Lake Macquarie City Council

Development Contributions Plan

Traffic and Transportation Background Study

Belmont Contributions Catchment

2015 – 2030

Contents

1 Traffic and Transportation Background Study

1.1 Introduction

Traffic and transport infrastructure is essential to support the future growth anticipated within the Belmont development contributions catchment. The Belmont catchment is bounded by the Charlestown catchment to the north, the Wyong Shire Local Government Area boundary to the south, Pacific Ocean in the east and Lake Macquarie in the west. It also incorporates the Wallarah catchment.

Council's Transportation Planning Section has been commissioned to prepare the Belmont Contributions Catchment Development Contributions Plan (the Plan). This report focuses on traffic and transport infrastructure required for the catchment until 2031.

The study includes a review of previous traffic investigations completed for a number of development and rezoning proposals, and has included assessment of key local road intersections, sub-arterial and collector Council roads, and public transport facilities required to support the community as development intensifies within the catchment.

1.1.1 Purpose of Study

The study identifies the traffic and transport infrastructure that is required to meet the transport demands of increased population and workforce within the Belmont catchment, anticipated to occur over the 15-year period, from 2015 to 2030.

The estimated increased population and workforce is based on an economic and development scenario prepared by Council's Integrated Planning Section, with further detail given in Section 3 of this report.

1.1.2 Objectives

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

- Review of existing studies for a number of rezoning and planning proposals, and development application submissions in the Belmont Contributions Catchment;
- Review of existing Levels of Service (LoS) of key intersections (non-state roads) within the Belmont catchment, and projected LoS in line with the anticipated growth;
- Need for road and intersection upgrades to support future development in the area based on projected growth impacts;
- Need for upgrades to local bus infrastructure.

The overall traffic and transport objectives to be achieved were to provide a cost effective, safe and efficient transport system that addresses the expected increase in demand for private car travel, goods movement and public transport, due to the anticipated increased development across the study area.

1.1.3 The Study Area

The study area covers the Belmont Development Contributions Catchment, divided into sub-catchments, Figure 1-1.

