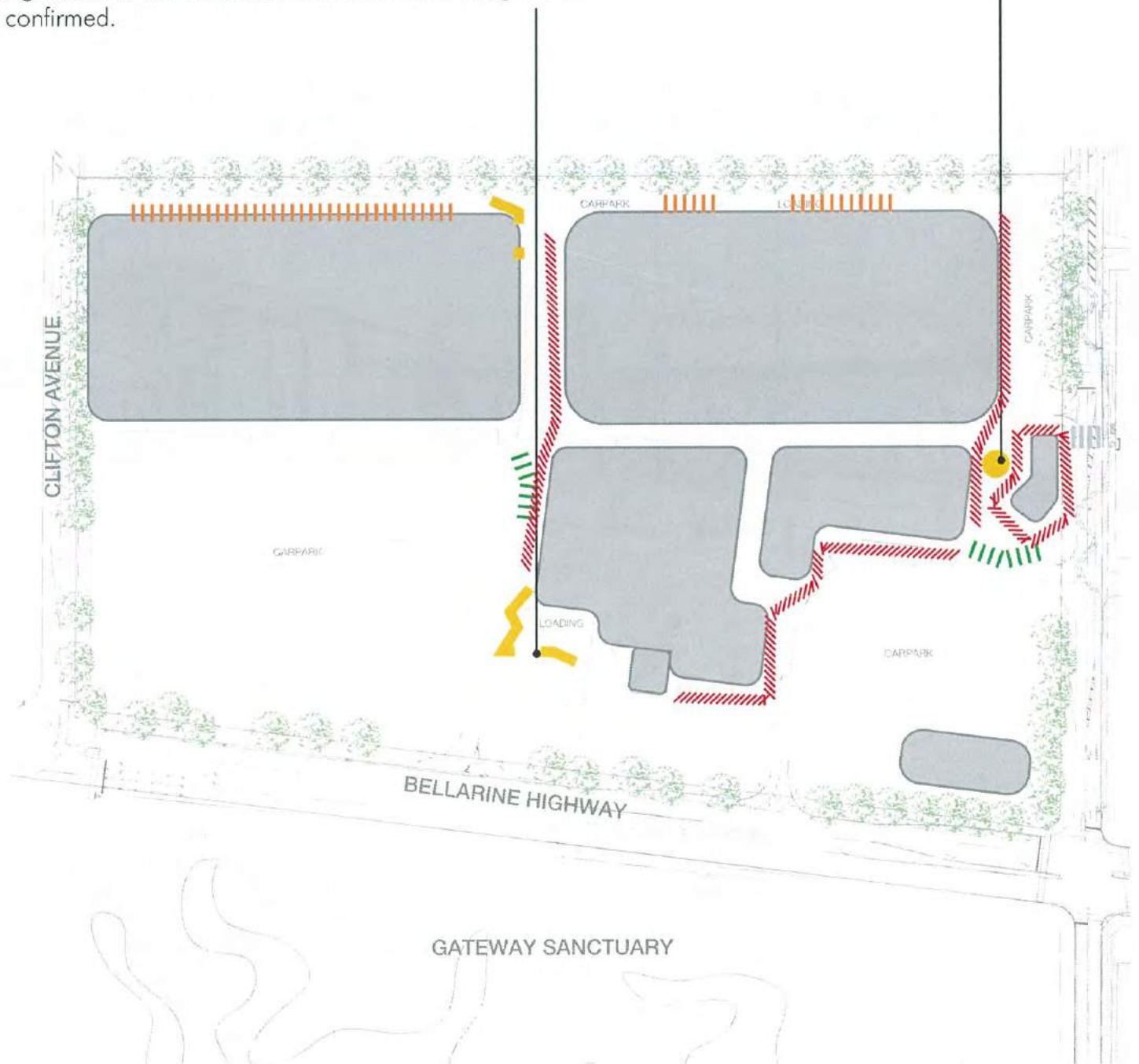
Key nodes / Public Art / Weather protection

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- Areas of articulated screening
- Key areas of weather protection with landscaping
- Weather protection canopies

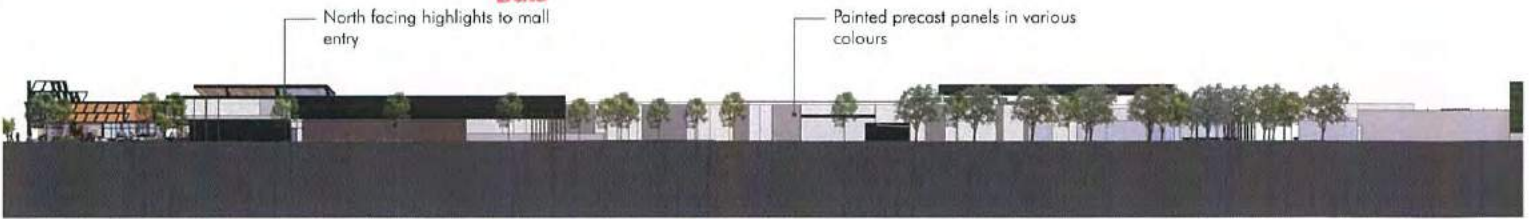
Sculptural entry boulevard:
- Art panels with graphic representation depicting elements significant to the Bellarine Peninsular. Final design to be confirmed.

Modernist public art location

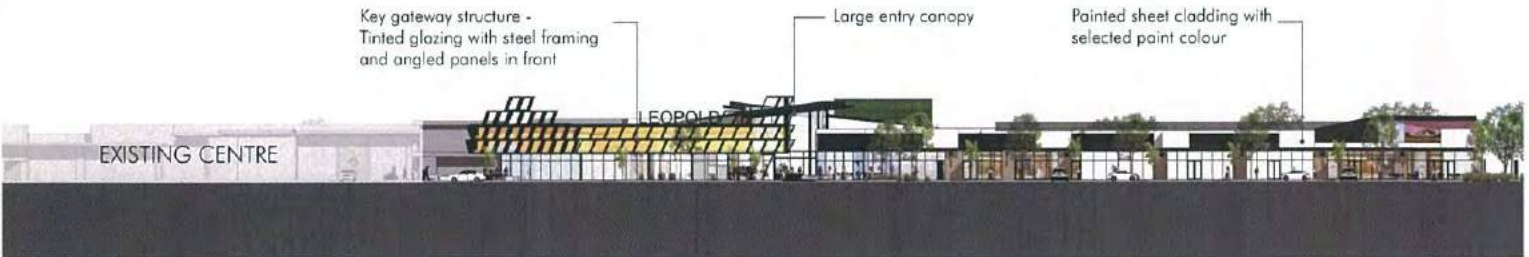


Elevations

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Northern elevation



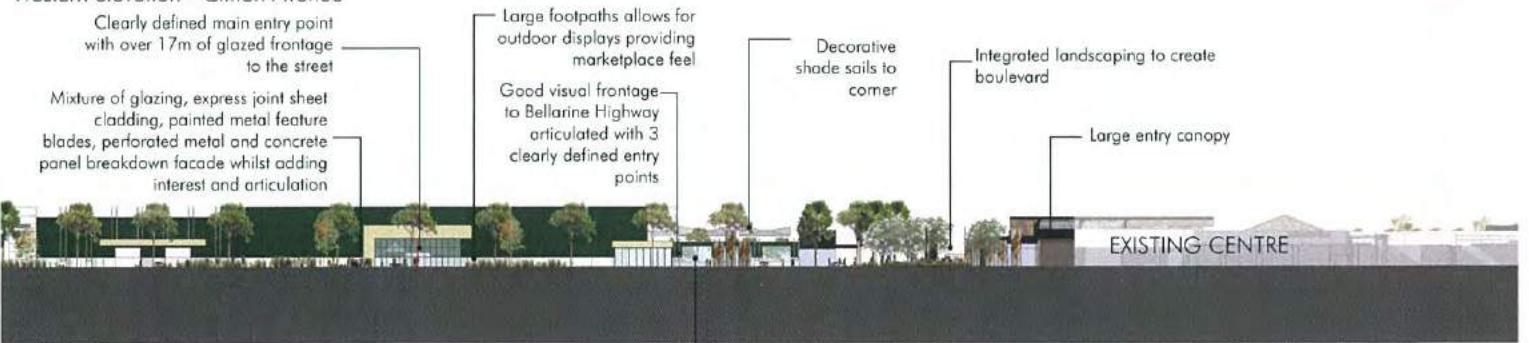
Eastern elevation



Western elevation



Western elevation - Clifton Avenue



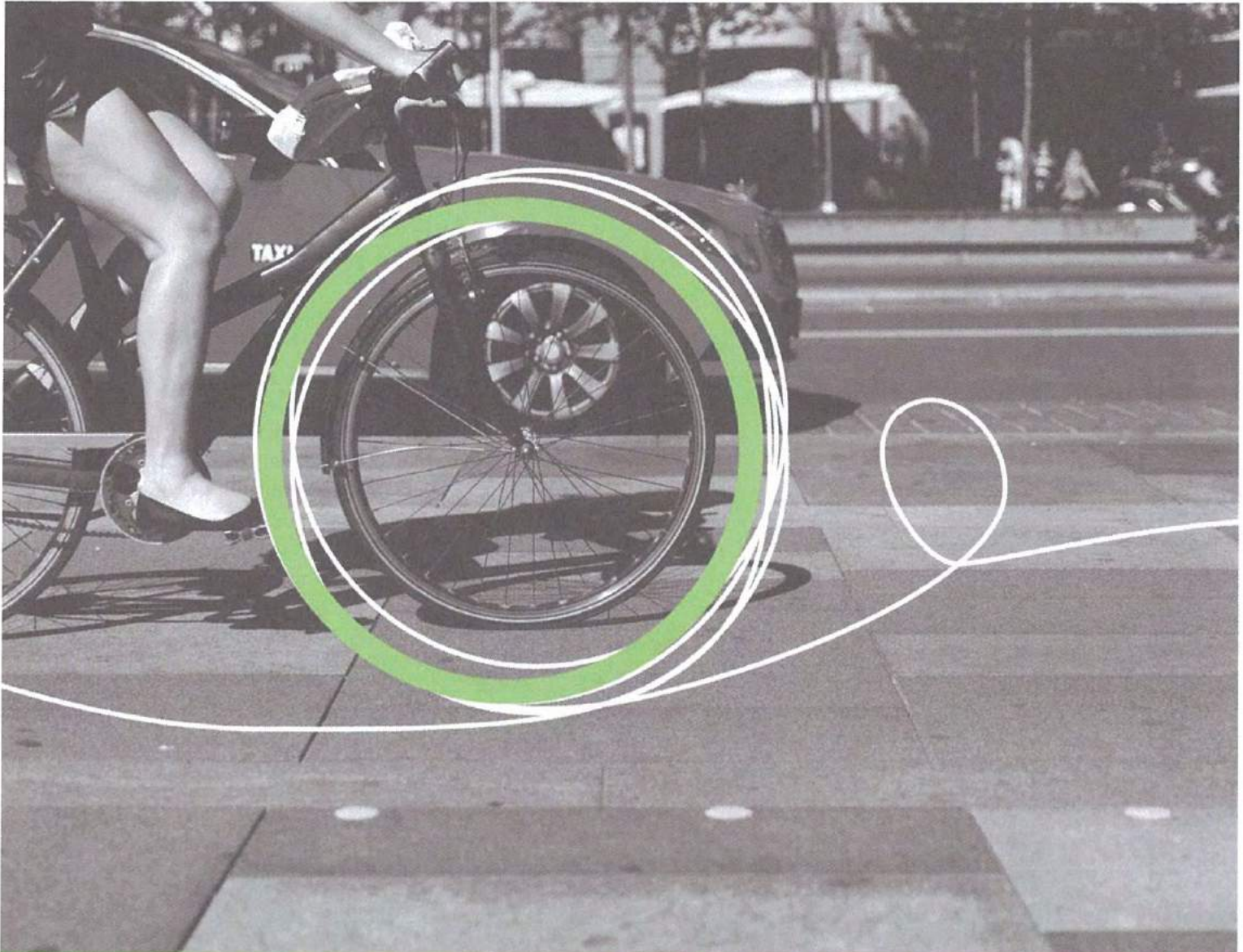
Southern elevation

Clear glazing to landscape area provides active connection to carpark and street.

Appendix C

Traffic Management Plan

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Leopold Sub Regional Activity Centre Southern Expansion Site Development

Client // Novion Property Group
Office // VIC
Reference // 15M1274000
Date // 01/05/15

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Leopold Sub Regional Activity Centre Southern Expansion Site Development Plan Traffic Management Plan

Issue: B 01/05/15

Client: Novion Property Group
Reference: 15M1274000
GTA Consultants Office: VIC

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Date

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	26/11/14	Final	David Trotter	Ben Simpson	Tim De Young	Original Signed
B	01/05/15	Amended Final	David Trotter	Ben Simpson	Tim De Young	T.D.Y.

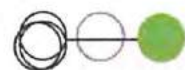


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1. Introduction

1.1 Background

In August 2014, Schedule 30 to the Development Plan Overlay (DPO30) was incorporated into the Greater Geelong Planning Scheme for the Leopold Sub Regional Activity Centre (herein referred to as the 'Activity Centre').

The Schedule applies to land located at 641-659 Bellarine Highway, Leopold (the existing Leopold Gateway Shopping Centre), 621-639 Bellarine Highway, Leopold (the "southern expansion site") and 92-100 Melaluka Road, Leopold (the "northern expansion site"). Within this report, the first two sites are referred to as the 'Southern Site' with the latter site referred to as the 'Northern Site'.

The Schedule outlines that its aims are to ensure development occurs generally in accordance with the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework 2011 and to coordinate the expansion of the broader shopping centre across the three properties (the Northern and Southern sites).

For reference the concept plan contained in the Schedule for the Activity Centre is shown within Figure 1.1.

Figure 1.1: Leopold Sub Regional Activity Centre – Concept Plan



1.2 Recent Planning Approvals

In parallel with the incorporation of the Schedule within the Greater Geelong Planning Scheme, a Planning Permit (No. 944/2012) was also issued for the Southern Site to facilitate the expansion of the existing shopping centre to the west.

This Permit contained a number of conditions relating to traffic and transport matters, including (but not limited to) the following:

Amended Plans Required

2. *Prior to the commencement of the development, three (3) of amended plans to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority... The plans must be drawn to scale... but modified to show:*
 - b) *Public transport infrastructure and car park design consistent with the approved Traffic Management Plan*

Traffic and Access Plan

4. *Prior to the commencement of the development, a Traffic and Access Plan to the satisfaction of the Responsible Authority, prepared by a suitably qualified professional, must be submitted to and approved by the Responsible Authority. The Traffic and Access Plan must outline how different transport modes will be integrated in the centre. The plan must be generally in accordance with the Traffic Management Plan forming part of the approved Development Plan. The Plan must include detail of but not be limited to:*
 - a) *internal and external bicycle links of the land, including to the Bellarine Rail Trail*
 - b) *internal and external pedestrian links of the land, including to the Leopold Recreation Reserve and the land to the north*
 - c) *the location and type of public transport infrastructure (including in-bound and out-bound bus stop/s, taxi rank/s and timetable information)*
 - d) *bicycle parking and change facilities*
 - e) *way-finding signage*
 - f) *the number and dimensions of car parking spaces and loading areas, including the car park design in the vicinity of the landscaping/trees in the car park*
 - g) *intersection and road treatments*

When approved, the Traffic and Access Plan will be endorsed and then form part of the permit. The use and development of the land must be carried out in accordance with the Traffic and Access Plan to the satisfaction of the Responsible Authority.

Creation of a Road Reserve (East-West Road)

5. *Prior to occupation of the development, a road reserve must be created and a road constructed along the northern boundary that connects Melaluka Road and Clifton Avenue to the satisfaction of the Responsible Authority. The owner of the land will be responsible for the maintenance of the road for 24 months after its completion.*

VicRoads conditions

38. *Demonstrate how the proposed development will safely cater for all road users, including buses, bicycles and pedestrians*
39. *Details of mitigating works to upgrade the Bellarine Highway/Clifton Street Avenue [sic] intersection such as the installation of left and right turn lanes, and traffic signals*

40. Details of the scope of works required for the installation of additional street lighting within Bellarine Highway's road reserve between Clifton Avenue and Melaluka Road
41. Additional central median breaks within the Bellarine Highway to the overall development site will not be permitted.
42. All mitigation must be designed and constructed to VicRoads' satisfaction, in which a separate consent for all works is required under the Road Management Act

Public Transport Victoria conditions

43. The permit holder must take all reasonable steps to ensure that disruption to bus operations is kept to a minimum...
44. Prior to the commencement of the works within the shopping centre, the existing bus stop and shelter (within the centre) including all associated infrastructure, must be relocated or replaced to Melaluka Drive [sic] at a cost born by the permit holder to the satisfaction of Public Transport Victoria and deemed compliant with the Disability Discrimination Act – Disability Standards for Accessible Public Transport 2002.

1.3 Purpose of this Report

Since the rezoning and issue of the planning permit, the ownership of the Southern Site has changed and a new planning permit is now being sought for the Southern Site. In accordance with requirement of the Schedule, a Development Plan is being prepared to facilitate the issue of this Permit.

In this regard, it is noted that Section 3 of the Schedule outlines that a Development Plan for the Activity Centre must be generally consistent with the Concept Plan outlined above and the objectives of the Leopold Sub Regional Activity Centre Urban Design Framework 2011, and must include amongst other items:

"A **Traffic Management Plan** that takes into account likely development on both the southern and northern expansion sites, has regard to any VicRoads requirements and includes:

- o Proposed car parking provision, indicative design of access, service roads and intersections, bicycle routes, bicycle parking and arrangements for loading and unloading of vehicles;
- o Plans and cross sections of the central east-west road showing staging and pedestrian friendly treatments;
- o Plans and cross sections of the "main street" treatment of Melaluka Road including traffic calming measures, pedestrian crossing points and vehicle access into the activity centre having regard to the Memorial Reserve Masterplan;
- o Traffic modelling showing how the projected traffic flows would be catered for;
- o Details of upgrades required to the surrounding road system (Bellarine Highway, Melaluka Road and Clifton Avenue), including road cross sections and intersection layouts;
- o Accessible and integrated public transport facilities for people of all abilities."

This report has been prepared to detail the information and analysis sought above and, in doing so, also have regard to the information and/or documentation required by VicRoads and Public Transport Victoria (PTV) via conditions 38 to 44 of Planning Permit No. 944/2012¹.

¹ Notwithstanding the provision of this latter information/documentation, it is noted that a separate transport impact assessment report has been prepared for the new planning permit being sought for the Southern Site. This report is consistent with this report but is more tailored to the specifics of that proposal.

1.4 References

In preparing this report, reference has been made to the following:

- o Greater Geelong Planning Scheme
- o plans prepared by Clarke Hopkins Clarke
- o Australian Standard / New Zealand Standard, Parking Facilities (AS/NZS2890)
- o Leopold Sub Regional Activity Centre Urban Design Framework 2011
- o planning permit no. 944/2012 for 621-639 Bellarine Highway, Leopold
- o previous reports prepared for the Activity Centre by Traffix Group
- o traffic and car parking surveys as referenced in the context of this report
- o traffic volume data collated by VicRoads for abutting roads
- o various inspections of the site and its surrounds
- o other documents as nominated.

1.5 Key Assumptions

In accordance with the Development Plan requirements, this report has been prepared to assess the transport impacts of both the Northern and Southern Sites. At the time of the preparation of this report, however, only land use information relating to the Southern Site had been progressed. This report accordingly makes assumptions pursuant to the likely development on the Northern Site, informed by the submission on behalf of the northern land owners through the Panel Hearing process. These assumptions are outlined in detail in Section 3 of this report.

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2. Existing Conditions

2.1 Subject Site

2.1.1 Location

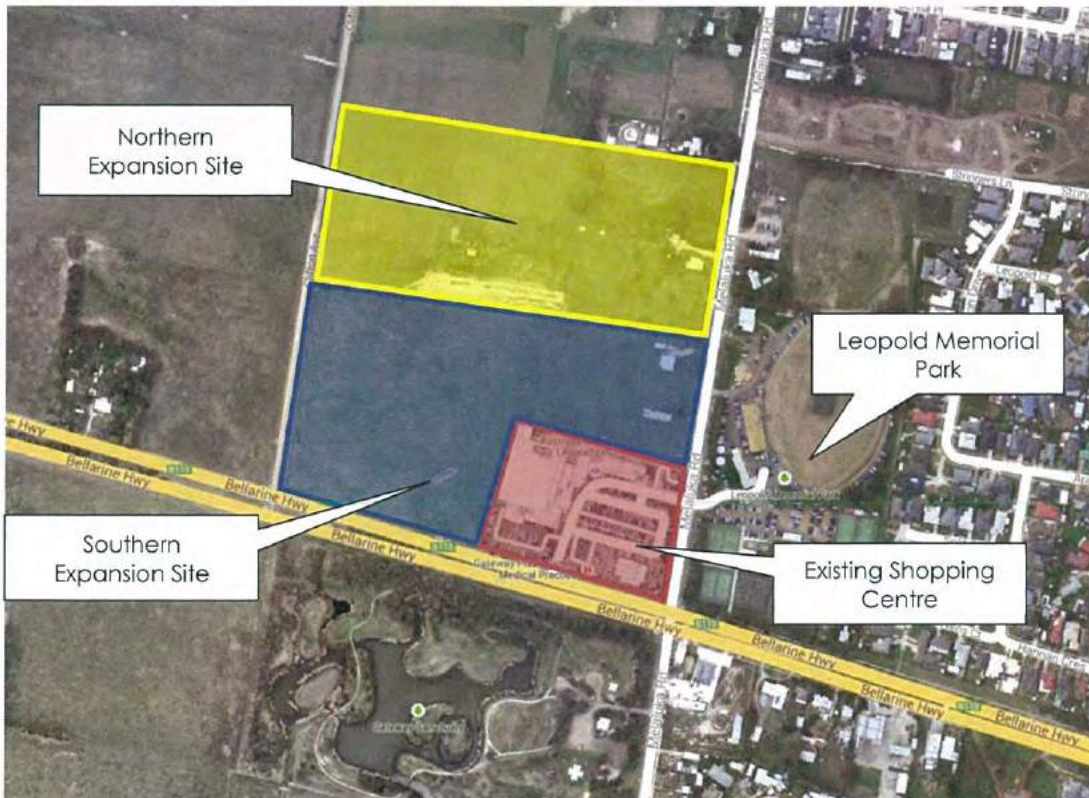
The Activity Centre incorporates land referred to within this report as:

- o the Southern Site containing 641-659 Bellarine Highway, Leopold (the existing shopping centre) and 621-639 Bellarine Highway, Leopold (the "southern expansion site")
- o the Northern Site containing 92-100 Melaluka Road, Leopold (the "northern expansion site").

The overall Activity Centre has an area of approximately 160,000m² with frontages of 380m, 390m and 440m (approx.) to Clifton Avenue, Bellarine Highway and Melaluka Road respectively. Bellarine Highway is located within a Road Zone 1 (RDZ1).

The location of the Activity Centre and the surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and its Environs



(Reproduced under licence from nearmap.com)

2.1.2 Land Uses

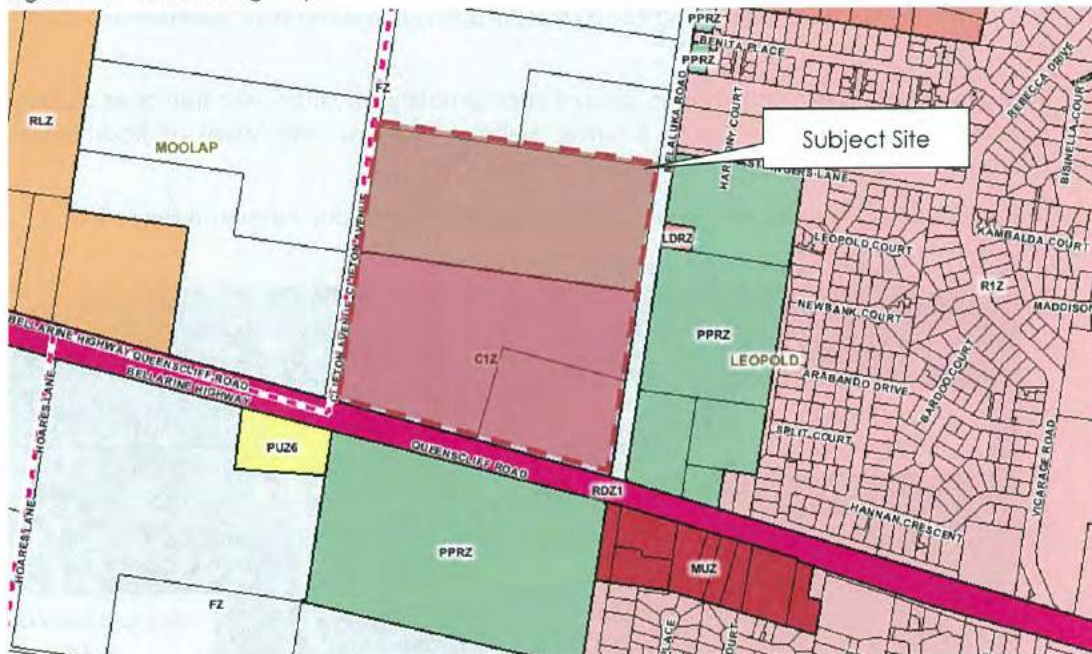
Land Zoning

The Southern Site is located within a Commercial 1 Zone (C1Z) with the Northern Site located within a Farming Zone (FZ).

The surrounding properties include predominately residential and recreational land uses to the east with predominately farming land uses located to the west. The notable exception includes sporting and recreation land uses to the immediate east and south respectively.

The land zoning of the Activity Centre and its surrounds is shown in Figure 2.2.

Figure 2.2: Land Zoning Map



(Reproduced from Land Channel web site)

Existing Shopping Centre

The Southern Site contains a land parcel (641-659 Bellarine Highway, Leopold) which currently accommodates a shopping centre with land uses as summarised in Table 2.1.

Table 2.1: Existing Land Uses within Shopping Centre (641-659 Bellarine Highway, Leopold)

Description	Land Use	Floor Area
Leopold Gateway Plaza Shopping Centre	Supermarket (Coles)	3,200m ²
	Shop	1,339m ²
	Office [1]	421.2m ²
	Food & Drink Premises [2]	346m ²
	Sub-total	5,306.2m²
Existing Pad Site	Convenience Restaurant	390m ² / 100 seats [3]
Total		5,696.2m²

[1] Includes Bank, real estate, insurance, ATM, etc.

[2] Includes café, takeaway, convenience restaurant, etc.

[3] 100 seats assumed (GTA Database indicates an average of 93 seats for 34 convenience restaurants)

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2.2 Road Network

2.2.1 Adjoining Roads

Bellarine Highway

Bellarine Highway is located to the south of the Activity Centre and functions as a primary arterial road (under VicRoads jurisdiction) aligned in an east-west direction.

It is a two-way divided road configured with a four-lane, 27.3m carriageway (including a 9.3m median) set within a 40 metre road reserve (approx.). Bellarine Highway has a sealed shoulder on both sides of the carriageway which is designated for use by cyclists. Kerbside car parking is not permitted on either side of the road in the vicinity of the Activity Centre.

Bellarine Highway carries approximately 15,500 vehicles per day² adjacent to the Activity Centre and is shown in Figure 2.3 and Figure 2.4.

Figure 2.3: Bellarine Highway (looking east)



Figure 2.4: Bellarine Highway (looking west)



Melaluka Road

Melaluka Road is located to the east of the Activity Centre and functions as a local road (under Council Control) aligned in a north-south direction.

To the north of the Activity Centre, it is a two-way road configured with a two-lane, 6.0 metre carriageway set within a 20 metre road reserve (approx.). Kerbside car parking is not permitted on either side of the road in the vicinity of the Activity Centre.

Adjacent to the Activity Centre, Melaluka Road widens to provide additional turning lanes into the existing shopping centre, the sporting fields to its immediate east and Bellarine Highway. These lanes allow for the deceleration and storage of vehicles turning into these sites/road.

Melaluka Road carries approximately 5,050 vehicles per day² adjacent to the Activity Centre and is shown in Figure 2.5 and Figure 2.6.

² Average weekday traffic volumes, based on SCATS detector count data (Monday 25/08-14 - Friday 29/08/14).

Figure 2.5: Melaluka Road (looking north)



Figure 2.6: Melaluka Road (looking south)



Clifton Avenue

Clifton Avenue is located to the west of the Activity Centre and functions as a local road (under Council control) aligned in a north-south direction.

It is a two-way unsealed road configured with a single lane, 3.5 metre carriageway set within a 20 metre road reserve (approx.). Kerbside car parking is not permitted on either side of the road in the vicinity of the Activity Centre.

Clifton Avenue carries approximately negligible traffic and is shown in Figure 2.7 and Figure 2.8.

Figure 2.7: Clifton Avenue (looking north)



Figure 2.8: Clifton Avenue (looking south)



2.2.2 Key Intersections

Key intersections providing vehicle access to, or abutting the Activity Centre, include:

- Vehicle Access
 - Bellarine Highway / Site Access (unsignalised intersection – left-in / left-out)
 - Melaluka Road / Site Access (unsignalised cross-intersection)
 - Melaluka Road / Loading Site Access (unsignalised T-intersection)
- Abutting Intersections
 - Bellarine Highway / Clifton Avenue (unsignalised T-intersection)
 - Bellarine Highway / Melaluka Road (signalised cross-intersection).

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2.2.3 Traffic Volumes

Traffic movement counts were undertaken at the above intersections during the following peak periods:

- o Friday 12 September 2014 4:00pm-6:00pm
- o Saturday 13 September 2014 11:00am-1:00pm.

The Friday PM and Saturday peak hour traffic volumes are shown in Figure 2.9 and Figure 2.10 respectively. These figures illustrate peak traffic volumes into and out of the existing shopping centre as follows:

- o Friday PM Peak Hour: 962 vehicle movements per hour (vph)
- o Saturday Peak Hour: 845 vehicle movements per hour (vph).

2.2.4 Traffic Generation Rates

On the basis of the traffic volumes summarised above and assuming that the McDonalds pad site generates approximately 120 vehicle movements per hour during the peak periods³, a summary of the resultant traffic generation rates for the existing retail floor area is presented in Table 2.2.

Table 2.2: Existing Site Traffic Generation

	Vehicle Movements per Hour (vph)	
	Friday PM	Saturday Midday
Total Traffic Generation	962vph	845vph
Less McDonald's Traffic Generation [1]	- 120vph	- 120vph
Net Retail Traffic Generation	842vph	725vph
Retail Traffic Generation Rate [2]	15.9vph/100m ²	13.7vph/100m ²

[1] Traffic generation rate for the McDonald's Convenience Restaurant has been assumed to be 120 vehicle movements in both the Friday PM and Saturday Midday peak hours.

[2] Traffic generation rate based on a total floor area within the Site of 5,306.2m², existing shopping centre area (excluding the convenience restaurant which is located within a pad site).

Table 2.2 indicates that the retail floor area within the existing shopping centre on the Southern Site currently generates traffic at the following rates (approximate):

- o Friday PM Peak Hour: 15.9 vehicle movements/100m²
- o Saturday Midday Peak Hour: 13.7 vehicle movements/100m²

It is noted that the Friday PM and Saturday peak hour rates detailed above are marginally higher and lower respectively than the rates nominated within the RTANSW 'Guide to Traffic Generating Developments' for a shopping centre of this size. This comparison indicates that the surveyed traffic generation rates are comparable to those that would typically be expected for such a land use and are accordingly fit for assessment purposes (i.e. they do not need to be factored up to represent more typical traffic levels).

³ This generation rate is generally consistent with data contained with the RTANSW Guide to Traffic Generating Developments and the GTA survey database.

Figure 2.9: Existing Traffic Volumes – Friday PM Peak Hour

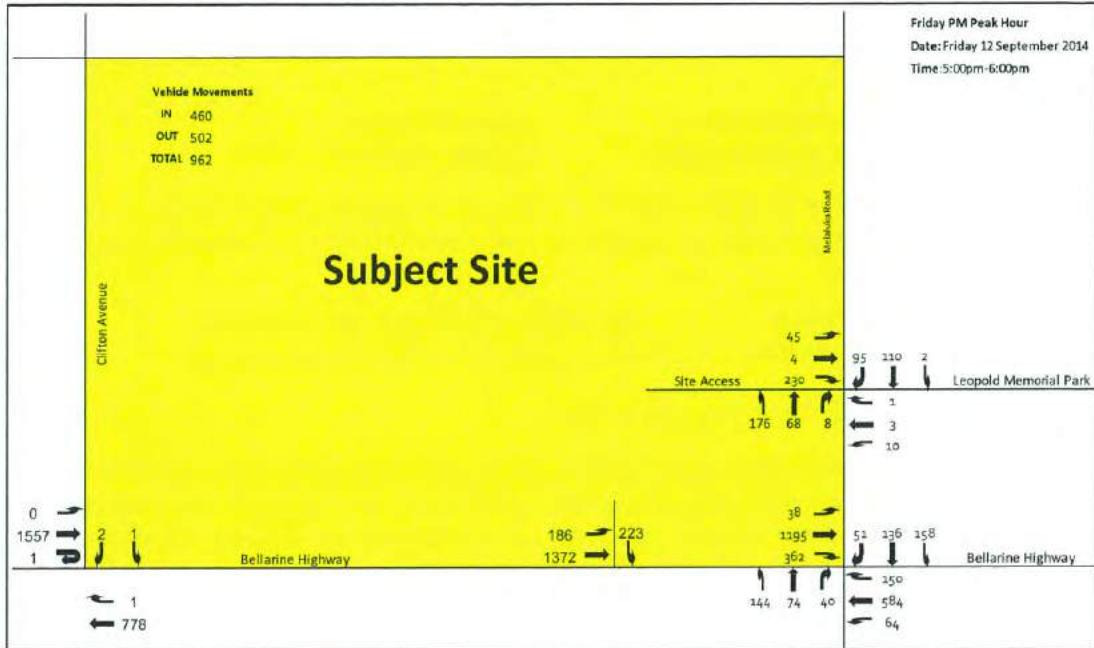
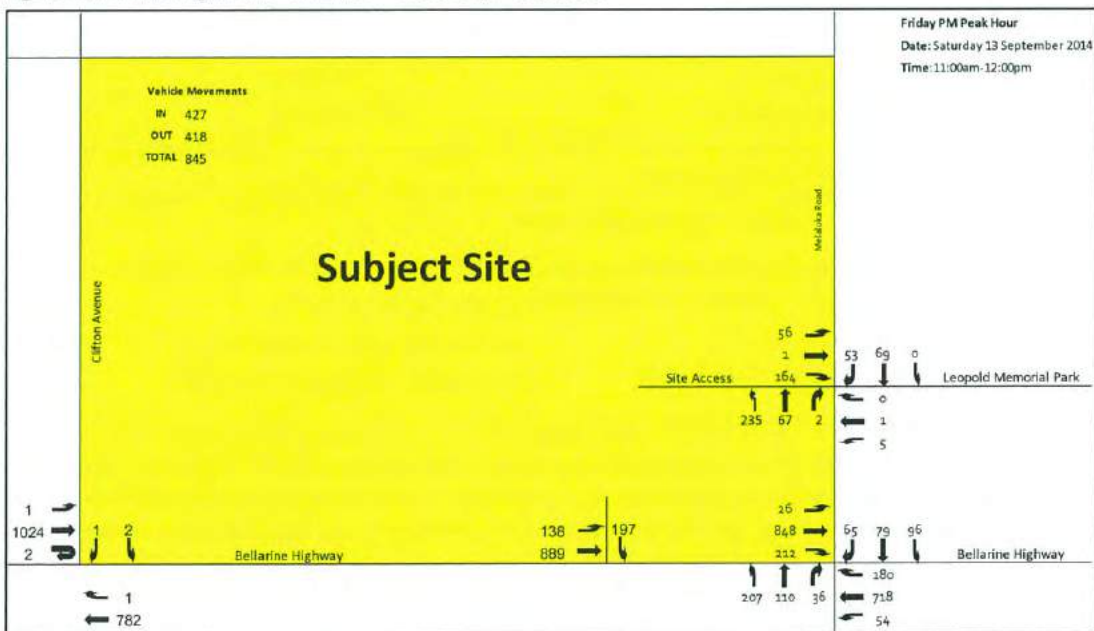


Figure 2.10: Existing Traffic Volumes – Saturday Peak Hour



2.2.5 Intersection Operation

The existing operation of the Bellarine Highway / Melaluka Road intersection has been assessed using *SIDRA INTERSECTION 5.1*⁴, a computer based modelling package which calculates intersection performance.

⁴ Program used under license from Akcelik & Associates Pty Ltd.

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The most commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of 0.95 is typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately⁵.

Using the existing traffic volumes shown in Figure 2.9 and Figure 2.10, Table 2.3 presents a summary of the existing operation of the intersection during the peak periods, with full results presented in Appendix A of this report.

