



4 Transport analysis

This chapter presents the transport analysis undertaken for the Plan, including the current and future transport needs for the Bells Line of Road corridor, taking into consideration population and traffic forecasts, and the desired 'level of service' of the road. The analysis considered traffic that may be attracted to the corridor if a major corridor upgrade was undertaken. It also took into account community feedback on the future of the Bells Line of Road corridor.

4.1 What is the role of the Bells Line of Road?

Measuring how well the Bells Line of Road performs as a thoroughfare first requires an understanding of the roles that the road is required to perform. The road performs three key roles which are consistent with the corridor objectives described in Chapter 2:

Local access road – the road provides for local access, often for relatively low traffic volumes and including in some locations access for pedestrians and cyclists. To fulfil this role, it is not necessary for the road to enable high traffic speeds. Instead, the relevant measure of service quality is the level of delay, as indicated by the formation of vehicle 'platoons', which occur when a line of vehicles is stuck behind a slower vehicle.

Through route – the road provides an access route enabling motorists to travel between town centres, including Sydney, Lithgow and centres in central and western New South Wales. In this role, the road serves long-distance and regional commercial, residential and recreational travellers. To fulfil this role, it would ideally allow consistent high speeds and provide sufficient opportunities for overtaking.

Scenic route – the road also serves scenic and recreational areas in which the vista and environment may be experienced and enjoyed, while in transit or by stopping at key locations. In this role, safety is important, but high speeds may neither be expected nor desired.

4.2 Measuring road performance

RMS measures and monitors the road network through network performance measures and manages road network impacts through targets. These measures and targets are described in RMS's *Network Performance Measures and Network Planning Targets* document of July 2010. This document includes a target that roads with characteristics similar to Bells Line of Road should operate at Level of Service C.

The 'level of service' (LOS) of a road is a quality measure of aspects such as speed and travel time, freedom to manoeuvre, lack of traffic interruptions, and comfort and convenience. Safety is not included in the measures that establish levels of service, as it is considered as a separate key area for assessment.

LOS is measured in terms of *per cent time-spent-following*. This is the average percentage of travel time that vehicles must travel in platoons behind slower vehicles due to an inability to pass.

Six levels of service are normally used in transport analysis, and are designated by letters at each level from A to F, with LOS 'A' representing the best operating conditions and LOS 'F' the worst. Each LOS represents a range of operating conditions and the driver's perception of those conditions.

LOS definitions are shown in **Table 4.1**.

Table 4.1 Level of service definitions for two-lane highways

LOS	% time following	Description
A	Less than 40	Free flow, low volume, high speed
B	40–55	Stable flow, operating speed slightly restricted
C	55–70	Stable flow, speed and manoeuvrability restricted
D	70–85	Approaching unstable flow, freedom to manoeuvre restricted
E	Greater than 85	Unstable maximum flow at capacity, no freedom to manoeuvre
F	Volume greater than capacity	Forced flow, frequent stopping and queuing

4.3 RMS road management hierarchy

RMS has produced a series of 'Practice Notes' designed for use in the development of network and corridor strategies (*Network and Corridor Planning Practice Notes*, NSW RTA, November 2008).

Practice Note 3 describes RMS' management hierarchy for the State road network. The hierarchy divides the network into six classes of urban roads and six classes of rural roads. The classification system serves as a basis for identifying appropriate performance levels for different road categories to guide investment decisions. **Table 4.2** is drawn from Practice Note 3.

The Bells Line of Road is classed as a '3U' road (U stands for urban). However, the Network Planning Targets described in Section 5.2 recommend that rural roads within the urban boundary be assessed under rural criteria. Bells Line of Road (west of Kurrajong) is rural in character and function and is therefore assessed in this Plan as a rural road (3R).

Table 4.2 Road network management hierarchy

(from RMS Network and Corridor Planning Practice Notes, 2008)

Road class	Average annual daily traffic	Heavy vehicles (average/day)	Typical road standard
1U	1000	50	Undivided two-lanes with limited kerbside parking restrictions
1R	500	50	Undivided two-lanes
2U	5000	400	Two-lane two-way undivided
2R	1500	250	Two-lane two-way undivided
3U	13,000	1000	Two-lane two-way undivided
3R	4500	500	Two-lane two-way undivided
4U	29,000	1600	Four-lane two-way undivided
4R	10,000	1000	Two-lane two-way undivided with overtaking lanes
5U	37,000	2500	Four-lane two-way undivided
5R	12,000	1200	Divided and undivided carriageways, frequent overtaking opportunities
6U	50,000+	3500	Divided carriageway four or more lanes
6R	12,000+	2500	Divided carriageway four or more lanes

4.4 How the current transport network performs

4.4.1 Traffic volumes on the Bells Line of Road

Traffic counts were undertaken along the Bells Line of Road corridor in April and May 2011, as part of the development of this Plan. The results of these counts are shown in **Table 4.3** and **Figure 4.1** (Figure 4.1 includes additional counts on the Great Western Highway) and show the higher traffic volumes that occur at the eastern end of Bells Line of Road when compared to the central sections.

