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Figure 9.4

# Indicative Bus Routes and Expanded Walking Catchments

CALDERWOOD
URBAN DEVELOPMENT PROJECT

**Legend**

- Site Boundary
- Potential Bus Stops
- SBC Potential Bus Stops
- Potential District Bus Route
- Strategic Bus Corridor (SBC)
- District Route 400m Buffer
- Strategic Bus Corridor 800m Buffer

*68% of Developable Area within 800m of Strategic Bus Corridor Bus Stop Locations*

N
W E
S

**Scale 1:15 000 (at A3)**

Metres
0 250 500 750 1,000

Cardno

Map Produced by Cardno Wollongong
Date: 17 February 2010
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF: 110026-01_58021_StrategicBusCorridor.mxd 06

Aerial imagery supplied by AAM Hatch (2001)
Concept Base Plan from Delfin Lend Lease - February 2010

### 9.5.4 Service Frequency and Operating Hours

The service frequency and operating hours for the proposed network have been developed in recognition of the following factors:

- Frequent services are required to attract discretionary users and six services per hour is widely considered as the minimum frequency for a turn-up-and-go service.
- The existing levels of service provided in the Illawarra region have clearly failed to develop any significant public transport ridership.
- The Calderwood area is likely to be settled by families, whose children (including teenagers) will require public transport services to transport them to school and social, employment and recreation activities.
- There is a significant volume of commuters to Sydney from the Illawarra Region and consequently the bus network should cater for early morning and late evening journeys.
- The CUDP is located remote from existing night-time entertainment spots such as Wollongong CBD and as such late night outbound services are desirable on Friday and Saturday nights.

The proposed bus network level of service is provided in Table 9.4.

**Table 9.4 Proposed Bus Network Level of Service**

| Service | Route Classification | NSWTI Service Planning Guidelines | Proposed Service Level | Comments |
|---|---|---|---|---|
| Strategic Bus Corridor | Regional Route | **Weekdays**<br>▪ Pre Peak: 60min<br>▪ Peak: 30min<br>▪ Inter-peak: 30min<br>▪ Night: 60min | **Weekdays**<br>▪ Pre-peak: 30min (northbound services timed to meet Sydney trains at Dapto)<br>▪ Peaks: 10min<br>▪ Inter-peak: 10min<br>▪ Night: 30min from 8:30pmto 10:30pm, hourly until 11:30pm (operates hourly all night on Fridays) | Exceeds standards. Provides an attractive base level of service throughout the day linking large catchment area with major centres. |
| | | **Weekends**<br>▪ Saturday: 60min<br>▪ Sunday: 60min | **Weekends**<br>▪ Saturday: 10min (8:00am-7:00pm)<br>▪ Saturday evening: 30min until 10:30pm then hourly all night<br>▪<br>▪ Sunday: 30min daytime<br>▪ Sunday evening: 60min from 7:00pm to 10:30pm | Exceeds standards. Provides an attractive base level of service on Saturdays with late night transport option. Sunday service provides base level of service. |
| Local Route 1 | District Route | ▪ Peaks: 60min<br>▪ Inter Peak: 60min<br>▪ Saturday daytime: 60min<br>▪ Sunday daytime: 120 min | ▪ Peaks: 20min<br>▪ Inter Peak: 60min<br>▪ Saturday: 60min<br>▪ Sunday: 60min | Complies with standards. Exceeds standards during peak periods to facilitate easier transfers and multi-purpose trips at Calderwood Town Centre. |
| Local Route 2 | District Route | ▪ Peaks: 60min<br>▪ Inter Peak: 60min<br>▪ Saturday daytime: 60min<br>▪ Sunday daytime: 120 min | ▪ Peaks: 20min<br>▪ Inter Peak: 60min<br>▪ Saturday: 60min<br>▪ Sunday: 60min | Complies with standards. Exceeds standards during peak periods to facilitate easier transfers and multi-purpose trips at Calderwood Town Centre. |

**Measure 15: Service levels that meet and exceed NSWTI's *Outer Metropolitan Service Planning Guidelines***

The public transport network should be operated with service levels as outlined in Section 9.5.4, which meet and exceed NSWTI's guidelines.

### 9.5.5 Early Bus Service Provision

Bus services to the CUDP should be provided from the day that the first resident moves in. The staged development of Calderwood needs to take into account the opportunity to provide efficient bus services as the area develops. The road network should be designed and constructed such that initial bus services can enter and exit the Calderwood development via a different path at all times, avoiding unnecessary loops.

**Measure 16: Early bus service provision**

Work with State Government and local transport providers (Premier Illawarra) to enable provision of early bus services for the development. Bus services to the CUDP should as a minimum be available from date of first resident moving in, with staging of the development designed to facilitate efficient bus services at all times, subject to negotiations with NSWTI and premier Illawarra.

### 9.5.6 Branding and Publicity

It is important that this bus network with appropriate branding of service levels be made available to future purchasers. This will allow future Calderwood residents to choose a home location which factors in their choice of lifestyle, such as a greater dependence on the use of public transport. This is a self-fulfilling cycle, i.e. people with the desire to have a higher dependence on public transport can locate adjacent to the frequent services, improving the economic viability of these services and allowing the concentration of public transport resources in the area where it will be most utilised and most cost-effective.

NSWTI should be approached to participate in the branding process. This would provide the opportunity for a consistent brand to be developed for the different levels of service and applied across the Illawarra Region (e.g. Melbourne's 'Smart Bus' branding).

**Measure 17: Branding and Publicity**

A clear map identifying the proposed bus route hierarchy and indicative stop locations should be made available to purchasers. DLL should make representations to NSWTI and Premier Illawarra to urge the development of a branding strategy based on public transport levels of service.

### 9.5.7 Bus Stop Infrastructure

Bus stops within the CUDP will be provided with a base level of infrastructure. The facilities at each of the identified bus stops will be determined taking into account surrounding land uses, frequency of bus services, potential patronage and ranking of the stop. Bus stops will be provided with facilities which may include the following:

- Timetable.
- Network map.
- Seat.
- Shelter.
- Bicycle parking rail.

**Measure 18: Bus Stop Infrastructure**

A hierarchy of bus stops should be developed and implemented as outlined in Section 9.5.2 and 9.5.3.

### 9.5.8 Bus Priority Infrastructure

All signalised intersections on bus routes within the CUDP will be provided with bus priority where appropriate.

Calderwood town centre will be designed to provide buses with priority access through the centre, including the bus interchange. A detailed design will be developed with the aim of reducing the delay to through passengers as much as practical whilst still providing adequate penetration into the town centre.

Bus queue jumps are proposed on the external road network at the following intersections in order to maintain reliability and speed of bus services: These facilities will be required to be developed as traffic volumes on the existing road network increase:

- Princes Highway/Huntley Road – southbound.
- Huntley Road/Marshall Mount Road – northbound.
- Marshall Mount Road/Yallah Road – northbound and southbound.
- Illawarra Highway/Calderwood Road – eastbound and westbound.
- Illawarra Highway/Tongarra Road/Terry Street – eastbound and westbound.
- Princes Highway/Tongarra Road – eastbound.

Where possible these should be provided as part of intersection upgrades as they occur. Further improvements to bus priority are considered to be outside the scope of the CUDP and will be the responsibility of NSWTI, Premier Illawarra and the RTA.

**Measure 19: Bus Network Infrastructure**

Bus queue jumps should be provided on approach to all signalised intersections within the CUDP, where appropriate. Calderwood town centre should be designed to provide buses with priority access through the centre, including the bus interchange. Bus priority measures should be provided along the Strategic Bus Corridor, as identified in Section 9.5.2.

### 9.5.9 External Public Benefits

As a function of the 'network effect', improvements to the wider public transport network in the Illawarra Region are required to realise the full potential public transport patronage. Similarly, the network improvements proposed as a result of the CUDP will contribute to increasing the network effect of the existing public transport and deliver considerable public benefits to areas outside of the CUDP.

The considerable public benefits associated with the recommended public transport network include:

- A substantial increase in service frequency and operating hours compared to existing public transport services in the Wollongong – Figtree – Unanderra – Dapto corridor.

The provision of six services per hour along the Wollongong to Dapto corridor essentially creates a turn-up-and-go service for journeys along the corridor. Combined with existing services, an approximately five-minute headway is provided throughout the day for much of the corridor north of Figtree. This level of service will facilitate the future densification of development along this corridor and positively develop sustained public transport patronage growth in the Illawarra Region.

- A substantial increase in service frequency and operating hours compared to existing public transport services in the Albion Park – Oak Flats – Shellharbour CBD corridor.

Whilst the potential for densification in this corridor is limited by existing urban development, the substantial increase in frequency, operating hours and directness of route dramatically increases the attractiveness for journeys by public transport in this area. This corridor benefits from catering for both bus/rail interchange journeys (e.g. Albion Park to

Sydney or Sydney to Shellharbour CBD) as well as through journeys, allowing efficient concentration of resources with maximum patronage attraction.

- Improving the range of origins and destinations available to existing public transport users.

The provision of frequent services on the Dapto-Wollongong and Albion Park-Shellharbour CBD corridors will significantly reduce wait time and consequently improve the reliability of transfers and reduce door-to-door travel time. Consequently, this will bring a new range of trip origins and destinations within range of existing public transport users, widening the opportunities for economic participation for those who are unable to drive and who are dependent on public transport.

- Encouragement of mode shift in areas affected by the proposed network.

The proposed bus network will encourage mode shift towards public transport in areas external to the CUDP, such as Tullimbar, Albion Park, Shellharbour CBD, Dapto, Unanderra and Wollongong. This is mainly due to the vastly increased service frequency and directness of route provided by the proposed network. These increases reduce waiting time and consequently make public transport significantly more attractive.

- The loading of additional potential patronage onto the network to improve the utilisation of the existing services.

The loading of Calderwood journeys onto the public transport network will improve the utilisation and consequently the economic viability of relevant existing services, such as the Dapto to Wollongong and Albion Park to Shellharbour CBD services.

### 9.5.10 Network Development Opportunities

The proposed network adequately serves the CUDP, as well as providing considerable public benefits to other parts of the Illawarra Region. Opportunities also exist for others to build on this network in the future. Potential network improvements could include:

- Provide a bus interchange at Illawarra Highway/Broughton Avenue intersection to serve Tullimbar Village.
- Provide bus priority measures along Princes Highway north of Dapto.
- Improve Oak Flats bus/rail interchange to reduce the detour to through passengers.
- Relocate the Strategic Bus Corridor between Oak Flats interchange and Shellharbour CBD to increase potential patronage.

These suggestions are not endorsed by DLL but are provided to demonstrate that the proposed network is based on sound planning principles and can form the basis of a long term strategy for improvement of the public transport network in the Illawarra.

### 9.5.11 Public Transport Measures

Based on the preceding discussion, the following public transport measures are recommended for implementation as part of the CUDP.

**Table 9.5 Summary of Public Transport Measures**

| Measure Number | Measure | Timing | Comment |
|---|---|---|---|
| Measure 14 | Bus Network Provision | Implement SBC as soon as North South Arterial becomes available for traffic. Other routes to be implemented as road network is made available, with interim routings are necessary. | Coordination with NSWTI and Premier Illawarra will be required, including approximately 12 months lead time for the implementation of new routes. |
| Measure 15 | Service levels that meet and exceed NSWTI's *Outer Metropolitan Service Planning Guidelines* | As soon as North South Arterial becomes available. | Frequent services will need to be provided as early as possible to encourage public transport usage and discourage the purchase of additional vehicles. |
| Measure 16 | Early bus service provision | Immediately pre-habitation | Subject to discussions with state government and transport providers |
| Measure 17 | Branding and Publicity | Pre-development/on-goiing. | |
| Measure 18 | Bus Stop Infrastructure | Coincide with construction of relevant road network sections. | |
| Measure 19 | Bus Network Infrastructure | To coincide with intersection upgrades. | |

10

# Road Infrastructure Improvements

## 10.1 INTRODUCTION

Regardless of the initiatives to improve public transport and active transport use, the development of the CUDP as well as other regional developments will result in increased usage of the road system. Forecasts of increases in traffic flows have been assessed through detailed modelling as described in the preceding chapters. These forecasts form the basis of the assessment of road infrastructure requirements.

The road network impact assessment included the following strategy for road network improvement within the CUDP area of influence within the Shellharbour and Wollongong local government areas:

- Ensure the existing network operates at an optimum level by implementing the improvements recommended to address existing deficiencies. The justification for these improvements is identified in Sections 4.1.7 and 4.1.8.
- Ensure the future road network operates at an optimum level:
  - Prioritise improvements to identified intersections that will operate at performance levels below acceptable levels.
  - Provide additional link capacities to major roads that have been identified as deficient with the introduction of various planned developments over the coming years.

The assessment of the future road network upgrades was considered in two stages:

- Identify road network upgrades required to ameliorate the impact of base 2031 future development excluding Calderwood.
- Identify additional road network upgrades required to ameliorate the impact of full 2031 future development including Calderwood.

## 10.2 UPGRADES RECOMMENDED TO ADDRESS EXISTING DEFICIENCIES

Network improvements recommended to address existing deficiencies are discussed in Section 4.1.9. A summary of the proposed upgrades is reproduced in Table 10.1 and Table 10.2.

**Table 10.1 Proposed Road Network Improvements to Address Existing Deficiencies**

| Upgrade Number | Location | Proposed Network Improvement |
|---|---|---|
| **Road Link Upgrades** | | |
| Upgrade 1 | F6 Extension from Tallawarra Interchange to Tripoli Way Interchange | Construction of a four-lane divided carriageway to freeway standard |
| Upgrade 2 | F6 Extension from Tripoli Way Interchange to Croome Road Interchange | |
| Upgrade 3 | F6 Extension from Croome Road Interchange to Oak Flats Interchange | |

**Table 10.2 Proposed F6 Extension Complimentary Road Network Improvements**

| Upgrade Number | Location | Proposed Network Improvement |
|---|---|---|
| **Road Link Upgrades** | | |
| Upgrade 4 | F6 Extension Tripoli Way North Facing Ramps | Single lane ramps on all approaches with double roundabouts and single central structure |
| Upgrade 5 | F6 Extension Tripoli Way South Facing Ramps | |
| Upgrade 6 | Tripoli Way extension from Illawarra Highway (East) to F6 Extension | Construct divided two way-four lane carriageway with minimum 3.5m lane widths with kerb and gutter. |
| Upgrade 7 | Tripoli Way extension from F6 Extension to Tongarra Road | |
| Upgrade 8 | F6 Extension Croome Road Ramps | Single lane ramps |
| Upgrade 9 | F6 Extension Complimentary Measures | Install LATM treatments along Princes Highway between F6 extension limits |
| **Intersection Upgrades** | | |
| Upgrade 10 | Tripoli Way/Illawarra Highway | New signalised intersection |
| Upgrade 11 | Tripoli Way/Tongarra Road | New signalised intersection |

The location of the proposed upgrades is presented in Figure 10.1.

The F6 extension has been identified as required to address the existing network deficiencies. However, due to the extent of planning, design and construction time required to implement the F6 freeway extension, it was assumed in the modelling that this would be complete within the period 2017 to 2021. It was assumed that the complimentary road network improvements would be undertaken in conjunction with the provision of the F6 extension.

In the short to medium-term (5-10 years) the existing capacity and performance issues along the Princes Highway from the Southern Freeway to the Illawarra Highway will remain and will worsen over time with background traffic growth and regional growth. The RTA may need to consider interim works such as providing additional traffic capacity by the addition of a lane in either direction along the Princes Highway. This would include a new bridge structure across Marshall Mount Creek. These works are considered to be provisional and as such have not been included in the recommended works, as the preferred option is early provision of the F6 extension.

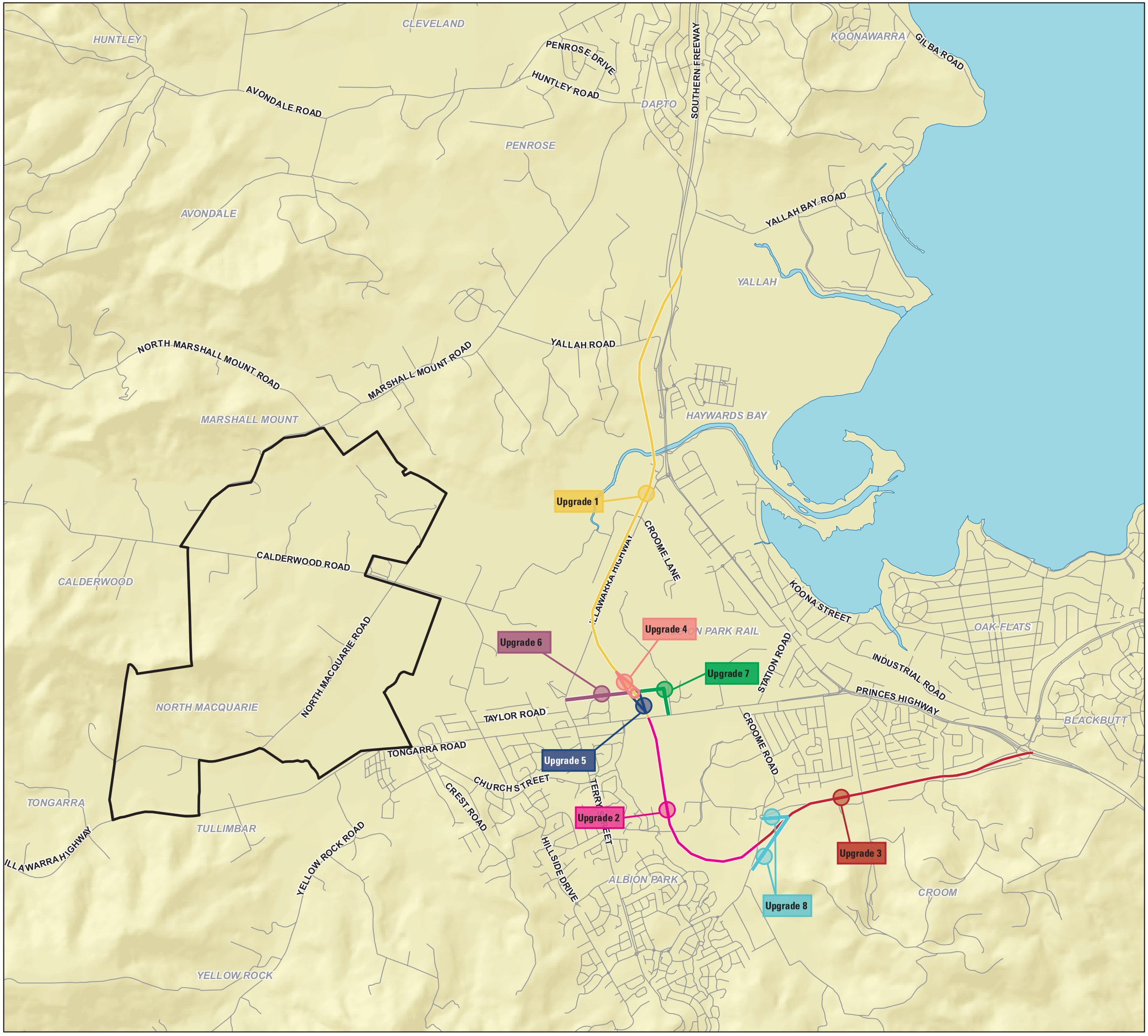


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Figure 10.1
**Road Network Upgrades: Existing Deficiencies**

CALDERWOOD
URBAN DEVELOPMENT PROJECT

**Legend**

- Site Boundary
- Local Roads (LPMA)
- Watercourse (LPMA)
- Lake Illawarra (LPMA)
- Existing Built Up Areas (LPMA)
- F6 Extension* from Tallawarra Interchange to Tripoli Way Interchange (Upgrade 1)
- F6 Extension* from Tripoli Way Interchange to Croome Road Interchange (Upgrade 2)
- F6 Extension* from Croome Road Interchange to Oak Flats Interchange (Upgrade 3)
- F6 Extension Tripoli Way North Facing Ramps (Upgrade 4)
- F6 Extension Tripoli Way South Facing Ramps (Upgrade 5)
- Tripoli Way extension from Illawarra Highway (East) to F6 Extension (Upgrade 6)
- Tripoli Way extension from F6 Extension to Tongarra Road (Upgrade 7)
- F6 Extension Croome Road Ramps (Upgrade 8)

*** Construction of a four-lane divided carriageway to freeway standard**

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Date: 03 December 2009
Coordinate System: Zone 56 MGA/GDA 94
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## 10.3 UPGRADES RECOMMENDED TO ADDRESS FUTURE BASE DEFICIENCIES

Network improvements recommended to address base future deficiencies (as a result of development to 2031 excluding the CUDP) are detailed in Table 10.3 (excluding the upgrades required as a result of existing network deficiencies).

**Table 10.3 Proposed Road Network Improvements to Address Future Base Deficiencies**

| Upgrade Number | Location | Proposed Network Improvement |
|---|---|---|
| **Road Link Upgrades** | | |
| Upgrade 12 | F6 northbound off-ramp at Tallawarra | Provide additional off-ramp lane and associated freeway diverge upgrades |
| Upgrade 13 | F6 southbound on-ramp at Tallawarra | Provide additional on-ramp lane and associated freeway merge upgrades |
| Upgrade 14 | Tripoli Way from Illawarra Highway/ Broughton Avenue to Calderwood Road | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. |
| Upgrade 15 | Tripoli Way from Calderwood Road to Illawarra Highway (East) | |
| Upgrade 16 | Tripoli Way Complimentary Measures | Install LATM treatments along Illawara Highway/ Tongarra Road between Tripoli Way limits |
| Upgrade 17 | Princes Highway from Mount Brown Road to Huntley Road | Provide additional northbound traffic lane |
| Upgrade 18 | Princes Highway from Mount Brown Road to Huntley Road | Provide additional southbound traffic lane |
| Upgrade 19 | Princes Hwy from Huntley Road to F6 Off-ramp | Provide additional northbound traffic lane |
| Upgrade 20 | Princes Hwy from Huntley Road to F6 Off-ramp | Provide additional southbound traffic lane |
| Upgrade 21 | Princes Highway from F6 Off – Yallah Bay Road | Provide additional southbound traffic lane |
| Upgrade 22 | Marshall Mount Road from CUDP North-South Route to Yallah Road | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders |
| Upgrade 23 | Marshall Mount Road from Yallah Road to TAFE | |
| Upgrade 24 | Marshall Mount Road from TAFE to Huntley Rd | |
| Upgrade 25 | Yallah Road from Marshall Mount Road to Haywards Bay Drive | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders |
| **Intersection Upgrades** | | |
| Upgrade 26 | Princes Highway/Huntley Road | Signalise existing priority controlled intersection |
| Upgrade 27 | Princes Highway/F6 southbound off-ramp | Signalise existing priority controlled intersection |
| Upgrade 28 | Princes Highway/Cormack Avenue | Signalise existing priority controlled intersection |
| Upgrade 29 | Illawarra Highway/Broughton Avenue | Additional northern leg for Calderwood collector road |
| Upgrade 30 | Tripoli Way/Calderwood Road | New roundabout intersection |
| Upgrade 31 | Illawarra Highway/Terry Street | Minor signal alterations |

More detailed descriptions of some of the intersection upgrade measures are provided in Appendix 10-A. Figure 10.2 shows cumulative set of upgrade works required to address the 2031 base road network deficiencies (without CUDP) including the upgrades required as a result of existing network deficiencies highlighted in Figure 10.1.

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Figure 10.2

# Road Network Upgrades: Futures Base Deficiencies

CALDERWOOD
URBAN DEVELOPMENT PROJECT

## Legend

- Lake Illawarra
- Site Boundary
- Existing Road Network (LPMA)
- F6 Extension from Tallawarra Interchange to Tripoli Way Interchange (Upgrade 1)
- F6 Extension from Tripoli Way Interchange to Croome Road Interchange (Upgrade 2)
- F6 Extension from Croome Road Interchange to Oak Flats Interchange (Upgrade 3)
- F6 Extension Tripoli Way North Facing Ramps (Upgrade 4)
- F6 Extension Tripoli Way South Facing Ramps (Upgrade 5)
- Tripoli Way extension from Illawarra Highway (East) to F6 Extension (Upgrade 6)
- Tripoli Way extension from F6 Extension to Tongarra Road (Upgrade 7)
- F6 Extension Croome Road Ramps (Upgrade 8)
- F6 Extension Complimentary Measures (Upgrade 9)
- F6 northbound off-ramp at Tallawarra (Upgrade 12)
- F6 southbound on-ramp at Tallawarra (Upgrade 13)
- Tripoli Way from Illawarra Highway/ Broughton Avenue to Calderwood Road (Upgrade 14)
- Tripoli Way from Calderwood Road to Illawarra Highway (East) (Upgrade 15)
- Tripoli Way Complimentary Measures (Upgrade 16)
- Princes Highway from Mount Brown Road to Huntley Road (Upgrade 17 & 18)
- Princes Hwy from Huntley Road to F6 Off-ramp (Upgrade 19 & 20)
- Princes Highway from F6 Off – Yallah Bay Road (Upgrade 21)
- Marshall Mount Road from CUDP North-South Route to Yallah Road(Upgrade 22)
- Marshall Mount Road from Yallah Road to TAFE (Upgrade 23)
- Marshall Mount Road from TAFE to Huntley Rd (Upgrade 24)
- Yallah Road from Marshall Mount Road to Haywards Bay Drive (Upgrade 25)

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## 10.4 UPGRADES RECOMMENDED TO ADDRESS FUTURE FULL CUDP DEVELOPMENT DEFICIENCIES

Additional network improvements recommended to address future full development deficiencies (as a result of development to 2031 including the CUDP) are presented in Table 10.4.

**Table 10.4 Proposed Road Network Improvements to Address Full CUDP Development Deficiencies**

| Upgrade Number | Location | Proposed Network Improvement |
|---|---|---|
| **Road Link Upgrades** | | |
| Upgrade 32 | Calderwood Road from CUDP to Tripoli Way | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders |
| Upgrade 33 | North-South Route – southern section | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. |
| Upgrade 34 | North-South Route – central section | |
| Upgrade 35 | North-South Route – northern section | |
| **Intersection Upgrades** | | |
| Upgrade 36 | Marshall Mount Road/Yallah Road | Upgrade existing T-intersection to a roundabout |
| Upgrade 37 | Illawarra Highway/Yellow Rock Road | Upgrade existing T-intersection to a four-arm roundabout |

Figure 10.3 shows the full set of upgrade works required to address the 2031 full development road network deficiencies including the base network deficiencies highlighted in Figure 10.2 and existing network deficiencies highlighted in Figure 10.1.

More detailed descriptions of some of the intersection upgrade measures are provided in Appendix 10-B.

