PERTH TO BUNBURY HIGHWAY:
ESTUARY BRIDGE TO DAWESVILLE BRIDGE
ROAD AND LAND USE STUDY

SUMMARY REPORT

NOVEMBER 2006

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1. INTRODUCTION

1.1 Summary

This report provides a summary of the Perth to Bunbury Highway – Estuary Bridge to Dawesville Bridge Road and Land Use Study (or 'Bridge to Bridge' Study) as prepared by consultants on behalf of Main Roads WA and the City of Mandurah.

The Study commenced in 2001 after the City of Mandurah and Main Roads WA (MRWA) appointed Opus International and sub-consultants Thompson McRobert Edgeloe to carry out an extensive review of the Study Area.

The Study is the result of land use, transportation modelling and traffic engineering analysis for the Study Area, which is the land between the Estuary Channel and Dawesville Channel, focusing on the Old Coast Road.

The key objectives of the Study are to:

- Provide transportation networks that adequately address the future land use development along the Highway;
- Reinforce the development of the Study Area by ensuring that adequate and efficient access is provided to important centres including pedestrian, vehicular and public transport access;
- Identify a hierarchy of dedicated access points and opportunities to rationalise existing low priority access points along the Highway; and
- Ensure that connectivity is provided within the urban areas developed on either side of the Highway to access the Study Area.

The key outcomes of the Study are as follows:

- The identification of a clear implementation strategy to facilitate integrated land development and transport movements with recommended timing, staging and priorities;
- The development of a traffic modelling forecast (20 year projection) based on future urban development within the study area.
- The identification of cost and staging of design options for intersections currently accessing the study section of the Perth Bunbury to accommodate future (predicted) urban development.
- The identification of opportunities to rationalise existing access points along the Highway on the basis of improved access configuration.
- The identification of new road infrastructure within the urban areas developed on either side of the Highway in order to reduce access to the Highway.

The overall aim of the Bridge to Bridge Study is to provide a strategic plan to identify future road access points and required intersection treatments along Old Coast Road (between the Estuary and Dawesville Bridges) to accommodate the traffic requirements generated from the surrounding development and regional areas.

The recommended improvements are a combination of outcomes from the Land Use Context analysis, TRIPS and SIDRA modelling together with a strategic overview assessment in order to arrive at solutions which satisfy the following primary objectives of the study:

- maintain the arterial function of the highway;
- provide an acceptable level of service for local road network users, including pedestrians;
- rationalise the location and regime of existing access points along the highway to improve road user safety;
- identify the local road interconnections and modifications.

The Study's recommendations are based on three timeframes of short term (by 2006), medium term (by 2016) and long term (beyond 2016).

These timeframes will be associated with adjacent land use development as a primary driver for traffic generation, deteriorating levels of service, capacity and the requirement for upgrading.

The timeframe recommendations have been based on the construction of the Perth-Bunbury Highway by 2016, however current commitments are that the Perth-Bunbury Highway will be completed by 2009/2010

This report is to be read in conjunction with the detailed report prepared by Opus International Consultants (dated 26 September 2006), which includes detailed analysis and technical information, beyond the scope of this summary report.

1. INTRODUCTION

1.2 Council Adoption of Study

This report summaries the key recommendations of the Study and provides an overview into the processes undertaken leading to Council's adoption of the Study in April 2006, where it resolved the following:

That:

1. ***The Final Report of the Perth-Bunbury Highway Estuary Bridge to Dawesville Bridge Road and Land Use Study ('Bridge to Bridge Study') be adopted as a strategic document to guide the City and Main Roads WA in relation to future land use and road design proposals for the Perth-Bunbury Highway Estuary.***

   (a) The Study Report to reference that the review of the Old Coast Road intersection treatment is to include the consideration of a roundabout.

   (b) The Study Report to reference that should the Novara Store cease to operate, the access road is to be closed.

   (c) The Study Report to reference to the extension of Mahogany Drive – Honeysuckle Ramble to Peelwood Parade be considered a longer term option and would only be provided after further localised consultation in terms of carriageway width, design, location and treatment.

2. ***Council acknowledges that further localised consultation will be required to be undertaken by the City prior to the implementation of the Study's recommendations relating to Dorothy Avenue – Wattleglen Avenue and the Dampier Avenue – Glendart Court link.***

3. ***Council acknowledges the need for budget allocations to implement the key infrastructure recommendations (design and construction) of the Bridge to Bridge Study that are the responsibility of the City of Mandurah, with Main Roads WA also needing to provide budgetary allocations for those key infrastructure recommendations that are their responsibility.***

4. ***The Bridge to Bridge Study be reviewed in 2010 or upon the construction of the Perth-Bunbury Highway (whichever is the earliest) to ensure that the traffic modelling undertaken has resulted in actual outcomes and that the recommendations are being implemented (i.e. short/medium term improvement recommendations).***

5. ***Council requests Main Roads WA undertake annual monitoring of traffic for Old Coast Road and that the data be made available to the City of Mandurah.***

6. ***Council lobbies the State Government and Federal Government for the duplication of the Estuary Bridge.***

7. ***Council acknowledges the working relationship between the City of Mandurah and Main Roads WA in relation to the Bridge-To-Bridge Study and encourages similar partnerships to occur in the future where opportunities arise.***

2. STUDY AREA AND PLANNING CONTEXT

2.1 Study Area

The Study Area covers the localities of Halls Head, Eskine, Falcon and Wannanup, between the Mandurah Estuary Channel and the Dawesville Channel (Refer **Figure 1**).

The Study Area is approximately 2306 hectares in size and represents about one-third of Mandurah's urban area.

In 2001, the Study Area had a population of 16,000 people in approximately 7800 dwellings. Over the life of the Study (to 2021), these figures are forecast to grow to a population of 37 500 people in 16 700 dwellings, which is approximately a 'build out' time, when all major developments have been completed.

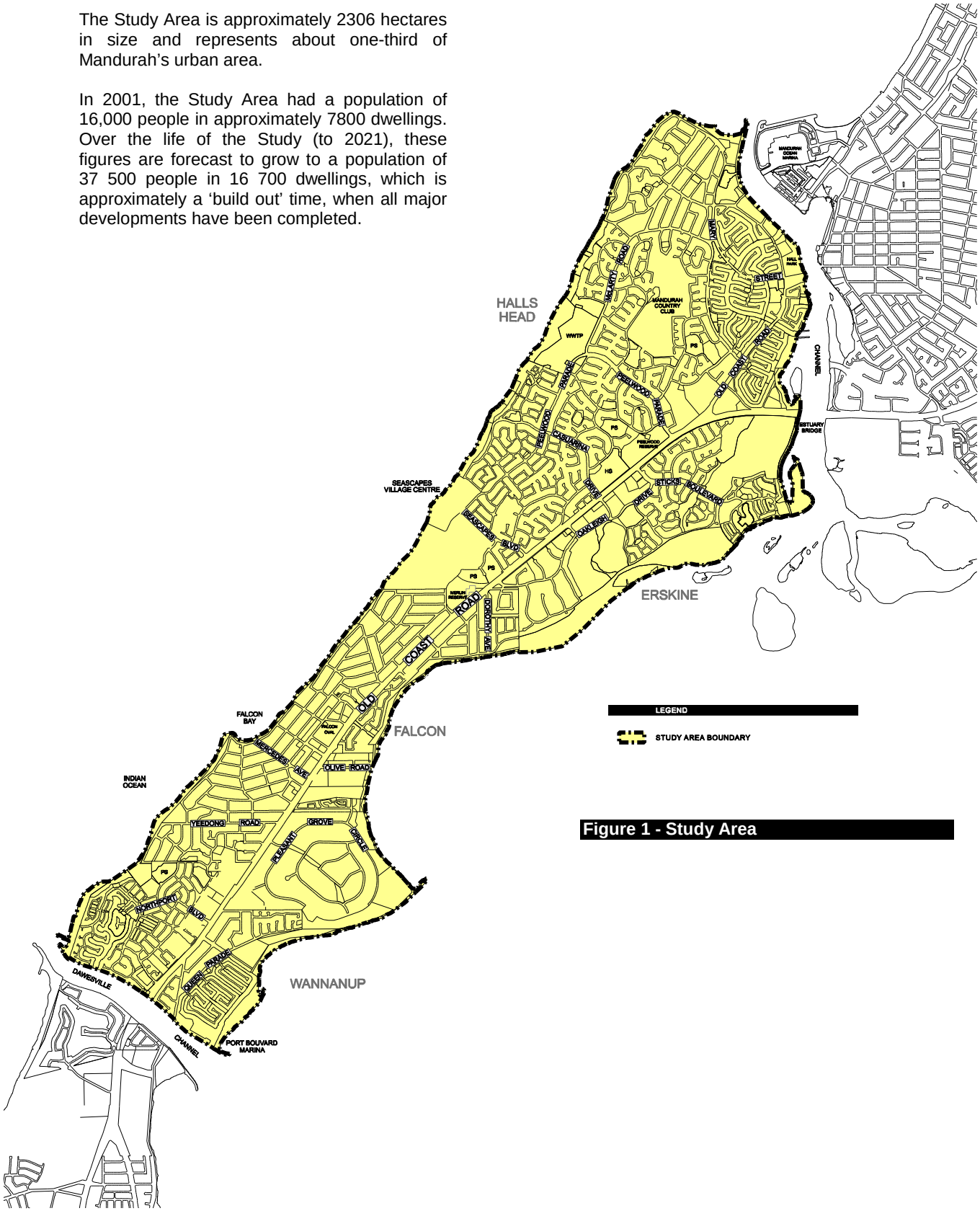


Figure 1 - Study Area

2. STUDY AREA AND PLANNING CONTEXT

2.1.1 Road Hierarchy

The study section of the Perth Bunbury Highway is located between the Estuary and Dawesville Bridges and performs a key transportation function both at a regional and local level. From a regional function perspective the highway could be classified as a Primary Distributor because it carries traffic making longer-distance trips between Perth and the South West. However the highway is also required to function as an Urban Distributor or Local Connector road by providing access to the substantial areas of land use development.

The existing highway is comprised of a four-lane dual carriageway road including a constructed central median with breaks at the various side road and local access points. Only its intersection with Peelwood Parade is signalised (as at July 2003).

The existing intersection regime along the route is a classical “staggered tee”. Traffic movement across the road from one side of study area to the other is therefore indirect and requires drivers to either first turn left into the highway and then turn right at the next intersection or alternatively turn right then left from the highway. This staggered movement results in a conflict with regional through traffic on the main road, which has intensified in recent years due to an increase of the local traffic generation from new land use developments. There is also the risk that multiple staggered tees will all require traffic signal control while a lesser number of four way developments provide the same function.