Table 2.3: Bellarine Highway/Melaluka Road Intersection – Existing Operating Conditions

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)	
Friday PM Peak Hour [1]	Melaluka Road (South)	Left (40m)	0.31	15	16	
		Through/Right	0.38	36	32	
	Bellarine Highway (East)	Left (40m)	0.30	43	18	
		Through x 2 Right (100m)	0.83 0.74	43 54	104 50	
	Melaluka Road (North)	Left/Through	0.53	31	77	
		Right (40m)	0.23	36	13	
	Bellarine Highway (West)	Left (75m)	0.06	21	5	
		Through x 2 Right (110m)	0.85 0.89	20 37	170 83	
	Intersection		All	0.89	30	170
	Saturday Peak Hour [2]	Melaluka Road (South)	Left (40m)	0.51	18	29
Through/Right			0.29	23	31	
Bellarine Highway (East)		Left (40m)	0.20	32	11	
		Through x 2 Right (100m)	0.69 0.71	27 46	96 52	
Melaluka Road (North)		Left/Through	0.28	23	35	
		Right (40m)	0.27	33	14	
Bellarine Highway (West)		Left (75m)	0.32	31	5	
		Through x 2 Right (110m)	0.81 0.83	32 51	128 67	
Intersection		All	0.83	31	128	

[1] Assumes practical cycle time of 85 seconds and four phases (including a lagging west approach phase)

[2] Assumes practical cycle time of 75 seconds and three phases

Table 2.3 indicates that the Bellarine Highway / Melaluka Road intersection currently operates with a 'good' level of service (DOS of up to 0.89) with manageable queues on all approaches and an overall intersection average delay of up to 31 seconds.

2.2.6 Safety Assessment

A review of the reported casualty accident history for the roads and intersections adjoining the Site has been sourced from VicRoads CrashStats accident database.

⁵ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

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This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victorian Police) and categorises these accidents as follows:

- o Fatal injury: at least one person was killed in the accident or died within 30 days as a result of the accident.
- o Serious injury: at least one person was sent to hospital as a result of the accident.
- o Other injury: at least one person required medical treatment as a result of the accident.

A summary of the accidents in the immediate vicinity of the Activity Centre for the last available five year period (1 July 2008 to 31 June 2013) is presented in Table 2.4.

Table 2.4: Casualty Accident History

Location	Number of Accidents by Type		
	Fatality	Serious Injury	Other Injury
Bellarine Highway / Clifton Avenue	-	-	-
Bellarine Highway (between Clifton Avenue and Melaluka Road)	-	-	1
Bellarine Highway / Melaluka Road	-	3	3
Melaluka Road (between Bellarine Highway and Site Access / Leopold Memorial Park)	-	-	-
Melaluka Road / Site Access / Leopold Memorial Park	-	-	-
Total	0	3	4

Source: VicRoads

Table 2.4 indicates that a total of seven (7) casualty accidents have been recorded within the immediate vicinity of the Activity Centre during the nominated period.

A review of the individual accident details indicates that a total of four (4) accidents involved a 'right through' collision (i.e. a right turning vehicle conflicting with a vehicle travelling straight). All four accidents involved vehicles turning from Bellarine Highway into Melaluka Road (two turning to travel north and two to the south). It is presumed that these particular right turn movements have recently been fully controlled in response to these accidents (as has been assessed in the SIDRA analysis presented above).

2.3 Car Parking

2.3.1 Supply

A total of 323 car spaces are provided within the existing shopping centre on the Southern Site, including spaces designated as being for disabled, taxi, and loading uses.

2.3.2 Demand

Spot car parking demand surveys of this car parking supply were undertaken on Friday 12 September 2013 at 4:30pm and 5:30pm. These results are summarised in Table 2.5 and illustrate a peak recorded demand of 216 car spaces⁶. For reference, this demand equates to a parking demand rate of 3.8 spaces per 100m² based on the total existing floor area of 5,696.2m².

⁶ It is acknowledged that these counts do not reflect the potential peak demand that could have occurred at another time of the day or day of the week. The spot counts are accordingly presented for information only.

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Table 2.5: Car Parking Demand Results

Restrictions	Friday 12 September 2014	
	4:30pm	5:30pm
Supply	323	323
Demand	216	160
Vacancies	107	163
Occupancy	67%	50%

2.4 Sustainable Transport

2.4.1 Walking

Pedestrian paths are currently located on the western side of Melaluka Road (1.5 - 2.0m wide path) abutting the Activity Centre (which connect into the existing shopping centre on the Southern Site), with pedestrian crossings also provided across all legs of the Melaluka Road/Bellarine Highway signalised intersection. At present, however, no such paths are provided along the Bellarine Highway or Clifton Avenue frontages.

2.4.2 Cycling

Figure 2.11 shows the Principal Bicycle Network in the vicinity of the Activity Centre, and indicates that Melaluka Road and Bellarine Highway form part of this network.

At present, on-road bicycle lanes are provided on Bellarine Highway along the frontage of the Activity Centre (in the both the eastbound and westbound directions) with none provided along Melaluka Road.

The Bellarine Rail Trail, which connects South Geelong to Queenscliff runs east-west approximately 950m north of Bellarine Highway along the now closed Bellarine Railway. The 2.0m wide path north of the subject site and located on the western side of Melaluka Road connects the Bellarine Highway to the Bellarine Highway.

Figure 2.11: VicRoads Principal Bicycle Network



Within the Site, existing bicycle parking spaces are provided at two locations, as shown in Figures 2.12 and 2.13. These facilities accommodate a total of approximately 20 bicycles (i.e. 10 bicycles per rack). It is noted that on-site observations by GTA and advice provided by the Centre owners indicates that these racks are rarely utilised at present.

Figure 2.12: On-site Bicycle Parking – Rack 1



Figure 2.13: On-site Bicycle Parking – Rack 2



2.4.3 Public Transport

Existing Routes

Figure 2.12 and Figure 2.13 shows the existing public transport routes which operate within the vicinity of the Activity Centre, with Table 2.6 summarising the road based routes and major destinations that can be reached using these services.

Table 2.6: Existing Road Based Public Transport Provision

Service	Route Nos	Route Description	Distance to Nearest Stop (m)	Significant Destinations On Route	Frequency On/Off Peak
Bus	75	Geelong City - Queenscliff via Leopold	100m	Geelong Station, Leopold Gateway Plaza Village SC, Adventure Park, Queenscliff ferry terminal	90mins[1]
	76	Geelong City - Queenscliff via Ocean Grove	100m	Geelong Station, Leopold Gateway Plaza Village SC, Adventure Park, Ocean Grove market place, Queenscliff ferry terminal	1 hour / 5 hours[2]
	77	Geelong City - Leopold	On-site	Geelong rail station, Geelong hospital, Eastern Park, Leopold Gateway Plaza, Newcomb Secondary College	60 mins

[1] Route 75 only runs four times during the day (Monday-Friday) & 10 times (Saturday)

[2] Route 76 runs eight times during the day (Monday-Friday) & five times (Saturday)

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Figure 2.12: Transmap Public Transport Map



Figure 2.13: Existing Public Transport Route Map



Existing Infrastructure

The above figure illustrate that bus route 77 currently stops within the existing shopping centre on the Southern Site prior to its departure towards Geelong.

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It is understood that buses accessing this stop travel along Bellarine Highway before turning left into Melaluka Road and entering the Southern Site via the northernmost access to this road. On departure the buses travel in a counter-clockwise direction within the shopping centre to exit onto Melaluka Road at the main access.

The existing bus interchange infrastructure within the shopping centre is shown in Figure 2.14 and Figure 2.15.

Figure 2.14: On-site Bus Stop – Photo 1



Figure 2.15: On-site Bus Stop – Photo 2



Proposed Routes

New bus routes are proposed by Public Transport Victoria (PTV) for Geelong and the Bellarine Peninsula, which are understood to comprise higher service frequency and improved connectivity with trains. The proposed bus routes are summarised in Table 2.7 and Figure 2.16.

Table 2.7: Proposed Road Based Public Transport Provision

Service	Route Nos	Route Description	Distance to Nearest Stop (m)	Significant Destinations On Route	Frequency On/Off Peak
Bus	32	Geelong Station to Leopold	On-Site	Geelong Station, Geelong Hospital, Newcomb Secondary College, Gateway Plaza Leopold, Leopold	40min / 60min
	56	Geelong Station to Queenscliff via Ocean Grove North.	On-Site	Geelong Station, Geelong Hospital, Newcomb Secondary College, Gateway Plaza Leopold, Leopold, Ocean Grove, Queenscliff, Sorrento-Queenscliff Ferry	60-90min / 120min
	60	Geelong Station to Drysdale Geelong Station to St Leonards via Portarlington	On-site	Geelong Station, Geelong Hospital, Geelong Botanic Gardens, Drysdale, Portarlington, Indented Head, St Leonards	40-80min / 120min
	61	Geelong Station to Drysdale via Leopold, Clifton Springs	1.25km to Portarlington Road	Geelong Station, Geelong Hospital, Newcomb Secondary College, Gateway Plaza Leopold, Clifton Springs, Drysdale	40min / 120min

Figure 2.16: Proposed Public Transport Route Map



(Source: www.ptv.vic.gov.au)

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3. Development Plan

3

3.1 Land Uses

3.1.1 Southern Site

A summary of the anticipated land uses to be constructed on the Southern Site is presented in Table 3.1 (noting that the floor area estimates are based upon information provided by Clarke Hopkins Clarke).

Table 3.1: Indicative Land Uses – Southern Site

Land Use	Indicative Floor Area (approximate)		
	Existing	Additional	Post Development
Supermarket (Coles)	3,200 m ²	-	3,200 m ²
Supermarket (ALDI)	-	1,570 m ²	1,570 m ²
Shop [2]	1,339 m ²	12,241 m ²	13,580 m ²
Food & Drink Premises	346 m ²	1,557 m ²	1,903 m ²
Sub-Total	4,885 m²	15,368 m²	20,253 m²
Convenience Restaurant [3]	390 m ² (100 seats)	-	390 m ² (100 seats)
Restricted Recreation Facility [4]	-	501 m ²	501 m ²
Office [5]	421.2 m ²	1,270.8 m ²	1,692 m ²
Sub-total	811.2 m²	1,771.8 m²	2,583 m²
Trade Supplies [6]	-	12,500 m ²	12,500 m ²
Total	5,696.2 m²	29,639.8 m²	35,336 m²

[1] Future PAD sites FLA of 'shop' & 'Food & Drink Premises' included in overall Retail land uses

[2] Includes café, takeaway, convenience restaurant, etc.

[3] McDonalds PAD site.

[4] Gymnasium is classified as a Restricted Recreation Facility within the Planning Scheme.

[5] Includes Bank, real estate, insurance, ATM, etc.

[6] Includes timber sales and garden area.

It is noted that while the bank, real estate, insurance and ATM, etc. tenancies fall under 'office' land use, it is considered that these uses are more akin to 'shop' land uses in a shopping centre environment.

3.1.2 Northern Site

A summary of the anticipated land uses to be constructed on the Northern Site is presented in Table 3.2 (noting that the floor area estimates are rough approximations only).

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Table 3.2: Northern Site Indicative Land Uses

Land Use	Indicative Floor Area (approx.)		
	Existing	Additional	Post Development
Restricted Retail	-	10,000 m ²	10,000 m ²
Shop	-	5,000 m ²	5,000 m ²
Sub-Total	-	15,000 m²	15,000 m²
Convenience Restaurant	-	500 m ² (200 seats) [1]	500 m ² (200 seats) [1]
Tavern	-	800 m ²	800 m ²
Office	-	1,000 m ²	1,000 m ²
Trade Supplies	-	13,000 m ²	13,000 m ²
Total	-	30,300 m²	30,300 m²

[1] Assumed as two tenancies with 100 seats each

3.2 Car Parking

It is envisaged that approximately 2,000 car spaces will be provided within the Activity Centre following its full development, including approximately 1,100 car spaces on the Southern Site and 900 car spaces within the Northern Site. It is expected that these car spaces will be designed in accordance to meet or exceed Planning Scheme requirements.

3.3 Vehicle Access

Vehicle access to the Activity Centre is proposed via connections to all road frontages (generally as per the Concept Plan presented in Section 1 of this report), including:

- o Clifton Avenue: three (3) 'full turning movement' access points
- o Bellarine Highway: two (2) 'left-in/left-out' access points, including the existing access point to the shopping centre on the Southern Site
- o Melaluka Road: four (4) 'full turning movement' access points, including the existing southernmost access to the shopping centre on the Southern Site

It is envisaged that these vehicle access points will facilitate access to both customer cars and loading vehicles (as it will not be feasible to locate all vehicle loading to the rear of the buildings, particularly for the pad sites). For reference, an indicative road access plan, including potential mitigation works at abutting intersections, is shown in Appendix B.

3.4 Sustainable Transport

3.4.1 Walking & Cycling

Pedestrian and cycling access to and from the Activity Centre (and between the Northern and Southern Sites) is proposed via a number of connections to Clifton Avenue, Bellarine Highway and Melaluka Road. These connections are also shown in the plan at Appendix B.

3.4.2 Public Transport

The existing public transport bus stop within the Southern Site is to be located to the immediate south following the development of the Activity Centre. This location is discussed later in this report.

4. Car Parking Provision

4.1 Statutory Car Parking Requirements

Statutory requirements for the provision of car parking are set out in Clause 52.06 of the Greater Geelong Planning Scheme, with a summary of the applicable rates (for the anticipated land uses) outlined as follows:

- o Southern Site:
 - o Supermarket: 5 car spaces/100 m²
 - o Shop: 4 car spaces/100 m²
 - o Food & Drink Premises: 4 car spaces/100 m²
 - o Convenience Restaurant: 0.3 car spaces/patron
 - o Restricted Recreation Facility: Not specified
 - o Office: 3.5 car spaces/100 m²
 - o Trade Supplies: 10% of site area for car parking
- o Northern Site (additional uses only):
 - o Restricted Retail: 3 car spaces/100 m²
 - o Tavern: 0.4 car spaces/patron

Using the above rates, an assessment of the statutory car parking requirement for the ultimate development of the Activity Centre, assuming the indicative land uses outlined previously, is set out in Table 4.1.

Table 4.1: Statutory Car Parking Requirements for Activity Centre (Northern & Southern Sites)

Land Use	Floor Area [1]	Statutory Parking Rate	Statutory Parking Requirement
Supermarket	4,770 m ²	5 spaces/100m ²	238 spaces
Restricted Retail	10,000 m ²	3 spaces/100m ²	300 spaces
Shop, other	18,580 m ²	4 spaces/100m ²	743 spaces
Food & Drink Premises	1,903m ²	4 spaces/100m ²	76 spaces
Convenience Restaurant	890 m ² (300 seats)	0.3 spaces/patron	100 spaces
Restricted Recreation Facility	501m ²	Not Specified	-
Office	2,692 m ²	3.5 spaces/100m ²	94 spaces
Tavern	800 m ² (270 patrons [2])	0.4 spaces/patron	108 spaces
Trade Supplies	25,500 m ²	10% of site area	170 spaces [4]
Total			1,829 spaces

[1] Includes land uses in both Southern and Northern Sites.

[2] Assuming one person per 3sqm within the Tavern (approximate)

[3] The floor areas are akin to 'shop' land use in a shopping centre scenario. Notwithstanding, the statutory rate of office has been adopted.

[4] Assuming the site area is equal to the floor area of the land use multiplied (arbitrarily) by 2 and an average space requirement of 30m² per car space.

Table 4.1 indicates that the ultimate development of the Activity Centre, assuming the indicative land uses outlined previously, could be expected to generate a statutory parking requirement of approximately 1,830 car spaces.

As outlined earlier, it is envisaged that approximately 2,000 car spaces will be provided on the Northern and Southern Sites. This provision would exceed the statutory requirement anticipated above. Notwithstanding this, a succinct Car Parking Demand Assessment is presented below for completeness.

4.2 Car Parking Demand Assessment

4.2.1 Empirical Rates

Supermarket

Based on locally relevant empirical data (including data collected at existing ALDI and Safeway supermarkets in Drysdale), it is considered likely that the supermarkets will generate a demand for car parking at rates of up to approximately 4.0 spaces per 100 m² for Coles and 5.0 spaces per 100 m² for ALDI.

Restricted Retail

Based on empirical data as summarised in the GTA car parking survey database for similar land uses, it is considered likely that this use will generate a demand for car parking at a rate of up to approximately 2 car spaces per 100 m².

It is noted that this rate is arguably conservative on the high side as it make little allowance for the likelihood that a significant proportion of visitors to the restricted retail land use will be multi-purpose trips from the other shop floor area.

Shop and Food & Drink

In this instance, the statutory parking rate of 4.0 car spaces per 100 m² is considered likely to represent the upper car parking requirement of these land uses.

Convenience Restaurants

Based on empirical survey data of convenience restaurants in both metropolitan and non-metropolitan areas (38 in total), it is considered likely that this use will generate a demand for car parking at a rate of up to approximately 0.29 car spaces per seat.

Restricted Recreation Facility (Gymnasium)

Based on experience at other shopping centres, it is considered likely that the gymnasium use will be largely complementary to the other land uses and accordingly generate a relatively low demand for car parking on its own right. For the purposes of this assessment, a parking rate of 2.0 car spaces per 100 m² has been assumed.

Office

Given that the tenancies falling into this land use category will be more akin to 'shop' land uses in a shopping centre environment, although may not necessarily be open for the duration of the day on Saturdays, a car parking rate equivalent to 50% of the shop land use is considered to be appropriate (if not conservative on the high side as a traditional office use would typically not generate a car parking demand on a Saturday).

Tavern

In this instance, the statutory parking rate of 0.4 car spaces per patron is considered likely to represent the upper car parking requirement of these land uses, noting that this rate is generally consistent with empirical evidence.

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Trade Supplies

Guidance on the anticipated car parking demands of the trade supplies land use has been sought from rates contained in the GTA car parking survey database for similar land uses (e.g. Bunnings Warehouses).

The database reports an average car parking rate of approximately 1.5 to 2.0 car spaces/100m² for regional trade supplies uses. For assessment purposes, a rate of 2.0 car spaces/100m² has been assumed for the Activity Centre, which is considered to be conservatively high.

4.2.2 Estimated Peak Demand

On the basis of the above discussions and analysis, a summary of the expected car parking rates⁷ is as follows:

- o Southern Site:
 - o Supermarket (Coles): 4 car spaces/100 m²
 - o Supermarket (ALDI): 5 car spaces/100 m²
 - o Shop: 4 car spaces/100 m²
 - o Food & Drink Premises: 4 car spaces/100 m²
 - o Restricted Recreation Facility: 2 car spaces/100 m²
 - o Convenience Restaurant: 0.29 car spaces/seat
 - o Office: 2 car spaces/100 m²
 - o Trade Supplies: 2 car spaces/100 m²
- o Northern Site (additional uses only):
 - o Restricted Retail: 2 car spaces/100 m²
 - o Tavern: 0.4 car spaces/patron

Using these empirical rates, an assessment of the anticipated peak car parking requirement for the ultimate development of the Activity Centre, assuming the indicative land uses outlined previously, is set out in Table 4.2.

Table 4.2: Anticipated Peak Car Parking Demand for Activity Centre (Northern & Southern Sites)

Land Use	Floor Area/Size [1]	Parking Rate	Parking Demand
Supermarket (Coles)	3,200 m ²	4 spaces/100m ²	128 spaces
Supermarket (ALDI)	1,570 m ²	5 spaces/100m ²	79 spaces
Restricted Retail	10,000 m ²	2 spaces/100m ²	200 spaces
Shop	18,580 m ²	4 spaces/100m ²	743 spaces
Food & Drink Premises	1,903m ²	4 spaces/100m ²	76 spaces
Convenience Restaurant	890 m ² (300 patrons)	0.29 spaces/patron	87 spaces
Restricted Recreation Facility	501m ²	2 spaces /100m ²	10 spaces
Office	2,692 m ²	2 spaces/100m ²	54 spaces
Tavern	800 m ² (270 patrons [2])	0.4 spaces/patron	108 spaces
Trade Supplies	25,500 m ²	2 spaces/100m ²	510 spaces
Total			1,995 spaces

- [1] Includes land uses in both Southern and Northern Sites.
 [2] Assuming one person per 3sqm within the Tavern (approximate.)

⁷ It is expected that these rates would be further examined in subsequent planning permit applications.

Table 4.2 indicates that the ultimate development of the Activity Centre, assuming the indicative land uses outlined previously, could be expected to generate a peak parking demand of approximately 1,995 car spaces.

In reality, it is expected that the overall car parking demand would be lower than this estimate as the impact of multi-purpose trips between land uses and differences in the timing of the peak car parking demands for each use would act to lessen the overall cumulative car parking demand.

4.3 Adequacy of Car Parking Provision

On the basis of the above assessment, it is evident that a car parking provision of approximately 2,000 car spaces within the Activity Centre would be expected to be sufficient for anticipated (indicative) land uses proposed.

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5. Bicycle Parking

5.1 Statutory Requirement

Statutory requirements for the provision of bicycle parking (and related facilities) are set out in Clause 52.34 of the Greater Geelong Planning Scheme. The applicable statutory bicycle parking rates are set out in Table 5.1.

Table 5.1: Statutory Requirement for Bicycle Facilities

Use	Statutory Rate	
	Employee	Shopper
Supermarket	1 space/600m ²	1 space/500m ²
Shop		
Food & Drink Premises	1 space/300m ²	1 space/500m ²
Convenience Restaurant	1 space/25m ² available to the public	2 spaces
Restricted Recreation Facility [1]	1 per 4 employees	1 space/200m ²
Office	1 space/300m ²	1 space/1000m ²
Trade Supplies [2]	1 space/300m ²	1 space/500m ²

[1] Gymnasium is classified as a Restricted Recreation Facility within the Planning Scheme which is nested under the Minor sports and recreation facility land use category, the rate for which is reproduced.

[2] Trade supplies is nested as part of Retail premises within the Planning Scheme, the rate for which is reproduced.

5.2 Recommended Rates / Provision

Clause 52.34-2 of the Greater Geelong Planning Scheme also specifies that a permit may be granted to vary, reduce or waive any requirement and details a number of decision guidelines that the responsible authority must consider (as appropriate) before deciding on an application.

In this instance, the most relevant decision guideline considers "the users of the land and their opportunities for bicycle travel". Having regard to the location of the outer metropolitan location of the site, it is considered reasonable to expect that a low proportion of customers will likely ride to the proposed land uses, particularly for the hardware use for which transport of the goods sold is generally not possible via a bicycle (but rather requires a car or larger vehicle). This view is also consistent with observations of the existing on-site bicycle parking, which indicate that the existing provision of 20 bicycle spaces is rarely utilised (refer to discussion in Section 2.4.2 of this report).

Accordingly, it is considered appropriate that a lesser bicycle parking provision (than the statutory requirement) be provided for the proposed development. In this instance, it is considered reasonable that 50% of the statutory requirement for the existing and proposed floor area be provided.

6. Layout & Access

6.1 Access

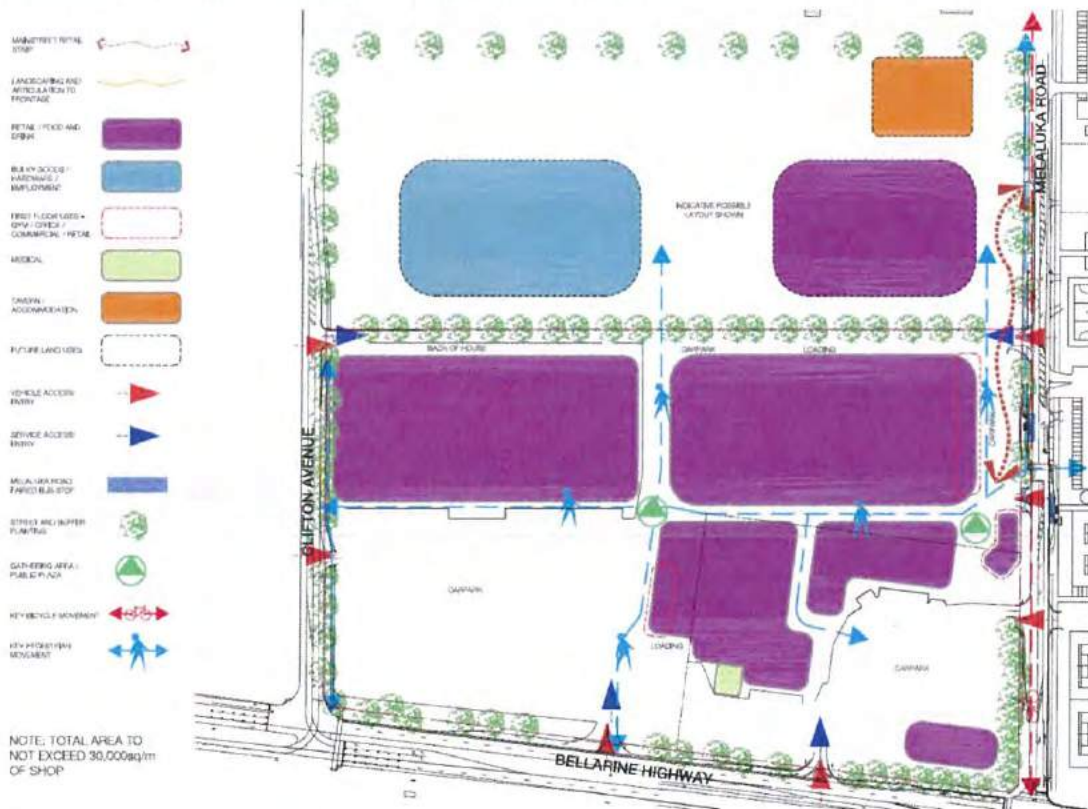
6.1.1 Pedestrian & Cycling Connections

Pedestrian and cycling access to the Activity Centre is proposed to/from all road frontages and adjacent land parcels in general accordance with the Schedule to the DPO.

These accesses, coupled with the provision of footpaths on the frontages of the Activity Centre and the existing on-road bicycle lanes on Bellarine Highway, can be expected to enhance the accessibility of the Activity Centre for pedestrians and cyclists and thus reduce the reliance on the use of private motor vehicles.

For reference, the location of the pedestrian and cycling access paths to, from and within the Activity Centre is shown illustratively in Figure 5.1.

Figure 5.1: Pedestrian & Cycling Connections to Activity Centre



(source: Clarke Hopkins Clarke Architects)

6.1.2 Vehicle Access / External Roads

As outlined in Section 3.3, vehicle access to the Activity Centre is proposed via connections to Clifton Avenue, Bellarine Highway and Melaluka Road.

These access arrangements have been designed to generally accord with the Concept Plan outlined in the Schedule to the DPO, with appropriate auxiliary turn lanes to be provided to these access points (particularly for those on Bellarine Highway).

These access arrangements are shown in the plans included at Appendix B and are discussed in further detail in Section 6 of this report.

In addition, the following figures have been prepared to illustrate the proposed Clifton Avenue and Melaluka Road indicative cross sections.

Figure 6.2: Melaluka Road Proposed Cross Section

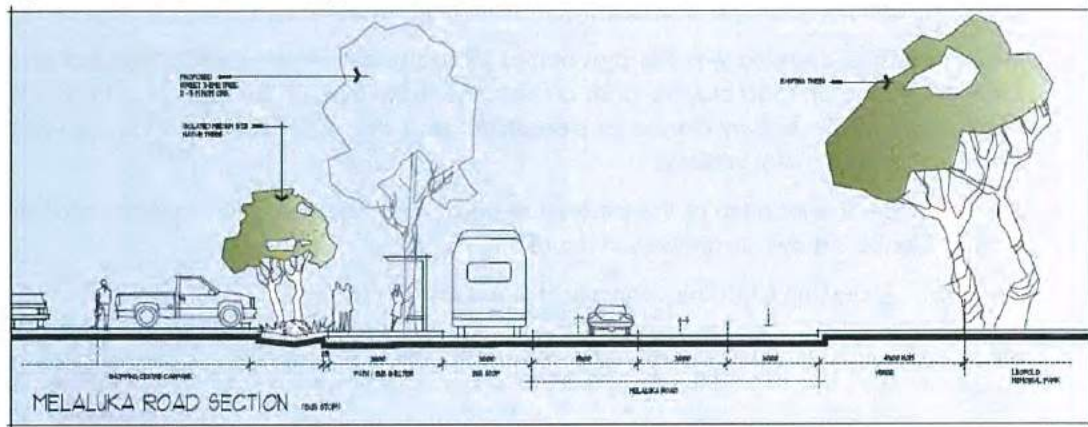
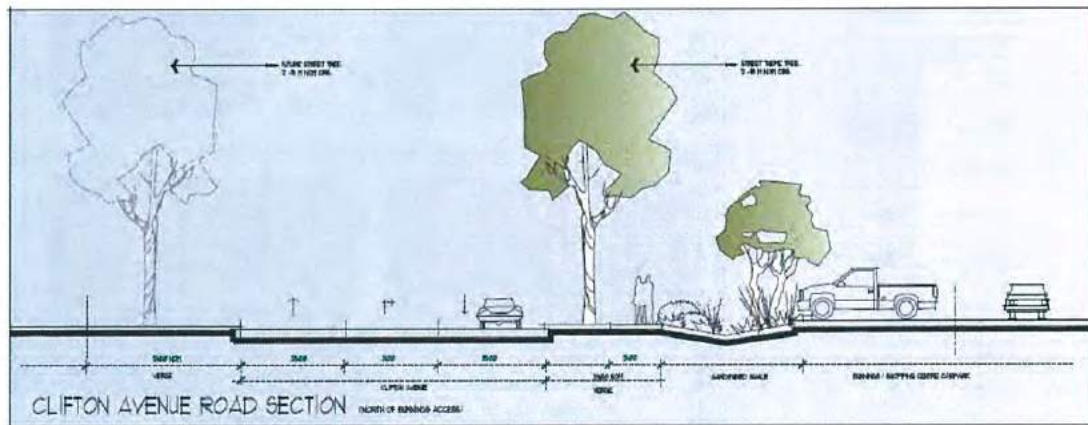


Figure 6.3: Clifton Avenue Proposed Cross Section



6.1.3 Internal Road Network

The internal road network within the Activity Centre is to be designed to minimise the potential for conflict between pedestrians and vehicles (e.g. via the provision of appropriate traffic calming measures and pedestrian crossings).

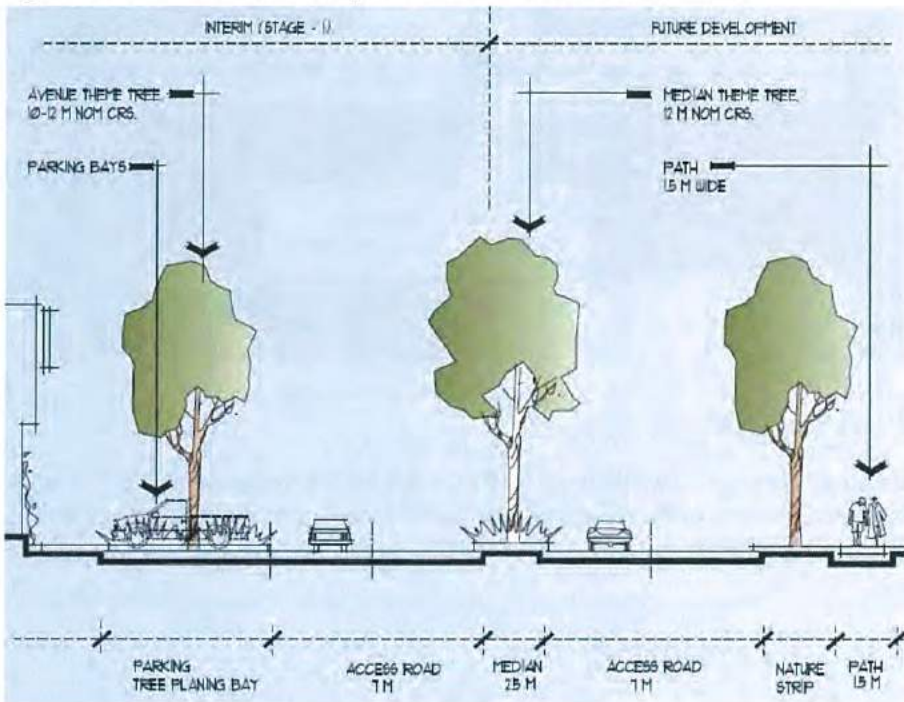
This road network will include an east-west road dividing the Northern and Southern Sites connecting to Clifton Avenue to the west and Melaluka Road to the east. It is understood that this road will be constructed in two stages, as follows:

- o Stage 1: 7.0m carriageway (providing two-way vehicle flow along its length) which is entirely accommodated on the Southern Site

- o Stage 2: Two 7.0m carriageways (each providing two lanes in each direction) which are separated by a 2.5m central median and divides both the Northern and Southern Sites.

For reference, the interim and ultimate cross-sections of this road are shown in Figure 6.4.

Figure 6.4: East-West Road – Proposed Interim & Ultimate Cross-section



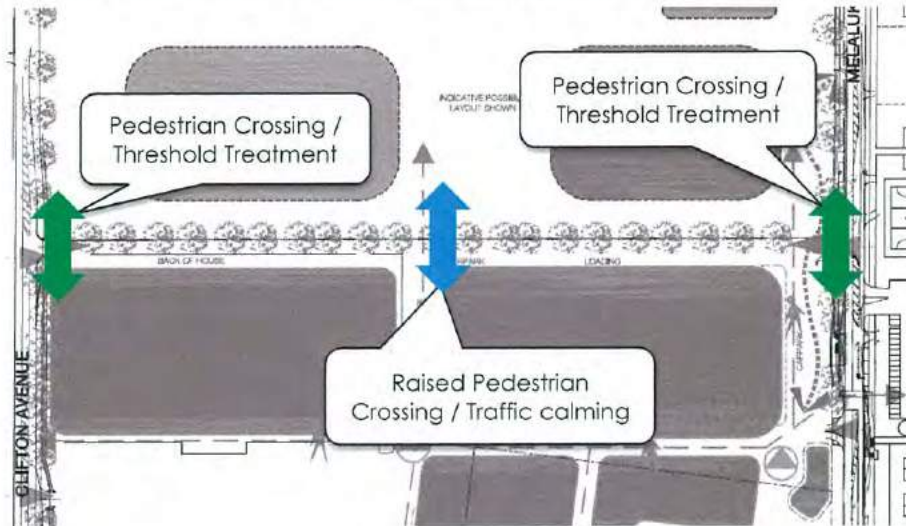
(Prepared by FORMIUM landscape architecture and urban designers)

In addition to the above, and with respect to the ultimate East-West Road configuration when the northern site is developed, it is noted that this road will provide access to both customer/shopper vehicles, delivery vehicles and buses (refer section 6.4 below) and will need to facilitate pedestrian connectivity between the southern and northern sites.

On this basis, appropriate pedestrian and traffic calming treatments are necessary. Noting that these details will be resolved at the time of development of the Northern Site, Figure 6.5 has been prepared to illustrate the indicative location of potential ultimate pedestrian and traffic calming treatments. This figure identifies that such treatments may include the following:

- o Raised Pedestrian Priority Crossing / Traffic Calming Treatment connecting the north-south pedestrian spine within the Southern Site to the Northern Site.
- o Pedestrian Priority Crossing / Pavement Threshold treatments at the both ends of the East-West Road where it joins Melaluka Street and Clifton Avenue.

Figure 6.5: East-West Road –Ultimate Potential Pedestrian & Traffic Calming Treatments



6.2 Parking Layout

It is expected that car parking within the Activity Centre will be designed to meet, if not exceed, statutory requirements and accommodate appropriate swept path requirements. Further detail regarding car parking layouts will be provided within reports submitted for each planning permit application.

6.3 Loading Arrangements

It is expected that loading will be provided within the Activity Centre to meet, if not exceed, statutory requirements and will be designed to accommodate appropriate design vehicles.

It is further expected that these loading areas will, as far as practical, be provided in areas separate to car parking and pedestrian/cycling routes to minimise the potential for conflict between these users.

Further detail regarding loading arrangements will be provided within reports submitted for each planning permit application.

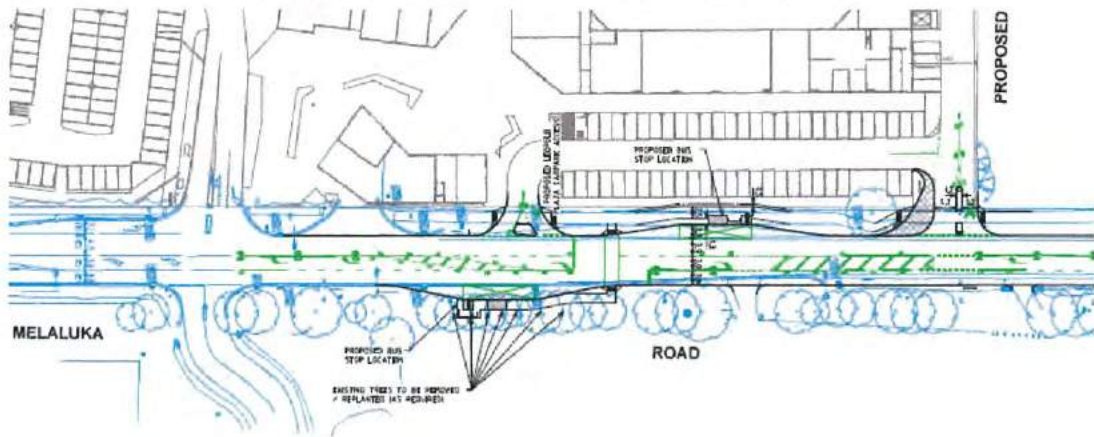
6.4 Public Transport Infrastructure

Following discussions with Public Transport Victoria (PTV) as part of the Southern Site development, the existing on-site bus stop is to be relocated and replaced with a paired bus stop and pedestrian operated sign crossing arrangement on Melaluka Street.