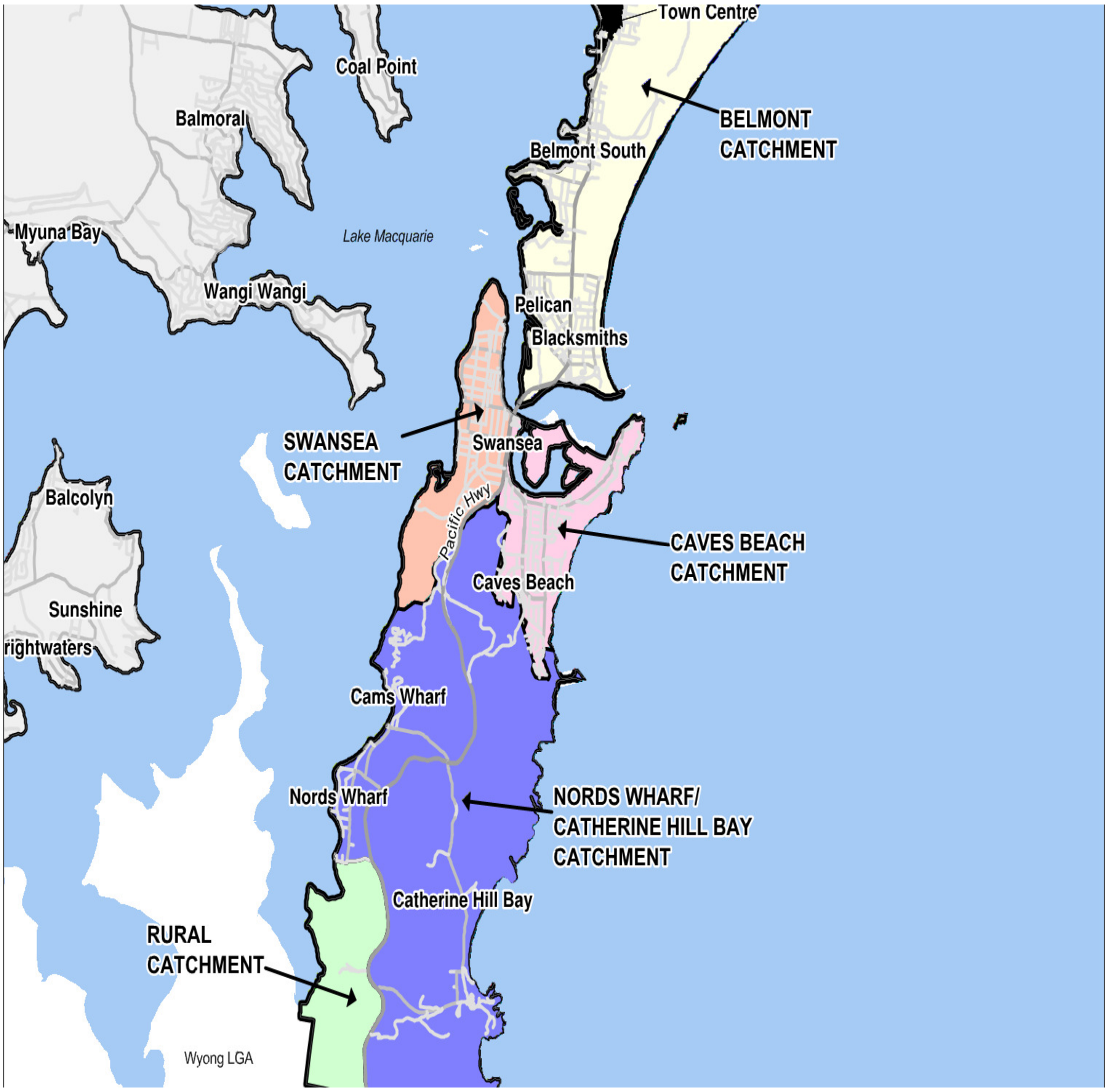

Figure 1-1 Belmont Development Contributions Catchment and sub-catchments

The sub-catchments are:

- Belmont Central - Belmont, Belmont North, Belmont South
- Swansea - Swansea, Blacksmiths, Marks Point, Pelican and Caves Beach
- Wallarah - Murrays Beach and Pinny Beach
- South - Catherine Hill Bay, Cams Wharf and Nords Wharf

1.1.4 Approach to the Study

The emphasis is on the provision of acceptable service levels on local infrastructure. The following approach to technical assessment of performance has been adopted.

- Agreement on Acceptable Performance Standards (Levels of Service, LoS)
- Agreement on Acceptable Minimum Service Levels (MSL's)
- Assessment of existing performance
- Upgrade of the existing situation (intersection or road segment) to meet the acceptable performance standard (where required)
- Assessment of the Agreed Growth Scenarios against the Base Facilities
- Assessment of the 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 minimum service levels.

1.2 Discussion on Performance Standards

1.2.1 Introduction

An integral component to planning infrastructure requires the adoption of specific performance standards with regard to the operation of the transport network. The adoption requires consideration of the Levels of Service (LoS) at intersections and road segments, 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.

1.2.2 Level of Service (LoS) Assumptions

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

For Council infrastructure (road segments and intersections), the Level of Service of D is the proposed maximum limit, which is considered the boundary between stable and unstable flow. It is considered appropriate to examine each differing segment of a road to assess its function, operating conditions and traffic carrying capacity, and each intersection to determine the worst movement LoS.

The ‘RMS Guide to Traffic Generating Developments’ is a guide that evaluates the impact of developments on traffic. It references the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (AGTM Part 3), which states that lane capacities may increase under ideal conditions to between 1,200 and 1,400 vehicles per hour. The analysis of critical road segments in the Glendale catchment has taken these limits and LoS criteria into consideration.