As traffic volumes increase, the number of traffic conflicts from this mix of movements are likely to increase the risk of crashes unless appropriate interventions are initiated.

Whilst regional traffic demands are usually satisfied by the provision of high standard roads with limited access or side friction, local traffic demands require increased access and number of intersections along each route. The local versus regional demands along this route are to some extent, mutually exclusive and this study aims to identify the most suitable compromise.

This study is required to maintain the integrity of the Highway’s dual function without compromising either local or regional traffic demands in a sustainable manner.

2.1.2 Traffic Volumes

MRWA has three traffic count site stations located within the study section of the Perth to Bunbury Highway. The 2003 highest Average Annual Daily Traffic (AADT) count of 33 600 vehicles per day (VPD) was recorded south of Old Coast Road. The traffic volume at this location is significantly influenced by the contribution of the adjoining Halls Head precinct.

Highway traffic volumes decrease progressively to the South with a count of 12,500 VPD immediately north of Dawesville Bridge. At this location the regional or through traffic component is much more significant.

Historical traffic growth rates of 3.0% and 6.0% have been recorded over the past 8-year consideration period (i.e. 1995 to 2003) at survey points located at Port Bouvard and south of Old Coast Rd respectively.

The Perth to Bunbury highway also experiences significant seasonal fluctuations in traffic volumes with higher flows occurring every weekend and very high flows occurring on long weekends and during the major holiday periods. These high traffic flows frequently result in traffic slowing to a crawl through Mandurah, which severely restricts local access and increases travel times for regional traffic.

The highest traffic flows occur for just a few hours on about eight days each year during these times.

The traffic analysis used to determine the existing levels of service along the road and the consequent need for roading improvements has been based on typical, midweek peak hour morning and afternoon flows.

2. STUDY AREA AND PLANNING CONTEXT

2.2 Network Changes

In preparing recommendations for the Study, the following changes in the overall transport network need to be acknowledged:

2.2.1 New Perth Bunbury Highway

Construction of the New Perth Bunbury Highway has been commissioned by the State Government, with a completion date targeting December 2009. The New Perth to Bunbury Highway involves the extension of the Kwinana Freeway and a new highway around the eastern side of the Peel-Harvey Estuary, connecting to Old Coast Road at Preston Beach (Refer **Figure 2**).

The development of the New Perth Bunbury Highway will result in a significant redistribution of traffic off the existing Perth to Bunbury Highway through the Study Area. The analysis completed this highway for indicates about 20% of the traffic within Mandurah and more than 90% of the traffic south of Mandurah will shift to the New Perth Bunbury Highway.

This re-distribution of traffic will help relieve peak congestion along the study route and assist with delaying the need for significant upgrading of the existing highway. However, the increasing levels of traffic generated by ongoing land development will negate any traffic benefits likely to accrue from these projects.

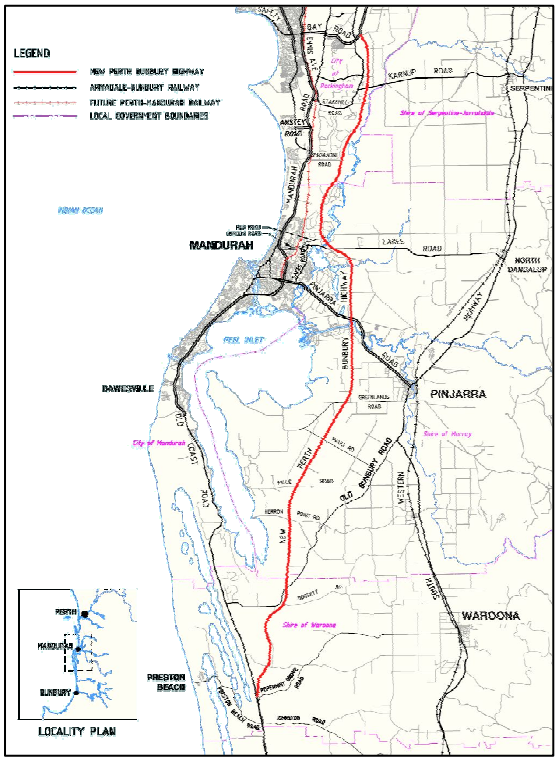


Figure 2 - New Perth Bunbury Highway

2.2.2 Mandurah Estuary Bridge

The existing Mandurah Estuary Bridge is a three lane undivided roadway that creates a "choke point", with two south-bound lanes and one north-bound lane, between four lane divided carriageway approaches.

Duplication of the bridge has been recommended in the medium term timeframe 2011 – 2021 in the WAPC's Mandurah Inner Area Strategic Plan.

The bridge operates under a tidal flow system during long weekends when the direction for the central lane is reversed to provide two lanes for traffic in the preferred (peak) direction of travel with one lane operating in the opposing direction. All cyclist traffic is re-routed down Old Coast Road.

The precise timing and likely commitment for duplication of the Estuary Bridge is not within the scope of this Study due to a combination of associated political and funding influences. Ultimately, the preferred timing will be dictated by deteriorating traffic conditions and the timing of the New Perth Bunbury Highway.

The existing bridge will therefore continue to represent a choke point for the freeflow of traffic on the Perth to Bunbury Highway. The recent extension of the dual carriageway on the southern bridge approach offers traffic some ability to disperse (away from a platoon) before negotiating the intersections located at the northern end of the study section.

2.2.3 Southern Suburbs Railway

Infrastructure works are currently in progress for construction of the Southern Suburbs Railway (Perth to Mandurah rail link). The Mandurah Transit station terminus is currently under construction with a projected commencement of operation of the rail line being June 2006.

Due to the size of the catchment area the new terminus will comprise a fully integrated transit interchange with bus feeder services to the town centre and other major areas and attractions. Road access to the site is from the recently upgraded Allnutt Street, which connects with Mandurah Road.

The Mandurah Transit Station terminus is located approximately 8.0km north of the study section and is not anticipated to significantly affect traffic volumes on the study section. Transperth will enhance its existing range and frequency of bus services within the Mandurah Region with some (minor) consequential reduction of car movements.

2. STUDY AREA AND PLANNING CONTEXT

2. STUDY AREA AND PLANNING CONTEXT

2.3 Planning Context

2.3.1 Peel Region Scheme

Figure 3 identifies the zoning and reservations contained within the Peel Region Scheme within the Study Area, which is generally characterised by:

- a predominant 'Urban' zoning which is consistent with existing and proposed developments;
- a generally continuous foreshore reserve ('Regional Open Space') adjacent to the shore lines of the Indian Ocean and Peel Estuary;
- identification of two significant 'Public Purpose' reserves currently incorporating the Mandurah No 2 Waste Water Treatment Plant and Halls Head Community College and,
- Reservation of the northern-most section of the Old Coast Road (where it passes through Halls Head) as an 'Other Regional Road' and the balance of the Old Coast Road (between the Estuary and Dawesville Bridges) as a 'Primary Regional Road'.

2.3.2 Inner Peel Region Structure Plan

The Inner Peel Region Structure Plan (1997) provided the basis for the preparation of the Peel Region Scheme.

The Structure Plan gives direction to the long-term urban development of the Inner Peel Region (30-50 years) and establishes objectives and actions for the Structure Plan Area.

The Structure Plan states that "is particularly important in the Peel Region because of its location immediately adjacent to the southern boundary of the metropolitan region. The Peel Region will form the bridge between the metropolitan region and the future development areas to the south, and the placement of major transport and other infrastructure corridors between the two areas will be important."

The functions of the Structure Plan are to:

- Provide the basis for formulating and promulgating a regional planning scheme for the Peel Region.
- Provide the basis for statutory planning and development control.
- Provide a basis for servicing and transport authorities to plan their future requirements.

The Structure Plan, as is relates to the Study Area is generally consistent with the Peel Region Scheme. Of note however are the identification of the following:

- Halls Head Shopping Centre as 'Major Commercial';
- Halls Head Golf Course as 'Open Space – Recreation';
- 'Tourist' sites at Halls Head, Erskine, Falcon and Wannanup;
- Significant expansion at Falcon as 'Major Commercial';
- 'Mixed Business' and 'Industry' at Falcon;
- Old Coast Road (between the two bridges) as 'State Highways and Roads';
- Other roads within the study area as 'Important Roads'; and,
- Significant portions of land as 'Future Urban – Cat A1' at Wannanup, Erskine, and Halls Head.

2. STUDY AREA AND PLANNING CONTEXT

Figure 3 - Peel Region Scheme Zoning

2.3.3 Town Planning Scheme No 3

The Study Area is subject to the provisions of the City of Mandurah Town Planning Scheme No 3 (Scheme 3). This Scheme was gazetted in July 1999 following a comprehensive review of Council's previous Scheme, which assisted in identifying land suitable for urban development into the foreseeable future. Council's existing Scheme 3 therefore has provided, and continues to provide, the major context for development within the study area.

Having regard to Scheme 3, the study area is characterised by its predominantly 'Residential' zoning (refer to **Figure 4**).

Residential density codings within the 'Residential' zone vary significantly from medium density R15 and R20 codings to R1 at Pleasant Grove and various R40 and R60 sites spread throughout. Other key zoning characteristics include:

- the extensive areas zoned 'Urban Development' at Halls Head/Seascapes, Bridgewater South and North and Port Bouvard.
- land zoned 'Canal' at the northern (Halls Head) and southern (Port Bouvard) ends of the study area.
- within existing developed areas, the relatively even spread of open space areas and primary schools.
- the Halls Head and Falcon District Centre being zoned 'Precinct Development'.
- land zoned 'Tourist' at Mandurah Quay and Falcon.
- the 'Industrial' and 'Service Commercial' zoned land at Galbraith Loop, Erskine
- the identification of the Old Coast Road and Mandurah By-Pass Road as a 'Primary Distributor Road'.
- the identification of the northern-most extent of the Old Coast Road, Sticks Boulevard and a portion of Peelwood Parade as 'District Distributor Roads'.
- the scattering of numerous public purpose reserves (primarily in the northern half of the study area). These include water towers, wastewater treatment plants and other public utility sites, primary schools, high school, private club, municipal purposes sites and fire station.

2.3.4 Outline Development Plans

Throughout the Study Area a number of Outline Development Plans have been approved, which are set out in **Figure 5**.