Analysis of historical traffic counts was also undertaken to gain a broader understanding of traffic volumes. The results of this suggest that traffic volumes can vary considerably across different days of the week and at different times of the year. Traffic data shows that:

- > The Bells Line of Road serves significant weekend activities along some sections. In the central section from Bell to Bilpin, volumes on Sunday were highest. Friday and Saturday volumes were higher than for other days of the week.
- > At Kurrajong, traffic was heavier on Friday and Saturday.
- > In Richmond, traffic was heavier on weekdays.
- > At Kurrajong there is higher travel activity on the Bells Line of Road in February and September, and lower activity in March–April and November–December.
- > Near Bell there is little seasonal variation in traffic volumes.

Table 4.3 Traffic counts on the Bells Line of Road corridor (April/May 2011)

Site	Location	Avg daily volume
1	Bells Line of Road, North Richmond	16,210
2	Bells Line of Road near Comleroy Road, Kurrajong	12,150
3	Bells Line of Road near Coach House Road, Kurrajong Heights	4,800
4	Bells Line of Road, Bilpin	4,000
5	Bells Line of Road, eastern side Mount Tomah	3,300
6	Bells Line of Road, east of Bell	3,440
8	Chifley Road, west of Bell	3,270
10	Chifley Road, east of Lithgow near Hartley Valley Road	3,690

Note: The site numbering in Table 4.3 is not sequential as the numbering system refers to the overall transport analysis and not all analysis points involved repeated traffic counts.

4.4.2 Travel behaviour

Travel behaviour in the Bells Line of Road corridor and north-western Sydney can be summarised as follows:

- > Peak travel times – there are distinct morning (8–9am) and afternoon (3–6pm) peaks on weekdays. The afternoon peak is higher at school finishing time and extends to business hour finishing time. The weekend peak is of lower intensity than the weekday morning and afternoon peaks, but is longer, spanning several hours across the middle of the day.
- > Reasons for travel – the dominant trip purposes in weekday morning peak periods are education/childcare journeys and travel to work. The dominant weekday afternoon peak trip purpose is to return home, and the dominant weekend trip purpose is for social/recreation purposes.
- > Private vehicle use – the car is the dominant mode of travel, particularly on weekends.

