BETTER TRANSPORT FUTURES
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Morisset Contributions Catchment Development Contribution, Traffic and Transport Study

Volume 1: Contribution Plan

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Contents

Executive Summary

Introduction

Traffic and Transport Infrastructure is a key supporting element to the future growth planned in the Morisset Contributions Catchment. The Study Area includes and is focussed on the emerging regional centre of Morisset as identified in the Lower Hunter Regional strategy. The Morisset Town Centre is planned to expand to provide the necessary level of local facilities to service the existing and planned growth of the Morisset community.

The study has included a review of previous traffic investigations completed for a number of development and rezoning proposals, and has included assessment of all local road intersection, pedestrian, cyclist and public transport facilities to support the community.

The Study Area

The study area covers the Morisset Contributions Catchment **(Figure 1-1)** divided into seven sub catchments **(Figure 1-2).**

Study Objectives

The study has considered the following objectives:

- The full range of local traffic and transport facilities justified to meet the technical demands of future development activity
- Achieve a cost effective, safe and efficient transport system for all users
- Satisfy the technical requirements for provision of traffic and transport facilities to agreed service levels and standards

Approach to Technical Assessment

The local traffic and transport facilities covered by this investigation have included the performance of local:

- Roads
- Intersections
- Cycling and pedestrian facilities
- Public transport facilities

The emphasis is clearly on the provision of acceptable service levels on local infrastructure. However, traffic analysis has been performed for example on critical intersections where local roads meet the main road network, where these have influence on the adjacent local road performance.

In all cases the following approach to technical assessment of performance has been adopted.

1. Agreement on Acceptable Performance Standards (Levels of Service)
2. Agreement on Acceptable Minimum Service Levels
3. Assessment of Existing Situation Performance
4. Upgrade of existing situation to meet Acceptable Performance Standard (where applicable)
5. Assessment of Agreed Growth Scenarios against Base Facilities
6. Assessment of Upgrade Scenarios to meet Acceptable Performance Standards (where applicable)

The emphasis in the analysis has been to test threshold or incremental upgrades to facilities so that over design (and hence over investment) of facilities is minimised. This approach has been particularly important in the assessment of local road upgrades required to satisfy the adopted service levels, for example in the case of upgrading Awaba Street as a means to divert some traffic away from town centre roads.

The extent of facilities required to achieve the desired performance levels is summarised in the assessment matrix at Appendix A to this report and these works and their estimated costs are summarised in the following table.

Table 0-1 Summary of identified works and capital cost estimates

Reference #	Facility Name	Capital Cost Estimate
Roads and Intersections		
M02	Roundabout at Freemans Drive and Stockton Street - North Cooranbong VPA Item 19	$864,000
M03	New Roundabout - Intersection of Stockton Road and Awaba Street	$1,482,000
M04	Awaba Street Extension at Bridge Street	$1,682,000
M05	Upgrade Intersection of Kahibah/Wyong/Doyalson Streets	$913,000
M06	New Traffic Signals - Intersection of Freemans Drive and Deaves Road - North Cooranbong VPA Item 18	$312,000
M07	New Traffic Signals - Intersection of Freemans Drive, Avondale Road and Newport Road - North Cooranbong VPA Item 14	$1,709,000
M08	Upgrade priority controlled intersection Newport Road and Coorumbung Road with sheltered turn lane	$679,000
M09	Upgrade priority controlled intersection of Coorumbung Road and Gradwells Road with change in priority	$458,000
M10	Upgrade of priority controlled intersection of Newport Road and Gradwells Road with sheltered turn lane	$829,000
M11	Upgrade of intersection to provide 4-way traffic signals for Wamsley Street – Macquarie Street – Dora Street	$1,232,000
M13	Fishery Point Road – Morisset Park Road	$722,000
M14	Upgrade of T-intersection of Fishery Point Road – Station Street with traffic signals	$867,000
M15	Upgrade of priority controlled intersection of Newport Road - Cadillac Close with sheltered turn lane	$632,000
M16	New Priority Control Intersection - Freemans Drive and new access road	$921,000
M17	Upgrade of intersection Wyee Road - Alliance Avenue to roundabout control	$864,000
M18	Upgrade of intersection Freemans Drive – Industrial Site Access with sheltered turn lane	$845,000
M19	New Roundabout - Intersection of Newcastle Street and Doyalson Street	$819,000
M20	Priority Control to traffic signals - Intersection of Freemans Drive and Alton Road - North Cooranbong VPA Item 16	$292,000
M22	Dora Street	$290,000
M23	Freemans Drive – Awaba Street	$865,000
M24	New Intersection with Traffic Signals - Freemans Drive and new access road (central) - North Cooranbong VPA Item 15	$1,142,000
	Sub-Total	**$18,419,000**
Pedestrian / Bicycle Facilities		
M25	New Shared Way - Dora Street	$152,000
M26	New Cycleways - Bonnells Bay to Sunshine	$561,000

Reference #	Facility Name	Capital Cost Estimate
M27	New Cycleways - Bonnells Bay to Mirrabooka	$153,000
M28	New Cycleways - Bonnells Bay to Trinity Point	$371,000
M29	New Cycleways - Morisset – Kahibah Street	$211,000
M30	New Cycleways - Morisset – Doyalson Street	$69,000
M31	New Road Shoulder Cycle Lane – Wyee Road	$20,000
M32	New cycleway – North Cooranbong to Dora Creek	$400,000
M33	New cycleway- Morriset CBD to Morriset Industrial Area	$200,000
M34	New cycle network – Morisset CBD	$50,000
	Sub-Total	**$2,187,000**
Public Transport Facilities		
M35	New Bus Shelters x 22	$ 440,000
	Sub-Total	**$440,000**
	TOTAL	**$21,046,000**

In addition to local road and intersection works the work schedule includes items under the categories of local public transport, pedestrian and cycle facilities, to meet nominated minimum service levels on collector roads.

The analysis conducted seeks to justify any works put forward for inclusion in the plan against the agreed performance levels. As such not all works nominated for consideration in the study brief have been found to be required to meet the nominated service levels. This is particularly evident with some of the CBD intersections where upgrades on purely traffic capacity/Levels of Service grounds do not appear justified.

Road & Intersection Upgrades

Local Road and Intersection Upgrades have been considered within the nominated sub-catchments. In many cases road upgrades can be attributed to a specific development need, and hence upgrading has been assumed to be required as a condition of that development, rather than for multiple sites. The Itemised Work Schedule summarises the works with nominated upgrade sites illustrated and described in more detail under the nominated project descriptions in Volume 2.

Public Transport, Pedestrian & Cycle Facilities

In terms of local public transport, pedestrian and cycling needs there is a fundamental assumption that new developments will provide works and facilities in accordance with Council policies where these relate specifically to the individual development. Additionally in order to complete a network of facilities to meet a minimum service level for connectivity, a series of works along collector routes has been nominated. These works are particularly focussed on connections to the Morisset Town Centre. The extent of these facilities is related to the nominated sub-catchment within the study area.

Works Concepts and Engineering Estimates

The works identified as part of this study have been developed as concepts only. The level of assumed knowledge and the subsequent accuracy of estimates of costs reflect this early stage of project development.

The procedures utilised to develop concept estimates have been established to allow the inclusion and updating of information as the concepts are developed through more detailed phases of design and implementation.

Cost Apportionment

Having justified the items for inclusion in the works schedule to deliver acceptable performance levels, and identified estimates of costs for the concepts, apportionment of costs has been calculated as follows:

- Where the need for a particular facility can be attributed as 100% to one development activity, the work is noted as such, and is assumed would be a condition imposed on that development activity.
- Where the need for upgrade to a facility or for a new facility is derived from multiple development activities (including existing development) the cost is apportioned between the contributing developments
- Where the need for a particular facility is related to provision of a minimum service level across the study area, consideration has been given to implementing a study area wide contribution (per unit of development activity)

The works schedule has been prepared taking into consideration the transport needs of the nominated sub-catchments, to arrive at a contribution amount for each sub-catchment.

Next Steps

Having established a contribution framework derived from a first principles assessment of transport needs, operational performance, and targeted upgrades to arrive at acceptable service levels to accommodate planned growth, the basis of the plan will be subject to consultation and review prior to being finalised and presented to Council for its consideration and adoption.

1 Introduction

Better Transport Futures (BTF) is part of the Don Fox Planning (DFP) team commissioned to prepare the Morisset Contributions Catchment Development Contributions Plan (The Plan). BTF's role focuses on traffic and transport infrastructure needs for this plan.

1.1 Purpose of the Study

The Morisset Traffic and Transport Study (The Study) is a supporting document of the Morisset Contributions Catchment Development Contributions Plan. The study identifies the traffic and transport infrastructure that is required to meet the transport demands of new development within the Morisset Contributions Catchment to the year 2025.

This is based on a Council endorsed estimate of an economic and development scenario prepared by the DFP team.

1.2 Objectives

The study includes the following tasks, with a focus on traffic and transport matters:

- a review of existing studies for a number of rezoning and planning and development application submissions in the Morisset Contributions Catchment
- need for basic road and intersection upgrades to support development in the area
- additional investigations of pedestrian/cycle links
- need for upgrades to local bus infrastructure

The overall traffic and transport objectives to be achieved were to arrive at a cost effective, safe and efficient transport system that addresses the expected increase in demand for private car travel, goods movement, public transport, pedestrian and cycle trips across the study area.

1.3 Land to Which the Study Applies

The Study Area is the Morisset Contributions Catchment as illustrated in Figure 1-1. Figure 1-2 also includes a breakdown into sub-catchments where the development will occur as follows:

- Cooranbong
- Dora Creek
- Morisset CBD
- Morisset
- Morisset Peninsula
- Wyee
- Rural Catchment

1.4 Approach to the Study

Council are faced with a dynamic planning environment where there are applications and submissions for development at all stages of the planning process. In the City of Lake Macquarie and in the Morisset Contributions Catchment this has included in recent years:

- Development consents subject to conditions. Examples include the Coles and Woolworths developments in Morisset Town Centre, a new Service Station and other industrial activity within the Alliance Avenue industrial estate, Scarborough Gardens residential developments at Station Street.
- Part 3A Consents, including Planning Agreements such as the North Cooranbong residential development
- LES investigations such as at Dora Creek

Wherever possible and relevant the conditions relating to these and other completed plans and development consents have been considered in this review.

The Morisset Contributions Catchment Developer Contributions Plan is a local plan and hence focuses on local street facilities:

- Roads
- Intersections
- Pedestrian and cycling facilities
- Local public transport facilities

It does not include works or services relating to non-local assets, such as main roads, regional bus and rail facilities and services. It also does not include projects which relate strictly to the Town Centre Upgrade projects such as the Town Square, pedestrian improvements and urban design improvements. In compiling the schedule of supporting works consideration has been given to completed planning agreements and development consents that cover elements of the planned growth, as well as potential city wide (or Contributions Catchment wide) facilities.

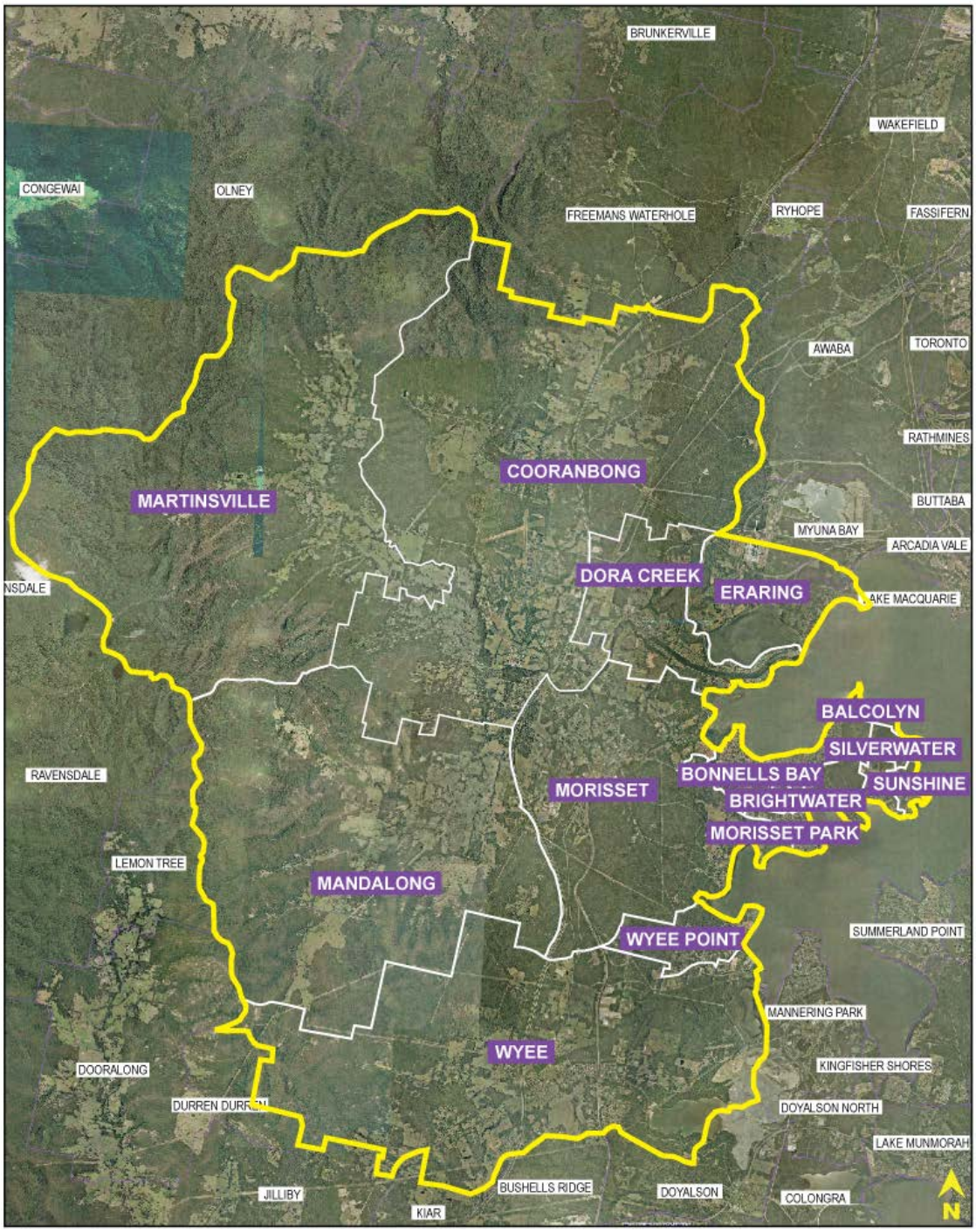


Figure 2-1 Contributions Catchment

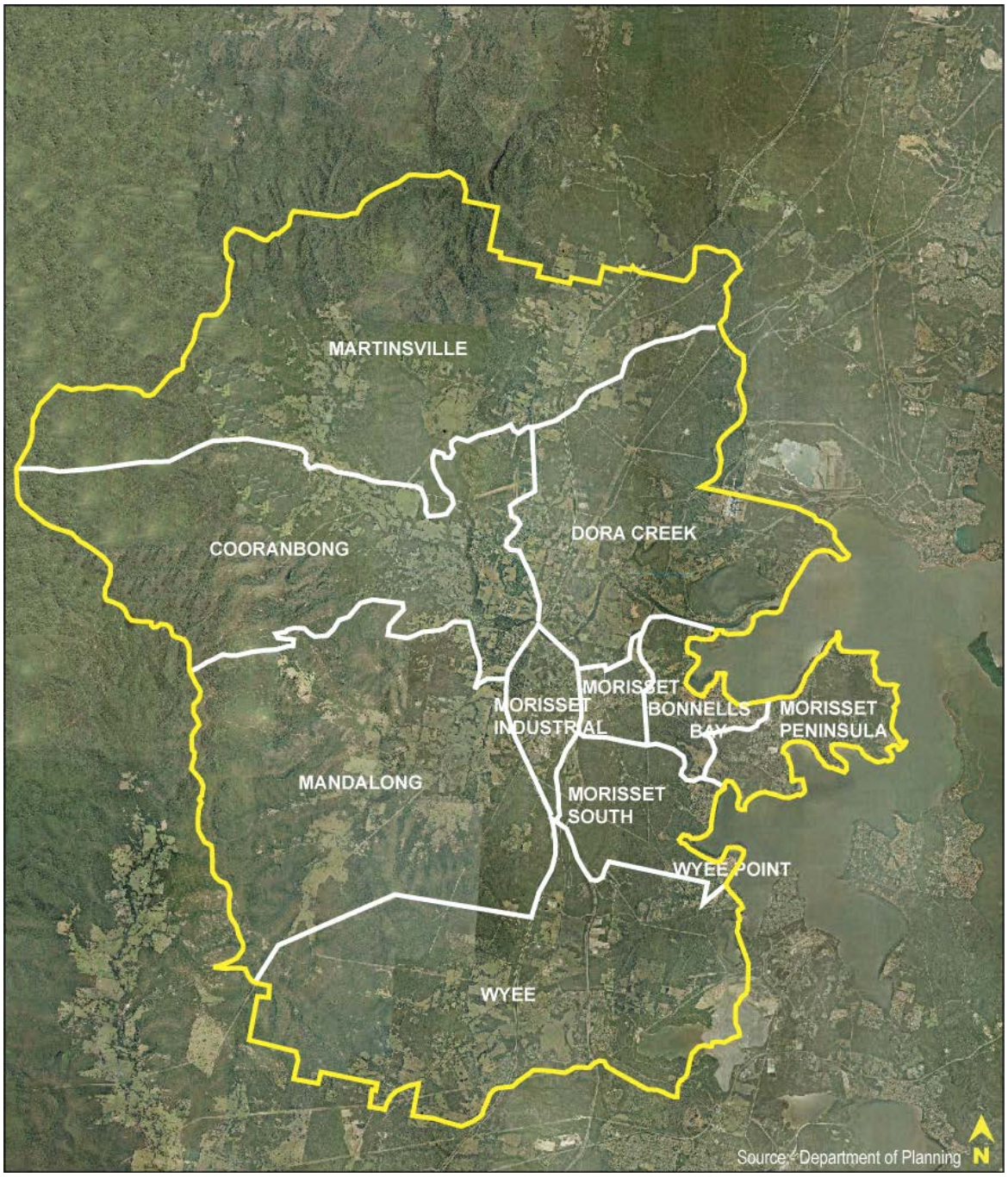


Figure 2-2 Transport sub-catchments

2 . Discussion on Performance Standards

2.1 Introduction

A fundamental keystone of all infrastructure planning requires the adoption of specific performance standards with regard to the operation of the transport network. The adoption requires consideration of such concepts as levels of service, where it is possible to achieve a range of passenger and vehicle flow scenarios, depending on the capacity and delay considerations adopted. The following sections discuss the issue of performance standards and guidelines in relation to the adopted performance criteria, as they relate to the local infrastructure provision that is the focus of this study.