A total of 18 Outline Development Plans are either approved or nearing completion in regards to their approval process, ranging in size from the Seascapes ODP to a number of smaller scale plans.

2.3.5 Local Commercial Strategy

The City of Mandurah's Local Commercial Strategy was prepared in 2002.

The major findings and proposals of the strategy of relevance to the Study Area include:

- The Pinjarra Road commercial strip and Mandurah Forum should be regarded as an important 'Strategic Regional Centre'.
- Mandurah's demographic characteristics including higher proportions of school age children and over 55's, a concentration of older persons in or near the central area, lower than average household incomes and fewer motor vehicles per household.
- A high concentration (81%) and centralisation of commercial floor space with 70% of commercial floor space being some form of retail and an 8% vacancy factor.
- "….. because of the high central area retail floor space concentration, the supply of District and Neighbourhood floor space is currently significantly under-supplied."
- "….. the time is now ripe for Mandurah to transition from functioning as a highly centralised independent town to functioning as an integrated part of a major urban region."
- The recommended "general strategic direction" of the strategy to focus new retail floor space development into the district and neighbourhood/local centres as opposed to any expansion of the 'regional centre complex.

2. STUDY AREA AND PLANNING CONTEXT

Figure 4 - Town Planning Scheme No 3

Figure 5 - Approved Outline Development Plans

- The recommended hierarchy of centres is as follows:

  - Regional Centre;
  - District Centres (Halls Head, Falcon & Lakelands);
  - Neighbourhood/Local Centres;
  - Mixed Use Areas;
  - Mixed Business Areas.

- "Every encouragement should be given to developing the Halls Head District Centre to around 16,000 square metres as soon as reasonably practical including provision of a Discount Department Store. No additional discount department stores are recommended for anywhere in the regional centre."

- "Modelling indicates that Shop Retail floor space in the Falcon/Miami complex has the market potential to increase from its current size to 17,000 sqm."

- The desire to build upon the presence of existing retail establishments at Falcon/Miami as opposed to creating a separate development to the south.

- The strategy specifies as a guide, the amount of floor space to be allocated to areas the subject of detailed structure planning.

- The strategy recommends that centre plans be prepared for the three district centres.

- "To resolve some of the issues associated with the more detailed centre planning for the Falcon/Miami district centre, the Council may need to take quite a forthright and pro-active leadership role."

3. CONTEXT ANALYSIS

3.1 Existing Development & Character

An analysis of the existing urban form of the Study Area suggests that it has "evolved" in the absence of any early strategic or integrated land use and/or transport planning.

The Study Area is characterised by early individual precinct development. More recent development has occurred in a planned manner although, up until recently, and probably due to the "lineal" dominance of the Old Coast Road, in the absence of a coordinated land use/transport planning approach.

While recent development and current structure planning has gone some way to resolving current deficiencies in the urban structure (in particular the connectivity of roads), the existing urban form still suffers from its earlier disjointed planning and development.

While this approach worked well for Mandurah in its earlier days, allowing for the development of distinct areas such as Falcon, Miami, Halls Head, Dawesville, Florida and Melros, the legacy of this early settlement has been to place significant constraints upon the ability to achieve high levels of connectivity and permeability between established and 'new' areas.

In formulating an integrated land use / transport planning approach which seeks to address these deficiencies, it is essential to recognise the dominance of the existing urban form which has, to a very large extent, contributed to the character of the various precincts.

The existing predominantly north-east/south-west lineal urban form of the study area is a result of its geographical definition and, by virtue of the Dawesville Cut and Peel Inlet, its "island" location which has provided many and varied opportunities. This lineal form of development is gradually extending south as the study area becomes more fully developed and new areas to the south are "opened up" via extensions to the urban infrastructure.

Other key features of the existing urban form include:

- The various marina/canal styled estates including at Halls Head, Mandurah Quays and Port Bouvard with their associated "cul-de-sac" character with significant impediments on pedestrian and vehicular permeability.

- The more regular "grid" network of roads within the more established precincts such as Falcon and older areas of Halls Head providing opportunities to achieve connectivity with adjoining areas.

- The numerous culs-de-sac based estates at Halls Head and Erskine with associated constraints on achieving higher levels of connectivity with other areas.

- Lower density development at Pleasant Grove and Erskine.

- The narrowness of the Study Area between Cox and Falcon Bays and the limits that this geographical constraint places upon connections between precincts as an alternative to utilising the Old Coast Road, in particular, for local traffic movements.

- The distinct lack of direct frontage for residential development along the Highway through the Study Area and the variety of alternative frontage / buffer treatments which add to the visual character of specific precincts. This compares with other 'Highways' - particularly in the Metropolitan Area, which tend to turn their back on regional roads.

- A current lack of local employment generators including mixed business and industrial complexes.

- The variety of recreational opportunities throughout the Study Area.

- The occurrence of coastal 'parks' and the constraints these place upon achieving high levels of connectivity.

3.2 Future Development & Character

The forecast population and dwelling numbers utilised in this study vary from that data presented in other studies. For the purposes of traffic modelling, the study area was divided into zones consistent with the Main Roads Western Australia zones. In calculating ultimate dwelling numbers and populations within individual cells, both existing and forecast population scenarios for the City were taken into account. The calculations, while having regard to these forecasts and predicted rates of growth, necessarily took into account a number of assumptions.

A number of areas are still subject to further development, notwithstanding that a fair degree of planning has been undertaken (as noted by **Figure 5**).

The following provides a description of each of these 'development areas' and how they relate to adjoining precincts within the study area:

3.2.1 Port Mandurah

Port Mandurah is now almost completely developed. Port Mandurah is a canal based residential estate. The plan incorporates both medium density residential and tourist cells together with a commercial site at the corner of Mary Street and Old Coast Road.

The previous amusement park site adjoins the Port Mandurah development and is considered likely for future development as a medium density residential site. Connectivity between stages and adjoining areas is generally limited due to the primarily cul-de-sac based layout. The estate is however generally well linked to local connector roads.

A possible connection to Bridgewater North under the Estuary Bridge would enhance connectivity particularly in relation to public transport and pedestrian/cyclist routes and potentially provide considerably better access for residents of Bridgewater north to the Mandurah City Centre and Halls Head Shopping Centre.

3.2.2 Bridgewater North

No development plans have been formally submitted for the future development of the remaining residential portion of this precinct. Some discussion has occurred with a possible change to the previous design that proposed to create a limited canal or marina to form a focus of the development. The land is predominantly zoned Residential with pockets of medium density zoned land adjoining to the north of the developing Mandurah Quays development.

Previous planning for the precinct would likely exacerbate the lack of accessibility for existing Bridgewater residents due to the lack of connections with the By-pass and land further to the north. Traffic utilising Sticks Boulevard is known to currently experience significant delays where the road intersects with the Old Coast Road.

As discussed above, a possible link road under the ramp to the Estuary Bridge would assist greatly in achieving a much higher level of accessibility for future and existing residents within this locality.

Opportunities to access the proposed Erskine Shopping Centre for future residents would also be greatly enhanced by a realignment of Oakleigh Drive within the Bridgewater South (Erskine) development plan area.

3.2.3 Bridgewater South

The Bridgewater South Outline Development Plan shows a mixture of single residential and low-density residential lots. In addition, the plan identifies a primary school site and retirement village site together with a conservation area as a central focus of proposed development.

The plan shows a road layout, which is generally considered to provide for good linkages to the surrounding road network and with internal roads generally focussed onto the conservation area as a central feature. The conservation area however creates a divide through the development plan area placing significant limitations upon opportunities to achieve additional linkages particularly along the southern boundary of the development area.

As discussed above, it is considered that opportunities to access the proposed Erskine Shopping Centre (particularly for residents to the east) and to enable a greater number of local traffic movements would be enhanced by a realignment of Oakleigh Drive within the development plan area.

3.2.4 Seascapes

The Seascapes Outline Development Plan shows a predominant Residential R20 pattern of subdivision with a village centre adjoining the Foreshore surrounded by an enclave of medium density residential and tourist sites.

The plan provides for a high degree of permeability and is considered to be well connected to the surrounding road network. The plan is also considered to complete and link the current disjointed road network between Halls Head and Falcon.

3.2.5 Eastport (Port Bouvard)

Eastport is primarily a canal-based estate with associated limitations on permeability. The estate is however, generally well connected to the surrounding road network.

The estate is serviced by two local connectors to the Old Coast Road, which are in close proximity to one another. The marina has, and is likely to become more important as a focal point for boating enthusiasts. Accordingly, consideration of future access to the marina via Rees Place or alternatively, Estuary Place warrants further investigation.

3.2.6 Northport (Port Bouvard)

Northport provides a mix of traditional land based and canal based residential lots at varying densities. The estate includes a limited amount of commercial floor space (Bouvard Village).

The canal based lots and adoption of a cul-de-sac style of layout in the southeast corner of the estate place significant limitations on permeability and the ability to achieve additional linkages.

3. CONTEXT ANALYSIS

Figure 6 - Development Areas

The estate is generally considered to be well connected to the surrounding road network with two entries to Old Coast Road and three separate linkages to the north. It is believed that the northern entry from Old Coast Road could have been relocated to align with Estuary Place to create a 4-way intersection as opposed to the resulting staggered T formation.

3.2.7 Falcon Precinct

The latest Falcon Precinct Plan illustrates the intention to develop a busy and vibrant neighbourhood centre based upon the existing Falcon commercial area and offering a mix of land uses.

The plan proposes considerable areas of medium to higher density development together with some urban consolidation within the existing Falcon residential area.

The plan proposes a range of road treatments and linkages which would all assist in addressing a number of the current deficiencies largely resulting from the dominance of the Old Coast Road and undeveloped portions of land. It is considered essential that a connection be achieved with the Cox Bay estate to the north to provide alternative local access opportunities to Old Coast Road.

The proposal to connect with Pleasant Grove to the south is also believed to have considerable merit.

3.2.8 Pleasant Grove

Pleasant Grove estate is primarily a low-density residential estate. The estate is currently services by one access to Old Coast Road with associated impacts upon permeability and significantly constraining opportunities for local traffic access to the north and south.

Portions of the estate remain undeveloped and an updated ODP demonstrates the proposed infill of these areas with additional (smaller) lots. The plan also shows a southern connection with Duke Street to the south. The possible relocation of the southern access to align with Earl Street is considered to provide a more direct and convenient route for local traffic particularly in the event that Duke Street is closed due to its awkward alignment to Old Coast Road and close proximity to Northport Boulevard. The opportunity to connect Charles Place to Pleasant Grove Circle also warrants further investigation, as does the extension of Bluerise Cove to connect with the Falcon Precinct to the north.