It should be noted that for roundabouts and sign controlled intersections (give way and stop signs), examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle will also be taken into account. An intersection where all movements are operating at a LoS A, except one, which is at LoS E, may not necessarily define the intersection LoS as E if that movement is minimal. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue occurred, or unless strategically it is the most appropriate intersection to upgrade. This would occur where an intersection offered a better outcome, and the alternative intersections (if currently operating outside the acceptable service levels) could have movements banned to improve the LoS and safety of those intersections.

1.2.3 Road Capacity Thresholds

As mentioned in the previous section, for urban arterial roads with interrupted flow the recommended traffic volumes per lane per hour are in the range of 1,200 to 1,400 vehicles.

There are many examples within the Hunter where such lane flows are observed, mostly on State roads. 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. Due to the costs associated with widening and upgrading roads, there is a consideration that a poor LoS (E) is an acceptable outcome, however where possible motorists will take the perceived fastest route, leading to local areas being infiltrated by traffic meant for the higher order roads.

AGTM Part 3 quotes typical mid-block capacities with interrupted flow and without intersection flaring and with interruptions from cross and turning traffic at minor intersections. The guide continues to explain this matter of capacity as follows:

"Peak period mid-block traffic volumes may increase to between 1,200 and 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, or banning turning into driveways*
- *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"*

In practical terms, it is 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. As not all of these conditions can be met on the investigated roads, the capacity of principle traffic carrying routes in the study area was taken as 1,300 vehicles per hour per lane.

With the limit agreed and set at 1,300 vehicles per hour, the existing peak hour traffic volumes on Council's sub-arterial roads were obtained from peak hour counts, and indexed by the anticipated percentage growth within the sub-catchment that the road is located. Where the predicted future traffic volume exceeds capacity, the year of failure is determined and the appropriate solution is determined. It is considered for most cases, where possible, increasing the number of trafficable lanes is appropriate. Where it is not possible to increase the number of lanes, restricting right turn movements into streets and having separate deceleration lanes for left turns may assist traffic flow. Table 1-1 from the RMS and Austroads Guides shows lane capacity thresholds under various scenarios.

Table 1-1 Lane Capacity Thresholds

Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: RMS, Austroads

1.2.4 Environmental Capacity of Local Roads

The RMS Guide 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
- Percentage of heavy vehicles
- Speed

Road

- Road reserves and carriageway width
- Number of traffic lanes
- Grade
- Road pavement condition

Locality

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

The Environmental Capacity of Council roads (local and collector roads) is most easily assessed by comparing the existing and predicted future traffic volume to Table 1-2, which is extracted from the RMS Guide and sourced from the AMCORD Guidelines.

Table 1-2 Environmental Capacity of Local Roads

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Source: RMS

For this study, the environmental capacity is not reviewed on sub-arterial roads.

1.2.5 Intersections

The capacity of an intersection impacts the operation of the roads it is intersects. Requirements for intersection upgrades are generally determined using traffic modelling tools such as SIDRA intersection modelling, with the limit for upgrade or change required where there is a LoS D or worse. SIDRA calculates the average delay to vehicles at an intersection and gives a LoS rating (Table 1-3), which indicates the relative performance of the intersection control.

The LoS is defined in terms of delay, which is a measure of a driver's delay, frustration and lost travel time. There are six LoS measures ranging from A (very low delay, very good operating conditions) to F (over-saturation, arrival rate exceeds capacity).