2.2 Level of Service Assumptions

The concept of Levels of Service (LoS) has been applied in transport planning for many years. Austroads has defined a range of traffic conditions associated with a scale of A to F for urban and suburban arterial roads with interrupted flow conditions based on average travel speeds when related to free flow conditions.

Clarification has been sought recently as to the RTA's interpretation of transport planning thresholds relating to level of service when being applied to road planning investigations.

The confirmed current policy of the RTA is the application of Level of Service D, being the defined boundary between stable and unstable flow, as the appropriate threshold to apply in these circumstances (reference Appendix B (Volume 3)). The RTA also explained that:

> *"Given that road capacity varies for each road depending upon the road's function, attributes (posted speed limit, lane width, intersection spacing, clearway, etc) and environment, each road should be assessed individually"*

Based on this statement from the Austroads guidelines and the RTA application of Level of Service D that confirms the conclusion, it is considered appropriate to examine each road and indeed each differing segment of a road to assess its function, operating conditions and traffic carrying capacity.

The Austroads LoS definitions and evaluation is based on the 1985 US Highway Capacity Manual (HCM) methods. The Austroads guide quotes Average Travel Speeds (ATS) based on the HCM 1985 definition of Road Classes. For a Level of Service D on a Class I road (the highest standard) the Average Travel Speed is quoted as greater than or equal to 25 km/h and less than 35 km/ h. for other Classes of road the Average Travel Speed reduces to as low as 15 km / hr.

In terms of evaluation of performance it is useful to first compare performance to the typical values as described in the guide, and only consider segments of road where these criteria are exceeded. In practical terms this may mean that some sections of road are operating at higher service levels than for a "typical" road because they demonstrate some of the characteristics that allow higher lane capacity.

The RTA Guide to Traffic Generating Developments, another often quoted guide used in determining traffic engineering matters relating to development traffic impacts, references the Austroads Guide Part 2 and states that the quoted peak hour flows for different service levels are *"based on volume / capacity ratios applicable for rural roads in level terrain with no sight distance restrictions on overtaking."*

This assumption regarding overtaking restrictions becomes significant when considering urban travel conditions where the prospect of overtaking on two lane roads is very limited. Indeed in many cases this opportunity is removed from drivers by the road authorities preventing overtaking for safety reasons by line marking roads with double barrier centrelines.

Such is the case on some elements of the local collector network, such as on Freemans Drive, on the two lane sections of these roads on the fringe of the built up urban area.

The comment noted in the RTA guide and the restrictions placed on overtaking also reaffirm the Austroads guide's statement that capacities at times may increase under ideal conditions to 1200-1400

VEH/hr (See below). The base assumption of rural road capacity in defining levels of service becomes significant in terms of assessing true urban road conditions. Indeed the correct interpretation of Levels of Service for Urban Roads with interrupted flow comes from the definitions relating to Average Travel Speeds as described above.

The analysis of critical road segments in these investigations has taken the above criteria and definitions of Levels of Service (LoS) into consideration.

2.3 Road Capacity Concepts

Road capacities have been derived from a number of sources from two important flow rates. The **ultimate capacity** of a road is used to predict the volumes that would use the road given the number of lanes and type of road assumed. From these, the roads where volumes were predicted as exceeding a **maximum service flow rate** for a level of service (LoS) D are flagged as requiring investigation for upgrading. Upgrades may include adding lanes, changing the type of road or a reconsideration of the operating conditions on that section of road.

The graphs below illustrate the concept that the ultimate road capacity is higher than the maximum service flow rate for a particular LoS D. Sensitivities relating to level of service assumptions have also been conducted.

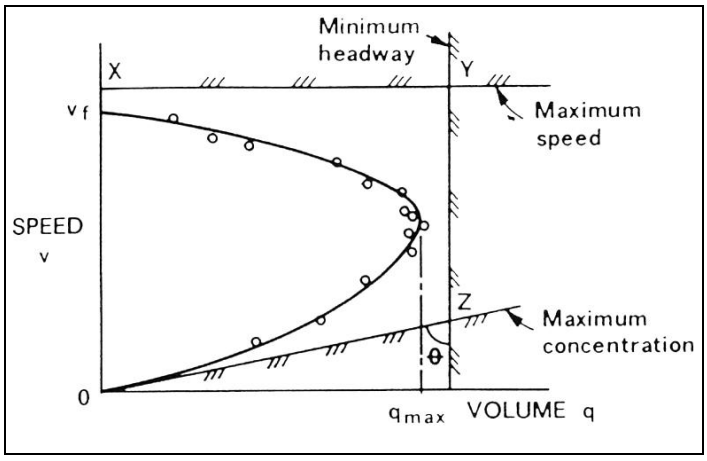


Figure 2-2-1 Speed-Volume Relationship

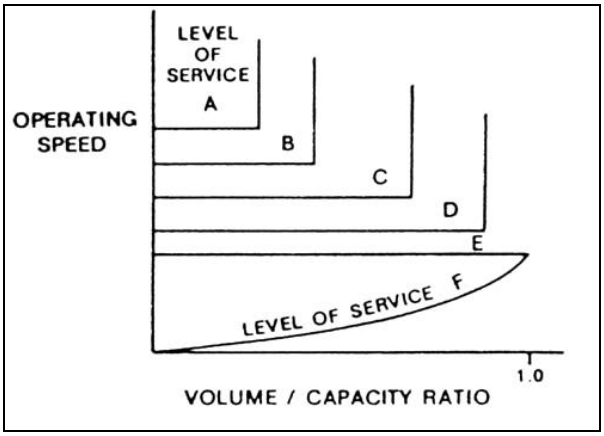


Figure 2-2-2 Levels of Service

Source: Ogden, K.W., Bennett, D.W. (eds), *Traffic Engineering Practice* (4th Edition), Melbourne, 1989

The RTA Guide to Traffic Generating Developments, 2002 makes references to the Austroads Guide to Traffic Engineering Practice – Part 2 Roadway Capacity, (1988) which in turn references to US Highway Capacity Manual (TRB 1985)

The Highway Capacity Manual (HCM) recommends that the capacity for a two lane highway is 1,700 passenger cars per hour per lane (pcphpl).

The Austroads Guide to Traffic Engineering Part 2, 1988 recommends that 1,200 to 1,400 vehicles per hour per lane is the capacity of urban arterial roads with interrupted flow.

There are many examples within the Hunter and Sydney urban areas where such lane flows are regularly observed. The flows on these roads are achieved through higher capacities relating to their physical design, but also with traffic management such as parking restrictions, signal coordination and flaring at intersections.

The Austroads guide quotes typical mid-block capacities with interrupted flow and without intersection flaring and with interruptions from cross and turning traffic at minor intersections. This is the often quoted capacity of 900 vehicles per hour per lane. The guide continues to explain this issue of capacity as follows:

"Peak period mid-block traffic volumes may increase to 1,200 to 1,400 vehicles per lane per hour on any approach road when the following conditions exist or can be implemented:

- *Adequate flaring at upstream junctions*
- *Uninterrupted flow from a wider carriageway upstream of an intersection approach and flowing at capacity*
- *Control or absence of crossing or entering traffic at minor intersections by major road priority controls*
- *Control or absence of parking*
- *Control or absence of right turns by banning turning at difficult intersection*
- *High volume flows of traffic from upstream intersections occurs during more than one phase of a signal cycle*
- *Good co-ordination of traffic signals along the route"*

What this means in practical terms is that it is very possible to achieve lane capacities of up to 1,400 vehicles per lane per hour if some or all of the above conditions apply to a particular stretch of road. Based on these conditions and evidence from practical examples the capacity of principal traffic carrying routes in the study area was taken as 1,200 vehicles per hour per lane. This value is conservative and in the mid-range of those suggested by the Austroads, HCM and RTA guides, and also from surveyed road volumes.

2.4 Road Capacity Thresholds

While the capacities of the roads have been used to determine the amount of traffic which would use the road, a maximum service flow rate for LoS D has been used to determine whether or not a road requires upgrading. The RTA has confirmed recently that this is the appropriate threshold to use in urban conditions.

The traffic flow conditions which have been used as the threshold for predicting upgrading of roads is the estimated point where traffic flow changes from D to E. This has been assumed so that unstable flow is avoided where possible. This becomes a necessary component in supporting any potential public transport initiatives. Continuing upgrading of roads with higher levels of service will not attract drivers to change their travel mode and could even induce extra car trips.

The volumes which have been assumed as the point of transition from LoS D to E are included in **Table 2-1** below.

Table 2-1 Road Capacity Thresholds

Road Type	Average Travel Speed for Urban LoS D	Typical Mid-Block Capacity for LoS D	Proposed Traffic Capacity for LoS D	Capacity (HCM)
Urban Two-way Two-lane	25 to 35	900	1600	1,700
4 lane undivided – with occasional parked cars		1500 in 2 lanes	1700	3,200
4 lane undivided – with Clearways		1800 in 2 lanes	1800	3,200
4 lane divided		1900 in 2 lanes	2200	3,200

Source: RTA, Austroads, HCM

In recent times the RTA has accepted peak period lane capacities of up to 1500 vehicles per hour per lane. This is evident in its recent decision to replace the Tourle Street Bridge over the Hunter River with a two lane bridge, thereby maintaining the existing lane capacity for this strategically important arterial road. It is concluded that these capacities are consistent and therefore should be applied as the basis of assessment of the critical segments of the road throughout the Morisset Contributions Catchment.

2.5 Environmental Capacity of Local Roads

The RTA Guide to Traffic Generating Developments 2002 recognises that *"the Environmental Capacity of an area is determined by the impact of traffic, roads and various aspects of the location".*

Characteristics recognised as having influence include:

Traffic

- Traffic volume
- Traffic composition, in particular the proportion of heavy vehicles
- Vehicle speed

Road

- Road reserves and carriageway width
- Number of traffic lanes
- Gradient
- Road surface condition

Locality

- Distance from road carriageway to property boundary
- Nature of intervening surfaces
- Setback of building from property boundary
- Type and design of building

Appendix B (Volume 3) includes RTA Table 4.6 Environmental capacity performance standards on residential streets.

2.6 Intersections

It has long been agreed that the major limit on road capacity in an urban environment is intersection capacity. Requirements for intersection upgrades are generally determined using traffic modelling tools such as the SIDRA, SCATES and TRANSYT intersection modelling programs on the basis of providing a Level of Service of D or better. In this way, the impact of intersection capacity on mid-block capacities is minimised. In this study the SIDRA traffic modelling software has been applied.

SIDRA calculates the amount of delay to vehicles using an intersection and gives a level of service rating which indicates the relative performance of the intersection control. **Table 2.2 Intersection Level of Service Criteria** presents the level of service criteria generally applied to intersection performance. The level of service is defined in terms of delay, which is a measure of a driver's delay, frustration, fuel consumption and lost travel time. There are six levels of service measures ranging from A (very low delay, very good operating conditions) to F (over-saturation, where arrival rate exceeds intersection capacity). SIDRA also calculates the degree of saturation for the intersection (the ratio of volume to capacity on the most critical movements).

Table 2-2 Intersection Level of Service Criteria

Level of Service	Average Delay per vehicle (sec)	Expected Delay
Signalised Intersections and Roundabouts		
A	0-14	Little or no delay
B	15-28	Minimal delays & spare capacity
C	29-42	Satisfactory delays with spare capacity
D	43-56	Satisfactory but near capacity
E	57-70	At capacity, incidents will cause excessive delays
F	>70	Extreme delay, unsatisfactory
Give Way & Stop Signs		
A	0-20	Good
B	20-40	Acceptable delays & spare capacity
C	40-60	Satisfactory
D	60-80	Near capacity
E	80-100	At capacity & requires other control mode
F	>100	Unsatisfactory & requires other control mode

Note: Based on the RTA NSW method of calculation of Level of Service

Based on the level of traffic generation determined previously and the number of access points and travel lanes assumed for development, it is possible to consider some initial concepts for operation of local road intersections under the development scenario being considered. As indicated previously the level of traffic generation may require higher orders of control such as traffic signals at these junctions.

The design of the road network and intersections controls would be a staged process as part of project planning, and in particular would be linked to the overall staging of the development parcels.

2.7 Local Public Transport

Section 94 can provide for the provision of transport facilities to satisfy the demands generated by new development. This would typically exclude the provision or operation of public transport facilities but can include associated infrastructure such as bus shelters, bus stops and footpath connections.

The following issues have been noted from observations and past studies as requiring consideration in developing local public transport facilities.

2.7.1 Rail Access Issues

Improving access to regional rail facilities:

- Town Centre plans focus pedestrian works on providing good pedestrian access to /from the Morisset Railway station. There is potential to upgrade some town centre roads, such as Bridge Street and Station Street to provide improved pedestrian and cycle access through from the High School to the Station/Bus interchange. Station Street could also connect to the collector route from the Cooranbong sub - catchment.
- The local and district cycleway network must include the station.

2.7.2 Local Buses

In order to encourage the use of public transport it will be necessary to provide a viable sustainable public transport service to the new areas of development. The following planning parameters need to be considered in order to develop better public transport facilities:

- The majority of new areas of development should be within 400m of a bus stop.
- All existing bus timetables need improving. There will be a need to increase frequency of all existing services as both residential and industrial development progresses. Although this may not be a specific s94 cost it has been identified as part of the overall improvements to public transport to improve patronage and which justifies other PT facilities such as improved bus stop facilities at key locations.
- The exact location of bus stops will need to be reviewed consistently as development progresses to ensure the locations are convenient, safe and appropriate.
- At this stage it is difficult to justify a bus route on Newport Road, however it should not be ruled out as feasible in the future.
- No requirement for bus priority at non RTA roads/intersections has been identified at this stage and it is beyond the scope for this study to plan for it. Any increase in bus services as a result of increased population and development should involve bus/train interchange facilities both in location and service timetables.
- Increase in general population levels in the area will increase demand to Belmont, (Route 352) and other facilities to the north - University/Hospital/employment. Need to improve levels of existing service.
- The Don Fox Planning report suggests medium growth would result in an extra 1293 jobs by 2025 in Gimberts Road/Gateway area. Need to encourage bus use. Growth may also justify local facilities to be serviced both by public transport and pedestrian/cycling facilities.
- A review of planned Town Centre improvements so that tree planting and kerb extensions in parking lanes etc. are appropriate for bus services, and possibility of provision of bus lanes on approach to bus/rail interchange.
- Process to notify the Ministry of Transport of increased population and whether requirement to review extensions to the kilometres of bus contracts for the area.

2.8 Cycling Facilities

The standard of cycling facilities can vary as with public transport street furniture, depending on the importance of the location (such as at local shops, or a school) and its patronage levels. Council has considered the overall needs of the Lake Macquarie area in its Bicycle Plan, first developed as a comprehensive city wide plan in the mid 1990's. It is understood that this plan still provides the framework for consideration of cycle facilities, and it is being reviewed against current cycling guidelines for updating and application in this study.