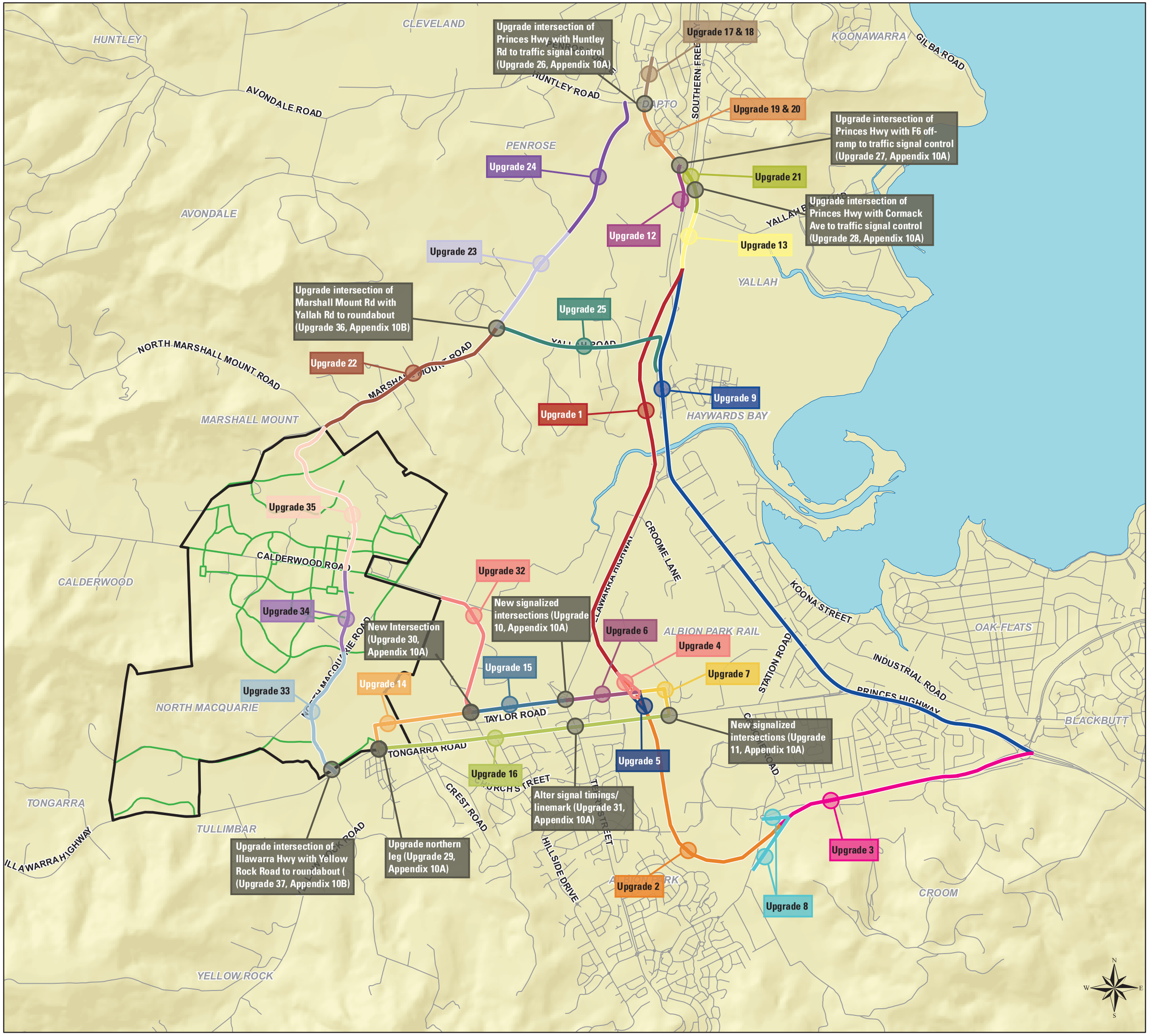


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Figure 10.3

## Road Network Upgrades: Full CUDP Development Deficiencies

CALDERWOOD
URBAN DEVELOPMENT PROJECT

### Legend

- Lake Illawarra
- Site Boundary
- Existing Road Network (LPMA)
- Indicative CUDP Internal Road Network
- F6 Extension from Tallawarra Interchange to Tripoli Way Interchange (Upgrade 1)
- F6 Extension from Tripoli Way Interchange to Croome Road Interchange (Upgrade 2)
- F6 Extension from Croome Road Interchange to Oak Flats Interchange (Upgrade 3)
- F6 Extension Tripoli Way North Facing Ramps (Upgrade 4)
- F6 Extension Tripoli Way South Facing Ramps (Upgrade 5)
- Tripoli Way extension from Illawarra Highway (East) to F6 Extension (Upgrade 6)
- Tripoli Way extension from F6 Extension to Tongarra Road (Upgrade 7)
- F6 Extension Croome Road Ramps (Upgrade 8)
- F6 Extension Complimentary Measures (Upgrade 9)
- F6 northbound off-ramp at Tallawarra (Upgrade 12)
- F6 southbound on-ramp at Tallawarra (Upgrade 13)
- Tripoli Way from Illawarra Highway/ Broughton Avenue to Calderwood Road (Upgrade 14)
- Tripoli Way from Calderwood Road to Illawarra Highway (East) (Upgrade 15)
- Tripoli Way Complimentary Measures (Upgrade 16)
- Princes Highway from Mount Brown Road to Huntley Road (Upgrade 17 & 18)
- Princes Hwy from Huntley Road to F6 Off-ramp (Upgrade 19 & 20)
- Princes Highway from F6 Off – Yallah Bay Road (Upgrade 21)
- Marshall Mount Road from CUDP North-South Route to Yallah Road(Upgrade 22)
- Marshall Mount Road from Yallah Road to TAFE (Upgrade 23)
- Marshall Mount Road from TAFE to Huntley Rd (Upgrade 24)
- Yallah Road from Marshall Mount Road to Haywards Bay Drive (Upgrade 25)
- Calderwood Road from CUDP to Tripoli Way (Upgrade 32)
- North-South Route – southern section (Upgrade 33)
- North-South Route – central section (Upgrade 34)
- North-South Route – northern section (Upgrade 35)

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# 11

# Apportionment of Transport Initiatives

## 11.1 INTRODUCTION

The purpose of the establishing the apportionment of trips on various road sections and through intersections is to assist in determining an appropriate contribution for all proposed network upgrades from individual development sites such as the Calderwood Urban Development Project.

It should be noted that the costs to rectify an existing deficiency are not to be borne by those parties developing land. The F6 extension has been identified as required to address an existing deficiency, furthermore the roadworks are strategic in nature. Accordingly the apportionment of trips on the F6 extension (refer to Table 10.1) have been excluded from the apportionment calculations.

However, the associated F6 extension complimentary road network improvements (such as freeway ramps, access roads and intersection improvements at access points) (refer to Table 10.2) have been included in the apportionment calculations. It could be argued that these works are required to provide access to the F6 extension and as such are works required to address existing deficiencies and therefore the costs should not be borne by those parties developing land. It is considered more appropriate and reasonable that these works should be funded (according to the appropriate apportionment) by the regional development in the areas.

## 11.2 TECHNICAL APPORTIONMENT

Apportionment procedures are technical calculations used to determine a total contribution for all proposed network upgrades from individual development sites such as the Calderwood Urban Development Project. Once the value of the total contribution has been estimated, the allocation of funds towards individual upgrade projects is expected to be rationalised. The selected improvements are considered elements of achieving a better balance and are deliverable.

The apportionment procedures to determine the contribution attributed to the CUDP are clarified further in Sections 11.2.1 and 11.2.2 below.

### 11.2.1 APPORTIONMENT METHOD - INTERSECTION UPGRADES

The apportionment method applied for intersection upgrades is:

- Model runs were undertaken for the assessment period of 2016, 2021 and 2026. If during any of these model runs an intersection was found to operate at an overall level of service of E or worse it was assumed that an upgrade would be undertaken and implemented within the next model year. For example if an intersection was found to overcapacity (LoS E) during 2016 it was assumed for modeling purposes that the proposed upgrade was implemented for 2021.
- All apportionment calculations are based on the modelled approach flows for the year in which the upgrade is implemented.
- The apportionment calculations for existing intersections requiring upgrades are as follows:
  - Determine total entering volumes at each intersection in 2009 during the AM and PM peak periods.
  - Determine total entering volumes at each intersection in the assessment year during the AM and PM peak periods.
  - Determine the increase in total entering traffic volumes from 2009 to the upgrade year during the AM and PM peak periods.
  - Determine which peak period is critical, i.e. has the greatest increase in total entering volumes.
  - For the critical peak period determine the proportion of additional trips associated with:
    - CUDP.
    - Other Regional growth areas.

- The apportionment calculations for new intersections are as follows:
  - Determine total entering volumes at each intersection in the year in which the upgrade is required during the AM and PM peak periods.
  - Determine which peak period is critical, i.e. has the greatest total entering volumes.
  - For the critical peak period determine the proportion of additional trips associated with:
    - CUDP.
    - Other Regional growth areas.
- Contribution from Government is based on any remaining traffic growth compared to existing flows. If the traffic passing through the intersection which is associated with development sites is greater than the net growth compared to existing flows, then the contribution from Government is zero.

Table 11.1 presents a summary of the apportionment calculated for intersection upgrades for CUDP, other development sites and the Government.

**Table 11.1 Technical Apportionment for Intersection Upgrades**

| Intersection | Funding Road Classification[8] | Timing | Cost Apportionment | | | |
|---|---|---|---|---|---|---|
| | | | CUDP | Other Dev. Sites | Govt. | Total |
| Tripoli Way/ Illawarra Highway (Upgrade 10) | State | 2017 - 2021 | 68% | 32% | 0% | 100% |
| Tripoli Way/ Tongarra Road (Upgrade 11) | State | 2017 - 2021 | 18% | 31% | 52% | 100% |
| Princes Highway/ Huntley Road (Upgrade 26) | Regional | 2017 - 2021 | 7% | 93% | 0% | 100% |
| Princes Highway/ F6 southbound off-ramp (Upgrade 27) | State | 2017 - 2021 | 4% | 96% | 0% | 100% |
| Princes Highway/ Cormack Avenue (Upgrade 28) | Regional | 2017 - 2021 | 3% | 97% | 0% | 100% |
| Illawarra Highway/ Broughton Avenue (Upgrade 29) | State | 2017 - 2021 | 57% | 33% | 10% | 100% |
| Tripoli Way/ Calderwood Road (Upgrade 30) | Local | 2027 - 2031 | 59% | 41% | 0% | 100% |
| Illawarra Highway/ Terry Street[9] (Upgrade 31) | State | 2017 - 2021 | - | - | - | - |

[8] Based on main road classification
[9] Minor works to upgrade signal timings and phases – no costs associated

| Intersection | Funding Road Classification[8] | Timing | Cost Apportionment | | | |
|---|---|---|---|---|---|---|
| | | | CUDP | Other Dev. Sites | Govt. | Total |
| Marshall Mount Road/ Yallah Road (Upgrade 36) | Local | 2027 - 2031 | 47% | 44% | 9% | 100% |
| Illawarra Highway/ Yellow Rock Road (Upgrade 37) | State | 2009 - 2016 | 66% | 22% | 12% | 100% |

### 11.2.2 APPORTIONMENT METHOD - ROAD UPGRADES

The method applied to determine the technical apportionment of costs for road widening is as follows:

- Model runs were undertaken for the assessment years of 2016, 2021 and 2026. If during any of these model runs a road section was found to operate at level of service of E or worse it was assumed that an upgrade would be undertaken and implemented within the model year. For example if a road link was overcapacity (LoS E) during 2016 it was assumed for modeling purposes that the proposed upgrade was implemented for 2021.
- All apportionment calculations are based on the flows for the assessment year in which the upgrade is implemented.
- Contribution from development sites is based on the direction of traffic during the peak periods that trigger the requirement for the upgrade. i.e. the highest one-way flow (morning or evening) in one direction is used for apportionment of the upgrade of the road in that direction.
- The apportionment calculations for road sections requiring upgrades are as follows:
  - Determine the peak traffic volume in each direction during the AM and PM peak periods for the upgrade year.
  - For the critical peak period determine the proportion of additional trips associated with:
    - CUDP.
    - Other Regional growth areas.
- Contribution from Government is based on any remaining traffic growth compared to existing flows for the directions used for the apportionment. If the traffic associated with development sites is greater than the net growth compared to existing flows, then the contribution from Government is zero.

Table 11.2 presents a summary of the technical apportionment calculated for CUDP, other agreed regional development growth sites, and the Government.

**Table 11.2 Technical Apportionment for Road Upgrades**

| Section of Road | Funding Road Classification | Timing | Cost Apportionment | | | |
|---|---|---|---|---|---|---|
| | | | CUDP | Other Dev. Sites | Govt. | Total |
| F6 Extension Tripoli Way North Facing Ramps (Upgrade 4) | State | 2017 - 2021 | 32% | 19% | 49% | 100% |
| F6 Extension Tripoli Way South Facing Ramps (Upgrade 5) | State | 2017 - 2021 | 19% | 14% | 68% | 100% |
| Tripoli Way from Illawarra Highway (East) to F6 Extension (Upgrade 6) | State | 2017 - 2021 | 36% | 19% | 45% | 100% |

| Section of Road | Funding Road Classification | Timing | Cost Apportionment | | | |
|---|---|---|---|---|---|---|
| | | | CUDP | Other Dev. Sites | Govt. | Total |
| Tripoli Way from F6 Extension to Tongarra Road (Upgrade 7) | State | 2017 - 2021 | 0% | 25% | 75% | 100% |
| F6 Extension Croome Road Ramps (Upgrade 8) | State | 2017 - 2021 | 0% | 3% | 97% | 100% |
| F6 Extension Complimentary Measures (Upgrade 9) | State | 2017 - 2021 | 7% | 20% | 74% | 100% |
| F6 northbound off-ramp at Tallawarra (Upgrade 12) | State | 2022 - 2026 | 4% | 94% | 2% | 100% |
| F6 southbound on-ramp at Tallawarra (Upgrade 13) | State | 2017 - 2021 | 3% | 97% | 0% | 100% |
| Tripoli Way from Illawarra Highway/ Broughton Avenue to Calderwood Road (Upgrade 14) | Local | 2017 - 2021 | 34% | 40% | 26% | 100% |
| Tripoli Way from Calderwood Road to Illawarra Highway (East) (Upgrade 15) | Local | 2017 - 2021 | 64% | 19% | 17% | 100% |
| Tripoli Way Complimentary Measures (Upgrade 16) | Local | 2017 - 2021 | 34% | 44% | 23% | 100% |
| Princes Highway from Mount Brown Road to Huntley Road (Northbound) (Upgrade 17) | Regional | 2017 - 2021 | 9% | 91% | 0% | 100% |
| Princes Highway from Mount Brown Road to Huntley Road (Southbound) (Upgrade 18) | Regional | 2017 - 2021 | 15% | 85% | 0% | 100% |
| Princes Highway from Huntley Road to F6 Off-ramp (Northbound) (Upgrade 19) | Regional | 2017 - 2021 | 4% | 96% | 0% | 100% |
| Princes Highway from Huntley Road to F6 Off-ramp (Southbound) (Upgrade 20) | Regional | 2017 - 2021 | 3% | 97% | 0% | 100% |
| Princes Highway from F6 Off-ramp to F6 On-ramp (Southbound) (Upgrade 21) | Regional | 2017 - 2021 | 3% | 97% | 0% | 100% |
| Marshall Mount Road from CUDP North-South Route to Yallah Road (Upgrade 22) | Local | 2017 - 2021 | 25% | 74% | 0% | 100% |
| Marshall Mount Road from Yallah Road to TAFE (Upgrade 23) | Local | 2017 - 2021 | 50% | 13% | 37% | 100% |
| Marshall Mount Road from TAFE to Huntley Road (Upgrade 24) | Local | 2017 - 2021 | 42% | 27% | 31% | 100% |
| Yallah Road from Marshall Mount Road to Haywards Bay Drive (Upgrade 25) | Local | 2017 - 2021 | 0% | 63% | 37% | 100% |
| Calderwood Road from CUDP to Tripoli Way (Upgrade 32) | Local | 2027-2031 | 98% | 2% | 0% | 100% |

| Section of Road | Funding Road Classification | Timing | Cost Apportionment | | | |
|---|---|---|---|---|---|---|
| | | | CUDP | Other Dev. Sites | Govt. | Total |
| North-South Route – southern section (Upgrade 33) | Local (on-site) | 2009 – 2016 | 84% | 12% | 4% | 100% |
| North-South Route – central section (Upgrade 34) | Local (on-site) | 2017 – 2021 | 66% | 19% | 14% | 100% |
| North-South Route – northern section (Upgrade 35) | Local (on-site) | 2022 - 2026 | 67% | 24% | 9% | 100% |

## 11.3 STAGING OF UPGRADES

The location of the specific upgrade works is shown in Figure 11.1.

### 11.3.1 TIMING OF UPGRADE WORKS

For modelling purposes the timing of proposed works is identified in Table 11.3. The majority of works are required post 2016 in the period between 2017 and 2021.

### 11.3.2 FUNDING MECHANISM

A funding mechanism by which works could be funded by the CUDP are proposed for each upgrade. These are categorised into three types of funding arrangement alternatives:

- Works in kind (WIK) – works undertaken by the CUDP in developing the site.
- State Infrastructure Contributions (SIC) – works funded by CUDP by contributions paid to the state government under the SIC.
- Voluntary Planning Agreements (VPA) – works funded by CUDP by contributions paid under a VPA.

The proposed funding mechanisms are also identified in Table 11.3.

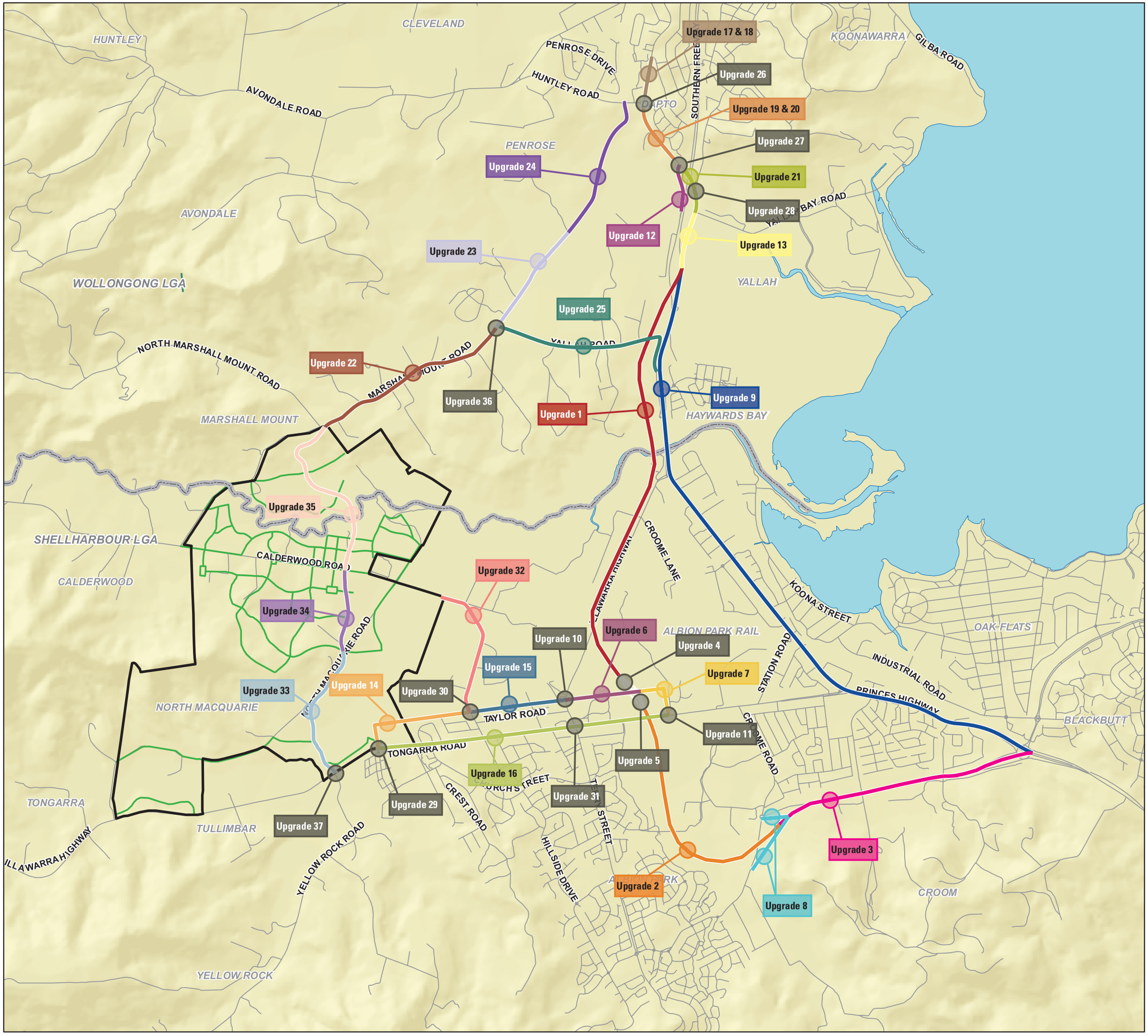
The option of variations to the works in kind, SIC or VPA items should be discussed with the proponent during VPA negotiations.

**Table 11.3 CUDP - Transport Infrastructure Funding Mechanism and Timing Arrangements**

| Upgrade Item | Location | Upgrade Description | Upgrade Type | Funding Road Classification ~[1] | Timing | Funding Mechanism |
|---|---|---|---|---|---|---|
| **Works Required without CUDP** | | | | | | |
| Upgrade 4 | F6 Extension Tripoli Way North Facing Ramps | Single lane ramps on all approaches a roundabout | Road | State | 2021 | SIC |
| Upgrade 5 | F6 Extension Tripoli Way South Facing Ramps | Single lane ramps on all approaches a roundabout | Road | State | 2021 | SIC |
| Upgrade 6 | Tripoli Way from Illawarra Highway (East) to F6 Extension | Construct divided two way-four lane carriageway with minimum 3.5m lane widths with kerb and gutter. | Road | State | 2021 | SIC |
| Upgrade 7 | Tripoli Way from F6 Extension to Tongarra Road | Construct divided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. | Road | State | 2021 | SIC |
| Upgrade 8 | F6 Extension Croome Road Ramps | Single lane ramps - east facing | Road | State | 2021 | SIC |
| Upgrade 9 | F6 Extension Complimentary Measures | Install LATM treatments along Princes Highway between F6 extension limits | Road | State | 2021 | SIC |
| Upgrade 10 | Tripoli Way/Illawarra Highway | New signalised intersection | Intersection | State | 2021 | VPA |
| Upgrade 11 | Tripoli Way/Tongarra Road | New signalised intersection | Intersection | State | 2021 | VPA |
| Upgrade 12 | F6 northbound off-ramp at Tallawarra | Provide additional off-ramp lane and associated freeway diverge upgrades | Road | State | 2026 | SIC |
| Upgrade 13 | F6 southbound on-ramp at Tallawarra | Provide additional on-ramp lane and associated freeway merge upgrades - includes bridge | Road | State | 2021 | SIC |
| Upgrade 14 | Tripoli Way from Illawarra Highway/ Broughton Avenue to Calderwood Road | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. | Road | Local | 2021 | VPA |
| Upgrade 15 | Tripoli Way from Calderwood Road to Illawarra Highway East | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. | Road | Local | 2021 | VPA |
| Upgrade 16 | Tripoli Way Complimentary Measures | Install LATM treatments along Illawara Highway/ Tongarra Road between Tripoli Way limits | Road | Local | 2021 | VPA |
| Upgrade 17 | Princes Highway from Mount Brown Road to Huntley Road | Provide additional northbound | Road | Regional | 2021 | VPA |
| Upgrade 18 | Princes Highway from Mount Brown Road to Huntley Road | Provide additional southboud traffic lane | Road | Regional | 2021 | VPA |
| Upgrade 19 | Princes Highway from Huntley Road to F6 Off-ramp | Provide additional northbound traffic lane | Road | Regional | 2021 | VPA |
| Upgrade 20 | Princes Highway from Huntley Road to F6 Off-ramp | Provide additional southboud traffic lane | Road | Regional | 2021 | VPA |
| Upgrade 21 | Princes Highway from F6 Off-ramp to Yallah Bay Drive | Provide additional southbound traffic lane | Road | Regional | 2021 | VPA |
| Upgrade 22 | Marshall Mount Road from CUDP North-South Route to Yallah Road | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders | Road | Local | 2021 | VPA |
| Upgrade 23 | Marshall Mount Road from Yallah Road to TAFE | 3.5m lane widths and sealed shoulders | Road | Local | 2021 | VPA |
| Upgrade 24 | Marshall Mount Road from TAFE to Huntley Road | 3.5m lane widths and sealed shoulders | Road | Local | 2021 | VPA |
| Upgrade 25 | Yallah Road from Marshall Mount Road to Haywards Bay Drive | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders | Road | Local | 2021 | N/A |
| Upgrade 26 | Princes Highway/Huntley Road | Signalise existing priority controlled intersection | Intersection | Regional | 2021 | VPA |
| Upgrade 27 | Princes Highway/F6 southbound off-ramp | Signalise existing priority controlled intersection | Intersection | State | 2021 | VPA |
| Upgrade 28 | Princes Highway/Cormack Avenue | Signalise existing priority controlled intersection | Intersection | Regional | 2021 | VPA |
| Upgrade 29 | Illawarra Highway/Broughton Avenue | Additional northern leg for Calderwood collector road | Intersection | State | 2021 | VPA |
| Upgrade 30 | Tripoli Way/Calderwood Road | New roundabout intersection | Intersection | Local | 2031 | VPA |
| Upgrade 31 | Illawarra Highway/Terry Street | Minor signal alterations | Intersection | State | 2021 | N/A |
| **Additional works required as a result of CUDP inclusion** | | | | | | |
| Upgrade 32 | Calderwood Road from CUDP to Tripoli Way | Upgrade road to undivided two way-two lane carriageway with minimum 3.5m lane widths and sealed shoulders | Road | Local | 2031 | WIK |
| Upgrade 33 | North-South Route – southern section | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter including 3 x RAB | Road | Local (on-site) | 2016 | WIK |
| Upgrade 34 | North-South Route – central section | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. Includes 2 x signals and 1 x RAB | Road | Local (on-site) | 2021 | WIK |
| Upgrade 35 | North-South Route – northern section | Construct undivided two way-two lane carriageway with minimum 3.5m lane widths with kerb and gutter. | Road | Local (on-site) | 2026 | WIK |
| Upgrade 36 | Marshall Mount Road/Yallah Road | Upgrade existing T-intersection to a roundabout | Intersection | Local | 2031 | VPA |
| Upgrade 37 | Illawarra Highway/Yellow Rock Road | Upgrade existing T-intersection to a roundabout | Intersection | State | 2016 | WIK |

**Notes:**

~[1] RTA 2009 Funding Classification




Delfin
Lend Lease

Figure 11.1

# Road Network Upgrades for Costing and Apportionment

CALDERWOOD
URBAN DEVELOPMENT PROJECT

**Legend**

- Site Boundary
- Local Government Area
- Lake Illawarra (LPMA)
- Existing Road Network (LPMA)
- Indicative CUDP Internal Road Network

N
W E
S

Cardno
Shaping the Future

Map Produced by Cardno Forbes Rigby Pty Ltd
Date: 16 December 2009
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF: 110026-01_58022_Road_Infrastructure_Improvements.mxd 01

# 12

# Summary and Conclusions

## 12.1 SUMMARY

The CUDP Transport Management and Accessibility Plan (TMAP) has been prepared in accordance with the procedures agreed for the Project. A summary of the TMAP on a chapter by chapter basis follows.

### 12.1.1 Chapter 1

Chapter 1 provides the necessary background information about the Project and the need for the TMAP. In particular Chapter 1 provides information on the following matters.

- This TMAP has been prepared to fulfil the Environmental Assessment Requirements issued by the Director General for the inclusion of the Calderwood site as a State Significant Site under SEPP Major Development, and for a Concept Plan approval for the development.
- The following State agencies and Councils have been involved in preparing the TMS:
  - Roads and Traffic Authority of NSW (RTA).
  - NSW Transport and Infrastructure (NSWTI) formerly known as the Ministry of Transport (MoT).
  - Wollongong City Council.
  - Shellharbour City Council.
- The TMAP objectives are provided.
- Key access and transport issues are identified.
- The area of influence for the transport assessment is defined.
- The structure of the TMAP report is explained.

### 12.1.2 Chapter 2

Chapter 2 provides the strategic and local context for the development of the CUDP.

- A number of New South Wales government policies, plans and strategies have been reviewed as part of the study process with important strategic policy aspects summarised as follows:
  - The NSW State Plan (2009) And Illawarra Local Action Plan (2009) identifies a target to increase public transport mode share to 15% for commuter journeys to Wollongong CBD.
  - The State Infrastructure Strategy is a rolling 10–year plan for infrastructure projects to support service delivery and provides information on the proposed Dapto Railway Station easy access upgrade.
  - Action for Air is the NSW Government's 25 year air quality management plan for the Greater Metropolitan Region of New South Wales, and identifies a range of actions to make transport greener.
  - Action for Bikes does not detail areas outside of the Sydney metropolitan area although its four point action plan includes the actions of improving the bike network, making it safer to cycle, improving personal and environmental health and raising community awareness.
  - The Integrated Land Use and Transport (ILUT) package (DUAP 2001) specifies the concentration of large trip generators/attractors near each other, the use of parking as a travel demand management tool and the adoption of a minimum density of 15 dwellings per hectare for new residential areas.
  - Planning Guidelines for Walking & Cycling (2004) identifies the provision of facilities and design outcomes that are supportive of walking and cycling.
  - Accessible Transport Action Plan (2007) is reviewed to ensure that the proposed CUDP and transport improvements recommended in this report meet accessibility requirements.
  - Review Of Bus Services In New South Wales – Final Report (Unsworth) (2004) has been reviewed to assist in the identification of an appropriate bus strategy for the CUDP.