3.2.9 Halls Head Precinct

The Halls Head Precinct focuses on the two Halls Head shopping centres, and was prepared to ensure co-ordinated development within the precinct, to create a vibrant and attractive town centre.

The current Precinct Plan seeks to retain an existing left in-left out access to Old Coast Road from the shopping centre, and a new road connecting Leisure Way to Peelwood Parade, which would form part of the access under the Estuary Bridge to Bridgewater North.

4. KEY STRATEGIC IMPROVEMENTS

4.1 Level of Service

Throughout the Study Area, the Perth to Bunbury Highway is a 4-lane, dual carriageway road. The capacity of the road can be gauged Austroads Guide to Traffic Engineering Practise Part 2. The highway has a capacity of approximately 1150 vehicles per hour (vph) per lane (i.e. 2300 per direction) at level of service 'C'. This clearly shows that the road itself has sufficient capacity to carry the predicted maximum traffic demand of 2100 vph assuming Peel Deviation is constructed by 2016.

However, on the approaches to signalised intersections, portions of the traffic flow will be stopped at red lights and queues will develop.

The SIDRA analyses show that, under these conditions some significant queues are formed that will require long cycle times (say 130 seconds) to clear. In practise this means that drivers will be delayed in long queues at traffic lights but will tend to pass through the intersection on the first green phase.

Widening the highway approaches to the intersection from 2 to 3 lanes would reduce queue lengths and delays but obviously impose costs. Furthermore, if the decision is made to widen the approaches, then obviously the number of traffic lanes leaving the intersection must also be widened from 2 to 3 lanes, but can then be tapered back down to the 2-lane cross-section.

The following issues should be considered when resolving a strategy for the corridor:

- Seagull intersections reduce congestion and delay for non-turning traffic on one carriageway of the highway by retaining free flowing traffic. A consequence of this benefit however, is that pedestrians may experience some difficulty crossing the uncontrolled portion of the road at these locations. The construction of acceleration lanes is preferable in association with seagull island treatments if there is sufficient separation distance from adjacent intersections to facilitate the safe merging movements of traffic.

- Safe roads result from consistent standards and the combination of conventional signalisation and seagulls along the route may lead to driver confusion.

- Whilst a satisfactory flow condition can be achieved by increasing the number of approach (and departure) lanes on the highway approaches to intersections, it is generally acknowledged that the third lanes are not well utilised unless they extend far beyond either side of the intersection. Under these circumstances, the merging lane from intersection 1 often extends up to the divergent lane of intersection 2 and it is thus a more satisfactory solution to provide the third lane along the entire length of the road between each intersection.

- The spacing of intersections along the northern section of the study route is reasonably consistent which will support the efficient linking of traffic lights by a SCATS system or similar. This will facilitate continuous traffic flows and minimise driver inconvenience. Co-ordination of traffic signals is feasible if the separation distance between adjacent intersections is less than 1 km. At spacings beyond this distance the traffic platoons tend to spread out to such an extent that the signal operation becomes inefficient. The benefits of traffic signal co-ordination will be significant at peak periods such as Easter school holidays and long weekends where there is very heavy unidirectional flow on the highway.

- The location of the signalised intersections needs to be strategic on account of the associated capital cost and time delays imposed. The number of sets of signalised intersections should be minimised in order to help preserve the arterial function of the highway.

- The provision of traffic signals also provides the opportunity for a dedicated pedestrian phase to facilitate safe movements across the highway (though this adds considerable time delays to the system).

- The opportunity to provide or "open up" alternative parallel routes should be promoted (where feasible) in order to further assist in preserving the arterial function of the Highway.

- A reduction in speed (in particular within the existing 90 km/hr zones) along the Highway throughout the Study Area has the potential to reinforce a built up area e.g. Falcon Precinct and generally improve safety between arterial and local traffic movements.

4. KEY STRATEGIC IMPROVEMENTS

4.2 Hierarchical Strategy

The following categorise the nature of potential improvements that could be considered along the route. It will be seen that the alternatives listed tend to escalate in cost and effectiveness:

(a) Retain the status quo; maintain the current traffic lane arrangements and intersection controls. This would only be acceptable at locations where congestion is predicted to be at an acceptable level.

(b) Introduce median break closures, effectively banning right turn movements, and permitting only left turns in and out. This arrangement reduces the level of congestion but increases travel distance and journey times as drivers are forced to seek alternative (longer) routes. It may have somewhat limited application but is still a feasible option nevertheless.

(c) Extend the acceleration and deceleration lanes to comply with NAASRA standards to help improve merge and separation between regional and local traffic movements.

(d) Introduce seagull island treatments at strategic intersections to improve the safety and efficiency of all right turn movements.

(e) Close unnecessary intersections with the consequential development of local road network interlinks to alternative access points to the highway. In this case the existing intersection or access location is not perceived to be rational or strategic, relative to future use or function. This option will have a significant social impact to local residents and commercial entities.

(f) Provide entirely new or extended road links and intersections to meet predicted demands.

(g) Install traffic signals at strategic intersections where there is an unacceptable level of service.

(h) Construct an additional (third) lane to improve on those sections of the route where existing lane capacity is anticipated to be exceeded.

In addition the Study also identifies safety movement treatments along the route e.g. lighting upgrade, sign rationalisation that does not require modelling justification.

Roundabouts and grade separation improvements have not been considered due to their negative social and economic impacts (including visual impacts, pedestrian inconvenience, land requirements etc).

At a number of existing intersections the extent of land use development severely constrains the feasibility of these options. In addition the performance of roundabouts is optimal where the flows are similar in contributing directions. Highway arterial traffic movements dominate the contributing side road flows along the study section.

It is perceived that a combination of intersection rationalisation, targeted improvements and capacity upgrades will be likely to offer an acceptable projected level of service within the study timeframe (20 years) at reasonable investment cost in anticipation of the benefits arising from key network macro improvements being completed

5. RECOMMENDATIONS (PRE-CONSULTATION)

The Study's recommendations are based on the Study Area being broken down into three sectors. The report provides recommendations based on three timeframes:

- Short Term – by 2006;
- Medium Term – by 2016;
- Long Term – beyond 2016.

The report's recommendations are based on the construction of the Peel Deviation before 2016, however these timeframes are subject to State and Federal government funding and decision making. Current advice provided suggests that the Peel Deviation will be constructed prior to this time (approx 2009) and should this occur, there will be a positive impact on the Study Area.

5.1 Projected Traffic Volumes

The recommendations on the Study highlight a couple of important implications with regard to Old Coast Road within the Study Area:

- The Peel Deviation will result in a change in function of Old Coast Road as well as a significant redistribution of traffic of the existing Perth-Bunbury Highway and South West Highway.

  Upon the completion of the Peel Deviation, regional commercial and passing vehicles travelling between Perth and the South-West region will no longer need to rely on Old Coast Road.

  Upon the completion of the Peel Deviation, there will be a change in the nature of traffic using Old Coast Road, which is likely to result in an initial decrease in vehicle numbers using this road.

  The analysis indicates that about 45 per cent of the traffic on the Perth-Bunbury Highway north of Mandurah, about 20 per centre of the traffic within Mandurah and more than 90 per cent of the traffic south of Mandurah will shift to the Peel Deviation. However, over time, the relocated regional traffic will be replaced by district traffic as a result of continued growth within Mandurah.

  This is demonstrated in Table 1 as the Study provides surveyed and anticipated traffic volumes for 2001, 2006, 2016 (Peel Deviation in), 2016 (Peel Deviation out) and 2021.

  This information highlights that the vehicle numbers by location for each of the locations has a drop in vehicle numbers following the implementation of the Peel Deviation, however ultimately the numbers are higher than current numbers.

- The regional and district status of Old Coast Road needs to be maintained and the reliance of this road for local vehicle trips needs to be reduced;

- The provision of the local accesses provides for alternative 'options' that do not necessarily result in all the traffic using the local roads. Without the options, however, there is reliance on a smaller number of roads.

Table 1- Proposed Traffic Volumes

	Adjacent to Estuary Bridge	Between Sticks Boulevard and Casuarina Drive	Between Perseverance Blvd and Falcon Shopping Centre	Adjacent to Dawesville Channel Bridge
2001 Base Year	23240	24120	17950	12270
2006	27460	28860	22070	17220
2016 (Peel Deviation In)	32830	32450	22690	17530
2016 (Peel Deviation Out)	38730	39600	30810	25920
2021 (Peel Deviation In)	37900	36950	26620	21110

5. RECOMMENDATIONS (PRE-CONSULTATION)

5.2 Road Recommendations

The draft recommended improvements contained in the Study are a combination of the outcomes of a Land Use Context analysis, traffic modellings (TRIPS and SIDRA modelling methods), together with a strategic overview assessment in order to arrive at solutions, which aim to satisfy the following primary objectives:

- Maintaining the arterial function of the highway;
- Provide an acceptable level of service for local road network users, including pedestrians;
- Rationalising the location and regime of existing access points along the highway to improve road user safety;
- Identify the local road interconnections and modifications.

The following is an outline of proposals identified within the Study Area, prior to the community consultation phase.

5.2.1 Old Coast Road

The ultimate long term scenario for the Study Area includes the following aspects that should be highlighted with regard to Old Coast Road:

- This road being six lanes (three in each direction) between the Old Coast Road intersection and Seascapes Boulevard. The implementation of this aspect of the study will require additional work on the Estuary Bridge which currently only provides for one lane in each direction, however works are expected to be carried out on the Bridge that provides for three lanes in total (one each way and one interchangeable).

- Six sets of traffic signals will be required between the Old Coast Road intersection and Seascapes Boulevard at various stages.

  In the short term (by 2006), additional signals to those currently provided at Peelwood Parade are required at Casuarina Drive.

  In the medium term (by 2016), signals are recommended for the Old Coast Road intersection, whilst in the long term (beyond 2016), signals are recommended for Sticks Boulevard, Oakleigh Drive and Seascapes Boulevard. Notwithstanding this recommendation, additional works are proposed to be constructed in the near future at Sticks Boulevard to improve its operation.

- The closure of accesses to Old Coast Road at Dorothy Avenue, Merlin Street Reserve, Karanga Road, Olive Road (replaced by Mercedes Avenue four-way intersection) and the service road access adjacent to the Veterinary Clinic at Wannanup. These closures are to be supported by local road access.