Table 1-3 Intersection Level of Service Criteria

Level of service	Average delay per vehicle (d) in seconds			
	Unsignalised intersections	Roundabouts(1)	Signalised intersections	All intersection types
	HCM 2000 and 2010; SIDRA INTERSECTION	SIDRA INTERSECTION Recommended values	HCM 2000 and 2010; SIDRA INTERSECTION	RTA (1993)
A	d ≤ 10	d ≤ 10	d ≤10	d ≤ 14.5
B	10 < d ≤ 15	10 < d ≤ 20	10 < d ≤ 20	14.5 < d ≤ 28.5
C	15 < d ≤ 25	20 < d ≤ 35	20 < d ≤ 35	28.5 < d ≤ 42.5
D	25 < d ≤ 35	35 < d ≤ 50	35 < d ≤ 55	42.5 < d ≤ 56.5
E	35 < d ≤ 50	50 < d ≤ 70	55 < d ≤ 80	56.5 < d ≤ 70.5
F	50 < d	70 < d	80 < d	70.5 < d

Source: Austroads

1.2.6 Public Transport Facilities

Development contributions can provide for the provision of public transport infrastructure to satisfy the demands generated by new development and increased population. This can include associated infrastructure such as bus or taxi infrastructure compliance, and will exclude the provision or operation of public transport.

In order to encourage the use of public transport, it will be necessary to provide a sustainable public transport service to the new areas of development. At least 80% of new development areas should be within 400 metres of a bus stop.

In terms of local public transport facilities, bus shelters will be provided at a rate of one per 1,000 additional persons in the Belmont catchment. It is anticipated that this Plan will provide 12 shelters in the higher growth areas of the catchment between 2015 and 2030. Alternative funding for shelters are available per annum in Council's Capital Works budget, and can be achieved from successful grant funding (for example the Country Passenger Transport Infrastructure Grants Scheme (CPTIGS)).

1.2.7 Cycling Facilities

Council has considered the overall needs of the Lake Macquarie area in its Cycling Strategy, which was adopted by Council in 2012. Cycling facilities are not considered as part of the transportation study, and are included in the Belmont Recreation and Land Plan.

1.2.8 Pedestrian Facilities

Council adopted the Footpath Strategy in 2013, applying over the 10 year period to 2023. All footpath facilities required as part of any development consent conditions will be assessed in accordance with the objectives of the Footpath Strategy and Council's guidelines.

Pedestrian footpath facilities have not been considered as part of the transportation study, and instead the shared paths have been evaluated and included in the Belmont Recreation and Land Plan.

1.3 Existing Transportation Situation

1.3.1 Introduction

Council's strategic estimate of population growth within the Belmont catchment estimates an additional 3,043 dwellings will be required over the 15-year period to 2030, increasing the population by 7,252 persons and the Peak Vehicle Traffic (PVT's) by 2,278 trips per peak hour throughout the catchment.

1.3.2 Roads

The existing road network comprises of a series of arterial, sub arterial, collector and local roads. The Council controlled roads are the subject of this report, and State roads are not considered.

There are no Council controlled arterial or sub-arterial roads within the catchment. There are several collector roads that travel through the residential catchments on either side of the State road network, which runs between the northern and southern limits of the catchment. The main collector road routes that make up the Belmont catchment road network include:

1. Bowman Street and Park Avenue through Swansea, Caves Beach and Swansea Heads;
2. Lake Road, Swansea;
3. Earnest Street, Belmont;
4. Marks Point Road, Marks Point;
5. Evans Street, Belmont;
6. Floraville Road, Belmont North.

1.3.3 Intersections

The following intersections were identified as having potential capacity limitations. They have been reviewed to assess the provision of adequate capacity for the infrastructure and development upgrades. Further details and results of the analysis are included in Section 4. No roads intersecting with State roads were included as part of the investigation.

1. Maude Street and Edgar Street, Belmont;
2. Josephson Street, Wood Street and Lake Road, Swansea;
3. Albert Street and Marks Street, Belmont;
4. Old Pacific Highway and Wood Street, Swansea;
5. Ernest Street and Maude Street, Belmont;
6. Ernest Street and George Street, Belmont;
7. Belmont Street and Josephson Street, Swansea.

1.3.4 Public Transport

The Belmont catchment is serviced by both Newcastle Buses and Busways. There are currently no bus interchanges located within the Belmont catchment. The bus routes that service the Belmont catchment are 99, 310, 313, 317, 318, 322, 349, 350 and 352.