- Documents reviewed and summarised as part of the Illawarra transport context include the following:
  - Illawarra Regional Strategy 2006 – 2031 focuses on regional transportation.
  - The Illawarra Urban Transport Opportunities Study (1997 DJA Maunsell for DUAP) identified that a 30% modal split to public transport during the commuter peak periods would be required to improve air quality and reduce the environmental impact of urban development.
  - Illawarra's Action For Transport (1999) strategy identified that modal split to public transport was approximately 4.1% in 1999.
  - The Moving Together (2004) document forms the current broad transport strategy covering the Illawarra region.
  - The West Dapto Release Area studies –
    - West Dapto Urban Development TMAP Stage 1 and Stage 2 Reports – Final Report (2006) identified that widening of the F6 north of Fowlers Road to six lanes and the provision of south-facing ramps at Kanahooka Road and widening of Princes Highway to four lanes across Mullet Creek would be required to support the development of West Dapto.
    - The West Dapto Release Area Draft Infrastructure Implementation Plan (2006) sets out the infrastructure which would be provided as part of the development of the West Dapto Release Area including the F6/Princes Highway north-facing ramps at Tallawarra interchange ($0.85 million – 25% share, with the remaining funded by the State Government and other sources).
    - The West Dapto TMAP Extension Study (2008) recognised the present low levels of public transport usage in the Dapto area, and identified that, if these levels were not markedly improved by 2026, the road network would come under considerable pressure.
    - The West Dapto Release Area Review: Planning and Infrastructure, Planning Report and Supporting Documentation (2008) identified a range of potential infrastructure upgrades for development of 8,000 dwellings at Calderwood including Widening of Illawarra Highway from Broughton Avenue to Terry Street to four lanes, widening of Tongarra Road from Terry Street to Princes Highway to four lanes, upgrade of two-lane road link from Calderwood Road to Yallah Road, upgrade of the Princes Highway/Yallah Road interchange to provide improved northbound on and off-ramps, possible earlier provision of an additional westbound lane across the Haywards Bay Drive overbridge if Calderwood development occurs before or in conjunction with the Yallah/Marshall Mount release and upgrading of the Albion Park railway station interchange.
    - West Dapto Initial Access Strategy Supporting Stages 1 and 2 – Report by Manager of Infrastructure to City of Wollongong Council (2009) report sets out the proposed initial access strategy to facilitate the development of Stages 1 and 2 of the West Dapto Release Area.
  - Albion Park Traffic Study (2006) investigated the need for the Albion Park West Connector, potential future use for a north-south link west of Albion Park., the need and timing for the Tripoli Way extension and the location of the future F6 interchange in Albion Park.
- Local government plans were reviewed to gain an insight into the local planning context for Calderwood and adjoining areas in order to shape the master planning process with the following summaries provided:
  - Shellharbour Rural LEP 2004 identifies that the portions of the development site within Shellharbour LGA are presently zoned 1(a) Agriculture and 7(n) Nature Conservation.
  - Wollongong LEP (1990) and Draft Wollongong (West Dapto) LEP 2009. LEP 1990 identifies that the portion of the CUDP site within Wollongong LGA is presently zoned non-urban, however under the draft 2009 LEP the zoning of this area has been deferred for future resolution.
  - WDRA Planning Documents:
    - Draft West Dapto DCP 2007 (Superseded) recommends enhancements to the public transport and cycling/walking networks, upgrades to Huntley Road, Avondale Road, Cleveland Road, and a new access link aligned north-south, located to the west of the railway.
    - Draft West Dapto Staging Plan (2006) (Superseded).
    - Draft West Dapto Master Plan Report (2006) (Superseded).
- An outlined is provided of the previous Calderwood planning context comprising five significant planning resolutions to define the current status of Calderwood.

### 12.1.3 Chapter 3

Chapter 3 discusses the CUDP proposal including:

- Sustainability initiatives and examples of successful travel demand management measures adopted at other DLL master planned communities are described.
- The urban design principles for CUDP are defined.
- A description of a concept plan for the proposed development.
- Identification of a breakdown of land uses within CUDP including:
  - Residential – approximately 4,800 dwellings including around 280 retirement living dwellings.
  - The Town Centre will include:
    - 25,000sqm of retail floor area.
    - 20,000sqm of mixed use employment land.
    - Community facilities.
    - Public Primary School and High School.
    - Residential mixed use dwellings.
  - A village centre including:
    - 5,000sqm of retail floor area.
    - 1,000sqm of mixed use employment land.
    - Residential mixed use dwellings.
  - An additional primary school is located in the Macquarie Village precinct.
- Description of an indicative road network layout and hierarchy developed for assessment of the transport impacts of the Concept Plan incorporating a north-south sub arterial road which connects to major and minor collector roads within the CUDP.
- Discussion on potential public transport provisions and bus routes within and the CUDP.
- A mode share target for the CUDP of 80% car based journeys to work by 2031 is identified. This represents a 10% modal shift away from private vehicle use and is a 'stretch target' that DLL, in collaboration with all agency stakeholders, is determined to achieve.
- A staging plan is described which outlines the incremental community growth at CUDP from 2012 to full development achieved at 2036.

### 12.1.4 Chapter 4

This chapter presents an overview of existing conditions and transport infrastructure surrounding the site.

- The road classification is described.
- Arterial and sub-arterial/regional roads within the study area are identified.
- Freight Routes are identified.
- The characteristics of the existing road network in terms of carriageway and intersection controls.
- Technical assessment criteria are explained
- Existing road network performance is analysed and existing deficiencies are identified.
- The key deficiency is identified as the Princes Highway between the Southern Freeway and Illawarra Highway.
- To rectify existing traffic conditions it is considered that the F6 Freeway extension be constructed including appropriate connections to the road network.
- Existing bus and rail services within the study area are identified.
- Existing and planned cycling facilities are identified.
- Existing travel patterns based on the 2006 JTW data are established.

### 12.1.5 Chapter 5

This chapter identifies future transport context.

- A three-step generation, distribution and assignment traffic model covering the whole of the Illawarra Region known as the WOLSH TRACKS model was the major tool for the assessment of the transport/land use interactions. The model was recalibrated and validated for 2009 for a smaller study area for assessment.
- Future growth in vehicle trips is determined by consideration of regional growth, infill growth, external growth and CUDP growth. The land use planning assumptions agreed by DoP and RTA for each of these growth areas is discussed.
- A future regional transport network (2031) is described comprising the following infrastructure elements:
  - F6 Freeway extension: Tallawarra to Oak Flats.
  - Tripoli Way (Albion Park Bypass).
  - North-facing ramps at Tallawarra interchange.
  - Upgrade of Marshall Mount Road and Yallah Road.
- The future CUDP road network is described and future travel demands are outlined.

### 12.1.6 Chapter 6

This chapter provides a description of the purpose of traffic modeling in the technical assessments and describes:

- The objective of the modelling and its outputs.
- The modeling methodology and the extent of the modeled area are described.
- The development of models to represent the years of 2009 (existing) and 2031 (full CUDP) are described.
- An outline is provided as to the modeling scenarios which include road network options, travel demand options, mode share options and scenario options.

### 12.1.7 Chapter 7

This chapter provides a summary of the evaluation undertaken to assess the road network operation. For base assessments (without CUDP) the following scenarios are reported:

- 2031 Base 'Do Nothing' BAU Scenario - overall under 2031 base future growth scenario with no road infrastructure upgrades it is shown that the road network will be under considerable strain with key road sections and intersections failing.
- 2031 Base 'Do Minimum' BAU Scenario - overall the introduction of the 'do minimum' upgrades provides significant benefits to the 2031 road network. However some issues will still need to be resolved. It was established that under the base 2031 scenario there is insufficient demand to warrant the Tallawarra north facing Freeway ramps.
- 2031 Base 'Do Minimum' Mode Shift Scenario - overall the consideration of a 10% mode shift on regional growth areas has little impact on the road network within the CUDP area of influence.
- 2031 Base 'Do Absolute Minimum' BAU Scenario - overall the introduction of the 'do absolute minimum' upgrades provides significant benefits to the 2031 road network. However some issues will still need to be resolved. It is identified that the following works are required for satisfactory 2031 base operation (without CUDP):
  - Duplication of Princes Highway (adding an additional traffic lane):
    - Northbound from Mount Brown Road to the F6 off-ramp.
    - Southbound from Mount Brown Road to the F6 on-ramp.
  - In conjunction with the above upgrade to traffic signal control of the following existing intersections:
    - Princes Highway / Huntley Road
    - Princes Highway / Southern Freeway northbound off slip
    - Princes Highway / Cormack Avenue

- Southern Freeway southbound on-slip road upgrade to two lanes and associated freeway merge widening works to accommodate.
- Southern Freeway northbound off-slip road upgrade to two lanes and associated freeway diverge widening works to accommodate.
- Marshall Mount and Yallah Road upgrades to satisfactory one lane width in either direction with sealed shoulders.

- 2031 Base 'Do Base Upgrades' Mode Shift Scenario - The 2031 future base road network will perform satisfactorily with the 'do base upgrade' package of measures.

For the with CUDP assessment the following are reported:

- 2031 CUDP 'Do Nothing' BAU Scenario - significant sections of the existing road network would be overcapacity during both modelled peak hour periods. The extent of the road network upgrades largely mirrors the improvements required under the base 'do absolute minimum' scenarios with north-south movement through the study area along Princes Highway and east-west movements along Tongarra Road severely restricted by overcapacity road sections. Additionally movement between Princes Highway and Dapto Town Centre would also be restricted by overcapacity road sections.
- 2031 CUDP 'Do Nothing' Mode Shift Scenario - A 10% modal transfer away from private vehicle usage with the proposed CUDP would have little impact upon the extent of existing road network operating at unsatisfactory peak hour LoS.
- 2031 CUDP 'Do Minimum' Mode Shift Scenario - The 'Do minimum' upgrades go some way to providing a reasonable level of overall satisfactory road network operation although a lack of capacity is still apparent particularly on the Princes Highway and its connections to the Southern Freeway.
- 2031 CUDP 'Do Absolute Minimum' Mode Shift Scenario - The removal of the north-facing ramps at Tallawarra interchange provides no detrimental impact to road network operation.
- 2031 Base 'Do Base Upgrades' Mode Shift Scenario - This scenario identified that the modelled road network (on a mid-block capacity basis) provided a road network capable of satisfactorily accommodating the 2031 future demand (including CUDP). Intersection analysis of this scenario led to the identification of a further intersection improvements at the Marshall Mount Road and Yallah Road
- 2031 CUDP 'Do Full Development Upgrades' Mode Shift Scenario - satisfactory network performance results with all road sections operating at LoS D (or close to) during the both 2031 modelled peak hour periods.

### 12.1.8 Chapter 8

This chapter identifies the non private motor vehicle (PMV) mode share.

### 12.1.9 Chapter 9

This chapter details the initiatives developed to reduce car dependency and achieve the target modal transfer of 10% away from car modes. A range of travel demand management type measures has been identified such as:

- Timely Provision of Facilities and Services
- Fibre to the Home (FttH) and National Broadband Network
- Website/Community Portal
- Resident Kits
- Promotions
- Public transport incentives
- Land Use/Transport Interaction
- Local Access Street Design
- Pedestrian and Cycle Hierarchy
- Wayfinding Signage
- Parking Strategies

- Safety Elements for Network
- Bicycle Parking

Furthermore, a detailed range of measures to promote public transport use are recommended. These include such measures as:

- Bus Network Provision
- Service levels that meet and exceed NSWTI's Outer Metropolitan Service Planning Guidelines
- Early Bus Service Provision
- Branding and Publicity
- Bus Stop Infrastructure
- Bus Network Infrastructure

### 12.1.10 Chapter 10

Road infrastructure improvements identified through the technical assessment are listed as follows:

- Existing deficiencies require the implementation of the F6 Freeway extension.
- Future network deficiencies as a result of identified future development (non CUDP) require the implementation of Tripoli Way, section of Princes Highway duplicated, Southern Freeway /Princes Highway south facing ramp upgrades, Marshall Mount Road and Yallah Road upgrades and other associated intersection upgrades.
- With the addition of CUDP intersection improvements on Illawarra Highway/Yellow Rock Road and Marshall Mount Drive/Yallah Road are required along with upgrade of Calderwood Road.

### 12.1.11 Chapter 11

This chapter provides the details of the proposed apportionment for intersection upgrades and road improvements.

- To identify the points at which road network upgrades were required model runs were undertaken for the assessment years of 2016, 2021 & 2026.
- If it was demonstrated during an assessment year that a LoS E or worse was identified the upgrade proposal was included as part of the next assessment year.
- Road network infrastructure apportionments were determined based upon the identification of when an upgrade was required and then based upon an apportionment of the sum of all inflows to the roundabout once constructed.
- The method determines apportionment for CUDP, other regional growth areas and government.
- Potential staging of upgrade works was identified.
- Potential funding mechanisms were established for these works being undertaken as works in kind or through planning agreements (State Infrastructure Contribution or Voluntary Planning Agreement).

## 12.2 REVIEW AGAINST DGR AND SSS REQUIREMENTS

The following sections provide a succinct description as to how the DGR and SSS requirements in relation to transport and accessibility have been considered.

### 12.2.1 DGR

DGR 1: Prepare a Traffic Management Plan that considers the traffic constraints of the site and surrounding locality.

- This report in its entirety constitutes a Traffic Management Plan and considers the traffic constraints of the site and surrounding locality.
- The extent of the impact on the surrounding locality to be assessed was agreed by the RTA and is detailed in Section 1.6.

DGR 2: Demonstrate a strategy for providing linkages to regional transport networks.

- Section 5.3 and 5.4 provides a detailed description of the proposed future road network, and the links to the existing external network are documented in detail in Appendix 5-E.
- Section 6 provides an overview of the modelling methodology undertaken to assess the regional transport impact of the cumulative growth in the region including CUDP. Section 7 details the impacts of this growth and recommended road network upgrades are provide in Section 10.
- Section 9.5 provides detailed measures to be undertaken to link the CUDP to the regional public transport network through the provision of new strategic and district bus services.

DGR 3: Demonstrate that there is the ability for sites located within the release area, but not within the proponent's control, to connect to infrastructure.

- The proposed internal road network is shown in Section 3.3.2 and is discussed in further detail in Section 5.4. Proposed linkages to external roads are documented in Appendix 5-E.
- These discussions highlight that all existing roads surrounding the site will remain connected to the proposed future road network thus allowing surrounding areas to connect to the transport infrastructure.

DGR 4: Detailed traffic modelling to determine level of infrastructure needed plus annual traffic growth/approved development (including Delmo Albion Park).

- Section 5 provides an overview of the proposed future transport context including proposed changes to the future road network. It also details the assumptions in relation to growth for proposed and approved developments such as Delmo Albion Park. The growth has then been considered in terms of traffic growth through the detailed transport modelling outlined in Section 6.
- Section 7 details the impacts of this growth on the surrounding road network. Recommended road network upgrades are provide in Section 10.

DGR 5: Timing/delivery/scope of local and regional road infrastructure.

- The scope of local and regional road upgrades is documented in Section 10.
- The proposed timing and delivery method for these infrastructure improvements is documented in Section 11.

DGR 6: Network modelling for impacts on Illawarra Highway, Princes Highway/Southern Freeway, Tongarra Road, Marshall Mount Road, Yallah Road and the future Southern Freeway corridor between Yallah and Oak Flats.

- The network modelling methodology is outlined in Section 6 with growth assumptions and base network upgrades outlined in Section 5.
- The impact on the abovementioned roads is documented in Section 7.

DGR 7: Intersection modelling, using SIDRA, for any junctions likely to be impacted by the development as identified in the network modelling, including AM and PM peaks, from the occupation of the Stage 1 development to the completion of the full development of the Concept Plan site.

- Intersection modelling was undertaken using SIDRA.
- SIDRA was used to assess the base existing road network performance at key agreed intersections.
- Each of these key intersections was analysed with SIDRA to consider impact of the full development of the Concept Plan site. This is documented in Section 7.

DGR 8: Identify infrastructure including road, pedestrian and cycling infrastructure to ameliorate the impacts of the development.

- The proposed provisions for cycleways and footpaths are detailed in the *Landscape and Open Space Master Plan (LOSM)* prepared by Environmental Partnerships.
- Specific measures for improvements to pedestrian and cycling infrastructure are outlined in Section 9.4.
- The road infrastructure improvements required to ameliorate the impacts of the development (including cumulative impacts of other regional developments) is detailed in Section 10.

DGR 9: Measures to promote public transport usage and reduce car usage.

- Measures to promote public transport and reduce car usage are outlined in terms of the urban design principles in Section 3.2.
- Further detail is also provided in the *LOSM* prepared by Environmental Partnerships.
- Examples of similar measures implemented at other DLL communities are detailed in Section 3.1.
- Specific measures for inclusion in CUDP are detailed in; Section 9.3 for travel demand management measures; Section 9.4 for specific active transport measures; and Section 9.5 for specific public transport measures.

DGR 10: Identify various Travel Demand Management (TDM) measures that will optimise the opportunity provided by the projects sites proximity to public transport.

- Refer to DGR 9 above.

DGR 11: Provide a road network plan identifying the proposed road hierarchy including cycleways, footpaths and car parking. Plan should identify public, private roads and typical cross sections and long sections.

- The road network plan identifying the proposed road hierarchy is provided in Section 3.3.2. The internal CUDP road network is discussed in further detail in Section 5.4.
- The proposed provision for cycleways and footpaths are detailed in the LOSM and is also considered in the *Development Control Strategy*.
- The principles of cycleway and footpath provision are outlined in the urban design principles in Section 3.2. Specific measures for inclusion in CUDP are detailed in Section 9.4.
- Proposed car parking provision is considered in the *Development Control Strategy*. However, specific car parking requirements for individual stages will be dealt with at the relevant application stage.
- The intention at this stage is that all roads will be public roads and hence no roads have been identified as private.
- Typical road carriageway cross sections are provided in the *Development Control Strategy.*
- Detailed road carriageway cross sections and long sections for individual stages will be dealt with at the relevant application stage.

DGR 12: Prepare a Transport Management and Accessibility Plan (TMAP) generally in accordance with the Ministry of Transport's Interim TMAP Guidelines, also including:

- This report outlines the TMAP and it has been prepared generally in accordance with the Ministry of Transport's Interim TMAP Guidelines.

a. Staging/Sequencing Plan.

- Staging of the proposed road network infrastructure upgrades is detailed in Section 11.3.

b. Measures to maximise public transport, walking and cycling.

- Refer to DGR 9 above.

c. Proposed pedestrian, cycling and public transport infrastructure.

- The proposed provisions for cycleways and footpaths are detailed in the *LOSM* and are also considered in the *Development Control Strategy*.
- General principles to promote public transport and reduce car usage are outlined in terms of the urban design principles in Section 3.2.
- Specific measures for inclusion in CUDP are detailed in Section 9.4 for specific active transport measures and Section 9.5 for specific public transport measures.

d. Measures to mitigate any potential impacts on pedestrian safety.

- Providing for pedestrian safety is a fundamental DLL principle, as discussed in the urban design principles in Section 3.2.
- The proposed provisions for cycleways and footpaths are detailed in the *LOSM*.
- Specific measures for pedestrians are outlined in Section 9.4.
- More detailed measures for individual stages will be dealt with at the relevant application stage.

### 12.2.2 SSS Requirements

SSS 1: The suitability of the site for any proposed land use taking into consideration environmental, social or economic factors, the principles of ecologically sustainable development and any relevant State or regional planning strategy.

- The suitability of the site in terms of transport and accessibility has been assessed in detail throughout this TMAP.
- A discussion on the relevant state and regional planning policies that have been considered throughout this TMAP study has been provided in Section 2.
- The consideration of regional growth is detailed in Section 5.2 and the future transport network is considered in Section 5.3.

SSS 2: The implications of any proposed land use for local and regional land use, infrastructure, service delivery and natural resource planning.

- The need for additional transport infrastructure is detailed in Section 10 for road network upgrades and in Section 9.5 for public transport improvements.

## 12.3 CONCLUSIONS

The CUDP TMAP has arrived at the following conclusions:

1) The CUDP TMAP has been prepared in accordance with the Director General's Requirements and State Significant Site Study Requirements for the project (as documented in Section 12.2).
2) Assessment of existing road network operation highlighted satisfactory operation except for the Princes Highway between Illawarra Highway and Southern Freeway. A remedy would be to construct the F6 Freeway extension in view of the planned longer term land use changes within the local area.
3) Regional planning assumptions have been agreed with the DoP and RTA.
4) The modelling base network and assumption for the WOLSH TRACKS model have been agreed with the DoP and RTA.
5) A detailed assessment of the future road network performance (2031) has been undertaken for with CUDP and without CUDP development included under a range of scenarios.
6) The cumulative impact of all regional growth to 2031, including the CUDP, in the area of influence will have a significant impact on the performance of the road network. As a result a significant package of road network upgrades (34) has been identified.
7) The CUDP site will trigger only minor additional works over and above those required to address the network deficiencies due to other non-CUDP growth.
8) Timeframes were identified for when the road upgrade measures will be required.
9) CUDP, if considered in isolation, does not specifically identify the need for the significant range of road upgrades required. However, to ensure a reasonable allocation of costs between all parties benefitting from the road network upgrades, an apportionment method to split costs between CUDP, other planned/proposed land uses and Government was undertaken based upon the year which the improvement is to be implemented.
10) The technical apportionments identified that the CUDP should contribute towards an overall package of road network upgrades.
11) Funding mechanisms to deliver the works have been proposed to incorporate WIK, SIC and VPA.
12) A package of deliverable sustainable transport measures (including public transport improvement measures) has been identified whose implementation would assist in achieving a 10% mode shift away from private motor vehicles.

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# Reference List

## 13.1 CUDP Documents

*Preliminary Assessment Report and Submission to Department of Planning on Delfin Lend Lease's Calderwood Urban Development Project*, Delfin Lend Lease, February 2009.

*Calderwood Release Area Justification Report*, Delfin Lend Lease, June 2008.

## 13.2 State Government Planning Documents

*Accessible Transport Action Plan for NSW Transport, Roads and Maritime Agencies December 2007 Update,* NSW Government, December 2007

*Action for Air 2006 Update,* Department of Environment and Climate Change, August 2006

*Action for Bikes: Bike Plan 2010*, Roads and Traffic Authority, September 1999

*Illawarra Regional Strategy 2006-2031*, Department of Planning, January 2007

*Moving Together – A Transport Strategy for Wollongong, Shellharbour and Kiama*, Illawarra Transport Taskforce Wollongong, January 2004

*NSW State Plan*, NSW Government, 2009 (including *Illawarra Local Action Plan*)

*Review of Bus Services in NSW Final Report*, NSW Government, February 2004

*State Infrastructure Strategy 2008/09-2017/18*, NSW Treasury, June 2008

## 13.3 Local Government Planning Documents

*Albion Park Traffic Study – Final Report,* Maunsell, May 2006

*City of Wollongong Bicycle Plan 2006-11*, Wollongong City Council, October 2005

*Shellharbour LGA Shared Use Path Strategy*, Shellharbour City Council, 2008

*Shellharbour Rural LEP 2004*

*West Dapto Development Control Plan 2007*

*West Dapto Initial Access Strategy Supporting Stages 1 & 2 – Report by Manager of Infrastructure to Wollongong City Council,* 20 October 2009

*West Dapto Release Area Draft Infrastructure Implementation Plan,* Wollongong City Council, May 2006

*West Dapto Release Area Review: Planning Report and supporting documentation*, Growth Centres Commission, November 2008

*West Dapto Staging Plan,* Wollongong City Council, March 2006

*West Dapto TMAP Extension Study*, Connell Wagner, October 2008

*West Dapto TMAP Stage 1 Report – Baseline Study*, Kellogg Brown & Root, 2004

*West Dapto TMAP Stage 2 Study– Final Report*, Kellogg Brown & Root, March 2007

*Wollongong Local Environmental Plan 1990*

## 13.4 Standards and Guidelines

*Draft Interim Guidelines on Transport Management and Accessibility Plans*, NSW Department of Transport/Roads and Traffic Authority, n.d.

*Integrating Land Use and Transport*, NSW Department of Urban Affairs and Planning, August 2001

*Planning Guidelines for Walking and Cycling*, NSW Government, December 2004

*Outer Metropolitan Service Planning Guidelines*, Ministry of Transport, September 2009

## 13.5 Other Documents

Towards a High-Bandwidth, Low-Carbon Future – Telecommunications-based Opportunities to Reduce Greenhouse Gas Emissions, Climate Risk Pty Ltd, n.d.

*RTA West Gosford Tele-centre Project*, Roads and Traffic Authority, 1998/99

# 14

# Glossary

## 14.1 ACRONYMS

| Acronym | Full Name |
|---|---|
| AADT | Annual Average Daily Traffic |
| ADT | Average Daily Traffic |
| AS | Australian Standards |
| AT | Active Transport |
| AVD | Average Vehicle Delay |
| BAU | Business as Usual |
| BNSW | Bicycle NSW |
| BSWC | Bus Stop Walking Catchment |
| BUG | Bicycle User Group |
| CBD | Central Business District |
| CCD | Census Collector District |
| CCTV | Closed Circuit Television |
| CPTED | Crime Prevention Through Environmental Design |
| CSD | Conventional Suburban Development |
| CUDP | Calderwood Urban Development Project |
| DA | Development Application (defined by EP&A Act) |
| DCP | Development Control Plan (defined by EP&A Act) |
| DECC | Department of Environment and Climate Change, NSW |
| DGR | Director General Requirements |
| DIPNR | Department of Infrastructure, Planning and Natural Resources *(former)* |
| DLL | Delfin Lend Lease |
| DoP | Department of Planning, NSW |
| DRT | Demand Responsive Transport |
| DS | Degree of Saturation |
| EA | Environmental Assessment |
| EAR | Environmental Assessment Report |
| EP&A | NSW Environmental Planning and Assessment Act 1979 |
| FttH | Fibre to the Home |
| GCC | Growth Centres Commission |
| GIS | Geographic Information system |
| HTS | Household Travel Survey |
| ILUT | *Integrated Land Use and Transport* |
| IRS | Illawarra Regional Strategy |
| JTW | Journey to Work |
| LATM | Local Area Traffic Management. |
| LEP | Local Environmental Plan (defined by EP&A Act) |

| Acronym | Full Name |
|---|---|
| LGA | Local Government Area |
| LoS | Level of Service |
| MoT | Ministry of Transport |
| NBN | National Broadband Network |
| NSW | New South Wales |
| NSWTI | New South Wales Transport & Infrastructure (formerly Ministry of Transport) |
| PMV | Private Motor Vehicle |
| PT | Public Transport |
| RTA | Roads and Traffic Authority, NSW |
| SD | Statistical Division |
| SEPP | State Environmental Planning Policy (defined by EP&A Act) |
| SLA | Statistical Local Area |
| SSS | State Significant Site |
| TAG | Transport Access Guide |
| TDC | Transport Data Centre (formerly Transport and Population Data Centre) |
| TND | Traditional Neighbourhood Design |
| TDM | Travel Demand Management |
| TMAP | Transport Management and Accessibility Plan |
| TOD | Transit Oriented Development |
| TP | Travel Plan |
| TZ | Travel Zone |
| VKT | Vehicle Kilometres Travelled |
| VMS | Variable Message Signs |
| VOT | Vehicle Operating Time |
| WDRA | West Dapto Release Area |
| WOLSH | Wollongong and Shellharbour (Model) |