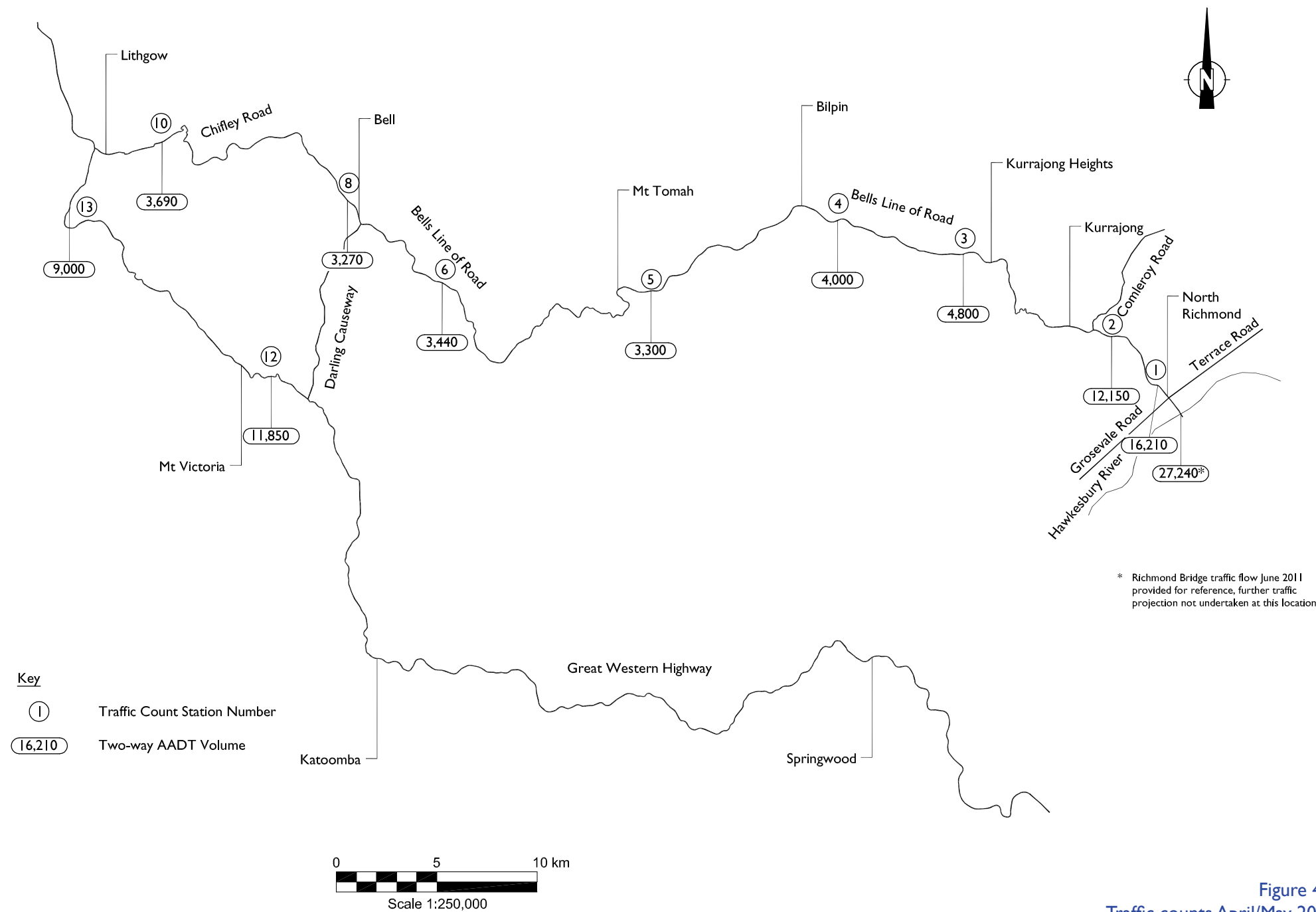


Figure 4.1
Traffic counts April/May 2011

4.4.3 Travel between Bells Line of Road and the Sydney motorway network

Surveys of travel patterns in the eastern section of the Bells Line of Road corridor were undertaken in May 2011. These surveys sought to quantify the volumes of traffic travelling between the Bells Line of Road to/from the Sydney motorway network (via the M7). These outcomes can inform further detailed analysis of the rationale for provision of connections between the Bells Line of Road and the Sydney motorway network.

The surveys were undertaken over a 12 hour period on a typical weekday. During the survey period (6:30am–6:30pm), some 3,900 vehicles were recorded travelling eastbound on the Bells Line of Road at Kurrajong. Of these, some 380 vehicles (around 10 per cent) travelled onwards to Richmond Road near Garfield Road heading in the direction of the M7. A total of 450 vehicles (around 11 per cent) travelled by a different route to Windsor Road as far as Groves Avenue in the direction of the M7. In the reverse direction, some 380 vehicles were recorded travelling from Richmond Road and some 390 vehicles from Windsor Road through to the Bells Line of Road at Kurrajong. Based on expansion factors obtained from the traffic count data, this would suggest that up to 2,000 vehicles (both directions combined) travel between the Bells Line of Road at Kurrajong and the M7 on a typical weekday.

These counts also suggest a relatively even division of use between the two main existing corridors that connect Bells Line of Road with the Sydney motorway network.

4.4.4 Historical traffic growth

Historical changes in traffic volume for selected locations on the Bells Line of Road and Great Western Highway were evaluated as part of this Plan on the basis of previous traffic count data from RMS. This indicated that growth rates along the Bells Line

of Road corridor were generally low, except for Marrangaroo on the Great Western Highway.

Traffic growth was assessed at locations on the Bells Line of Road and Great Western Highway. **Figure 4.2** presents these growth rates. It shows that:

- > Long term traffic growth on the Bells Line of Road has generally been below 1.0 per cent per annum.
- > Growth rates have picked up in some locations since 2005, but have generally remained below 1.5 per cent per annum, with the exception of Kurrajong. Traffic volumes at Kurrajong decreased after 2002 and, while traffic has grown at a higher rate since 2005, volumes are still below 2002 levels.
- > Growth rates on the Great Western Highway to the west of the Darling Causeway have been stronger.

4.4.5 Identifying a traffic design criterion

It is not cost-effective or efficient to plan and design transport facilities to cater for the single highest peak daily (or hourly) transport demand that may be expected in any given future year.

Instead, transport facilities need to be designed to cater for projected demands throughout the year. This approach recognises that the level of service will decline for a few hours or days of extremely high demand, but will be better than the design standard on an average day.

RMS' *Network Performance Targets* document aims for performance at level of service C in the 100th highest traffic hour of the year. The 100th highest traffic hour was estimated as being the peak hour of the 100th highest traffic day of the year (as a full year of hourly data was not available for any of the sites).

4.4.6 Existing level of service of the Bells Line of Road

The existing level of service (LOS) was calculated at various points along the Bells Line of Road and Great Western Highway. The Great Western Highway was included in the analysis to provide a picture of the overall performance of the cross-mountain road network.