Figure 6.6 on the following page illustrates a concept design for the paired Melaluka Road bus stops and pedestrian operated signal crossing with due regard to the future Leopold Memorial Park development. Concept plans have been prepared for both configurations (i.e. with and without future Leopold Memorial Park development) and are included in Appendix C of this report.

GTA has discussed the proposed Melaluka Road paired bus stop arrangement with PTV, and the required rerouting of proposed PTV bus routes, to which PTV have agreed.

Figure 6.6: Proposed Melaluka Street Paired Bus Stops (Concept Ultimate Design)



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7. Traffic Impact

7.1 Generation

7.1.1 Empirical Rates

Supermarket, Shop, Food & Drink, and Office

Guidance on the anticipated traffic generation of the expanded retail land uses at the Activity Centre (excluding restricted retail) has been sought from the following sources:

- i the traffic surveys undertaken at the existing shopping centre on the Southern Site (as documented in Section 2.2.4 of this report)
- ii the RTANSW 'Guide to Traffic Generating Developments' to assess the extent to which the existing traffic generation rates can be expected to decrease as the floor area of the Activity Centre increases.

GTA Traffic Surveys

As documented in Section 2.2.4 of this report, the existing supermarket and shop land uses at the Activity Centre generate traffic at the following rates:

- o Friday PM Peak Hour: 15.9 vehicle movements/100m²
- o Saturday Peak Hour: 13.7 vehicle movements/100m²

RTANSW Guide

Empirical research undertaken by the RTANSW (and other traffic engineering consultancies and authorities) indicates that traffic generation rates per 100m² decrease as the floor area of the Centre increases.

This principle is illustrated in Figure 7.1 and Figure 7.2 which presents the RTANSW traffic generation rates for various shopping centre sizes for Friday and Saturday peak hours respectively. These figures show that the traffic generation rates for the supermarket and shop uses following the expansion of the Activity Centre are likely to be substantially reduced compared to existing rates, as follows:

- o Friday PM Peak Hour: 15.9 to 7.7 vehicle movements/100m²
- o Saturday Peak Hour: 13.7 to 6.8 vehicle movements/100m²

It is further noted that these rates assume that no further land uses are added to the expanded Activity Centre. In reality, it is expected that the overall reduction to the rates will be greater than the estimates outlined above, as customers to the supermarket and shop uses can be expected to also visit other uses (e.g. trade supplies, restricted retail, etc.). Having regard to the expected impact of multi-purpose trips, the following traffic generation rates have been assumed for the supermarket and shop uses in this assessment:

- o Interim: Southern Site only (10% discount):
 - o Friday PM Peak Hour: 6.93 vehicle movements/100m²
 - o Saturday Peak Hour: 6.16 vehicle movements/100m²
- o Ultimate: Southern & Northern Sites (20% discount):
 - o Friday PM Peak Hour: 6.12 vehicle movements/100m²
 - o Saturday Peak Hour: 5.44 vehicle movements/100m²

Figure 7.1: Anticipated Future Traffic Generation Rates for Supermarket & Shop – Friday PM Peak Hour

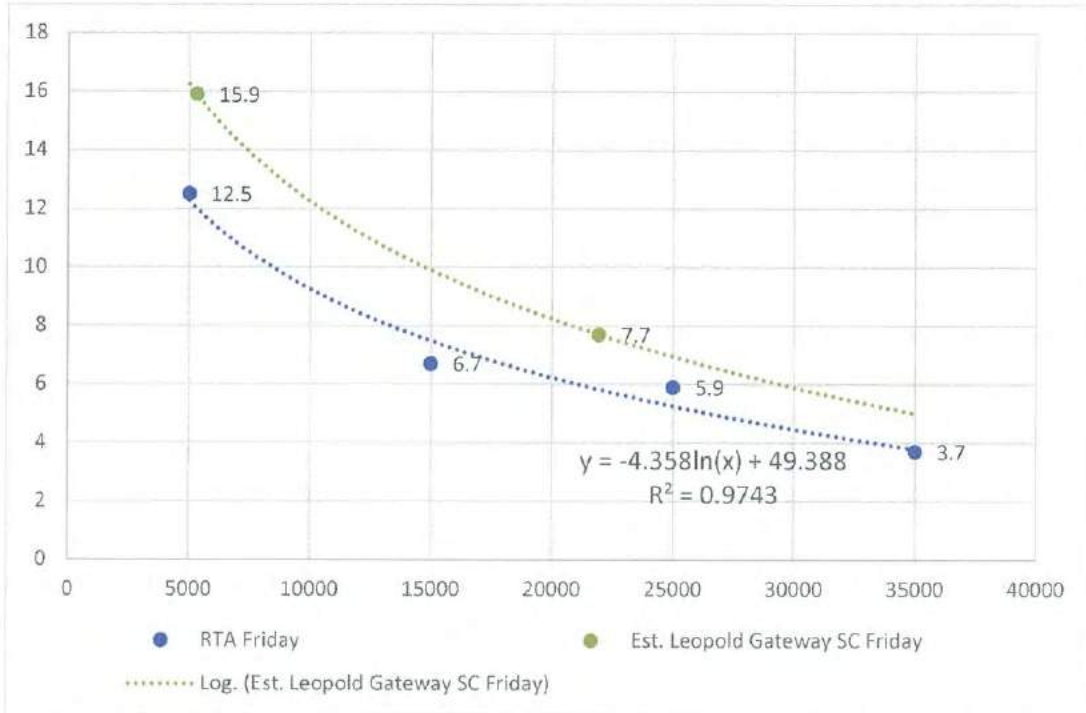
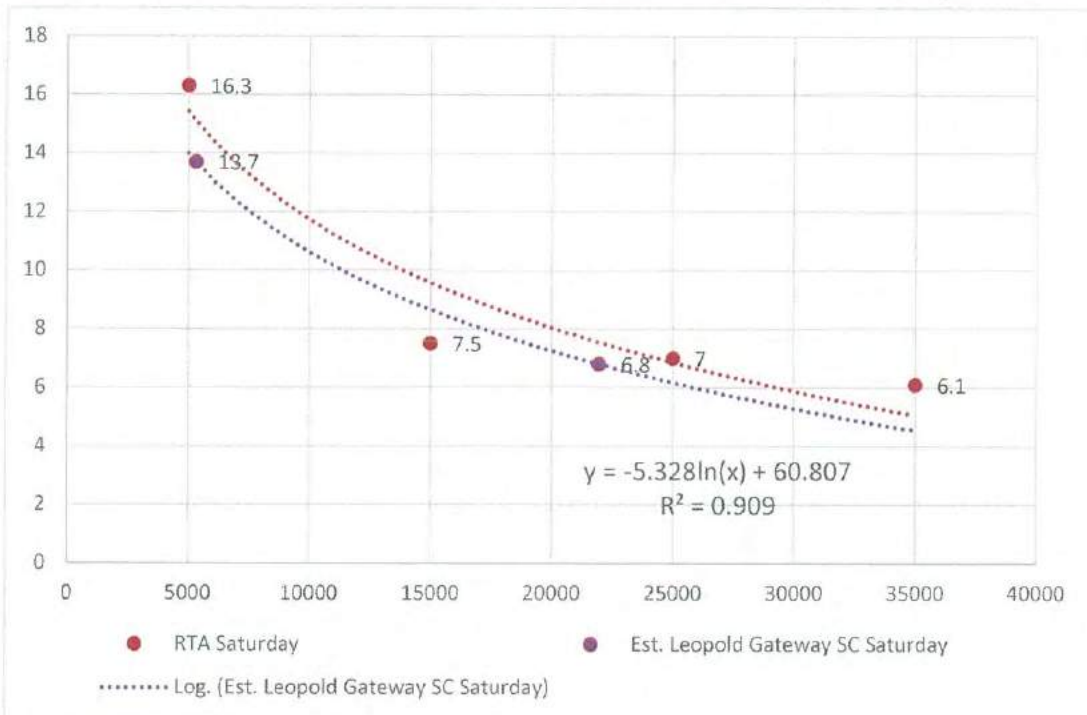


Figure 7.2: Anticipated Future Traffic Generation Rates for Supermarket & Shop – Saturday Peak Hour



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Restricted Retail

Guidance on the traffic generation rates of the restricted retail use has been sought from rates summarised in the GTA traffic survey database for similar uses of approximate 10,000sqm or greater floor area in Victoria and New South Wales.

This database suggests average traffic generation rates as follows:

- o Friday PM Peak Hour: 1.7 vehicle movements/100m²
- o Saturday Peak Hour: 2.8 vehicle movements/100m²

Notwithstanding these averages, having regard to the expected impact of multi-purpose trips, the following traffic generation rates have been assumed for the restricted retail use in this assessment:

- o Interim: Southern Site only – *not applicable*
- o Ultimate: Southern & Northern Sites (20% discount):
 - o Friday PM Peak Hour: 1.4 vehicle movements/100m²
 - o Saturday Peak Hour: 2.2 vehicle movements/100m²

Trade Supplies

Guidance on the traffic generation rates of the trade supplies use has been sought from rates summarised in the GTA traffic survey database for similar uses located in Shepparton, Mildura and Echuca.

This database suggests average traffic generation rates as follows:

- o Friday PM Peak Hour: 2.6 vehicle movements/100m²
- o Saturday Peak Hour: 4.9 vehicle movements/100m²

Notwithstanding these averages, having regard to the expected impact of multi-purpose trips, the following traffic generation rates have been assumed for the trade supplies use in this assessment:

- o Interim: Southern Site only (10% discount):
 - o Friday PM Peak Hour: 2.3 vehicle movements/100m²
 - o Saturday Peak Hour: 4.4 vehicle movements/100m²
- o Ultimate: Southern & Northern Sites (20% discount):
 - o Friday PM Peak Hour: 2.1 vehicle movements/100m²
 - o Saturday Peak Hour: 3.9 vehicle movements/100m²

Convenience Restaurants

Guidance on the traffic generation rates of the convenience restaurants has been sought from the RTANSW Guide and other data sources (including GTA's database for typical convenience restaurants such as McDonalds).

Having regard to these sources and assuming that three convenience restaurants are likely within the ultimate (southern and northern sites), the following assumptions have been made regarding the likely traffic generation of this use:

- o Interim: Southern Site only 120 vehicle movements in each peak hour.
- o Ultimate: Southern & Northern Sites 360 vehicle movements in each peak hour.

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Tavern

For the purposes of this assessment, it has been assumed that the tavern generates traffic at rates of 5 vehicle movements per 100m² during the Friday PM peak hour and 10 vehicle movements per 100m² during the Saturday peak hour. These rates are considered appropriate, noting that they approximately equate to 0.4 and 0.75 vehicle movements per car space during each peak hour.

Gymnasium

For the purposes of this assessment, it has been assumed that the gymnasium generates traffic at a discounted (~10%) metropolitan sub-regional RTANSW rate of 8 vehicle movements per 100m² during the Friday PM and Saturday midday peak hour. This rate is considered to be highly conservative.

7.1.2 Estimated Generation – Southern Site Only

Based on the rates identified above and the indicative floor areas outlined earlier in this report, a summary of the expected traffic generation of the Southern Site only is presented in Table 7.1.

Table 7.1: Anticipated Traffic Generation of Southern Site Only

Description	Land Use	Floor Area	Friday		Saturday	
			Rate	Generation	Rate	Generation
Retail	Supermarket	4,770m ²	6.9vph/100m ²	331 vph	6.1vph/100m ²	292vph
	Shop	13,580m ²	6.9vph/100m ²	941 vph	6.1vph/100m ²	831 vph
	Food & Drink Premises	1,903m ²	6.9vph/100m ²	132vph	6.1vph/100m ²	116vph
Other	Convenience Restaurant (100 seats)	390m ²	-	120vph	-	120vph
	Restricted Recreation Facility	501m ²	8vph/100m ²	40vph	8vph/100m ²	40vph
Office	Office	1,692m ²	6.9vph/100m ²	117vph	6.1vph/100m ²	104vph
Hardware	Trade Supplies	12,500m ²	2.3vph/100m ²	288vph	4.4vph/100m ²	550vph
Total		35,336m²		1,969vph		2,053vph

Table 7.1 indicates that under interim conditions whereby only the Southern Site is developed, a total of approximately 1,970 and 2,050 vehicle movements could be expected to/from the Activity Centre during the Friday PM and Saturday peak hours respectively.

By way of comparison, against an anticipated car parking provision on the Southern Site only of approximately 1,100 car spaces, this traffic generation would equate to approximately 1.79 and 1.86 vehicle movements per car space provided during the Friday PM and Saturday peak hours respectively. These rates are considered to be conservative on the high side having regard to empirical evidence in the GTA database for shopping centres⁸.

7.1.3 Estimated Generation – Southern & Northern Sites

Based on the rates identified above and the indicative floor areas outlined earlier in this report, a summary of the expected traffic generation of the Southern and Northern Sites is presented in Table 7.2.

⁸ It is noted that traffic surveys undertaken at Stockland Shopping Centre in Wendouree in 2012 (which had a floor area at that time of approximately 25,000sqm) recorded traffic generation rates of 1.25 and 1.34 vehicle movements per car space during each of the respective peak hours.

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Table 7.2: Anticipated Traffic Generation of Southern & Northern Sites

Description	Land Use	Floor Area	Friday		Saturday	
			Rate	Generation	Rate	Generation
Southern Site						
Retail	Supermarket	4,770m ²	6.16vph/100m ²	294vph	5.44vph/100m ²	259vph
	Shop	13,580m ²	6.16vph/100m ²	837vph	5.44vph/100m ²	739vph
	Food & Drink Premises	1,903m ²	6.16vph/100m ²	117vph	5.44vph/100m ²	104vph
Other	Convenience Restaurant (100 seats)	390m ²	-	120vph	-	120vph
	Restricted Recreation Facility	501m ²	8vph/100m ²	40vph	8vph/100m ²	40vph
Office	Office	1,692m ²	6.16vph/100m ²	104vph	5.44vph/100m ²	92vph
Hardware	Trade Supplies	12,500m ²	2.1vph/100m ²	263vph	3.9vph/100m ²	488vph
Sub-Total		35,336m²		1,775vph		1,842vph
Northern Site						
Retail	Restricted Retail	10,000m ²	1.4vph/100m ²	140vph	2.2vph/100m ²	220vph
	Shop	5,000m ²	6.16vph/100m ²	308vph	5.44vph/100m ²	272vph
Other	Convenience Restaurant (200 seats)	500m ²	-	240vph	-	240vph
Hotel/Tavern	Tavern	800m ²	5vph/100m ²	40vph	10vph/100m ²	80vph
Office	Office	1,000m ²	6.16vph/100m ²	62vph	5.44vph/100m ²	54vph
Hardware	Trade Supplies	13,000m ²	2.1vph/100m ²	273vph	3.9vph/100m ²	507vph
Sub-Total		30,300m²		1,063vph		1,373vph
Total		65,336m²		2,838vph		3,215vph

Table 7.2 indicates that under ultimate conditions whereby both the Southern and Northern Sites are developed, a total of approximately 2,840 and 3,220 vehicle movements could be expected to/from the Activity Centre during the Friday PM and Saturday peak hours respectively.

By way of comparison, against an anticipated car parking provision on both the Southern and Northern Sites of approximately 2,000 car spaces, this traffic generation would equate to approximately 1.42 and 1.61 vehicle movements per car space provided during the Friday PM and Saturday peak hours respectively. As outlined above, these rates are considered to be conservative on the high side.

7.2 Distribution and Assignment

7.2.1 Assumptions

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- i configuration of the arterial road network in the immediate vicinity of the site
- ii existing & future operation of intersections providing access between the local and arterial road network
- iii distribution of households in the vicinity of the site
- iv configuration of existing & future access points to the site.

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Having consideration to the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- o To/from North: 20%
- o To/from East: 40%
- o To/from South: 10%
- o To/from West: 30%

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) has been assumed as 50 / 50.

7.2.2 Interim Site Traffic Volumes – Southern Site

Based on the distributions in Section 7.2.1 and site generated traffic volumes summarised in Table 7.1 (southern site only), Figure 7.3 and Figure 7.4 have been prepared to summarise the site generated traffic volumes assuming full development of the southern site.

Figure 7.3: Interim Friday PM Peak Hour Site Generated Traffic Volumes (southern site)

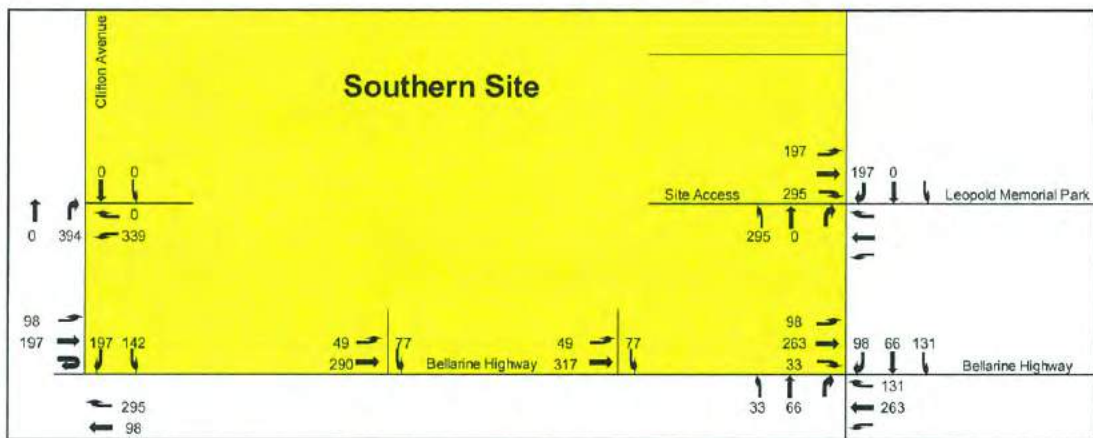
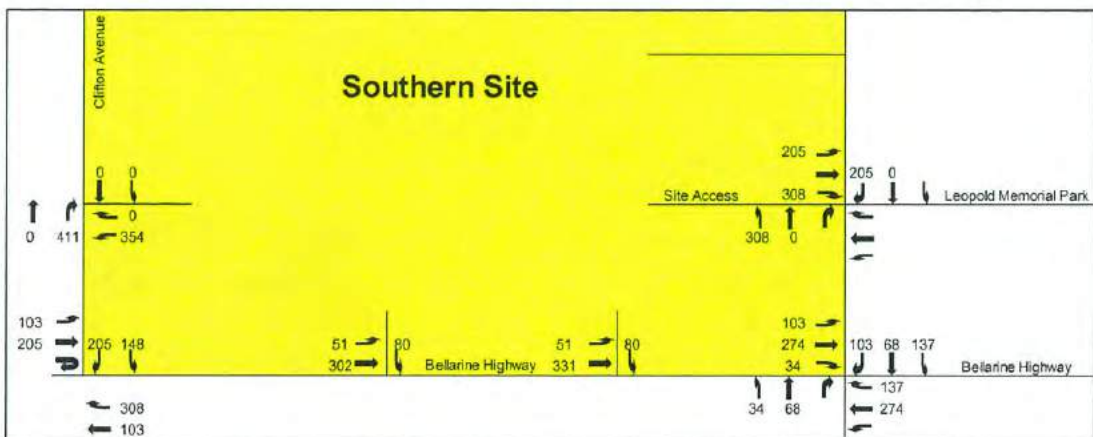


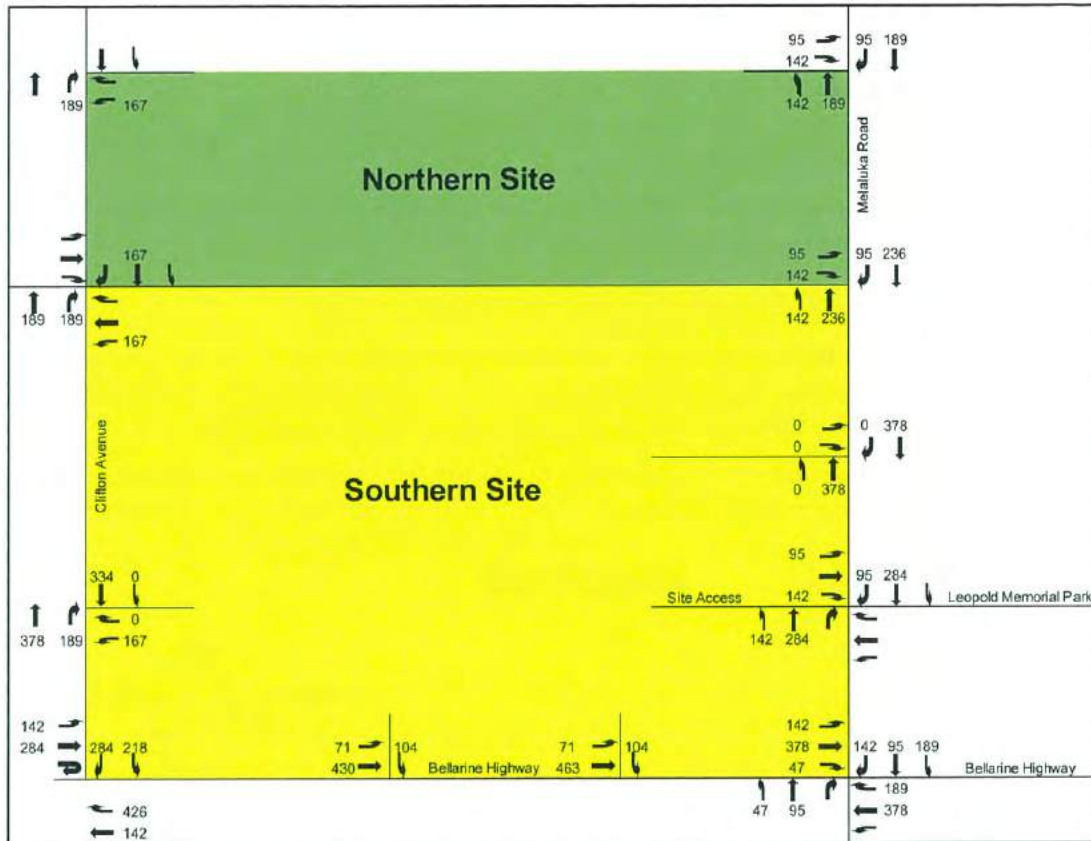
Figure 7.4: Interim Saturday Midday Peak Hour Site Generated Traffic Volumes (southern site)



7.2.3 Ultimate Site Traffic Volumes – Southern & Northern Sites

Based on the distributions discussed in Section 7.2.1 and site generated traffic volumes summarised in Table 7.2 (both sites), Figure 7.5 and Figure 7.6 have been prepared to summarise the site generated traffic volumes assuming full development of both sites.

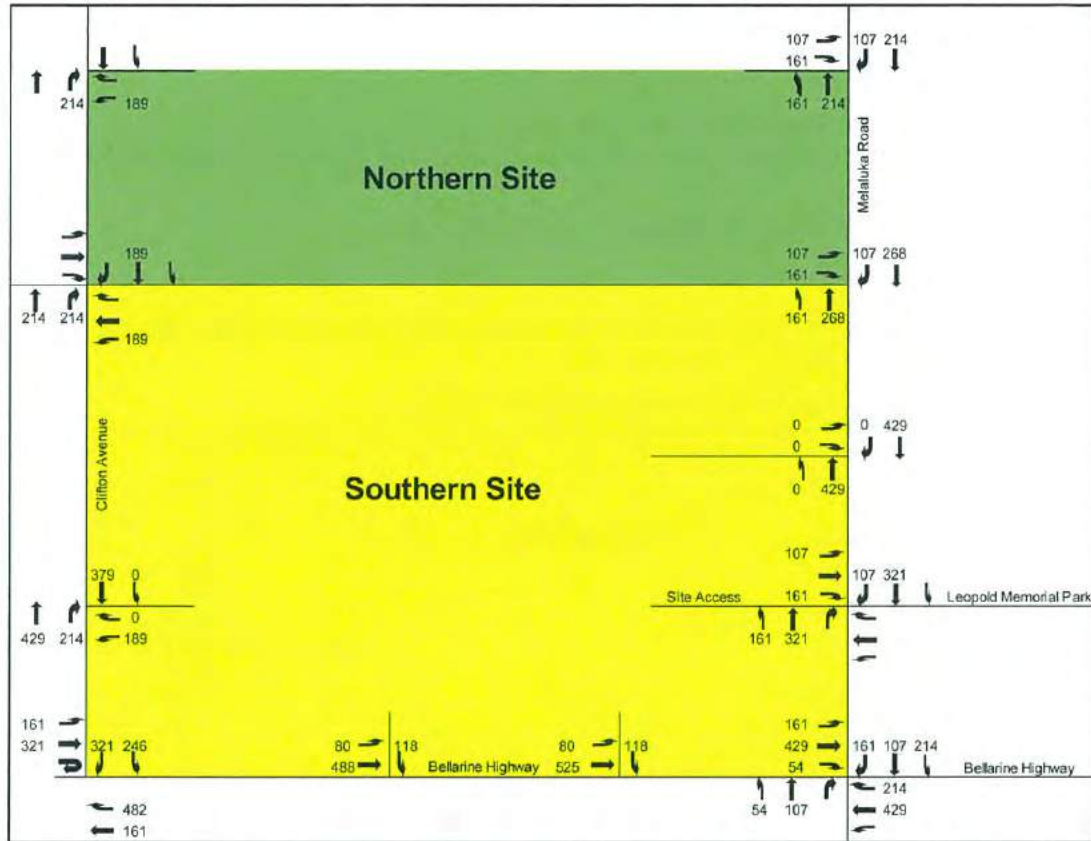
Figure 7.5: Ullimate Friday PM Peak Hour Site Generated Traffic Volumes (both sites)



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Figure 7.6: Ultimate Saturday Midday Peak Hour Site Generated Traffic Volumes (both sites)



7.3 Impact Assessment

7.3.1 Preamble

To assess the impact of proposed developments, VicRoads' 'Guidelines to Transport Impact Assessment Reports' specifies:

"To ascertain the impact of the proposal on existing road infrastructure, in accordance with the TIAR performance objectives detailed in 5.1, a base case should be developed to compare the traffic performance (level of service) of the road network with and without the proposed land use development.

The base case should consist of an assessment of the traffic performance (level of service) of the road network without the proposed land use development, at key points in time, including anticipated opening, any key intermediate staging points and of full development (as appropriate). The base case traffic volumes should be derived from existing traffic volumes and an estimate of traffic growth up to these key points in time. The estimated traffic growth should be based on historical growth rates, general land use and relevant travel patterns."

An assessment in accordance with these guidelines is presented as follows.

7.3.2 Base Case Conditions

Assumptions

The following assumptions apply to this section:

- o 1.68% per annum growth (compound)⁹
- o applied to through movements on Bellarine Highway (at Bellarine Highway/Melaluka Road) only
- o applied for 10 years to represent Year 2024 conditions.

Base Case Traffic Volumes

On the above basis, the Friday PM and Saturday midday peak hour Base Case traffic volumes are illustrated in Figure 7.7 and Figure 7.8.

Figure 7.7: Base Case Friday PM Peak Hour Traffic Volumes

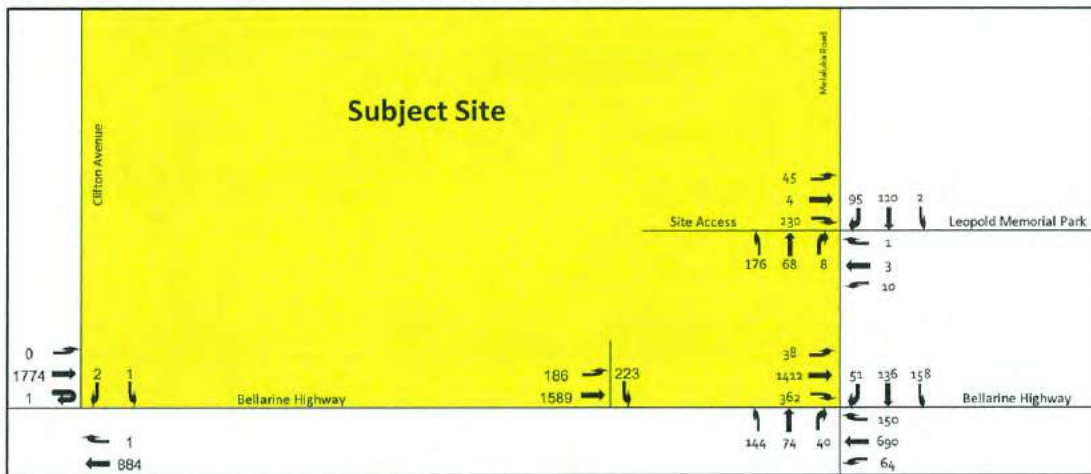
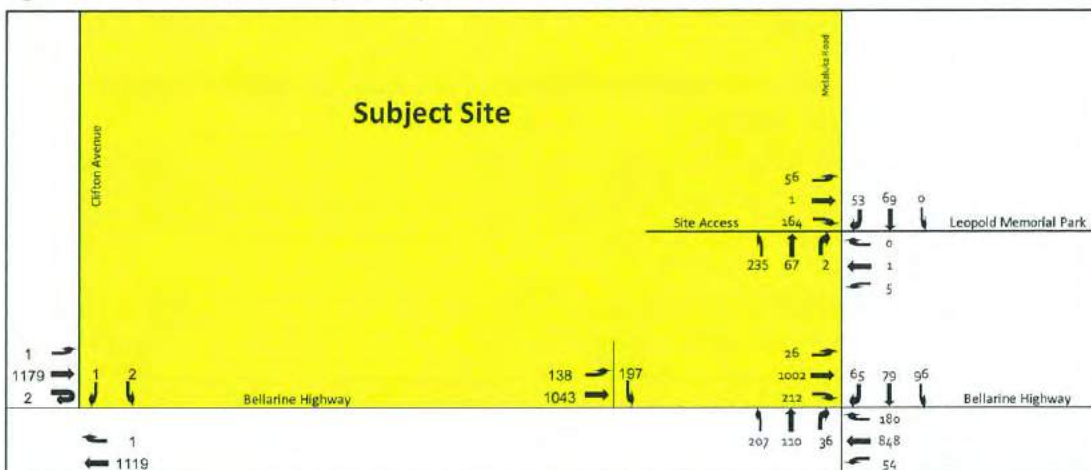


Figure 7.8: Base Case Saturday Midday Peak Hour Traffic Volumes



Base Case Intersection Operation

The operation of the Bellarine Highway / Melaluka Road intersection under base case conditions has been assessed using *SIDRA INTERSECTION 5.1*.

⁹ Based on historic traffic growth on Bellarine Highway from VicRoads AADT traffic volume information (2003-2013).

Using the base case traffic volumes shown in Figure 7.7 and Figure 7.8, Table 7.3 presents a summary of the operation of the intersection under base case conditions during the peak periods, with full results presented in Appendix D of this report.

Table 7.3: Bellarine Highway/Melaluka Road Intersection – Base Case Operating Conditions

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Friday PM Peak Hour [1]	Melaluka Road (South)	Left (40m)	0.35	16	19
		Through/Right	0.42	40	35
	Bellarine Highway (East)	Left (40m)	0.30	41	18
		Through x 2	0.84	43	128
		Right (100m)	0.87	63	58
	Melaluka Road (North)	Left/Through	0.57	33	84
		Right (40m)	0.24	39	14
	Bellarine Highway (West)	Left (75m)	0.05	19	4
		Through x 2	0.90	20	219
		Right (110m)	0.89	41	84
Intersection		All	0.897	31	225
Saturday Peak Hour [2]	Melaluka Road (South)	Left (40m)	0.56	20	32
		Through/Right	0.31	27	35
	Bellarine Highway (East)	Left (40m)	0.20	23	12
		Through x 2	0.73	28	118
		Right (100m)	0.69	48	55
	Melaluka Road (North)	Left/Through	0.30	26	38
		Right (40m)	0.29	36	16
	Bellarine Highway (West)	Left (75m)	0.06	31	5
		Through x 2	0.86	36	166
		Right (110m)	0.82	52	70
Intersection		All	0.86	33	170

[1] Assumes practical cycle time of 90 seconds and four phases (including a lagging west approach phase)
 [2] Assumes practical cycle time of 80 seconds and three phases

Table 2.3 indicates that the Bellarine Highway / Melaluka Road intersection can be expected to operate with a 'good' level of service (DOS of up to 0.897) under base case conditions with manageable queues on all approaches and an overall intersection average delay of up to 33 seconds.

7.3.3 Interim Post Development Conditions – Southern Site

Interim Post Development Traffic Volumes (southern site)

Figure 7.9 and Figure 7.10 have been prepared to illustrate the Friday PM and Saturday midday peak hour post development volumes assuming development of the southern site only.

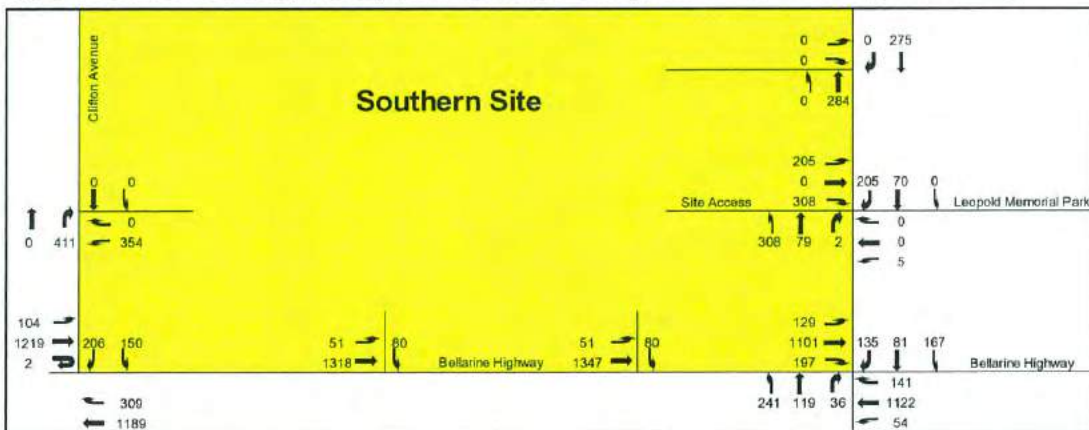
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Figure 7.9: Interim Friday PM Peak Hour Post Development Traffic Volumes (southern site)



Figure 7.10: Interim Saturday Midday Peak Hour Post Development Traffic Volumes (southern site)



Interim Post-Development Intersection Operation (southern site)

The operation of the Bellarine Highway / Melaluka Road and Bellarine Highway / Clifton Avenue intersections under post-development conditions following the development of the Southern Site only has been assessed using *SIDRA INTERSECTION 5.1*.

The assessment of the Interim development scenario (southern site only) assumes a signalised intersection to the Bellarine Highway/Clifton Avenue intersection, including double right turns from the east, a single short left turn lane from the west and a double right turn lane/shared single left turn lane from the north. Further discussion and further detail regarding this future signalised intersection is included in Section 7.4 and Appendix B.

Using the post development traffic volumes shown in Figure 7.9 and Figure 7.10, Table 7.4 and Table 7.5 present a summary of the operation of the intersections under the 'interim' post-development conditions during the peak periods, with full results presented in Appendix E of this report.

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Table 7.4: Bellarine Highway/Melaluka Road Intersection – Interim Post-Development Operating Conditions (southern site)

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Friday PM Peak Hour [1]	Melaluka Road (South)	Left (40m)	0.51	20	30
		Through/Right	0.58	47	49
	Bellarine Highway (East)	Left (40m)	0.30	39	18
		Through x 2	0.88	47	200
		Right (100m)	0.86	68	63
	Melaluka Road (North)	Left/Through	0.63	40	101
		Right (40m)	0.57	48	34
	Bellarine Highway (West)	Left (75m)	0.17	17	13
		Through x 2	0.84	13	187
		Right (110m)	0.89	41	84
Intersection		All	0.89	31	205
Saturday Peak Hour [2]	Melaluka Road (South)	Left (40m)	0.72	28	50
		Through/Right	0.39	32	42
	Bellarine Highway (East)	Left (40m)	0.20	30	11
		Through x 2	0.86	35	191
		Right (100m)	0.58	49	44
	Melaluka Road (North)	Left/Through	0.43	29	61
		Right (40m)	0.67	46	42
	Bellarine Highway (West)	Left (75m)	0.29	31	28
		Through x 2	0.84	33	182
		Right (110m)	0.80	54	68
Intersection		All	0.86	35	196

[1] Assumes practical cycle time of 100 seconds and four phases (including a lagging west approach phase)

[2] Assumes practical cycle time of 85 seconds and three phases

Table 7.4 indicates that the Bellarine Highway / Melaluka Road intersection can be expected to operate with a 'good' level of service (DOS of up to 0.89) under the interim post development conditions with manageable queues on all approaches and an overall intersection average delay of up to 35 seconds.