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## 14.2 TERMS

| Term | Definition |
|---|---|
| Accessibility | The ease with which people can access or undertake a range of daily activities (employment, shopping, education, health, entertainment, social and other) in an area with a minimum of travel. The word 'accessible' is often more narrowly used to describe improvements to transport for people with physical and other disabilities. |
| Active Transport | Travel modes that involve physical activity - movement undertaken by active means, e.g. walking, cycling, jogging, skating, roller blading etc – including access to public transport. |
| Bicycle lane | A marked on-road lane provided for the movement of cyclists. |
| Bus lanes | Traffic lanes on a roadway that are for the use of buses. Bus lanes can be exclusively for buses and or shared with taxis and high occupancy vehicles. |
| Bus Priority | Traffic management measures where buses have priority over other vehicles in the traffic stream. These include bus-activated traffic signals and bus only lanes. |
| Census Collector District | The smallest geography for which Census data is available (comprise around 200 households each). |
| Connectivity | The degree to which streets join to each other. |
| Cycle Advisory Group | A group of stakeholder representatives that advises on improving cycling conditions. |
| Cycle Facility | Infrastructure that is cycling-specific, such as cycle lanes, paths and parking. |
| Cycle Lane | A lane marked on a road with a cycle symbol, which can only be used by cyclists. |
| Cycle Network Plan | A map of the primary cycle route network (see definition below) and a schedule of the cycle infrastructure projects required to develop it. |
| Cycle Path | An off-road path for cycles. It can be an exclusive cycle path, a shared-use path or a separated path (see definitions below). |
| Cycle Provision | The provision of satisfactory conditions for cycling, whether or not there are specific cycle facilities. |
| Cycle Planner/Champion | A road controlling authority employee who is responsible for the day-to-day planning and implementation of cycle provision in the authority's area. |
| Cycling Policy | A general course of action relating to cycling to be adopted by the government or an organisation. |
| (Cycling) Safety Audit | A formal process to identify factors that could either increase the risk of crashes involving cyclists, or increase the severity of cyclists' injuries in a crash. |
| Cycling Strategic Plan (or Bike Plan) | A document setting out cycling objectives and the actions required to achieve them including a cycle network plan. |
| Cycleway | An off-road cycling path – in almost all instances in NSW, these are shared walking and cycling paths. |
| Desire Lines | A straight line or fastest route between the origin and destination of a potential trip. |
| Developed Areas | Developed areas are considered to be those areas where more intensive land use activity occurs, such as urban residential areas, employment centres etc. |
| Directness | The degree to which streets lead directly, without deviation, to destinations such as accessible centres. |

| Term | Definition |
|---|---|
| Discretionary Users | Also known as 'choice users'. This term describes public transport users who choose to use public transport over other travel modes due to the attractiveness of the service. Generally these users would have access to a vehicle, a drivers license and ample parking at their destinations yet choose to use public transport. |
| Frontage | The interface between a land use and the street. |
| GIS | Geographic information system - a computer based mapping system. Other information can be linked to the geographic information using a data base. |
| Grade Separation | The vertical separation of opposing traffic movements by a bridge or underpass across a roadway, railway line etc. It contrasts with an at-grade intersection or level crossing. |
| Green Travel Plan | Workplace initiatives undertaken by the employer that are generally appropriate in large workplaces. The aim of these programs is to provide transport options and encouragement for employees in a workplace to encourage more sustainable travel. Travel plans can also be used for commercial, residential, educational and tourism developments. (Refer to 7-A for further information) |
| Level Of Service | The quality measure of how well conditions provide for road users. For motor traffic it mainly assesses interruptions to free traffic flow. For cycling, other factors such as perceived safety, comfort, and directness of route are more important. |
| LGA | Local government area i.e. municipality, shire or council. |
| Managing travel demand | Refers to measures which:<br>• minimise the need to travel and the length of trips, particularly by cars.<br>• Direct travel to the most sustainable mode of transport. |
| Mixed use centres | Centres containing a variety of services and activities such as businesses, shops, community services and entertainment facilities. |
| Mixed use development | Development that involves more than one activity, either vertically or horizontally, for example, housing located above shops. |
| Mode | The means of travel, for example, car, ferry and bicycle. |
| Multi-purpose trips | Trips taken for more than one purpose, for example, shopping is done on the way home from work. |
| Net community benefit | Development which has no detrimental effect on public or private investment in centres and which addresses the assessment criteria in this policy. |
| Nodes | Are centres of activity such as commercial centres, retail centres, education facilities and other centres of human activity. In the transport context they generally refer to centres that are trip origins and/or destinations. |
| Permeability | The degree to which streets allow pedestrians and cyclist to take short cuts and select multiple alternative route options. |
| Primary Cycle Network | The most used cycle facilities, designed mainly for trips across town, between suburbs and to major destinations such as schools, shopping centres etc. |
| Real Time Public Transport Information | Accurately predict the arrival time of buses at bus stops, based on knowing the location of the bus and then disseminating this information to the public. In other areas, this has involved the use of telemetry relaying a bus' position for analysis and arrival prediction. |
| Shared Use Path | A path provided for use by both cyclists and pedestrians. |
| Statistical Local Area | A statistical area 'usually' smaller than an LGA. |
| Strategic Bus Corridor | An identified corridor linking major trip attractors and generators on which frequent services and bus priority improvements are targeted. |

| Term | Definition |
|---|---|
| Street network | The pattern of street connections. |
| Surveillance | Overlooking of streets, laneways and open space areas by people using these spaces, or by people within adjacent dwellings, shops and other buildings. Surveillance generally improves security. |
| Sustainable transport | Has been defined as transportation that does not endanger public health or ecosystems and meets the needs for access consistent with sustainable use of renewable resources at below their rates of regeneration, and use of non-renewable resources at below the rates of development of renewable solutions (OECD, 1999) from Hans Westerman, ARRB conference, Dec. 2002. |
| Sustainable Transport Modes | Walking, cycling and public transport, as these modes are seen as important in achieving a more sustainable transport system in future. |
| Transit Oriented Development | Transit Oriented Development (TOD) is development that is built around and oriented towards public transport services. The design of transit-oriented development is such that development encourages and supports the use of public transport services and, as a corollary, development is supported and enhanced by the public transport services. TODs can be commercial, residential or a mixture of the two and are generally characterized by high to medium building development around a public transport node. |
| Transport Access Guide (TAG) | A Transport Access Guide presents ways to reach a site or venue using low-energy forms of transport such as public transport, walking or cycling. (Refer to 7-A for further information) |
| Travel Demand Management | Measures designed to minimise the need for travel as well as the length of trips, particularly by cars. TDM techniques can be broken into the following classifications:<br>• improved transport options.<br>• incentives to use alternative modes and reduce driving.<br>• parking and land use management.<br>• policy and institutional reforms. |
| TravelSmart | A generic name for Travel Demand Management programs designed to influence people's use of travel modes through travel behavior change. They are generally used to encourage greater use of walking, cycling and public transport. |
| Traffic Calming | A combination of measures (mostly changes to road environment) aimed at altering driver behavior (such as by reducing speed) and improving conditions for pedestrians/cyclists. |
| Trip generator | A land use that attracts people and so creates trips. This may be on a regular or irregular basis. Hospitals for example generate many trips on a regular basis, whilst events do so on an irregular basis. |
| Trip-generating development | Businesses and services that are frequently accessed by many people and create a demand for travel. |
| Vehicle kilometres Travelled (VKT) | A measure of the total distances of travel by cars, that is, the number of kilometres travelled by private car. |
| Walking Catchment | The distance which it can be expected that public transport users will walk to/from a public transport stop. For regular bus services this distance is generally accepted as 400 metres, however it has been observed to increase to over 1 kilometre for fast, frequent and direct public transport. |

Cardno
Shaping the Future

Calderwood Urban Development Project

# Concept Plan Transport Management and Accessibility Plan (TMAP)

**FINAL REPORT**

Prepared for Delfin Lend Lease
**February 2010**

Delfin
Lend Lease

**Volume iI**
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## DOCUMENT CONTROL

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| 5.0 | 18.02.2010 | Adrian Bateman<br>Anissa Levy | AB | Anissa Levy | AL |

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## Appendices

Appendix 1A

# Director General Requirements (DGR)

# Part 3A – Project Application
# Director-General's Requirements
**Section 75F of the *Environmental Planning and Assessment Act 1979***

| | |
|---|---|
| **Application No.** | MP 09_0082 (Concept Plan) and MP 09_00083 (Stage 1 Project Application) |
| **Project** | **Concept Plan and Stage 1 Project Application – Calderwood Urban Development Project** |
| **Site** | Land at Calderwood (refer to attached schedule) |
| **Proponent** | Delfin Lend Lease |
| **Date of Issue** | 10 June 2009<br>*(If the environmental assessment is not exhibited within 2 years after this date, the applicant must consult further with the Director-General in relation to the preparation of the environmental assessment.)* |
| **General Requirements** | The Environmental Assessment (EA) must include:<br>(1) An executive summary;<br>(2) A detailed description of the project including the:<br>(a) strategic justification for the project;<br>(b) alternatives considered; and<br>(c) various components and stages of the project in detail (and should include infrastructure staging);<br>(3) A consideration of the following with any variations to be justified:<br>(a) all relevant State Environmental Planning Policies,<br>(b) all applicable planning instruments, including relevant Council LEP and DCP instruments, and<br>(c) relevant legislation and policies, including the *Illawarra Regional Strategy.*<br>(4) A draft Statement of Commitments, outlining commitments to the project's management, mitigation and monitoring measures with a clear identification of who is responsible for these measures;<br>(5) A detailed conclusion justifying the project, taking into consideration the environmental impacts of the proposal, mitigation measures to address these impacts, the cumulative impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest;<br>(6) Identify the development contributions applicable to the site and, if relevant, and any public benefits to be provided with the development, and consider any relevant development contributions plans prepared to date;<br>(7) A signed statement from the author of the EA certifying that the information contained in the report is neither false nor misleading; and<br>(8) A report from a quantity surveyor identifying the correct capital investment value for the concept plan and the stage 1 project application. |
| **Key Assessment Requirements** | **Strategic Planning**<br>• Demonstrate consistency with the revised MDP boundary as discussed in the Illawarra Regional Strategy, and justification for any variation.<br>• Demonstrate that the site can be serviced independently of the West Dapto release area, and therefore will not significantly impact upon the provision of infrastructure for West Dapto.<br><br>**Urban Design**<br>• Undertake a site analysis that identifies the relevant natural and built environmental features. The site analysis should form the basis for justifying the configuration of the development of the land and the mix of land uses.<br>• Provide suggested new controls and urban design guidelines to regulate the development, including the subdivision pattern, lot sizes, development controls and management arrangements.<br>• Details of the proposed landscaping and open space areas. |

- View analysis, including artist's perspective and photomontages.
- Staging and timing of the development of the site.
- Linkages with existing and proposed urban development adjoining the site.
- Aircraft noise and aircraft safety issues due to the proximity of the Illawarra Regional Airport.

**Transport and Accessibility**

- Prepare a Traffic Management Plan that considers the traffic constraints of the site and surrounding locality.
- Demonstrate a strategy for providing linkages to regional transport networks.
- Demonstrate that there is the ability for sites located within the release area, but not within the proponent's control, to connect to infrastructure.
- Detailed traffic modelling to determine level of infrastructure needed plus annual traffic growth/approved development (including Delmo Albion Park).
- Timing/delivery/scope of local and regional road infrastructure.
- Network modelling for impacts on Illawarra Highway, Princes Highway/Southern Freeway, Tongarra Road, Marshall Mount Road, Yallah Road and the future Southern Freeway corroder between Yallah and Oak Flats.
- Intersection modelling using SIDRA for any junctions likely to be impacted by the development as identified in network modelling, including AM and PM peaks, from the occupation of the Stage 1 development to the completion of the full development of the Concept Plan site.
- Identify infrastructure including road, pedestrian and cycling infrastructure to ameliorate the impacts of the development.
- Measures to promote public transport usage and reduce car usage.
- Identify various Travel Demand Management (TDM) measures that will optimise the opportunity provided by the projects sites proximity to public transport.
- Provide a road network plan identifying the proposed road hierarchy including cycleways, footpaths and car parking. Plan should identify public, private roads and typical cross sections and long sections.
- Prepare a Transport Management and Accessibility Plan (TMAP) generally in accordance with the Ministry of Transport's *Interim TMAP Guidelines*, also including:
    - Staging/Sequencing Plan;
    - Measures to maximise public transport, walking and cycling;
    - Proposed pedestrian, cycling and public transport infrastructure, and;
    - Measures to mitigate any potential impacts on pedestrian safety.

**Biodiversity**

- Address the impact of the development on existing native flora and fauna and their habitats, including identified threatened species (eg. Illawarra Lowland Grassy Woodland, and *Lespedeza juncea* and *Chonzema parviflora* species), having regard to the Threatened Species Assessment Guidelines and recommend offset measures to avoid or mitigate impacts on threatened species and their habitat.
- Evaluate the ecological values of Johnsons Spur and Yallah-Calderwood Regional Habitat Corridor on this site for development (including any road upgrades).
- Identify the ecological attributes of the lands proposed for dedication and how the environmental land offsets scheme will mitigate the impacts of the development.
- Discuss the development of ecological corridors to link flora and fauna corridors both on and adjoining the site.

**Flooding**

- Assessment of any flood risk for the site should be conducted in accordance with the NSW Government's Flood Prone Land Policy as set out in the Floodplain Development Manual 2005.
- Flood Study Report for existing conditions is to be prepared to include hydrologic and hydraulic models, calibration against existing local flood records, downstream and upstream conditions, and floodplain characteristics.

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| | • Flood Risk Management Assessment Report for the development including estimation of Flood Planning Levels and Flood Planning Area, extent of flood prone and mapping, flood behaviour, flood risks up to the PMF, evacuation, and impacts of climate change.<br>• Consider Shellharbour Council's Floodplain Risk Management DCP and justify any departure.<br>• Consideration of upstream and downstream flows and impacts of development yet to be built.<br>• Assess geomorphic impacts on the watercourses and floodplain area affected by the proposal.<br><br>**Water Courses/Riparian Corridors**<br>• Detail protection of watercourses of riparian lands in relation to the following<br>  ○ The NSW State Rivers and Estuaries Policy;<br>  ○ The NSW Wetlands Management Policy;<br>  ○ The State Natural Resource Management Targets (particularly Targets 1 & 5);<br>  ○ Stream mapping including watercourses on the site, riparian corridors, APZs and proposed revegetation of riparian corridors.<br>• Surface Water and Groundwater assessment including any proposed surface water and groundwater extraction volumes, function and location of proposed storage/ponds, design, layout, pumping and storage capacities, and all associated earthworks and infrastructure works.<br>• Details on any water management structures/dams both existing and proposed including size and storage capacity.<br>• Identify groundwater issues including predicted highest groundwater table at the site, works likely to affect groundwater surfaces, and proposed extraction, prevention of groundwater pollution.<br>• Provide a scaled plan to detail and wetlands on or adjacent to the site, buffer setbacks, any Asset Protection Zones and the footprint of the proposed development.<br>• Assess any potential impact on surrounding waterways and wetlands in terms of water quality, aquatic ecosystems and riparian corridors. This should include but not be limited to:<br>  ○ Onsite pollution such as accidental spills and sewer overflows;<br>  ○ Risks such as weed invasion, encroachment and litter; and<br>  ○ Vegetated buffer zones.<br><br>**Drainage and Stormwater Management**<br>• The EA should address drainage and stormwater management issues, including: on site detention of stormwater; water sensitive urban design (WSUD); and drainage infrastructure.<br>• Consider Shellharbour Council's Stormwater Policy and Subdivision Code for stormwater design and infrastructure, and justify any departure.<br><br>**Ecologically Sustainable Development (ESD)**<br>• Detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development including water sensitive urban design measures, water re-use, energy efficiency, energy minimisation/generation, recycling, waste disposal and trip containment.<br><br>**Heritage**<br>• A heritage impact statement should be prepared in accordance with NSW Heritage Office guidelines. The statement should assess the impacts of the application on the area and any significant components of the site. The heritage significance of the area and any impacts the proposed development may have upon this significance is to be assessed. |

- The EA is to identify the nature and extent of impacts on any Aboriginal cultural heritage and address the requirements set out in the *draft "Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation"*.

**Bushfire Risk Assessment**

Provide an assessment against *Planning for Bush Fire Protection 2006*. The EA is to identify the ongoing management arrangements of any proposed APZs.

**Utilities Infrastructure**

- Prepare a utility and infrastructure servicing strategy detailing supply of water, sewerage, stormwater, gas, electricity and telephone services.
- Consideration should be given to technologies which may reduce the demand or need for servicing or provide for the supply of sustainable services.

**Social and Community**

- Demonstrate that the appropriate housing diversity and affordability are provided.
- Provide a social assessment of the project giving consideration to the range of possible social impacts and identify positive and negative social impacts of the project, including measures to ensure the development will integrate socially with local communities.
- Demand for social and community facilities and proposed S94 contributions.
- Details of open space and community facilities, ongoing maintenance, and arrangement for public use, especially as the site is in 2 local government areas.

**Agricultural land**

Address the impact of the development on primary production values and practices of adjoining rural areas and whether any impacts on regional significant areas of food production may result.

**Planning Agreements and/or Developer Contributions**

- The environmental assessment should address and provide the likely scope of planning agreement (should one be proposed) and/or developer contributions between the proponent, Council and other agencies for matters such as community, regional and local infrastructure.
- It should address demand, proposed services, local and regional services and cross boundary/LGA issues.

**STAGE 1 PROJECT APPLICATION**

**Site Preparation Works**

The EA should include the following:

- Detailed site survey
- Any likely geotechnical impacts and mitigation measures
- Groundwater details
- Erosion and sediment controls
- Any potential contamination on the site
- Cut and fill proposed and whether any fill is proposed to be imported or exported to/from the site

**Subdivision Works**

- Detailed subdivision layout, including covenants, easements and notations proposed for each land title.
- Detailed design of infrastructure including roads (including typical cross sections and long sections), drainage, open space, pedestrian and bicycle infrastructure.
- Staging plan.

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| **Test of Adequacy** | If the Director-General considers that the Environmental Assessment does not adequately address the Environmental Assessment Requirements, the Director-General may require the proponent to submit a revised Environmental Assessment to address the matters notified to the proponent.<br>The Director-General may modify these requirements by further notice to the proponent. |
| **Consultation Requirements** | During the preparation of the Environmental Assessment, you should undertake an appropriate level of consultation with the relevant Local or State government authorities, service providers, and other stakeholders.<br>In addition the EA is to include written evidence of consultation with the following:<br>**Agencies, other authorities and groups:**<br>• Wollongong City Council<br>• Shellharbour City Council<br>• NSW Roads and Traffic Authority<br>• NSW Ministry of Transport<br>• Department of Environment and Climate Change<br>• Department of Water and Energy<br>• Lake Illawarra Authority<br>• NSW Rural Fire Service<br>• Department of Primary Industries<br>• Department of Education and Training<br>• All relevant utility providers<br><br>A detailed community engagement strategy for the project |
| **Deemed Refusal Period** | 60 days (see Clause 8E of the *Environmental Planning and Assessment Regulation 2000).* |
| **Application Fee Information** | The application fee is based on Capital Investment Value (CIV) of the project as defined in the Major Projects SEPP and as set out in Clause 8H of the *Environmental Planning and Assessment Regulation 2000.* To verify the cost of works for this project you are requested to submit a **Quantity Surveyor's** report to detail the CIVs of the Concept Plan and the Stage 1 Project Application. |
| **Landowners Consent** | Landowner's consent is to be provided in accordance with the *Environmental Planning and Assessment Regulation 2000.* |

Appendix 1B

# Minister for Planning Declaration Letter

NSW GOVERNMENT
**Department of Planning**

22 April 2009

Contact: Michelle Cramsie
Phone: 9228 6534
Fax: 9228 6570
Email: michelle.cramsie@planning.nsw.gov.au

Our ref: MP 09-0082 & MP 09-0083

Mr Bill Mitchell
Project Director – Calderwood Valley
Delfin Lend Lease
Ropes Crossing Boulevarde
ROPES CROSSING NSW 2760

Dear Mr Mitchell,

**Calderwood Urban Release Area – Concept Plan, Stage 1 Project Application and Proposed State Significant Site Listing**

I write in response to the letter of 6 February 2009 from Mr Simon Basheer concerning the above project.

I am pleased to advise you that on 16 April 2009, pursuant to Clause 6 of the Major Projects SEPP, the Minister for Planning formed the opinion that the proposed development constitutes a Major Project and also authorised the submission of a Concept Plan for the site. In doing so the Minister also formed the opinion that a State significant site (SSS) study be undertaken to determine whether to list the site a State Significant site in Schedule 3 of the *State Environmental Planning Policy (Major Projects) 2005*. Please find attached the SSS study requirements (Appendix 1).

As discussed, we intend to hold a planning focus meeting with Council and agencies to assist in the preparation of Director General's Environmental Assessment Requirements. In order to progress this matter please provide eight (8) hard copies of the preliminary assessment report prepared by Delfin Lend Lease dated February 2009, and any other additional information that may assist stakeholders to identify the key issues which may be included in the DGRs.

Should you have any questions please do not hesitate to contact Michelle Cramsie on 9228 6534 or by email at michelle.cramsie@ planning.nsw.gov.au

Yours sincerely

Michael File
**Director, Strategic Assessments**

**Scope of study to be undertaken to determine whether the Calderwood Urban Development Project should be inserted in Schedule 3 to the *State Environmental Planning Policy (Major Projects) 2005***

The following issues will be considered and assessed as part of the study to be undertaken pursuant to clause 8 of the *State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP) to determine whether the site should be included as a State significant site in Schedule 3 to the SEPP:

(a) the State or regional planning significance of the site (having regard to the Department of Planning's *Guideline for State Significant Sites under the Major Projects SEPP*);

(b) the suitability of the site for any proposed land use taking into consideration environmental, social or economic factors, the principles of ecologically sustainable development and any relevant State or regional planning strategy;

(c) the implications of any proposed land use for local and regional land use, infrastructure, service delivery and natural resource planning;

(d) those parts of the site which should be subject to Part 4 of the *Environmental Planning and Assessment Act 1979* with Council as consent authority;

(e) the development controls for the site that should be included in Schedule 3 of the Major Projects SEPP generally in accordance with the provisions of the *Standard Instrument (Local Environmental Plans) Order 2006* and;

(f) the means by which local and regional developer contributions should be secured in respect of the site.

(g) ecological characteristics such as critical habitat and threatened species.

(h) appropriate arrangements for the dedication of land to council for public open space purposes.

Appendix 1C

# Minutes of Agency Consultation

**CALDERWOOD URBAN DEVELOPMENT PROJECT** (FR110026)
**SUMMARY RECORD OF AGENCY CONSULTATION/WCC**

| | | |
|---|---|---|
| Date: | Monday 2 November 2009 – 10.30am<br>At Wollongong City Council | |
| Project team member / firm | Bill Mitchell (BM) – Calderwood Project Director – Delfin Lend Lease<br>Martin Wells (MW) – Infrastructure Engineer – Cardno<br>Anissa Levy (AL) – Transport and Accessibility Engineer – Cardno | |
| Organisation | Wollongong City Council | |
| Name of Contact: | Ted Collins (TC) | Andrew Byers (AB) |
| Position in Organisation: | Traffic Unit Manager<br>Strategy and Planning Branch<br>Infrastructure Division | Traffic & Transportation Engineer |
| Contact details | Ph 02 4251 0664<br>Mb 0419 236 124<br>Fax 02 4225 1138 | |

Form of Consultation **Face to face** Phone call Email

| | |
|---|---|
| Issues Outcomes Discussed | **1. Bill Mitchell**<br>a. Presented background on DLL projects in NSW<br><br>*TC: WCC not in position to comment at the moment but will listen.* |
| | **2. Bill Mitchell**<br>a. Discussed background and context of Calderwood project (refer Briefing Note tabled at meeting)<br>b. Noted documents, timeframes, status. (refer Briefing Note)<br>c. Consultation is consistent with other agency consultations. Most consultation completed except: RTA, MoT, Telstra, DPI, SCC (traffic, water, community), WCC (water)<br><br>*TC: Asked if plans had progressed beyond schematic?*<br>*BM: Noted that the Master Planning being done new. Iterative process* |
| | **3. Anissa Levy**<br>a. Noted that no formal previous correspondence with the WCC had taken place<br>b. Acknowledged that WCC had provided 2006 and 2026 WOLSH Tracks Models via the RTA<br>c. for facilitating provision of the 2006 and 2026 WOLSH Tracks Models |
| | **4. Anissa Levy**<br>a. Provided a review of the base year modelling<br>b. DGRs requested strategic modelling, it was agreed to use TRACKS<br>c. Utilising the WCC 2006 WOLSH TRACKS model to develop the Calderwood 2009 model<br>d. Traffic assessment would be carried out with the area of influence (refer to Briefing Note attachment)<br>e. Review Calibration of the model<br>f. Carry out an existing deficiency analysis based on model output and new junction counts |

**5. Anissa Levy & Bill Mitchell**

a. Principles of Integrated Land Use & Transport Planning
b. Urban design principles, community designed for more than just car
c. Early provision infrastructure to influence behaviour e.g. bus services, walking and cycling paths, retail and education facilities
d. Negotiations will commence soon with MoT and bus operators
e. Ropes Crossing has 25km cycleways with linkages to the village centre
f. Woolworths/Coles at early stages and built with 5 star green rating
g. From July 2010 the National Broadband Network (NBN) requirements will be for Fibre to the Premises (FTTP).
h. Other travel demand management measures such as householder packs, travel guides, community support
i. Mode share targets are to be set

*TC: Asked if measures will form part of the TMAP?*
*AL: Cardno will work with DLL to establish cycle paths, safer routes to schools initiatives, buses etc for TMAP therefore justification for mode share. Next step establish mode share targets*
*AL: Asked if the MST for was assumed to be 15%?*
*TC: No defined target. Just modelling various scenarios. Heading between 15-20%*
*TC: Targets difficult to establish and that it would be good to demonstrate track record.*
*BM: Residents only there between 1 &2 years and difficult to establish MS at this stage esp. with construction related traffic.*
*TC: It would be worthwhile interviewing Ropes Crossing residents for mode split information. Luke Preston from SCC did his undergraduate thesis on trip generation*
*BM: Noted that the empirical evidence was in the sales.*

**6. Anissa Levy**

a. Provided an overview of the 2031 TRACK modelling
b. 2031 selected as this is full development for this site
c. An assumed set of major road network upgrades were assumed to be required (refer to Briefing Note attachment)
d. Review of potential growth as a result of development in the region was assumed to be as per map and table provided (refer to Briefing Note attachment)
e. Outside of the above areas, growth was assumed to be as per the 2026 model, extrapolated to 2031.
f. Presented an indicative map showing the Calderwood North/South Link (refer to Briefing Note attachment) connecting at Yellow Rock Road in the south

*TC: Marshall Mt Road of particular interest to WCC*
*AL: Noted that the internal road link – still being debated but likely to be high level sub-arterial road*

**7. Anissa Levy**

a. Outlined the process to assess the traffic impact
b. Identify potential road network deficiencies
c. Develop package of mitigation measures
d. Test package of mitigation measures
e. Determine staging of mitigation measures

*AL: Noted that interim models will be developed for staging*

**8. Martin Wells**

a. Provided an overview of funding for infrastructure provision, including cost apportionment and VPA versus a SIC

*TC: Noted that there is a need to model other loads (Balance of Calderwood) to get apportionment*

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| Actions Arising | 1. Minutes to be distributed (AL) |

**CALDERWOOD URBAN DEVELOPMENT PROJECT** (FR110026)
**SUMMARY RECORD OF AGENCY CONSULTATION/ RTA**

| | |
|---|---|
| Date: | Monday 2 November 2009 - 12.00pm<br>at DoP Offices, Wollongong |
| Project team member / firm | Bill Mitchell (BM) – Calderwood Project Director – Delfin Lend Lease<br>Martin Wells (MW) – Infrastructure Engineer – Cardno<br>Anissa Levy (AL) – Transport and Accessibility Engineer – Cardno |
| Organisation | NSW Roads and Traffic Authority |
| Name of Contact: | Chris Millett (CM) |
| Position in Organisation: | Manager, Land Use Development<br>Southern Region |
| Other Participants: | Simon Bennett (SB), DoP<br>Michelle Cramsie (MC), DoP<br>Linda Davis (LD), DoP |
| Contact details | Ph 02 4251 0664<br>Mb 0419 236 124<br>Fax 02 4225 1138 |

Form of Consultation **Face to face** Phone call Email

| | |
|---|---|
| Issues Outcomes Discussed | **1. Bill Mitchell**<br>a. Presented background on DLL projects in NSW |
| | **2. Bill Mitchell**<br>a. Discussed background and context of Calderwood project (refer Briefing Note tabled at meeting)<br>b. Noted documents, timeframes, status. (refer Briefing Note)<br>c. Consultation is consistent with other agency consultations. Most consultation completed except: MoT, Telstra, DPI, SCC (traffic, water, community), WCC (water)<br><br>*LD: Enquired about the % developable land*<br>*BM: Still as per Pg 22 of the justification report (not much changed).* |
| | **3. Anissa Levy**<br>a. Noted that previous correspondence with the RTA had taken place<br>b. Thanked RTA for facilitating provision of the 2006 and 2026 WOLSH Tracks Models<br><br>*CM: Noted that the RTA models were still not sufficiently advanced for use in this project*<br>*AL: Cardno work has taken account of this – see below.* |
| | **4. Anissa Levy**<br>a. Provided a review of the base year TRACK modelling<br>b. Utilising the WCC 2006 WOLSH TRACKS model to develop the Calderwood 2009 model<br>c. Traffic assessment would be carried out with the area of influence (refer to Briefing Note attachment)<br>d. Review Calibration of the model<br>e. Carry out an existing deficiency analysis based on model output and new junction counts |