The LOS for the Bells Line of Road and Great Western Highway was calculated at the locations shown in **Table 4.4**.

Table 4.4 Sites used for LOS analysis

Site	Road	Location
1	Bells Line of Road	Kurrajong – east of Comleroy Road
2	Bells Line of Road	Bilpin – west of Post Office
3	Bells Line of Road	East of Darling Causeway
4	Bells Line of Road	East of Darling Causeway
5	Chifley Road	West of Darling Causeway
6	Chifley Road	West of Bell
7	Chifley Road	Lithgow – east of Hartley Valley Road
8	Darling Causeway	South of Bells Line of Road
9	Great Western Highway	Faulconbridge – west of Bellevue Road
10	Great Western Highway	West of Soldiers Pinch
11	Great Western Highway	West of McKanes Falls Road
12	Great Western Highway	Marrangaroo, west of Castlereagh Hwy
13	Bells Line of Road	North Richmond, west of Grose Vale Rd
14	Bells Line of Road	West of Coach House Road
15	Bells Line of Road	East of Mount Tomah Botanic Garden

The results of the LOS analysis for 2011 traffic volumes are shown in **Figure 4.3**.

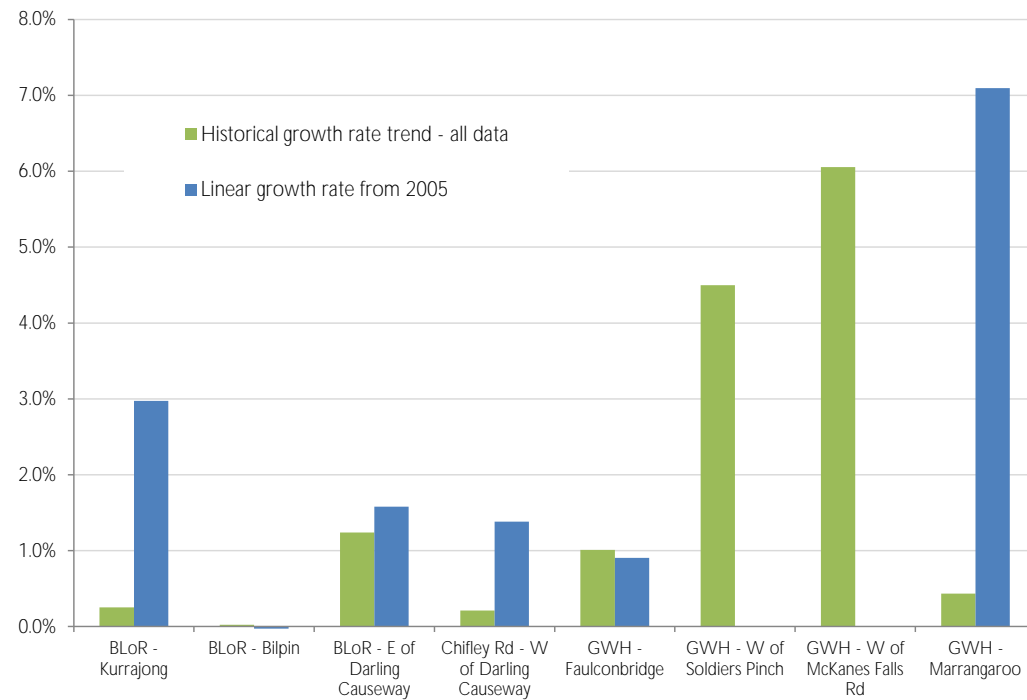


Figure 4.2 Traffic growth rates (long term and from 2005)

The existing LOS analysis shows that:

- > The central and western sections of the Bells Line of Road are generally operating at good LOS, with LOS 'A' through 'C' being typical.
- > The eastern section of the Bells Line of Road operates at poorer levels of service. On the approaches to North Richmond, the environment is increasingly urban and the constraints for traffic occur at intersections rather than mid-block.