Table 7.5: Bellarine Highway/Clifton Avenue Intersection – Interim Post-Development Operating Conditions (southern site)

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Friday PM Peak Hour [1]	Bellarine Highway (East)	Through x 2	0.34	4	53
		Right (85m & 50m)	0.74	61	55
	Clifton Avenue (North)	Left/Right (53m)	0.77	55	68
		Right	0.77	61	58
	Bellarine Highway (West)	Left (51m)	0.15	13	8
		Through x 2	0.80	16	248
Intersection		All	0.80	21	248
Saturday Peak Hour [2]	Bellarine Highway (East)	Through x 2	0.47	6	82
		Right (85m & 50m)	0.66	51	47
	Clifton Avenue (North)	Left/Right (53m)	0.61	40	49
		Right	0.61	47	50
	Bellarine Highway (West)	Left (51m)	0.16	14	9
		Through x 2	0.66	17	143
Intersection		All	0.64	17	143

[1] Assumes practical cycle time of 100 seconds and four phases

[2] Assumes practical cycle time of 80 seconds and three phases

Table 7.5 indicates that the Bellarine Highway / Clifton Avenue intersection can be expected to operate with a 'good' level of service (DOS of up to 0.80) under the interim post development conditions with manageable queues on all approaches and an overall intersection average delay of up to 21 seconds.

7.3.4 Ultimate Post Development Conditions – Southern & Northern Sites

Post Development Traffic Volumes (both sites)

Figure 7.11 and Figure 7.12 have been prepared to illustrate the Friday PM and Saturday midday peak hour post development volumes assuming development of both sites.

Figure 7.11: Ultimate Friday PM Peak Hour Post Development Volumes (both sites)

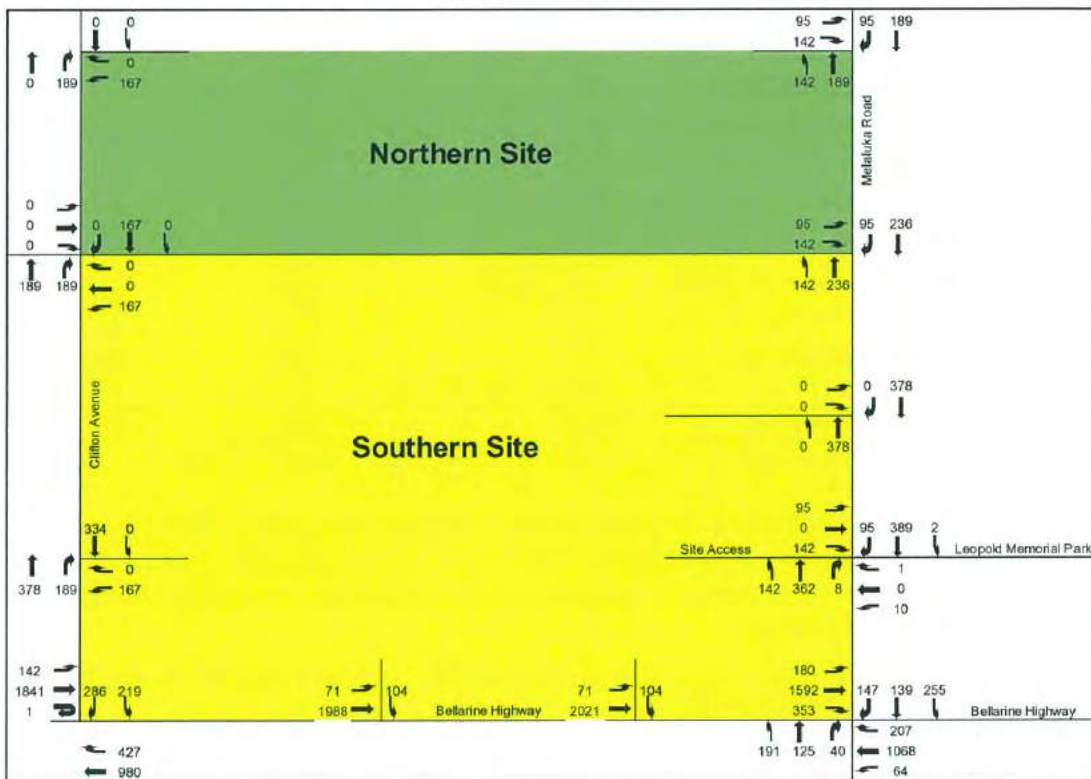
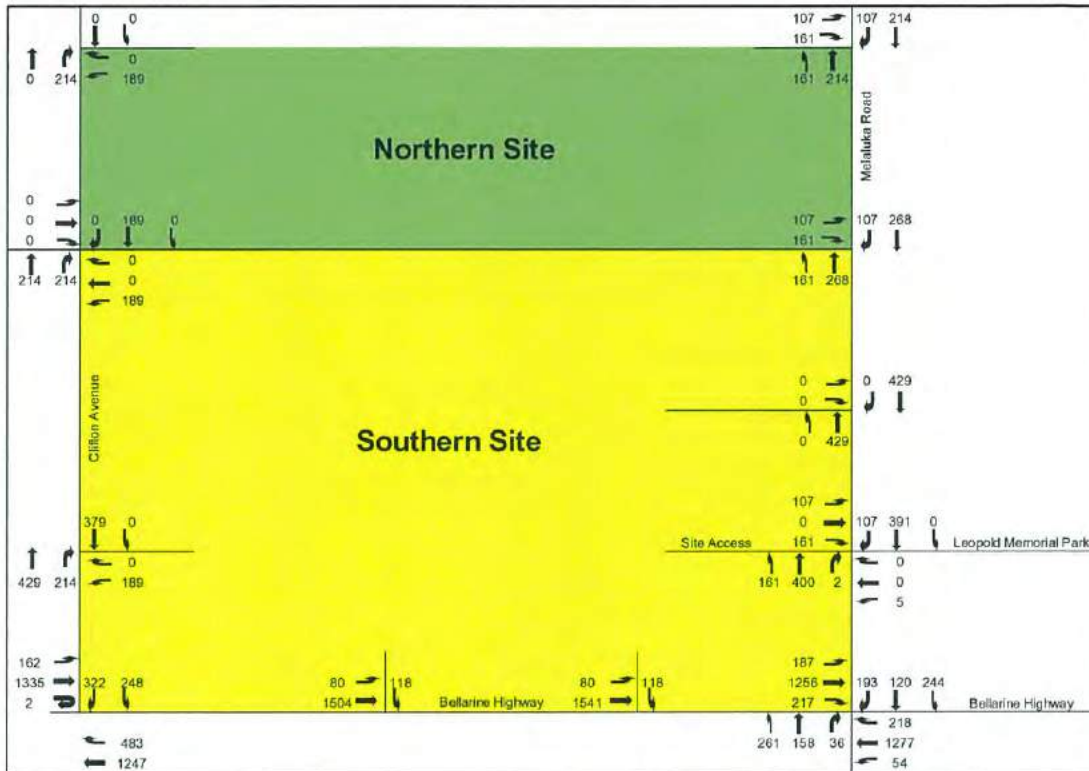


Figure 7.12: Ultimate Saturday Midday Peak Hour Post Development Volumes (both sites)



Ultimate Post-Development Intersection Operation (both sites)

The operation of the Bellarine Highway / Melaluka Road and Bellarine Highway / Clifton Avenue intersections under post-development conditions following the development of both the Southern and Northern Sites has been assessed using *SIDRA INTERSECTION 5.1*.

In addition to the proposed signalised Bellarine Highway/Clifton Avenue intersection, this assessment assumes a minor intersection upgrade to the north and east approaches of the Bellarine Highway/Melaluka Road signalised intersection, comprising lengthened right turn lanes. This intersection upgrade is considered to be a practical outcome and to fit within the existing road reserve boundaries as it is understood that the current Leopold Memorial Park access to Melaluka Road is to be relocated to the north.

Using the post development traffic volumes shown in Figure 7.11 and Figure 7.12, Table 7.6 and Table 7.7 present a summary of the operation of the intersections under the 'ultimate' post-development conditions during the peak periods, with full results presented in Appendix E of this report.

It is noted that the ultimate conditions assessment is considered to be conservative on the high side for various reasons, including:

- i It assumes relatively high traffic generation rates (with only a modest reduction to account for multi-purpose trips).
- ii It excludes any reduction in passing traffic to account for the proportion of trips to the Centre which are made by vehicles already on the road network.
- iii It assumes a reasonably modest distribution to the north.
- iv It assumes pedestrian phases run every cycle at Bellarine Highway/Melaluka Road.

Table 7.6: Bellarine Highway/Melaluka Road Intersection – Ultimate Post-Development Operating Conditions (both sites)

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Friday PM Peak Hour [1]	Melaluka Road (South)	Left (40m)	0.64	24	39
		Through/Right	0.85	67	81
	Bellarine Highway (East)	Left (40m)	0.34	42	20
		Through x 2	0.93	64	290
		Right (120m)	0.96	93	92
	Melaluka Road (North)	Left/Through	0.76	48	164
		Right (75m)	0.57	56	61
	Bellarine Highway (West)	Left (75m)	0.28	20	24
		Through x 2	0.95	30	371
		Right (110m)	0.94	58	119
Intersection		All	0.96	47	381
Saturday Peak Hour [2]	Melaluka Road (South)	Left (40m)	0.96	38	65
		Through/Right	0.48	44	75
	Bellarine Highway (East)	Left (40m)	0.27	38	16
		Through x 2	0.96	70	372
		Right (120m)	0.89	77	111
	Melaluka Road (North)	Left/Through	0.56	37	126
		Right (75m)	0.94	91	114
	Bellarine Highway (West)	Left (75m)	0.54	40	60
		Through x 2	0.94	63	347
		Right (110m)	0.88	77	110
Intersection		All	0.96	62	381

[1] Assumes practical cycle time of 120 seconds and four phases (including a lagging west approach phase)
 [2] Assumes practical cycle time of 120 seconds and three phases

Table 7.6 indicates that the Bellarine Highway / Melaluka Road intersection can be expected to operate with a 'poor' level of service (DOS of up to 0.96) under the ultimate post development conditions albeit with manageable queues on all approaches and an overall intersection average delay of up to 62 seconds.

Table 7.7: Bellarine Highway/Clifton Avenue Intersection – Ultimate Post-Development Operating Conditions (both sites)

Intersection	Approach	Lane (Length)	DOS	Average Delay (sec)	95 th Percentile Queue (m)
Friday PM Peak Hour [1]	Bellarine Highway (East)	Through x 2	0.37	6	79
		Right (85m & 50m)	0.91	76	103
	Clifton Avenue (North)	Left/Right (53m)	0.91	54	87
		Right	0.91	77	136
	Bellarine Highway (West)	Left (51m)	0.26	14	16
		Through x 2	0.94	50	493
Intersection		All	0.94	43	493
Saturday Peak Hour [2]	Bellarine Highway (East)	Through x 2	0.50	9	129
		Right (85m & 50m)	0.88	67	108
	Clifton Avenue (North)	Left/Right (53m)	0.90	52	87
		Right	0.85	67	147
	Bellarine Highway (West)	Left (51m)	0.35	17	24
		Through x 2	0.87	43	308
Intersection		All	0.90	36	308

[1] Assumes practical cycle time of 120 seconds and four phases
 [2] Assumes practical cycle time of 120 seconds and three phases

Table 7.7 indicates that the Bellarine Highway / Clifton Avenue intersection can be expected to operate with an 'acceptable' level of service (DOS of up to 0.94) under the ultimate post development conditions with manageable queues on all approaches and an overall intersection average delay of up to 43 seconds.

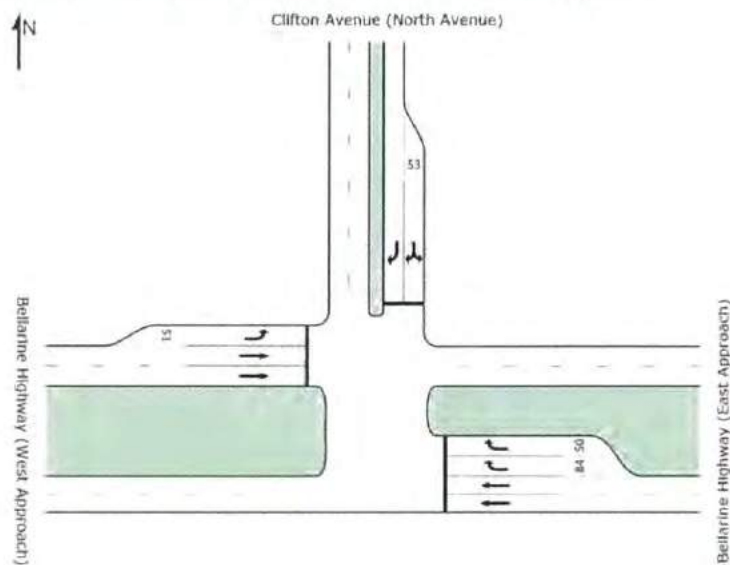
7.4 Summary of External Road Works

7.4.1 Interim Development Scenario - Southern Site Only

As outlined earlier, it is proposed to upgrade the Bellarine Highway/Clifton Avenue intersection to incorporate a signalised intersection including double right turn lanes from the east, a single left turn deceleration lane from the west and a double right turn lane/shared single left turn lane from the north.

The proposed Bellarine Highway/Clifton Avenue signalised intersection layout is figuratively shown in Figure 7.13, with a concept layout plan of the proposed signalised intersection also included in Appendix B. It is noted that this design is not expected to change for ultimate conditions.

Figure 7.13: Bellarine Highway/Clifton Avenue Signalised Intersection Layout

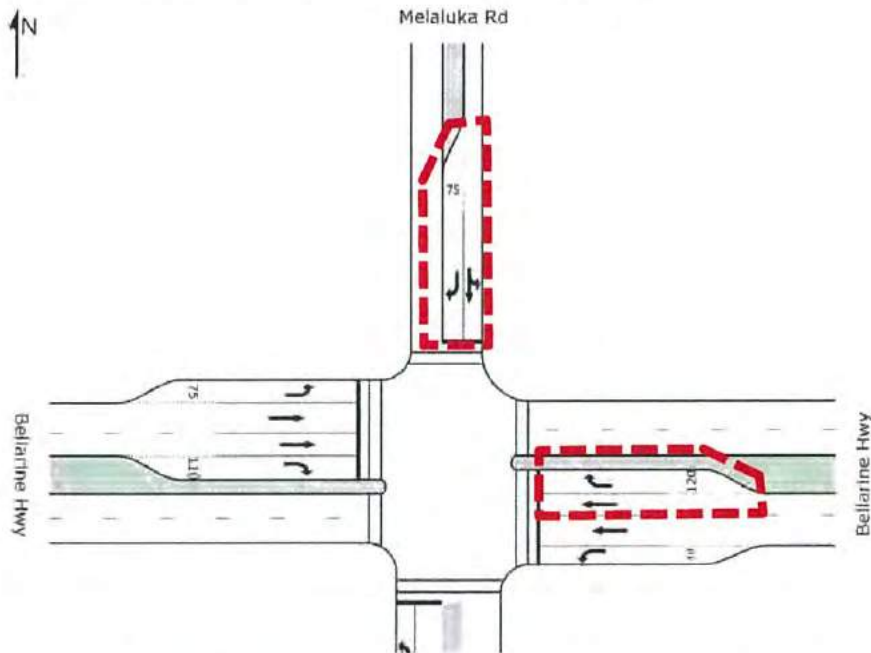


7.4.2 Ultimate Development Scenario - Southern & Northern Sites

As outlined earlier, it is proposed to lengthen the north approach right turn lane on the Melaluka Road to 75m, and the east approach right turn lane to 120m on Bellarine Highway (under ultimate conditions).

The proposed Bellarine Highway/Melaluka Road signalised intersection upgrade is figuratively shown in Figure 7.14.

Figure 7.14: Bellarine Highway/Melaluka Road Intersection Upgrade



It is noted that whilst the SIDRA analysis suggests that the above mitigation may result in a DOS of 0.96 (0.957 – which sits above the ideal limit of 0.95), this analysis is highly conservative for the reasons previously outlined. In reality, operating conditions at the intersection will be acceptable ($DOS \leq 0.95$) with the proposed mitigation. Notwithstanding this, it is noted that this intersection will likely be further assessed for any Development Plan prepared specifically for the northern site, at which time additional mitigation may be identified.

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13/07/2015
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8. Conclusion

8

Based on the analysis and discussions presented within this report, the following conclusions are made:

Car Parking

- i The overall development of the Southern and Northern Sites has a statutory car parking requirement of approximately 1,830 car spaces.
- ii The overall development of the Southern and Northern Sites is expected to generate a car parking demand of up to approximately 1,995 car spaces.
- iii The proposed supply of approximately 2,000 spaces is expected to exceed both the statutory requirement and anticipated peak demand, and is therefore considered to be satisfactory.

Bicycle Parking

- i It is recommended that bicycle parking be provided at 50% of statutory requirements.

Layout and Access

- i The overall development of the Southern and Northern Sites will incorporate appropriate north-south and east-west pedestrian and cyclist connections.
- ii The proposed vehicle access arrangements to Southern and Northern sites have been designed to generally accord with the Concept Plan outlined in the Schedule to the DPO, with appropriate auxiliary turn lanes to be provided at these access points (particularly for those on Bellarine Highway).
- iii The internal road network of the Southern and Northern Sites has been designed to minimise the potential for conflict between pedestrian and vehicles (e.g. via the provision of appropriate traffic calming measures and pedestrian crossings).
- iv It is expected that provision for loading within the Activity Centre will meet, if not exceed, statutory requirements and will be designed to accommodate appropriate design vehicles.
- v The existing public transport bus stop within the Southern Site is to be relocated to Melaluka Road. This relocation has been agreed to by PTV.

Traffic Impact

- i The overall development of the Southern and Northern Sites could be expected to generate up to approximately 2,840 and 3,220 vehicle movements during the respective Friday PM and Saturday Midday peak hours.
- ii The surrounding road network can be expected to operate satisfactorily subject to the completion of mitigating road works as follows:
 - Clifton Avenue / Bellarine Highway (Interim Conditions)
 - o Signalised of the intersection
 - o Two right-turn lanes (east approach)
 - o Two turn lanes (north approach)
 - o Designated left turn lane (west approach).
 - Melaluka Road / Bellarine Highway (Ultimate Conditions)
 - o Lengthening of right turn lanes (north and east approaches)
- iii The vehicle access arrangements can be expected to operate safely and efficiently under a 'post-development + 10 years of traffic growth' scenario.

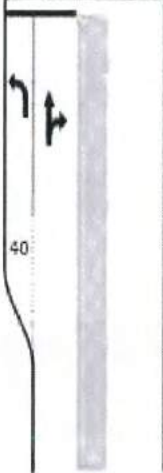
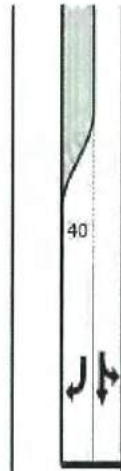
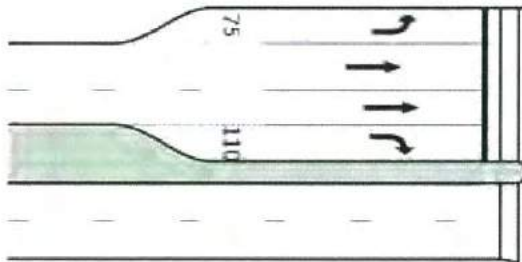
Existing Conditions SIDRA Results

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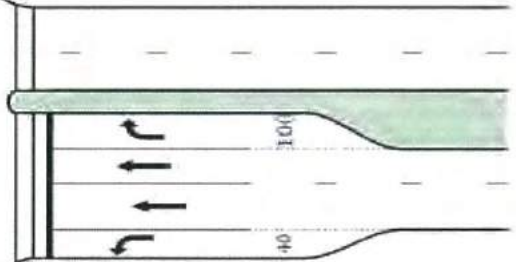


Melaluka Rd

Bellarine Hwy



Melaluka Rd



Bellarine Hwy

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Date

MOVEMENT SUMMARY

Site: Bellarine/Melaluka Exg Fri
PM

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 85 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Melaluka Rd											
1	L	147	8.0	0.313	14.9	LOS B	2.2	16.2	0.38	0.74	45.9
2	T	76	8.0	0.378	32.8	LOS C	4.3	32.3	0.91	0.73	29.6
3	R	41	8.0	0.378	42.3	LOS D	4.3	32.3	0.91	0.80	31.1
Approach		263	8.0	0.378	24.3	LOS C	4.3	32.3	0.62	0.75	37.6
East: Bellarine Hwy											
4	L	65	8.0	0.297	42.6	LOS D	2.3	17.6	0.88	0.76	31.0
5	T	596	8.0	0.834	42.6	LOS D	13.9	103.9	1.00	0.96	31.8
6	R	153	8.0	0.737	53.6	LOS D	6.7	50.4	1.00	0.86	26.8
Approach		814	8.0	0.834	44.7	LOS D	13.9	103.9	0.99	0.92	30.7
North: Melaluka Rd											
7	L	161	8.0	0.534	34.9	LOS C	10.3	76.9	0.87	0.85	34.0
8	T	139	8.0	0.534	25.3	LOS C	10.3	76.9	0.87	0.74	32.6
9	R	52	8.0	0.226	35.5	LOS D	1.7	12.6	0.80	0.75	33.1
Approach		352	8.0	0.534	31.2	LOS C	10.3	76.9	0.86	0.79	33.4
West: Bellarine Hwy											
10	L	39	8.0	0.059	21.2	LOS C	0.6	4.6	0.40	0.73	44.5
11	T	1219	8.0	0.852	19.4	LOS B	22.8	170.3	0.86	0.82	45.7
12	R	369	8.0	0.887	37.4	LOS D	11.1	83.1	1.00	0.94	33.5
Approach		1628	8.0	0.887	23.5	LOS C	22.8	170.3	0.88	0.84	42.5
All Vehicles		3057	8.0	0.887	30.1	LOS C	22.8	170.3	0.88	0.85	37.1

Level of Service (LOS) Method: Delay (HCM 2000).
 Vehicle movement LOS values are based on average delay per movement
 Intersection and Approach LOS values are based on average delay for all vehicle movements.
 SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	35.8	LOS D	0.1	0.1	0.92	0.92
P3	Across E approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	34.9	LOS D	0.1	0.1	0.91	0.91
P7	Across W approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	36.0	LOS D			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: Bellarine/Melaluka Exg Fri PM

Bellarine/Melaluka

Signals - Fixed Time Cycle Time = 85 seconds (Practical Cycle Time)

Phase times determined by the program

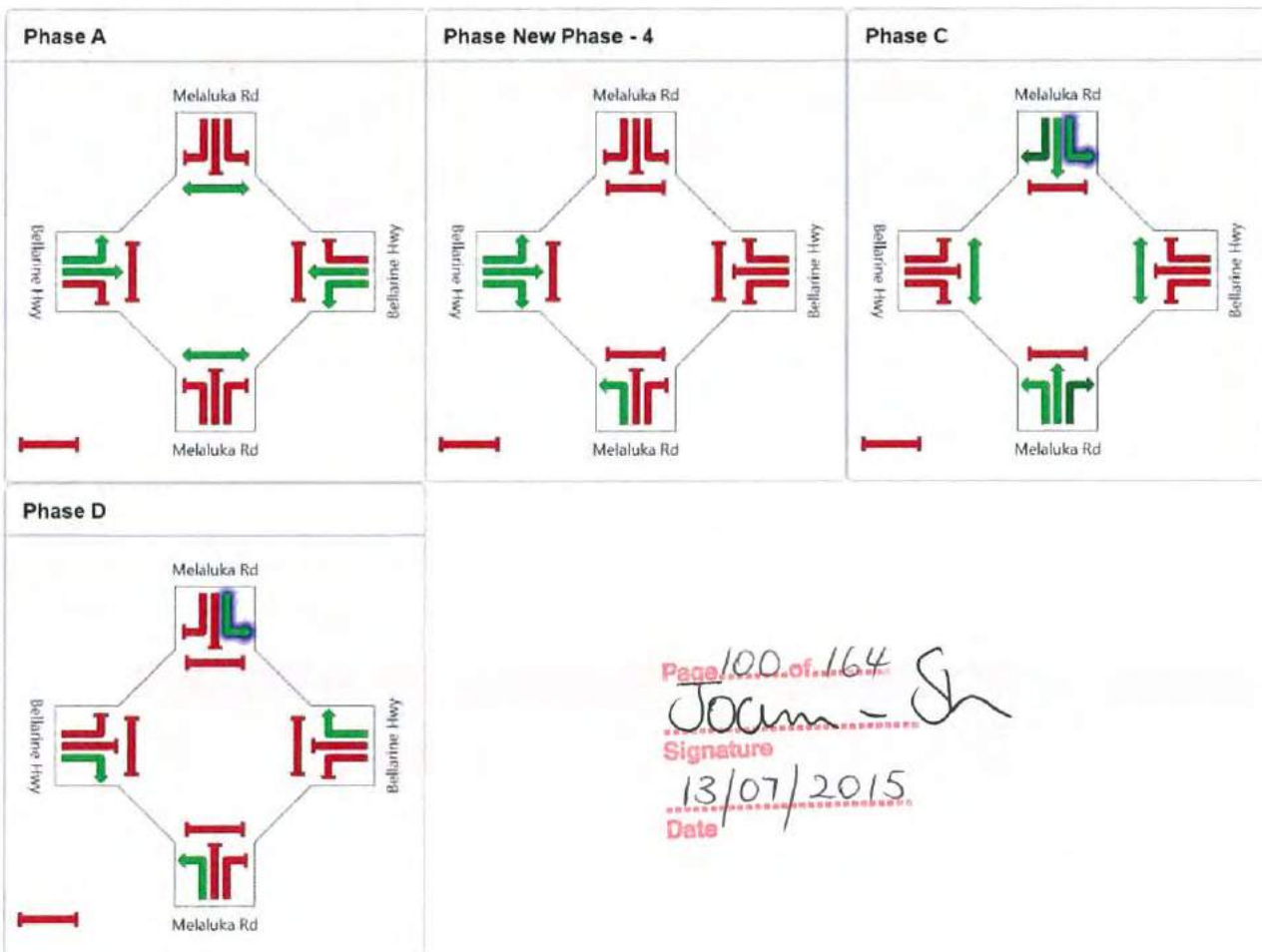
Sequence: Two-Phase

Input Sequence: A, New Phase - 4, C, D

Output Sequence: A, New Phase - 4, C, D

Phase Timing Results

Phase	A	New Phase - 4	C	D
Green Time (sec)	16	10	25	10
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	22	16	31	16
Phase Split	26 %	19 %	36 %	19 %



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 13/07/2015
 Date

Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

MOVEMENT SUMMARY

Site: Bellarine/Melaluka Exg Sat

Bellarine/Melaluka

Signals - Fixed Time Cycle Time = 75 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Melaluka Rd											
1	L	211	8.0	0.513	18.4	LOS B	3.9	29.0	0.53	0.77	43.1
2	T	112	8.0	0.288	20.9	LOS C	4.2	31.1	0.79	0.65	35.8
3	R	37	8.0	0.288	30.4	LOS C	4.2	31.1	0.79	0.82	36.6
Approach		360	8.0	0.513	20.4	LOS C	4.2	31.1	0.64	0.73	40.0
East: Bellarine Hwy											
4	L	55	8.0	0.201	32.3	LOS C	1.5	11.4	0.78	0.75	36.3
5	T	733	8.0	0.690	27.1	LOS C	12.8	95.5	0.95	0.83	39.7
6	R	184	8.0	0.709	46.4	LOS D	7.0	52.2	1.00	0.86	29.4
Approach		971	8.0	0.709	31.1	LOS C	12.8	95.5	0.95	0.83	37.3
North: Melaluka Rd											
7	L	98	8.0	0.280	27.4	LOS C	4.6	34.6	0.74	0.82	37.8
8	T	81	8.0	0.280	17.9	LOS B	4.6	34.6	0.74	0.61	37.1
9	R	66	8.0	0.265	32.5	LOS C	1.9	14.4	0.80	0.76	34.5
Approach		245	8.0	0.280	25.6	LOS C	4.6	34.6	0.76	0.74	36.6
West: Bellarine Hwy											
10	L	27	8.0	0.058	31.8	LOS C	0.7	5.3	0.76	0.73	36.6
11	T	865	8.0	0.812	32.2	LOS C	17.1	127.8	0.99	0.95	36.6
12	R	216	8.0	0.833	51.0	LOS D	8.9	66.8	1.00	0.94	27.7
Approach		1108	8.0	0.833	35.8	LOS D	17.1	127.8	0.99	0.94	34.7
All Vehicles		2685	8.0	0.833	31.1	LOS C	17.1	127.8	0.91	0.86	36.4

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	26.5	LOS C	0.1	0.1	0.84	0.84
P3	Across E approach	53	31.7	LOS D	0.1	0.1	0.92	0.92
P5	Across N approach	53	25.6	LOS C	0.1	0.1	0.83	0.83
P7	Across W approach	53	31.7	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		212	28.9	LOS C			0.88	0.88

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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SIDRA INTERSECTION 5.1.13.2093

Project: P:\15M1200-1299\15M1274000 - Leopold Gateway Plaza\Modelling\141123sid-15M1274000-Bellarine-Melaluka.sip

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INTERSECTION**

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Date 13/07/2015

PHASING SUMMARY

Site: Bellarine/Melaluka Exg Sat

Bellarine/Melaluka

Signals - Fixed Time Cycle Time = 75 seconds (Practical Cycle Time)

Phase times determined by the program

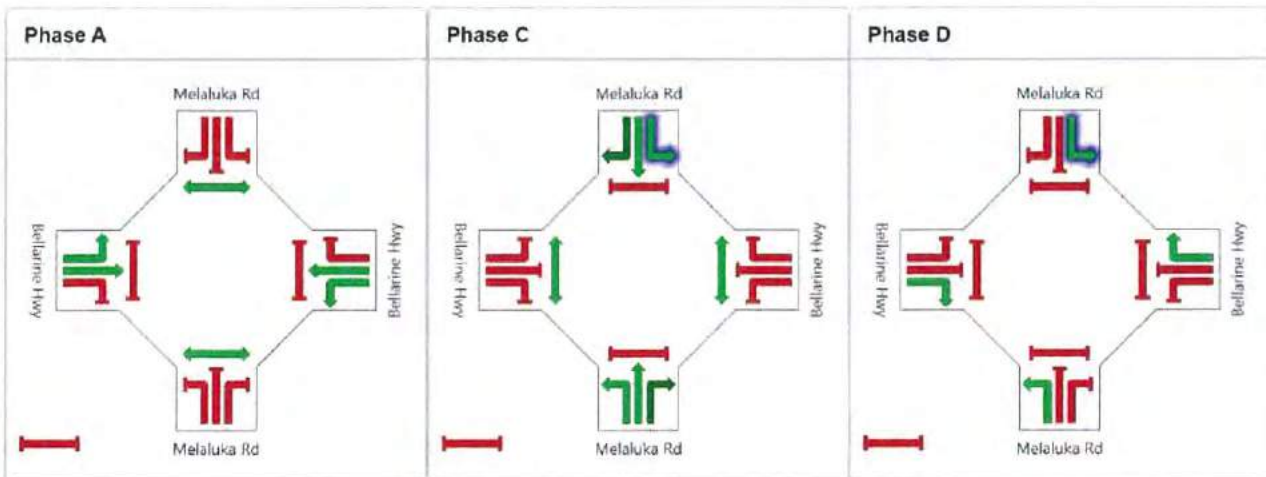
Sequence: Two-Phase

Input Sequence: A, C, D

Output Sequence: A, C, D

Phase Timing Results

Phase	A	C	D
Green Time (sec)	21	25	11
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	27	31	17
Phase Split	36 %	41 %	23 %



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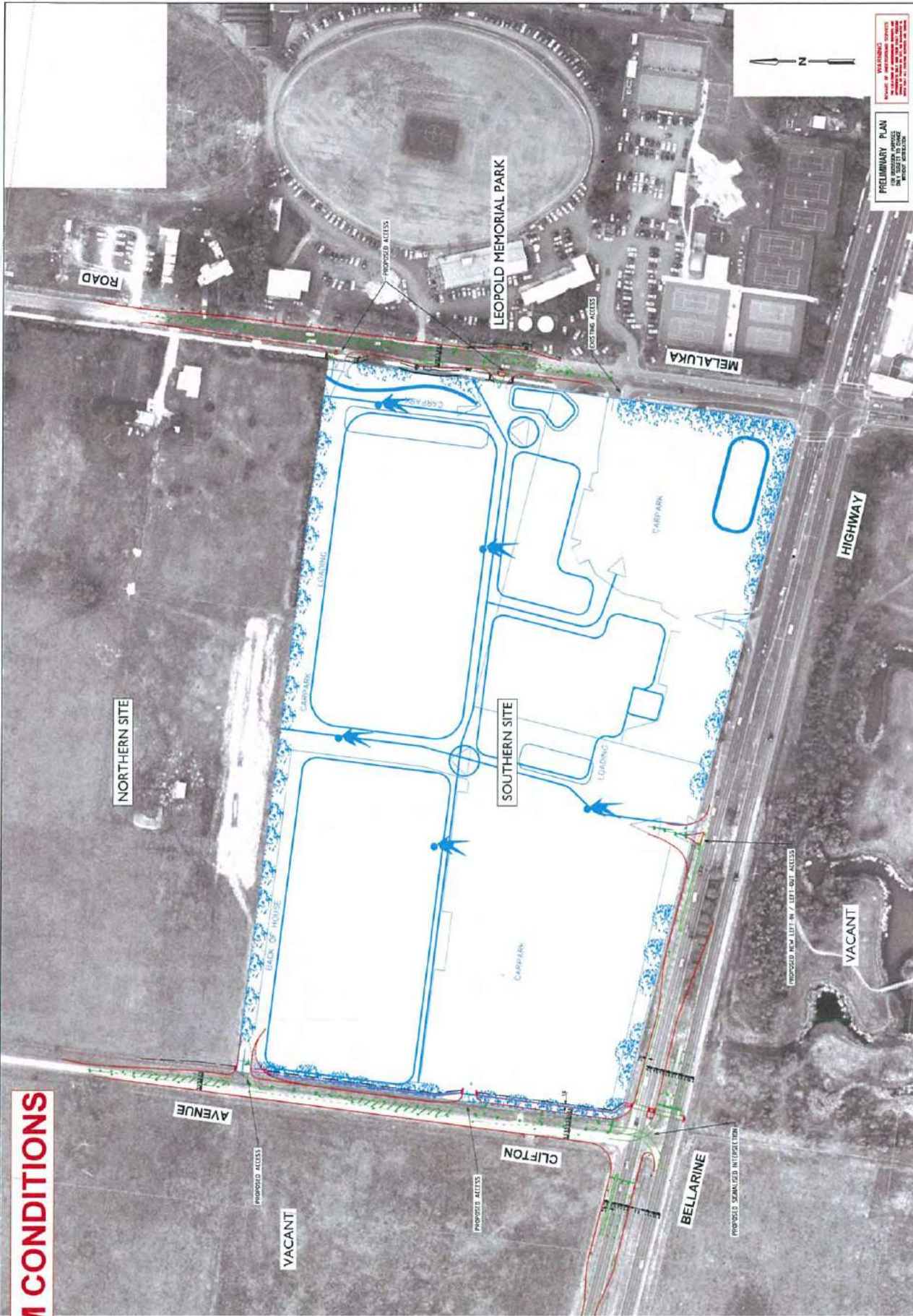
Appendix B

Concept Functional Layout Plan

Appendix B

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13/07/2015
Date

INTERIM CONDITIONS



PRELIMINARY PLAN
 THIS PLAN IS A PRELIMINARY DESIGN AND IS SUBJECT TO CHANGE WITHOUT NOTICE.
 NO WARRANTY IS MADE BY THE ENGINEER AS TO THE ACCURACY OF THE INFORMATION PROVIDED HEREON.