1.4 Future Situation

1.4.1 Demographics

Council's Integrated Planning section has undertaken extensive demographic assessment into the future population characteristics that can be expected within the Belmont catchment. The increase in population can be converted into Peak Vehicle Trips (PVT's), which is used to determine the growth in traffic within the relevant sub-catchments and how this affects the roads and intersections.

1.4.2 Expected growth in Peak Vehicle Trips

Table 3-1 below shows the growth in PVT's within the Belmont Catchment from the current 14,728 trips to 17,006 trips by the year 2030.

Table 3-1 Peak Vehicle Trip (PVT's) increase per sub-catchment

Estimated projected PVT's in Belmont catchment sub-catchments 2015 to 2030				
Sub-catchment	**Existing (2015)**	**Projects PVT's**	**2030 estimate**	**Percentage Increase**
Belmont Central	7,181	778	7,959	10.84%
Swansea	6,995	559	7,555	7.99%
Wallarah	110	623	733	568.08%
South	442	317	759	71.70%
Total	14,728	2,278	17,006	15.46%

The RMS Guide to Traffic Generating Developments, with updated information from RMS Technical Direction TDT 2013/04a, provides estimated peak hour traffic generation of developments based on use. The rates from this guide are given in Table 3-2.

Table 3-2 Land Use Traffic Generation Rates

PVT Rates		
Residential	**Quantity**	**PVT**
Dwelling House / Lot	Per dwelling	0.85
Residential Accommodation with 1 bedroom / bedsit	Per dwelling	0.15
Residential Accommodation with 2 bedrooms	Per dwelling	0.30
Residential Accommodation with 3 or more bedrooms	Per dwelling	0.450
Seniors Housing	Per dwelling	0.40
Residential Care Facility	Per bed	0.15
Moveable Dwelling (Long-term)	Per site	0.40
Moveable Dwelling (Short-term)	Per site	0.40
Hostel/ Backpackers/ Boarding House/ Group Home/ Hospital	Per bed	0.40
Educational Establishment (residential component)	Per bed	0.40
Hotel or Motel Accommodation / Serviced Apartment	Per bed	0.40
Employment Generating		
Bed and Breakfast Accommodation	Per bed	0.40
Bulky Goods Premises	Per 100m² GLFA	2.70
Business Premises and Office Premises	Per 100m² GFA	1.20
Childcare Centre	Per Child	
Light Industry	Per 100m² GFA	0.78
Industry – Storage	Per 100m² GFA	0.50
Industry – Warehousing/Manufacturing	Per 100m² GFA	0.50
Medical Centre		

Retail Premises	Per 100m² GLFA	7.00
Supermarket	Per 100m² GLFA	12.30

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

1.4.3 Alternate Development Contribution Methods

The methods available for funding of local infrastructure have been amended to include:

- Section 94 development contributions
- Section 94 levy
- Voluntary Planning Agreements (VPA's).
- Section 94 developer contributions - the subject of this study

This study focuses on the calculation of Section 94 developer contributions, with other methods considered on a case-by-case basis.

1.4.4 Determining Nexus of Transport Facilities

For the purposes of this study, the determining nexus is the relationship between the expected types of development within an area and the demand for additional facilities generated. In terms of transport facilities, it is the relationship between the expected types of development and the demand for additional traffic and transport facilities generated.

1.4.5 Determining Apportionment

Intersections and road segments within the Belmont catchment have been investigated as part of Section 4, analysis. For intersections or road lengths that have been modelled and currently do not fail (LoS D or better), but fail prior to the horizon year of the study (2030), any upgrade will be required as a direct result of the future growth and therefore all costs should therefore be borne by these future developments.

For intersections or road lengths that have been modelled and currently represent a LoS of E or F, this is considered the point when alternative traffic arrangements should be considered. For this case, the cost of the infrastructure upgrade will be apportioned between the new development and the existing development. The 'existing development' apportionment will most likely be funded by Council. The 'new development' is funded through contribution collections, and is related to the anticipated increase in traffic volume over time.