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| BM | **5. Anissa Levy & Bill Mitchell**<br>a. Principles of Integrated Land Use & Transport Planning<br>b. Urban design principles<br>c. Early provision infrastructure to influence behaviour e.g. bus services, walking and cycling paths, retail and education facilities. For example:<br>i. Ropes Crossing has 25km cycleways with linkages to the village centre<br>ii. Woolworths/Coles at early stages and built with 5 star green rating<br>d. From July 2010 the National Broadband Network (NBN) requirements will be for Fibre to the Premises (FTTP).<br>e. Other travel demand management measures such as householder packs, travel guides, community support<br>f. Mode share targets are to be set<br><br>*LD: Enquired what the mode share targets would be*<br>*AL: Advised they would be conservative with a 10% mode shift to achieve a 15% mode share to non-car based transport.*<br>*CM: Noted that the RTA would like to see information from other developments in relation to mode share*<br>*BM: Ropes Crossing has introduced measures to deliver a 80:20 to 70:30 MS. Difficult to establish actual rates due to construction/thru traffic/other issues such as timeframe*<br>*CM: RTA agrees on the principles.*<br>*SB: Asked if empirical evidence was available*<br>*LD: Suggested Ropes Crossing could be an example*<br>*BM: Asked if others such as WDRA had been required to provide empirical data?*<br>*LD: Suggested a combined approach where a conservative MST was used for considering impacts on roads, and 'aspirational' targets be used when considering other measures*<br>*MW: Noted this had impact on affordability – and may overprovided for some or all mode types*<br>*AL: Design for future mode shift with consideration of aspirational items*<br>*BM: Noted DLL would provide empirical evidence of putting mode share items in place*<br>*CM: Noted that the RTA encourage mode share initiatives* |
| | **6. Anissa Levy**<br>a. Provided an overview of the 2031 TRACK modelling<br>b. 2031 selected as this is full development for this site<br>c. An assumed set of major road network upgrades were assumed to be required (refer to Briefing Note attachment)<br>d. Review of potential growth as a result of development in the region was assumed to be as per map and table provided (refer to Briefing Note attachment)<br>e. Outside of the above areas, growth was assumed to be as per the 2026 model, extrapolated to 2031.<br>f. Presented an indicative map showing the Calderwood North/South Link (refer to Briefing Note attachment) connecting at Yellow Rock Road in the south<br><br>*CM: Asked if Marshall Mt Rd was being included*<br>*AL: Indicated it was* |
| | **7. Anissa Levy**<br>a. Outlined the process to assess the traffic impact<br>b. Identify potential road network deficiencies<br>c. Develop package of mitigation measures<br>d. Test package of mitigation measures<br>e. Determine staging of mitigation measures<br><br>*MW: Asked RTA to comment on the methodology as we can't afford to change assumptions in Feb 2010*<br>*CM: Noted that the process seems logical, but would need to discuss with Nick Boyd and provide feedback in a week.*<br>*AL: Asked the RTA to also comment on area of influence*<br>*CM: Noted it seemed reasonable – to confirm in 1 week.*<br>*AL: Noted that interim models will be developed for staging* |

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| | **8. Martin Wells**<br>a. Provided an overview of funding for infrastructure provision, including cost apportionment and VPA versus a SIC<br><br>*MW: Noted that there would be consideration of VPA vs. SIC and asked after the progress of the regional SIC.*<br>*CM: Noted that the proposed upgrade roadworks (by Cardno), dotted lines on the map, were indicative of SIC (except Tripoli Way).*<br>*BM: Asked if there was a timeframe for the SIC?*<br>*LD: Difficult to commit as it had to get Cabinet approval. Noted that it will relate to local infrastructure contribution*<br>*SB: Advised that it was likely to have a number by the Pre-lodgement meeting. Noted that VPA or works in kind (WIK) would be considered. Benchmark against SIC*<br>*BM: Asked if principles of Nexus had been applied*<br>*LD: Yes, nexus had been applied*<br>*BM: Asked if the deliverability of other projects had been considered?*<br>*LD: DoP had to make some assumptions*<br>*CM: RTA will provide comment on planning assumptions made by DLL/Cardno in 1 week.*<br>*AL: Need to draw line in the sand and not re-model if RTA later considers some development may not happen*<br>*CM: Acknowledge that the RTA also needs to draw line in the sand. Comfortable looking at numbers of developments proposed. Proportional contribution from developers to be considered.*<br>*AL: More discussion to occur when looking at staging.*<br>*BM: DLL vs VPA/ RTA SIC. What if RTA spends SIC elsewhere - WIK and $ contribution with payment schedule. DLL prefer WIK where it benefits DLL customers*<br>*CM: RTA's spend would have to be reasonable*<br>*LD: Had written SIC for WDRA - now need to re-write, based on GCC framework*<br>*BM: How can we insulate against change of scope?*<br>*CM: RTA list of indicative projects. High level. Contribution will be set at outset*<br>*MW: Asked if the SIC will be exhibited*<br>*LD: Yes will require Public Exhibition*<br>*BM: If SIC had been developed as per the Planning circular, nexus and WIK would be considered and provide a level playing field*<br>*CM: Noted that the preparation of Calderwood impact should consider impact on proposed roads.* |
| | **9. Anissa Levy**<br>a. Presented an indicative map showing the Calderwood North/South Link (refer to Briefing Note attachment) connecting at Yellow Rock Road in the south<br><br>*CM: Asked if there would be a potential connection to F6 extension.*<br>*AL: Noted, not at this stage* |
| Actions Arising | 1. RTA to provide comment on the methodology and area of influence within 1 week (CM)<br>2. DLL to provide information on TDM measures implemented at other projects (BM)<br>3. Minutes to be distributed (AL) |

**CALDERWOOD URBAN DEVELOPMENT PROJECT** (FR110026)
**SUMMARY RECORD OF AGENCY CONSULTATION/ MOT**

| | |
|---|---|
| Date: | Thursday 5 November 2009 - 2.00pm<br>at MoT Offices, Elizabeth Street, Sydney |
| Project team member / firm | Bill Mitchell (BM) – Calderwood Project Director – Delfin Lend Lease<br>Tamara Rasmussen (TR) - Development Manager - Community and Education - Delfin Lend Lease<br>Martin Wells (MW) – Infrastructure Engineer – Cardno<br>Anissa Levy (AL) – Transport and Accessibility Engineer – Cardno |
| Organisation | Ministry of Transport |
| Name of Contact: | David Hartmann (DH) |
| Position in Organisation: | A/Transport Planning Manager<br>Centre for Transport Planning and Product Development<br>NSW Transport & Infrastructure |
| Contact details | Ph 02 4251 0664<br>Mb 0419 236 124<br>Fax 02 4225 1138 |

Form of Consultation **Face to face** Phone call Email

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|---|---|
| Issues Outcomes Discussed | **1. Bill Mitchell**<br>a. Presented background on DLL projects in NSW<br><br>*DH: Advised the following:*<br>*- MoT has been contacted by DoP, RTA & SCC*<br>*- MoT will be different in March due to re-structure*<br>*- MoT has no view on the project as yet* |
| | **2. Bill Mitchell**<br>a. Discussed background and context of Calderwood project (refer Briefing Note tabled at meeting)<br>b. Noted documents, timeframes, status. (refer Briefing Note)<br>c. Consultation is consistent with other agency consultations. Most consultation completed except: MoT, Telstra, DPI, SCC (traffic, water, community), WCC (water)<br><br>*DH: Program is up to DoP, MoT has own timeframes and is meeting them*<br>*TR: Structure Plan is indicative and is being revised during current process* |
| | **3. Anissa Levy**<br>a. Noted that no previous formal correspondence with the MoT had taken place |

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| BM | **4. Anissa Levy & Bill Mitchell**<br>a. Principles of Integrated Land Use & Transport Planning<br>b. Urban design principles<br>c. Early provision infrastructure to influence behaviour e.g. bus services, walking and cycling paths, retail and education facilities<br>d. For example, Ropes Crossing has 25km cycleways with linkages to the village centre<br>e. Woolworths/Coles at early stages and built with 5 star green rating<br>f. From July 2010 the National Broadband Network (NBN) requirements will be for Fibre to the Premises (FTTP).<br>g. Other travel demand management measures such as householder packs, travel guides, community support<br>h. Mode share targets are to be set<br><br>*DH: Advised the following:*<br>*- RTA had produced a document on tele-commuting/Broadband which may be useful*<br>*- MoT focussing on peak periods*<br>*- MoT would like to see TDM measures included in SOC*<br>*- State Gov't no longer collects contributions for PT services, no provision in the Sic for services*<br>*- Integrated Network Planning (INP) (Bus) being undertaken o be consulted around March 2010*<br>*- Adrian DeSanti is looking after the INP review for Illawarra Region*<br>*- State Plan has 'revitalised' mode share targets of 15% (non –car based for JTW) to Wollongong CBD*<br>*- regional transport strategies are to be developed in 2010*<br>*- Transport Blueprint for NSW being prepared*<br>*BM: NBN documentation indicates reduced traffic generation* |
| | **5. Tamara Rassmussen**<br>a. DLL would like to facilitate early provision of bus services<br>b. DLL will initiate conversations with MoT and Bus operators<br><br>*DH: Noted that provision of new bus services was MoT responsibility not operators* |
| | **6. Anissa Levy**<br>a. Provided a brief review of the base year TRACKS modelling<br><br>*DH:*<br>*- MoT not too concerned about the modelling but was mostly concerned about the MST and buses*<br>*- MoT want stretch targets*<br>*- MoT would like to see stretch targets for MST*<br>*- consider options such as satellite parking*<br>*- For buses consideration should be given to interchange locations, street furniture, wide streets, bus stop locations, facilities, bus priority*<br>*- Timing is important to MoT, given consideration to when schools in place and when roads will be built*<br>*- Consideration to be given to density around 'hubs' with mixed use developments*<br>*- Tullimbar had god planning principles applied*<br>*AL: Noted that there is push-pull between agencies in relation to MST*<br>*DH: Noted we cannot expect to keep a 95-5 MS*<br>*TR: Noted that NBN is not just about tele-commuting but home based businesses*<br>*DH: MoT would like to see empirical evidence of MS*<br>*BM: Empirical evidence of introduction of agreed measures will be presented. Extremely difficult to establish actual rates due to construction/thru traffic and other issues*<br>*DH: Report should be focussed on how we can achieve a 15%MS* |
| | **7. Anissa Levy**<br>a. Noted that no previous formal correspondence with the MoT had taken place |
| Actions Arising | 1. Minutes to be distributed (AL) |

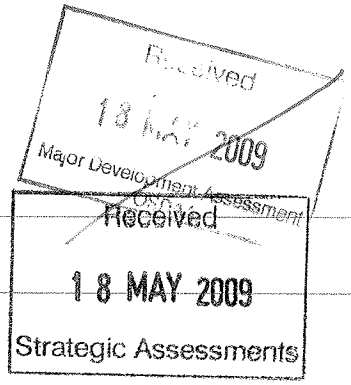
**Calderwood Urban Development Project**
**Summary Record of Agency Consultations**

| | | | |
|---|---|---|---|
| **Date** | **11.12.09** | | |
| **Project team member / firm** | **Tamara Rasmussen** | | |
| **Organisation** | **Premier Illawarra (bus services)** | | |
| **Name of contact** | **Stuart Blair and Sunny Brailey** | | |
| **Position in organisation** | **Operations Manager and Contracts Manager** | | |
| **Contact details** | **stuart@premierillawarra.com.au; sunny@premierillawarra.com.au** | | |
| **Form of Consultation** | **Face to face** | ~~**Phone call**~~ | ~~**Email**~~ |
| **Issues discussed / outcomes** | ▪ Sunny asked that DLL consider road widths when designing the new community (to accommodate buses)<br>▪ Sunny noted that if regular bus services are expected to travel along Calderwood Road, this, along with any potential increase in traffic nos, may warrant an upgrade of the Calderwood Road bridge. Currently, school buses travel along Calderwood Road and have to give way to cars as both cannot travel on at once due to the crossing width.<br>▪ Premier Illawarra would like to have buses in place prior to the first resident<br>▪ Premier Illawarra are happy to stage delivery of the service with the development<br>▪ Sunny noted that it would take approx. 6 months to implement the service from time of MOT approval for proposal<br>▪ Premier Illawarra noted that the Calderwood services would likely be new services, rather than extensions of existing services. This is due to the scale of the development and the fact that the existing services are already long.<br>▪ Sunny noted that the new services would potentially link Calderwood with the railway stations (Albion Park Rail and Oak Flats) and the Stockland Mall in Shellharbour. | | |
| **Actions arising** | ▪ TR to continue to liaise with Premier Illawarra throughout re-zoning process<br>▪ TR to send Sunny and Stuart copy of the Regional Context Plan and Concept Plan | | |

Appendix 1D

# DLL/RTA Correspondence

Our Ref: 401da60 (09/600)
Contact: Chris Millet (42212523)
Your Ref: MP 09_0082, MP 09_0083




Major Development Assessment
Department of Planning
GPO Box 39
SYDNEY NSW 2001

14 MAY 2009

Attention: Michelle Cramsie

**SHELLHARBOUR CITY COUNCIL – MP 09_0082 & MP 09_0083 – CALDERWOOD VALLEY RELEASE AREA, CALDERWOOD VALLEY**

Dear Sir

Reference is made to your letter dated 8 May 2009 regarding the subject Part 3A Project Application forwarded to the RTA for consideration.

The RTA has reviewed the information provided. In addition to the draft key assessment requirements outlined in your letter under the heading "Transport and Accessibility", the RTA considers that the following information should be addressed in the Environmental Assessment (EA):

- Network modelling is required to assess the impacts of the proposal on the Illawarra Highway (HW25), Princes Highway (HW1)/Southern Freeway (F6), Tongarra Road (MR262), Marshall Mount Road, Yallah Road and the future Southern Freeway corridor between Yallah and Oak Flats. Given that there is no firm commitment to the extension of the F6 from Yallah to Oak Flats at this stage, the modelling needs to consider the impact of the development with and without the future Southern Freeway extension between Yallah and Oak Flats. The RTA recommends the use of TRACKS to undertake this assessment and that the proponent liase with the RTA, together with traffic representatives from Wollongong and Shellharbour City Councils, prior to undertaking this analysis. Once the network modelling has been completed the RTA recommends that it is submitted to the RTA with analysis and comments for acceptance prior to proceeding with detailed intersection modelling.
- Intersection modelling using SIDRA should be undertaken for any junctions likely to be significantly impacted by the proposal as identified by the network modelling. The modelling should consider the impact of the development in AM and PM peak periods at occupation and 10 years after occupation. This includes consideration to road infrastructure required at key junctions and intersections on the State Classified Road Network, including the following:
  - Southern Freeway/Princes Highway and the Old Princes Highway (in the vicinity of Tallawarra) for traffic accessing the site to and from the north via Marshall Mount Road, Yallah Road and the Old Princes Highway
  - Princes Highway and the Illawarra Highway
  - Illawarra Highway, Tongarra Road and Terry Street
  - Illawarra Highway and the proposed site access
  - Illawarra Highway and the proposed Albion Park Bypass
  - Any other intersection identified through the network modelling process to be significantly impacted upon by the development.

- The proponent should identify infrastructure, including road, public transport, pedestrian and cycling infrastructure, required to ameliorate the impacts of the development, for both the Stage 1 application and the overall concept plan application. This should be done cognizant of current road safety and accessibility guidelines.
- The proponent should identify appropriate planning mechanism/s to ensure that the infrastructure will be provided, e.g. through a Voluntary Planning Agreement. It should be noted that the RTA are unlikely to support the proposal, including an access to the Illawarra Highway as proposed in Stage 1, unless suitable planning mechanisms are in place and consultation has taken place with relevant stakeholders.
- The RTA recommends that the developer considers the environmental impacts of any proposed roadworks as part of the Statement of Environmental Effects. If these impacts are not considered, then the RTA would require the applicant to provide a separate environmental impact assessment, a 'Review of Environmental Factors' prior to commencing any works that were conditioned as requirements of the development

  Note: The RTA has a responsibility to ensure that all environmental impacts are considered to the fullest extent possible under Section 111 of the Environmental Planning and Assessment Act.

The RTA will commence its detailed assessment once the aforementioned information is provided to its satisfaction. Should you require any clarification on this matter please call Chris Millet on 4221 2570.

Yours faithfully

14 MAY 2009

Trish McClure
Manager, Road Safety and Traffic Management
Southern Operations & Engineering Services

Our Ref FR110026
Contact Anissa Levy

30 September 2009

Trish McLure
Manager, Road Safety and Traffic Management
Roads and Traffic Authority
PO Box 477
Wollongong NSW 2520

CC: Chris Millett
Nick Boyd

**Cardno (NSW) Pty Ltd**
ABN 95 001 145 035
Transportation and
Traffic Specialists

Level 3
910 Pacific Highway
Gordon, NSW 2072
Australia

Phone: 61 2 9496 7700
Fax: 61 2 9499 3902
Email:
Sydney.Traffic@cardno.com.au

**www.cardno.com.au**

Dear Ms McLure,

**RE: UPDATED WOLSH TRACKS MODELS FOR CALDERWOOD VALLEY RELEASE AREA TRANSPORT ASSESSMENT**

I am writing to you to ascertain the availability of the updated RTA WOLSH TRACKS models, which could prove useful and assist us in producing a Transport and Accessibility Assessment (TAA) for the Calderwood Valley Urban Development Release Area Part 3A Concept Plan and Project Applications.

Cardno has been appointed by Delfin Lend Lease (DLL) to produce the TAA to form part of Environmental Assessment Reports (EAR) for the Concept Plan and Project Applications. The TAA is to comply with the Director General's Requirements (DGR) issued 10 June 2009. The TAA will include the preparation of a Transport Management and Accessibility Plan (TMAP) and modelling of the impacts of the proposed development to assess appropriate mitigation measures.

The DLL proposal for Calderwood includes development of approximately 700 hectares of land in the Calderwood Valley in the Illawarra Region as a community development with potential for about 4,500 to 5,000 dwellings, which would accommodate around 12,500 people. DLL's philosophy is for the development of sustainable communities, to ensure viability and desirability into an uncertain future. Provision of an appropriate urban form, sustainable transport options and travel demand management are key components of this.

The DGRs state that "detailed traffic modelling to determine level of infrastructure needed" should be undertaken. The DGRs further state that "network modelling for impacts on Illawarra Highway, Princes Highway/Southern Freeway, Tongarra Road, Marshall Mount Road, Yallah Road and the future Southern Freeway corroder between Yallah and Oak Flats" be undertaken.

In a letter from the RTA to Shellharbour City Council dated the 14th May 2009 it is indicated that network modelling is required to assess the impacts of the proposal on the surrounding road network. Furthermore the letter recommends that TRACKS should be used to undertake this assessment. However, it should be noted that the DGRs do not specify the use of TRACKS modelling specifically.

The RTA has previously advised that they are in the process of updating the Wollongong Shellharbour (WOLSH) TRACKS models for the updated base (2011) and future (2021 and 2036) year models and that the existing 2006, 2016 and 2026 WOLSH TRACKS models are outdated in terms of planning assumptions and proposed road network upgrades. It is Cardno's preference to use the updated RTA WOLSH TRACKS models as a basis for the modelling for Calderwood if they are available for immediate use for the purposes of this assessment.

However, an email from Chris Millett (RTA) to Martin Wells (Cardno) dated the 5th June 2009 stated that both the base and future scenario models would be available within 6-8 weeks, which would have been the first or second week of August.

Discussions on another project with Nick Boyd of the RTA (August 2009) intimated that the 2036 models would be made available by the end of September 2009. Advice in an email dated 11 August 2009 also from Nick Boyd indicated that the 2011 and 2021 models may become available earlier than the 2036 models.

Could you please confirm urgently whether or not the RTA is now in a position to release the following updated RTA WOLSH TRACKS models:

- 2011 AM and PM Peak.
- 2021 AM and PM Peak.
- 2036 AM and PM Peak.

If they are not available immediately could you please advise of a date when the models will be made available.

Our client proposes to lodge the Environmental Assessment Report for their Calderwood Concept Plan and Project Application submissions for assessment under the NSW Department of Planning's strict assessment timeframes, and the modelling will form a critical part of this assessment. In keeping with the modelling for the region it is our preference to use TRACKS for this work. It would be useful to start this process with the RTA's latest TRACKS modelling as a base. If the updated RTA WOLSH TRACKS models won't be available in the very near future (to be used as a basis for this modelling) it will be necessary to discuss an alternate methodology to undertake the modelling and subsequent assessment of the impacts of the proposal on the surrounding road network.

Cardno will continue to consult with the RTA throughout the preparation of the TAA for Calderwood and would welcome input from the RTA. In particular we are seeking input from the RTA in relation to an agreed set of base arterial road network improvements to be included in the future road network for modelling up to 2036. Your advice on this matter is sought urgently. We would be happy to meet with you to discuss this matter in detail.

If you have any queries regarding this letter please do not hesitate in contacting the undersigned on (02) 9496 7809 or at anissa.levy@cardno.com.au.

Yours faithfully,

*Anissa Levy*
*Business Unit Manager*
*for* **Cardno Eppell Olsen**

**From:** MILLET Christopher P [Christopher_MILLET@rta.nsw.gov.au]
**Sent:** Thursday, 8 October 2009 4:29 PM
**To:** Russell Yell (Sydney)
**Cc:** MCCLURE Trish J; COLLINS Bradley J; BOYD Nick M; Andrew Byers; tcollins@wollongong.nsw.gov.au; Anissa Levy (Sydney); STEVENSON Nicole R
**Subject:** Calderwood Valley Release Area - TRACKS model request
**Attachments:** FW: TRACKS Model for Calderwood

Russell

Reference is made to your email to Trish McClure below and your email to Brad Collins earlier today (as attached). Trish is off on leave at the moment however I can provide the following advice:

TRACKS models
The RTA will provide the current TRACKS models to you early next week. At the latest, by close of business Tuesday next week (13/9/09).
However, it should be noted that the RTA is close to finalising a revised model.

Infrastructure Upgrades
The future network upgrades are dependant on future development. In this regard land releases such as Calderwood, West Dapto and Tallawarra will dictate which infrastructure upgrades are required. At this point in time the RTA does not have an adopted list of infrastructure upgrades required to ameliorate the impacts of the development and therefore cannot provide advice on these works.

Cheers

*Chris Millet*

Chris Millet
Manager, Land Use Development
Southern Region
Roads and Traffic Authority

P - 4221 2570
F - 4221 2777

---

**From:** Russell Yell (Sydney) [mailto:russell.yell@cardno.com.au]
**Sent:** Thursday, 8 October 2009 12:25 PM
**To:** MCCLURE Trish J
**Cc:** MILLET Christopher P; BOYD Nick M
**Subject:** RE: FR110026 Calderwood Valley Release Area - TRACKS model request
**Importance:** High

Hi Trish,

Following Anissa's mail I'd like to ask whether or not you're in a position to confirm the current anticipated road network upgrades proposed in the Illawarra region.

I need to notify the client before 2pm today so if you could let me know any info that'd be greatly appreciated.

Regards,

Russell

***Russell Yell***
Senior Transport Engineer
Phone:02 9496 7700
Fax:02 9499 3902

Email:russell.yell@cardno.com.au
Web:www.cardno.com.au

---

**From:** Anissa Levy (Sydney)
**Sent:** Wednesday, 30 September 2009 11:44 AM
**To:** MCCLURE Trish J
**Cc:** MILLET Christopher P; BOYD Nick M; Russell Yell (Sydney)
**Subject:** FR110026 Calderwood Valley Release Area - TRACKS model request

Cardno (NSW) Pty Ltd | ABN 95 001 145
Level 3, Cardno Building
910 Pacific Highway Gordon NSW 2072
Tel:02 9496 7700 Fax:02 9499 3902

Hello Trish

Cardno have been appointed by Delfin Lend Lease to undertake the Transport and Accessibility Assessment fo
Calderwood Release Area Concept Plan and Project Application to DoP.
Please find a letter attached outlining some more information about the project and a request for access to the
updated RTA WOLSH TRACKS models.
Your urgent consideration of the matters in this letter would be greatly appreciated.
Don't hesitate to contact me if you have any questions or would like to discuss the matter in person.

kind regards

***Anissa Levy***
Business Unit Manager
Traffic and Transport Planning
Cardno Eppell Olsen (NSW)

Phone:61 (0)2 9496 7700
Fax:61 (0)2 9499 3902
Direct:61 (0)2 9496 7809
XTN:309
Mobile:61 (0)434 608 596
Email:anissa.levy@cardno.com.au
Web:www.cardno.com.au



Our Ref: 401da60
Contact: Chris Millet (42212523)
Your Ref: MP 09_0082, MP 09_0083

10 NOV 2009

Mr Bill Mitchell
Delfin Lend Lease Limited
Locked Bag 1
MILLERS POINT NSW 2000

**SHELLHARBOUR CITY COUNCIL – MP 09_0082 & MP 09_0083 – CALDERWOOD VALLEY LAND RELEASE AREA, CALDERWOOD VALLEY**

Dear Sir

Reference is made to the meeting held for the subject land release between the Roads and Traffic Authority (RTA), the Department of Planning (DoP) and the proponent, Delfin Lend Lease held at the Wollongong Office of the Department of Planning on 2 November 2009. In particular, reference is made to the proposed transport assessment methodology for the strategic modelling of the Calderwood proposal outlined by Anissa Levy (Cardno)

The RTA, in collaboration with Wollongong City Council, has recently developed the Illawarra TRACKS models primarily to assist with the assessment of the proposed land releases in the Illawarra, such as West Dapto, Tallawarra and Calderwood. In this regard, full development models are now available for the 24hour, AM peak and PM peak scenarios. These models can be obtained from Wollongong City Council at a cost of $22,770 (refer to attached correspondence) for the purposes of modelling the Calderwood Land Release. In this regard, Ted Collins, Traffic Unit Manager at Wollongong City Council can be contacted on 4227 7106.

In addition to the comments made by Wollongong City Council in the attached correspondence, if Delfin Lend Lease intend on utilising these models, the following issues must be noted:

- These models represent a full development scenario. Therefore, if Delfin Lend Lease intend on modelling a 2031 scenario, the scale of all land releases will need to be adjusted in accordance with the figures in the attached land use inputs table which were provided to the RTA by DoP. That is, the TRACKS models available from Council assume full development and this is not likely to be achieved for any of the land releases by 2031.
- In order to assess the impacts of the land releases on the State Road Network it was necessary to make a number of assumptions. In this regard, the future State Road Network and associated infrastructure upgrades used for the purposes of this assessment should be considered as "strategic" and the location of any particular element of infrastructure should not be viewed as a commitment to the infrastructure at that exact location. For instance, the location of the Albion Park Interchange, item 5 is purely indicative. That is, whilst the modelling shows a demand for an interchange in the vicinity of Albion Park, the location of the interchange itself has not been determined.

- The infrastructure upgrades identified in the models are required to ameliorate the impact of the proposed land releases in the Illawarra. Therefore, it should be noted that the RTA considers that Calderwood is at least in part responsible for many of the upgrades.

Notwithstanding the above, whilst the updated TRACKS models are now available to the proponent, the RTA offers the following comments on the proponents proposed methodology:

- The RTA does not object to the proponent proposed study area as provided to the RTA in the meeting held on 2 November 2009. The RTA recommends that the outcomes of the TRACKS modelling undertaken by the proponent are provided to the RTA for review and verification prior to proceeding with any intersection modelling. This should include an electronic copy of the modelling.

- The future development assumptions should be consistent with the figures in the attached land use input table which were provided to the RTA by the Department of Planning.

- The RTA notes that the proponent discussed a mode shift in the order of 15% towards public transport at the meeting. Whilst the RTA would support any measures to increase public transport mode share, the RTA considers that a comprehensive package of works, strategies and planning controls would be required to achieve a mode shift of any significant magnitude. Given this, combined with the relative attractiveness of using private vehicles in the Illawarra, the RTA considers that a mode shift in the order of 15% to be highly optimistic. Therefore, any mode split assumptions which differ to mode splits of existing developments in the vicinity of Calderwood must be fully justified and supported. This must include data obtained from similar sites where a mode shift were achieved as well as the strategies, infrastructure and services that will be implemented at Calderwood to achieve any identified shift.

The RTA will commence its detailed assessment once the aforementioned information is provided to its satisfaction. Should you require any clarification on this matter please call Chris Millet on 4221 2570.

Yours faithfully

10 NOV 2009

Trish McClure
Manager, Road Safety and Traffic Management
Southern Operations & Engineering Services

CC

Anissa Levy, Cardno (by email)
Linda Davis, Department of Planning (by email)
Simon Bennett, Department of Planning (by email)
Ted Collins, Wollongong City Council (by email)
Geoff Hoynes, Shellharbour City Council (by email)
David Hartmann, Department of Transport (by email)

Land Use Inputs

The following land use inputs are suggested for the future land use scenarios that will underpin the strategic TRACKS modelling that the RTA is undertaking to identify future network deficiencies.