CLIENT NOVION PROPERTY GROUP
LEOPOLD SUB REGIONAL ACTIVITY CENTRE
BELLARINE HIGHWAY / MELALUKA ROAD / CLIFTON AVENUE, LEOPOLD
CONCEPT LAYOUT - DEVELOPMENT PLAN INTERIM CONDITIONS

GTA CONSULTING
 www.gtaconsulting.com.au
 Melbourne: 03 9588 8000
 Perth: 08 9447 1000
 Adelaide: 08 8338 3000
 Gold Coast: 07 5571 8000
 Brisbane: 07 5571 8000

DATE 15 OCTOBER '14
SCALE 1:1000
DATE 15 OCTOBER '14
SCALE 1:1000
DATE 15 OCTOBER '14

DESIGNED	P. PHAM
DRAWN	P. PHAM
APPROVED BY	DATE APPROVED FOR TENDERS
SCALE	1:1000
DATE	15 OCTOBER '14

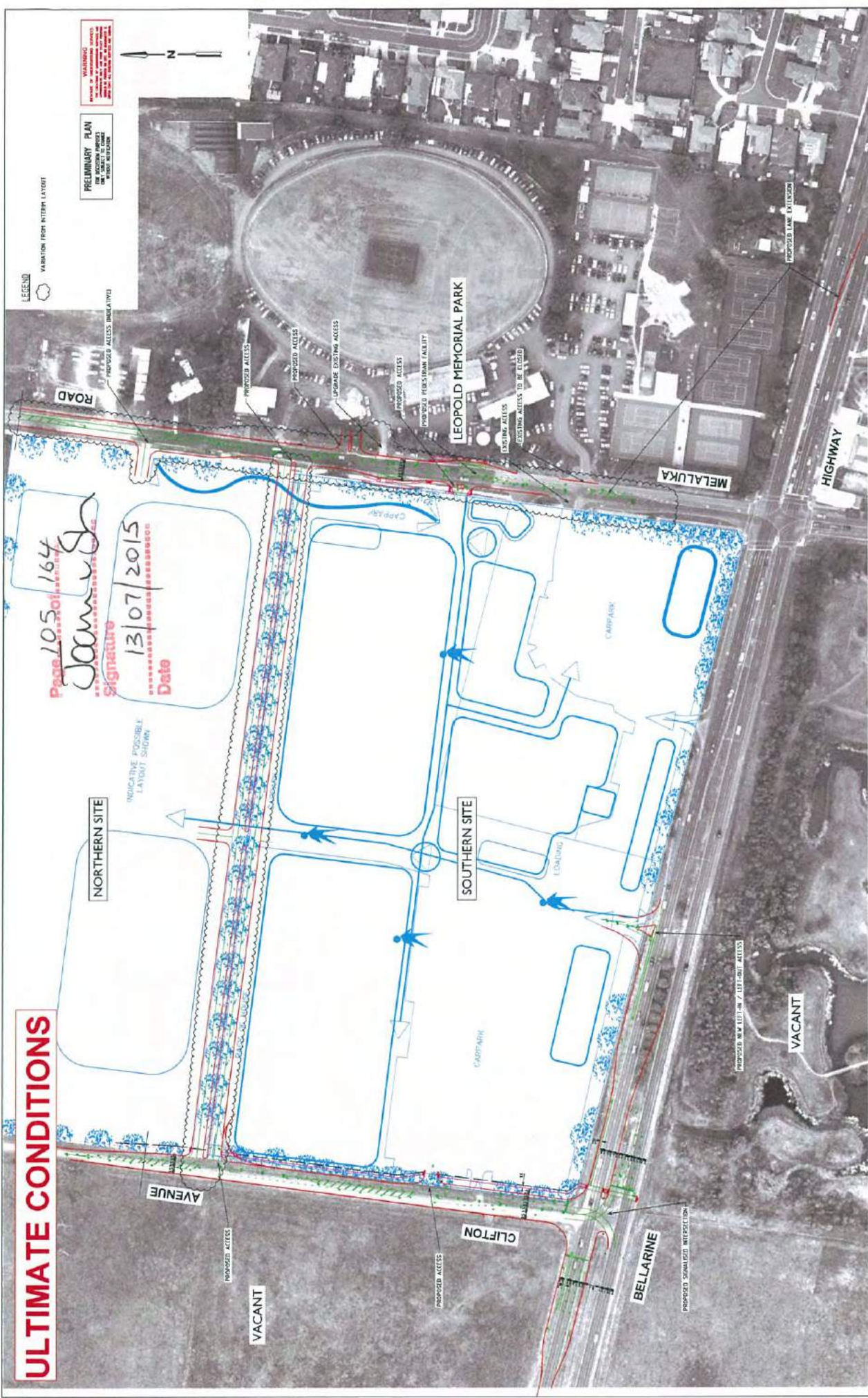
GENERAL NOTES

- ALL SPREADINGS AND RATES ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
- BASE INFORMATION OBTAINED FROM NAAMAP AND GAUSSALAN INFORMATION FROM LANDVIC.
- GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING INFORMATION PROVIDED TO THE CLIENT. THE CLIENT IS ADVISED TO VERIFY THE EXISTING INFORMATION PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
- DETAILED STATE HIGHWAY - BELLARINE HIGHWAY - SPEED ZONE 100KPH
 MAIN ROAD - MELALUKA ROAD - SPEED ZONE 100KPH
 CLIFTON AVENUE - SPEED ZONE APPROX

NO.	DATE	DESCRIPTION	BY	CHK.
01	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
02	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
03	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
04	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
05	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
06	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
07	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
08	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
09	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
10	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
11	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
12	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
13	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
14	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
15	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
16	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
17	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
18	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
19	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP
20	15/10/14	ISSUE UNLIMATED TO SELECT CARPARK FUNCTIONAL LAYOUT PLAN	PP	PP

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 Signature: *Joan - Sh*
 Date: 13/07/2015

ULTIMATE CONDITIONS



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 Signature: *James S.*
 Date: 13/07/2015

CLIENT
 NOVION PROPERTY GROUP
 LEOPOLD SUB REGIONAL ACTIVITY CENTRE
 BELLARINE HIGHWAY / MELALUKA ROAD /
 CLIFTON AVENUE, LEOPOLD

**CONCEPT LAYOUT -
 DEVELOPMENT PLAN ULTIMATE CONDITIONS**

DEVELOPER: NOVION
 DATE: 15/01/2015

GTA consultants
 www.gta.com.au
 Melbourne: 03 9586 6000
 Brisbane: 07 3211 1000
 Sydney: 02 9232 2800
 Perth: 08 9447 2000
 Adelaide: 08 8344 4444

DESIGNED	DESIGNED BY	DATE
P/PHAM	P/PHAM	23 OCTOBER '14
APPROVED BY		

GENERAL NOTES

- ALL DIMENSIONS AND RAMP ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
- BASE INFORMATION OBTAINED FROM MAPS AND CADASTRAL INFORMATION FROM LANDVIC.
- SEA LEVEL INDICATED DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING SURFACE LEVELS ON WHICH THE STREET DETAIL IS BASED.
- BEFORE TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
- DECLARED STATE HIGHWAY - BELLARINE HIGHWAY - SPEED ZONE 70KM/H
 MAIN ROAD - MELALUKA ROAD - SPEED ZONE 60KM/H
 CLIFTON AVENUE - SPEED ZONE 40KM/H

NO.	REVISION	DATE	BY	CHK.	APP.
01	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
02	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
03	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
04	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
05	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
06	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
07	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
08	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
09	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
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11	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
12	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
13	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
14	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
15	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
16	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
17	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
18	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
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21	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
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23	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
24	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
25	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
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27	ISSUE FOR PERMIT	23 OCT 2014	P/PHAM		
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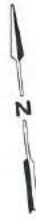
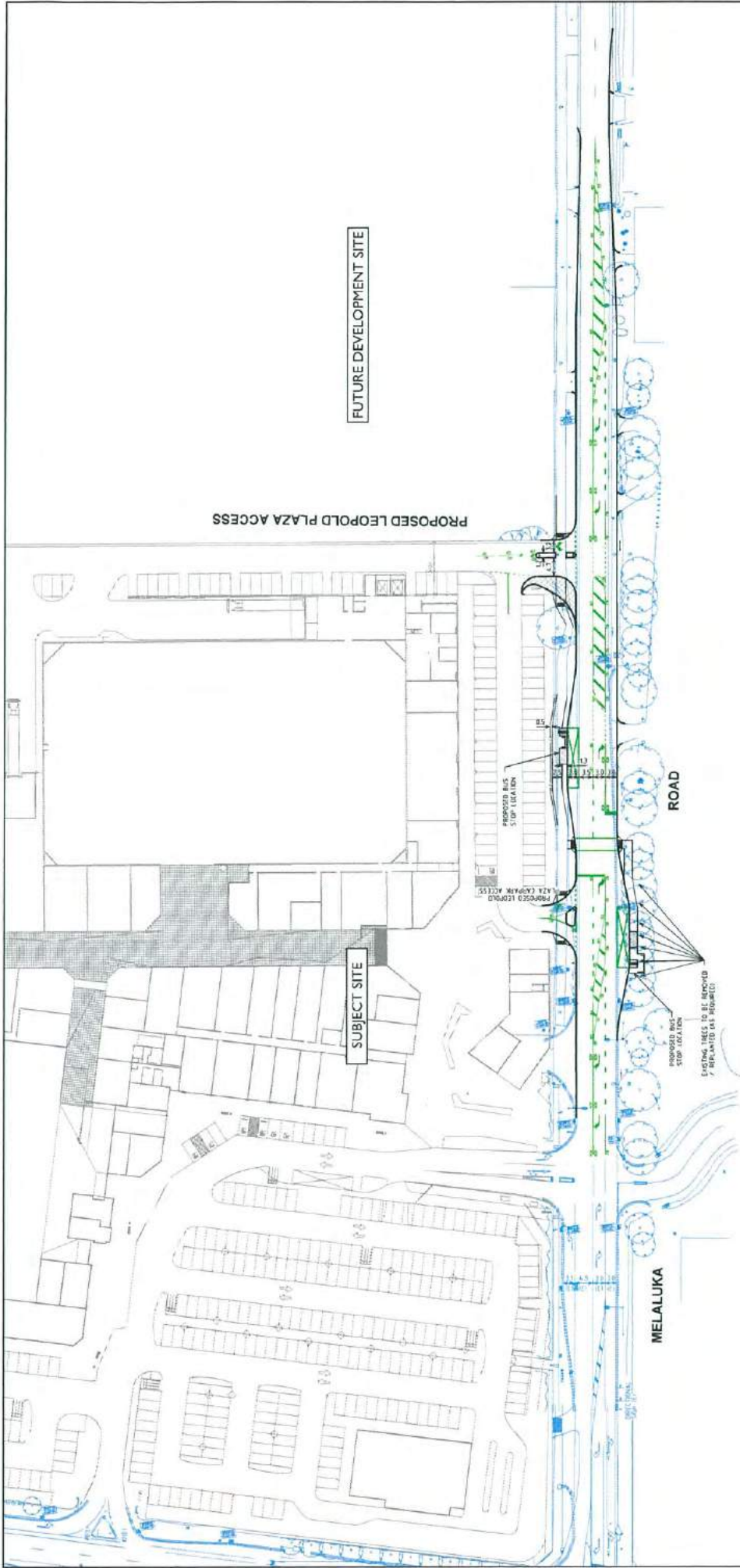
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 DATE: 23 OCTOBER 2014

Appendix C

Interim & Ultimate Melaluka Bus Stop Concept Plans

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Signature: *Joan - Sh*
Date: 13/07/2015

Appendix C



PRELIMINARY PLAN
 FOR DISCUSSION PURPOSES
 ONLY. SUBJECT TO CHANGE
 WITHOUT NOTIFICATION

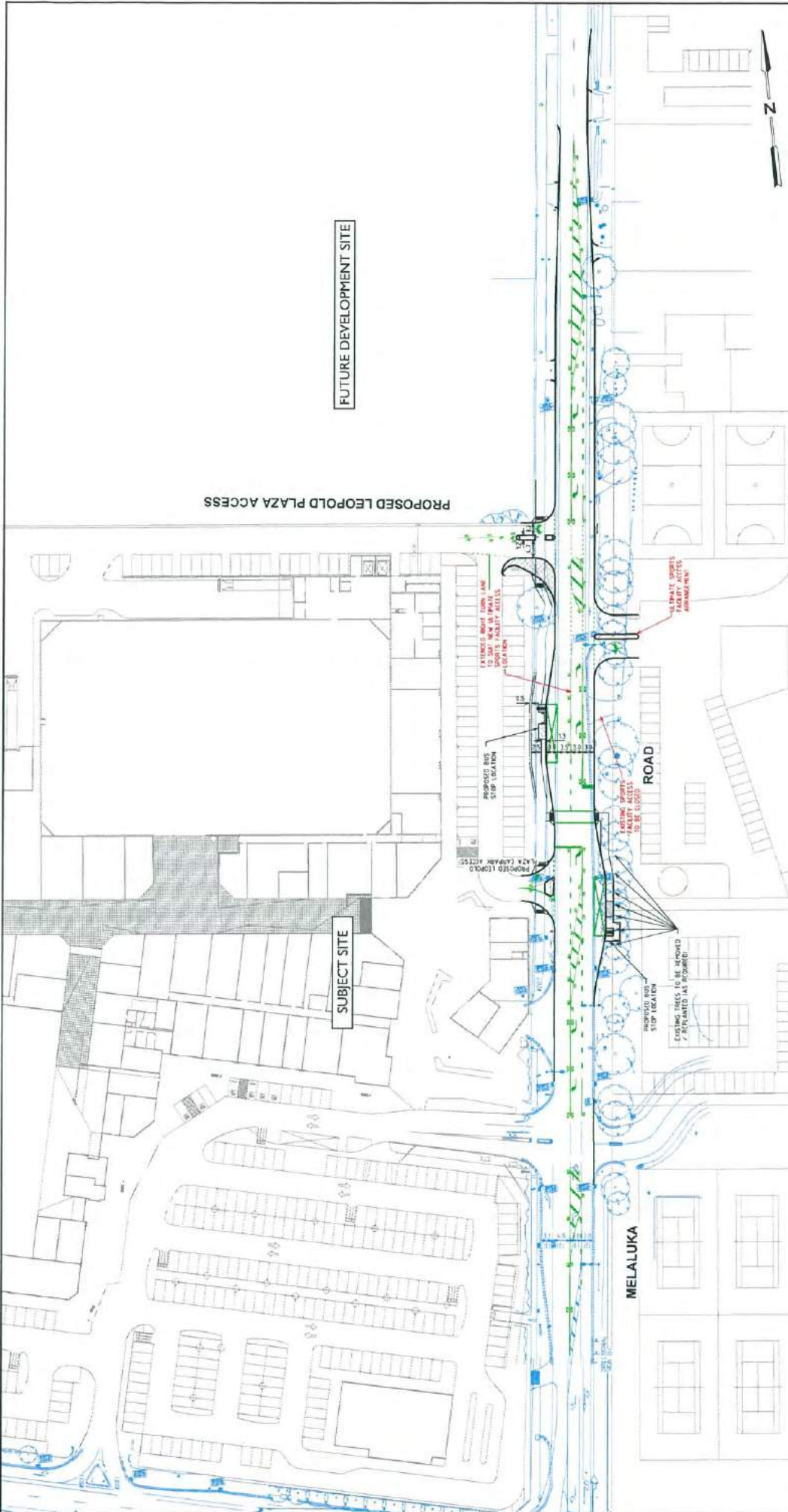
LEOPOLD MEMORIAL PARK



LEOPOLD SUB REGIONAL ACTIVITY CENTRE
 MELALUKA ROAD, LEOPOLD
 CONCEPT LAYOUT PLAN
 PROPOSED ACCESS ARRANGEMENT

DATE	10 MARCH '15	SCALE	1:1000 @ A3	REVISION	25A/C1
DRAWN BY	P. PHAM	DRAWING NO.	15M1274300-01-SK01P3		

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 Signature: *John - Sh*
 Date: 13/07/2015



PRELIMINARY PLAN
 FOR DISCUSSION PURPOSES
 ONLY. SUBJECT TO CHANGE
 WITHOUT NOTIFICATION



LEOPOLD SUB REGIONAL ACTIVITY CENTRE
 MELALUKA ROAD, LEOPOLD
 CONCEPT LAYOUT PLAN
 POTENTIAL ULTIMATE ACCESS ARRANGEMENT

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DRAWN BY	P PHAM	PROJECT NO.	15M1274300-04-SKD1P2		

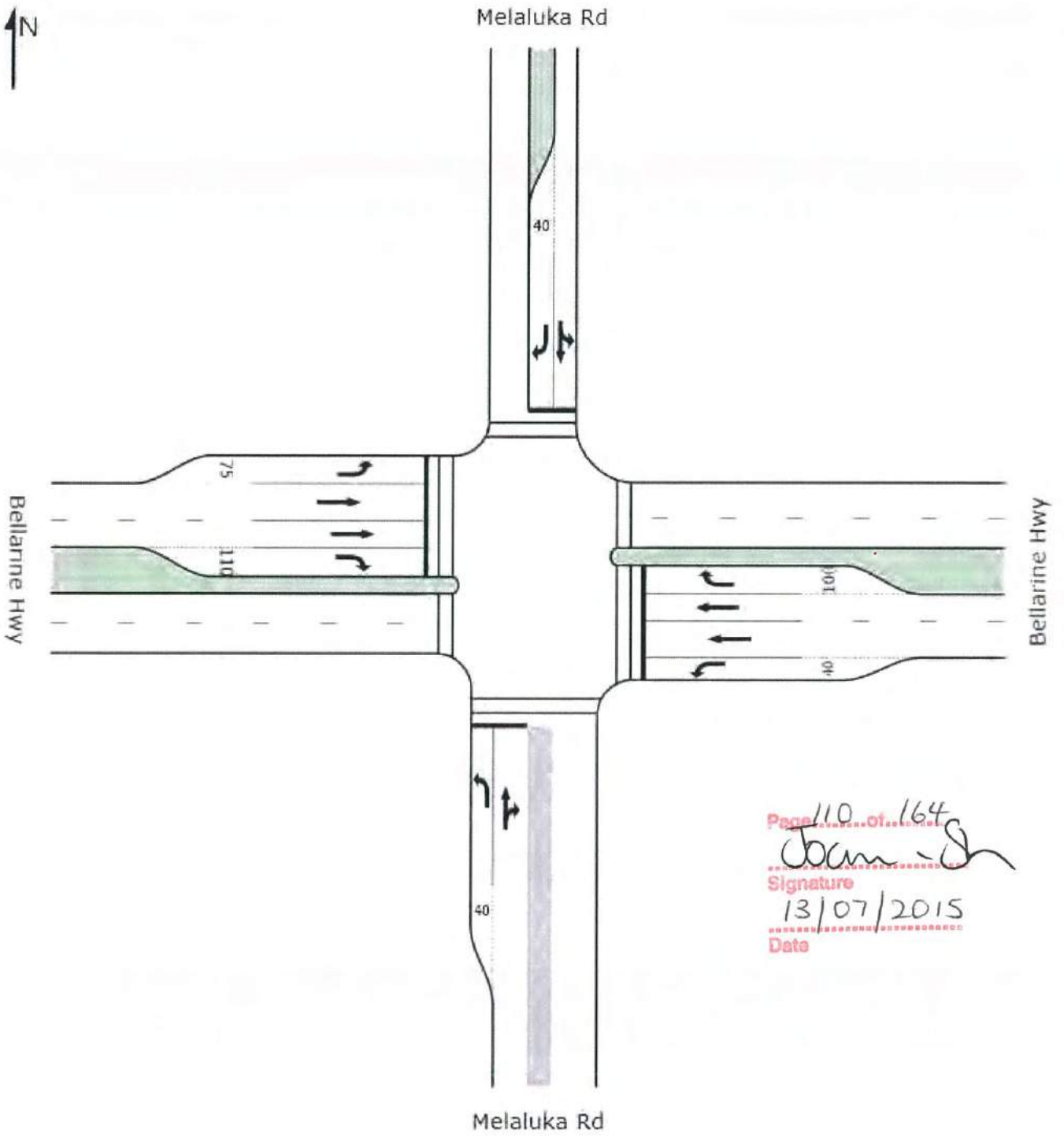
LEOPOLD MEMORIAL PARK

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 Date: 13/07/2015

Appendix D

Base Case SIDRA Results

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Signature
13/07/2015
Date

MOVEMENT SUMMARY

Site: Bellarine/Melaluka BASE
(Exg+growth) Fri PM

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 90 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Melaluka Rd											
1	L	147	8.0	0.345	16.1	LOS B	2.5	18.5	0.41	0.74	44.9
2	T	76	8.0	0.423	36.8	LOS D	4.7	35.3	0.93	0.75	28.1
3	R	41	8.0	0.423	46.2	LOS D	4.7	35.3	0.93	0.80	29.6
Approach		263	8.0	0.423	26.7	LOS C	4.7	35.3	0.64	0.75	36.1
East: Bellarine Hwy											
4	L	65	8.0	0.298	41.4	LOS D	2.4	17.6	0.85	0.76	31.5
5	T	704	8.0	0.835	42.7	LOS D	17.1	128.0	1.00	0.96	31.7
6	R	153	8.0	0.867	63.1	LOS E	7.8	58.0	1.00	0.95	24.0
Approach		922	8.0	0.867	46.0	LOS D	17.1	128.0	0.99	0.95	30.3
North: Melaluka Rd											
7	L	161	8.0	0.566	37.8	LOS D	11.2	83.6	0.89	0.85	32.7
8	T	139	8.0	0.566	28.3	LOS C	11.2	83.6	0.89	0.76	31.1
9	R	52	8.0	0.243	39.0	LOS D	1.8	13.8	0.82	0.75	31.6
Approach		352	8.0	0.566	34.3	LOS C	11.2	83.6	0.88	0.80	31.9
West: Bellarine Hwy											
10	L	39	8.0	0.053	18.8	LOS B	0.5	3.9	0.32	0.73	46.8
11	T	1441	8.0	0.897	20.2	LOS C	30.0	224.5	0.87	0.86	45.0
12	R	369	8.0	0.894	40.7	LOS D	11.3	84.3	1.00	0.96	31.9
Approach		1849	8.0	0.897	24.2	LOS C	30.0	224.5	0.88	0.88	41.9
All Vehicles		3387	8.0	0.897	31.4	LOS C	30.0	224.5	0.89	0.88	36.5

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	34.7	LOS D	0.1	0.1	0.88	0.88
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	33.8	LOS D	0.1	0.1	0.87	0.87
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	36.7	LOS D			0.90	0.90

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

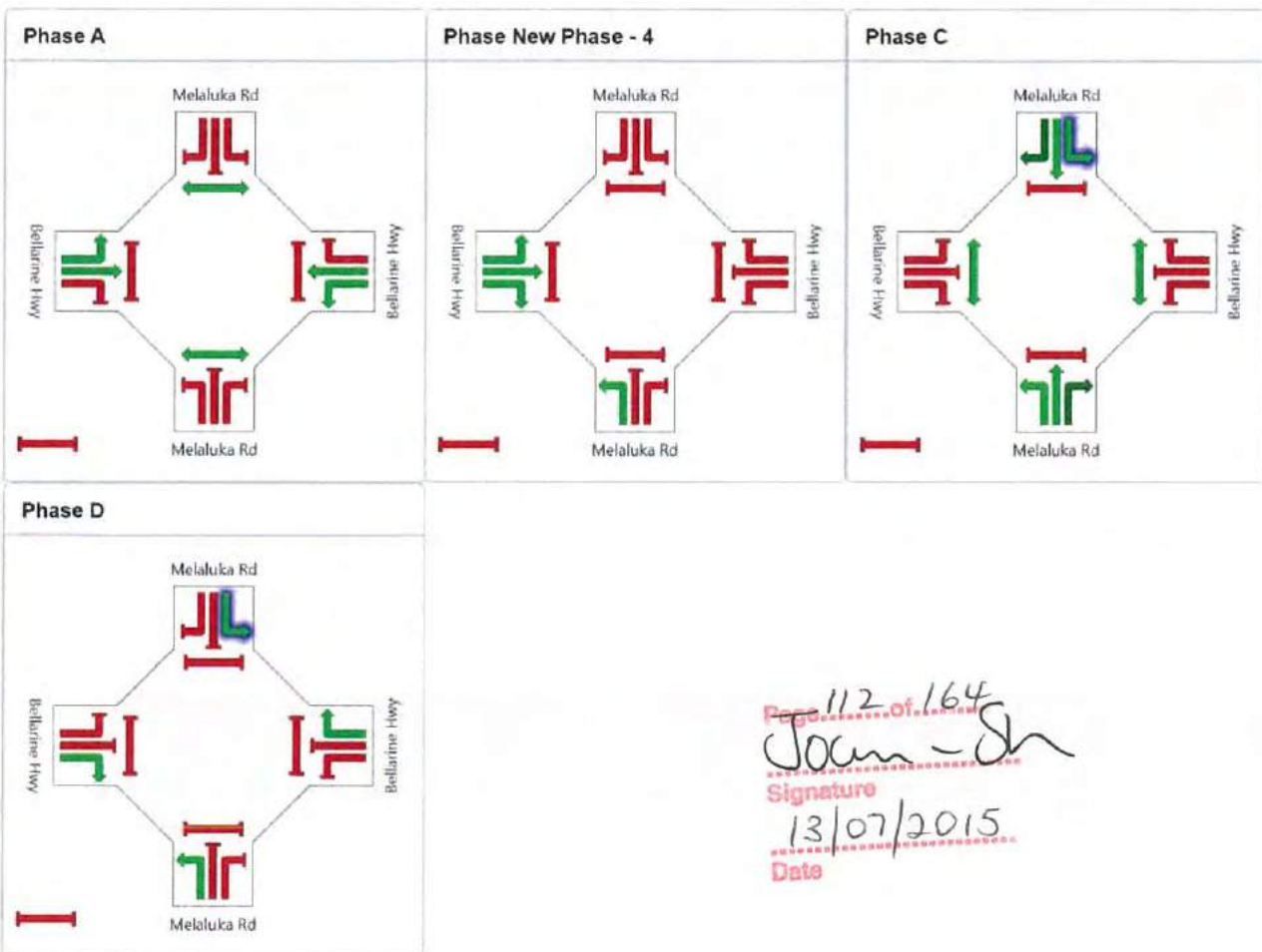
Site: Bellarine/Melaluka BASE
(Exg+growth) Fri PM

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 90 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, New Phase - 4, C, D
Output Sequence: A, New Phase - 4, C, D

Phase Timing Results

Phase	A	New Phase - 4	C	D
Green Time (sec)	20	12	25	9
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	26	18	31	15
Phase Split	29 %	20 %	34 %	17 %



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	Normal Movement		Permitted/Opposed
	Slip-Lane Movement		Opposed Slip-Lane
	Stopped Movement		Continuous Movement
	Turn On Red		Undetected Movement
			Phase Transition Applied

MOVEMENT SUMMARY

Site: Bellarine/Melaluka BASE
(Exg+growth) Sat

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Melaluka Rd											
1	L	211	8.0	0.559	20.0	LOS C	4.3	32.4	0.56	0.77	41.9
2	T	112	8.0	0.313	24.5	LOS C	4.6	34.7	0.83	0.67	33.8
3	R	37	8.0	0.313	33.9	LOS C	4.6	34.7	0.83	0.82	34.8
Approach		360	8.0	0.559	22.8	LOS C	4.6	34.7	0.67	0.74	38.4
East: Bellarine Hwy											
4	L	55	8.0	0.203	31.6	LOS C	1.5	11.5	0.74	0.75	36.7
5	T	865	8.0	0.730	28.0	LOS C	16.2	120.8	0.95	0.85	39.2
6	R	184	8.0	0.693	48.0	LOS D	7.3	54.9	1.00	0.85	28.8
Approach		1104	8.0	0.730	31.5	LOS C	16.2	120.8	0.95	0.85	37.1
North: Melaluka Rd											
7	L	98	8.0	0.298	30.1	LOS C	5.1	38.2	0.77	0.82	36.4
8	T	81	8.0	0.298	20.5	LOS C	5.1	38.2	0.77	0.64	35.4
9	R	66	8.0	0.288	36.1	LOS D	2.1	16.0	0.83	0.76	32.8
Approach		245	8.0	0.298	28.6	LOS C	5.1	38.2	0.79	0.74	35.0
West: Bellarine Hwy											
10	L	27	8.0	0.059	31.1	LOS C	0.7	5.4	0.73	0.73	37.0
11	T	1022	8.0	0.860	36.3	LOS D	22.8	170.2	1.00	1.00	34.5
12	R	216	8.0	0.815	52.1	LOS D	9.3	69.6	1.00	0.92	27.3
Approach		1265	8.0	0.860	38.9	LOS D	22.8	170.2	0.99	0.98	33.2
All Vehicles		2974	8.0	0.860	33.3	LOS C	22.8	170.2	0.92	0.88	35.3

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	25.6	LOS C	0.1	0.1	0.80	0.80
P3	Across E approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	24.8	LOS C	0.1	0.1	0.79	0.79
P7	Across W approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	29.7	LOS C			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Tuesday, 25 November 2014 9:48:58 AM

SIDRA INTERSECTION 5.1.13.2093

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SIDRA INTERSECTION

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13/07/2015

Date

PHASING SUMMARY

Site: Bellarine/Melaluka BASE
(Exg+growth) Sat

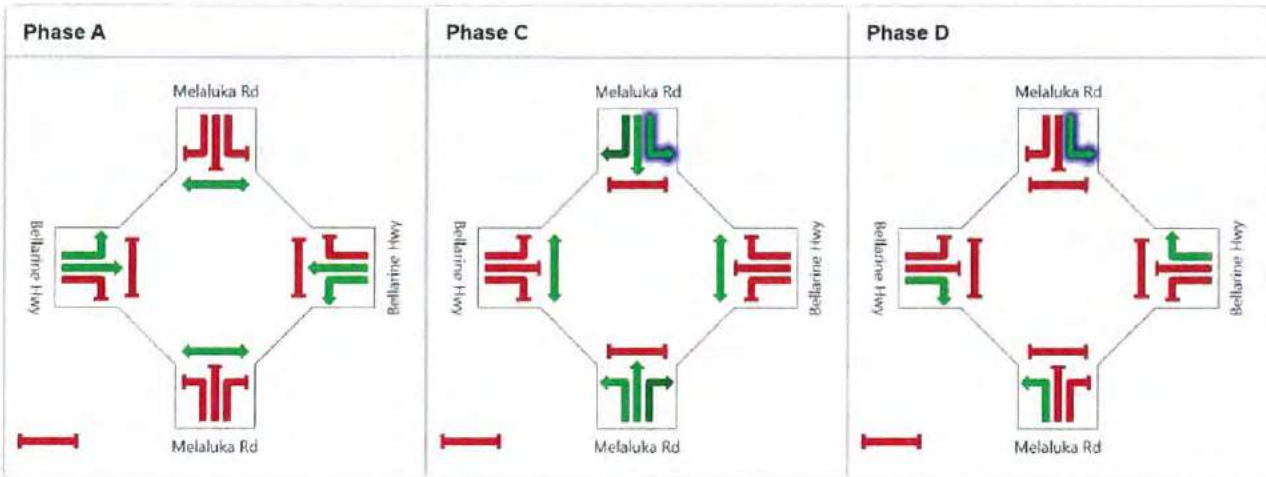
Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Two-Phase
Input Sequence: A, C, D
Output Sequence: A, C, D

Phase Timing Results

Phase	A	C	D
Green Time (sec)	25	25	12
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	31	31	18
Phase Split	39 %	39 %	23 %



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SIDRA INTERSECTION 5.1.13.2093

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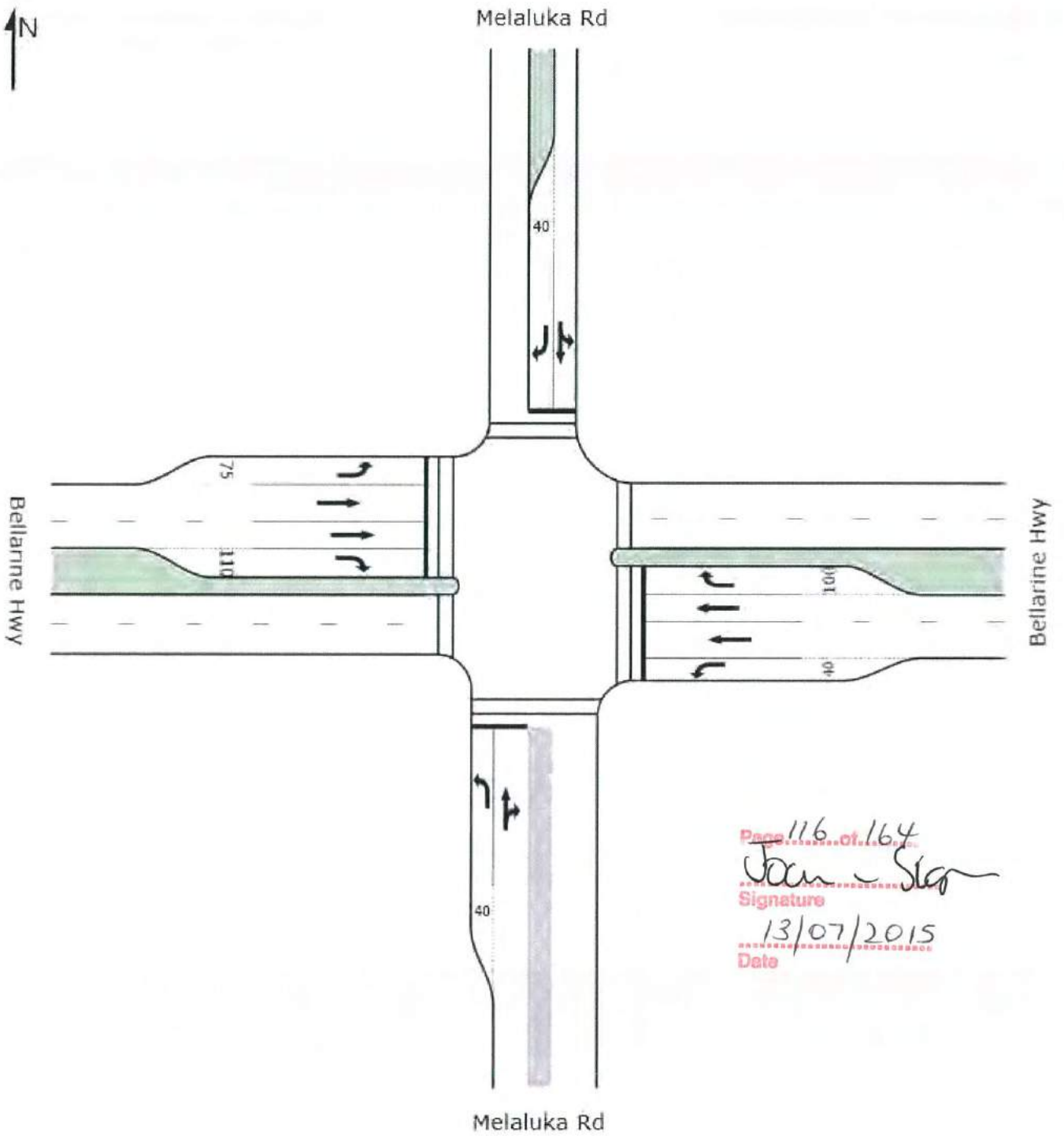
SIDRA INTERSECTION

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Appendix E

Interim Post Development SIDRA Results

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13/07/2015
Date

MOVEMENT SUMMARY

Site: **Bellarine/Melaluka Post Dev**
Fri PM - Southern Site Only

Bellarine/Melaluka
 Signals - Fixed Time Cycle Time = 100 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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: Melaluka Rd											
1	L	181	8.0	0.514	19.5	LOS B	4.0	29.8	0.49	0.76	42.3
2	T	98	8.0	0.589	44.5	LOS D	6.6	49.3	0.98	0.80	25.5
3	R	41	8.0	0.589	54.0	LOS D	6.6	49.3	0.98	0.81	27.1
Approach		319	8.0	0.589	31.6	LOS C	6.6	49.3	0.70	0.78	33.5
East: Bellarine Hwy											
4	L	65	8.0	0.298	38.7	LOS D	2.4	17.6	0.77	0.75	32.8
5	T	971	8.0	0.883	47.6	LOS D	27.4	204.8	1.00	1.02	29.9
6	R	152	8.0	0.861	67.7	LOS E	8.4	63.0	1.00	0.94	22.9
Approach		1189	8.0	0.883	49.6	LOS D	27.4	204.8	0.99	0.99	29.0
North: Melaluka Rd											
7	L	201	8.0	0.632	43.2	LOS D	13.5	100.7	0.93	0.85	30.4
8	T	112	8.0	0.632	33.7	LOS C	13.5	100.7	0.93	0.79	28.7
9	R	105	8.0	0.566	47.6	LOS D	4.6	34.4	0.91	0.79	28.5
Approach		418	8.0	0.632	41.7	LOS D	13.5	100.7	0.92	0.82	29.4
West: Bellarine Hwy											
10	L	139	8.0	0.173	17.1	LOS B	1.7	12.5	0.26	0.74	48.6
11	T	1506	8.0	0.842	12.7	LOS B	25.6	191.5	0.69	0.65	52.9
12	R	346	8.0	0.888	41.0	LOS D	11.2	83.5	1.00	0.93	31.7
Approach		1991	8.0	0.888	17.9	LOS B	25.6	191.5	0.71	0.71	47.7
All Vehicles		3917	8.0	0.888	31.2	LOS C	27.4	204.8	0.82	0.81	36.8

Level of Service (LOS) Method: Delay (HCM 2000).
 Vehicle movement LOS values are based on average delay per movement
 Intersection and Approach LOS values are based on average delay for all vehicle movements.
 SIDRA Standard Delay Model used.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	Across S approach	53	32.0	LOS D	0.1	0.1	0.80	0.80	
P3	Across E approach	53	44.2	LOS E	0.1	0.1	0.94	0.94	
P5	Across N approach	53	31.2	LOS D	0.1	0.1	0.79	0.79	
P7	Across W approach	53	44.2	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		212	37.9	LOS D			0.87	0.87	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
 Pedestrian movement LOS values are based on average delay per pedestrian movement.
 Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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 Signature: *Juan - J*
 Date: 13/07/2015