For the purposes of this study cycling facilities would be dealt with in a two tiered consideration of facilities:

- Local cycle paths – assumed to have low level signage, considered appropriate for low patronage locations and developed as dual use (cycle/ pedestrian) paths.
- Collector cycle facilities– assumed to have higher levels of patronage, either because of location (at shops or road junctions where catchments are extended). These facilities are concentrated on the collector routes that serve the locality and link surrounding areas to the Morisset Town Centre. Again these facilities have been assumed to be developed as dual use (cycle/ pedestrian) paths.

The extent to which these facilities can be attributed to new or to existing development activity is discussed in section 5 of this report.

2.9 Pedestrian Facilities

Council's Standards and Guidelines require all new development to include minimum standards of pedestrian facilities. In the past this has not always been the case and so there are inconsistencies in the provisions in some parts of the study area's network.

For the purposes of this study pedestrian facilities would be dealt with in a two tiered consideration of facilities:

- Local pedestrian paths – assumed to have low level signage, considered appropriate for low patronage locations and developed as standard footpaths
- Collector cycle facilities– assumed to have higher levels of patronage, either because of location (at shops or road junctions where catchments are extended). These facilities are concentrated on the collector routes that serve the locality and link surrounding areas to the Morisset Town Centre. Again these facilities have been assumed to be developed as dual use (cycle/ pedestrian) paths

The extent to which these facilities can be attributed to new or to existing development activity is discussed in section 5 of this report.

2.10 Parking

The demands and requirements of parking in and around the Morisset Town Centre will be significantly influenced by the Coles (completed) and Woolworths (under construction) developments. Once completed and operational the additional parking supply will change the nature of parking in the town centre. Consequently council has decided to defer any consideration of parking in this study until a time when observations covering the new parking regime can be made, and an assessment made of any further need for parking.

3 Existing Transport Situation

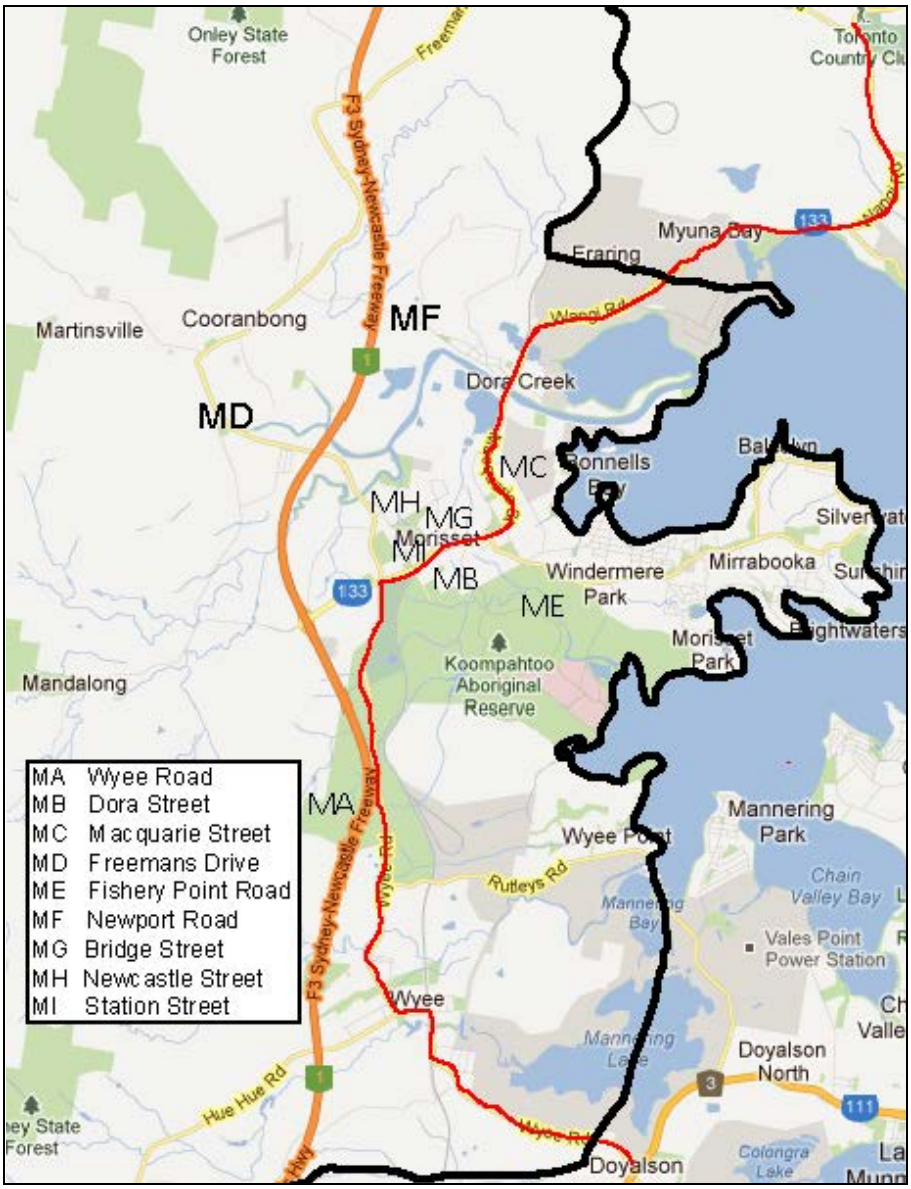
3.1 Introduction

Morisset has been identified as an emerging regional centre in the NSW Government's Lower Hunter Regional Strategy produced in October 2006. The NSW Department of Planning is embarking on a review of the LHRS, due for completion by October 2011. Morisset has been earmarked for an increasing in housing development in the order of 6000 dwellings over the 25 year life of the strategy, with comparable levels of employment generating activity, primarily focussed on the Morisset town centre and the industrial lands adjacent to the F3 Freeway interchange. Development planning has continued with several significant projects moving through the planning approval process (e.g. Coles and Woolworths in the town centre, North Cooranbong residential, Trinity Point Marina and residential development). It is within this context that the existing situation of transport assets in the study area has been considered.

3.2 Roads

The existing road network is made up of a series of sub arterial and local collector roads (see **Figure 3-1** Study Area Roads), linking Morisset with Cooranbong, and the wider regional road network. This includes Main Road 217 which links Morisset in the south to Toronto and Wallsend in the north and ultimately links up with the State Highway 23 and the Pacific Highway at Sandgate. Any construction on this route will require concurrence from the RTA. The roads which make up the Morisset road network include:

1. **Wyee Road (MA)**: Operates as a sub arterial main road linking Morisset in the north to Wyee and Doyalson in the south. Wyee Road forms part of the Regional Road 454. It is a two lane, two way road in the order of 12 metres wide, with lane width being approximately 3.5 metre. It operates under a speed limit of 60 km/h changing to 90km/h 100m south of the Alliance Avenue intersection.
2. **Dora Street (MB)**: Operates as an arterial main road through the Morisset CBD and forms part of Main Road 217. Any construction on this road will require concurrence from the RTA. Provides an important link to the F3 Sydney – Newcastle Freeway. Operates as a two lane, two way road in the order of 12 metres, with lane widths approximately 3.3 metres. There are parking lanes through the CBD in the order of 3 metres wide. Outside of the CBD the parking lanes become hard shoulders. It operates under a speed limit of 60 km/h changing to 50 km/h through the Morisset town centre.
3. **Macquarie Street (MC)**: operates as an arterial main street linking Dora Creek to Morisset and forms part of the Main Road 217. Any construction on this road will require concurrence from the RTA. Currently a two lane two way street in the order of 11 metres wide, with lane widths of approximately 3.3 metres. There are hard shoulders on both sides of the street. Macquarie Street operates under a speed limit of 60 km/h.
4. **Freemans Drive (MD)**: a local collector road linking Morisset in the south to Cooranbong in the north. Currently a two lane two way road with a width in the order of 11 metres, with lane width approximately 3.5 metres. Shoulders vary from soft to hard throughout the length of the road. It operates under a speed limit of 70km/hr dropping to 60 km/h within built up areas.
5. **Fishery Point Road (ME)**: operates as a local collector road linking Morisset to the Bonnells Bay peninsula. Currently a two lane road two way road in the order of 10 metres wide, with a lane width approximately 3.5 metres with hard shoulders of approximately 1.5 metres along both sides of the road. There is a footpath from its intersection with Macquarie Street along to its intersection with Grenache Way. It operates under a speed limit of 70km/h changing to 60km/hr approximately 200 meters before the Morisset Park Road intersection.



Study Area Boundary (indicative)

Figure 3-1 Study Area Roads\

6. **Newport Road (MF)**: Operates as a local collector road linking Cooranbong to Dora Creek. Currently a two lane two way road in the order of 7 metres wide with lane widths approximately 3.5 metres. There are soft shoulders on either side of roadway. The road operates at 60km/hr within the built up areas and 80km/hr 150 metres east of Cadillac Close to 200 metres west of Coorumbung Road.
7. **Bridge Street (MG)**: Operates as a local collector street in a residential and commercial area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 11 metres in width. There are footpaths on both sides of the street from its intersection with Dora Street to its intersection with Terrigal Street.
8. **Newcastle Street (MH)**: Operates as a local collector street in a residential and commercial area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 10.5 metres in width. There are foot paths along both sides of the street between Bridge Street and Station Street.
9. **Station Street (MI)**: operates as a local collector street in a residential area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 12.5 metres wide. There are footpaths along both sides of the street between Dora Street and Yambo Street, while between Yambo Street and Newcastle Street there is a footpath on the western side of Station Street.

3.3 Intersections

The following intersections were identified in the study brief, and in previous studies as possibly having capacity limitations. They have been reviewed in this project to assess the provision of adequate capacity for the infrastructure and development upgrades. The location of these intersections is illustrated on **Figure 3-2** Local Intersections.

1. **Bridge Street with Newcastle Street (M01):**
   A cross road intersection with Bridge Street operating as the major through road. Newcastle Street operates under give way signed controls. Parking is permitted along both sides of both Newcastle and Bridge Street.
2. **Stockton Street with Freemans Drive (M02):**
   A T intersection with Freeman Drive operating as the major through road. Stockton Street operates under give way signed controls. Stockton Street provides a link into Morisset town centre.
3. **Stockton Street with Awaba Street (M03):**
   A T intersection with Stockton Street operating as the major through road. Awaba Street operates under give way signed controls.
4. **Bridge Street with Awaba Street (M04):**
   A cross road intersection with Bridge Street operating as the major through road. Awaba Street operates under give way signed controls.
5. **Kahibah Street with Wyong Street and Doyalson Street (M05):**
   Currently a staggered intersection with Kahibah Street and Wyong Street producing a T intersection with Kahibah Street operating as the main through road and Wyong Street operating under give way signed controls, Wyong and Doyalson Street producing a T intersection with Wyong Street operating as major through road, Doyalson Street is unsignalised.

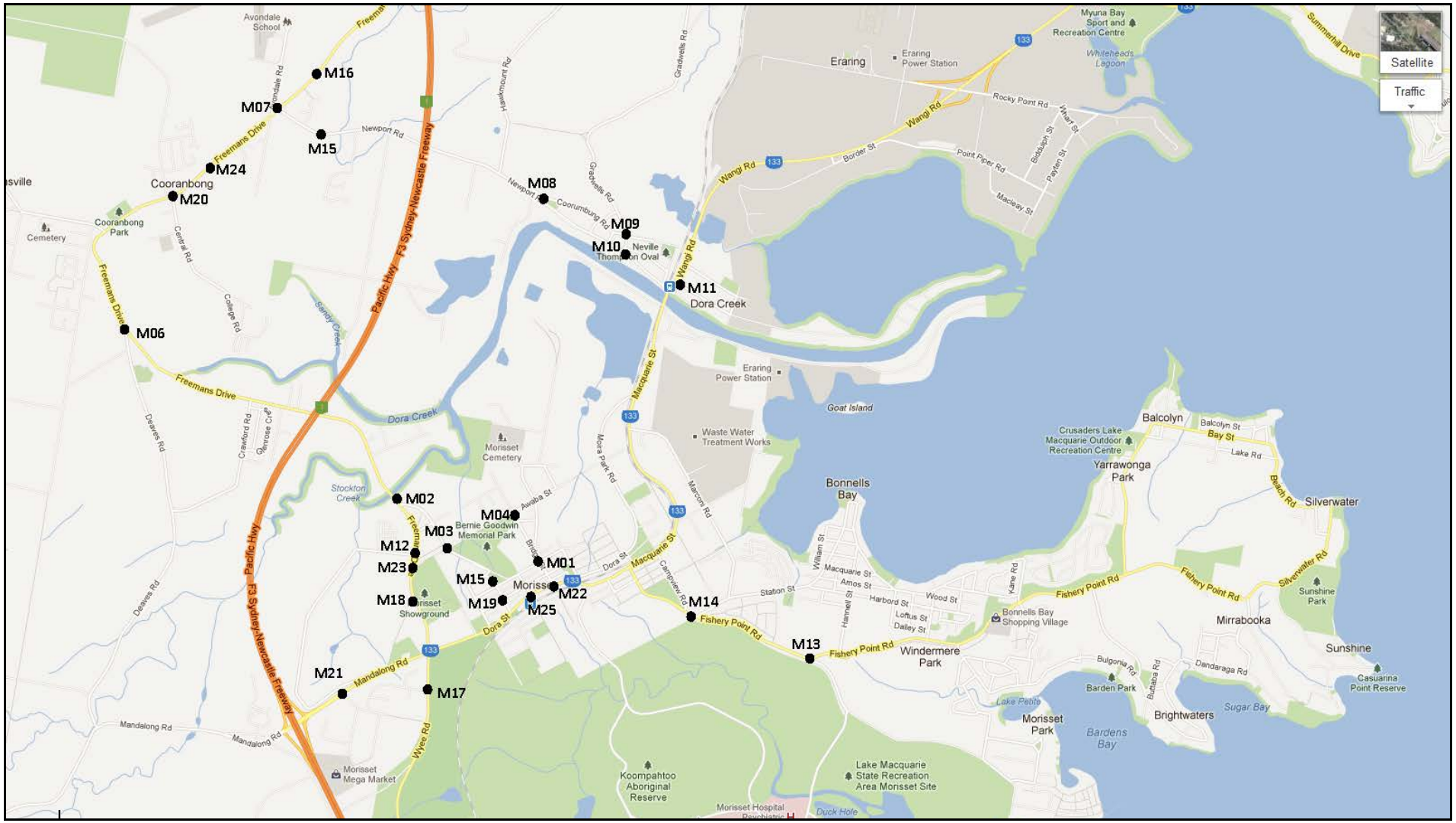


Figure 3-2 Local Intersections under review

Figure 3-3 Staggered intersection of Kahibah,Wyong, Doyalson Streets

6. Deaves Road with Freemans Drive (M06):
   An acute T intersection with Freemans Drive operating as the major through road. Deaves Road operates under give way signed controls.
7. Avondale Road with Freemans Drive and Newport Road (M07):
   A T intersection with Freemans Drive and Newport Road, with Freemans Drive operating as the major through road. The intersection of Freemans Drive and Avondale Road is a T intersection, with Freemans Drive operating as the major through road and Avondale Road operates under give way sign controls.
8. Coorumbung Road with Newport Road (M08):
   A T intersection with Newport Road operating as the major through road. Coorumbung Road is unsignalised.
9. Gradwells Road with Coorumbung Road (M09):
   An offset crossing intersection which operates under a 4 way stop sign control
10. Gradwells Road with Newport Road (M10):
    Is a cross intersection with Newport Road operating as the major through road. Gradwells Road has an unformed road extension on the southern side providing access to approximately 5 houses and Dora Creek and operates under a signed give way signed controls.
11. Wamsley Street/Macquarie Street with Dora Street (Dora Creek) (M11):
    A complex intersection with Wamsley Street/Macquarie Street operating as the major through road and Wamsley Street southern extension operating under priority conditions. Dora Street operates under a signed stop control as does the southern approach of Wamsley Street.

Figure 3-4 Complex intersection of Wamsley St/Macquarie St with Dora St

12. Gimberts Road with Freemans Drive (M12):
    A T intersection with Freemans Drive operating as the major through road. Gimberts Road operates under a signed give way control.
13. Fishery Point Road with Morisset Park Road (M13):
    A T intersection with Morisset Park Road/ Fishery Point Road (west) operating as the major through road. Fishery Point Road (east) operates under a signed give way control at this intersection.
14. Fishery Point Road with Station Street (M14):
    A T intersection with Fishery Point Road operating as the major through road. Station Street operates under a signed give way control
15. Cadillac Close with Newport Road (M15):
    A T intersection with Newport Road operating as the major through road. Cadillac Close operates under a signed give way control.
16. New intersection with Freemans Drive (M16):
    From the proposed development of land north of Newport Road and east of Freemans Drive, Cooranbong
17. Wyee Road with Alliance Avenue (M17):
    A T intersection with Wyee Road operating as the major through road. Alliance Avenue operates under a signed give way control
18. An intersection with Freemans Drive between Jamerin Way and Gimberts Road (C18).
19. Newcastle Street with Doyalson Street (M19):
    A crossing intersection with Doyalson Street operating as the major through road. Newcastle Street operates under a signed give way control
20. Freemans Drive / Alton Road with Central Road (M20):

A staggered T intersection in the order of 50 metres apart with Freemans Drive operating as the major through road. Both Alton Road and Central Road operate under a signed stop control

21. **Mandalong Road with Gimberts Road (M21):**
    A two lane roundabout, with four entry/exits. Mandalong road being the main through road linking the industrial estate to the south with the F3.