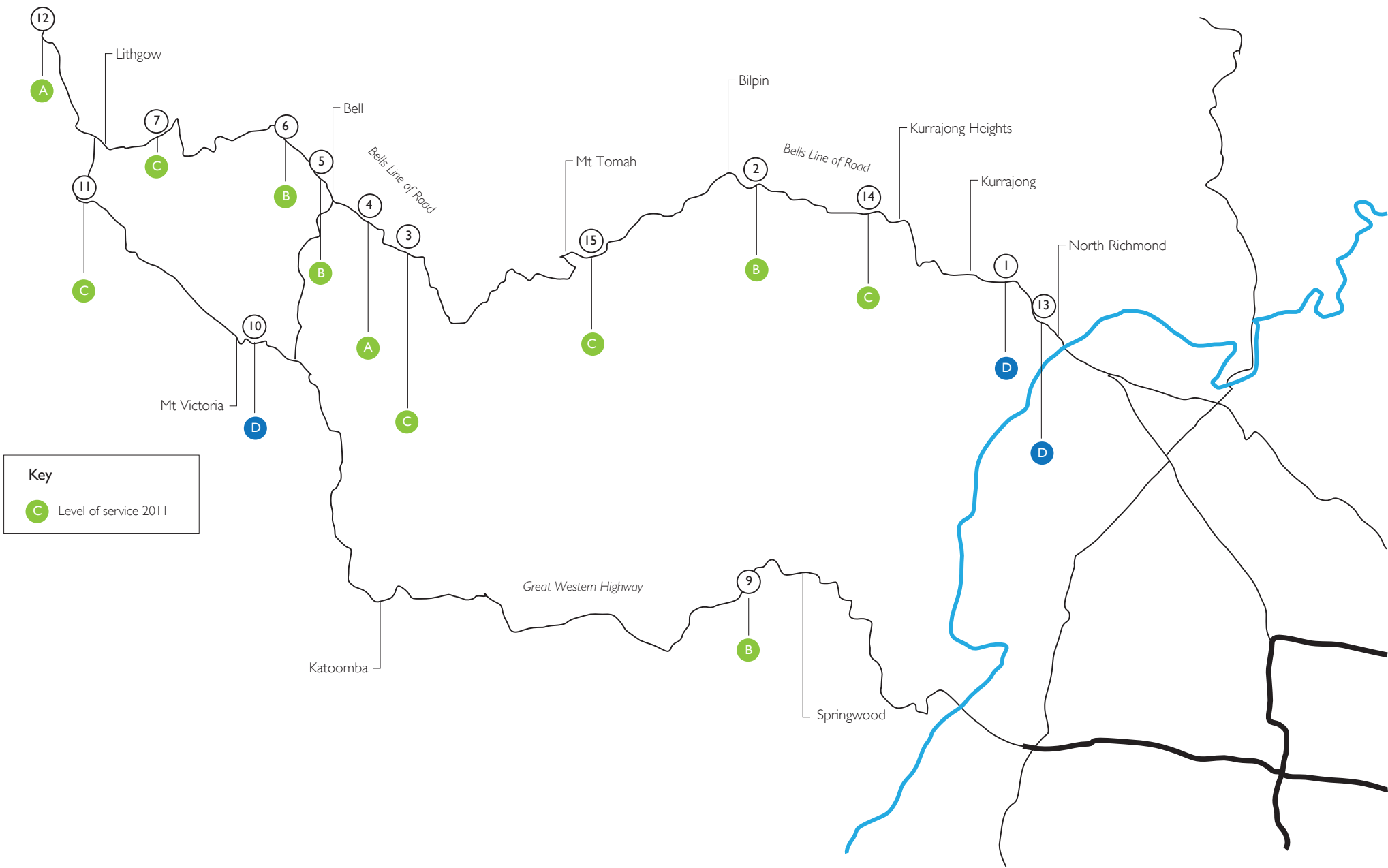


Figure 4.3
Existing level of service

4.4.7 Freight and trucks

Truck volumes

The Bells Line of Road plays an important role as a route for transporting freight, operating as a secondary route to the Great Western Highway.

Table 4.5 shows the proportion of heavy vehicles on the Bells Line of Road corridor during an average weekday as surveyed in March and April 2011.

Table 4.5 Proportion of trucks on the Bells Line of Road and Great Western Highway

Name	Location	Heavy vehicles (%)
Bells Line of Road	North Richmond	6
Bells Line of Road	Comleroy Road, Kurrajong	12
Bells Line of Road	Coach House Road, Kurrajong Heights	8
Bells Line of Road	Bilpin	9
Bells Line of Road	Eastern side of Mt Tomah	9
Bells Line of Road	Bell	8
Chifley Road	West of Bell	13
Chifley Road	East of Lithgow near Hartley Valley Road	10
Great Western Highway	Near McKanes Falls Road	13

Table 4.5 shows there is a high proportion of heavy vehicles in the western section of the Bells Line of Road corridor, with trucks making up to 10–13 per cent of traffic on an average weekday.

Truck travel restrictions and access to ports

Travel restrictions are placed by RMS on trucks using the Bells Line of Road and Great Western Highway. For example:

- > The Bells Line of Road and Great Western Highway are not approved for travel by B-doubles longer than 19 metres and with a total mass greater than 50 tonnes.
- > The Bells Line of Road is approved for vehicles up to 4.6 metres high, whereas the Great Western Highway is not. Vehicles of this height include car carriers, trucks with wool or hay bales, high containers and livestock crates.
- > Overmass vehicles are permitted on the Great Western Highway but not on the Bells Line of Road.
- > As a result, there are no direct routes for larger B-doubles (longer than 19 metres) from the central and west regions of NSW to Sydney via the Blue Mountains.