In addition to existing developments, the following should be included for the western Lake Illawarra area:

| **Release Area/Project** | **2011** | **2021** | **2036** |
|---|---|---|---|
| West Dapto | 160 lots (assumes stage 1 [100 lots] + stage 2 [60 lots] | 3410 lots (160 + 3250) (assumes ramp up to 250 lots p/a in stage 1 + 60 lots p/a in stage 2 + 50 lots p/a in Marshall Mount from 2013) | 8890 lots (3410 + 5480) (assumes ramping down in Stage 1 and ramping up in Stage 2 + commencing of Stage 3 [late in timeframe] + 50 lots p/a in Marshall Mount) |
| Calderwood | - | 2300 lots (assumes ramping up from 100/200 lots in 2011/2012 to 250 lots p/a) | 6050 lots (2300 + 3750) (assumes 250 lots p/a – from p8 of Delfin's justification report) |
| Tallawarra | - | 700 (assumes 70 lots p/a from 2011) | |
| Huntley Heritage | - | Golf course, tourist facility + 400 lots (assumes 50 lots p/a from 2013 until finished) | |
| Illawarra Health Precinct (refer to Environmental Assessment for details) | Specialists centre and pathology/radiology units | 24 hr medical centre, obstetrics unit, hospital, retail centre, nurses accommodation, education facility, aged and disability centre, seniors accommodation. | |
| Illawarra Employment and Teaching Centre (refer to project application for details) | - | Teaching/conference facilities, accommodation, workshops (total floor space of 320,000 $m^2$) | |
| Increased residential densities around Dapto town centre. | | Gradual increase in densities up to 6 storeys and up to 1.5:1 FSR) | |
| | | | |
| | | | |

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41 Burelli Street Wollongong • **Post** Locked Bag 8821 Wollongong NSW 2500 • **Phone** (02) 4227 7111 • **Fax** (02) 4227 7277
**DX** 27811 Wollongong Court • **Email** council@wollongong.nsw.gov.au • **Web** www.wollongong.nsw.gov.au • ABN 63 139 525 939 - GST Registered

The Regional Manager
Roads & Traffic Authority
Southern Region
DX 5178
WOLLONGONG

| | |
|---|---|
| Your Ref : | |
| Our Ref | I.EC/mf |
| File | SU 20739 |
| Date | 10 November 2009. |

Attention: Chris Millet

Dear Chris

I refer to our previous communications regarding the TRACKS modelling of the Wollongong/Shellharbour south-west future development and offer the following advice.

1 Council is prepared to provide the "Full Development" WOLSH models to Cardno in accordance with Council's adopted "Fees and Charges 2009/10" for the sum of $22,770 (including GST).

2 Council requires written acceptance of both the fee payable to Council and the following statement prior to authorisation of the use of the models by others.

*"These models must not be distributed to any other parties and are authorised by Council for use in the assessment of the transport impacts of the Delfin Lend Lease Calderwood Valley development only. Whilst Council provides these models in good faith, the accuracy of the models cannot be guaranteed and no responsibility can be accepted for any consequences arising from their use".*

3 The attached statement for the models, their inputs and benefits for development assessment is provided for the Authority and other authorised parties. The benefits identified reflect the significant resource expended by Council in the development of the models as well as the consistent planning and assessment outcomes resulting from their use.

I trust the above advice is of assistance to the Authority and would be pleased to discuss these issues further with you should that be necessary.

Yours faithfully

T. Collins.

Ted Collins
*Traffic Unit Manager*
*Infrastructure Division*
*Wollongong City Council*
Direct Line (02) 4227 7106

# WCC – RTA FULL DEVELOPMENT WOLSH MODELS

## 1 THE MODELS

(i) Based on modified 2026 models

(ii) Models provided:
- 24 hr
- am peak
- pm peak

(iii) Mode split = "Business as Usual"

## 2 MODEL INPUTS

(i) Land Use
- All proposed West Dapto (+ 17,400 (approx.) dwellings; 5,500 (approx.) jobs)
- Tallawarra (+1,200 (approx.) dwellings; 1,500 (approx.) jobs)
- Delfin Lend Lease. (4,500 dwellings; 1,600 (approx.) jobs)
- Remaining zones including CBD = @ 2026 (approx.)

(ii) Road Network
- F6 upgraded to ultimate (general max 3 lanes each way)
- Includes F6 northbound to Masters Road ramp
- Includes West Dapto access upgrades (TMAP and more)
- Includes Tallawarra interchange
- Includes Yallah F6/Highway interchange
- Includes Albion Park Bypass and interchanges (intermediate at Croom Road, Tongarra Road, Tripoli Way)
- Remainder of network = do minimum/committed works

## 3 DEVELOPMENT ASSESSMENT

(i) Models developed used as "base" for option testing.

(ii) Extensive research, planning, model coding and validation undertaken to date for development of current models. (At significant resource allocation and cost).

(iii) Assessment of development, proposed infrastructure and traffic management would be consistent and expedited if current models were used as base by all.

Delfin
Lend Lease

20th November 2009,

Ms Trish McClure
Manager, Road Safety and Traffic Management
Southern Operations & Engineering Services
Roads and Traffic Authority
PO Box 477
Wollongong NSW 2500

Dear Ms McClure,

RE: CALDERWOOD URBAN DEVELOPMENT PROJECT

I refer to your letter dated 10th November 2009 concerning the approach to meeting the Director General's Requirements for the Calderwood Urban Development Project particularly in respect to Transport and Accessibility. The purpose of this letter is to clarify and respond to the matters raised in your letter.

By way of background there has been considerable discussion and correspondence between your office and Delfin Lend Lease (DLL) / Cardno on the transport assessment methodology including traffic modelling. As a result of this correspondence and discussion, in which RTA staff have been most helpful and co-operative, DLL reached the point where, in order to progress the Project, it was determined to use the 2006 WOLSH TRACKS base model (appropriately calibrated and updated) and the existing 2026 WOLSH TRACKS model for the modelling for the Project. Our reading of your letter is that this remains an appropriate course of action acceptable to the RTA.

Your letter advises that a revised full development TRACKS model is available from Wollongong City Council at a cost of $22,770.00 for the purposes of modelling the Calderwood Urban Development Project. However it is noted that it would still be necessary to adjust the planning assumptions in the model to be in line with both DoP and RTA assumptions and DLL assumptions and undertake an extensive update of the model. It is noted that our respective assumptions are generally consistent. On this basis it would seem to be that there is no benefit to be obtained in using the model while there are considerable disbenefits in terms of costs of the model, time and cost already expended on the previously agreed approach and potential for consequential delays. We also note that the cost advised seems very high compared with the previously quoted $5,000 for access to RTA models.

We note the recommendation to provide the TRACKS modelling results to the RTA prior to undertaking detailed intersection modelling. This is welcome subject to the very tight timeframes we are working to. It should also be noted that this can be an iterative process.

Delfin Lend Lease Limited
ABN 88 000 966 085
Level 4, 30 The Bond
30 Hickson Road
Millers Point NSW 2000
Australia

Postal Address
Locked Bag 1
Millers Point NSW 2000

Telephone +61 2 9236 6111
Facsimile +61 2 9383 8259
www.delfinlendlease.com

Delfin
Lend Lease

As far as the matter of mode shift and mode share is concerned it is understood that the Wollongong region has a mode share of 5% for non-car based transport for journey to work trips. It is anticipated that the measures proposed to be implemented by DLL at Calderwood will aid in achieving a 10% mode shift to non-car based transport resulting in a 15% non-car based mode split or mode share.

Your letter asks that DLL provide data obtained from similar sites where a mode shift were achieved as well as the strategies, infrastructure and services that will be implemented at Calderwood to achieve any identified shift. DLL can provide empirical evidence of measures implemented by DLL to achieve a mode shift on its Projects and this is consistent with the Director General's Requirements. However we note that every Project is unique in this respect. We note that the request to provide data from similar sites where a mode shift were achieved is inconsistent with the Director General's Requirements and is not a requirement of the TMAP Draft Guidelines. We also note that we are not aware of any instances where this has been provided.

DLL looks forward to continuing to work collaboratively with the RTA on this Project and would be pleased to discuss any matters arising from this letter.

Yours sincerely,

BILL MITCHELL
PROJECT DIRECTOR CALDERWOOD

CC: Anissa Levy, Cardno (by email)
Linda Davis, Department of Planning (by email)
Simon Bennett, Department of Planning (by email)
Ted Collins, Wollongong City Council (by email)
Geoff Hoynes, Shellharbour City Council (by email)
David Hartmann, Department of Transport (by email)

Appendix 1E

# Area of Influence

# APPENDIX 1E - Area of Influence

For modelling purposes, it has been agreed with the RTA the extent of the road network over which the transport demands associated with the CUDP should be assessed. Described as the 'area of influence' the extent of road network is shown in Figure 1.2 in the report.

This area is considered to represent all the road sections and key intersections over which development related transport impacts need to be assessed.

It is shown that the area of influence includes the following key road sections:

- Illawarra Highway between Terry Street and North Macquarie Road
- Tongarra Road between Terry Street and Princes Highway
- Princes Highway between Mount Brown Road and south of New Lake Entrance Road.
- Southern Freeway north of Princes Highway southbound on ramp.
- Yallah Road between Marshall Mount Road and Princes Highway.
- Marshall Mount Road between Calderwood Road and Huntley Road.
- North Macquarie Road between Illawarra Highway and Calderwood Road.
- Calderwood Road between Calderwood Valley Golf Club and Illawarra Highway.
- Huntley Road between Marshall Mount Road and Princes Highway.
- Princes Highway and Southern Freeway southbound On-Ramp
- Princes Highway and Southern Freeway northbound Off-ramp
- Princes Highway and Yallah Bay Road (including F6 southbound off-ramp in 2031 scenarios)

Key existing intersections for assessment within the area of influence (external to CUDP) have been agreed with the RTA to comprise the following:

- Illawarra Highway and North Macquarie Road.
- Illawarra Highway and Tongarra Road/Terry Street.
- Princes Highway and Illawarra Highway.
- Princes Highway and Tongarra Road.
- Marshall Mount Road and Yallah Road.
- Huntley Road and Marshall Mount Road.
- Princes Highway and Huntley Road.
- Illawarra Highway and Calderwood Road/Macquarie Street.
- Illawarra Highway and Broughton Avenue (/Tripoli Way[1] in 2031).
- Tongarra Road and Station Road.
- Yallah Road and Haywards Bay Drive.
- Illawarra Highway and Yellow Rock Road (Proposed North-South Arterial in 2031).
- Haywards Bay Drive and Princes Highway southbound ramps.
- Princes Highway and Tallawarra northbound ramp (including northbound on-ramp in 2031).
- Princes Highway and Cormack Avenue.
- Princes Highway and Southern Freeway northbound Off Ramp
- Princes Highway and Southern Freeway southbound On Ramp
- Princes Highway and Yallah Bay Road (including F6 southbound off-ramp in 2031 scenarios)

Furthermore the following proposed future intersections have been assessed where relevant to the scenario:

- Tripoli Way and proposed major collector street.
- Tripoli Way and Calderwood Road.
- Illawarra Highway and Tripoli Way.
- Tripoli Way and F6 Extension ramps.
- Tongarra Road and Tripoli Way.

[1] Also known as Albion Park Bypass

Appendix 2A

# Review of State and Regional Strategic Policies

# APPENDIX 2A - Review of State & Regional Strategic Policies

The following documents have been reviewed:

- NSW State Plan 2009 and Illawarra Local Action Plan 2009.
- NSW State Infrastructure Strategy 2008.
- Action for Air (2006 update).
- Action for Bikes (1999).
- Integrating Land Use and Transport (2001).
- Section 117 Ministerial Decisions Direction no.17 – Integrating Land Use and Transport (2005)
- Planning Guidelines for Walking and Cycling (2004).
- Accessible Transport Action Plan (2007)
- Review of Bus Services in NSW – Final Report (2004).

## THE NSW STATE PLAN 2009 AND ILLAWARRA LOCAL ACTION PLAN 2009

The *NSW State Plan* sets out the goals and priorities for government action in a range of key areas, with targets for improvements, to guide decision–making and resource allocation. The current version of the plan was prepared in 2009 as a revision of the original plan released in 2006. It is structured around 14 long–term goals and 34 priorities for action. It identifies measurable targets that allow progress to be assessed. In addition, it sets out how government agencies will work to deliver on the targets. The State Plan service delivery priorities for government agencies are underpinned by investment in infrastructure and maintenance of existing assets. The *State Infrastructure Strategy* enables these infrastructure and maintenance programs to be implemented.

In terms of transport, the key target relevant to this project is increase public transport mode share to 15% for commuter journeys to Wollongong CBD. There are also a number of public transport improvement projects to encourage public transport use in the region.

The following are key transport targets which are of importance to this project:

- Develop an Illawarra Region Transport Strategy in 2010.
- Construct additional commuter car park spaces at Waterfall, Wollongong and Woonona railway stations over the next 2 years.
- Carry out an easy access upgrade for Dapto rail station to help ensure the station is accessible to everyone in the community.
- Undertake an integrated bus network review to ensure services continue to match the needs of the local community (underway now).

This TMAP has been developed on the basis of a mode share of 15%.

## THE STATE INFRASTRUCTURE STRATEGY 2008

The *State Infrastructure Strategy* is a rolling 10–year plan for infrastructure projects to support service delivery. First published in 2006, it is updated every two years. The Strategy maps infrastructure projects across six broad regions – Sydney, Central Coast, Hunter, North Coast, Illawarra - South East and Inland NSW.

Transport highlights of the *State Infrastructure Strategy* affecting the study area includethe Dapto Railway Station easy access upgrade.

## ACTION FOR AIR

*Action for Air* is the NSW Government's 25 year air quality management plan for the Greater Metropolitan Region of New South Wales, which includes the Illawarra region. It contains a range of measures aimed at reducing emissions from transport.

The *Action for Air: 2006 Update* retains the objectives of *Action for Air* and includes an updated review of the air quality and issues in the Greater Metropolitan Region. The key objective is to make transport greener, by reducing the use of unsustainable transport and reducing the emission levels of existing transport systems. Actions to implement the goals of the plan are also included. Actions relevant to the Calderwood development include:

- Provide public transport to new suburbs.
- Implement an extensive bus priority scheme.
- Introduce integrated ticketing.
- Develop a long-term transport strategy for the Illawarra region.
- Facilitate walking/cycling as a mode of transport.

## ACTION FOR BIKES – BIKE PLAN 2010 NSW

This Bike Plan aims to ensure cycling is a viable travel alternative. *Action for Bikes* is a four point plan outlining a range of actions that may be taken to achieve these goals. The plan presents a costed 10 year plan for a series of arterial bicycle networks across NSW, and includes a commitment to provide cycling facilities when new roads are built and to create off-road cycleways wherever possible.

The infrastructure plan is not detailed for areas outside of the Sydney metropolitan area. The only major cycling routes listed in the Illawarra region are:

- Sutherland to Bulli Tops.
- Bulli Tops to Wollongong.
- North Wollongong to Fairy Meadow.
- Warrawong to Kiama Heights.
- Kiama to Nowra.

None of the listed routes will serve the development site directly, being located over ten kilometres away. However they may facilitate the use of cycling as part of a multi-modal journey to or from the site.

The four point action plan includes the actions of improving the bike network, making it safer to cycle, improving personal and environmental health and raising community awareness.

## INTEGRATING LAND USE AND TRANSPORT 2001

The *Integrated Land Use and Transport* (ILUT) package (DUAP 2001) provides a framework for State Government agencies, councils and developers to integrate land use and transport planning at the regional and local levels.

This package identified the following opportunities for facilitating the achievement of objectives related to improving access to housing, jobs and services, increasing the choice of available transport, reducing travel demand (especially by car) and supporting efficient and viable operation of public transport services, specifically:

- Concentrating large trip generators/attractors near each other (in centres) and creating a network of these centres linked by good public transport services.
- Using parking as a travel demand management tool.
- A minimum of 15 dwellings per hectare for new residential areas.

The site is an extension of the urban area immediately adjoining Albion Park and Tullimbar, The principles of the package will inform the urban design philosophy for the development.

## SECTION 117 MINISTERIAL DECISIONS DIRECTION NO.17 – INTEGRATING LAND USE AND TRANSPORT (2005)

The NSW Government Department of Planning Section 117 direction 17 is applicable to local councils when preparing a draft LEP that creates, removes or alters a zone or a provision relating to urban land, such as for residential, business or industrial Purposes. The direction is intended to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:

- Improving access to housing, jobs and services by walking, cycling and public transport.
- Increasing the choice of available transport and reducing dependence on cars.
- Reducing travel demand including the number of trips generated by development and the distances travelled, especially by car.
- Supporting the efficient and viable operation of public transport services providing for the efficient movement of freight.

## PLANNING GUIDELINES FOR WALKING & CYCLING (2004)

The guidelines have been designed to provide a walking and cycling focus to the NSW Government's Integrating Land Use & Transport Planning Policy Package. They are also designed to provide a planning complement to the RTA's facilities-focused policies and actions.

At the broadest level, these guidelines illustrate how metropolitan strategies, Masterplans and Local Environmental Plans (LEPs) can help create an urban form that is conducive to walking and cycling. At a more detailed level, the guidelines show how Development Control Plans (DCPs), developer contributions plans and development assessment processes can reinforce these broader plans through funding mechanisms, provision of facilities and design outcomes that are supportive of walking and cycling.

These guidelines will form the basis of the walking and cycling recommendations in this report.

## ACCESSIBLE TRANSPORT ACTION PLAN (2007)

This Action Plan outlines the legal responsibilities of the transport agencies, with respect to accessibility, the guiding principles of integrated accessible transport services, progress to date in improving accessibility and future strategies to improve accessibility.

One key aspect is a timetable for compliance with the anti-discrimination and disability legislation for transport infrastructure, including information (to be compliant by the end of 2007), buses, coaches and rail services. All buses and coaches are to be compliant with the legislation by 2022, with percentages of stock to be compliant in the preceding years, while all rail stock must be compliant by 2032 (with 90% required to be compliant by 2022).

The Action Plan also outlines an assessment of aspects of the transport system and how compliant they are currently. Results vary, with more work needing to be done.

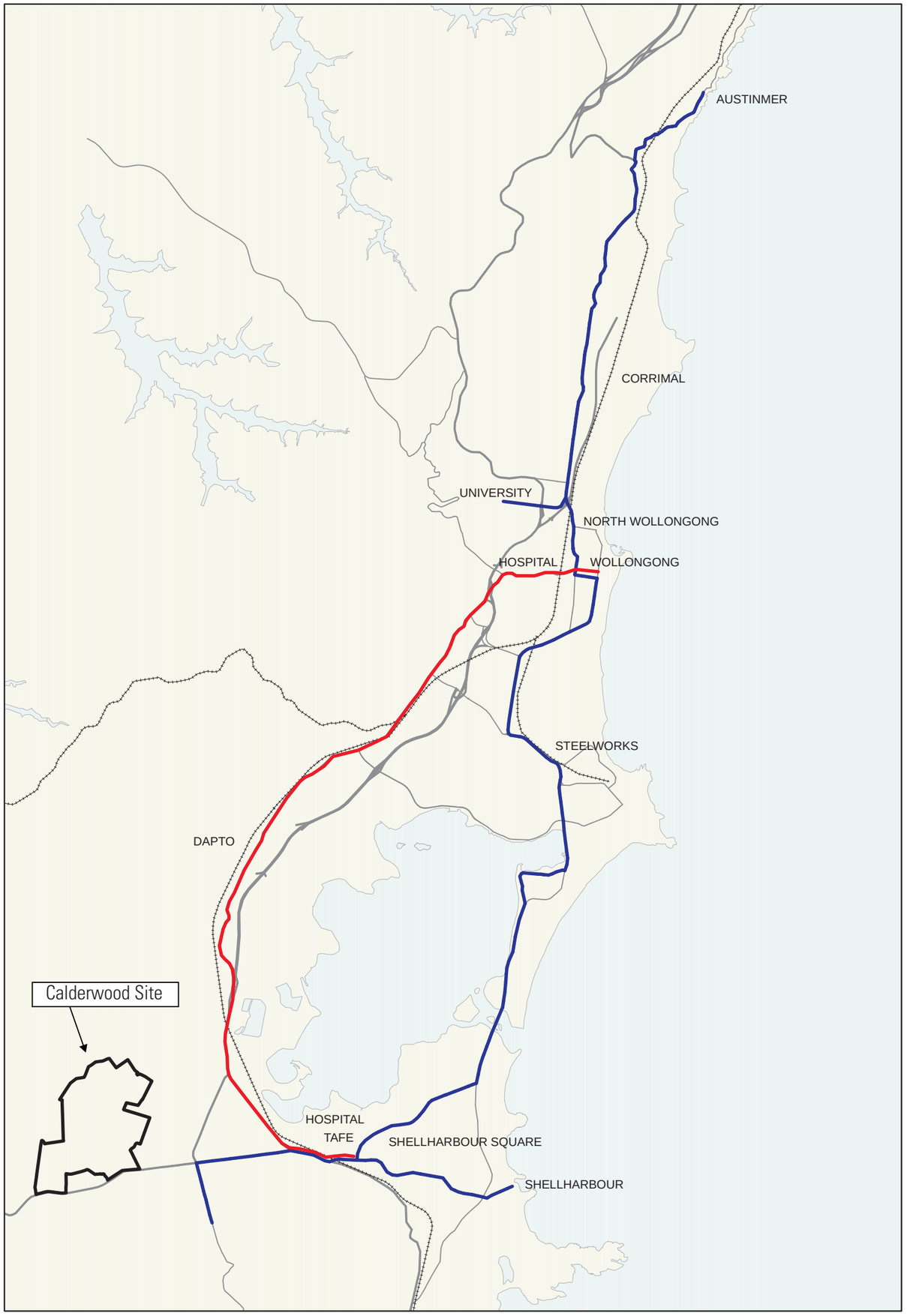
Finally, the plan identifies a series of barriers, with subsequent strategies, responsibilities, budgets and targets aimed at improving key areas of accessibility shortfalls, including related to information provision, adequacy of infrastructure, communication with groups, road and pedestrian access and crossings and the planning of developments to include all users.

The guiding principles of this plan will be used to ensure that transport improvements recommended in this report meet accessibility requirements.

## REVIEW OF BUS SERVICES IN NEW SOUTH WALES (UNSWORTH) 2004

The Final Report was released in February 2004 and has since been used as the basis for ongoing reform to bus services in New South Wales. The report contained recommendations covering metropolitan issues (network and service planning, contracting and funding), rural and regional NSW and state-wide issues (fares, ticketing and concessions, school student travel and governance arrangements).

The recommendations from the final report of relevance to this study include a network of viable strategic corridors, regional service planning forums, planning for the provision of bus services being factored into the planning of greenfield sites, high level integrated transport planning at the regional and sub-regional level, the development of viable public transport solutions such as supporting employment and population growth in regional centres and encouraging development along strategic corridors. The corridors for Wollongong are displayed in Figure 2A.




Delfin
Lend Lease

Figure 2A

# Wollongong Strategic Bus Corridors

CALDERWOOD
URBAN DEVELOPMENT PROJECT

**Legend**

- Site Boundary
- Wollongong to Shellharbour
- Austinmer to Shellharbour

N
W E
S

2 0 2 4 Kilometres



Cardno
Shaping the Future

Appendix 2B

# Review of Illawarra Regional Transport Context Documents

# APPENDIX 2B - Review of Illawarra Regional Transport Context Documents

The following documents have been reviewed:

- Illawarra Regional Strategy 2006-2031 and 2009 Update Report.
- Illawarra Urban Transport Opportunities Study
- Illawarra Action for Transport
- Moving Together 'Illawarra Regional Strategy'
- Albion Park Traffic Study
- West Dapto Release Area Studies:
  - West Dapto Urban Development TMAP Stage 1 Report – Baseline Study (2004) and West Dapto Urban Development TMAP Stage 2 – Final Report (2006).
  - West Dapto Release Area Draft Infrastructure Implementation Plan (2006).
  - West Dapto TMAP Extension Study (2008).
  - West Dapto Release Area Review: Planning And Infrastructure, Planning Report and Supporting Documentation (2008).
  - West Dapto Initial Access Strategy Supporting Stages 1 and 2 – Report by Manager of Infrastructure to City of Wollongong Council (20 October 2009).

## ILLAWARRA REGIONAL STRATEGY 2006 – 2031 AND 2009 UPDATE REPORT

The stated aim of the regional strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate the housing and employment needs of the residents to 2031. The strategy incorporates requirements set out in the State Infrastructure Strategy and is the pre-eminent strategic policy document for the region.

Challenges are discussed, including in the areas of employment, economy, environment, population and housing. A vision to meet the challenges is presented, promoting a prosperous, diverse and sustainable region. Regional transport is a key area of focus for the strategy. The following actions emerge from the strategy:

- Protection of the existing transport corridors, including through local environment plans.
- Consideration of transport access implications and travel demand management and inclusion of these measures in planning policies.
- Continued monitoring of the road network.
- Timely implementation of major transport infrastructure projects.
- Identification of strategic transport corridors.
- Monitoring of the functioning and future of the rail lines.
- Protection of Illawarra Airport.

Little detail is given regarding specific transport infrastructure projects, and none are listed in close proximity to the site.

A regional strategy update was published in 2009. Of key relevance to the subject site is the recognition within the regional strategy of the habitat corridor between Yallah and Marshall Mount Road. Future planning will consider opportunities to provide an appropriate balance between conservation and development outcomes within this corridor.

## ILLAWARRA URBAN TRANSPORT OPPORTUNITIES STUDY (1997)

In 1997, the *Illawarra Urban Transport Opportunities Study* (DJA Maunsell for DUAP) identified that a 30% modal split to public transport during the commuter peak periods would be required to improve air quality and reduce the environmental impact of urban development. The study identified Dapto as one of three sub-regional transport interchanges, along with Wollongong CBD and Oak Flats, which would be integral to the achievement of that target.

## ILLAWARRA'S ACTION FOR TRANSPORT (1999)

In 1999, the Illawarra Transport Taskforce prepared the *Illawarra's Action for Transport* document. The strategy contained a number of goals, including:

- Generate a significant shift to public transport and higher occupancy vehicles for journey within the region.
- Reduce total vehicle kilometres travelled for journeys to school.
- Reduce use of private vehicles for shopping trips within the region.

The strategy identified that modal split to public transport was approximately 4.1% in 1999.

## MOVING TOGETHER (2004)

In 2003, the Illawarra Transport Taskforce began reviewing the 1999 *Action for Transport* document with the result being the release of *Moving Together* in 2004. This document forms the current broad transport strategy covering the Illawarra region. Moving Together contains a number of actions relevant to the area, including:

- Apply a 'trunk and feeder' network structure for public transport services, e.g. local bus to main bus route or local to railway station.
- Review public transport services to major trip generators (e.g. University, Hospitals, WIN Stadium, commercial centres) and recommend improvements.
- Review existing neighbourhoods to improve public transport accessibility and the ability to move in and around suburbs.
- Improve the accessibility, attractiveness, safety and frequency of bus and train services.
- Promote off-peak travel using public transport.
- Promote the benefits of public transport and non-motorised transport (i.e. walking, bicycles etc.).
- Work with employers to encourage journey to work by public transport, e.g. transport access information.
- Provide and promote better integration of public transport services through integrated timetables.
- Provide and promote better integration of public transport services through integrated ticketing options.
- Promote and facilitate car pooling, car sharing and 'park and ride' options.
- Provide integrated public transport at commercial centres.
- Apply Transit Oriented Development (TOD) principles in land use planning to support and encourage public transport. A neighbourhood based on TOD principles would include a high density mixed use centre, narrow streets with wide footpaths, active street frontages, quality public open spaces, shared parking, safe pedestrian and cycle routes and an interconnected road network.
- Review planning controls to reallocate parking infrastructure costs to the provision of public transport infrastructure.
- Develop a set of effective parking supply management strategies to manage limited parking resources. These would specify pricing, duration and availability in the CBD's and other busy areas. As an incentive for more desirable modes, provide more parking for buses, taxis, disabled, delivery and high occupancy vehicles.
- Develop a set of effective parking supply management strategies to manage travel demand. These would specify pricing, duration and availability on campuses. Provide incentives for more desirable modes, i.e. for buses, taxis, disabled, delivery and high occupancy vehicles.
- Ensure Council Planning policies encourage alternatives to private transport when assessing Development Applications, e.g. showers at destinations, bicycle storage in new developments, bus stops in subdivisions etc.
- Provide physical and timing priority for preferred road based modes, i.e. pedestrians, buses, taxis and bicycles. e.g. bus lanes, transit lanes and 'B' traffic light phase.

The actions relating to integrating fare structures and timetables will be particularly pertinent to the Calderwood development as it is located outside of the walking catchment of the nearest railway station.

## ALBION PARK TRAFFIC STUDY (2006)

This study was undertaken by Maunsell/Aecom to test the validity of the road network which has been used as the basis of developing a Section 94 contributions plan for Shellharbour LGA.

In particular, the study investigated the following issues:

- The need for the Albion Park West Connector.
- The potential future use for a north-south link west of Albion Park.
- The need and timing for the Tripoli Way extension.
- The location of the future F6 interchange within Albion Park.