PHASING SUMMARY

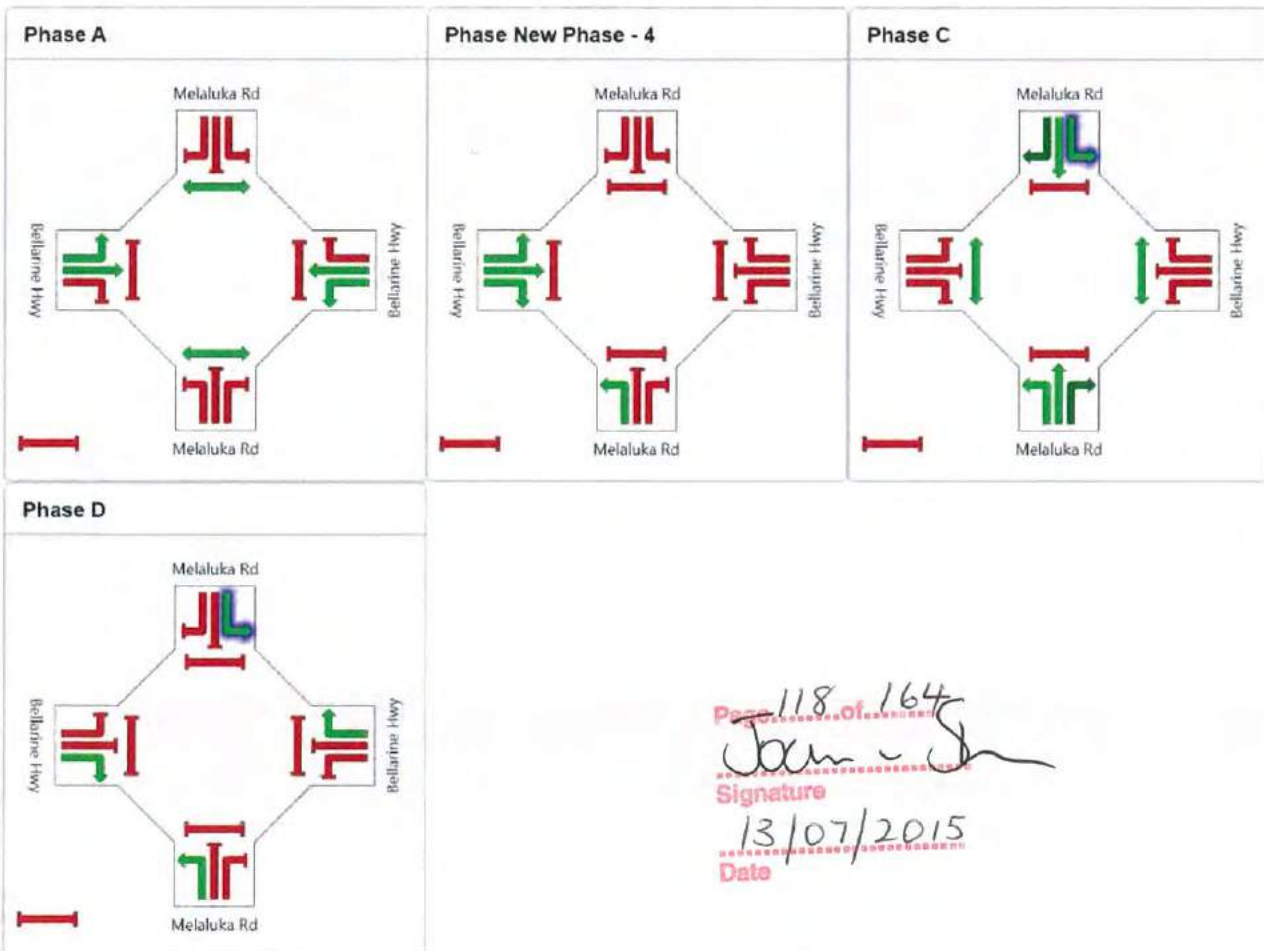
Site: Bellarine/Melaluka Post Dev
Fri PM - Southern Site Only

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 100 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, New Phase - 4, C, D
Output Sequence: A, New Phase - 4, C, D

Phase Timing Results

Phase	A	New Phase - 4	C	D
Green Time (sec)	29	12	25	10
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	35	18	31	16
Phase Split	35 %	18 %	31 %	16 %



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 Signature: *John - J*
 Date: 13/07/2015

	Normal Movement		Permitted/Opposed
	Slip-Lane Movement		Opposed Slip-Lane
	Stopped Movement		Continuous Movement
	Turn On Red		Undetected Movement
			Phase Transition Applied

MOVEMENT SUMMARY

Site: Bellarine/Melaluka Post Dev
Sat - Southern Site Only

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 85 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Melaluka Rd											
1	L	246	8.0	0.720	27.7	LOS C	6.7	50.3	0.67	0.84	37.0
2	T	121	8.0	0.390	29.4	LOS C	5.6	41.9	0.88	0.72	31.3
3	R	37	8.0	0.390	38.9	LOS D	5.6	41.9	0.88	0.82	32.6
Approach		404	8.0	0.720	29.2	LOS C	6.7	50.3	0.75	0.80	34.8
East: Bellarine Hwy											
4	L	55	8.0	0.202	30.2	LOS C	1.5	11.4	0.70	0.75	37.6
5	T	1145	8.0	0.855	35.2	LOS D	26.2	195.9	0.99	0.99	35.1
6	R	144	8.0	0.577	48.9	LOS D	5.9	43.8	0.98	0.80	28.5
Approach		1344	8.0	0.855	36.4	LOS D	26.2	195.9	0.98	0.96	34.4
North: Melaluka Rd											
7	L	170	8.0	0.426	32.3	LOS C	8.1	60.5	0.81	0.83	35.0
8	T	83	8.0	0.426	22.8	LOS C	8.1	60.5	0.81	0.69	33.8
9	R	138	8.0	0.670	46.0	LOS D	5.6	42.2	0.95	0.86	29.0
Approach		391	8.0	0.670	35.1	LOS D	8.1	60.5	0.86	0.81	32.4
West: Bellarine Hwy											
10	L	132	8.0	0.292	31.2	LOS C	3.8	28.7	0.74	0.78	36.9
11	T	1123	8.0	0.837	33.3	LOS C	24.9	186.2	0.98	0.96	36.1
12	R	201	8.0	0.804	54.4	LOS D	9.1	67.9	1.00	0.91	26.6
Approach		1456	8.0	0.837	36.0	LOS D	24.9	186.2	0.96	0.94	34.6
All Vehicles		3595	8.0	0.855	35.3	LOS D	26.2	195.9	0.94	0.92	34.3

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	24.1	LOS C	0.1	0.1	0.75	0.75
P3	Across E approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	23.3	LOS C	0.1	0.1	0.74	0.74
P7	Across W approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		212	30.2	LOS D			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Processed: Tuesday, 25 November 2014 9:48:59 AM

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Project: P:\15M1200-1299\15M1274000 - Leopold Gateway Plaza\Modelling\141123sid-15M1274000-Bellarine-Melaluka.sip

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PHASING SUMMARY

Site: Bellarine/Melaluka Post Dev
Sat - Southern Site Only

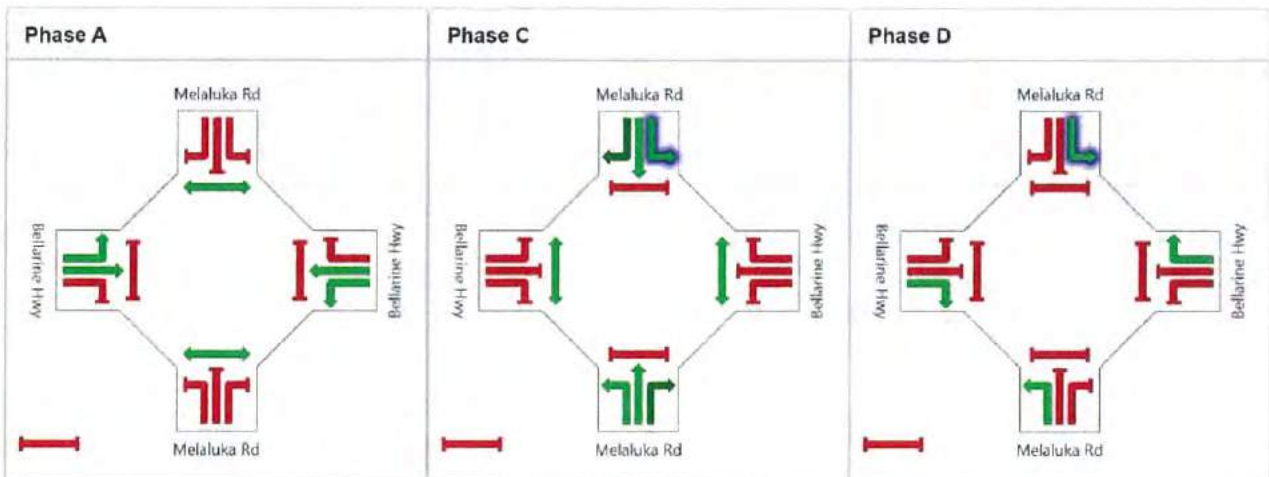
Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 85 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Two-Phase
Input Sequence: A, C, D
Output Sequence: A, C, D

Phase Timing Results

Phase	A	C	D
Green Time (sec)	30	25	12
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	36	31	18
Phase Split	42 %	36 %	21 %



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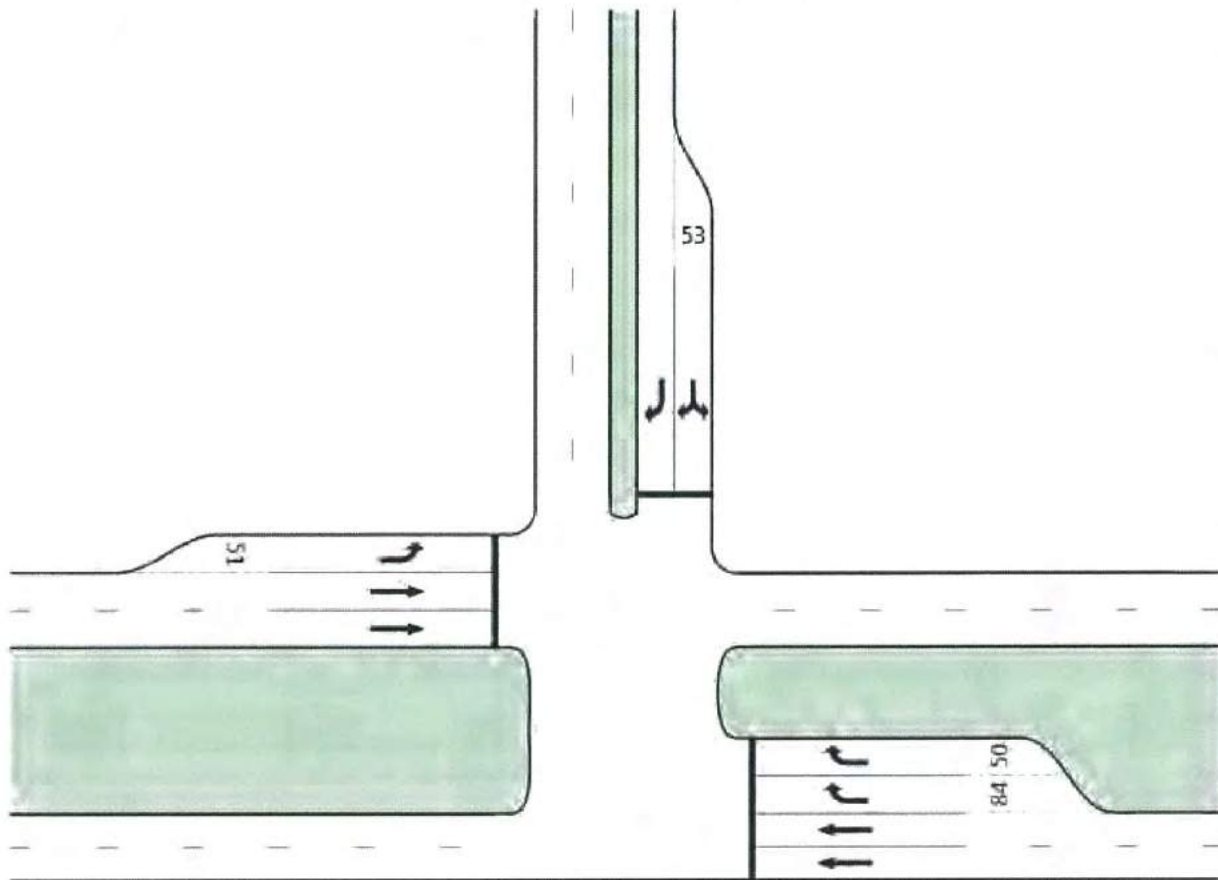
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Clifton Avenue (North Avenue)

Bellarine Highway (West Approach)



Bellarine Highway (East Approach)

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13/07/2015

Date

MOVEMENT SUMMARY

Site: Friday PM - Southern Site
Only - no peds - no left slip

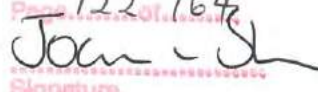
Bellarine Highway / Clifton Avenue
Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Bellarine Highway (East Approach)											
5	T	955	8.0	0.338	3.8	LOS A	7.1	53.2	0.33	0.30	68.3
6	R	302	2.0	0.742	60.7	LOS E	7.7	55.1	1.00	0.86	24.7
Approach		1257	6.6	0.742	17.5	LOS B	7.7	55.1	0.49	0.43	49.3
North: Clifton Avenue (North Avenue)											
7	L	146	2.0	0.769	55.4	LOS E	9.5	67.7	0.98	0.89	26.0
9	R	203	2.0	0.769	59.4	LOS E	9.5	67.7	1.00	0.90	25.0
Approach		349	2.0	0.769	57.8	LOS E	9.5	67.7	0.99	0.89	25.4
West: Bellarine Highway (West Approach)											
10	L	100	2.0	0.147	13.1	LOS B	1.2	8.2	0.26	0.73	53.0
11	T	1791	8.0	0.797	16.4	LOS B	33.2	248.4	0.83	0.77	48.4
Approach		1891	7.7	0.797	16.2	LOS B	33.2	248.4	0.80	0.77	48.6
All Vehicles		3497	6.7	0.797	20.8	LOS C	33.2	248.4	0.71	0.66	44.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

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PHASING SUMMARY

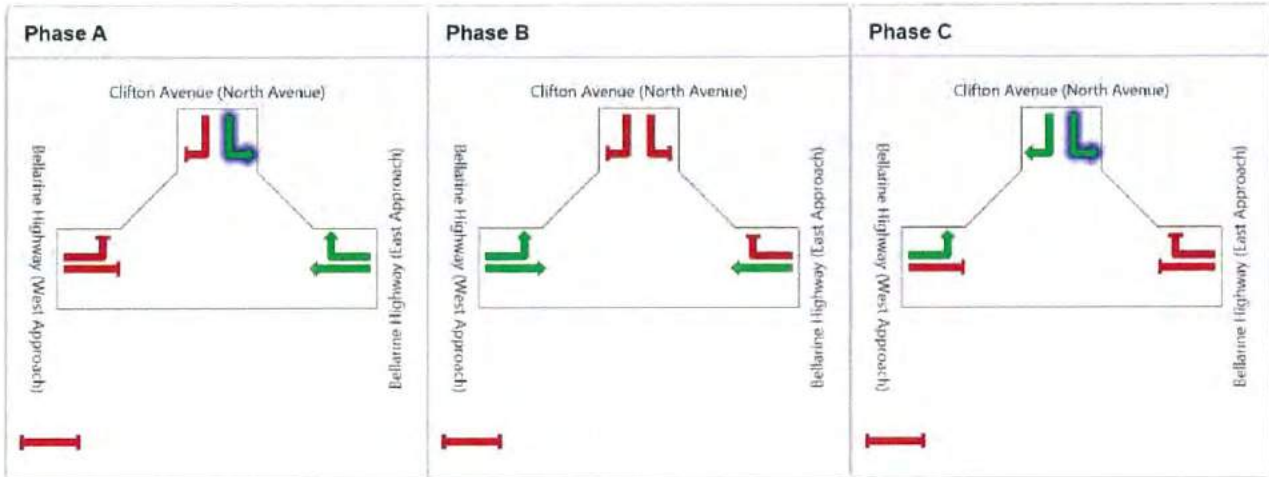
Site: Friday PM - Southern Site
 Only - no peds - no left slip

Bellarine Highway / Clifton Avenue
 Signals - Fixed Time Cycle Time = 100 seconds (User-Given Cycle Time)

Phase times determined by the program
 Sequence: Two-Phase
 Input Sequence: A, B, C
 Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	11	60	11
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	17	66	17
Phase Split	17 %	66 %	17 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

Processed: Tuesday, 25 November 2014 2:22:56 PM
 SIDRA INTERSECTION 5.1.13.2093
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 13/07/2015

MOVEMENT SUMMARY

Site: Saturday - Southern Site
Only - no peds - no left slip


Bellarine Highway / Clifton Avenue
Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Bellarine Highway (East Approach)											
5	T	1213	8.0	0.469	5.8	LOS A	10.9	81.8	0.47	0.43	63.5
6	R	315	2.0	0.658	50.5	LOS D	6.6	47.3	1.00	0.83	27.9
Approach		1529	6.8	0.658	15.1	LOS B	10.9	81.8	0.58	0.51	51.3
North: Clifton Avenue (North Avenue)											
7	L	153	2.0	0.611	39.9	LOS D	6.9	49.2	0.90	0.81	31.1
9	R	210	2.0	0.611	45.8	LOS D	7.0	50.0	0.97	0.82	29.0
Approach		363	2.0	0.611	43.3	LOS D	7.0	50.0	0.94	0.81	29.9
West: Bellarine Highway (West Approach)											
10	L	106	2.0	0.157	13.6	LOS B	1.2	8.8	0.30	0.74	52.3
11	T	1246	8.0	0.658	16.7	LOS B	19.1	143.0	0.80	0.71	48.3
Approach		1352	7.5	0.658	16.5	LOS B	19.1	143.0	0.76	0.72	48.5
All Vehicles		3244	6.5	0.658	18.8	LOS B	19.1	143.0	0.70	0.63	46.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Processed: Tuesday, 25 November 2014 2:22:57 PM
SIDRA INTERSECTION 5.1.13.2093
Project: P:\15M1200-1299\15M1274000 - Leopold Gateway Plaza\Modelling\141123sid-15M1274000 Bellarine Hwy & Clifton Av.sip
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PHASING SUMMARY

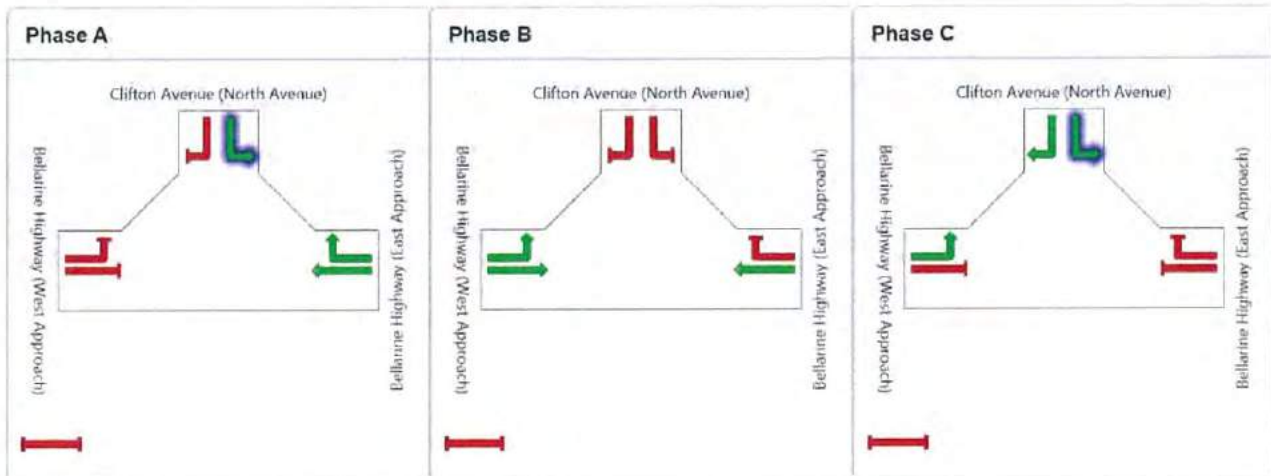
Site: Saturday - Southern Site
 Only - no peds - no left slip

Bellarine Highway / Clifton Avenue
 Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Phase times determined by the program
 Sequence: Two-Phase
 Input Sequence: A, B, C
 Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	11	43	13
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	17	49	19
Phase Split	20 %	58 %	22 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

Processed: Tuesday, 25 November 2014 2:22:57 PM
 SIDRA INTERSECTION 5.1.13.2093
 Project: P:\15M1200-1299\15M1274000 - Leopold Gateway Plaza\Modelling\141123sid-15M1274000 Bellarine Hwy & Clifton Av.sip
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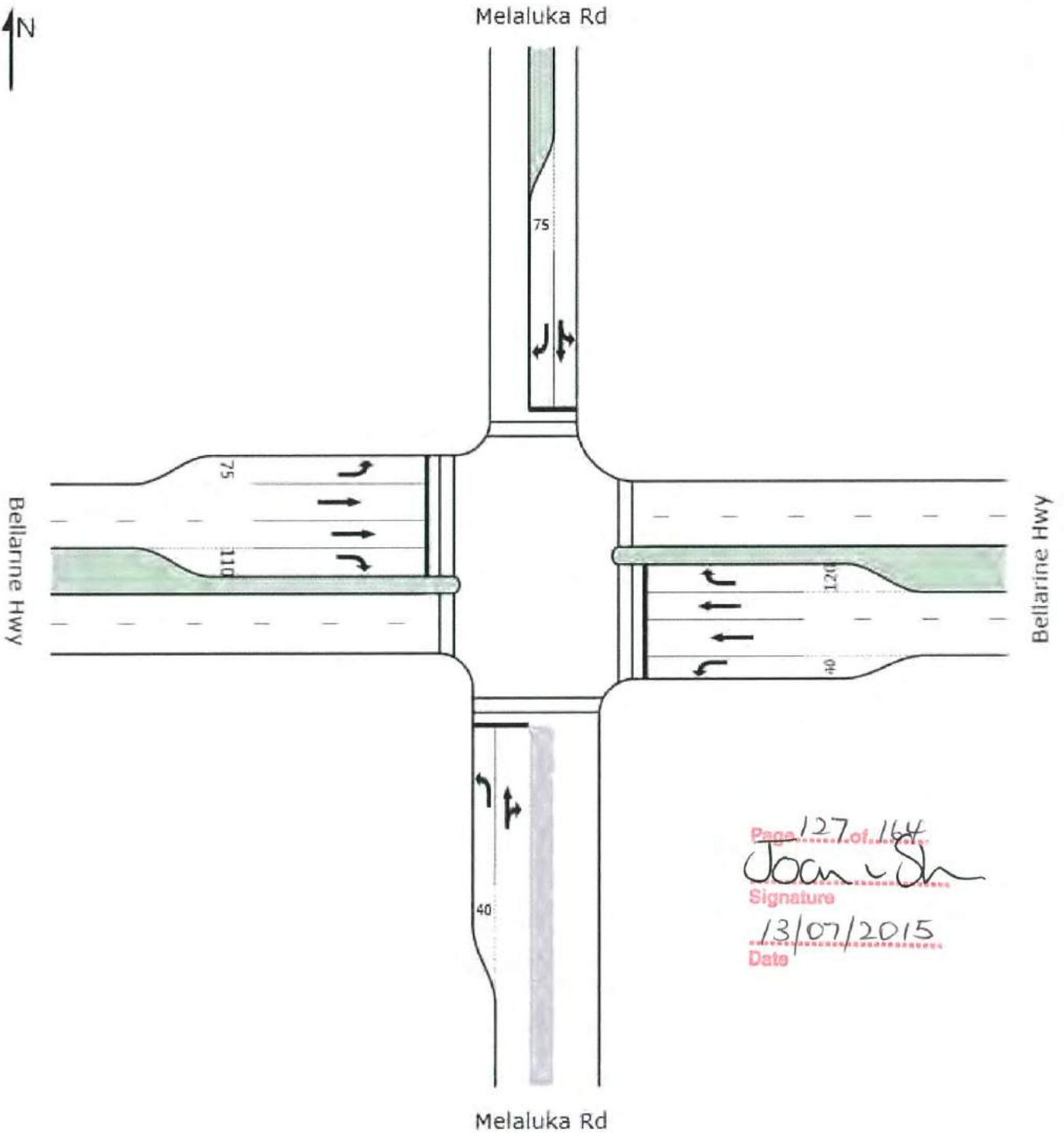
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Appendix F

Ultimate Post Development SIDRA Results

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Date 13/07/2015



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Signature: *Joan & Sh*
Date: 13/07/2015

MOVEMENT SUMMARY

Site: Bellarine/Melaluka Post Dev
Fri PM - Ult + MITIGATION

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Melaluka Rd											
1	L	195	8.0	0.638	24.1	LOS C	5.2	38.7	0.60	0.77	39.1
2	T	128	8.0	0.848	65.1	LOS E	10.9	81.4	1.00	0.97	20.6
3	R	41	8.0	0.848	74.6	LOS E	10.9	81.4	1.00	0.97	22.1
Approach		363	8.0	0.848	44.2	LOS D	10.9	81.4	0.78	0.87	28.3
East: Bellarine Hwy											
4	L	65	8.0	0.339	42.3	LOS D	2.7	20.4	0.75	0.75	31.1
5	T	1090	8.0	0.932	64.0	LOS E	39.7	296.7	1.00	1.08	25.0
6	R	211	8.0	0.957	93.3	LOS F	15.8	118.3	1.00	1.02	18.0
Approach		1366	8.0	0.957	67.5	LOS E	39.7	296.7	0.99	1.06	23.9
North: Melaluka Rd											
7	L	260	8.0	0.757	51.5	LOS D	21.9	163.7	0.97	0.89	27.6
8	T	142	8.0	0.757	41.9	LOS D	21.9	163.7	0.97	0.86	25.8
9	R	150	8.0	0.569	56.1	LOS E	8.1	60.5	0.94	0.82	25.9
Approach		552	8.0	0.757	50.3	LOS D	21.9	163.7	0.96	0.86	26.6
West: Bellarine Hwy											
10	L	184	8.0	0.280	20.2	LOS C	3.2	24.0	0.32	0.75	45.4
11	T	1624	8.0	0.949	30.5	LOS C	50.9	380.5	0.94	0.98	37.7
12	R	360	8.0	0.939	57.8	LOS E	15.9	118.8	1.00	0.98	25.5
Approach		2168	8.0	0.949	34.1	LOS C	50.9	380.5	0.90	0.96	35.6
All Vehicles		4450	8.0	0.957	47.2	LOS D	50.9	380.5	0.92	0.97	29.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	35.3	LOS D	0.1	0.1	0.77	0.77
P3	Across E approach	53	46.8	LOS E	0.2	0.2	0.88	0.88
P5	Across N approach	53	34.5	LOS D	0.1	0.1	0.76	0.76
P7	Across W approach	53	46.8	LOS E	0.2	0.2	0.88	0.88
All Pedestrians		212	40.9	LOS E			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

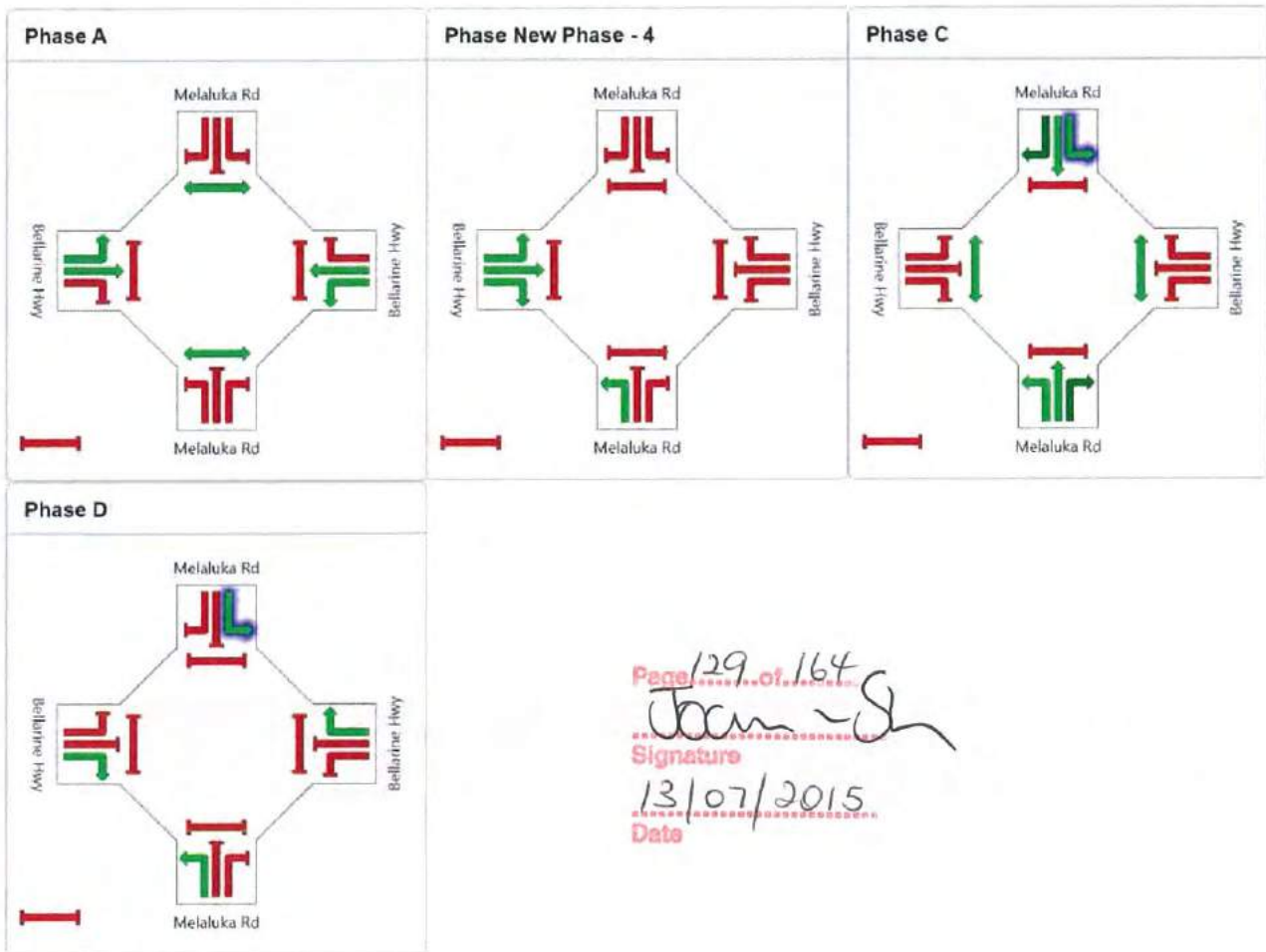
Site: Bellarine/Melaluka Post Dev
Fri PM - UIt + MITIGATION

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 120 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, New Phase - 4, C, D
Output Sequence: A, New Phase - 4, C, D

Phase Timing Results

Phase	A	New Phase - 4	C	D
Green Time (sec)	37	11	33	15
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	43	17	39	21
Phase Split	36 %	14 %	33 %	18 %



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 Signature: [Handwritten Signature]
 Date: 13/07/2015

Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

MOVEMENT SUMMARY

Site: Bellarine/Melaluka Post Dev
Sat - Ult + MITIGATION

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Melaluka Rd											
1	L	266	8.0	0.963	38.3	LOS D	8.7	65.3	0.96	0.85	31.9
2	T	161	8.0	0.480	41.7	LOS D	10.0	74.7	0.90	0.75	26.6
3	R	37	8.0	0.480	51.2	LOS D	10.0	74.7	0.90	0.84	28.1
Approach		464	8.0	0.963	40.5	LOS D	10.0	74.7	0.94	0.81	29.6
East: Bellarine Hwy											
4	L	55	8.0	0.267	37.6	LOS D	2.1	15.8	0.69	0.75	33.3
5	T	1303	8.0	0.958	70.0	LOS E	50.9	380.9	1.00	1.14	23.5
6	R	222	8.0	0.889	77.7	LOS E	14.9	111.4	1.00	0.95	20.7
Approach		1581	8.0	0.958	70.0	LOS E	50.9	380.9	0.99	1.10	23.3
North: Melaluka Rd											
7	L	249	8.0	0.557	40.0	LOS D	16.9	126.2	0.83	0.86	31.6
8	T	122	8.0	0.557	30.5	LOS C	16.9	126.2	0.83	0.73	30.2
9	R	197	8.0	0.937	90.9	LOS F	15.2	113.8	1.00	1.11	18.9
Approach		568	8.0	0.937	55.6	LOS E	16.9	126.2	0.89	0.92	25.3
West: Bellarine Hwy											
10	L	191	8.0	0.544	40.1	LOS D	8.0	59.8	0.76	0.80	32.1
11	T	1282	8.0	0.940	63.1	LOS E	47.6	355.8	1.00	1.10	25.2
12	R	221	8.0	0.883	76.8	LOS E	14.7	110.0	1.00	0.94	20.9
Approach		1694	8.0	0.940	62.3	LOS E	47.6	355.8	0.97	1.05	25.1
All Vehicles		4307	8.0	0.963	61.9	LOS E	50.9	380.9	0.96	1.03	24.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	30.8	LOS D	0.1	0.1	0.72	0.72
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.81	0.81
P5	Across N approach	53	30.1	LOS D	0.1	0.1	0.71	0.71
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.81	0.81
All Pedestrians		212	34.8	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Joan - J
Signature
13/07/2015
Date

PHASING SUMMARY

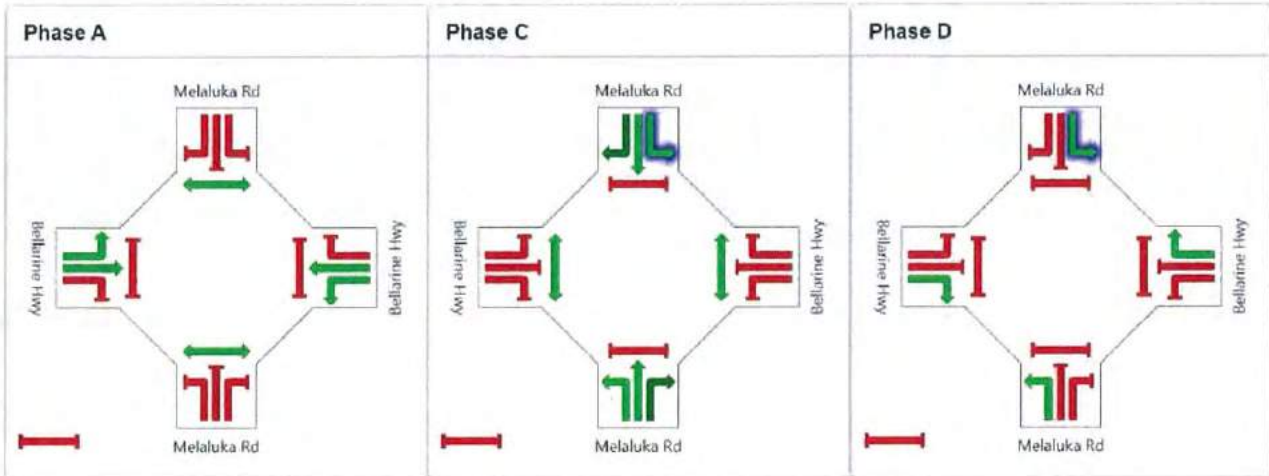
Site: Bellarine/Melaluka Post Dev
Sat - Ult + MITIGATION

Bellarine/Melaluka
Signals - Fixed Time Cycle Time = 120 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, C, D
Output Sequence: A, C, D

Phase Timing Results

Phase	A	C	D
Green Time (sec)	43	42	17
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	49	48	23
Phase Split	41 %	40 %	19 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

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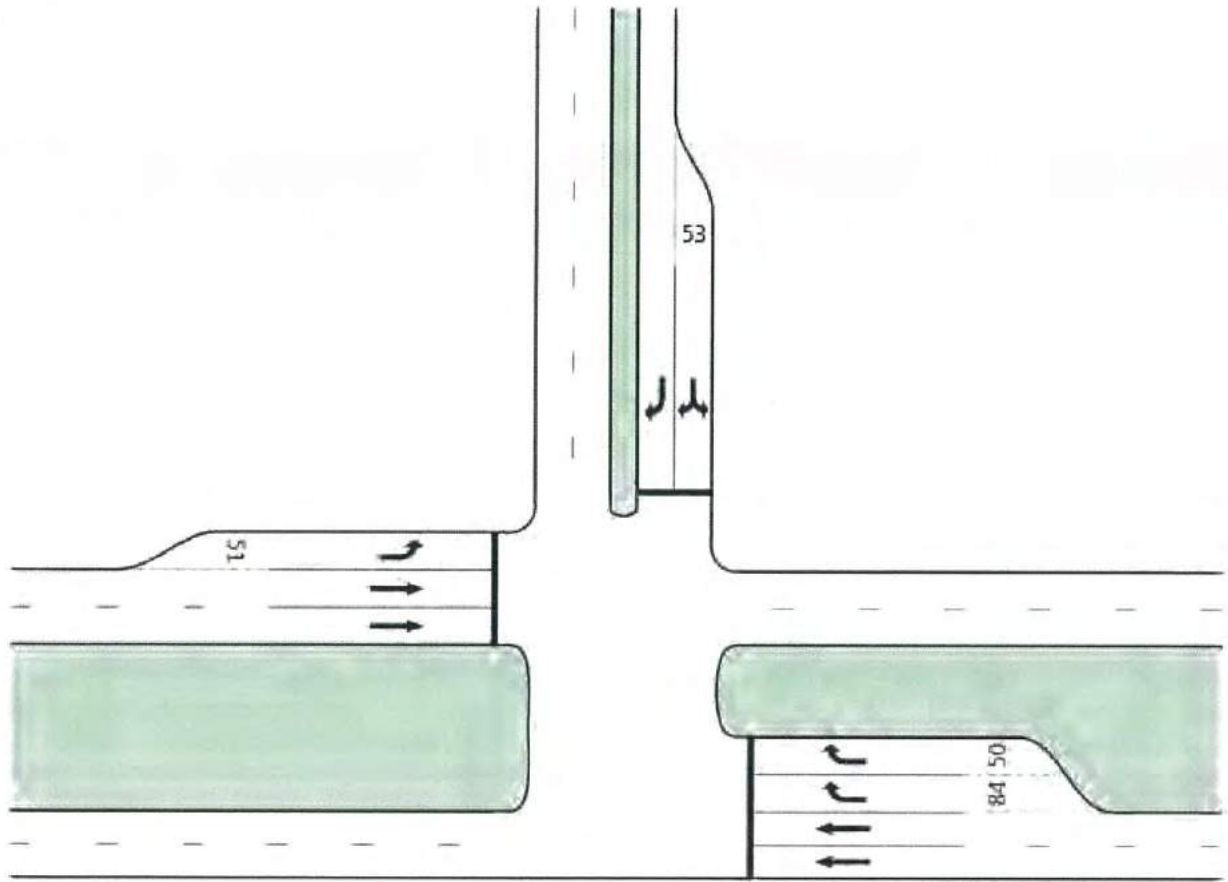
SIDRA INTERSECTION

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John - Jh
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13/07/2015
Date



Clifton Avenue (North Avenue)

Bellarine Highway (West Approach)



Bellarine Highway (East Approach)

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Signature: *Joan - S*
Date: 13/07/2015

MOVEMENT SUMMARY

Site: Friday PM - Ultimate - no Peds - no left slip

Bellarine Highway / Clifton Avenue
 Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow 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
East: Bellarine Highway (East Approach)											
5	T	1000	8.0	0.372	6.2	LOS A	10.5	78.5	0.40	0.36	63.6
6	R	436	2.0	0.912	77.0	LOS E	17.4	124.1	1.00	0.95	20.9
Approach		1436	6.2	0.912	27.7	LOS C	17.4	124.1	0.58	0.54	40.6
North: Clifton Avenue (North Avenue)											
7	L	223	2.0	0.906	54.4	LOS D	12.1	86.5	0.88	0.87	26.3
9	R	292	2.0	0.906	76.1	LOS E	19.1	135.7	1.00	1.01	21.4
Approach		515	2.0	0.906	66.7	LOS E	19.1	135.7	0.95	0.95	23.2
West: Bellarine Highway (West Approach)											
10	L	145	2.0	0.255	14.4	LOS B	2.2	15.9	0.29	0.74	51.4
11	T	1880	8.0	0.941	50.1	LOS D	65.8	492.5	1.00	1.10	29.0
Approach		2024	7.6	0.941	47.5	LOS D	65.8	492.5	0.95	1.07	29.8
All Vehicles		3976	6.3	0.941	42.8	LOS D	65.8	492.5	0.81	0.86	31.6

Level of Service (LOS) Method: Delay (HCM 2000).
 Vehicle movement LOS values are based on average delay per movement
 Intersection and Approach LOS values are based on average delay for all vehicle movements.
 SIDRA Standard Delay Model used.