  Of these recommendations, the closure of the access to Old Coast Road at Dorothy Avenue is likely to have the greatest impact based on current use.

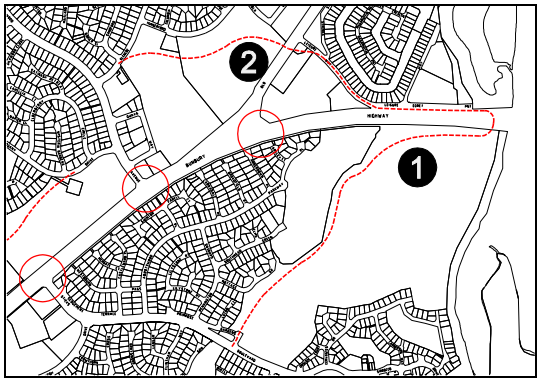
- The remaining intersections being provided with 'Seagull Islands' in order to assist with traffic movements.

5. RECOMMENDATIONS (PRE-CONSULTATION)

5.2.2 Local Road Improvements

The report makes the following recommendations with respect to new road infrastructure than may assist reduce access and reliance on the highway:

Proposal 1 – Leisure Way to Sticks Boulevard



The purpose of providing this connection is to enhance connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and potentially provides considerably better access for residents of Bridgewater to the City Centre and Halls Head Shopping Centre without the necessity to use the highway. The provision of this road link will also provide alternative access/egress options to Bridgewater rather than placing increased pressure on Sticks Boulevard as development in the area proceeds.

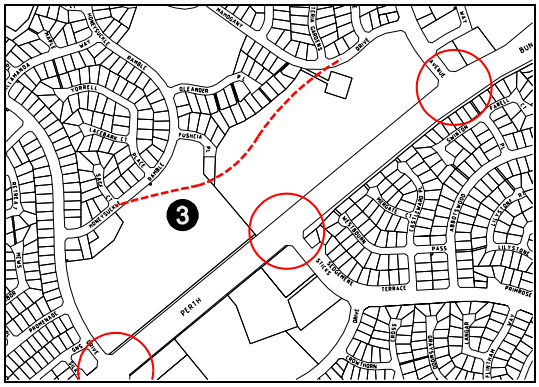
Proposal 2 – Leisure Way to Peelwood Pde

This proposed road link forms part of the Halls Head Town Centre Precinct Plan. This road link enhances connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and potentially provides considerably better access to the Halls Head Shopping Centre and the City Centre without the necessity to use the highway.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link is referenced in the Halls Head Town Centre Precinct Plan, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link should a review of the Halls Head Town Centre Precinct Plan occur.

In this instance the provision of the road link, including the timing, is associated with future land development.

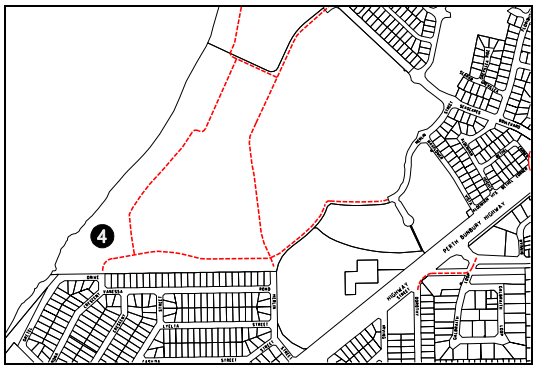
Proposal 3 – Mahogany Drv to Peelwood Pde



The purpose of providing this connection is to enhance connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and potentially provides considerably better access for residents of Seascapes and Halls Head to Peelwood Reserve, Halls Head Community College and the Halls Head Shopping Centre without the necessity to use the highway.

At this stage, the alignment is conceptual and more detailed design work is required to be undertaken.

Proposal 4 – Seascapes to Falcon

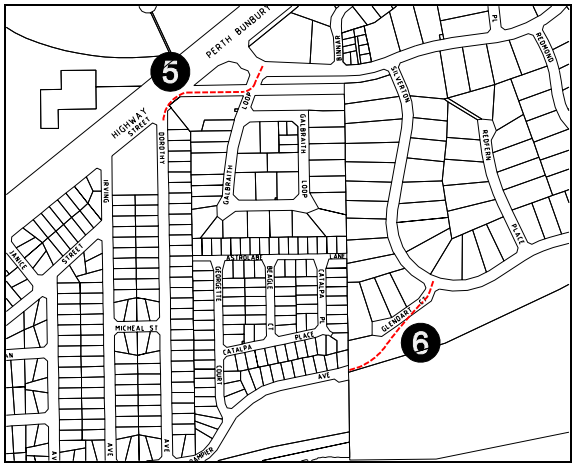


This proposed road link has been approved by the Western Australian Planning Commission as part of the subdivision approvals for the development of Seascapes (consistent with the Outline Development Plan for Seascapes). This road link enhances permeability between Halls Head and Falcon, whilst providing connections to the surrounding road network.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link has been approved as part of the subdivision approvals, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link in the event that a modification to the Outline Development Plan for Seascapes is sought by the developers.

5. RECOMMENDATIONS (PRE-CONSULTATION)

Proposal 5 and 6 – Dorothy Avenue Intersection Closure; Internal Link to Wattleglen Avenue via Galbraith Loop and Dampier Avenue; Link from Dampier Avenue to Glendart Court



The Study recommends closure of the Dorothy Avenue intersection as the intersection has an existing short stub, angle approach to the highway, together with a short substandard deceleration taper for highway traffic on account of its proximity to Wattleglen Avenue. Closing this intersection however requires road links to facilitate easterly movements (i.e. towards Erskine) for residents without the need to access the highway.

In this regard the Study has recommended the provision of two road links, being Dorothy Avenue-Wattleglen Avenue via Galbraith Loop/Lloyd Court and Dampier Avenue-Glendart Court.

At this stage, the alignment indicated on plans is conceptual and more detailed design work would be required to be undertaken.

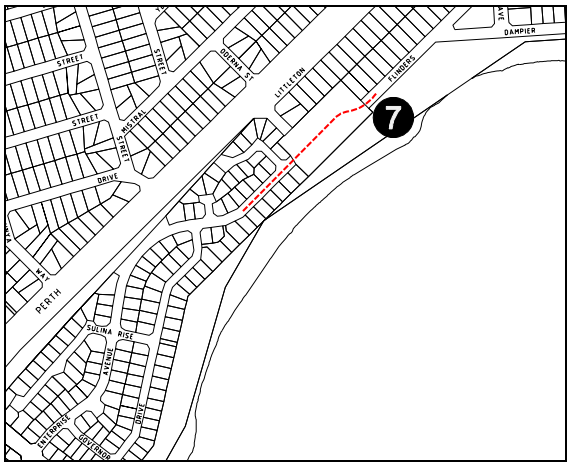
Specifically in relation to the Dampier Avenue-Glendart Court Road link, the provision of this road link is recommended as there was a lack of connectivity for intra neighbourhood access.

The key strategic outcome for the local road network is to provide an alternative intra neighbourhood access facility to that of the need to access via the highway.

The proposed connections are local road linkages that will be designed to manage traffic volume and speed. In all instances traffic volumes are predicted to be low, ie less than 500 vehicles per day. This is common for low order residential streets.

There currently exists a limestone accessway providing access to the estuary foreshore at this point. There is also an informal capark which accommodates local visitation. The area has links to the foreshore trail to Erskine which has boardwalks, bird hives and rotunda. The proposed Glendart Court road link would formalise the road access past this foreshore activity area.

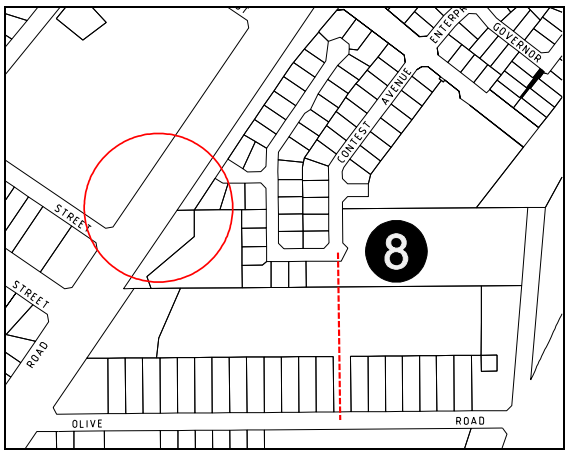
Proposal 7 – Link from Flinders Street to Enterprise Avenue, Incorporating Closure of Karanga Street and Connection to Littleton Street



This proposed road link has been approved by the Western Australian Planning Commission as part of the subdivision approvals for the development of Cox Bay. The road link enhances permeability between neighbouring zones.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link has been approved as part of the subdivision approvals, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link in the event that the subdivision approval expires prior to the road link being provided.

Proposal 8 - Link from Contest Ave to Olive Rd



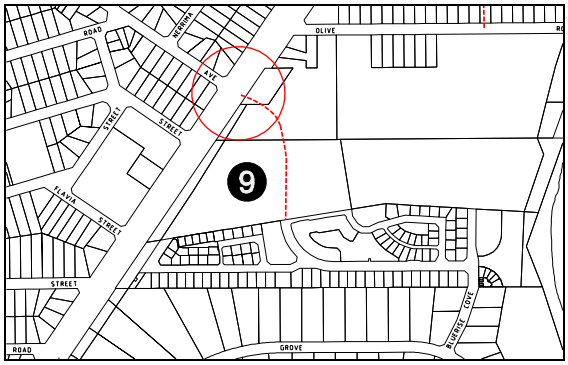
Portion of this proposed road link has been approved by the Western Australian Planning Commission as part of the subdivision approvals

for the development of Cox Bay (NB – the road reserve to facilitate this road link has been provided for as part of the approval), with the remaining portion of this road link being endorsed by Council as part of the Falcon Village Precinct Plan.

This road link enhances connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and provides considerably better access to the Falcon Village Precinct without the necessity to use the highway.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link has been approved as part of the subdivision approvals and Falcon Village Precinct Plan, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link in the event that the subdivision approval expires prior to the road/road reserve being provided to facilitate the road link and/or should a review of the Falcon Village Precinct Plan occur.