Additional intersections considered and assessed include:

1. **Dora Street and Bridge Street (M22)** – a T-intersection with Dora Street the major through road.
2. **Freemans Drive and Awaba Street (M23)** – a future intersection requiring a three legged roundabout
3. **Freemans Drive and new central access road for North Cooranbong (M24)**
4. **Station Street and Dora Street (M25)** - A T Intersection with Dora Street being the main through road.

3.4 Public Transport

Morisset is served by the Central Coast Rail Line and 4 bus services. Morisset has its own Transport Access Guide effective March 2009.

Source: Morisset Area Transport Access Guide 2009

Figure 3-5 Regional Connection for the Morisset Area

3.4.1 Train Services.

Morisset public transport services are focussed on the Morisset Railway Station, on the Newcastle/Central Coast Line between Newcastle and Sydney. Both express and stopping trains service Morisset to Sydney, and both the Newcastle to Sydney stopping trains and Newcastle to Morisset stopping service stop at Morisset. These services combined provide an (approximately) 30 minute peak hour frequency to/from Sydney and to/from Newcastle, with hourly inter peak services.

Morisset Station has the following facilities: manned ticket office, toilets, pay phones, wheelchair access, taxi rank, car park, bus interchange and bicycle storage facilities. The station platforms cannot accommodate all the carriages used on this line consequently passengers are advised to use the last 4 carriages if alighting at Morisset.

A designated bus rail interchange facility adjacent to the station has been completed.

Access between Morisset and much of the employment, retail, education and medical facilities in the Greater Newcastle area requires travel for all or part of the journey by train. Similarly access to Central Coast communities requires use of trains, Morisset High School students use trains for travel to and from school. Consequently the access to and from the station is fundamental to the level of service provided by public transport in the overall Morisset area.

3.4.2 Bus Services

Morisset is in the Outer Metropolitan Bus System Contract Region 4 and any future services must conform to the 2009 Service Planning Guidelines.

There are 3 bus services in the Morisset area, linking the surrounding suburbs of Cooranbong, Mandalong, Balcolyn, Bonnells Bay, Brightwaters, Mirrabooka, Morisset Park, Silverwater, Windermere Park, and Yarrawonga Park. A fourth service provides a limited morning and afternoon service to the Swansea retail area through to Belmont. From Belmont bus access to the greater Newcastle area is available.

Service 278 to Bonnells Bay – 3 am buses, 5 afternoon/evening buses.

Service 279 to Peninsula via Morisset Park – 4 am buses, 6 pm buses, 30/40 minute service.

Service 280 to Cooranbong – 40 minute service, no buses between 11.45 am and 1.50pm.

Service 352 to Belmont - 1 bus in each direction morning and evening.

There are also School bus services servicing this area.

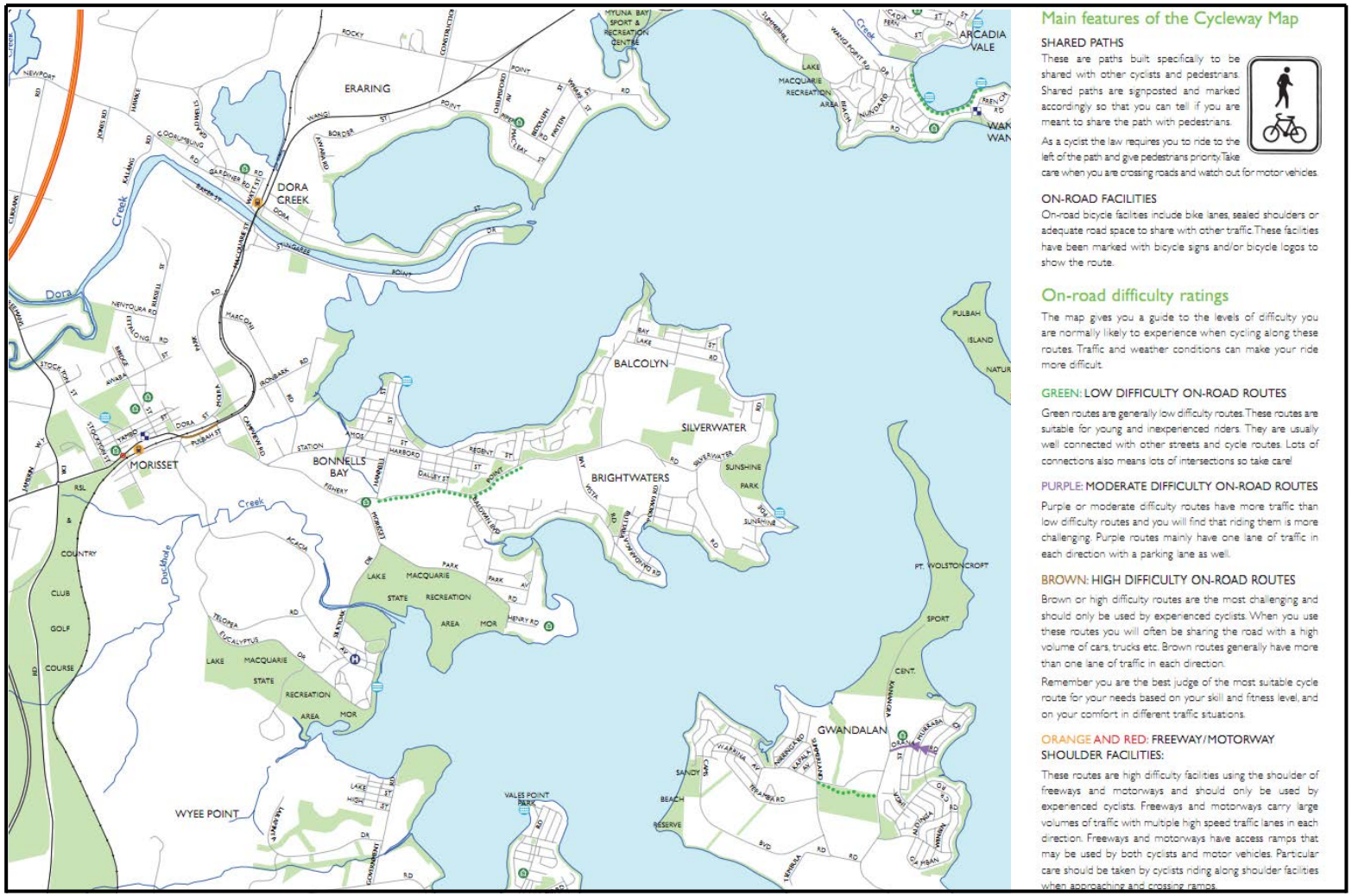
Source: Morisset area Transport Access Guide 2009

Figure 3-6 Access to Morisset Area by Bus

3.5 Cycle Network

A review of existing and planned cycling facilities has been conducted as part of the study, using Council's 1996 Newcastle Lake Macquarie Bike Plan as the base. (This plan is in the process of being updated for Council. The 1996 plan is still the current planning document at this time.) Additionally the 2004 S94 Contributions Plan (Contributions Plan No. 1 City Wide (2004) identified the need for a cycle path along Fishery Point Road from Bonnells Bay Primary School to Mirrabooka Quarries route to cater for recreational needs. This has been constructed from the roundabout at Grenache Way westwards through to just before the intersection with Macquarie Street. This cycle path provides a combined commuter, school and recreational route. This is the only section of cycleway in the area although the RTA Newcastle cycleways map nominates a short stretch of "high difficulty on-road" route on the northern side of the Morisset township. There are no other cycle paths in the vicinity.

The NSW RTA Action for Bikes and BikePlan 2010 includes no specific proposals for this area.



Source: RTA Newcastle Area Cyclemap

Figure 3-7 Current Cycleways in Morisset Area

3.6 Pedestrian Facilities

Observations indicate that existing pedestrian and footpath provision is minimal in the Morisset area generally, many residential and town centre streets do not have any footpaths (e.g. east side of Bridge Street). There are some pedestrian crossing islands in the CBD at key locations. Previous public consultations have indicated pedestrian safety is a key concern in the area, particularly in the vicinity of the Morisset town centre and surrounding schools.

4 Future Situation

4.1 Demographics

As part of this project Don Fox Planning have undertaken extensive demographic assessment into the future population characteristics that can be expected in the Morisset Contributions Catchment. Three growth scenarios were identified and following consultation with Council officers the Medium growth scenario was adopted for consideration in the development of The Plan.

Further information is presented in the Tables in **Appendix C (Volume 3)** , showing the split and staging of the residential development.

4.1.1 Expected Population Increase

Table 4-1 below and **Appendix C (Volume 3)** shows the growth in population from the current 21,000 people to 38,500 by the year 2025.

This study has been based on the traffic and transport impacts of development associated with this level of population growth.

Table 4-1 Population Potential of Development Precincts (or similar)

Estimated Residential Population by Sub-Catchment 2010-2025 (DFP, 2010)					
Locality	Persons				
	2010 (Existing)	2015	2020	2025	Growth 2010-2025
Cooranbong	4,460	6,540	8,240	9,850	**5,380**
Bonnells Bay	4,060	4,440	4,770	4,990	**930**
Dora Creek	2,320	2,500	2,700	3,030	**710**
Martinsville	420	420	430	440	**30**
Mandalong	440	450	450	470	**30**
Morisset	1,150	2,050	3,070	3,920	**2,770**
Morisset Peninsula	4,630	5,260	5,700	5,880	**1,250**
Morisset South	320	500	1,000	1,720	**1,400**
Wyee	2,510	3,110	4,280	5,430	**2,910**
Wyee Point	820	890	1,100	1,230	**410**
Total	**21,130**	**26,160**	**31,740**	**36,960**	**15,820**

Source: Don Fox Planning: 2010

Table 4-1 above clearly shows the areas of population growth. Cooranbong, Wyee, Morisset Town Centre and surrounds and Peninsula show the largest population growth and are therefore likely to have the most traffic and transport impacts. The growth is expected to be fairly steady over the 15 years projected by this study with the study area population increasing by 70% between 2006 and 2025.

4.1.2 Anticipated Characteristics of the Incoming Population

Table 4-2 Estimated Demographic Profile – Medium Growth Scenario

Estimated Residential Development 2010-2025 (DFP, 2010)						
Residential Dwelling Type	**Occupancy Rate[A]**	**# Dwellings / Beds**				**Growth**
		2010	**2015**	**2020**	**2025**	**2010-25**
Private Dwellings	**2.55**	**8,280**	**10,050**	**12,060**	**13,930**	**5,650**
Dwelling House / Lot	2.91	7,430	8,760	10,190	11,460	**4,030**
Residential Accommodation with 1 bedroom / bedsit	1.22	30	70	120	180	**150**
Residential Accommodation with 2 bedrooms	1.62	80	200	360	540	**460**
Residential Accommodation with 3 or more bedrooms	2.48	70	180	320	480	**410**
Seniors Housing	1.37	370	470	620	730	**370**
Moveable Dwellings (Long -term)	1.50	310	380	460	530	**230**
Non-Private Dwellings (Beds)[E]	**-**	**1,230**	**1,480**	**1,760**	**2,060**	**840**
Residential Care Facility	bed	470	570	670	770	**300**
Hostels/Boarding Houses/Backpacker's/Group Homes/Hospitals	2.24	410	510	630	790	**390**
Educational Establishments (residential component)	bed	240	240	240	240	**0**
Moveable Dwellings (Short -term)	site	20	40	50	70	**50**
Bed and Breakfast Accommodation	bed	60	80	100	120	**60**
Hotel or Motel Accommodation / Serviced Apartments	bed	40	60	70	90	**50**

Notes:

A. Forecast average occupancies across the Contributions Catchment as at 2025.

B. This is the average occupancy rate of all dwellings in the Contributions Catchment as forecast to 2025 for residential development.

C. Excluding boarding houses, dwelling houses, group homes, hostels and seniors housing.

D. Excluding residential care facilities (Estimates based on 2001 and 2006 ABS Census data).

E. NSW Average based on 2001 and 2006 ABS Census data.

Source: Don Fox Planning Development Contributions Plan Morisset Contribution Catchment 2010

Table 4-2 above shows the anticipated age profile of the population growth. It clearly shows growth over the entire age spectrum with an emphasis on families with children. This profile indicates the need for journeys to work, school, recreation and community facilities, by all modes of transport.

4.1.3 Occupancy Rates

Table 4-3 Estimated Residential Development by Type

Estimated Residential Development 2010-2025 (DFP, 2010)						
Residential Dwelling Type	**Occupancy Rate[A]**	**# Dwellings / Beds**				**Growth**
		2010	**2015**	**2020**	**2025**	**2010-25**
Private Dwellings[B]	**2.55**	**8,280**	**10,050**	**12,060**	**13,930**	**5,650**
Dwelling House / Lot	2.91	7,430	8,760	10,190	11,460	**4,030**
Residential Accommodation[C] with 1 bedroom / bedsit	1.22	30	70	120	180	**150**
Residential Accommodation[C] with 2 bedrooms	1.62	80	200	360	540	**460**
Residential Accommodation[C] with 3 or more bedrooms	2.48	70	180	320	480	**410**
Seniors Housing[D]	1.37	370	470	620	730	**370**
Moveable Dwellings (Long -term)	1.50	310	380	460	530	**230**
Non-Private Dwellings (Beds)[E]	**-**	**1,230**	**1,480**	**1,760**	**2,060**	**840**
Residential Care Facility	bed	470	570	670	770	**300**
Hostels/Boarding Houses/Backpacker's/Group Homes/Hospitals	2.24	410	510	630	790	**390**
Educational Establishments (residential component)	bed	240	240	240	240	**0**
Moveable Dwellings (Short -term)	site	20	40	50	70	**50**
Bed and Breakfast Accommodation	bed	60	80	100	120	**60**
Hotel or Motel Accommodation / Serviced Apartments	bed	40	60	70	90	**50**

Notes:

A. Forecast average occupancies across the Contributions Catchment as at 2025.

B. This is the average occupancy rate of all dwellings in the Contributions Catchment as forecast to 2025 for residential development.

C. Excluding boarding houses, dwelling houses, group homes, hostels and seniors housing.

D. Excluding residential care facilities (Estimates based on 2001 and 2006 ABS Census data).

E. NSW Average based on 2001 and 2006 ABS Census data.

Source: Don Fox Planning Development Contributions Plan Morisset Contribution Catchment 2010

Table 4-3 above shows the predominance of single dwelling houses in the anticipated growth in the area.

This medium growth scenario has been interpolated into traffic volumes and transport demand and assigned to the road network.

The NSW RTA Guide to Traffic Generating Developments Version 2.2 October 2002 Section 3 provides the following traffic generation potential of developments based on land use.

Table 3.7
Summary table of land use traffic generation Rates

Land Use	Traffic generation rates	
	Daily Vehicle Trips	Peak Hour Vehicle Trips
Residential		
Dwelling houses	9.0 / dwelling	0.85 per dwelling
hMedium density residential flat building	*Up to 2 bedrooms*	
	4-5 / dwelling	0.4-0.5 / dwelling
	3 bedrooms or more	
	5-6.5 / dwelling	0.5-0.65 / dwelling
High density residential flat building	*metropolitan regional centres*	
	-	0.24 / unit
	metropolitan sub-regional centre	
	-	0.29 / unit
Housing for aged and disabled persons	1-2 / dwelling	0.1-0.2 / dwelling
Casual accommodation		
Motels	3 / unit	0.4 / unit
Hotels - traditional	See section 3.4.2	-
Hotels - tourist	See Section 3.4.3	

Source: NSW RTA Guide to Traffic Generating Developments Version 2.2 October 2002

4.1.4 Expected Type of Development

Table 4-3 above and **Table 4-4** below show the geographic split and staging of this medium growth scenario.