The study presented a proposed road network for three forecast years; 2010, 2020 and 2030. The 2010 road network includes construction of Tripoli Way as a bypass of Albion Park from Illawarra Highway (east) to Illawarra Highway/Broughton Avenue, although this could be deferred to 2018 by implementing peak-period clearways along Illawarra Highway through Albion Park town centre.

The 2020 road network assumes that the extension of the F6 from Yallah to Oak Flats is constructed by 2020 and consequently Tripoli Way is extended from Illawarra Highway (east) to Tongarra Road via the preferred location for the F6 interchange. If the F6 is not constructed by 2020 then the extension of Tripoli Way to Tongarra Road is not required.

The 2030 road network assumes that the F6 extension and Tripoli Way extension have been constructed. The network includes two new access roads from the Calderwood development, should it proceed, via an upgraded Calderwood Road and via a new east-west crossing of Macquarie Rivulet, north of Albion Park.

The study found that the provision of an interchange with the F6 at Tripoli Way, rather than Tongarra Road, provides the greatest benefit to Tongarra Road and the surrounding road network.

In September 2008, Cardno Forbes Rigby, on behalf of Delfin Lend Lease, submitted to Council a response to the traffic study. The submission identified that the traffic study failed to take into account any urban development in the Calderwood Valley. DLL argued that development of the Calderwood Valley would significantly alter the results of the modelling due to additional travel demand and the provision of alternative travel paths. DLL noted that they had not been contacted by Maunsell.

## WEST DAPTO RELEASE AREA STUDIES

The following relevant West Dapto Release Area (WDRA) studies were reviewed as part of the TMAP study process:

- West Dapto Urban Development TMAP Stage 1 Report – Baseline Study (2004) and West Dapto Urban Development TMAP Stage 2 – Final Report (2006).
- West Dapto Release Area Draft Infrastructure Implementation Plan (2006).
- West Dapto TMAP Extension Study (2008).
- West Dapto Release Area Review: Planning And Infrastructure, Planning Report and Supporting Documentation (2008).
- West Dapto Initial Access Strategy Supporting Stages 1 and 2 – Report by Manager of Infrastructure to City of Wollongong Council (20 October 2009).

A summary of the key issues from these reports is provided following.

### WEST DAPTO URBAN DEVELOPMENT TMAP STAGE 1 REPORT – BASELINE STUDY (2004) AND WEST DAPTO URBAN DEVELOPMENT TMAP STAGE 2 –REPORT (2006)

In 2004, Kellogg Brown and Root prepared the *West Dapto Urban Development TMAP Stage 1 Report* for Wollongong City Council. The report aimed to identify barriers to public transport use and the impact of poor accessibility. This was followed by the Final Report, prepared in 2006. It is understood that this project is the subject of a gazettal.

The reports identified that the aim of placing bus routes within 400m of an area's population has lead to circuitous and unattractive bus routes and suggests that service provision standards also need to consider the directness of routes, frequency and journey times.

The report identified that long journey times and low service frequency are major barriers to public transport use. It was recognised that modern styles of fringe development forces buses further away from direct routes in order to serve the catchment adequately.

The report also identified that bus/rail interchanges will be an integral part of the public transport network and consequently a fully integrated multi-modal fare structure would be required in order to encourage people to transfer between modes.

The report concluded that the following key improvements would be required to serve West Dapto:

- Widening of the F6 north of Fowlers Road to six lanes and the provision of south-facing ramps at Kanahooka Road.
- Widening of Princes Highway to four lanes across Mullet Creek.
- Grade separation of all existing level crossings.
- High frequency bus routes along key corridors.
- A regional bus/rail interchange at Dapto and smaller bus interchanges at all town centres, including provision for a future railway station at Huntley Road.
- Incorporation of bus priority measures into the road network.
- Duplication of the rail line from Unanderra to Dapto in parallel with development of West Dapto and raising the line above the 1 in 100 year flood level.

## WEST DAPTO RELEASE AREA DRAFT INFRASTRUCTURE IMPLEMENTATION PLAN (2006)

The *Draft Infrastructure Implementation Plan* was prepared by Wollongong City Council in 2006 to set out the infrastructure which would be provided as part of the development of the West Dapto Release Area.

Relevant transport infrastructure and estimated costs include:

- F6/Fowlers Road south-facing ramps ($1.70 million plus a matching contribution from State Government).
- Dapto Bus/Rail interchange upgrade ($7.50 million plus a matching contribution from State Government).
- F6/Princes Highway north-facing ramps, Tallawarra interchange ($0.85 million – 25% share, with the remaining funded by the State Government and other sources).
- Huntley Road upgrade ($3.16 million).
- F6/Emerson Road on/off ramps ($2.07 million).

## WEST DAPTO TMAP EXTENSION STUDY (2008)

The TMAP Extension Study was prepared by Connell Wagner in 2008 to develop a preferred main roads strategy for the West Dapto area, focusing on links to the Southern Freeway and crossings of the South Coast Rail Line. A combination of TRACKS modelling and multi-criteria assessment was used to determine a preferred package of measures.

The study recommended a schedule of infrastructure improvements be implemented to serve the West Dapto Urban Release Area, in order to achieve the goals of increased road network permeability and grade-separation of existing level crossings.

The study also recognised the present low levels of public transport usage in the Dapto area, and identified that, if these levels were not markedly improved by 2026, the road network would come under considerable pressure. The study recommended that a greater emphasis be placed on the improvement of public transport services, especially in new release areas where the early provision of good public transport services can greatly influence modal choice. This recommendation is particularly relevant for the Calderwood development, given its location in an urban release area.

## WEST DAPTO RELEASE AREA REVIEW: PLANNING AND INFRASTRUCTURE, PLANNING REPORT AND SUPPORTING DOCUMENTATION (2008)

The Growth Centres Commission was commissioned by Wollongong City Council in 2008 to undertake a review of West Dapto Release Area planning, following revisions to the anticipated lot yields. The review included the LES, draft LEP, draft s.94 contributions plan, and the Draft Infrastructure Implementation Plan. The previously identified target of a 3.5% modal shift to public transport was accepted by the Commission.

The report also considered the potential transport requirements of the future development of Yallah/Marshall Mount and Calderwood.

Notable findings of the review include:

- Development in the Yallah, Marshall Mount and Calderwood areas is insufficient to warrant the development of the proposed Huntley Railway Station and that associated track amplifications are not cost effective.
- Instead the required road links to the Princes Highway and F6 should be developed to facilitate access to Dapto and Albion Park Stations.
- Albion Park Station is well located to serve any future Calderwood release area.
- Development of new bus/rail interchanges at Dapto and Albion Park stations will required as part of release area development.
- Payment by developers of a start-up bus service subsidy needs further consideration.

The review also found that the release of 8,000 dwellings in Calderwood is likely to generate the need for the following:

- Widening of Illawarra Highway from Broughton Avenue to Terry Street to four lanes.
- Widening of Tongarra Road from Terry Street to Princes Highway to four lanes.
- Upgrade two-lane road link from Calderwood Road to Yallah Road.
- Upgrade of the Princes Highway/Yallah Road interchange to provide improved northbound on and off-ramps.
- Possible earlier provision of an additional westbound lane across the Haywards Bay Drive overbridge if Calderwood development occurs before or in conjunction with the Yallah/Marshall Mount release.
- Upgrading of the Albion Park railway station interchange.

These works are estimated to cost $72.0 million, however this could be reduced to about $57.0 million if the extension of the F6 from Yallah to Oak Flats is constructed. However no detailed basis for these costing is provided within the report.

## WEST DAPTO INITIAL ACCESS STRATEGY SUPPORTING STAGES 1 AND 2 – Report by Manager of Infrastructure to City of Wollongong Council (20 October 2009)

This report sets out the proposed initial access strategy to facilitate the development of Stages 1 and 2 of the West Dapto Release Area. The strategy is in response to significant issues that were identified with the 2009 LEP for West Dapto and the GCC review in November 2008 which, among other things, identified the Fowlers Road Extension as unnecessary to support Stages 1 and 2. The strategy also addresses the immediate congestion and flooding access issues for the existing residents of Horsley. Table 1 presents the strategy as adopted by Council.

**Table 1 West Dapto Initial Access Strategy**

| | Road Link | Improvement | Estimated Cost | Programme |
|---|---|---|---|---|
| 1 | Bong Bong Road | Widen the level crossing and improve connections to the Princes Highway to increase traffic capacity and reduce congestion | $3.77m | 2009/10 to 2013/14 |
| 2 | West Dapto Road | Realign the intersection with the Princes Highway and install traffic signals to improve safety and traffic capacity | $1.10m | 2009/10 to 2010/11 |

| | Road Link | Improvement | Estimated Cost | Programme |
|---|---|---|---|---|
| 3 | Shone Avenue | Replace the single lane bridge and realign the intersection with West Dapto Road to improve safety and traffic capacity | $5.80m | 2009/10 to 2012/13 |
| 4 | Fairwater Drive (east) | Construct extension to Cleveland Road to connect to the current rail over pass and the highway | $16.86m | 2013/14 to 2017/18 |
| 5 | Cleveland Road | Replace Mullet Creek Bridge and improve access to Dapto High School to improve safety, traffic capacity | $5.11m | 2011/12 to 2013/14 |
| | | Widen road from Fairwater Drive to Mullet Creek and widen intersection with Princes Highway to improve safety, traffic capacity and decrease flood affectation | $12.58m | 2017/18 to 2021/22 |
| 6 | Fairwater Drive (west) | Construct extension from Highcroft Boulevard to Bong Bong Road to increase traffic capacity and complete the road network | $0.9m | 2014/15 |
| 7 | West Dapto Road, Shone Avenue and Bong Bong Road | Staged widening of West Dapto Road and Shone Avenue including construction of new bridges. Drainage improvements on Bong Bong Road to improve safety, traffic capacity and reduce flood affectation | $32.37m | 2013/14 to 2023/24 |
| | | **Total Estimated cost** | **$78.46m** | |

The plan is proposed to be funded primarily from developer contributions and partly from Council's revenue.

Appendix 2C

# Review of Local Planning Context Documents

# APPENDIX 2C - Review of Local Planning Context Documents

The following documents have been reviewed:

- Shellharbour Rural LEP 2004
- Wollongong LEP 1990 and Draft Wollongong Local Environmental Plan (West Dapto) 2009
- West Dapto Urban Release Area planning documents:
  - Draft West Dapto DCP 2007 (Superseded).
  - Draft West Dapto Staging Plan (2006) (Superseded).
  - Draft West Dapto Master Plan Report (2006) (Superseded).

## SHELLHARBOUR RURAL LEP 2004

The Shellharbour Rural LEP is the principal planning document that guides land use management and development in the rural parts of Shellharbour LGA. Towards achieving management of development, the following aims have been outlined by Council:

- To provide a comprehensive rural planning framework based on the principles of ecologically sustainable development,
- To establish ecologically sustainable development goals and require those goals to be taken into consideration when determining development applications,
- To ensure that the primary use of prime agricultural land and other land in the 1 (a) Agriculture Zone is for sustainable agricultural pursuits and associated development that supports a diversified range of agricultural uses,
- To preserve and enhance the visual rural landscape character of land in the 1 (rl) Rural Landscape Zone,
- To provide for the management of the extraction of mineral resources in a manner that has regard to the surrounding land uses and end-use options of the altered landscape while minimising the environmental impacts of mineral extraction,
- To protect, enhance and manage environmentally important land having special aesthetic, historic, ecological or conservation values for the benefit of present and future generations.

The portions of the development site within Shellharbour LGA are presently zoned 1(a) Agriculture and 7(n) Nature Conservation.

## WOLLONGONG LEP 1990 AND DRAFT WOLLONGONG (WEST DAPTO) LEP 2009

The Wollongong LEP is the principal planning document that guides land use management and development in the Wollongong LGA (excluding the Wollongong City Centre). Towards achieving management of development, the following aims have been outlined by Council:

The actions and initiatives employed to ensure the implementation of these aims include:

- To regulate development to coincide with the particular zones.
- To implement development and performance criteria to direct specific types of development and development in specific zones.
- To allow appropriate rezoning of particular areas, to further enable development.
- To combine all relevant planning documents and policies to enhance efficiency.
- To decrease the number of zones and definitions, while also reducing the level of permission required for minor development.

The LEP also outlines the provisions for exempt and complying development, the objectives and land use tables for each proposed zone and permitted and prohibited development activities. The draft 2009 LEP is presently under review by the Department of Planning and approval by the Minister for Planning is anticipated in the near future.

The portion of the development site within Wollongong LGA was previously zoned non-urban, however under the draft 2009 LEP the zoning of this area has been deferred for future resolution.

## WEST DAPTO RELEASE AREA PLANNING DOCUMENTS

Significant planning work has been undertaken by both Wollongong City Council and the Department of Planning for the West Dapto Urban Release Area since the late 1980s. Due to high infrastructure costs and low demand for housing, release beyond the suburb of Horsley did not proceed. Planning for the release area began again in 2004 when the then Department of Infrastructure, Planning and Natural Resources (DIPNR) announced that the release would be developed to ease anticipated future shortages of land in the Illawarra.

Comprehensive planning documents, including a Master Plan, Staging Plan, Infrastructure Implementation Plan and statutory planning documents were prepared and exhibited in 2006 and 2007 with the intention of releasing land for development during 2006. However, following exhibition of the Draft LEP in 2007, it was decided that the complex environmental and infrastructure issues required further consideration.

In 2008, Council appointed the Growth Centres Commission to review all planning for the West Dapto Release Area and the recommendations of this review were adopted by Council later that year. Subsequently, a revised draft LEP (2009) has been prepared and is awaiting approval from the Minister for Planning. Staging of the release area has been revised, with Stages 1 and 2 being release concurrently (first DAs expected to be lodged in early 2010) and a revised access strategy has been prepared in order to reduce the costs associated with infrastructure provision.

The delays related to the West Dapto Urban Release Area (currently running four years behind the timeframe stated in the 2006 Master Plan) have contributed to a shortage of developable land on the market and created upward pressure on land prices.

The following relevant WDRA Council documents were reviewed as part of the TMAP study process:

A summary of the key issues from these documents is provided following.

### WEST DAPTO DEVELOPMENT CONTROL PLAN 2007

The West Dapto Development Control Plan aims to regulate and control the development of land, through the implementation of specific requirements and standards. Through the satisfaction of these minimum standards, the DCP works towards achieving improved neighbourhood amenity, diversity and availability of housing types and environmental accountability.

In defining the urban structure of West Dapto, the DCP recommends enhancements to the public transport and cycling/walking networks. To allow for better accessibility to these network systems, more services and connections have been proposed, including upgrades to Huntley Road, Avondale Road, Cleveland Road, and a new access link aligned north-south, located to the west of the railway.

Additionally, there is a possibility of a new railway station located 3km south of the Dapto Station, at Huntley Road, Penrose. This has been included as part of the Master Planning process.

Towards a more sustainable community, Council has highlighted the need for an efficient transport system to reduce private vehicle usage and the main road network has been developed to support this system. A primary bus loop has been designed for express services, providing links for key centres, while a secondary network links all other centres to this. This has been aimed at providing public transport access to residents within a 5-minute walk (or 400m).

Further to this, the urban structure has been planned to provide for walkable communities, supported by several town and village centres, local bus stops, local shops and amenities, community facilities and schools, denser housing types and mixed use job opportunities. The aim is to design walkable communities, while reducing vehicle kilometres travelled (VKT) and promoting more cycling and pedestrian activity.

To encourage more cycling activity, several off-road and on-road routes, linking to major centres and attractions have been identified. These will also include east-west routes along the riparian corridors. Council is aiming for a well-connected network of routes that will promote a healthy lifestyle for residents.

## WEST DAPTO STAGING PLAN (2006)

The West Dapto Proposed Staging Plan details the staged development of areas within the West Dapto release area. The proposed staging plan is reproduced as Figure 2C1.

The portion of the CUDP site that is located in the Wollongong LGA falls within the Stage 5 Precinct – Yallah/Marshall Mount, which will ultimately yield approximately 1,070 dwellings according to the estimates prior to the Growth Centres Commission review in 2008.

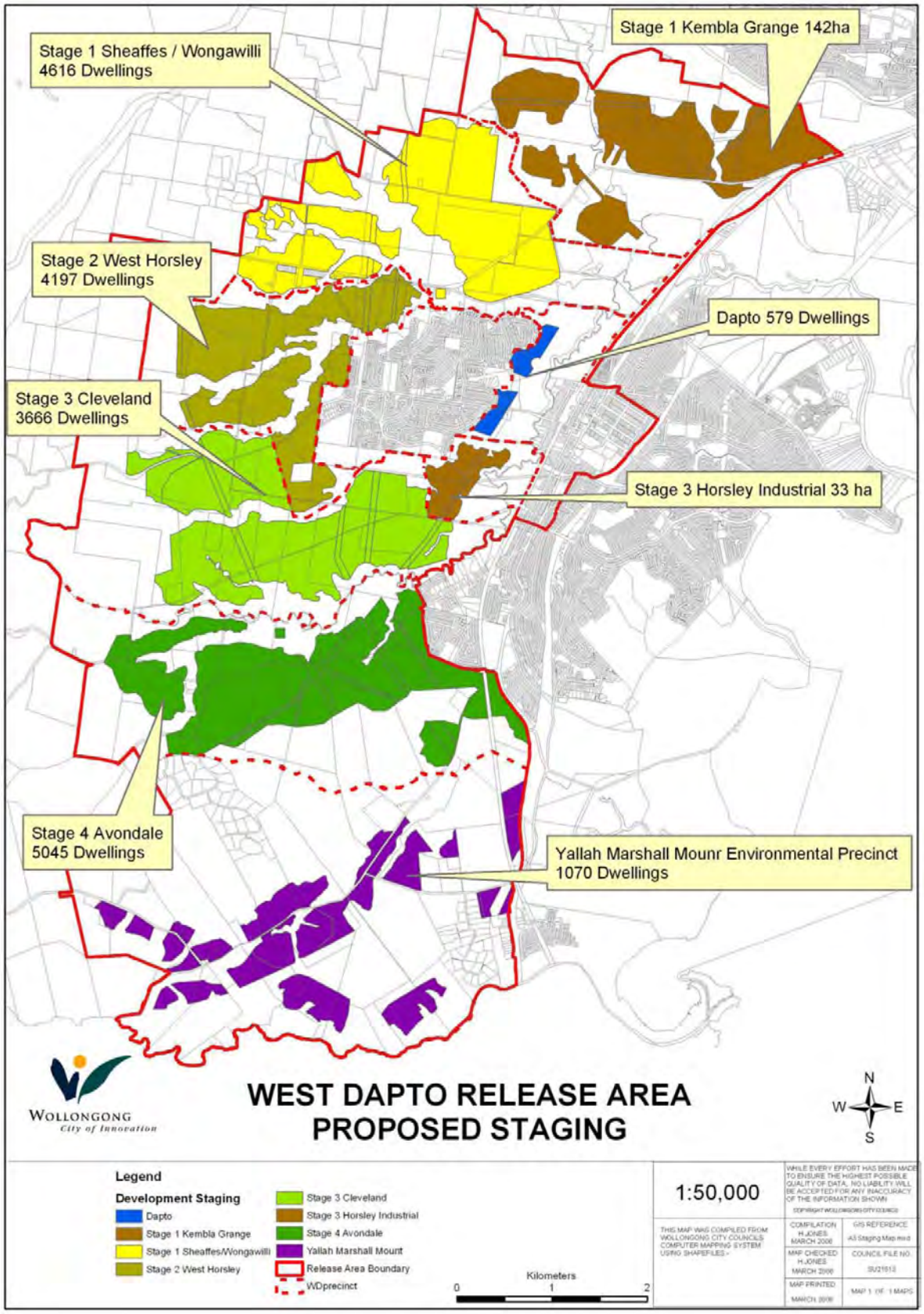
## WEST DAPTO MASTER PLAN REPORT (2006)

The West Dapto Master Plan Report summarises all the different planning reports undertaken to 2006 and synthesises them into a physical structure for growth. The proposed master plan is reproduced as Figure 2C2.

The report identifies key initiatives to provide a sustainable transport network, including:

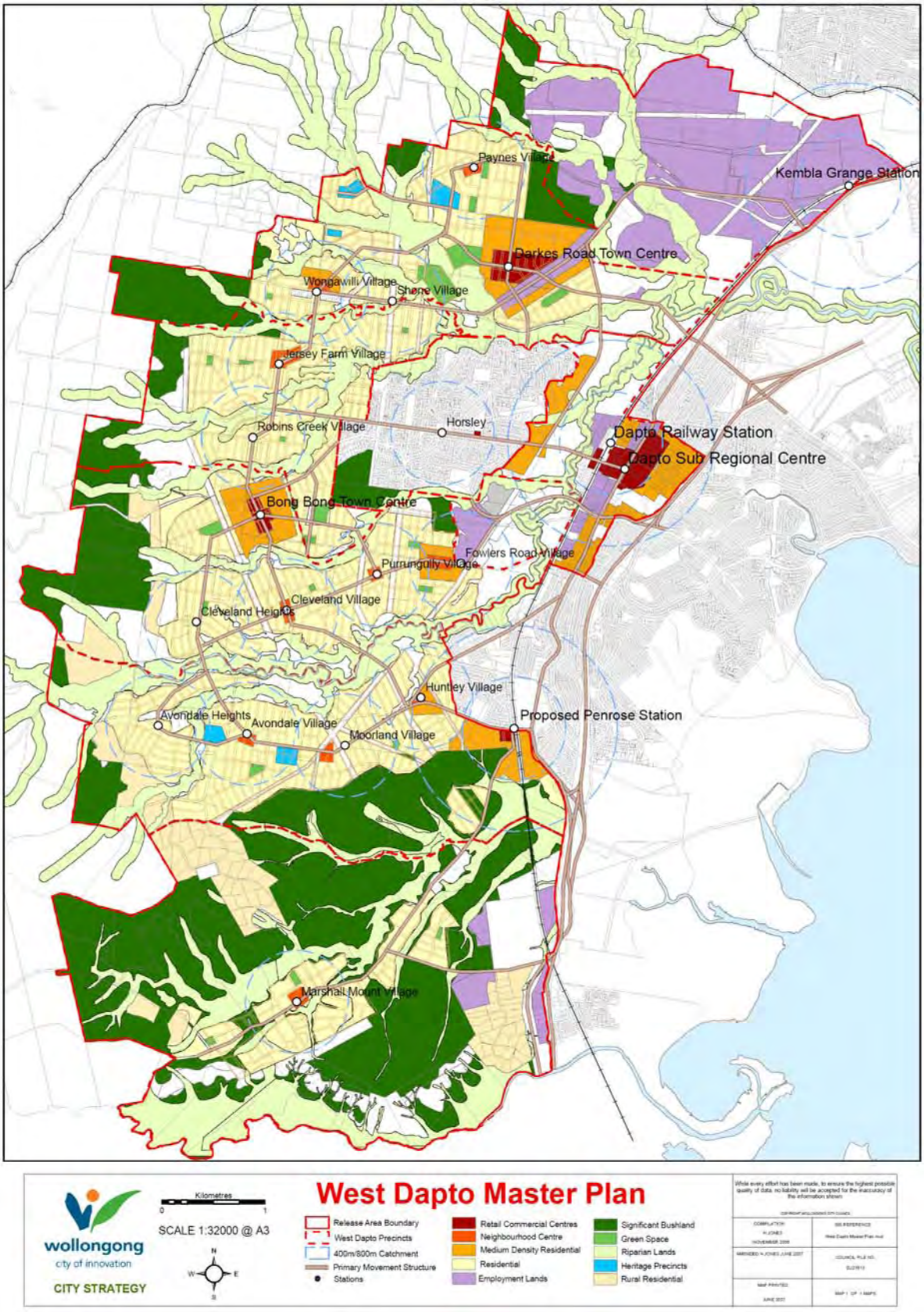
- Provision of a railway station at Huntley Road and the development of increased residential densities and a town centre around it.
- Design of the urban release area around a direct, north-south bus spine.
- The design of neighbourhood, village and town centres to have high permeability and walkability as well as supporting multi-purpose trips.

**Figure 2C1 West Dapto Proposed Staging**




Source: Wollongong City Council

**Figure 2C2 West Dapto Master Plan**




Source: Wollongong City Council

Appendix 2D

# Review of Calderwood Planning Context

# APPENDIX 2D - Review of Calderwood Planning Context

DLL controls approximately 700 hectares of land in the Calderwood Valley in the Illawarra Region for which it is seeking government approval for urban development. Approximately 107 hectares of the land is located in the Wollongong LGA while the balance is located within the Shellharbour LGA.

The Calderwood Valley has long been recognised as a location for future urban development, firstly in the Illawarra Urban and Metropolitan Development Programmes and more recently in the Illawarra Regional Strategy (IRS).

The IRS nominates Calderwood as an alternate release area if regional land supply is lower than expected. Following the recently completed review of the proposed West Dapto Release Area (WDRA) planning documents by the Growth Centres Commission (GCC), this situation has now been recognised as a reality. Also, the GCC report concluded that there is merit in the early release of Calderwood.

Changes in outlook arising from global, national and regional factors influencing investment and delivery certainty, housing supply and affordability and employment and economic development also add to the case for immediate commencement of the Calderwood Project.
DLL has established the conditions for the CUDP which enable effective and efficient implementation of major urban projects. These are:

- Committed landowners.
- A viable and uncomplicated infrastructure and servicing strategy.
- A well resourced proponent with the core business skills to implement the proposal.

There are five significant planning resolutions that define the current status of Calderwood:

- In September 2006, for that part of the land in its LGA, Shellharbour Council formally resolved to commence the rezoning process as part of its comprehensive LEP. However, the Department of Planning advised that it would be premature to study Calderwood at that time.
- In September 2007, Wollongong Council commenced public exhibition of the draft WDRA planning documents. These have the potential to affect the 107 hectares of land under DLL control in that LGA.
- The announcement on 15 May 2008 by Wollongong Council Administrators that significant issues have been identified in the proposed WDRA planning and the NSW Growth Centres Commission has been asked to assist to resolve these.
- On the 16 April 2009, pursuant to Clause 6 of SEPP Major Development, the Minister for Planning formed the opinion that the CUDP constitutes a Major Project to be assessed and determined under Part 3A of the EP&A Act.
- On 10 June 2009 the Department of Planning issued the Director General's Requirements to guide the preparation of the Concept Plan, Environmental Assessment Report and Stage 1 Project Application.

In summary, the following public documentation has previously been prepared for Calderwood:

- Rezoning Application (2006).
- Justification Report (2008).
- Preliminary Environmental Assessment (2009).

This TMAP, and associated documentation, is a natural continuation of the planning process for Calderwood.