Proposal 9 - Link from Blue Rise Cove to Mercedes Avenue

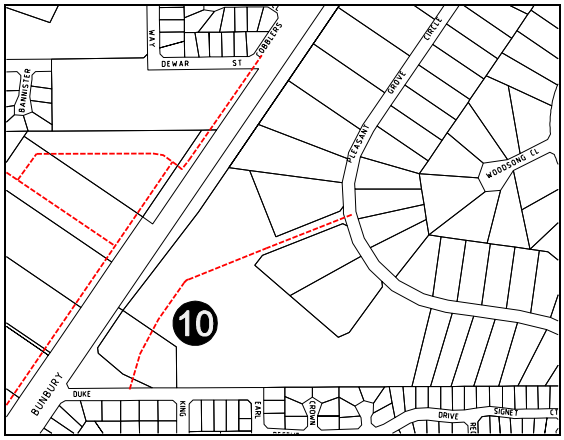


This proposed road link has been endorsed by Council and the Western Australian Planning Commission as part of the Mercedes Avenue Commercial Node Outline Development Plan and the Falcon Village Precinct Plan. This road link enhances connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and provides considerably better access to Falcon Village without the necessity to use the highway. The provision of this road link will also provide alternative access/egress options to Pleasant Grove and Coco C'Bay rather than placing increased pressure on the Pleasant Grove Circle intersection as development in the area proceeds.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link is referenced in the Mercedes Avenue Commercial Node Outline Development Plan and the Falcon Village Precinct Plan, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link should a review of either document occur.

With regards to the provision of this road link, including the timing, this is associated with the future land development of Lot 506.

Proposal 10 - Link between Duke Street and Pleasant Grove Circle



This proposed road link is required to be provided as per Scheme requirements for Pt Murray Locations 1921 and 1339 – site is zoned "Special Use' under Town Planning Scheme No 3, with the development requirements for these lots being the subject of Amendment 41 to the Scheme.

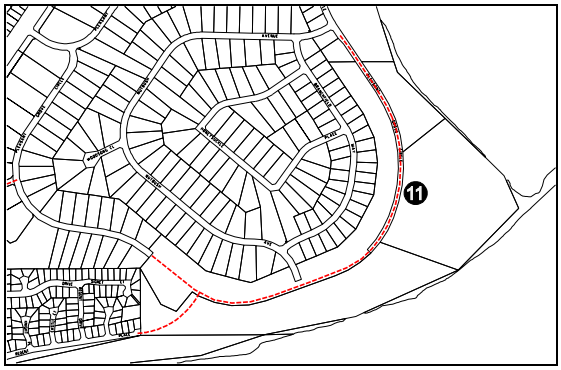
The provision of this road link increases permeability throughout the area and provides access to the proposed commercial development on the corner of Duke Street/Old Coast Road. This road link also provides alternative access/egress options to Pleasant Grove rather than placing increased pressure on the Pleasant Grove Circle intersection as development in the area proceeds.

The Study reinforces the appropriateness of providing this link and it is appropriate that notwithstanding the road link is referenced as a development requirement for these lots under Town Planning Scheme No. 3, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link should a review of Town Planning Scheme No. 3 occur.

With regards to the provision of this road link, including the timing, this is associated with the future land development of the subject land.

5. RECOMMENDATIONS (PRE-CONSULTATION)

Proposal 11 – Complete Pleasant Grove Circle and Link to Charles Place

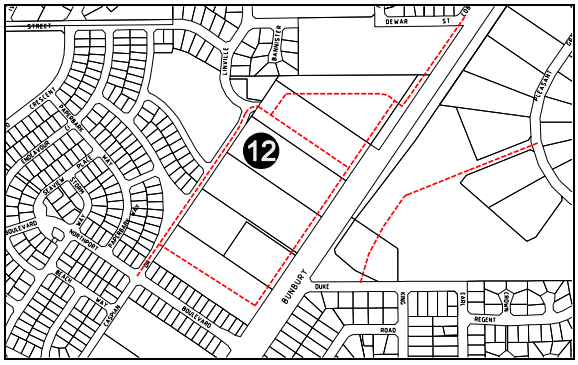


The completion of Pleasant Grove Circle has been planned to be associated with the future development of Lot 109, with this portion of the road link being a logical extension of the existing road network in the area. The Charles Place road link enhances permeability between neighbouring zones.

At this stage, the alignment indicated on plans is conceptual and more detailed design work is required to be undertaken. During the detailed design stage, liaison will be required to be undertaken with the Department for Planning & Infrastructure and the Department of Environment as key stakeholders, as the land is reserved Regional Open Space in the Peel Region Scheme.

In this instance the provision of the road link, including the timing, is associated with future land development in Pleasant Grove, thus these issues will form the basis for further discussions with the developers of this land when they are progressing development options.

Proposal 12 – Extend Cobblers Road to Dewar Street and Close Existing Access



This proposed road link has been endorsed by Council and the Western Australian Planning Commission as part of the the Wannanup Structure Plan.

The Study reinforces the appropriateness of providing this link and closure of the existing access, and it is appropriate that notwithstanding the road link and closure is referenced in the respective Outline Development Plans and the Wannanup Structure Plan, the road link is referred to in the Study documentation to reinforce the broader strategic rationale for the road link and closure should a review of either of the documents occur.

With regards to the provision of this road link, including the timing, this is associated with the future land development of the adjoining lots

6. CONSULTATION

6.1 Consultation Procedure

The advertising of the Study was undertaken from 11 August 2005 to 30 September 2005, with the consultation process comprising of:

- A general letter to approx 9000 landowners, schools and community groups within the Study Area.

  This letter included the summary brochure, details on obtaining the full report and an invitation to the Community Information Sessions (refer **Figure 7**)

- 'Site Specific' letters to landowners in the vicinity of the three new proposed internal road linkages, being Honeysuckle Ramble-Mahogany Drive, Dorothy Avenue-Galbraith Loop/Dampier Avenue-Glendart Court and Pleasant Grove to Wannanup. These letters included a plan detailing the proposals overlaid on an aerial photo.

- General letters to the Members of Parliament and State Government agencies.

- Two community information sessions held on 5 September 2005 – 88 people registered attendance at the information sessions.

- Details of the Study and the associated community information sessions within the City Voice section of Mandurah Mail, including details on gaining access to the full report on the City's website and the City's Administration Office.

A total of 112 submissions, inclusive of 2 petitions, were received in relation to the Study.

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Figure 7 - Consultation Summary Brochure

6. CONSULTATION

6.2 Summary of Submissions

Of the 112 submissions received, 108 submissions were received from the public. ***Table 2*** provides a summary of the issues raised in submissions received. A detailed copy of the summary of the submissions received and the Council's response to each of the submissions is separately available.