Table 4-4 Morisset Contributions Catchment Dwelling Projections 2010-2025

Table 11: Morisset Contributions Catchment Dwelling Projections 2010 - 2025 - Medium Growth Scenario									
	Existing dwelling units in 2006 (based on 2006 ABS Census)	By 2010	By 2015	By 2020	By 2025	Total additional lots/ dwelling units between 2010 - 2025	Estimated Total dwelling units in Morisset Contributions Catchment by 2025	Beyond 2025	Total additional lots/ dwelling units
North Cooranbong (VPA area)		0	500	500	500	**1,500**		750	**2,250**
Wyee		0	200	400	400	**1,000**		200	**1,200**
North Morisset		0	190	188	165	**543**		180	**723**
Morisset Peninsula		50	115	97	59	**321**		0	**321**
Trinity Point		53	145	71		**269**		0	**269**
Other UDP Areas		25	280	415	480	**1,200**		200	**1,400**
Other infill subdivision		79	121	88	50	**338**			**338**
Approved Dwellings		313				**313**			**313**
Seniors Housing		65	100	153	112	**430**			**430**
Medium Density infill		7	119	100	100	**326**			**326**
Totals	**7,687**	**592**	**1,770**	**2,012**	**1,866**	**6,240**	**13,927**	**1,330**[1]	**7,570**

1. The assumptions specific to the medium growth rate scenario include:
   - 600 lots in total will be developed on Koompahtoo land with less environmental and ownership constraints than the low growth scenario, but not all constraints overcome. Of these 450 will be developed by 2025 with the remaining 150 lots to be developed post 2025.
   - 120 lots being developed on the Landcom site in Awaba Street again due to environmental constraints.
   - North Cooranbong containing 2,250 lots (including 400 medium density dwellings). Only 1,500 dwellings will be developed in North Cooranbong by 2025 with the remaining 750 dwellings to be developed post 2025.
   - Development within Wyee will be 1,200 lots with 1,000 lots/dwellings developed by 2025. The remaining 200 dwellings will be developed post 2025.

Source: Don Fox Planning Development Contributions Plan Morisset Contributions Catchment 2010

Appendix D (Volume 3) shows the geographic split of the development growth scenario used which sees a growth in retail floor area of 14,980m^2, in commercial floor area of 4,240m^2 and a 122,520m^2 increase in industrial floor area. It is this growth in industrial floor area which is particularly significant as it will provide local employment and reduce overall trips on the road network.

The NSW RTA Guide to Traffic Generating Developments Version 2.2 October 2002 Section 3 provides traffic generation potential of developments based on land use. Table 3.7 Summary Table of Land Use Traffic Generation Rates is reproduced in full in Appendix E (Volume 3)

A summary of the traffic movements by catchment is shown below:

Location	Total additional lots	Peak hour trip movements
North Cooranbong	2350	1998
Wyee	1200	1020
North Morisset	723	615
Morisset Peninsula	321	273
Trinity Point	269	229
Other UDP areas	1400	1190
Other infill subdivisions	338	287
Approved dwellings	313	266
Seniors Housing	430	86
Medium Density infill	326	163

4.2 Alternate Development Contribution Methods

Over recent years the methods available for funding local infrastructure have been amended to include:

- s94 development contributions
- s94 A levy
- planning agreements

Within the Morisset Contributions Catchment there are examples of two of these methods currently in existence:

- s94 development contributions- the subject of this study
- planning agreements – such as applied to the approved North Cooranbong development

This study focuses on the calculation of s94 development contributions taking the other methods into account where applicable.

4.3 Determining Nexus

Nexus means the relationship between the expected types of development within an area and the demand for additional public facilities to meet that demand. In terms of transport facilities it is the relationship between the expected types of development in the plan area and the demand for additional traffic and transport facilities to meet that demand.

4.4 Determining Apportionment

There is no apportionment between the existing and future users, as the analysis indicates that currently all intersections operate at an acceptable level of service. All upgrades are a direct result of the proposed developments and all costs should therefore be borne by these future developments.

4.5 Threshold Analysis

Our approach to determining the requirement for new local infrastructure uses a threshold analysis approach, whereby the capacity of an infrastructure item (road or intersection predominately) is reached triggering the requirement for provision of more capacity, or an alternate facility.

In this way the utilisation of existing assets is best matched to their potential acceptable performance criteria.

Section 5 of this study report details the analysis conducted in line with this approach.

The threshold analysis was completed for the existing design year and the future design year of 2025. The interim analysis for 2020 was not considered, as it is considered that the road upgrades will be determined by the location of the development, rather than the extent of development. Where a road upgrade has been identified, there is a direct correlation between that road upgrade and a development sub catchment and this sub catchment drives the requirement for the identified works. It can also be seen that the timetable for development of the sub catchments cannot be defined and will be market driven.

The threshold analysis has been completed for the base case (existing scenario) for both the AM and PM peak periods. This analysis has then been completed for the future scenario in 2025 for the AM and PM peak periods.

4.6 Possible Alternate Transport Facilities

The Study Brief nominates a range of local roads and intersections for consideration in the study and these are incorporated into the existing and future development scenarios for threshold analysis.

In addition to this base level of infrastructure the following items were specifically raised within the brief for consideration as alternate facilities to possibly support acceptable traffic and transport performance under the future (2025) development scenario.

These items are (in no particular order):

- One new intersection with Freemans Drive from the proposed development of land north of Newport Road, and east of Freemans Drive. Cooranbong.
- Need for new intersection with Freemans Drive between James Way and Jamerin Way.
- Construction of Awaba Street between Moira Park Road and Stockton Street to collector road status.
- Wamsley Street between Doree Place and Dora Street.
- Upgrade link between Dora Street and Freemans Drive, via Stockton Street, Kahibah Street and Doyalson Street to collector road status.
- Road overpass – investigate need for a rail overpass to be constructed between Dora Street and Macquarie Street for the purpose of a southern bypass route of Morisset Town Centre.
- Rail underpass – investigate the need to upgrade the existing rail underpass adjacent to the intersection of Moira Park Road and Macquarie Street.
- Pedestrian paths and cycleways – investigate the need for pedestrian paths and cycleways through and to Morisset as identified in the Morisset Structure Plan.
- Bus and public transport facilities.
- Town centre car parking (deferred).

The traffic and transport study has considered the above items in determining the recommended upgrades, their cost estimates and apportionment between existing and new development.

5 Assessment of Future Traffic and Transport Requirements

5.1 Introduction

This section considers the performance of the local transport network under the future demand scenarios and comments on adequacy of existing facilities and makes recommendations on (nexus justified) improvements to meet the adopted performance criteria.

5.2 Roads

Within the context of the Morisset Contributions Catchment, the extent of flows generated using traditional levels of traffic generation has been applied to the road network as follows:

i) Using the existing road network, assign traffic flows to the road network using the shortest path between origins and destination within the study area.

ii) Consider the forecast mid-block capacities against agreed service level criteria as follows:
   a) Within Morisset Town Centre and the Freeway industrial estate based on the mid-block capacities outlined in **Appendix F (Volume 3**)of this report.
   b) As arterial and sub-arterial roads, using the mid-block capacities outlines in section **Appendix F (Volume 3**) of this report.
   c) In residential areas, using the mid-block environmental capacities allied in the RTA Guide to Traffic Generating Development, and discussed in section **Appendix F (Volume 3)** of this report.
   d) In local centres, such as at North Cooranbong, Bonnells Bay, Dora Creek and Wyee, application of the mid-block capacities outlined in **Appendix F (Volume 3)** of this report.

The subsequent analysis of mid-block capacities across the network has applied the Level of Service criteria and capacity thresholds identified and adopted in Section 2 of this report.

Where mid-block capacity has been assessed on sub-arterial and arterial (RTA controlled) roads these are included for information only and to assist in the consideration of network analysis at other local road and intersection locations.

The results of the road capacity analysis are summarised in the proposed works schedule at the end of this chapter.

5.3 Intersections

Intersection analysis has been repeated for forecast development levels on a range of junctions across the network within the Morisset Contributions Catchment.

This study has adopted the agreed levels of future development that best fit the time horizons applicable for this plan.

The existing situation analysis has been repeated here, taking forecast development levels into account as follows:

a) Existing situation analysis (plus deficiency upgrades) applied as base
b) Add forecast development flows to existing
c) Confirm acceptable service levels
d) Apply upgrade where necessary to achieve acceptable service levels
e) Confirm acceptable service levels

The analysis in points d) and e) is repeated until a solution is achieved that delivers an acceptable service level.

The results of this analysis are summarised in the proposed works schedule at the end of this chapter.

5.4 Local Public Transport

The assessment of local public transport facilities has been undertaken as follows:

a) Confirmation of minimum service levels (MSL)
b) Application of MSL to collector road network
c) All new development to include MSL within development

This approach allows development of MSLs on the nominated collector road routes that serve as the principle local bus routes in the study area. Figure 5.1 below summarises the provision of the two levels of facilities across the collector road network, and against existing facilities.

The results of this analysis are summarised in the proposed works schedule at the end of this chapter in Appendix A.

5.4.1 Recommendations

- Adherence to 400m rule in all new development areas
- Location of new "Collector" bus stops as shown in Figure 5-1 below.

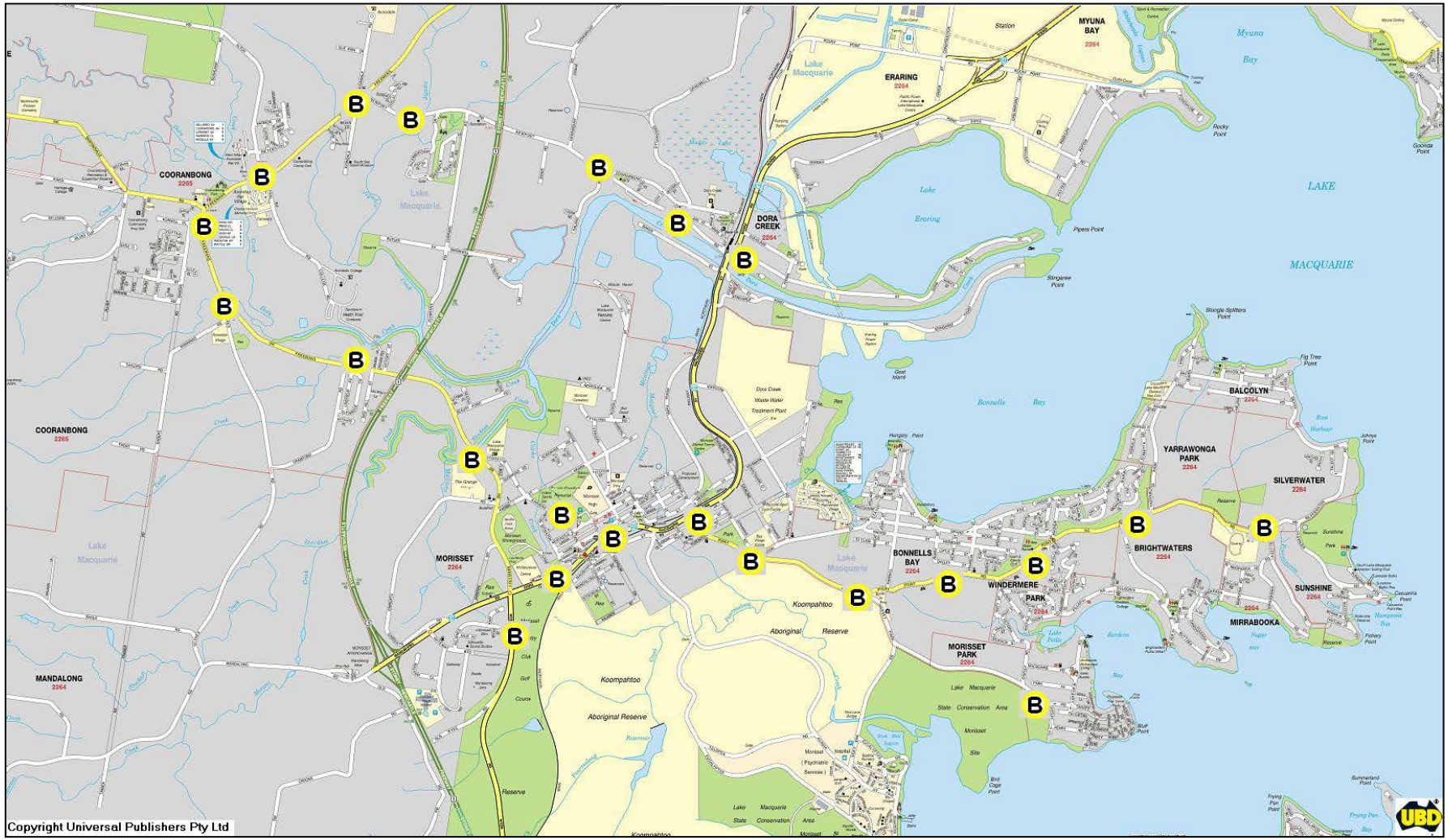


Figure 5-1 Local Bus Stop Infrastructure

5.5 Pedestrian and Cycle Facilities

5.5.1 Pedestrian and Cycle Facilities Assessment

The assessment of pedestrian and cycle facilities has followed the same Minimum Service Levels approach as applied for area wide application of local public transport facilities as follows:

a) All new development areas to provide standard footpath facilities on one side of roads, as per Council's engineering sub-division guidelines
b) All new collector roads to be provided with standard dual use path on one side of road, and pavement cross sections incorporating combined parking/cycling lanes
c) On existing nominated collector routes, apply dual use path standard, or on road cycle lanes to suit local conditions
d) In town and local centres standard footpaths to be provided to both sides of roads

5.5.2 Cycle Network Assessment

Morisset Peninsula

The cycle path along Fishery Point Road from Bonnells Bay Primary School to Mirrabooka Quarries route has been constructed from the roundabout at Grenache Way westwards through to Bonnells Bay Primary School. There is a footpath provided from Bonnells Bay Primary School to just before the intersection with Macquarie Street. Both the cycle path and footpath provides a combined commuter, school and recreational route and it is recommended it be extended to the east to the foreshore at Lake Macquarie. A route south on Bay Vista Road and along Morisset Park Road (west of Fishery Point Road) are also recommended to complete the commuter/school network for the Peninsula. A foreshore cycle/walking facility is also desirable and should replicate the Warners Bay facility developed over recent years.

Dora Creek

A dual use cycle path along Newport Road between Freemans Drive and Macquarie Road is required (connecting Dora Creek to North Cooranbong) which will then connect to a cycle path alongside Macquarie Road crossing Dora Creek to Morisset Town Centre (RTA responsibility).

Cooranbong

The North Cooranbong TMAP had 8 principle cycle route recommendations which have been assumed as forming the basis of the cycling facilities from the western areas.

Cycle routes located:

1. West side of development to Town Centre
2. West side of development to Town Centre
3. Town Common to Primary School
4. Town Common to Town Centre
5. Town Centre to Town Common
6. Town Centre to Avondale College
7. Town Centre to Central Drive
8. Central Drive to Morisset.

The significant cycle route here is the proposed Central Drive to Morisset route, which will form a major contribution to the overall Morisset Cycle network, linking the town centre to Cooranbong.

Morisset Town Centre area

Other study recommendations have included:

- A 3m wide cycle link along Kahibah Street/Doyalson Street
- Pedestrian/cycle links to the schools
- The upgrading of Station Street to a pedestrian/cycle oriented route will provide the centre with a good facility linking into cyclepaths/ footpaths along Kahibah Road to Cooranbong, Dora Street to the Gateway Industrial area, Newcastle Street, Bridge Street to the schools and recreation facilities, Macquarie Street/Moira Park Road to Dora Creek.
- Doyalson Road between Dora Street and Freemans Drive is recommended to be upgraded to a Collector road standard and therefore should include cycling facilities.
- A cycle route between Morisset town centre and the Morisset Industrial area would provide benefit to both commuters and consumers and a on-road cycle path utilising the shoulders on Dora Street / Mandalong Road should be provided.

Wyee

The standard of Wyee Road should be upgraded to include cycling facilities on both sides of Wyee Road to link the developments in the Wyee area to the Morisset industrial employment area and Town Centre. There is a sealed shoulder along the majority of the length of Wyee Road, although there are no cycle markings. There should be a sealed shoulder on both sides of Wyee Road with cycle way markings.

5.5.3 Pedestrian Facilities Assessment

- It is important that all facilities are coordinated, e.g. crossing points with logical pedestrian routes, especially around the station/interchange and schools. Town Centre plans must be coordinated with the public transport and pedestrian and cyclist routes in terms of links to any proposed local and district facilities.
- Plans for pedestrian facilities and improvements have to allow for manoeuvring of buses in key areas.
- Previous studies have recommended intersection improvements, including roundabouts at Newcastle St/ Bridge St, Newcastle St/ Doyalson Street, upgrading Freemans Rd/ Dora St; all proposals should take pedestrian requirements into account.
- Morisset Structure Plan has identified the need for a comprehensive network of facilities for cyclists and pedestrians linking the areas of proposed population, transport nodes, primary and high schools, colleges/universities, recreation and community facilities, retail, commercial and employment areas. "A greater percentage of employment will be in centres close to higher population densities and accessible by a variety of transport options".

5.5.4 Recommendations

That the principles of future Pedestrian and Cycling network should mirror those of the Cooranbong TMAP, this plan should be extended to cover the S94 study area:

- Provision of combined off road footpaths /cycleways to minimum service levels.
- Key pedestrian and cycling routes to Morisset CBD.
- Off road routes to connect key destinations.
- Connections to Public Transport.