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 Signature: *Joan - Sh*
 Date: 13/07/2015

PHASING SUMMARY

Site: Friday PM - Ultimate - no Peds - no left slip

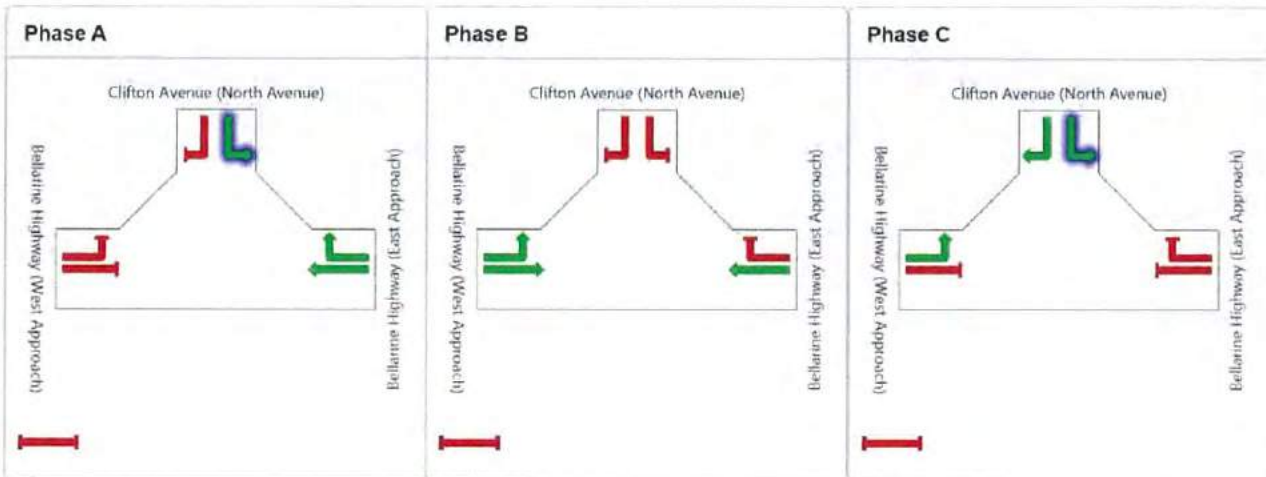
Bellarine Highway / Clifton Avenue
 Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program

Sequence: Two-Phase
 Input Sequence: A, B, C
 Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	18	64	20
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	24	70	26
Phase Split	20 %	58 %	22 %



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 8000056, GTA CONSULTANTS, ENTERPRISE

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MOVEMENT SUMMARY

Site: Saturday - Ultimate - no Peds
- no left slip

Bellarine Highway / Clifton Avenue
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Bellarine Highway (East Approach)											
5	T	1272	8.0	0.501	9.2	LOS A	17.2	129.0	0.51	0.47	58.3
6	R	493	2.0	0.877	67.5	LOS E	18.9	134.9	0.96	0.94	23.0
Approach		1765	6.3	0.877	25.5	LOS C	18.9	134.9	0.64	0.60	41.9
North: Clifton Avenue (North Avenue)											
7	L	253	2.0	0.896	52.0	LOS D	12.1	86.5	0.72	0.90	27.0
9	R	329	2.0	0.852	66.5	LOS E	20.7	147.2	1.00	0.95	23.3
Approach		582	2.0	0.896	60.2	LOS E	20.7	147.2	0.88	0.93	24.8
West: Bellarine Highway (West Approach)											
10	L	165	2.0	0.352	17.5	LOS B	3.4	24.0	0.38	0.75	47.9
11	T	1364	8.0	0.874	42.8	LOS D	41.1	307.6	0.99	0.98	31.7
Approach		1530	7.4	0.874	40.0	LOS D	41.1	307.6	0.92	0.96	32.8
All Vehicles		3877	6.1	0.896	36.4	LOS D	41.1	307.6	0.79	0.79	34.5

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model used.

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PHASING SUMMARY

Site: Saturday - Ultimate - no Peds
- no left slip

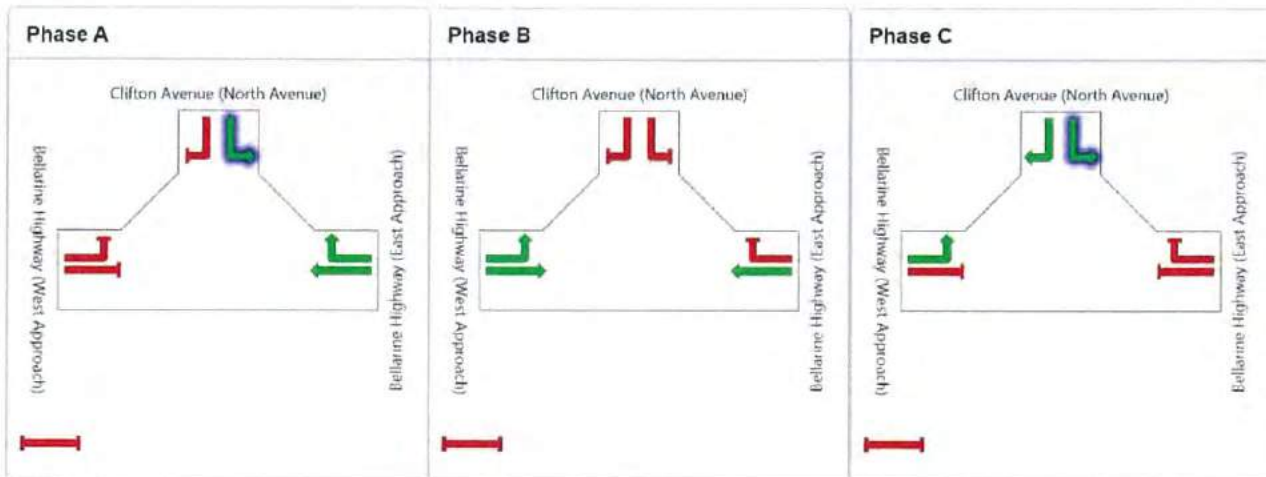
Bellarine Highway / Clifton Avenue
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program

Sequence: Two-Phase
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	27	50	25
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	33	56	31
Phase Split	28 %	47 %	26 %




- █ Normal Movement
- █ Slip-Lane Movement
- █ Stopped Movement
- █ Turn On Red
- █ Permitted/Opposed
- █ Opposed Slip-Lane
- █ Continuous Movement
- █ Undetected Movement
- Phase Transition Applied

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Appendix D

Flooding, Drainage and Stormwater
Management Plan

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Bellarine Gateway Plaza, Leopold Flooding, Stormwater & Drainage Management Plan

Job Number: CG120259

Prepared for Novion Property Group

1 May 2015



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Document Control

Version	Date	Description	Prepared	Reviewed	Principal Approval
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Rev 1	04 Oct 2012	SWMP	DB	MN	
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Rev 3	5 Aug 2013	SWMP	AN	EH	
Rev 4	12 Sept 2013	SWMP	EH	MN	
Rev 5	01 Oct 2013	SWMP	DB/JMN	EH	MN
Rev 6	12 Nov 2014	SWMP	DB/JMN	EH	MN
Rev 7	25 Nov 2014	SWMP	DB/JMN	EH	MN
Rev 8	1 May 2015	SWMP	DB/JMN	EH	RS

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1 Introduction

Cardno was engaged by Lascorp in May 2012 to prepare a Stormwater Management Plan (SWMP) for the proposed Gateway Plaza commercial activity centre in Leopold. Initially, the scope of work for this report was to consider the Lascorp site only with abutting land at 92-100 Melaluka Road excluded as it was owned by others and predominantly drained away from the subject site.

After the initial draft of this report was reviewed by Council and subsequent meetings held, it was agreed that the scope of drainage investigations should include the abutting land to the north as it formed part of the strategic development plan for the precinct and currently, flood runoff from 92-100 Melaluka Road is problematic.

Further, the approved Development Plan Overlay specifically requires this report to be "cognisant of catchment boundaries", and to take "into account development on both the southern and northern expansion sites".

This November 2014 version of the SWMP has been prepared for Novion, the new owners and includes the stormwater runoff from the property to the north, at 92-100 Melaluka Rd in respect to sizing the ultimate infrastructure required for development of both sites.

The following documents and policies have been considered in the preparation of this report:

- *WSUD Engineering Procedures: Stormwater, CSIRO Publishing, 2005;*
- *Clause 34.03 including decision guidelines relating to drainage and flooding in Clause 65 of the Greater Geelong Planning Scheme;*
- *City of Greater Geelong Stormwater Management Plan, 2002*
- *Melbourne Water Guidelines for Development in Flood Prone Areas 2003*
- *Royal Lifesaving Society – guidelines concerning safety in an around open water bodies to ensure adequate safety measures are built into the design.*

Stormwater detention has been modelled within the respective site and also on the land adjacent to Gateway Sanctuary to the south side the Bellarine Highway. Expected on site detention volumes and pipe sizes have been proposed to match predevelopment discharge rates to convey water safely to the appropriate locations.

Outlet conditions under the Bellarine Highway are restrictive and land to the west along Clifton Avenue is known to flood. To alleviate this situation, it is proposed to construct a new crossing under the Bellarine Highway to service the Gateway Plaza precinct.

The proposal also provides for an innovative solution to water quality and flooding through the construction of a stormwater detention and treatment system through a sedimentation basin and Biofilta that will provide the following benefits:

- Meet Best Practice stormwater runoff targets for the entire precinct with the option in the future of including the new catchment flows from 92-100 Melaluka Road, thus ensuring that future development of the precinct does not need to accommodate a distributed WSUD system;
- Implements a stormwater treatment system that is simple and uses proven natural processes to treat the stormwater;
- Provides an aesthetically appealing stormwater treatment system that is incorporated naturally into the surrounding landscape;

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2 Site Characteristics

2.1 Location and Existing Land Use

The primary subject site is located in the corner of Queenscliff Road and Melaluka Road, Leopold (Refer to Figure 1 below). The total site area is approximately 6.5ha and is currently zoned for business purposes with the Gateway Plaza development already in operation at the corner of the Bellarine Highway and Melaluka Road.

The existing site has previously been filled with material above the existing surface.

Figure 1: Locality Plan



2.2 Internal drainage sub-catchments and existing drainage system

Figure 2 below shows the internal sub-catchment areas and existing stormwater drainage system within and around the Novion site.

Figure 2: Sub-catchment Areas and Existing Drainage System



There is an existing box culvert to the south of the subject site running perpendicular to Bellarine Highway and to the west of the site parallel to Melaluka Road. These culverts discharge into the 'Gateway Sanctuary', which is a low depression formed into series of wetlands and serves as a general retardation basin. The site is not known to be a formal water quality treatment wetland.

The proposed development will discharge all stormwater to the western outlet, Outlet 1.

Details of Outlet 1 (Legal Point of Discharge) is presented in Table 1 below.

Table 1: Existing Drainage Invert Levels

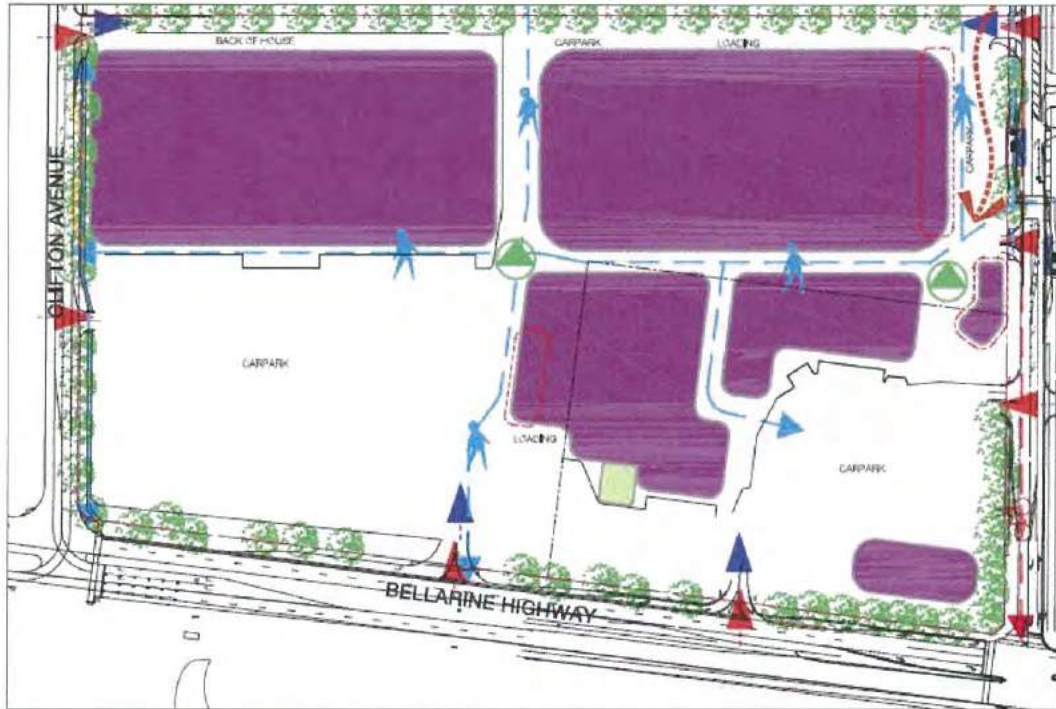
Area (ha)	Existing Outlet	Culvert	IL
6.50	1	900x450 Box Culvert	6.99

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3 Development Plan

The Novion site is proposed to be further developed for a range of commercial land uses. A Development Plan has been prepared to guide future proposals. This is shown in Figure 3. Specific planning permits will be sought to facilitate development inline with the plan.

Figure 3: Proposed Gateway Plaza Development



3.1 92-100 Melaluka Rd

The property to the north of the subject site currently lies on the boundary of two distinct catchments. Approximately the southern third of the site currently drains to the west and south via Clifton Ave. The flow passes under the Bellarine Highway via the existing 900x450mm culvert. The remaining northern two thirds of the site drain north towards Portarlington Rd. The City of Greater Geelong has indicated that the total runoff from the site, once it has been developed, will flow via Clifton Ave. Whilst the parcel does not form part of the Novion landholdings development this site has also been considered in preparing this report.

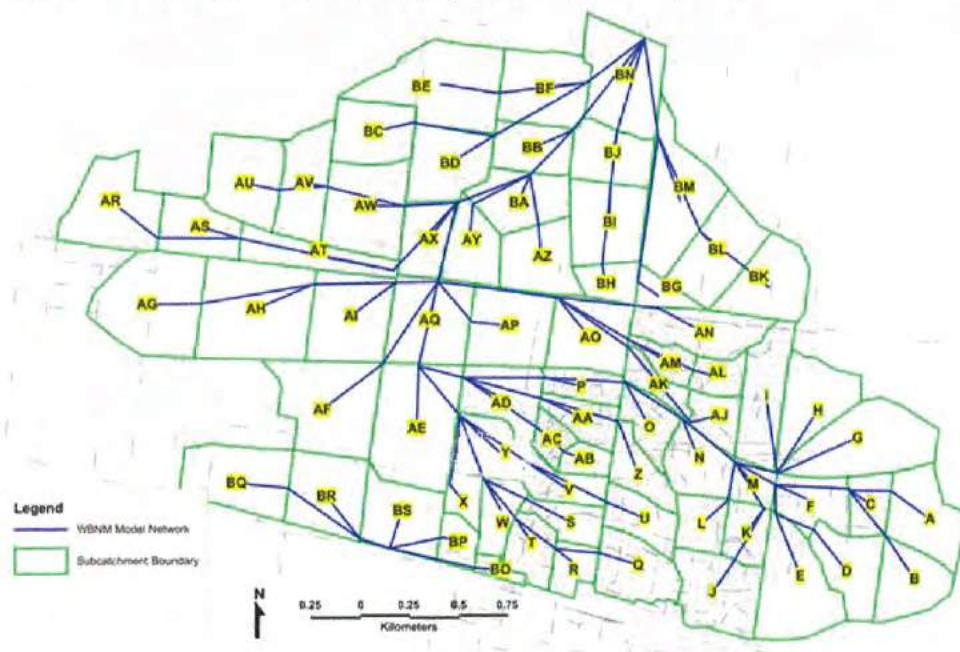
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4 1 in 100 year ARI Flood Assessment

Cardno has previously prepared a flood investigation report for Melaluka Road in February 2007 which includes the area surrounding this site. The flood investigation carried out was focused on flows to the north of the site which predominantly flow north and away from the site. The catchment to the south of the study area, and including the Bellarine Gateway Plaza Commercial Activity Centre, was included in the hydrological model to enable analysis of any cross-catchment flows that may occur in rare flood events.

The catchment plan and the modelled flood depth plot from the Cardno report are included in Figure 4 and Figure 5 below respectively. The location of Gateway Plaza commercial activity centre in Figure 4 is included in sub-catchment BS. The site to the north is included in sub-catchments BS and AE.

Figure 4: 1 in 100 year ARI Flood Mapping Map (Source: Cardno, 2007)



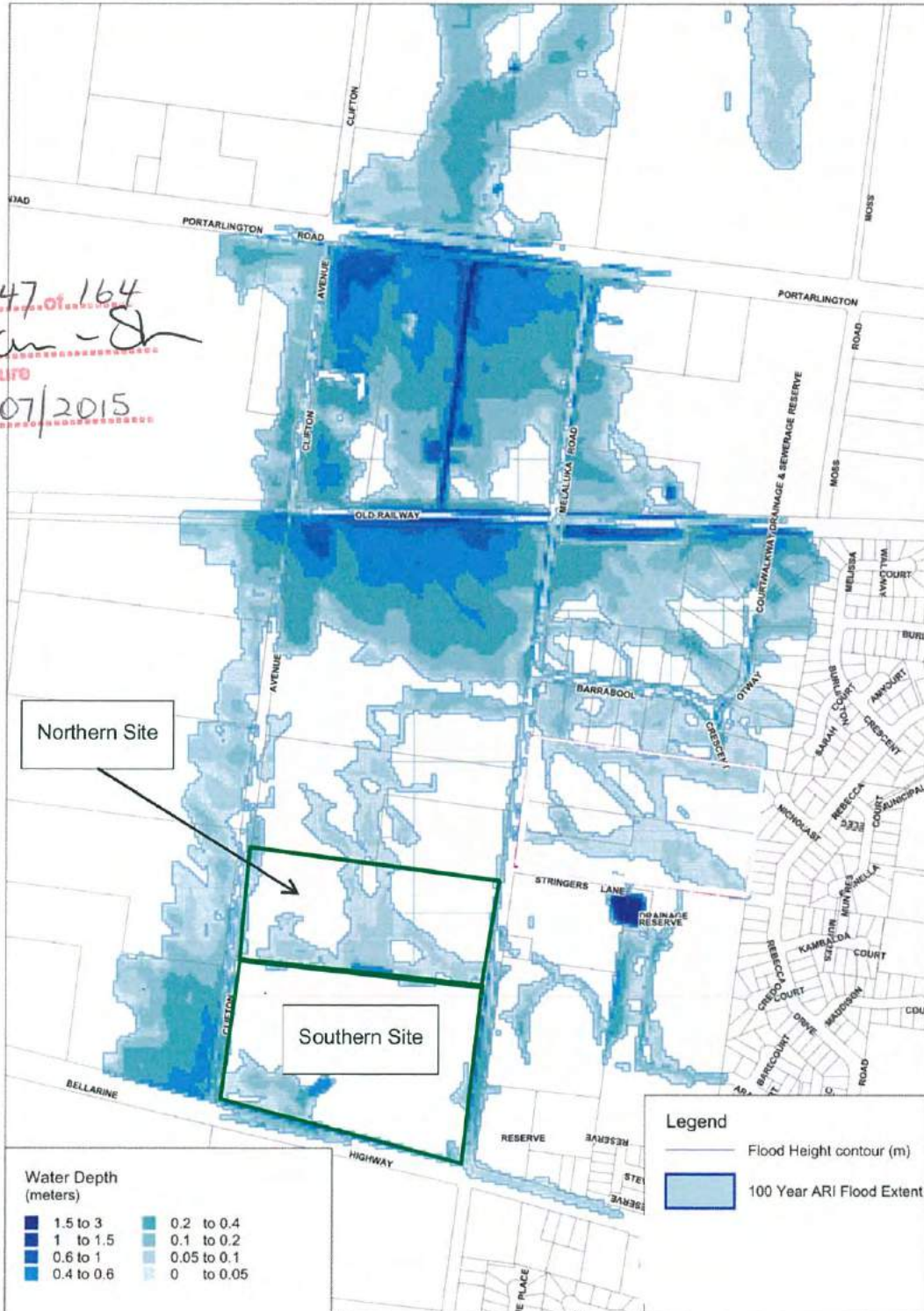
Note from previous flood modelling, there are external catchments which also affect the subject site from the east and west in sub catchments BQ, BR, BP and BO.

Figure 5 overleaf from the 2007 flood review shows that the Novion owned land is not affected by runoff from the abutting land to the north due to historical filling of the site; however there is currently significant flooding at the intersection of Clifton Avenue and Bellarine Highway due to limited existing culvert capacity.

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Figure 5: 1 in 100 year ARI Flood Mapping Map (Source: Cardno, 2007)

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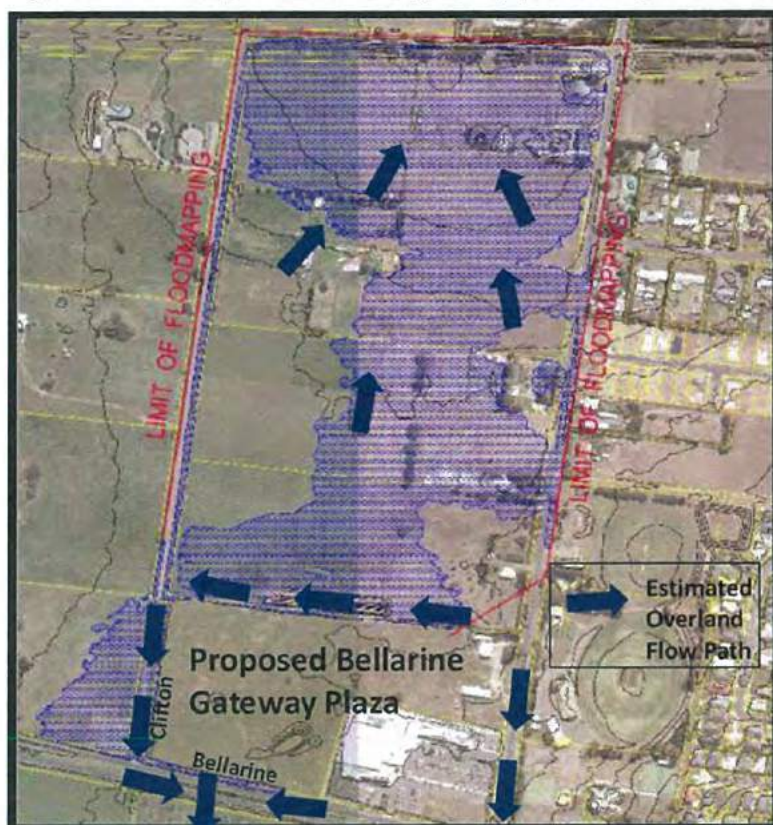


City of Greater Geelong prepared a 'Leopold Structure Plan' report in June 2011, which includes stormwater management for the area around the proposed Gateway Plaza and reads as follows (Refer to Figure 4 for the Flood Map):

The existing shopping centre site and the site directly abutting the centre was subject to filling a number of years ago. This fill raised the level of these sites above the level of surrounding land. The fill has subsequently displaced flood storage onto lots to the north and west and obstructed flood conveyance towards the Bellarine Highway (& Gateway Sanctuary) as shown by the map. As a result of this, flood waters and drainage flows within the southern sub-catchment now overflow more readily to the north and the drainage line discharging to Port Philip Bay at Moss Road.

Figure 6 shows the extent of 1 in 100 year ARI flood to the north and west of the subject site. The estimated overland flows paths are shown.

Figure 6: 1 in 100 year ARI Flood Mapping Map (Source: City of Greater Geelong, June 2011)



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Council have agreed that the mapping shown above is not accurate and should not be relied upon. Hence, Cardno have adopted the 2007 model and used reliable up to date Lidar data to better reflect the flood conditions.

It is expected that there will be no external catchment flows running into the site. Flows from north of the development site discharge into an existing channel that runs across the site's northern boundary in an East-West direction. These flows will then be diverted along Clifton Ave and Bellarine Highway, prior to being discharged into the 'Gateway Sanctuary', which is located to the south of the site.

The external catchment to the site flowing south past the Bellarine Highway has been included in our hydraulic model as discussed in more detail in Section 5 below.

5 Stormwater Quantity Management – Precinct Assessment

As required by the Development Plan Overlay the drainage investigations include the abutting land to the north and the current proposed development site. Hence the flows from the property to the north, 92-100 Melaluka Rd, have been incorporated into the investigation by determining the required detention and flow rates. The permissible site discharge from the property to the north is 0.35m³/s. This on-site detention is represented by a storage tank of size 1350kl. The runoff from this site is assumed to travel via Clifton Av in a 600mm dia underground pipe network and under the Bellarine Highway via the new culverts proposed as part of this development. The proposed 600mm dia pipe will not allow for the inflow of local stormwater in Clifton AV.

All flows up to the 1 in 100 year ARI from both sites are to be conveyed beneath the Bellarine Highway through three 600mm diameter proposed culverts. Detailed design of the new culverts will illustrate interactions with services that run along the Bellarine Hwy and will contain syphon details if required. Two of the proposed 600mm culverts will be used to convey the partially detained flow from the proposed Gateway Plaza with the remaining culvert to convey detained flows from the property to the north.

Flows from the Gateway Plaza will be partially detained with the car park to a depth of no more than 250mm. The total detention volume required to convey the 1 in 100 year flow through the two proposed 600mm culverts is 300m³.

Increasing flow capacity beneath the Bellarine Highway by the addition of the three proposed 600mm diameter culverts will also allow for greater capacity to handle flows from adjoining catchments and alleviate any problems of flooding surrounding the site.

All stormwater flows are proposed to be detained by an integrated Sedimentation/Retention Basin to the south of the site, adjacent to the existing Gateway Sanctuary. This system includes a sedimentation basin and retention basin which has the combined functionality of detention and initial treatment of stormwater prior to secondary treatment through a Biofilta.

Total storage for the proposed detention basin will be approximately 4,100m³ and is within the required detention volume to handle stormwater from the site. This storage capacity is due to the constraints of the inlet invert which ensures stormwater can be conveyed by gravity at a suitable grading to the detention basin and that the basin is graded up to existing levels of the site. The system will be located and excavated to the west of the Gateway Sanctuary.

A hydraulic model was developed to determine the detention volumes required to detain the peak discharge of the 1 in 100 year ARI events to the expected predevelopment levels.

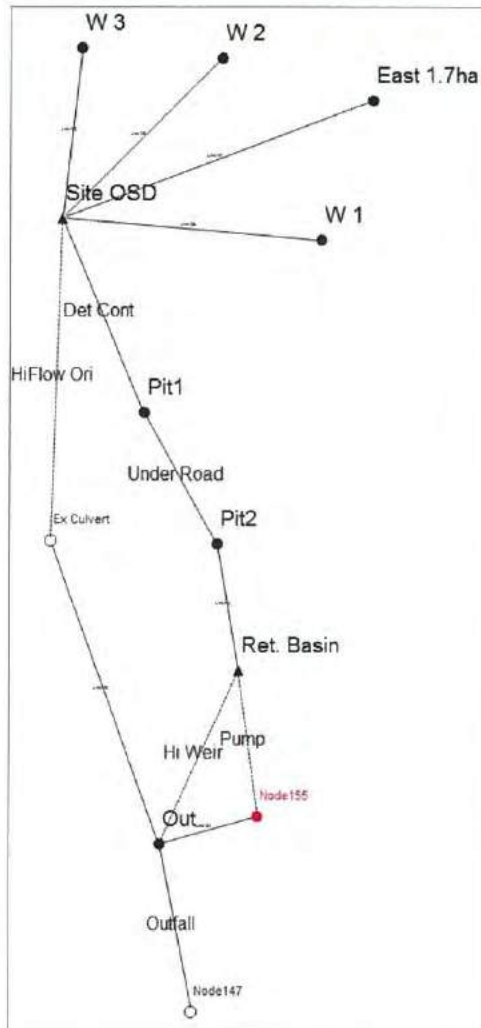
The volumes required to detain these flows are shown in Table 2 below.

Table 2: Detention Requirements for the 1 in 100 year ARI Flow

Storm Frequency	Pre-developed (both sites)	Post-developed (total detention basin outflow)	Buffer Detention Volume Required within Proposed Car Park	Detention Volume Required (South of Bellarine Highway)
1 in 100yr ARI	0.65 m ³ /s	0.63 m ³ /s	300 m ³	4,100 m ³

The proposed stormwater detention location is shown in Figure 7 below.

Figure 8: XP SWMM Network



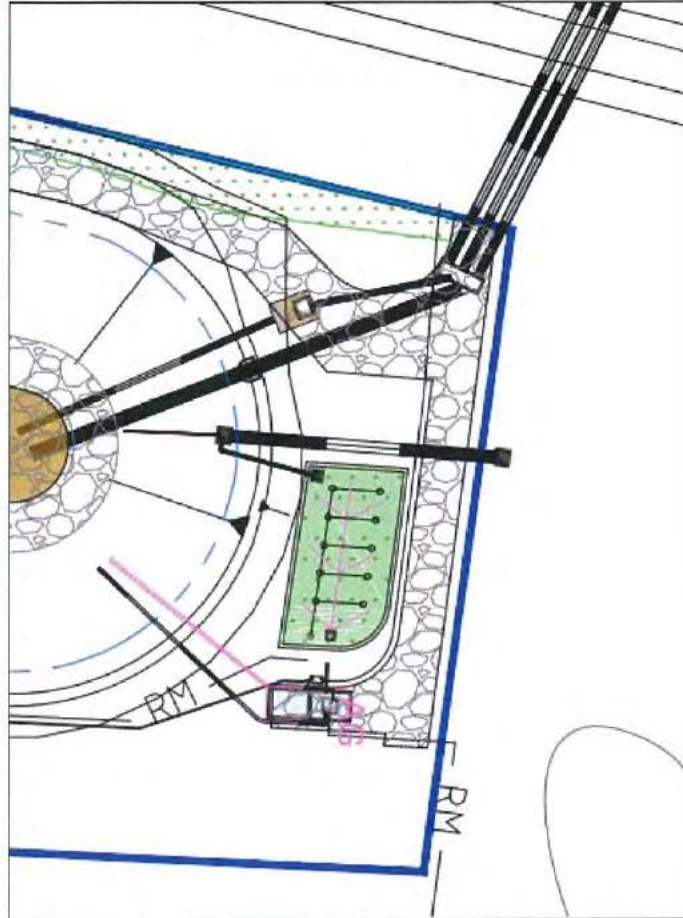
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A detention system is proposed at the location adjacent to the Gateway Sanctuary to the south of the site. As outlined above in Figure 8 the detention system will consist of a 400m² sedimentation basin and a 100m² planter bed. The sediment basin will also act as a detention basin with a capacity of approximately 4,100m³. The total flow through the three proposed culverts is expected to be 1.2m³/s for the 100 year ARI. The stormwater carried by the proposed culverts is conveyed directly into the sediment/detention basin.

The Biofilta transfer/sustainability tank outlet consists of a pump with a rising main to the legal point of discharge. The proposed pump and rising main is required to convey treated stormwater to the legal point of discharge, at an invert level of 6.99m AHD. The outlet pumping rate is 6 L/s.

A high flow outlet is provided in the detention basin and is sized such that the total outflow is no more than the pre-developed flow of 0.65m³/s. The high flow outlet has an invert of 7.5m AHD to prevent flows from the Gateway Sanctuary entering the detention basin. The retarded flows in the basin above 7.5m will flow to into the Gateway Sanctuary via a grated pit outlet at 7.5m AHD as shown in Figure 9.

Figure 9: XP SWMM Network



Flows from the proposed Bellarine Gateway Plaza, up to the 100 year ARI, will also be detained on the surface of the proposed car park within the subject site to a maximum depth of 250mm. The total detained volume on the surface of the car park is 300kl spread throughout the south western section of the carpark at a maximum depth 250mm. It is recommended that a bund is incorporated between the Bellarine Highway and Gateway Plaza at the location of the Q100 ARI pit.

Further refinement of pipe sizing and car park storage may be undertaken to limit the depth of temporary flooding in the car park by increasing the capacity of the new culvert under the Bellarine Highway. This will be addressed in detailed design in-conjunction with the civil works designers.

The 100 year ARI storage hydrograph and outflow hydrograph is shown in Figure 10 and Figure 11 below.