Table 2 - Summary of Submissions

	Landowner/ Community Submission	Government Department	Total
Proposal 1: Extend Leisure Way to Sticks Boulevard			
• Support	6	1	7
• Object	4	-	4
• Traffic calming devices will need to be implemented on Leisure Way	2	-	2
• Concern road will become bypass road	1	-	1
• Seems purpose is to provide easier access to Halls Head and shopping centre, yet this will be achieved with the traffic light proposals	1	-	1
• Concern that the link will provide traffic problems/antisocial behaviour	1	-	1
• Provision of lights at Old Coast Road, Peelwood Parade and Casuarina Drive will negate need for this link	1	-	1
• Provision of link will negate need for lights at Sticks Boulevard	1	-	1
• This road should be re-routed to run along the estuary	1	-	1
• This should be a priority	1	-	1
• Nottage Gardens should be extended to Quarriston Avenue and Pennington Gardens to Sticks Boulevard to assist with routing traffic to new connection road and Sticks Boulevard	1	-	1
• Off-ramp off Estuary Bridge linking to new Leisure Way roadway should be considered	1	-	1
• Only necessary if access from Sticks Boulevard to Old Coast Road is not improved	1	-	1
• Is an effective extension to increase connectivity without increasing movements onto the highway	-	1	1
Proposal 2: Leisure Way to Peelwood Parade			
• Support	2	1	3
• Object	2	-	2
• Concern that the link will provide traffic problems/antisocial behaviour	1	-	1
• Provision of lights at Old Coast Road, Peelwood Parade and Casuarina Drive will negate need for this link	1	-	1
• Provision of link will negate need for lights at Old Coast Road/Old Coast Road intersection	1	-	1
• If road link proceeds, a shared path will be needed on Sandford Crescent	1	-	1
• Increases connectivity without increasing movements onto the highway	-	1	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Proposal 3: Mahogany Drive – Honeysuckle Ramble to Peelwood Pde			
• Support	1	1	2
• Object	64*	-	64*
• Concern with increased traffic adjacent to recreation facilities	8	-	8
• Concern that the link will provide traffic problems/antisocial behaviour	8	-	8
• Concern with loss of value to property	6	-	6
• Concern parking in the area will be reduced as a result	5	-	5
• Concern that the link will reduce safety for children walking to school	5	-	5
• Concern with removal of vegetation and open space to facilitate road link	4	-	4
• Peelwood Parade is a good distributor road enabling access – this link is not needed	4	-	4
• Increases connectivity without increasing movements onto the highway	-	1	1
• Concern will increase pressure between Peelwood & Mahogany	1	-	1
• Provision of link will reduce traffic at Peelwood/Old Coast Road intersection	1	-	1
• Alternative solution – construct alternative access to hockey stadium on the northern boundary of the high school	3	-	3
• Alternative solution – spend money for this road to widen Old Coast Road to 3 lanes between Casuarina & Peelwood	1	-	1
• Alternative solution – reroute road on the edge of the reserve rather than through the reserve	-	1	1
**** - includes 48 signatories to a petition***			
Proposal 4: Seascapes to Falcon			
• Support	-	1	1
• Object	7	-	7
• Concern that the link will provide traffic problems/antisocial behaviour	7	-	7
• Concern with removal of vegetation to facilitate road link	3	-	3
• Is it possible to close off the northern end of Barabara Street (near the reserve)?	1	-	1
• Is it possible to cul-de-sac road adjoining Eldora Road?	1	-	1
• Traffic calming devices will need to be installed	1	-	1
Proposal 5: Dorothy Avenue Intersection Closure; Internal Links to Wattleglen Avenue via Galbraith Loop and Dampier Avenue			
• Support	15	1	16
• Object	3	-	3
• As a priority need turn from Galbraith Loop modified to allow right hand turn movements	3	-	3
• Link does not affect residents	2	-	2
• Link provides safe access to shops without any need to use Old Coast Road	2	-	2
• Alternative solution – provide new entrance between Dorothy & Wattleglen to avoid need for additional turning movements at Galbraith	1	-	1
• Provision of the two current access points is unnecessary	1	-	1
• If any link needed in this area, this one is preferred over Glendart Court	1	-	1
• Concern that the link will provide traffic problems/antisocial behaviour	1	-	1
• Alternative solution – close median strip and only allow left turn in/out movements	1	-	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Proposal 6: Link from Dampier Avenue to Glendart Court			
• Support	4	1	5
• Object	81*	-	81*
• No opinion	1	-	1
• Concern that the link will provide traffic problems/antisocial behaviour	11	-	11
• Concern with impact on the environment (flora/fauna/wetlands)	5	-	5
• Concern with loss of value to property	3	-	3
• Concern with loss of easy access to the foreshore	2	-	2
• Footpaths would be required to be provided in the area if link is built	2	-	2
• Link provides safe access to shops without any need to use Old Coast Road	2	-	2
• If proposal proceeds, need traffic calming devices installed and/or speed limits reduced	2	-	2
• Development and/or alterations to Reserve 43960 will require the approval of the Conservation Commission. Should be noted that DPI has been requested to upgrade the status of the reserve to 'A' class. Once this is achieved, Parliamentary approval is required for any change of status for the reserve.	1	1	2
• No need for this link road for locals as are other alternatives	1		1
• Road connection traverses a ROS reservation under the Peel Region Scheme. All development within or abutting a ROS reservation will require approval under the Peel Region Scheme.		1	1
**** - includes 63 signatories to a petition***			
Proposal 7: Link from Flinders Street to Enterprise Avenue			
• Support	2	1	3
• Object	4	-	4
• Concern that the link will provide traffic problems/antisocial behaviour	2	-	2
• Traffic calming devices will need to be implemented on Flinders Street	1	-	1
• Concern with loss of value to property	1	-	1
Proposal 8: Link from Contest Avenue to Olive Road			
• Support	2	1	3
• Object	7	-	7
• Concern that the link will provide traffic problems/antisocial behaviour	6	-	6
• Link should be for pedestrians/cyclists only, not vehicular traffic	1	-	1
• Contest Avenue is not suitably constructed for heavy traffic	1	-	1
Proposal 9: Link from Blue Rise Cove to Mercedes Avenue			
• Support	2	1	3
• Object	-	-	0
• Will give Pleasant Grove residents a direct link to the ocean	1	-	1
• This link should be a priority to reduce impact on Pleasant Grove	1	-	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Proposal 10: Link between Duke Street and Pleasant Grove Circle			
• Support	7	1	8
• Object	-	-	0
• Provides access between neighbourhoods and directs traffic to proposed commercial node	2	-	2
Proposal 11: Complete Pleasant Grove Circle & Link to Charles Place			
• Support	-	1	1
• Object (to the Charles Place link component of this proposal)	10	-	10
• Concern with impact on the environment (flora/fauna/wetlands)	8	1	9
• No reason for this link	3	-	3
• Concern that the link will provide traffic problems/antisocial behaviour	3	-	3
• Concern traffic will impact on the playground	3	-	3
• Support pedestrian and cycle connections between Charles Place and Pleasant Grove Circle	3	-	3
• Parking is currently not provided in the vicinity	2	-	2
• Charles Place is not wide enough for general traffic use	1	-	1
• Traffic calming devices are required on Pleasant Grove Circle	1	-	1
• Road connection to Charles Place traverses a ROS reservation under the Peel Region Scheme and a Conservation Category Wetland. Desirable for road to be located predominantly within Urban zone. All development within or abutting a ROS reservation will require approval under the PRS.		1	1
Proposal 12: Extend Cobblers Rd to Dewar St & close existing access			
• Support	-	1	1
• Object	-	-	0
• Concerns with removal of vegetation	1	-	1
Traffic Signals at Old Coast Road/Old Coast Road			
• Support	2	-	2
• Object	7	1	8
• Are a double-up of lights with Peelwood Parade and Leslie Street	1	-	1
• Will reduce traffic on McLarty and Hungerford Roads	1	-	1
• Support seagull island as short term proposal in conjunction with 3 lanes southbound and deleting right hand turn movements at intersection	-	1	1
• Alternative solution – realign Old Coast Road (being one into town) with Peelwood Parade	3	-	3
• Alternative solution – roundabout	2	-	2
• Alternative solution – this should be a left turn in/out intersection only	2	-	2

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Traffic Signals at Sticks Boulevard/Old Coast Road			
• Support	1	-	1
• Object	7	1	8
• Are a double-up of lights with Casuarina Drive	1	-	1
• Sticks Boulevard lights should be re-prioritised to 2006	1	-	1
• Alternative solution – roundabout	3	-	3
• Alternative solution – immediately construct road between Leisure Way and Sticks Boulevard and allow only left turn in/out from Sticks Boulevard.	2	-	2
• Alternative solution – 4 way with Peelwood Parade	2	-	2
• Alternative solution – provide for left in/left out turning movements only	1	-	1
Traffic Signals at Casuarina Drive/Old Coast Road			
• Support	2	1	3
• Object	-	-	0
Traffic Signals at Oakleigh Drive/Old Coast Road			
• Support	2	-	2
• Object	6	1	7
• Are a double-up of lights with Casuarina Drive	3	-	3
• Lights should be provided at Owen Avenue instead of at Oakleigh	2	-	2
• Lights should be re-prioritised from 2016 to short term priority	1	-	1
• Short term proposal of a seagull island and third north bound lane is adequate to handle existing and future vehicle movements	-	1	1
• Alternative solution - roundabout	2	-	2
• Alternative solution – provide for left in/left out turning movement only	1	-	1
Traffic Signals at Seascapes Boulevard/Old Coast Road			
• Support	2	-	2
• Object	3	-	3
• Alternative solution - roundabout	1	-	1
• Alternative solution – close median strip and only allow left turn in/out movements	1	-	1
• Alternative solution – 4 way intersection with Hopevale Place should be considered in the long term	-	1	1
Traffic Signals at Northern End of Falcon Precinct			
• Support	1	-	1
• Object	5	1	6
• Are a double-up of lights with Mercedes Avenue	2	-	2
• Alternative solution - continue central median island across existing openings onto Old Coast Road (i.e. left turn in/out only from Miami and Falcon shops)	2	-	2
• Alternative - roundabout	1	-	1
• Alternative options should be considered to achieve entry statement and address pedestrian access issues (i.e. overpass)	-	1	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Traffic Signals at Mercedes Avenue/Old Coast Road			
• Support	1	-	0
• Object	-	-	0
Closure of Merlin Reserve (Tennis Club) Access Road			
• Support	-	-	0
• Object	4	-	4
• Users will subsequently utilise residential streets creating traffic problems	2	-	2
• Alternative solution - roundabout	1	-	1
Closure of Karanga Street Intersection & Connect Karanga Street to Littleton Street			
• Support	1	-	1
• Object	1	-	1
General Comments About Study Outcomes/Findings			
• Too many traffic lights are proposed	36	-	36
• Why does the plan not provide for roundabouts	18	-	18
• Build the Peel Deviation ASAP	10	-	10
• Support/Welcome any improvements to traffic flow on Old Coast Road	8	-	8
• Upgrade to 3 lanes will only work if both bridges are upgraded as well	4	-	4
• Supports coastal strip connector roads	3	-	3
• No comment in study on public transport	2	-	2
• Why are traffic lights proposed at T intersections?	2	-	2
• There is no need to link suburbs with internal roads	2	-	2
• Driver and pedestrian safety should be priority for making road traffic changes and not the cost of the road changes	2	-	2
• Consideration should be given to left turn in/out only and not closure of access points	1	-	1
• Shared paths in lieu of proposed road connections would be more appropriate	1	-	1
• Internal roads will be used as bypass roads to Old Coast Road	1	-	1
• Property values will be affected with the development of internal roads	1	-	1
• Traffic lights are most efficient method to manage high volume vehicle movements	-	1	1
• Study over-focuses on problem of vehicle traffic movements rather than exploring viable transportation alternatives to address the problem	-	1	1
• Statistical information later than 2002 would have been useful	1	-	1
• Study should be updated to reflect currently implemented traffic conditions (Peelwood Parade modifications, Sticks Boulevard modifications; lights at Casuarina; closure of Olive Road and lights at Mercedes Avenue)	1	-	1
• No comment in study on shared paths	1	-	1
• Why are there no proposals for 'slip roads' like Singleton & Golden Bay	1	-	1
• No comment on speed limits on Old Coast Road	1	-	1
• Links between Old Coast Road and estuary should be walkways/cycleways	1	-	1
• Roundabouts are not the solution	1	-	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
• Fewer access points and network of local roads will not reduce the traffic along the highway	1	-	1
• Concept of bridge-to-bridge great if cycle/pedestrian network only	1	-	1
Additional Recommendations for Consideration			
• Speed limit from bridge to bridge should be 70km/h	6	-	6
• Shared paths should be provided all along Old Coast Road (or dedicated cycleway)	2	1	3
• Why not provide for small frequent CAT buses?	2	-	2
• Greater provision/promotion of walking & cycling (i.e. shared paths)	2	-	2
• Estuary Bridge should be duplicated	2	-	2
• Build underpasses at Peelwood Parade, Seascapes Boulevard, Mercedes Avenue and Northport Boulevard	2	-	2
• Service roads, in lieu of 3 lane upgrade, should be provided	2	-	2
• Traffic entering highway should be restricted to left turn in/out only	2	-	2
• Estuary Bridge should have another lane added – would negate many of the studies recommendations	2	-	2
• Novara Deli access road (between Owen and Dorothy) should have a deceleration lane if Dorothy Avenue is closed	2	-	2
• Recommend Old Coast Road be 6 lanes from Estuary Bridge to Falcon	2	-	2
• New roundabout at Peelwood Parade/Mahogany Drive intersection	2	-	2
• Public transport in study area should be improved	1	1	2
• Can consideration be given to alternate/improved access into Northport in the vicinity of the Dawesville Bridge	1	-	1
• New roundabout at Peelwood Parade/Glencoe Parade intersection	1	-	1
• New roundabout at Mahogany Drive/Silvertop Avenue intersection	1	-	1
• New roundabout at Silvertop Avenue/Honeysuckle Ramble intersection	1	-	1
• Mahogany Drive to be closed near new road access to recreation area	1	-	1
• New roundabout at Casuarina Drive/Honeysuckle Ramble intersection	1	-	1
• New roundabout at Casuarina Drive/Templetonia Parade intersection	1	-	1
• Peelwood Parade, McLarty Road and Casuarina Drive should be upgraded with extra lanes	1	-	1
• Speed limits on internal roads should be 40km/h	1	-	1
• All median strips on Old Coast Road should be closed (i.e. left turn in/out only from access points)	1	-	1
• Peelwood Parade traffic lights should have two lanes to turn left and right	1	-	1
• Exits from BP service station onto Peelwood Parade should be closed	1	-	1
• Novara Deli access just before Littleton Street should be closed	1	-	1
• Lights should be installed at Perseverance Boulevard/Old Coast Road (in lieu of northern end of Falcon Precinct)	1	-	1
• Improvement and promotion of public transport is required	1	-	1
• Provide left turn in/out only at Baroy Street intersection with Old Coast Road	1	-	1
• Buses should run on internal roads and not Old Coast Road	1	-	1
• Same road surface should be used from bridge to bridge	1	-	1
• Sound absorption barriers should be provided along the highway	1	-	1

6. CONSULTATION

	Landowner/ Community Submission	Government Department	Total
Miscellaneous Comments			
• Brochure presentation was excellent	2	-	2
• Developers should contribute to road widening and bridge upgrades	1	-	1
• Is there also a cycleway program to match the traffic control study?	1	-	1
• Driver education is needed about best options available when travelling through the area	1	-	1
• All development within or abutting a ROS reservation under the Peel Region Scheme will require approval under the Peel Region Scheme.		1	1

6.3 Main Issues Rising from Submissions

6.3.1 General Comments

Too Many Traffic Lights Are Proposed

A number of submissions have objected to the number of traffic lights proposed within the Study Area on the basis that the provision of traffic lights will impede traffic flow.