- Provision of support facilities /bike parking etc.
- Extend cycle path on Fishery Point Road from Grenache Way east to Lake Macquarie.
- Cycle path along Morisset Park Road from intersection with Fishery Point Road to Bardens Bay (may be classed as a recreation route).

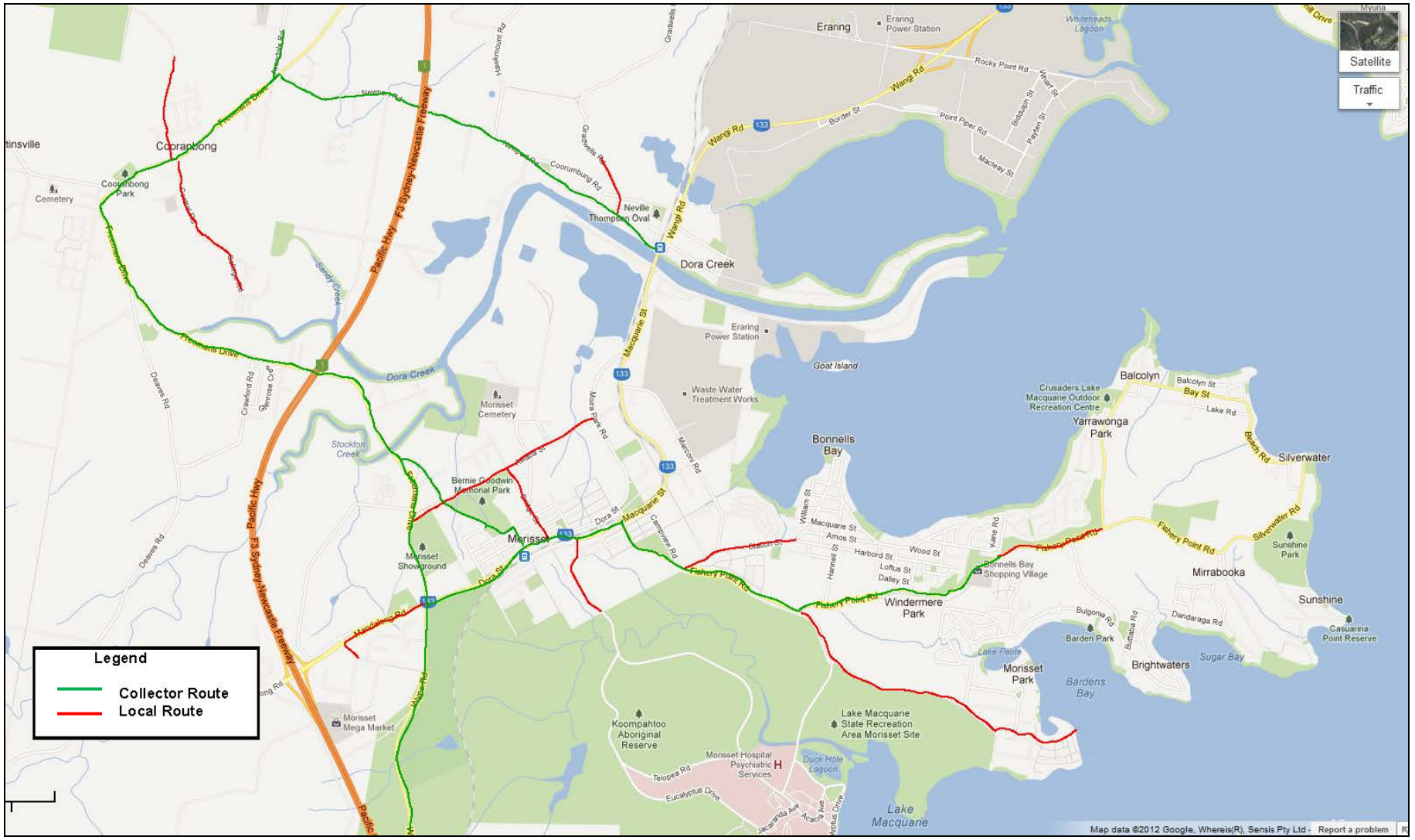


Figure 5-2 Local Cycle/Pedestrian Concepts

6 Proposed Works

The Combined Proposed Works Schedule for Local Road, Intersection, Public transport Cycling and Pedestrian Facilities is illustrated in **Figure 6-1** below and described in full in **Volume 2.**

6.1 Project Description

The assessment of potential land infrastructure upgrades has been conducted on a project by project basis. Where an existing piece of infrastructure is identified for upgrading, or a new facility is required to meet demand from more than one site, the works have been compiled using the project template outlined overleaf. This template includes descriptions of the works, its status (e.g.: concept, preliminary etc) as well as reference to supporting plans and estimates information and funding mechanisms applied.

The Project Description has been prepared for each nominated item of work under the plan. Details are contained in **Volume 2.**

6.2 Summary of Works Schedule

The Itemised Work Schedule contains a summary of the works recommendations to deliver traffic and transport facilities to meet the nominated performance and minimum service levels. Details are contained in **Appendix A**.

6.3 Comments and Recommended Local Road Works

In general, the collector road network was assessed as providing satisfactory levels of performance, for the planned level of growth in the study area. The following exceptions were:

a) **Completion of Awaba Street between Bridge Street and Stockton/Kahibah Streets**

Purpose: 1. To maintain traffic flows on the local Morisset collector road network, particularly Bridge Street, at acceptable environmental capacity levels.

2. To allow alternate access to Freemans Drive and then beyond to the F3 Freeway and other areas to the south, west and north.

b) **Realignment and connection of Kahibah Street to Doyalson Street, closure of Kahibah Street between Doyalson Street and Newcastle Street**

Purpose: 1. To reinforce collector road network and direct local flows to and through the Morisset Town Centre at junctions with appropriate levels of control.

c) **Wamsley Street Priority Control**

Purpose: 1. As part of intersection upgrade implement reversal at junction priorities to reinforce through movement function of Wamsley Street between Newport Road and Douglas Street as part of the collector road network.

d) **Railway Underpass (Moira Park Road)**

This existing road constraint does not need to be upgraded as alternate transport routes for development in the northern part of Morisset are available and can provide adequate capacity for development. The cost of upgrading this underpass is considered prohibitive and outside Section 94 consideration.

6.4 Comments and Recommended Intersection Upgrades

Within each sub-catchment of the study area a number of intersection upgrades were identified. These are illustrated in **Figure 6-1** and detailed in **Volume 2**.

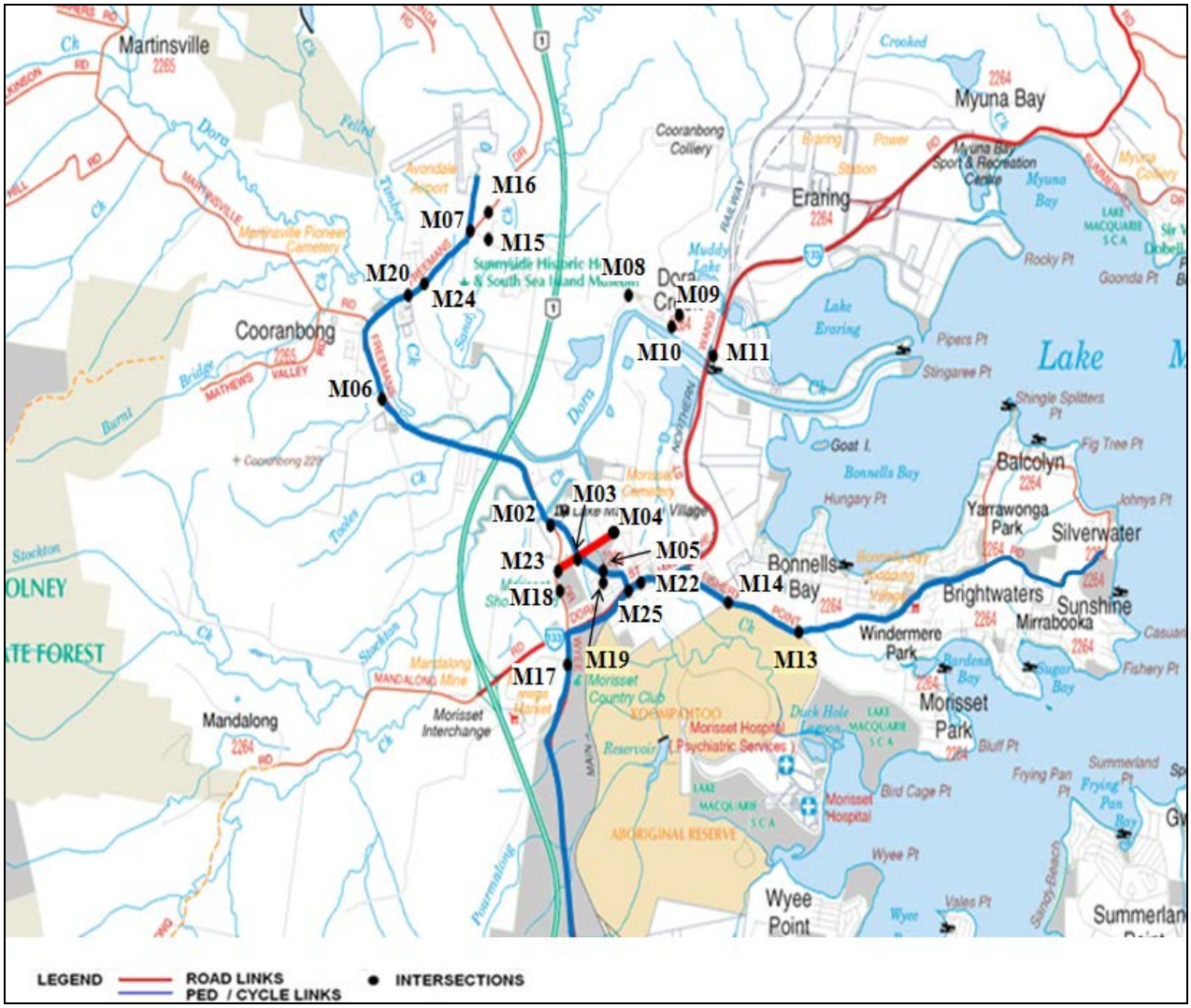


Figure 6-1 Location of Recommended Works

There are a number of upgrades excluded as the junctions are under the control and management of the NSW RTA, hence they are beyond the scope of this contribution plan. Where a pre-existing plan or agreement has been made, this is noted in the work schedule.

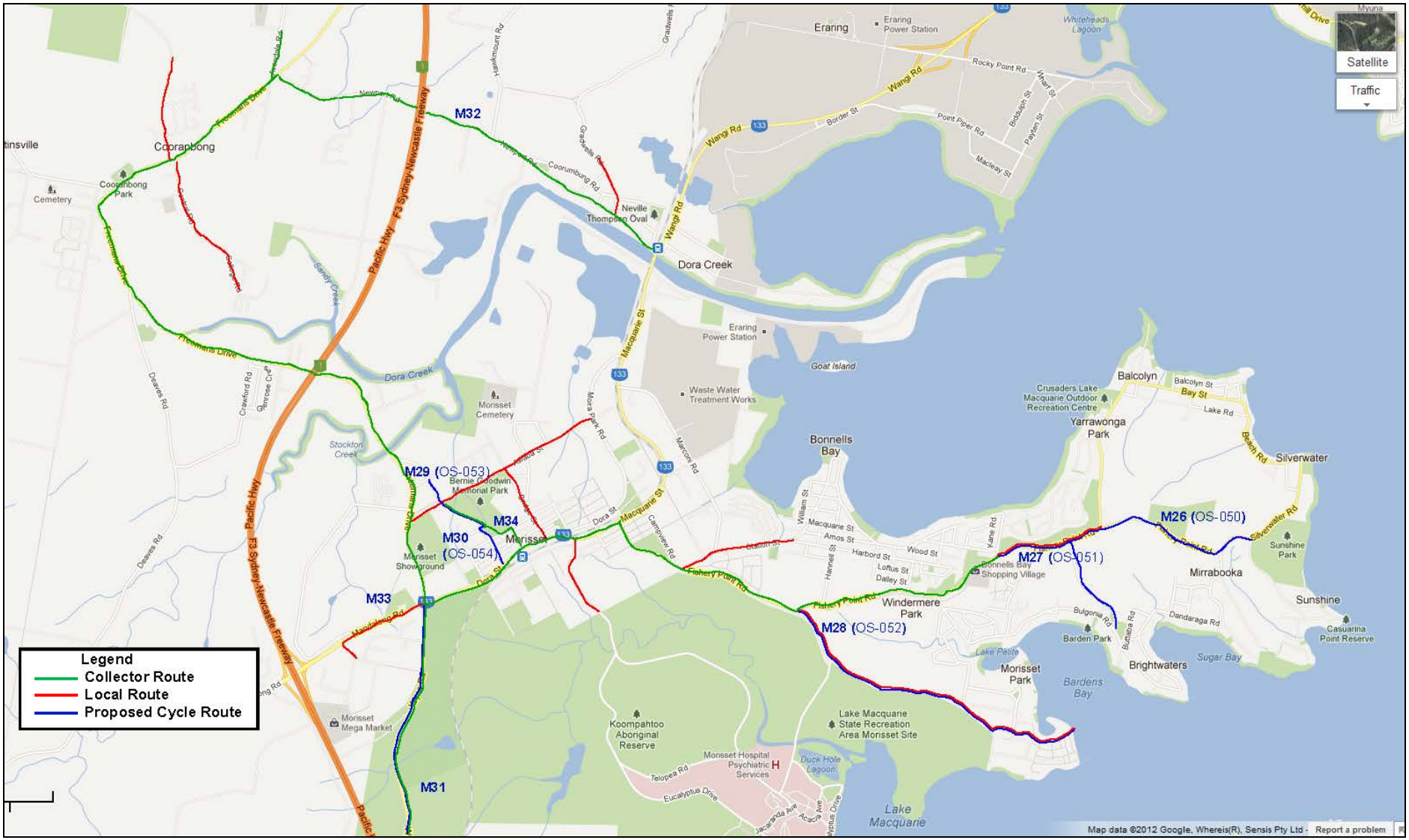


Figure 6–2 Location of Recommended Pedestrian/Cycle Facilities

7 Concept Design and Cost Estimates

7.1 Introduction

Council has required development of cost estimates for each item of upgrade works that is a component of the traffic and transport sub set of the Morisset Contributions Catchment Development Contributions Plan. This section outlines the approach taken to developing firstly concept designs, and then matching engineering (concept design) estimates for the basis of developing contributions and then apportionment.

7.2 Concept Designs

For the purpose of this study a concept design has been defined as an engineering concept plan only, with sufficient detail to allow calculation of concept stage engineering estimates based on Council's Schedule of Rates for Civil Engineering Work. It does not allow for any detailed consideration of ground conditions including underground or overhead service relocations, drainage calculations or any detailed level of geometric design (including 3-dimensional modelling) and hence earthworks calculations. It relies on the principle of deriving strategic estimates for engineering road works and traffic facilities as illustrated in **Table 7.1** below.

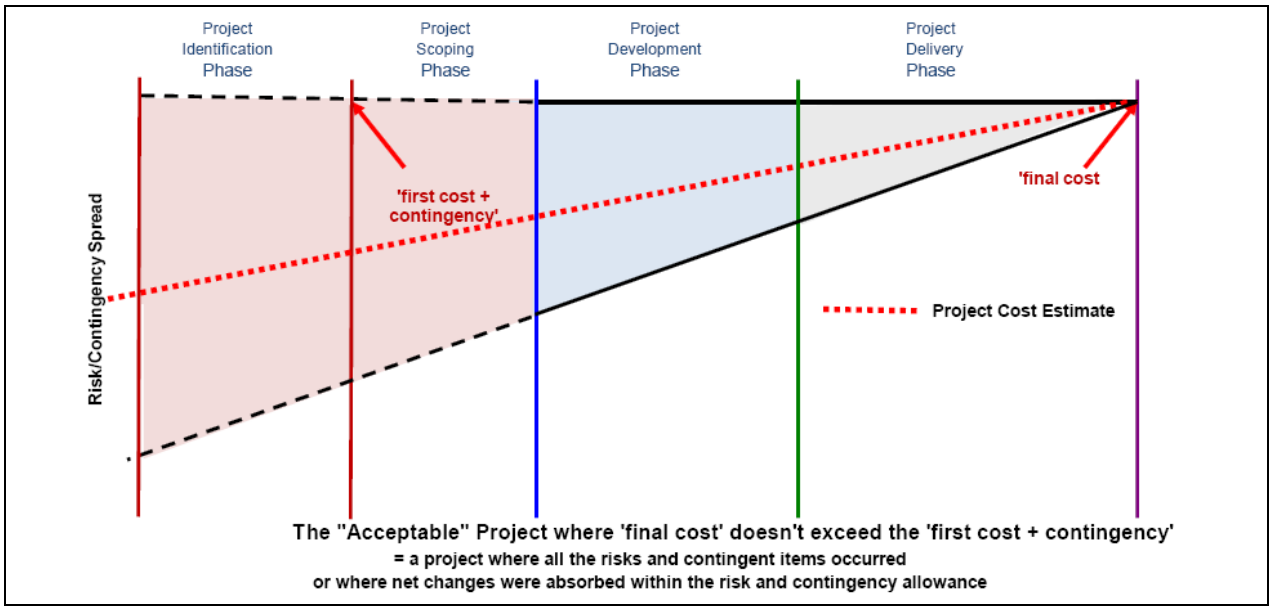
7.3 Land Acquisition

An important element of the concept design is the requirement for any land acquisition necessary to construct the road upgrade. The designs prepared by BTF have endeavoured to plan construction within the existing road reserve to reduce costs and impacts on adjacent land owners. Where additional land is required, the approximate area based upon the concept plans has been identified and is highlighted in **Table 7-1** below.