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Figure 10: Stage Hydrograph for the Site Detention System during a 100 Year ARI Storm Event

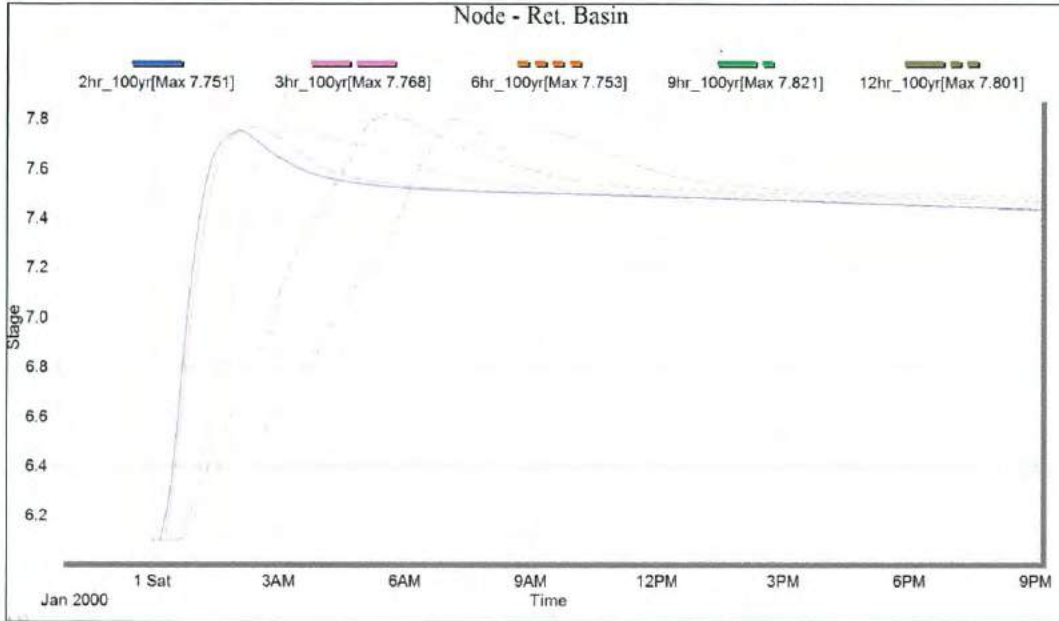
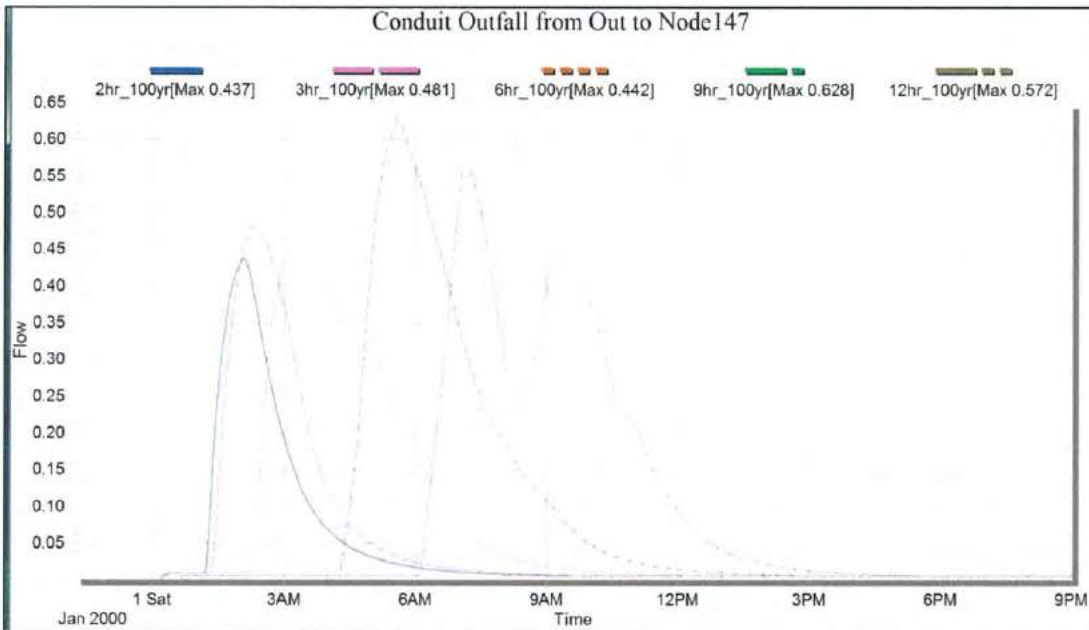
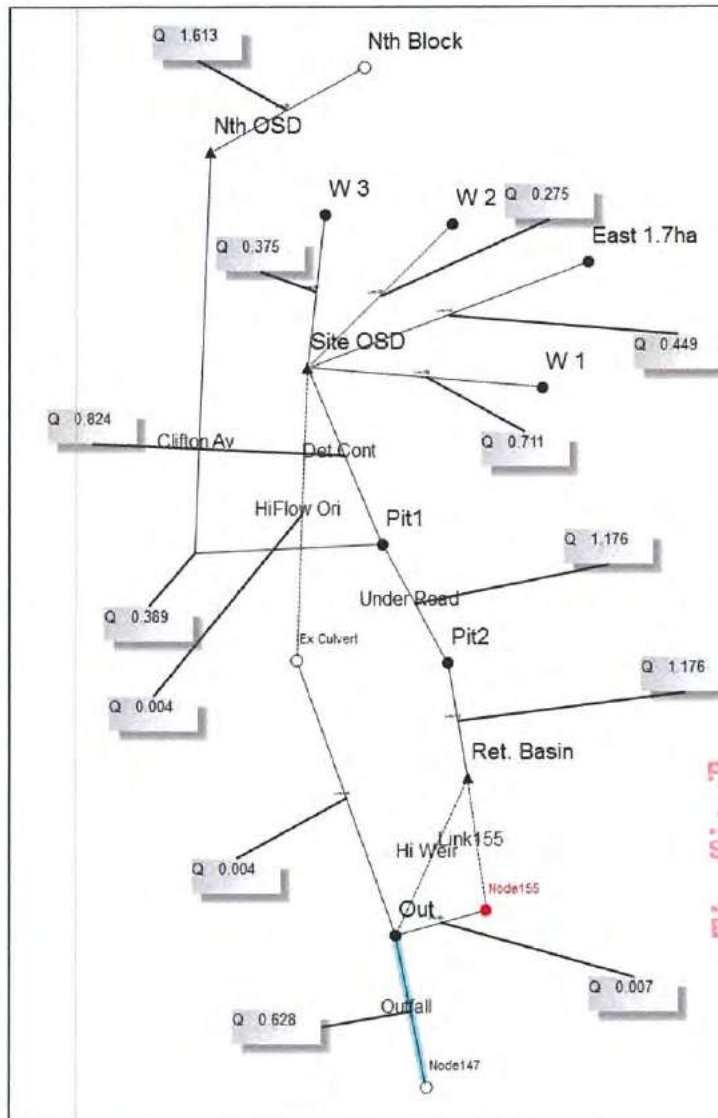


Figure 11: Outflow Hydrograph for the Site Detention System during a 100 Year ARI Storm Event



The peak flows for the post development drainage network for the 1 in 100 year ARI is shown below in Figure 12.

Figure 12: Flow Rates for all Elements of the Drainage Network for the 100 Year ARI Storm Event



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 Data

A schematic long section of the proposed detention network is included in Annex 1.

Flow up to 10 year ARI storm will be conveyed by an underground pipe network throughout the proposed development through the three proposed 600mm culverts and into the proposed detention system to the south of the Bellarine Highway. These pipes will be pipe jacked/tunnel bored under the highway to prevent disruption to the traffic flow.

Overland flow paths within the site will convey flows up to the 1 in 100 year ARI flow from the development to the detention system. The proposed road and car park levels will be regraded to provide these overland flow paths during detailed design. 100 year grated inlet pits have been included in the design as shown on C1001 to take all flows under the Bellarine Hwy.

6 Water Quality Impact Report

6.1 Objectives

The objective of the development with respect to stormwater quality is to treat the stormwater as such it can achieve environmental objectives as stated in Urban Stormwater Best Practice Environmental Management Guidelines (BPEMG). BPEMG objectives for stormwater quality improvement are as follows:

- Reduction of Total Suspended Solid (TSS) : 80%
- Reduction of Total Phosphorous (TP) : 45%
- Reduction of Total Nitrogen (TN) : 45%
- Reduction of Gross Pollutants (GP) : 70%

6.2 Proposed Treatment Measures

The model for Urban Stormwater Improvement Conceptualisation (MUSIC) V5.1 has been used to assess the water quality improvement measures for the development. The modelling was undertaken using City of Greater Geelong MUSIC Guidelines and rainfall from Geelong North Gauge, 1985 at 6min time step.

A sedimentation basin and Biofilta™ is proposed to the south of the development, on the western side of the Gateway Sanctuary to treat stormwater flow for the entire 6.5ha site of Bellarine Gateway Plaza and 6.7ha site of the abutting 92-100 Melaluka Rd site. The sedimentation and biofilta system has been designed to treat the site to exceed best practice guidelines.

The topography and grades of the site constrains the basin inlet invert and hence NTWL, at 5.45m AHD, which allows for natural gravity-driven conveyance of stormwater to the detention and treatment zone. A submerged pump pit within the sedimentation basin will transfer flows to the Biofilta through a rising main whereby a transfer/sustainability tank will collect the treated flow and a secondary pump within the tank will pump treated stormwater to the legal point of discharge, at an invert level of 6.99m AHD.

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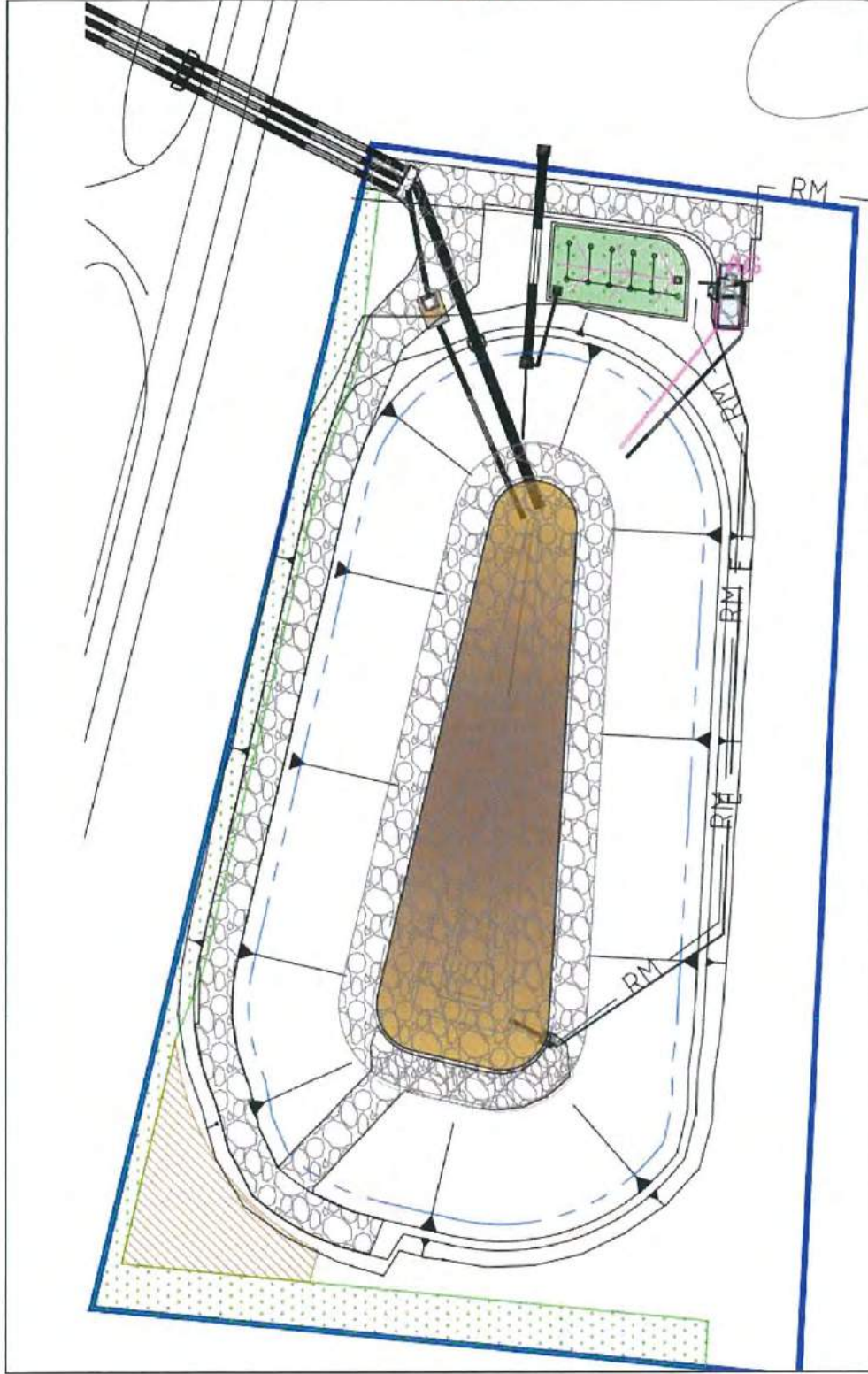


Figure 13: Proposed sedimentation/retention basin and Biofilta System

All stormwater runoff from the site will be conveyed to the 400m² sedimentation basin followed by the 100m² biofilter and will receive treatment within those water bodies. With this arrangement the total pollutant reduction for the development will exceed best practice guidelines as shown by Table 3. The overall treatment as modelled in MUSIC is shown in Figure 13 below.

Figure 14: MUSIC Model Layout and Output

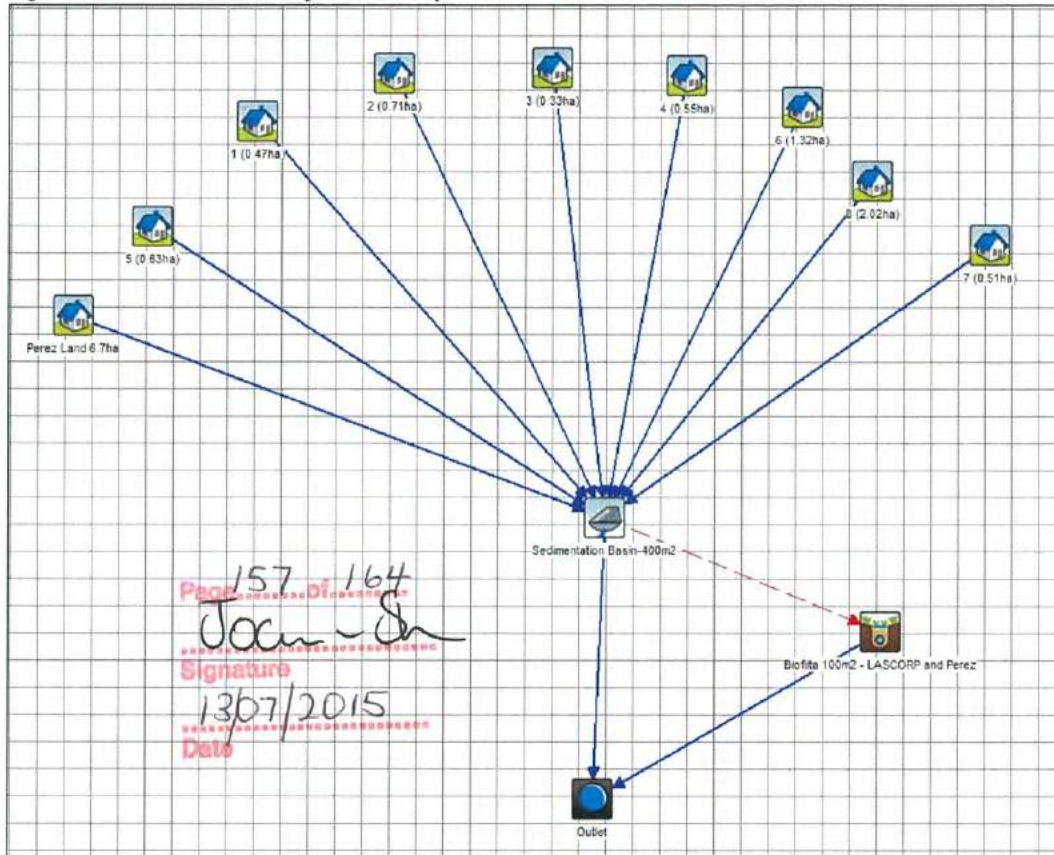


Table 3 MUSIC Model Results

Pollutant	Source	Residual	% Reduction
TSS	5350kg/yr	407kg/yr	92.4
TP	10.8kg/yr	1.54kg/yr	85.7
TN	74.1kg/yr	38.2kg/yr	48.4

Maintenance of the proposed system including the basin, pumps, vegetation and rising mains will be undertaken through an agreement between Novion and Council.

The proposed system will incorporate aesthetics with functionality through detailed landscape plans to demonstrate that it is in keeping with the surrounding environment. Protected batters will be incorporated to provide the required storage level and required bank stability. A maintenance track will be also included to allow for easy maintenance access. The sedimentation basin and biofilter will be integrated into the landscape and will form part of the Sanctuary landscape through the landscaping plans.

The overall water quality benefits of this scheme are therefore:

- Exceeding Best Practice stormwater runoff targets for the Southern (Gateway Plaza) and Northern (92-100 Melaluka Road) precincts
- Implements a stormwater treatment system that is simple and uses proven natural processes to treat stormwater.
- Provides a treatment system that is able to be appreciated by users of the Sanctuary and landscaped to be integrated into the surrounding environment and will become part of the discovery experience for the site.

The proposed stormwater treatment location is shown in Drawing C1002 in Annex 1.

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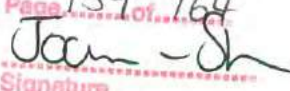
7 Conclusions

This Flooding, Stormwater & Drainage management Plan provides a holistic management strategy for proposed development of the Gateway Plaza and 92-100 Melaluka Rd precincts as illustrated in the Development Plan.

The plan provides:

- The proposed developments will not adversely affect the upstream and downstream drainage systems or cause nuisance to adjacent properties as the existing overland flow paths are maintained, and the current rate of discharge from the site to the external stormwater drainage system will be maintained up to the 1 in 100 year ARI flow.
- Stormwater flows generated from the two sites will be treated to exceed Best Practice environmental standards via the proposed 400m² sedimentation Basin and 100m² Biofilta.
- The detention system includes:
 - Volume of approximately 4,100m³ for the 1 in 100 year ARI event will be provided by the sedimentation basin, located adjacent to the Gateway Sanctuary to the south of the site. The 4,100m³ detention volume and pumping rate of 6L/s from the proposed system is sufficient to handle the required detention volume and is constrained by the inlet invert level. Flows from the development site to the detention system will be conveyed via an underground pipe network within the development and overland flow paths towards the proposed three 600mm diameter culverts under the Bellarine Highway.
 - The retarding basin will limit the post development of 1 in 100 year ARI flow to its pre-development level from Bellarine Gateway Plaza only through the existing culvert.
 - The Biofilta System requires two pumps. A submerged pump pit within the sedimentation basin will transfer flows to the Biofilta where the transfer/sustainability tank will collect the treated flow and a secondary pump within the tank will pump water to the legal point of discharge.

Through individual planning permits, detailed design plans will be prepared to implement this drainage strategy. All planning permit approvals will need to show consistency with the drainage strategy hereby prepared.

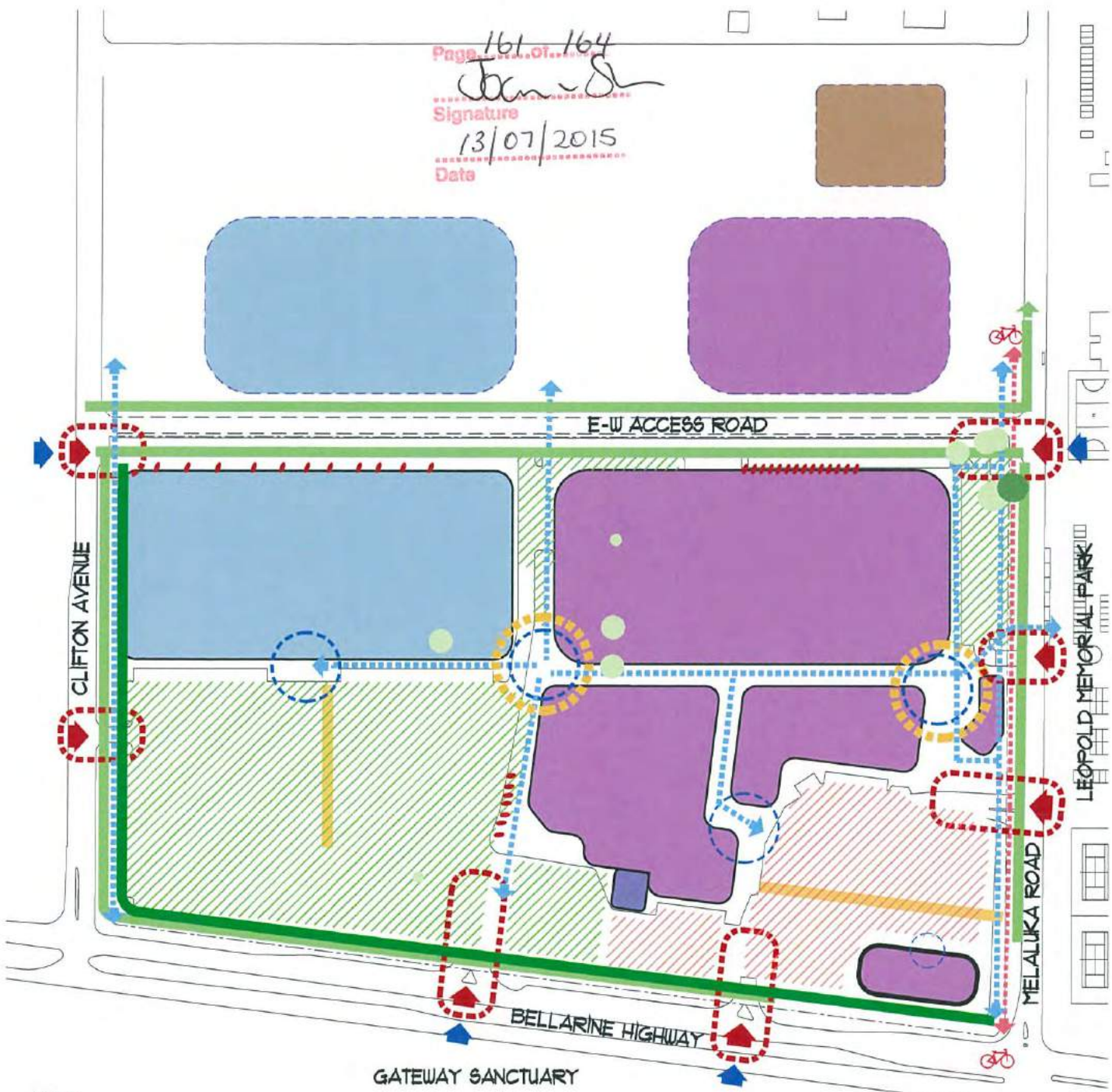
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Appendix E
















Landscape Masterplan

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Date 13/07/2015

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 Date: 13/07/2015



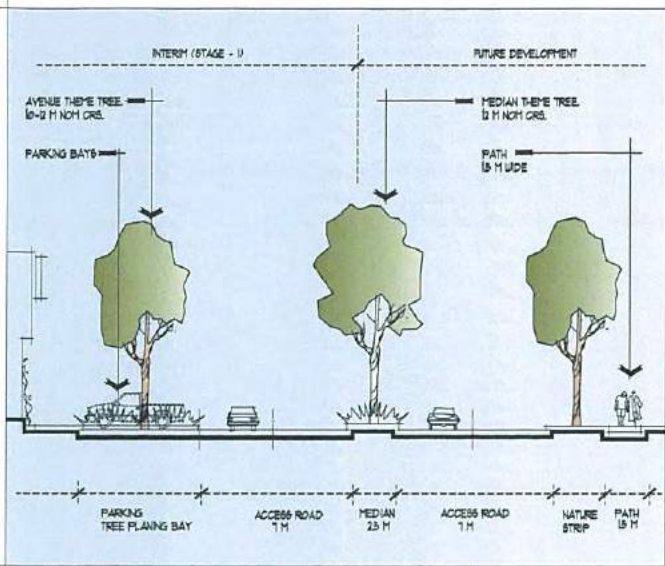
KEY

	RETAIL / FOOD AND DRINK		MAIN CARPARK ENTRY AVENUE		CAR PARK PEDESTRIAN LINK		LANDSCAPE PLAZA NODE
	MEDICAL		CARPARK ENTRY HIGHLIGHT TREATMENT		KEY CYCLIST MOVEMENT	<ul style="list-style-type: none"> ALL OPEN SPACE 'GATHERING' POINTS AND ENTRY FORECOURTS TO HAVE A HIGH QUALITY LANDSCAPE TREATMENT TO CLEARLY DELINEATE 'PLAZA' SPACES / ENTRIES USE ATTRACTIVE MODULAR AND COLOUR CONCRETE PAVING, USE FOCAL TREES, INTEGRATE SOFT AND HARD LANDSCAPE USE PUBLIC ART ELEMENTS OR SCULPTURES, GOOD SIGNAGE, AND A WELL DESIGNED INTEGRATED SUITE OF STREET FURNITURE, BOLLARDS AND LIGHTING. FUTURE DEVELOPMENT TO THE NORTH OF TO HAVE A LANDSCAPE TREATMENT / THEME GENERALLY IN CONSISTENT WITH ABOVE POINTS 	
	TAVERN / ACCOMMODATION		SERVICE ACCESS / ENTRY		KEY PEDESTRIAN MOVEMENT		
	BULKY GOODS / HARDWARE		CAR PARK • WOODLAND THEME TREES		LANDSCAPE STRIP		
	FUTURE LAND USES		EXISTING CAR PARK • RETAIN EXISTING TREES WHERE POSSIBLE • REPLACE DEAD / POOR TREES WITH THEME TREES		MAJOR BIOSWALE GARDENBED		
	EXISTING TREE RETAINED (ON COUNCIL LAND)		CENTRE ENTRY		LOADING ZONE SCREENING		
	EXISTING TREES REMOVED						

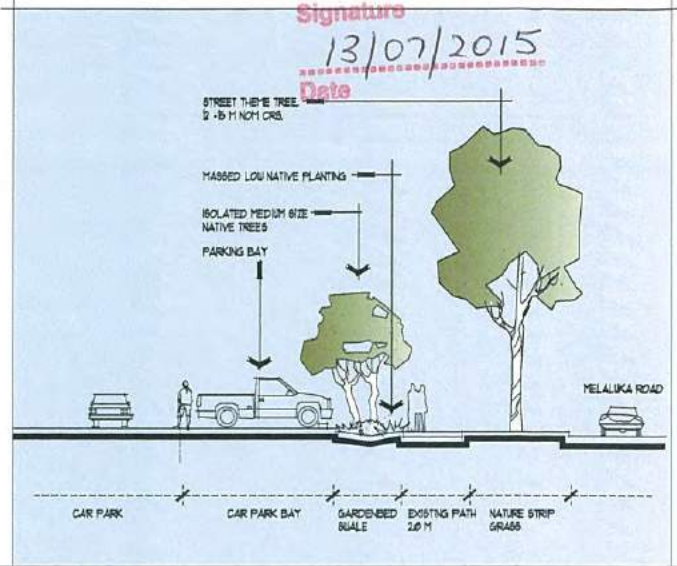
LEOPOLD SHOPPING CENTRE
 DEVELOPMENT PLAN - LANDSCAPE INDICATIVE PLAN

Jean S. Signature

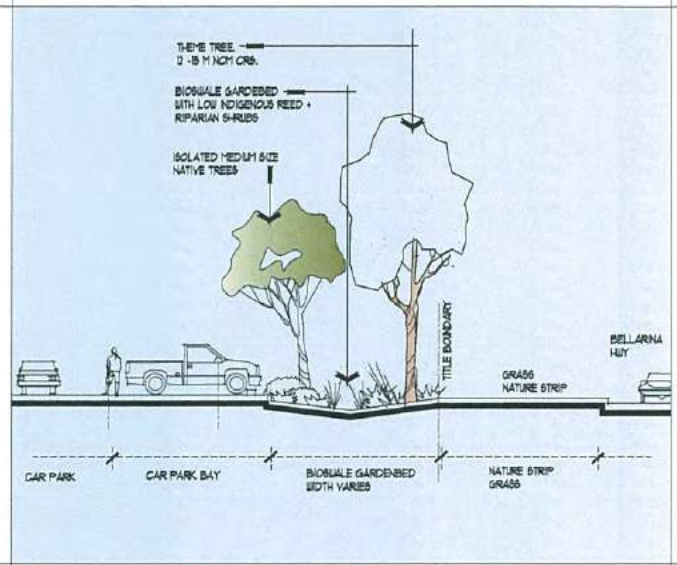
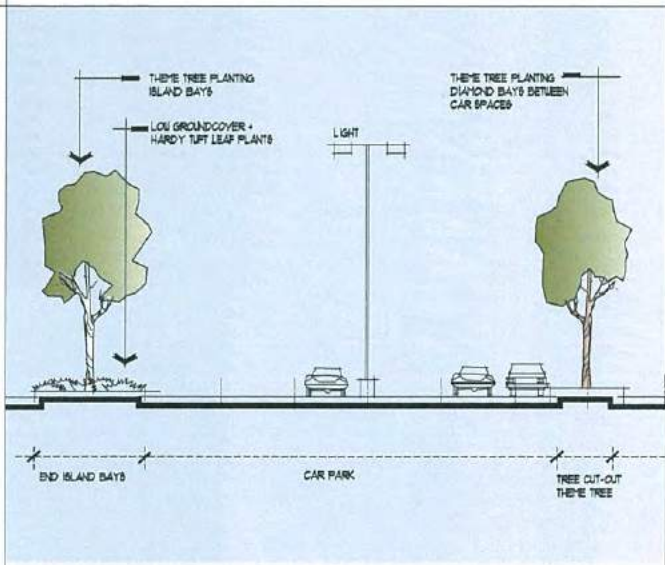
13/07/2015 Date



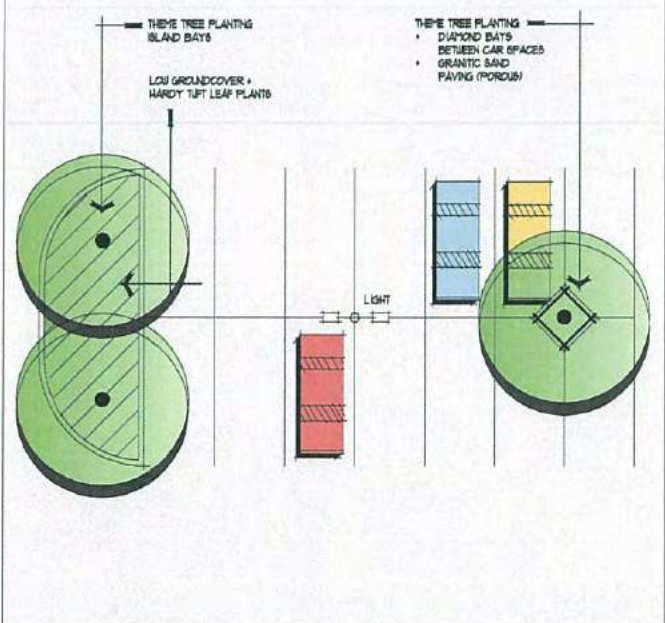
1. INDICATIVE E-W ACCESS ROAD



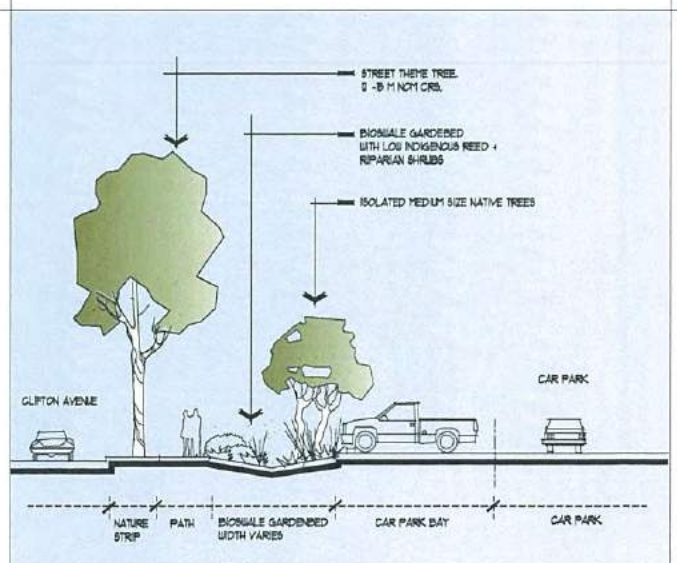
2. INDICATIVE MELALUKA ROAD INTERFACE



3. INDICATIVE BELLARINE HWY INTERFACE



5. INDICATIVE TYPICAL CARPARK TREATMENT



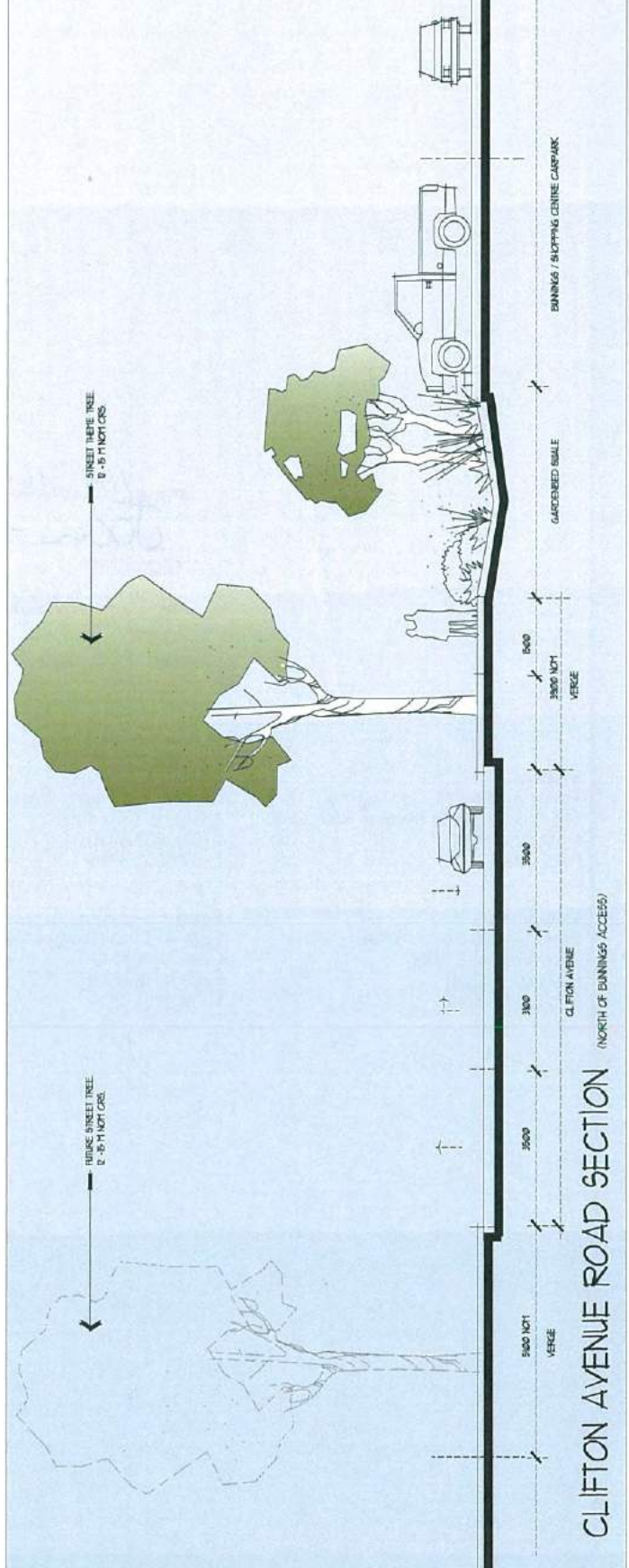
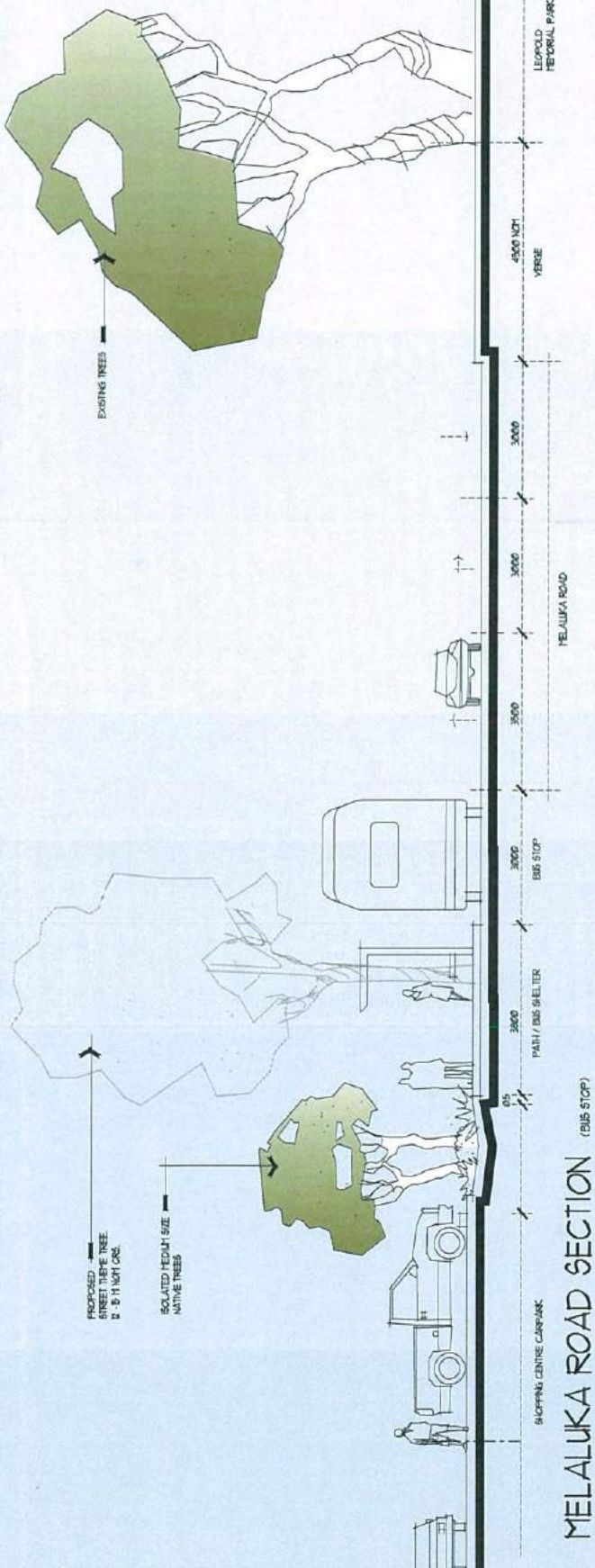
4. INDICATIVE CLIFTON AVE INTERFACE

John - [Signature]

Signature

13/07/2015

Date



LEOPOLD SHOPPING CENTRE

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13/07/2015
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