From a traffic flow perspective, traffic lights are the most effective way of co-ordinating and controlling through traffic on the highway whilst also providing access onto the highway from the adjacent urban areas – being two key objectives of the study. In addition traffic lights accommodate pedestrians and cyclists more safely and efficiently – although it is acknowledged that by facilitating these transport movements there can be additional delays to vehicular movements along the highway.

In times of peak periods, such as Easter school holidays and long weekends, there is very heavy unidirectional flow on the highway and the provision of 'synchronised' traffic lights provide the best opportunity to co-ordinate and control traffic of this nature.

In terms of the number of traffic lights proposed, the Study recommends four sets of traffic lights, being Sticks Boulevard, Oakleigh Drive, Seascapes Boulevard and the Falcon Town Centre, as long-term improvement proposals. In this regard these improvement proposals are considered to be 'marginal' as they are based on long-term traffic growth projections and assumed distributions.

Prior to any of these long term proposals being implemented, future reviews will be required to assess the affects from implementing the short/medium term works in terms of local traffic re-distribution patterns. Other influences such as regional traffic growth, re-assignment of traffic following completion of the Perth-Bunbury Highway and land use development rates will ultimately impact on the justification and timing of the long term improvement proposals.

Why Have Roundabouts Not Been Proposed?

A number of submissions, particularly those that objected to the traffic light proposals, have questioned why roundabouts have not been proposed.

From a traffic flow perspective, roundabouts give equal priority to each of the approach legs and work best when the traffic flows on each leg are approximately equal. Within the study area, similar traffic flow numbers on the highway and the side roads are not achieved, thus roundabouts are not considered to be a viable alternative to traffic lights.

Roundabouts also have negative social and economic impacts (including, pedestrian inconvenience, extensive land requirements etc). At a number of existing intersections within the Study Area, the extent of land use development severely constrains the feasibility of a roundabout being considered without the need for resumption/purchase of additional land.

Building The Perth-Bunbury Highway Is the Solution

A number of submissions have sought that the Perth-Bunbury Highway be constructed as soon as possible as this road will relieve the pressure on Old Coast Road and subsequently reduce the need for the traffic signal proposals to be implemented.

The Study has undertaken traffic modelling assuming the Perth-Bunbury Highway is constructed before 2016 (current commitments are 2009/2010), with the modelling demonstrating that the Perth-Bunbury Highway will have a short term effect on the traffic volumes on the highway. However over time the relocated regional traffic

will be replaced by district traffic as a result of continued growth within Mandurah, with projected future traffic volumes exceeding current traffic volume numbers.

As the short/medium term improvements are implemented and the Perth-Bunbury Highway is completed, future reviews will be required to be undertaken to justify the need and/or timing for the long term improvements recommended in the Study.

6.3.2 Specific Comments

Proposal 3 - Mahogany Drive-Honeysuckle Ramble to Peelwood Parade

The purpose of providing this connection is to enhance connectivity, particularly in relation to public transport and pedestrian/cyclist routes, and potentially provides considerably better access for residents of Seascapes and Halls Head to Peelwood Reserve, Halls Head Community College and the Halls Head Shopping Centre without the necessity to use the highway.

The submissions received in relation to this proposal specifically raised a number of issues including concerns with increased traffic adjacent to recreation facilities, loss of value to properties, concerns parking in the areas will reduced, reduced safety for children and the removal of vegetation and open space. At this stage, the alignment indicated on plans is conceptual and more detailed design work is required to be undertaken, with each of these issues able to be the subject of further consideration at the detailed design stage of the road link. This detailed design stage may also extend to reviewing the development related issues on the lots to the north-west of the proposed road link to ensure that impacts on these properties are minimised.

It is not envisaged that the Mahogany Drive-Honeysuckle Ramble extension would be needed in the short term, however as a longer term item it is considered very important. It is important that Council plans today for the longer term. The proposed link will have a number of advantages including increasing accessibility to the active sporting facilities which are proposed for the Peelwood Reserve. This link has the potential to reduce traffic on Old Coast Road – a key aim of the Study. While not needed today it will become increasingly important in the future. If not included in this Study the opportunity to provide the link may be lost.

It is acknowledged that there is community concern with respect to this option. Thus it is considered important that the long term nature of the option be highlighted and that the need for further community consultation will be required.

Proposal 5 and 6 - Dorothy Avenue Intersection Closure; Internal Link to Wattleglen Avenue via Galbraith Loop and Dampier Avenue; Link from Dampier Avenue to Glendart Court: Proposed Slip Lane for Novara Store and Owen Avenue

The Study recommends closure of the Dorothy Avenue intersection as the intersection has an existing short stub, angle approach to the highway, together with a short substandard deceleration taper for highway traffic on account of its proximity to Wattleglen Avenue. Closing this intersection however requires road links to facilitate easterly movements (i.e. towards Erskine) for residents without the need to access the highway. In this regard the Study has recommended the provision of two road links, being Dorothy Avenue-Wattleglen Avenue via Galbraith Loop/Lloyd Court and Dampier Avenue-Glendart Court.

With regards to the Novara Store Access Road and the Owen Avenue intersection, the Study notes that these two intersections are close in proximity and are potential conflict points as a result. The Study further acknowledges that closure of the Novara Store Access Road will have major impacts on the operation of the Novara Store, thus the Study recommends combined left hand turn lanes, which will serve as the deceleration access to both the Novara Store and Owen Avenue.

Consideration was given to restricting the access to the Novara Store to the Owen Avenue intersection. Owen Avenue is important because it allows direct access to the Novara Boat Ramp facility. If access to the Novara Store is limited to Owen Avenue it was considered that this would be detrimental to the success of the Novara Store and thus a solution was sought that protected the community benefit of the Store. If the Novara Store was to cease operating, then the northern access could be closed.

Consideration has also been given to retaining the Dorothy Avenue access on to the Highway as the access to the Novara Store, however it is considered to be too far north to be of real benefit to the Store.

The submissions received specifically raised a number of issues pertaining to the Glendart Court-Dampier Avenue road link including concerns about the impact on the environment (flora, fauna, wetland), traffic impacts in the area, need for traffic calming devices and footpaths in the surrounding road networks. At this stage, the alignment indicated on plans is conceptual and more detailed design work would be required to be undertaken, with each of these issues able to be the subject of further consideration at the detailed design stage of the road link.

6. CONSULTATION

A submission was also received from the Department for Planning & Infrastructure (Statutory Planning) referencing that the proposed Dampier Avenue-Glendart Court road traverses a 'Regional Open Space' reservation and that Peel Region Scheme approval is required to be obtained. CALM also lodged a submission referencing that approval of the Conservation Commission (or Parliament depending on the status of the reserve at the time the proposal proceeds) will be required to facilitate the proposed road link. At this stage, the alignment indicated on plans is conceptual and more detailed design work would be required to be undertaken. During the detailed design stage, liaison would be required to be undertaken with the Department for Planning & Infrastructure and CALM as key stakeholders.

Specifically in relation to the Dampier Avenue-Glendart Court link, the provision of this road link was recommended as there was a lack of connectivity for intra neighbourhood access.

The key strategic outcome for the local road network is to provide an alternative intra neighbourhood access facility to that of the need to access via the highway.

The proposed connections are local road linkages that will be designed to manage traffic volume and speed. In all instances traffic volumes are predicted to be low, ie less than 500 vehicles per day. This is common for low order residential streets.

There currently exists a limestone accessway providing access to the estuary foreshore at this point. There is also an informal capark which accommodates local visitation. The area has links to the foreshore trail to Erskine which has boardwalks, bird hives and rotunda. The proposed Glendart Court road link would formalise the road access past this foreshore activity area.

After reviewing the issues raised in the submissions it is recommended that the Study recommendations pertaining to the Dorothy Avenue intersection closure and the Dorothy Avenue-Wattleglen Avenue road link be supported, along with the proposed road link between Dampier Avenue-Glendart Court. It is acknowledged that further consultation will be required before these two modifications are implemented.

7. STRATEGIC PLAN AND IMPLEMENTATION

7.1 Council Endorsement

Council adopted the draft Report at its meeting in April 2006, subject to the following modifications being made:

(a) The Study Report to reference that the review of the Old Coast Road intersection treatment is to include the consideration of a roundabout.

(b) The Study Report to reference that should the Novara Store cease to operate, the access road is to be closed.

(c) The Study Report to reference to the extension of Mahogany Drive – Honeysuckle Ramble to Peelwood Parade be considered a longer term option and would only be provided after further localised consultation in terms of carriageway width, design, location and treatment.

These modifications have been incorporated into the Bridge to Bridge Strategic Plan, which reflects the final recommendations to the Study (Refer **Figure 8**).

7.2 Implementation

Implementation of the Study's recommendations will be via a combination of Council works (including design, consultation and construction), Main Roads WA works, and those as part of the subdivision and land development process.

Concept designs for the detail recommendations will be the key priority for a number of the infrastructure upgrades, which will progress as required.

6. CONSULTATION

Figure 8 - Final Strategic Plan