Note that ALL pedestrian, cycling and public transport facilities e.g. bus stops and shelters have been assumed to fit within the existing road reserve and hence there are NO land acquisition requirements for these elements of the plan.

7.4 Criteria for Concept Level Engineering Estimates

As a project moves through its various phases the objective is to ensure that it's agreed outturn cost estimate is maintained below an agreed value established early in the project's life cycle.

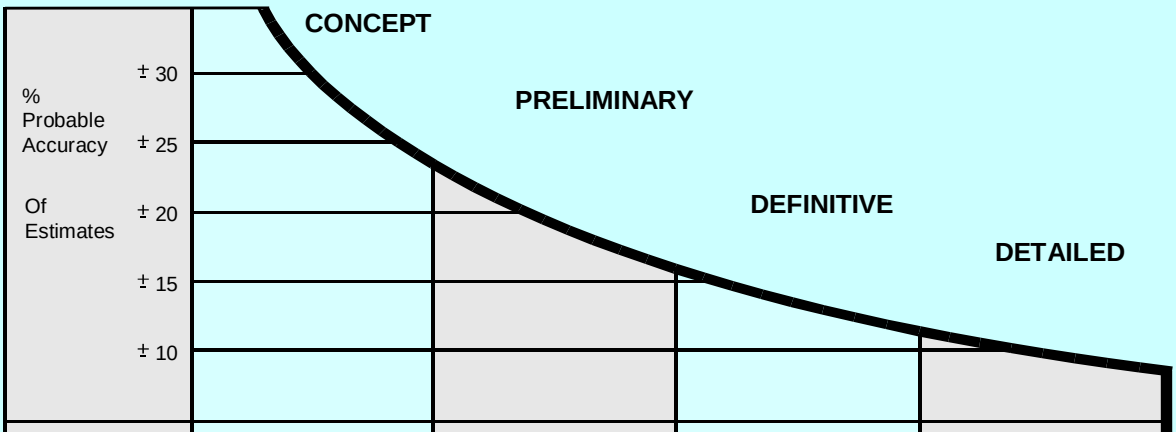


Source: Evans and Peck 2008

The criteria applied for developing concept level engineering estimate is outlined overleaf:

Road Infrastructure Cost Planning

- Concept
- Preliminary
- Definitive
- Detailed



Type of Estimate	Order of Magnitude	Preliminary	Definitive	Detailed
Documentation Provided	• Project capacity and Location • Cost Data on Similar Projects • Major Component List	• Preliminary Bill of Quantities • Engineering Line Diagram • General Arrangement • Maps and Surveys • Bench Test Results • Nature of Facilities	• Equipment Specifications and Vendor Quotations • Construction Schedule • Electrical One Lines • Piping and Instrumentation Flow Diagrams • Soil Data and Architect Features • Site Survey and Labour Complete	• Bulk Material Specifications and Vendor Quotes • Construction Specification and Sub Contractor Quotations • Engineering Advanced Approximately 10%
Definition of Scope of Work	Conceptual	Approximate	Clearly Described Essentially Complete	Complete. Well Detailed
Estimating Procedure	Factoring	Combination of Factoring and Quantity Take-Off	Most Quantity Take-Off. Very little Factoring	Complete Quantity Take-Off
Use of Study	Comparison/ Rejection	Final Feasibility	Budget	Funding

The accuracy of estimates at each stage of the design process is reflected by the extent of detailed knowledge of site conditions known at the time.

The process of preparing engineering estimates is iterative, and dependent on the level of detail information available. Types of information that can affect the estimate include the following items;

1. Existing services information
2. Relocation of existing services
3. Earthworks
4. Pavement design
5. Prepare a basic drainage layout for pipes and pit details
6. Type of traffic control (signals, priority, roundabout)
7. Traffic management control during construction
8. Cost of survey
9. Cost of design and project management
10. Cost of geotechnical investigations
11. Liaison with Council (and RTA if applicable)
12. Project management

The estimating process can be staged as follows:

1. **Concept Development** based on initial considerations such as planning capacity and functional requirements, costs based on strategic estimates (from comparable works)
2. **Preliminary Design Costing** based on the existing concept layouts; no further design but enquiries to utility providers; a "kick dirt" appraisal of ground conditions; drainage network estimated and a basic layout added to the concept; use standard cost rates and surface area measurements.

   Note: At this stage we will include a program and a fee estimate for detailed design and for construction.
3. **Detailed Design** ; This will cover services information, geotechnical investigation and pavement design; ground survey; roads and drainage design; utilities relocation agreements with providers; traffic signal design; road safety audit of design; design certification; preparation of bills of quantities.
4. **Contract Stage** will require preparation of tender documents; inviting tenders; assessment of tenders, negotiations and arranging signing the contract; negotiations and agreement with RTA and Council on certifying and approving procedures; contract administration and inspections; Contract Completion procedures and Works as Executed drawings.

Our guide for engineering works cost estimations are;

Stage	Confidence Limits	Comments
Concept Design	+ 40% to – 20%	Scope of works defined in outline & global estimates made for groups of elements.
Preliminary Design	+ 25% to – 15%	Most works identified & sized; global estimates made for some groups of elements; a detailed bill prepared for other elements.
Detailed Design Review	+ 20% to - 10%	All works sized & identified with some quantities at preliminary level, and some work methods not specified; a detailed estimate made for all elements.
Pre tender	+ 15% to - 5%	All elements which have been designed & identified are quantified. A cost is estimated for each element taking into account issues related to methods of construction.
Contract Agreement	+ 10%	Prices for all identified works agreed between owner & constructor
Construction completed	+/- 0%	All costs known & agreed & works accepted by owner

Notes

1. An estimate is just that, an estimate. The actual cost of works can only be known when the works have been finished and accepted as meeting the requirements specified by the owner. It is useful to make this clear by stating that an estimate is an "opinion" of the likely cost.
2. If an element of the works is identified it can be quantified and an estimate of cost applied to this element. Not all elements can be identified during the design stages resulting in omissions from the estimates. As the design is developed in detail so is the precision of identifying and estimating each element.
3. If the cost opinion is of a global nature it may have plus or minus error. This approach is only applicable in early stages of project development and its use should be limited to the Concept Stage and possibly to the Preliminary Design.
4. If the opinion of cost is derived from the elements of the works, it will usually only have plus errors of estimate. Minus errors (reductions) are rare because it is rare to identify elements which are later not required as part of the works.
5. If the rates in the schedule exclude "Overheads and Profit" this is added as a separate item of the bill expressed as a percentage and its effect is as a proportionate increase to every other item. It is distinct from and does not alter the selected contingency factor.
6. A contingency sum is provided to cover the upwards (plus) range of the confidence limits, i.e. add a contingency amount equal in value to the relevant percentage of the estimated items.
7. It is not usual to have minus cost estimate error and the range is therefore shown as skewed.
8. In presenting the opinion of cost the actual amount to be stated should be the total amount including the plus percentage amount for the contingency.

7.5 Basis of Applied Unit Rates for Construction

For the purpose of this study concept level engineering estimates have been derived from available industry data and a comparison of unit rates for civil engineering works, a copy of which is attached in Volume 2.

This approach provides for reasonable average costs estimates. Final costs determined at contract stage may be higher or lower but overall will be consistent with the average costs so that individual contribution rates for transport facilities are appropriately determined.

7.6 Basis of Concept Level Engineering Estimates

This study has applied Benchmark estimating software, utilising Council's schedule of rates as the basis of delivering concept estimates for each item of recommended works. This tool allows for the systematic upgrade of estimates at each stage of the design process, as new and more accurate dates become available.

As part of the costings procedure, a number of allowances and contingencies within the costings have been made in order to bring the accuracy of the estimate up to that of a P90 (+/- 10%). This has been achieved through the inclusion of a Design Development allowance (10%), a General Construction Contingency (5%) for unknown construction risk items, along with a number of specific contingencies for the known risk items such as unknown soil conditions and unknown services. (Muller Partnership, 2010)

7.7 Quality Review of Estimate

A quality review of the process and derived concept level estimates has been conducted by Muller Partnership. A bill of quantities and accompanying cost estimate was prepared based on the major road upgrade along Awaba Road, including the intersection upgrade works. This upgrade identified all types of upgrades, including key items such as road widening, kerb and guttering, footpaths etc. Muller Partnership reviewed, verified and provided amended bills of quantity and costing. This formed the basis for the calculations of costings for the other upgrades determined under this study. A summary of the cost estimates for the project is provided below with full details in Volume 2 of this report.

Table 7-1 Cost estimates for road works and land acquisition requirements

Reference #	Facility Name	Capital Cost Estimate
Roads and Intersections		
M02	Roundabout at Freemans Drive and Stockton Street - North Cooranbong VPA Item 19	$864,000
M03	New Roundabout - Intersection of Stockton Road and Awaba Street	$1,482,000
M04	Awaba Street Extension at Bridge Street	$1,682,000
M05	Upgrade Intersection of Kahibah/Wyong/Doyalson Streets	$913,000
M06	New Traffic Signals - Intersection of Freemans Drive and Deaves Road - North Cooranbong VPA Item 18	$312,000
M07	New Traffic Signals - Intersection of Freemans Drive, Avondale Road and Newport Road - North Cooranbong VPA Item 14	$1,709,000
M08	Upgrade priority controlled intersection of Newport Road and Coorumbung Road with sheltered right turn lane	$679,000
M09	Upgrade priority controlled intersection of Coorumbung Road and Gradwells Road with change on priority	$458,000
M10	Upgrade of priority controlled intersection of Newport Road and Gradwells Road with sheltered right turn lane	$829,000
M11	Upgrade of intersection to provide 4-way traffic signals for Wamsley Street – Macquarie Street – Dora Street	$1,232,000
M13	Fishery Point Road – Morisset Park Road	$722,000
M14	Upgrade of T-intersection of Fishery Point Road – Station Street with traffic signals	$867,000
M15	Upgrade of priority controlled intersection of Newport Road - Cadillac Close with sheltered right turn lane	$632,000
M16	New Priority Control Intersection - Freemans Drive and new access road	$921,000
M17	Upgrade of intersection of Wyee Road - Alliance Avenue to roundabout control	$864,000
M18	Upgrade of intersection of Freemans Drive – Industrial Site Access with sheltered right turn lane	$845,000
M19	New Roundabout - Intersection of Newcastle Street and Doyalson Street	$819,000
M20	Priority Control to traffic signals - Intersection of Freemans Drive and Alton Road - North Cooranbong VPA Item 16	$292,000
M22	Dora Street	$290,000
M23	Freemans Drive – Awaba Street	$865,000
M24	New Intersection with Traffic Signals - Freemans Drive and new access road (central) - North Cooranbong VPA Item 15	$1,142,000
	Sub-Total	**$18,419,000**
Pedestrian / Bicycle Facilities		
M25	New Shared Way – Dora Street	$152,000
M26	New Cycleways - Bonnells Bay to Sunshine	$561,000
M27	New Cycleways - Bonnells Bay to Mirrabooka	$153,000
M28	New Cycleways - Bonnells Bay to Trinity Point	$371,000
M29	New Cycleways - Morisset – Kahibah Street	$211,000
M30	New Cycleways - Morisset – Doyalson Street	$69,000
M31	New Road Shoulder Cycle Lane – Wyee Road	$20,000
M32	New cycleway – North Cooranbong to Dora Creek via Newport Road	$400,000
M33	New cycleway- Morisset CBD to Morriset Industrial area	$200,000
M34	Morisset CBD network	$50,000
	Sub-Total	**$2,187,000**
Public Transport Facilities		
M35	New Bus Shelters x 22	$440,000
	Sub-Total	**$440,000**
	TOTAL	**$21,046,000**

The above estimates **exclude** GST.

7.8 Land Value

Where an item of upgrade works (as detailed above) identifies the need for land acquisition as part of the design process, Council's Property Services Department will provide land valuations to enable land costs to be incorporated into the relevant works schedules and contributions calculations.

Table 7-2 Land Acquisition Requirements

Reference #	Facility Name	Land Area to be Acquired (m^2)
Roads and Intersections		
M02	Roundabout at Freemans Drive and Stockton Street - North Cooranbong VPA Item 19	NONE required – within road reserve
M03	New Roundabout - Intersection of Stockton Road and Awaba Street	60 sq metres
M04	Awaba Street Extension at Bridge Street	NONE required – within road reserve
M05	Upgrade Intersection of Kahibah/Wyong/Doyalson Streets	NONE required- Council land
M06	New Traffic Signals - Intersection of Freemans Drive and Deaves Road - North Cooranbong VPA Item 18	NONE required – within road reserve
M07	New Traffic Signals - Intersection of Freemans Drive, Avondale Road and Newport Road - North Cooranbong VPA Item 14	Covered under North Cooranbong VPA
M08	Newport Road and Coorumbung Road	NONE required – within road reserve
M09	Coorumbung Road and Gradwells Road	NONE required – within road reserve
M10	Newport Road and Gradwells Road	NONE required – within road reserve
M11	Wamsley Street – Macquarie Street – Dora Street	NONE required – within road reserve
M13	Fishery Point Road – Morisset Park Road	NONE required – within road reserve
M14	Fishery Point Road – Station Street	30 sq metres
M15	Newport Road - Cadillac Close	NONE required – within road reserve
M16	New Priority Control Intersection - Freemans Drive and new access road	NONE required – within road reserve
M17	Wyee Road - Alliance Avenue	NONE required – within road reserve
M18	Freemans Drive – Industrial Site Access	NONE required – within road reserve
M19	New Roundabout - Intersection of Newcastle Street and Doyalson Street	NONE required – within road reserve
M20	Priority Control to traffic signals - Intersection of Freemans Drive and Alton Road - North Cooranbong VPA Item 16	NONE required – within road reserve
M022	Dora Street	NONE required – within road reserve
M23	Freemans Drive – Awaba Street	NONE required – within road reserve
M24	New Intersection with Traffic Signals - Freemans Drive and new access road (central) - North Cooranbong VPA Item 15	Covered under North Cooranbong VPA
Sub-Total		**90 sq metres**
Pedestrian / Bicycle Facilities		
M25	Station Street – Dora Street	NONE required – within road reserve
M26	Bonnells Bay to Sunshine	NONE required – within road reserve
M27	Bonnells Bay to Mirrabooka	NONE required – within road reserve
M28	Bonnells Bay to Trinity Point	NONE required – within road reserve

Reference #	Facility Name	Land Area to be Acquired (m^2)
M29	Morisset – Kahibah Street	NONE required – within road reserve
M30	Morisset – Doyalson Street	NONE required – within road reserve
M31	Wyee Road Cycling Shoulders	NONE required – within road reserve
M32	Dora Creek to North Cooranbong	NONE required – within road reserve
M33	Morisset CBD to Morisset Industrial area	NONE required – within road reserve
M34	Morisset CBD	NONE required – within road reserve
Sub-Total		**Zero**
Public Transport Facilities		
M35	New Bus Shelters x 22	NONE required – within road reserve
	Sub-Total	**Zero**
	TOTAL	**90sq metres**

7.9 Contributions and Apportionment

Table 7-3 Contribution and Apportionment

Works Item	Catchment to be levied	Development Apportionment (residential & / or commercial
M02 – Item 19 of VPA	North Cooranbong	Residential and commercial
M03	Morisset	Residential
M04	Morisset	Residential
M05	Morisset and Cooranbong	Morisset - Residential and commercial Cooranbong - Residential
M06 – item 18 of VPA	North Cooranbong	Residential
M07 – items 13 & 14 of VPA	North Cooranbong	Residential and commercial
M08	Condition of development consent	
M09	Condition of development consent	
M10	Condition of development consent	
M11	RMS to determine scope of works. Do not include in contributions plan.	
M12	No upgrade required	
M13	Morisset Peninsula and Bonnells Bay	Morisset Peninsula - Residential and commercial Bonnells Bay - Residential and commercial
M14	Condition of consent DA/687/2007 – signalised intersection.	See Table 2 Consent condition to complete works, with a financial commitment for Council to forward fund $97,200 (not subject to indexation) or 36% of the total cost, whichever is the lesser. The portion to be forward funded by Council relates to contributions required from future developments.
M15	Cooranbong A [1]	Residential
M16	Cooranbong A [1]	Residential
M17	Morisset Employment - South Sector[2]	Employment development
M18	Delete works	
M19	Morisset and Cooranbong	Morisset - Residential and commercial Cooranbong - Residential
M20 – item 16 of VPA	North Cooranbong	Residential and commercial
M21	Morisset Employment – North Sector [2]	Employment development
M22	State Road and RMS responsible authority. Do not include in contributions plan.	
M23	Morisset and Cooranbong	Morisset - Residential and commercial Cooranbong - Residential
M24 – item 15 of VPA	North Cooranbong	Residential
Mandalong Rd – Dora Street – Freemans Dr – Wyee Rd	State Road and RMS responsible authority. Do not include in contributions plan.	