Truck movement patterns

In 2003 Sinclair Knight Merz (SKM) surveyed the origins and destinations of trucks using the Bells Line of Road. Key findings were:

- > The main destination of westbound trips recorded on the Bells Line of Road at Bell was western NSW, and the main destination of eastbound trips was the Hawkesbury region.
- > The main source of westbound trips on the Great Western Highway was the central Sydney region.
- > The main source of eastbound trips on the Great Western Highway was western NSW.

Rail freight

Rail freight from the central and western regions of NSW serves both domestic and export markets. The majority of freight comprises bulk coal and containerised minerals, which are moved to Sydney and then to Port Botany and Port Kembla by rail over the Blue Mountains, and to Newcastle via the Ulan line. There are major constraints on increased rail freight from the Central West. These include:

- > The significant growth in passenger trains within the Sydney metropolitan network, which reduces the availability of freight paths as a result of freight restrictions during commuter peaks.
- > Short passing and crossing loops as well as insufficient passing and crossing loops.

The constraints on increased rail freight, if they are not alleviated, will likely reinforce the importance of the Bells Line of Road as a secondary route for freight movements across the Blue Mountains.

4.4.8 Public transport

Rail and bus services are available for passengers travelling between Sydney and the Central West.

Rail services

Rail services between Sydney and western NSW travel via the Main Western railway line. Services are run by CityRail (Sydney Central Station–Lithgow) and CountryLink (Sydney–Dubbo via Lithgow). Services from the east to Lithgow diminish further westwards as population concentrations reduce. There is also a same-day return from the Central West to Sydney by bus, with an interchange at Lithgow for CityRail services.

CityRail statistics for rail passenger flows in 2008 show that an average of 6000 passengers travelled on the Blue Mountains Line via Emu Plains to Sydney on weekdays, and 2400 on weekend days.

Public bus services

Westbus operates two bus services on the eastern section of the Bells Line of Road, on routes 680 and 682. These routes provide frequent services along the Bells Line of Road between Richmond railway station and Kurrajong, and between Richmond station and Berambing.

4.5 Future network performance

4.5.1 Population projections

The majority of users of the Bells Line of Road corridor live in the Western Sydney Regional Organisation of Councils (WSROC) and Central Region Organisation of Councils (Centroc) regions. Population projections for these regions have generally been revised downwards in recent years, particularly for the Centroc region. **Figure 4.4** shows population projections for the Centroc region produced by:

- > The NSW Department of Planning (2010). These projections have negative growth rates for the Central West region after 2026.
- > Sinclair Knight Merz (SKM). SKM identified these traffic projections for the Bells Line of Road in its 2009 study.
- > The Western Research Institute (WRI, 2008). WRI developed forecasts for three scenarios, based on different assumptions for migration of employees to new jobs within the region.

Figure 4.4 also shows the most recent (2010 release) Department of Planning growth rate projections for WSROC, including the Hills Shire. These figures reflect population growth in line with land releases in the North West Growth Centre.

Table 4.6 shows the population growth rates implied by these projections.