Table 3-3 shows the apportionment for each facility proposed in the Belmont catchment.

Table 3-3 Table of apportionment between catchments and new or existing development

Intersection	Development	
	Existing	New
Maude Street and Edgar Street, Belmont	-	100 %
Josephson Street, Wood Street and Lake Road, Swansea	-	100 %
Albert Street and Mark Street, Belmont	-	100 %

Old Pacific Highway and Wood Street, Swansea	-	100 %
Ernest Street and Maude Street, Belmont	-	100 %
Ernest Street and George Street, Belmont	-	100 %
Belmont Street and Josephson Street, Swansea	-	100 %

1.4.6 Threshold Analysis

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

The threshold analysis was completed for the existing design year (2017) and the horizon year (2032). Sensitivity testing was also undertaken to determine the actual year, if applicable, where each intersection reaches a LoS E on any one leg. Further analysis was then undertaken for a projected time of ten years (for signals) or 20 years (for a roundabout) to determine the appropriate life of the intersection upgrade. An additional sensitivity test of 20% was loaded for significant infrastructure improvements to ensure that if traffic on the route increases above the anticipated growth anticipated, then the facility will be able to handle to an acceptable level.

1.5 Assessment of Future Traffic and Transport Requirements

1.5.1 Introduction

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

1.5.2 Roads

The analysis of mid-block capacities across the network has applied the LoS criteria and capacity thresholds identified and adopted in Section 1.2.2 and 1.2.3. The following process has been undertaken to determine the future traffic volumes per lane on a road segment to determine if upgrade is required:

1. Surveyed traffic volumes are indexed by percentage growth anticipated to be experienced by the sub-catchment.
2. Compare these volumes against agreed service level criteria as follows:
   i. As arterial and sub-arterial roads, using the mid-block capacities outlined in Section 1.2.3 of this report.
   ii. In residential areas, using the mid-block Environmental Capacity outlined in the RMS Guide to Traffic Generating Development, as discussed in Section 1.1.1 of this report.

1.5.3 Intersections

Intersection analysis has been undertaken for the anticipated growth on a range of intersections within the Belmont Contributions Catchment, refer to Section 1.1.1. The study has adopted the strategic development growth and applied the percentage growth to the surveyed traffic volumes at the intersections being analysed.

The intersections were analysed in the following way:

1. Existing situation analysis is considered as base
2. Add forecast development flows to existing
3. Confirm LoS
4. Apply upgrade where necessary to achieve acceptable LoS, and demonstrate options
5. Confirm acceptable LoS
6. Apply additional future time base factor to ensure viability
7. Apply sensitivity

The analysis in relation to points 4 and 5 above are iterated until a solution is achieved that delivers an acceptable LoS and an acceptable outcome for the road network.

1.5.4 Recommendation

Through the analysis of the selected intersections, none were identified as requiring upgrade due to the increase in development traffic.

1.5.5 Public Transport

Bus shelters:

The assessment of local public transport facilities has been undertaken. The rationale considered appropriate is as follows:

- Adopt rate of one shelter per 1,000 residents (or part thereof). This will be considered the Minimum Service Level (MSL) benchmark.
- In 2015, the population in the Belmont Contributions Catchment was 26,107 people.
- There are 39 shelters in the Belmont Contributions Catchment
- There is a current provision of 12 shelters above the MSL based on this information.
- Anticipated population increase over 15 years of 7,252 people, total population of 33,359 in 2030, which is an increase of 21.7%.
- At 1 shelter per 1,000 people, 34 shelters are required, and therefore no additional shelters will be required within the Belmont catchment to be funded by this Plan.