[1] – Residential area NE of the intersection of Freemans Drive and Newport Road.

[2] – Morisset Industrial area is split into North and South, with boundary being Mandalong Road.

Table 7-4 – Apportionment of M14

Development	Total Lots	Contribution (Est construction cost $270,000)	Comments
81 Station Street, Bonnells Bay (DA/687/2007)	180		Consent condition to complete works. Please note this development's portion is 180 lots. The 180 lots represents 164 lots from DA/687/2007 plus an additional 16 lots from the redevelopment of some lots to be created from DA/687/2007.
27 Morisset Park Road, Morisset Park (PT/7/2008)	62	$35,910	Consent issued by the Director-General requiring a monetary contribution of $35,910 (not subject to indexation).
270 Fishery Point Road, Bonnells Bay (DA/218/2011)	22	$0	
Future development (excluding 16 lots from land approved under DA/687/2007)		$61,290	Apportionment Morisset Peninsula - Residential and commercial Bonnells Bay - Residential and commercial

8 Monitoring and Review

8.1 Review Requirements

The Legislation governing the application of s94 Contribution Plans require plans to apply to 'reasonable' timeframes, and also to include review mechanisms to ensure contributions collected and works planned are delivered with the prescribed timeframe of the plan. Council has therefore proposed regular reviews of the plan, so that any time and monetary adjustments can be made.

8.2 Indexation

All contribution rates will be subject to indexation, the rate to be agreed with Council as appropriate for application to the proposed works.

9 References

- Draft Morisset Structure Plan (2007)
- Traffic Reports prepared for rezoning at:
  a) Morisset (Transport Studies Pty Ltd – 2004)
  b) North Cooranbong (GHD Pty Ltd and Mark Waugh Pty Ltd – 2007)
  c) Avondale College Cooranbong (Mark Waugh Pty Ltd – 2005)
  d) Highland Avenue Cooranbong (Northern Transport Planning and Engineering Pty Ltd-2006)
  e) Dora Creek (Northern Transport Planning and Engineering Pty Ltd-2005)
  f) Corner of Fishery Point Road and Station Street Bonnells Bay (Parsons Brinckerhoff Pty Ltd – 2004)
  g) Koompahtoo land (GHD Pty Ltd 2006)
  h) Gimberts Road, Morisset (draft) (GHD Pty Ltd 2007)
- Morisset Town Centre Area Plan (Lake Macquarie City Council and Placewise Urban Design, adopted 23rd August 2010)
- *Morisset Traffic Management Study 2005* prepared by Cardno Pty Ltd
- *Planning Guidelines for Walking and Cycling 2004* prepared by NSW Government
- The RTA's Guide to Traffic Generating Developments Version 2.2 October 2002
- Traffic Impact Assessment DA/687/2007 prepared by Better Transport Futures
- Council's Current Development Control Plan No 1
- *Draft LES for rezoning at Wyee*
- *Draft Wyee Structure Plan and Servicing Strategy*
- *NSW RTA Action for Bikes*
- *BikePlan 2010* prepared by NSW Government
- LMCC Morisset area Transport Access Guide 2009

Appendix A. Proposed Works Schedule

The Morisset Contributions Catchment Section 94 Contributions Plan Traffic and Transportation Study has included a traffic analysis of proposals as follows:

1. Consideration of the list of road links and intersections identified in the project brief.
2. Calculation of Existing Performance using Agreed (Austroads) Level of Service (LoS) Criteria. This is based upon the analysis of the existing intersection controls and existing traffic numbers surveyed as part of the project work.
3. Confirmation of Existing Performance (Satisfactory/ Unsatisfactory) against LoS. Level of service of D or better.
4. Identification of Upgrades to deliver Satisfactory Existing Performance against LoS.
5. Identification of Upgrades to deliver Satisfactory Future Performance against LoS.

A.1 Agreed Criteria for Assessment of Upgrade Works

The following criteria have been adopted as the basis for assessing acceptable Levels of Service in this study:

1. Intersections – Austroads Level of Service (LoS) Threshold D/E – That is where performance drops to LoS E under forecast peak traffic flows, upgrades will be considered.
2. Roads – The volumes which have been assumed as the point of transition from LoS D to E are included in Table A-1 below.

Table A-1 Road Capacity Thresholds

Road Type	Average Travel Speed for Urban LoS D	Typical Mid-Block Capacity for LoS D	Proposed Traffic Capacity for LoS D	Capacity (HCM)
Urban Two-way Two-lane	25 to 35	900	1600	1,700
4 lane undivided – with occasional parked cars		1500 in 2 lanes	1700	3,200
4 lane undivided – with Clearways		1800 in 2 lanes	1800	3,200
4 lane divided		1900 in 2 lanes	2200	3,200

Source: RTA, Austroads, HCM

A.2 Comments on Recommended Local Road Works

In general, the collector road network was assessed as providing satisfactory levels of performance, for the planned level of growth in the study area. The following exceptions were:

e) **Completion of Awaba Street between Bridge Street and Stockton/Kahibah Streets -** Purpose:
1. Maintains traffic flows on the local Morisset collector road network, particularly Bridge Street, at acceptable environmental capacity levels.
2. Allows alternate access to Freemans Drive & beyond to F3 Freeway & areas south, west & north.

f) **Realignment and connection of Kahibah Street to Doyalson Street, closure of Kahibah Street between Doyalson Street and Newcastle Street -** Purpose:To reinforce collector road network and direct local flows to and through the Morisset Town Centre at junctions with appropriate levels of control.

g) **Wamsley Street Priority Control -** Purpose: As part of intersection upgrade implement reversal at junction priorities to reinforce through movement function of Wamsley Street between Newport Road and Douglas Street as part of the collector road network.

h) **Intersections** - Within each sub-catchment of the study area a number of intersection upgrades were identified. The upgrades include a number of junctions that are under the control and management of the NSW RTA, which are beyond the scope of this contribution plan. Where a pre-existing plan or agreement has been made, this is noted in the work schedule.

Appendix B. Works Schedule

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
3.2 Road Network							
Awaba Street	Operates as a local collector street in a residential area with a 50km/hr speed limit. It operates as a two lane, two way street with varying road widths in the order of 7.5 - 3.5 meters. A no through road south west of the intersection with Bridge Street, and north west of the intersection with Terrigal Street.	Morisset	B	Y	Yes- existing road not sealed and will require upgrade due to future development	B	S94 Morisset Residential Development
Bridge Street (MG)	Operates as a local collector street in a residential area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 11 metres in width. There are footpaths on both sides of the street.	Morisset / Morisset CBD	A	Y	N	C	N/A
Dora Street (MB)	Operates as a sub arterial main road through the Morisset CBD, forms part of Main Road 217. Construction on this road will require concurrence from the RTA. Important link to the F3 Sydney – Newcastle Freeway. Operates as a two lane, two way road in the order of 12 metres, with lane widths approximately 3.3 metres.	Morisset / Morisset CBD	A	Y	N	C	RTA

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Dora Street (MB)	There are parking lanes through the CBD in the order of 3 metres wide. Outside of the CBD the parking lanes become hard shoulders. It operates under a speed limit of 60 km/h changing to 50 km/h through the Morisset town centre. Options for improvement include: a) replacement parking to allow peak period restrictions b) alternate route						
Fishery Point Road (ME)	Operates as a local collector road linking Morisset to the Bonnells Bay peninsula. Currently a two lane road in the order of 10 metres wide, with a lane width approximately 3.5 metres with hard shoulders of approximately 1.5 metres along both sides of the road. There is also a footpath along the entire length of the road. It operates under a speed limit of 70km/h changing to 60km/hr approximately 200 meters before the Morisset Park Road intersection.	Morisset Peninsula	A	Y	N	A	N/A
Freemans Drive (ME)	A local collector road linking Morisset in the south to Cooranbong in the north. Two lane road with a width in the order of 11 metres, with lane width approximately 3.5 metres. Shoulders vary from soft to hard throughout the length of the road. It operates under a speed limit of 70km/hr dropping to 60 km/h within built up areas.	Morisset / Cooranbong	A	Y	N	A	N/A

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Macquarie Street (MC)	RTA Road, Outside S94 scope. Operates as an arterial main street linking Dora Creek to Morisset and forms part of Main Road 217. Currently a two lane two way street in the order of 11 meters wide, with lane widths of approximately 3.3 meters. There are hard shoulders on both sides of the street.	Morisset	B	Y	N	B	N/A
Newcastle Street (MH)	Operates as a local collector street in a residential and commercial area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 10.5 metres in width. There are foot paths along both sides of the street.	Morisset CBD	A	Y	N	A	N/A
Newport Road (MF)	Operates as a local collector road linking Cooranbong to Dora Creek. Currently a two lane road in the order of 7 metres wide with lane widths approximately 3.5 metres. There are soft shoulders on either side of roadway. The road operates at 60km/hr within the built up areas and 80km/hr west of Coorumbung Road.	Cooranbong / Rural	A	Y	N	A	N/A
Station Street (MI)	Operates as a local collector street in a residential area with a 50km/hr speed limit. It operates as a two lane, two way street in the order of 12.5 metres wide. There are footpaths along both sides of the street.	Morisset CBD	B	Y	NO – road to be upgraded to one-way operation Under Streetscape Masterplan	A	Council Funded under Masterplan work

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Wyee Road (MA)	Operates as a sub arterial main road linking Morisset in the north to Wyee and Doyalson in the south. Wyee Road forms part of the Regional Road 454. It is a two lane, two way road in the order of 12 metres wide, with lane width being approximately 3.5 metre. It operates under a speed limit of 60 km/h changing to 90km/h 100m south of the Alliance Avenue intersection.	Morisset / Wyee	A	Y	N	A	N/A
3.3 Local Intersections							
Freemans Drive - Alton Road - Central Road (M20)	A staggered T intersection in the order of 50 metres apart with Freemans Drive the major through road. Both Alton Road and Central Road operate under a signed stop control	Cooranbong	A	Y	Yes. Proposed signalisation of the intersection of Freemans Drive and Alton Road	B	North Cooranbong VPA
Cadillac Close - Newport Road (M15)	A T intersection with Newport Road the major through road. Cadillac Close operates under a signed give way control.	Cooranbong	A	Y	Y	A	S94
New Access Road North-Freemans Drive (M16)	A T intersection with Freemans Drive the major through road. The intersection is structured as a seagull with a dedicated right hand turn bay for Freemans Drive	Cooranbong	N/A	N/A	New Access	A	S94
Deaves Road - Freemans Drive (M06)	An acute T intersection with Freemans Drive the major road. Deaves Road operates under give way signed controls.	Cooranbong	A	Y	Yes. Installation of traffic signals, including dedicated right hand turn bays, median	C/D	North Cooranbong VPA

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Avondale Road - Freemans Drive - Newport Road (M07)	T intersection with Freemans Drive and Newport Road, with Freemans Drive the major road with priority and Newport Road operates under priority conditions. T intersection with Freemans Drive and Avondale Road, with Freemans Drive the major road and Avondale Road operates under give way sign controls	Cooranbong	A	Y	Yes re-alignment of Avondale Road making it a 4 way signalised intersection.	C/D	North Cooranbong VPA
Stockton Street - Freemans Drive (M02)	T intersection with Freeman Drive the major road. Stockton Street operates under give way signed controls. Provides a link into Morisset town centre	Morisset	A	Y	Yes. Proposed construction of single lane round about	A	North Cooranbong VPA
Stockton Street - Awaba Street (M03)	T intersection with Stockton Road the major road. Awaba Street operates under give way signed controls	Morisset	A	Y	Yes. Proposed construction of single lane round about	A	S94
Bridge Street - Awaba Street (M04)	A cross road intersection with Bridge Street the major road. Awaba Street operates under give way signed controls	Morisset	A	Y	Yes. Proposed widening of the western Awaba Road approach.	A	S94
Kahibah Street - Wyong Street- Doyalson Street (M05)	Currently a staggered intersection with Kahibah Street and Wyong Street producing a T intersection with Kahibah Street being the main road and Wyong Street operating under give way signed controls, Wyong and Doyalson Street producing a T intersection with Wyong Street the major road, Doyalson Street is unsignalised	Morisset	A	Y	Proposing to close Kahibah St at the junction with Wyong St. Extending Doyalson Street to connect into the junction of Kahibah St and Wyong St	A	S94

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Wyee Road - Alliance Avenue (M17)	A T intersection with Wyee Road the major through road. Alliance Avenue operates under a signed give way control	Morisset	A	Y	Yes, proposed upgrade to single lane roundabout	A	S94
New Access Road - Freemans Drive (between Jamerin Way and Gimberts) (M18)	A signalised T intersection with Freemans Drive the major through road. There are dedicated turning lanes into and out of the new access road.	Morisset	N/A	N/A	Y	C	North Cooranbong
Gimberts Road - Freemans Drive (M12)	A T intersection with Freemans Drive the major through road. Gimberts Road operates under a give way control	Morisset	A	Y	N	A	N/A
Mandalong Road - Gimberts Road (M21)	A two lane roundabout, with four entry/exits. Mandalong Road the main through road linking the industrial estate to the south with the F3.	Morisset	A	Y	N	A	S94
Mandalong Road - Dora St - Freemans Dr - Wyee Road (M24)	A single lane, four way roundabout.	Morisset	N/A	N/A	Yes, Proposed signalisation of the intersection	N/A	RTA and North Cooranbong VPA
Bridge Street - Newcastle Street (M01)	A cross road intersection. Bridge Street is the major road. Newcastle Street operates under give way signed controls. Parking is permitted along both sides of the roads	Morisset CBD	A	Y	N	A	N/A

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Newcastle Street - Doyalson Street (M19)	A crossing intersection with Doyalson Street being the major through road. Newcastle Street operates under a signed give way control	Morisset CBD	A	Y	Yes. Proposed construction of single lane round about	A	S94
Dora Street - Bridge Street (M22)	A T intersection with Dora Street the major through road. Bridge operates under a signed give way control	Morisset CBD	F	N	Yes proposed signalised intersection	D	RTA. Existing situation not acceptable.
Fishery Point Road - Morisset Park Road (M13)	A T intersection. Morisset Park Road/ Fishery Point Road (west) operate with priority as the major through road. Fishery Point Road (east) operates under a signed give way control at this intersection.	Morisset Peninsula	A	Y	Y	A	Trinity Point VPA
Fishery Point Road - Station Street (M14)	A T intersection with Fishery Point Road the major through road. Station Street operates under a signed give way control. Upgrade to signals Approved.	Morisset Peninsula	B	Y	Y	B	Development Condition, residential corner of Fishery Pt Rd and Station St. Council contribution of $97,000 to be recouped through Contributions Plan
Coorumbung Road - Newport Road (M08)	T intersection with Newport Road the major through road. Coorumbung Road is unsignalised	Dora Creek	A	Y	Y	A	Development Condition

Item No.	Description	Locality	Existing Level Of Service	Existing Situation Satisfactory? Y/N	Upgrade Required Due to Future Demand Y/N	With Future Developments Level Of Service	Contribution / Plan Type
Gradwells Road - Coorumbung Road (M09)	An offset crossing intersection which operates under a 4 way stop sign control	Dora Creek	A	Y	Y	A	Development Condition, residential development off Gradwells Road
Gradwells Road - Newport Road (M10)	Is a cross intersection with Newport Road the major through road. Gradwells Road has an unformed road extension on the southern side providing access to approximately 5 houses and Dora Creek and operates under a signed give way controls.	Dora Creek	A	Y	N	B	Development Condition
Wamsley Street - Dora Street (Dora Creek) (M11)	A complex intersection with Wamsley Street/Macquarie Street the major through road and Wamsley Street southern extension operating under priority conditions. Dora Street operates under a signed stop control as does the southern approach of Wamsley Street.	Dora Creek	B	Y	Y	C	North Cooranbong VPA
Freemans Drive – Awaba Street (M23)	Future intersection will be a three legged roundabout.	Morisset	-	-	Y	A	S94, Morisset development