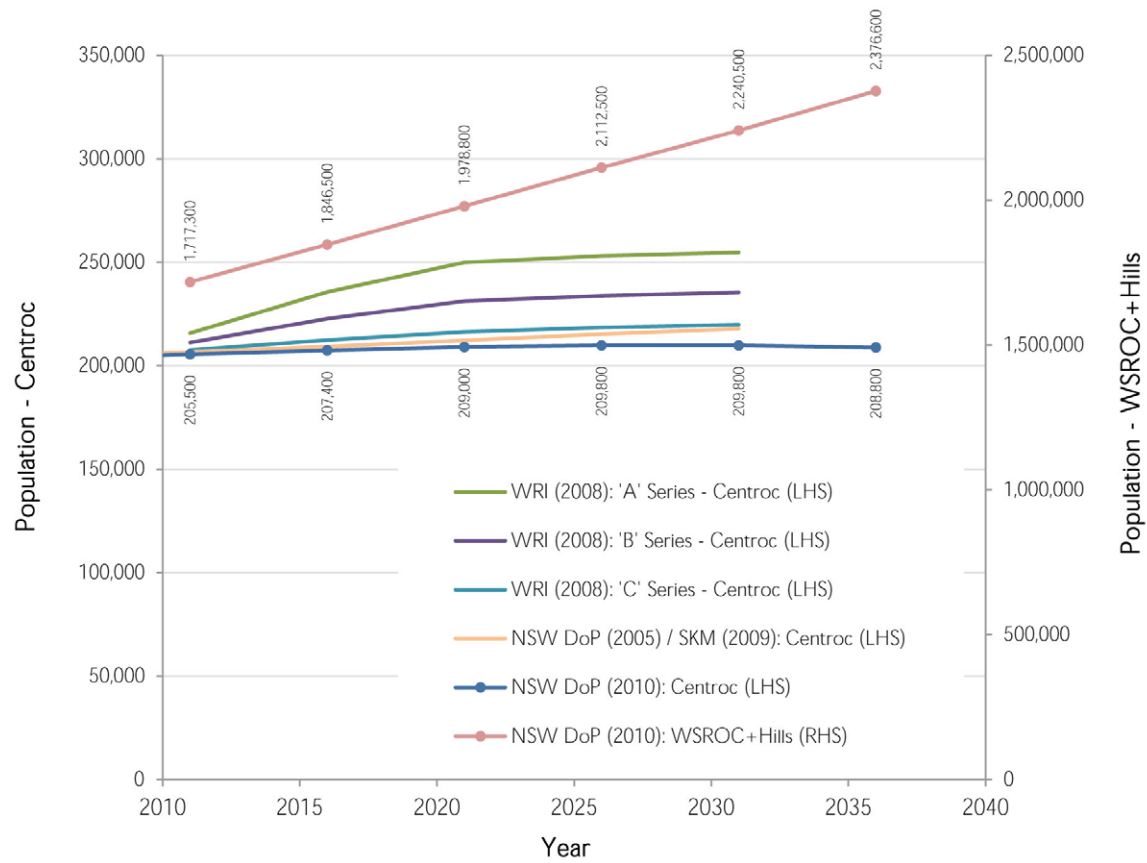


Figure 4.4 Population projections for Centroc and WSROC regions

Table 4.6 Population growth rates implied in forecasts for Centroc and WSROC

	2011–2016	2016–2021	2021–2026	2026–2031
NSW DoP (2010)	0.2%	0.2%	0.1%	0.0%
NSW DoP (2005)	0.3%	0.3%	0.3%	0.2%
WRI–Scenario A	1.8%	1.2%	0.3%	0.1%
WRI–Scenario B	1.1%	0.8%	0.2%	0.1%
WRI–Scenario C	0.5%	0.4%	0.2%	0.1%
WSROC + Hills NSW DoP (2010)	2.5%	2.0%	1.8%	1.0%

4.5.2 Road network improvements

RMS has been progressively upgrading the Great Western Highway in the Blue Mountains.

The upgrade projects involve widening the highway to four-lanes between Emu Plains and Katoomba and to mostly three lanes between Katoomba and Mount Victoria.

The Great Western Highway is a key route for transporting freight between Sydney and the Central West region, with more than half the road freight between Sydney and the Central West using the highway. It is also a tourist route to destinations such as the Blue Mountains, historic Hartley, Jenolan Caves, Mudgee and Bathurst. Importantly, it also functions as a local access road, connecting the many towns and villages along its length.

The ongoing upgrades of the Great Western Highway reinforce the role of the highway as the primary road crossing of the Blue Mountains. Construction of four-lanes to Katoomba is anticipated by 2014. By providing faster and more reliable travel times, it will maintain its current share of trips across the Blue Mountains, or even attract a greater share from the Bells Line of Road. This is discussed further below.

4.5.3 Traffic forecasts

Basic growth rates

Traffic on Bells Line of Road has generally grown by 1.0–1.5 per cent per annum over the past five years, with the exception of Kurrajong, which has more recently been growing at up to 3 per cent per annum but has still not reached traffic volumes recorded in 2002.

This Plan employs a basic growth rate of 1.0 per cent per annum for traffic on the length of Chifley Road and the Bells Line of Road west of Kurrajong, and 1.5 per cent per annum on the Bells Line of Road to the east of Kurrajong, which takes growth trends into account.

A 'higher growth' scenario was also developed to assess the potential impacts of additional traffic growth above the trend growth rates. This scenario employed growth rates of 2.0 per cent per annum for Chifley Road and the Bells Line of Road west of Kurrajong, and 3.0 per cent per annum for the Bells Line of Road east of Kurrajong.

Estimates of the average day's traffic volume for 2030 and 2050 were produced during the preparation of this Plan, for different locations along the corridor, including locations on the Great Western Highway (for which a growth rate of 0.5–1.5 per cent per annum was used in the basic case and 1.0–3.0 per cent per annum for the higher growth case). The resulting forecast traffic volumes for the basic case are shown in **Figure 4.5**. Forecast volumes for the higher growth case are shown in **Figure 4.6**.

Figures 4.5 and 4.6 show that of the locations on Bells Line of Road – Chifley Road, only two locations (site 1 east of Comleroy Road and site 2 within the East Richmond town area) would carry over 10,000 vehicles per day by 2050.