Other bus infrastructure:

The Disability Standards for Accessible Public Transport (DSAPT) 2002 require Council to have reached 90% compliance for accessible bus stops by 31 December 2017, and 100% compliance by 31 December 2022. The

Belmont Contributions Catchment has approximately 232 existing bus stops (not including hails and ride bus stops which are being replaced with formal bus stops over time). It is estimated that around 41 (17.7%) of these existing bus stops comply with the DSAPT requirements.

Council's current Disability Action Plan states the following regarding disability:

1. In June 2011, statistics provided by the RMS showed that Lake Macquarie had the highest number of Mobility Parking Scheme holders in NSW at 13,073.
2. Lake Macquarie has a slightly older population than the NSW average, with the area experiencing a "premature ageing" of its population. 34,846 people are aged 65+ years, which is 18% of the LGA's population. 24,953 people are aged 55-64 years, which is 13.2% of the LGA's population.
3. 11,572 people need assistance with core activities, which is 6% of the LGA's population (this covers mainly people with severe to profound disabilities).

It is estimated that currently 17% of Lake Macquarie residents are considered to have a disability where access is made difficult. The current service level provision of 41 compliant stops of the overall 232 stops is appropriate. As the population is projected to increase 17.2% over the next 15 years, then an additional 17.2% of the current service level is required to be upgraded. This results in an additional 7 stops requiring the minimum upgrade. The minimum upgrade is considered to be a concrete pad, seat, Tactile Ground Service Indicators and path connecting to a service such as a shop, school, or other facility. The list of upgrades is included in Section 3.2.

1.6 Proposed Works

This plan proposes no road or intersection upgrades for existing infrastructure as a result of development in this catchment for the next fifteen years.

1.7 Monitoring and Review

1.7.1 Review Requirements

The Legislation governing the application of s94 Contribution Plans require plans to apply to 'reasonable' timeframes, and 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.

1.7.2 Indexation

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

1.8 References

- Lake Macquarie Cycling Strategy 2012 to 2022
- Lake Macquarie Footpath Strategy 2013 to 2023
- Lake Macquarie City Council Development Control Plan 2014

- LMCC Section 94 Contributions Plan Citywide 2004
- RMS Guide to Traffic Generating Developments 2002 and update Technical Direction TDT 2013/04a

2 Analysis – Assessment of Traffic and Transportation requirements

The intersections evaluated in the Belmont Contributions catchment are listed in Table 4-1.

Table 4-1 Intersections investigated within the Belmont Contributions Catchment

	Location	Worst movement				Comments
		2017 LoS		2032 LoS		
		AM	PM	AM	PM	
1	Maude Street and Edgar Street, Belmont	A	A	A	A	No works required.
2	Josephson Street, Wood Street and Lake Road, Swansea	A	B	B	B	No works required.
3	Albert Street and Mark Street, Belmont	A	A	A	A	No works required.
4	Old Pacific Highway and Wood Street, Swansea	A	A	A	A	No works required.
5	Ernest Street and Maude Street, Belmont	A	A	A	A	No works required.
6	Ernest Street and George Street, Belmont	A	A	A	A	No works required.
7	Belmont Street and Josephson Street, Swansea	A	A	A	A	No works required.

3 Proposed Upgrades and Cost Estimates

No road or intersection upgrades are required as a result of development in this catchment over the next 15 years.

3.2 Belmont Catchment – Proposed Public Bus Infrastructure Upgrade

The bus stops (map below) within the Belmont Catchment that are to be upgraded to meet the Disability Standards for Accessible Public Transport (DSAPT) 2002 are as follows;

1. Croudace Bay Road, Belmont south of Lewers Street – western side.
2. Croudace Bay Road, Belmont south of Lewers Street – eastern side;
3. Pacific Highway, Pelican in front of Sunset Strip;
4. Pacific Highway, Pelican in front of Byrnes Reserve;
5. Pacific Highway, Belmont north of Beach Street – eastern side;
6. Pacific Highway, Belmont north of Alick Street – western side; and
7. Catherine Street, Swansea north of Lake Road – eastern side