Appendix 3A

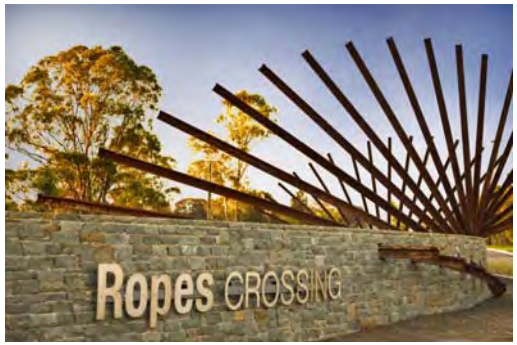
# DLL Example TDM Measures

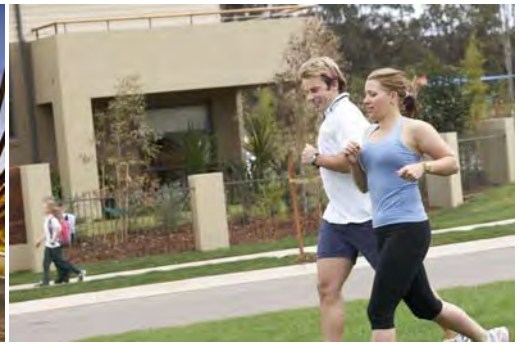
# DELFIN LEND LEASE MODE SHARE INITIATIVES
# ROPES CROSSING

| Ropes Crossing Key Facts | |
|---|---|
| Area | 161 ha |
| No. of Lots | Approximately 1,800 dwellings |
| Residential Population | Approximately 5,000 |

## Broad objectives of access and movement initiatives:

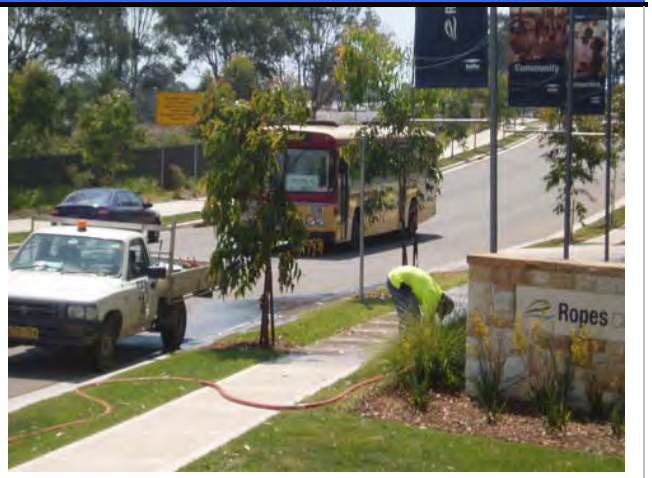
- Establish an urban form to maximise use of and access to public transport
- Concentrate high trip generating uses adjacent to major public transport routes and nodes
- Provide public transport infrastructure and services to achieve higher public transport use than other similar established areas in Blacktown and Penrith
- Provide public transport and services early in the development to establish use pattern
- Incorporate a range of uses within the site to minimise demand for travel outside the area
- Establish high quality and efficient pedestrian and cycle routes to encourage travel by these modes
- Community education to support public transport initiatives



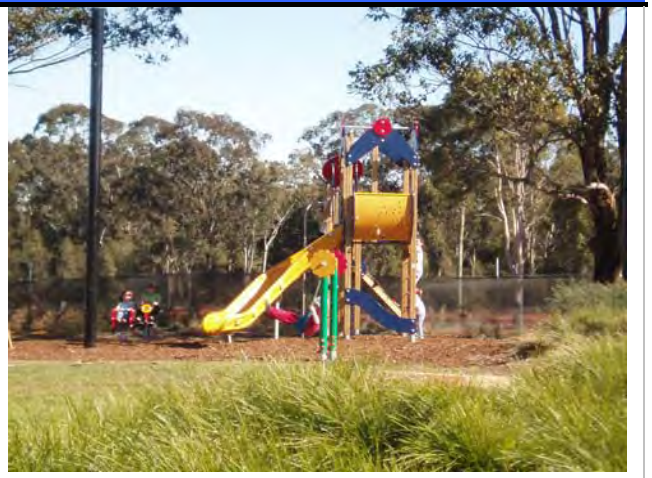



| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Establish an urban form to maximise use of public transport | • **Appropriately locate services and facilities** to ensure accessibility of these services by all groups<br>• Establish a **permeable modified grid street system** to promote connectivity and ease of movement for pedestrians, bicycles, buses and vehicles<br>• Create a **legible street hierarchy** responding to the intended uses and scale and is designed to calm traffic and encourage active uses on the street level<br>• Maximise safety in individual streets by implementing measures to **minimise the potential for 'rat-running' or shortcut routes** including roundabouts, appropriate speed limits and raised 'wombat' type pedestrian crossing at appropriate locations.<br>• Provide a **variety of lot sizes** to create dynamic and diverse streetscapes.<br>• **Active frontages** to all streets and open spaces. |  <br>*Simple and permeable street system to cater for pedestrian, cyclists, vehicles and buses*<br>  <br>*Establish legible street hierarchy and create roundabouts to calm traffic* |

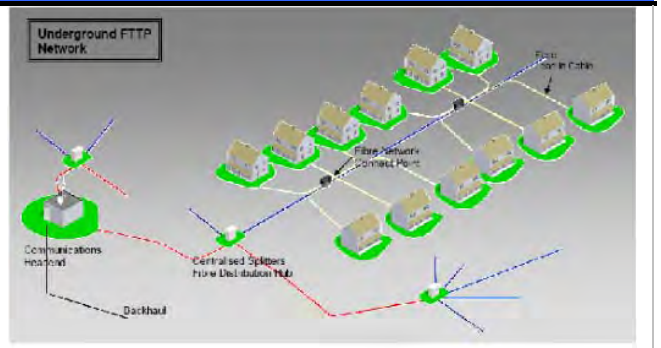
| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Concentrate high trip generating uses adjacent to major public transport routes and nodes | • **Consolidate key land uses within the Village Centre** which is located adjacent to bus routes<br>• Provide a range of **medium density residential development** in appropriate locations close to key activity nodes and bus stops<br>• Create a vibrant main street by **establishing active uses on the ground level**, **wide footpaths and landscaping**, to provide an attractive pedestrian environment in the Village Centre. |  <br>*Village Centre is located next to public transport routes to promote accessibility*<br><br>  <br>*Ropes Crossing Primary School located adjacent to public transport routes* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Provide public transport infrastructure and services to achieve higher public transport use than other similar established areas in Blacktown and Penrith | • Locate bus stops within 5 minute walk (400m) of the majority of dwellings<br>• Open space is generally located within 3-5 minutes walk to the majority of the homes<br>• Strategically locate the Village Centre to ensure most homes are within a 10 minute walk (800m)of the Centre or can easily access the centre by public transport<br>• Ensure public transport services connect the site with surrounding neighbourhoods and the established transport systems outside the site to enhance accessibility to jobs, shops, services and opportunities in the wider region<br>• Engage bus service operators and Ministry of Transport early in the development stage to ensure bus services are running when the first resident moved in |  <br>*Connect bus services with the surrounding areas to ensure accessibility to jobs and services in the wider region*<br><br>  <br>*Bus stops are generally located within a 5 minutes walking distance of dwellings* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Provide public transport and services early in the development to establish use pattern | • Infrastructure and services, including public transportation, are **provided early in each stage to establish a walking, cycling and public transport usage behaviour** for new residents | • **High quality streetscape** (street trees and furniture) was established prior to occupation of the site<br>• **Bus routes and services** were established before the first resident moved in<br>• **Ropes Crossing Primary School** was opened when only 6% of the total number of dwellings were completed and occupied<br>• **Village Centre** was opened with key anchor tenants operating when only 8% of the total number of dwellings were completed and occupied<br>• **3 key village parks and village greens and 50% of the hike and bike network** were completed when only 10% of the total number of dwellings were completed and occupied<br>• **Ropes Crossing Community Centre** commenced construction when only 10% of the total number of dwellings were completed and occupied<br>  <br>*Ropes Crossing Community Bus commenced operation prior to the first resident moving into the community* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Incorporate a range of uses within the site to minimise demand for travel outside the area | • Provide a range of local facilities and services to meet the needs of the community within the site to minimise the need to travel to other areas for the same facilities.<br>• Provide a mix of land uses within the site to provide local retail, community, education and employment opportunities.<br>• Provide a range of local passive and active open spaces to cater for the all recreational needs |  <br>*Children playgrounds are provided within walking distance to the majority of the residents to minimise the need to travel to other areas*<br>  <br>*Provide a range of retail and community uses within the site* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Establish quality and efficient pedestrian and cycle routes to encourage travel by these modes | • Provide a **clear and simple hike and bike network** to provide links throughout the neighbourhoods<br>• Ensure a safe pedestrian environment by **incorporate crime prevention through urban design principles**<br>• Incorporate **pedestrian priority streets with footpaths on both sides, increased verge widths and additional landscaping and street tree planting** to maximise amenity for pedestrians and cyclists<br>• Provide **links to commuter cycle networks beyond the site**<br>• Ensure **supermarkets and shops are accessible from the street level** to create activate streetscapes<br>• Civic spaces and pedestrian oriented uses such as cafes and restaurants are located with a **northerly outlook** to maximise amenity for users in all seasons.<br>• Generally **all streets have footpaths on both sides** to facilitate walkability of the community.<br>• Pedestrian network hierarchy with **pedestrian priority routes and width footpaths**<br>• **Street trees** to provide shaded routes<br>• **Minimise driveway crossings** on key pedestrian routes on collector roads. |  <br>*Hike and bike network to promote walking and cycling*<br><br>  <br>*Wider than standard verge to ensure ease of pedestrian movement and encourage walkability* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| National Broadband Network | • Incorporate **Fibre to the Home or Premise (FttH/FttP)** in an early stage to service all homes to provide opportunities for residents to work from home and facilitate communication between businesses without the need to travel outside the site |  *Provide underground FTTP Network to all homes* |
| Community education to support public transport initiatives | • Provide **public transport information** in Welcome Kits<br>• Provide **information and links to service provider** on Community Portal<br>• Implement a range of **promotional initiative to increase public transport usage** (eg. discount vouchers for public transport usage (one month free bus travel))<br>• Work with schools to establish **School Walking Bus initiatives** |  *Community education event to promote cycling, public transport usage and road safety.* |

# DELFIN LEND LEASE MODE SHARE INITIATIVES
# ROUSE HILL

| Forde Key Facts | |
|---|---|
| Area | 120 ha |
| No. of Lots | Approximately 1,800 dwellings |
| Residential Population | Approximately 4,000 – 5,000 |

## Relevant Masterplanning Principles

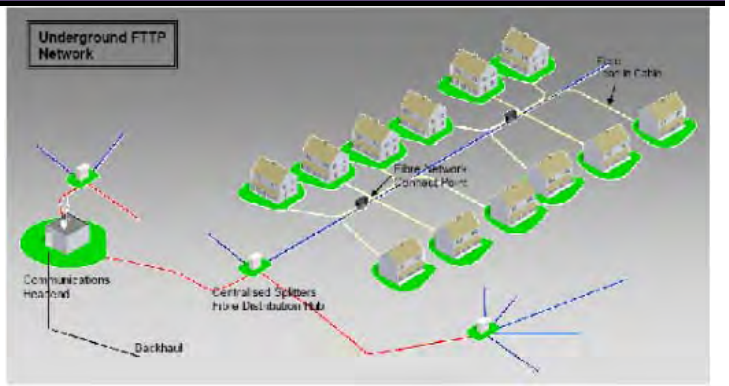
- Transit and pedestrian oriented development
- Pedestrian connectivity as built form determinant
- Power of Place and Civic Identity
- Discrete/Neighbourhoods with Identifiable Structure
- Compact Town Centre form and footprint
- National Broadband network

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Transit and pedestrian oriented development | • Maximise higher density residential and employment uses within 400m of transit interchange to enhance transit use<br>• Aim to reduce car dependency by providing pedestrian and cycle friendly streets and facilities within a 5-10 minute walk of the town centre and the transit station<br>• Provide convenient access to public transport within a 5-10 walk throughout the town centre<br>• Organise transit interchange as gateway and arrival experience with the provision for supportive commercial and retail uses at a later time<br>• Enhance pedestrian orientated development with provision of facilities, such as benches and landscaping, which will also create identifiable road character<br>• Enhance the pedestrian orientated development with primary and secondary pedestrian linkages, particularly throughout the Town Centre Core and to the surrounding residential neighbourhoods.<br>• Provide for an integrated transit and rail station at the termination of Main Street of the Town Centre connecting the community to the metropolitan network<br>• Local bus service network linking to the transit station<br>• Provide community bus service<br>• Cycle and pedestrian areas linking to the transit station. |  <br>*Transit oriented development where bus interchange is located adjacent to the town centre and forms the gateway of the development.*<br>  <br>*Community centre located within the town centre to improve accessibility for pedestrian and by public transport* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Pedestrian connectivity as built form determinant | • Provide high degree of permeability through the Town Centre built form to create convenience, safety and fine grain experience;<br>• Provide publicly accessible routes through large footprint land uses and integrated open space and public domain network to create connection throughout the Town Centre<br>• Provide off street cycleway network throughout the development to encourage cycling |  <br>*Pedestrian oriented streets to improve pedestrian connectivity.*<br>  <br>*Active streetscape to promote safe pedestrian activities, improve surveillance and encourage people to walk around the town centre.* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Discrete/Neighbourhoods with identifiable Structure | • Focus each neighbourhood on an internal park and establish clear edges and character t each precinct or neighbourhood<br>• Ensure a permeable and legible street structure<br>• Define a hierarchical network of streets providing convenient and legible access that clearly links to other neighbourhoods<br>• Acknowledge streets as view corridors, critical to orientation and way finding<br>• Acknowledge architectural treatment and diversity of the different neighbourhoods<br>• Define the neighbourhoods and the town centre by:<br>- Fingers of open space created by the Caddies Creek system and its tributaries<br>- One or more neighbourhood parks, centrally focused<br>- Less than 5 minute walk from neighbourhood centre to its outer limit and into adjacent neighbourhood<br>  |  <br>*Neighbourhood park forms the focus of the neighbourhood*<br>  <br>*Caddies Creek is accessible from the neighbourhoods to provide regional recreational opportunities for residents.* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Compact Town Centre form and footprint | • Reduce the extent of Town Centre footprint through possible vertical layering of land uses, reduction in road reserve areas and innovative approaches to mixed use<br>• Increase density of housing forms in the Town Centre and optimise all land development opportunities within a 5 min walking distance to the Main Street form employment and living |  <br>*Mixed use development facing town square to create civic gathering place*<br><br>  <br>*Vertical integration of development to promote a compact urban form in the town centre.* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| National Broadband Network | • Incorporate Fibre to the Home or Premise (FttH/FttP) in an early stage to service all homes to provide opportunities for residents to work from home and facilitate communication between businesses without the need to travel outside the site |  *Provide underground FTTP Network to all homes* |

# DELFIN LEND LEASE MODE SHARE INITIATIVES
# FORDE

| Forde Key Facts | |
|---|---|
| Area | 131 ha |
| No. of Lots | Approximately 1,100 dwellings |
| Residential Population | Approximately 2,700 |

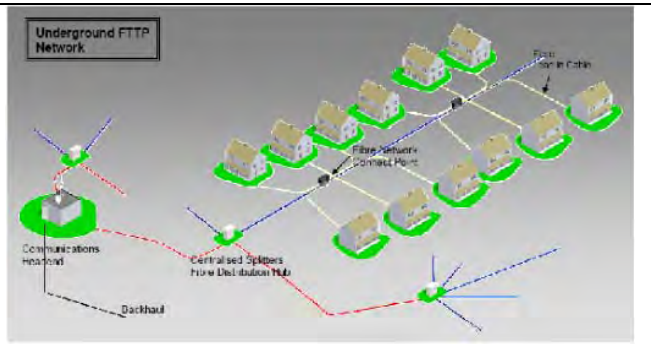
## Broad Access and Movement Objectives from North Gungahlin Structure Plan

- Reduce dependence on private cars and increase public transport use
- Road network capable of supporting efficient private and public vehicle use
- Encourage walking and cycling as alternative means of transport
- Establish a development pattern to encourage a greater use of public transport with resultant reductions in private car use
- Increase opportunities for locally based service provision and home based employment, reducing the need for travel to other areas
- National Broadband network

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Reduce dependence on private cars and increase public transport use | • Infrastructure and services, including public transportation, are **provided early in each stage to establish a walking, cycling and public transport use behaviour** for new residents<br>• **Engage bus service operators early** in the development stage to ensure bus services are running when the first resident moved in<br>• Design a public transport network to **connect Forde with the broader public transport network** in North Gungahlin and other major centres. Locate bus route on the collector road network, which connects Forde with adjoining town centres and areas of higher density.<br>• Locate **bus route within 400m of at lease 90% of dwellings**<br>• Locate **bus stops within 500m for 95% of dwellings** |  <br>*Bus stops are located within 5 minutes walk from 95% of the dwellings to maximise public transport uses.* |
| Road network capable of supporting efficient private and public vehicle use | • Establish a **clear and identifiable road hierarchy** to promote connectivity and ease of movement for pedestrians, bicycles, buses and vehicles<br>• Design of new roads to provide adequate capacity for vehicle traffic on the assumption that up to 20% **of total peak hour travel will take place using public transport**.<br>• Maximise safety in local streets by designing a road network that would **minimise through traffic and reduce 'rat running'** from Bonner and future suburbs to the Gungahlin Town Centre and areas south.<br>• **Internal road network is connected with Horse Park Drive**, which is the major arterial within the broader North Gungahlin area.<br>• **Connect internal road network with future entry point at Bonner** to promote connectivity between suburbs. |  <br>*Clear road hierarchy and internal road network to promote connectivity* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Encourage walking and cycling as alternative means of transport | • Provide a comprehensive network of both trunk on-road and off road pedestrian and cycle network that allows safe connections to all public open space, Mulligans Flat Nature Reserve, schools, community facilities and local centre.<br>• Establish an open space spine along the natural creek line linking the Mulligans Flat to the central and mixed use higher density housing area. A pedestrian pathway and cycleway network is incorporated along the open space spine to encourage walking and cycling.<br>• Create pedestrian connection to the existing suburb of Gungahlin via a pedestrian underpass to an existing bridge.<br>• Appropriately locate services and facilities to ensure accessibility of services by all groups<br>• Provide a variety of lot sizes to create dynamic and diverse streetscapes.<br>• Active frontages to all streets and open spaces.<br>• Incorporate pedestrian priority streets with footpaths on both sides, increased verge widths and additional landscaping and street tree planting to maximise amenity for pedestrians and cyclists<br>• Incorporate high quality streetscape design to define space, provide shade and enhance pedestrian amenity. Streetscape design is provided in a Landscape Master Plan which incorporates a variety of street trees to define neighbourhood character.<br>• Minimise driveway crossings on key pedestrian routes on collector roads. |  <br>*Open space spine incorporated with pedestrian walkway and cycleway to maximise recreational opportunities and reduce private care use.* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Establish a development pattern to encourage a greater use of public transport with resultant reductions in private car use | • Strategically locate the local centre on major road to ensure most homes are within a 5 minute walk (400m)of the Centre or can easily access the centre by public transport<br>• Maximise housing diversity within subdivision design and allow higher residential densities adjacent to centres to encourage greater use of public transport.<br>• Local neighbourhood is planned based on a walkable radius of 400m, and focussed on activity node such as shops, community facility, school or a bus stop to allow accessibility to these facilities.<br>• Open space is generally located within 3-5 minutes walk to the majority of the homes |  <br>*Community facility located along major road next to local centre and bus routes. It is connected by pedestrian pathways and cycleway to encourage walking and cycling.*<br>  <br>*Local centre is strategically locate close to public transport node to encourage public transport use.* |

| OBJECTIVES | INITIATIVES | IMPLEMENTATION |
|---|---|---|
| Increase opportunities for locally based service provision and home based employment, reducing the need for travel to other areas | • Create **mixed use local centre** to accommodate a range of retail, commercial and community uses to increase opportunities for locally based service provision and home based employment. This can also reduce the need for travel to other areas.<br>• Provide a **range of functions within the open space network**, including passive and active recreation, the retention and regeneration of riparian areas, green corridors, and historically and culturally important sites. The network of neighbourhood Parks and activity areas can provide a range of recreational opportunities for residents locally within the neighbourhood. |  <br>*A range of local recreation facilities are provided within walking distance to residential areas to minimise the need to travel to other areas* |
| National Broadband Network | • Incorporate **Fibre to the Home or Premise (FttH/FttP)** in an early stage to service all homes to provide opportunities for residents to work from home and facilitate communication between businesses without the need to travel outside the site |  <br>*Provide underground FTTP Network to all homes* |

Appendix 4A

# Functional Road Classification

# APPENDIX 4A - FUNCTIONAL ROAD CLASSIFICATION

The functional role or performance of individual roads can be appraised according to the classification of that road within an overall road hierarchy. Changes to traffic flows on the road can then be assessed within the context of the road hierarchy.

The RTA published guidelines for the classifications of roads in a functional system in their document *Functional Classification of Roads*. The objectives of these guidelines can be summarised as:

- In planning terms – the classification of streets and development of an operational hierarchy is seen as an essential component of structural planning at the neighbourhood level; and
- In operational terms – the concept of functional classification is seen as an endeavour to match the class of road to its use and to the environmental needs of the community.

The RTA document classifies roads according to the role they fulfil and the appropriate volume of traffic that they should convey:

- Arterial Road - is typically a main road carry in excess of 15,000 vehicles per day and over 1,500 vehicles per hour in the peak period. They predominantly carry traffic from one region to another, forming principal avenues of communication for metropolitan traffic movements.
- Sub-Arterial Road – is typically a secondary road carrying between 5,000 and 20,000 vehicles per day and over 500 and 2,000 vehicles per hour in the peak period. They predominantly carry traffic from one sub-region to another forming secondary inter-regional transport links.
- Collector Road – is typically a minor road carrying between 2,000 and 10,000 vehicles per day and over 250 and 1,000 vehicles per hour in the peak period. They provide a link between local areas and regional road carrying low traffic volumes. At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably.
- Local Road – is typically a local street carrying less than 2,000 vehicles per day and 250 vehicles per hour in the peak period. They provide immediate access to individual houses and carry low traffic volumes.

**Table 1** provides details of the characteristics of different functional classifications of roads. The table shows that there is considerable overlap between the functions of the various classes of roads.

**Table 1 Functional Classification of Roads - Parameters**

| Factor/Measure of Effectiveness | Arterial/ Freeway | Sub-Arterial | Collector | Local |
|---|---|---|---|---|
| Vehicle Speed / Operating Speed | | | | |
| | 70-110km/h | 60-80km/h | 40-60km/h | 40km/h (or less) |
| Traffic Volume (AADT) | | | | |
| Residential Area | No Limit | < 20,000 | < 5,000 | < 2,000 |
| Other Area | No Limit | < 20,000 | < 10,000 | < 4,000 |
| Intersection Spacing | | | | |
| | Approximately 1km | Approximately 0.5km | - | - |
| Road Geometry | | | | |
| Number of Lanes | 4 or more | 2 or more | 2 or more | 1 or more |
| Medians | ✔ | As needed | no | no |
| Minimum Carriageway Width | 13m | 7m | 7m | 4m |
| Heavy Vehicle Load Restrictions | | | | |
| | None | Preferably none | Yes, if residential | Yes, if residential |
| Traffic Management | | | | |
| Intersection Control | Refer to Table 2 | | | |
| Lane and Separation Lines | ✔ | ✔ | ✔ | ✔ |
| Property Access | Minimised | Minimised | ✔ | ✔ |
| Control of Turning Vehicle mid-block access | Median controlled | Maybe control | no | no |
| Right Turn Bays | ✔ | Preferred | no | no |
| Road Closures | none | none | possible | ✔ |
| LATM devices | - | - | ✔ | ✔ |
| SATM devices | - | ✔ | - | - |
| Interconnections | | | | |
| | sub-arterial | arterial / collector | sub-arterial / local | collector |
| Parking | | | | |
| Peak Period | no | no | ✔ | ✔ |
| Off Peak | no | ✔ | ✔ | ✔ |
| Period Parking | no | maybe | ✔ | ✔ |
| Unrestricted | no | no | maybe | ✔ |
| Parallel Parking | no | no | maybe | ✔ |
| Pedestrian Crossings | | | | |
| | Grade Separated or Signals | Signals or Refuge | Marked Crossing, Children's Crossing or Refuge | Marked Crossing, Children's Crossing or Refuge |
| Bus and Transit Lanes | | | | |
| | ✔ | ✔ | ✔ | - |

Sources: "Functional Classification of Roads", Roads and Traffic Authority of New South Wales
"Road Design Guide", Roads and Traffic Authority of New South Wales

**Table 2 Suitability for Provision of Right Turn Movements**

| | | Right Turn To | | | |
|---|---|---|---|---|---|
| | | Arterial/ Freeway | Sub-Arterial | Collector | Local |
| Right Turn From | Arterial/Freeway | Yes | Yes | Possible | No |
| | Sub-Arterial | Yes | Yes | Yes | Possible |
| | Collector | Possible | Yes | Yes | Yes |
| | Local | No | Possible | Yes | Yes |

Source: "Road Design Guide", Roads and Traffic Authority of New South Wales

The Growth Centres Development Code classifications, shown in Table 3, are consistent with the RTA classifications. These classifications have been designed for the growth centres and have therefore been adopted in this study.

**Table 3 Functional Classification of Roads (Growth Centres Commission)**

| Road Classification | AADT | Functions and Connections | Speed Limit |
|---|---|---|---|
| **Arterial/Freeway** | 35,000+ | Connects large urban areas | Up to 80km/h |
| **Sub-Arterial** | 10,000 – 35,000 | Arterial roads to town centres<br>Carries major bus routes | Up to 70km/h |
| **Collector** | 3,000 – 10,000 | Connects neighbourhoods<br>Can accommodate public transport | Up to 60km/h |
| **Local** | 1,000 – 3,000 | Priority to pedestrians and cyclists<br>Designed to slow residential traffic | Up to 50km/h |

Source: Growth Centres Development Code, Growth Centres Commission, October 2006

Appendix 4B

# Road Network Description

# APPENDIX 4B - ROAD NETWORK DESCRIPTION

## Southern (F6) Freeway

The Southern (F6) Freeway is located to the north east of the development site, running north-south and has a speed limit of 110 km/hr. The Freeway assumes the role of providing for through traffic between Sydney, Wollongong and points further south, bypassing the Princes Highway and Dapto Town Centre. In the study area, the Freeway is comprised of dual two-lane carriageways, separated by a wide, grassed median. Grade-separated crossings of the Freeway are provided at Martin Street (footbridge only), Emerson Road and Fowlers Road. Access to/from the Freeway is provided via north-facing ramps at Fowlers Road and south-facing ramps at Princes Highway, Tallawarra (the southern terminus of the freeway). There are no south-facing ramps on the Freeway south of Northcliffe Drive at Berkeley, and no north-facing ramps at the Princes Highway junction at Tallawarra.

**Photograph 1 Southern Freeway looking north from Fowlers Road**

## Princes Highway (north of Tallawarra)

This section of **Princes Highway**, formerly part of the main inter-regional route between Sydney, Wollongong and points further south, now functions as a sub-arterial route serving Dapto Town Centre. Through the study area, the Highway generally comprises of a two-lane undivided carriageway. The speed limit through the study area is 80 km/hr, slowing to 60km/h as it enters the built up area of Dapto.

**Photograph 2 Princes Highway looking north from the Southern Freeway**

## Princes Highway (south of Tallawarra)

This section of Princes Highway forms part of the major inter-regional route between Sydney, Wollongong and the South Coast, linking directly to the southern end of the Southern Freeway at Tallawarra. It generally consists of two travel lanes in each direction, on dual carriageways north of Illawarra Highway and on a single, undivided carriageway south of Illawarra Highway. The speed limit is 100km/h between the Southern Freeway and Macquarie Rivulet, 70km/h between Macquarie Rivulet and Creamery Road, 60km/h between Creamery Road and Tongarra Road, and 70km/h from Tongarra Road to the edge of the study area.

**Photograph 3 Princes Highway looking north from Tongarra Road**

## Illawarra Highway

Illawarra Highway is located to the south and east of the development site and is a major highway linking the Illawarra with inland New South Wales. It commences at a roundabout at the intersection with the Princes Highway, running south across floodplain to Albion Park before turning west and running through the Macquarie Rivulet valley en route to Macquarie Pass. It is generally a two-lane undivided carriageway, except through Albion Park where it becomes a four-lane undivided carriageway. West of Hamilton Road, the carriageway widens from 12 metres to 18 metres before narrowing again east of Polock Crescent. A speed limit of 60km/h applies through Albion Park, increasing to 90km/h between Albion Park and Princes Highway and 100km/h west of Broughton Avenue. A school zone applies between Polock Crescent and Calderwood Road at Albion Park.

**Photograph 4Illawarra Highway looking east from Calderwood Road**

## Tongarra Road

Tongarra Road is an arterial road linking Illawarra Highway at Albion Park with Princes Highway at Oak Flats. It is a two-lane undivided carriageway for most of its length, widening to four lanes on approach to the junctions with Princes Highway and Illawarra Highway. The eastern-most 600 metres has a concrete median. The speed limit alternates between 60km/h and 80km/h – the 80km/h zone being located between the eastern edge of Albion Park and Croome Road.

**Photograph 5Tongarra Road looking west across Frazers Creek**

## Huntley Road

Huntley Road is a collector road, running east-west between the Princes Highway and Avondale Road. It is generally a two-lane undivided carriageway. Through the existing urban area it has a 10 metre wide pavement with kerb and gutter on the northern side. The line markings are also off-centre, to allow on-street parking along the northern side of the pavement. To the west of the existing urban area, Huntley Road is a two-lane rural carriageway 5 metres wide, with unsealed shoulders. The speed limit is 80 km/hr. It reduces to 50 km/hr in the built up area between Penrose Street and Princes Highway

**Photograph 6 Huntley Road looking east towards the existing urban area**

## Marshall Mount Road

Marshall Mount Road is a two-lane undivided, 6 metre wide carriageway with an 80km/h speed limit. It links Huntley Road at the rail overpass with Calderwood Road, skirting the north-western edge of the development site. A single-lane bridge over a branch of Duck Creek is located 1.3km north of Yallah Road. The pavement is generally in good condition except for the final 500m on approach to Calderwood Road.

**Photograph 7Marshall Mount Road looking north near Calderwood Road**

## Yallah Road

Yallah Road is a two-lane undivided carriageway linking Princes Highway with Marshall Mount Road. It has a speed limit of 80km/h, except in the vicinity of Princes Highway where a 60km/h speed limit applies. Pavement width is generally 6 metres, widening to 7 metres on approach to Yallah.

**Photograph 8 Yallah Road looking west to Marshall Mount Road**