Under the RMS network management hierarchy system (see **Table 4.2**), the Bells Line of Road (in its entirety) would not warrant upgrading to a four-lane divided road in the foreseeable future if traffic volumes alone are considered. This is consistent with findings of previous studies such as the *Bells Line of Road Corridor Study* (SKM, 2004) and the *Central West Transport Needs Study* (SKM, 2009).

Forecast level of service

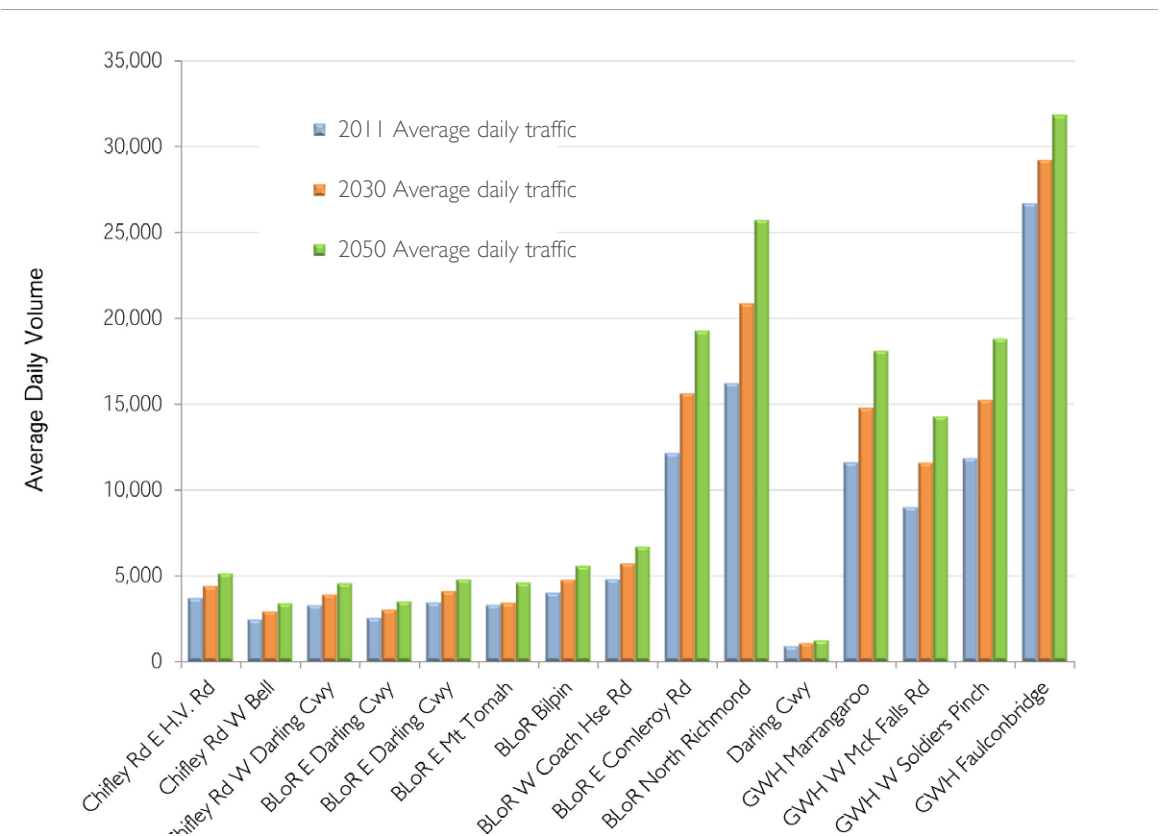
Level of service (LOS) has been calculated in relation to the projected traffic volumes and based on standard rural road assessment procedures which use percent time following as a measure. The forecast LOS also suggests that upgrading the entire Bells Line of Road to a four-lane divided road within the foreseeable future is not warranted on traffic performance grounds alone (**Figure 4.6**). The assessment forecast the LOS in peak periods for locations on the Bells Line of Road in future years. It was found that:

- > By 2030, levels of service would be LOS C or better, with the exception of locations east of Kurrajong Heights (which would be either LOS D or E).
- > By 2050, levels of service would be generally LOS C for locations west of Bilpin. This site and sites to the east would be either LOS D or E in peak periods. It is likely that the lower level of service in 2050 at Bilpin is associated with localised traffic movements in and around the township.

4.5.4 The effect of potential corridor improvements

Generated and induced demand

Road improvements save travel time and vehicle operating costs for road users and make roads safer. However, these



improvements can also generate or induce an increase in traffic volumes on the improved road.

Generated traffic is defined as changes in existing trips and can be caused by travellers:

- > Changing their route to the improved road.
- > Extending their trip (for example, to shop further away).
- > Switching from bus or train to car.
- > Time shifting (for example, departing later in the peak period rather than before it).

Figure 4.5
Forecast average daily traffic volumes

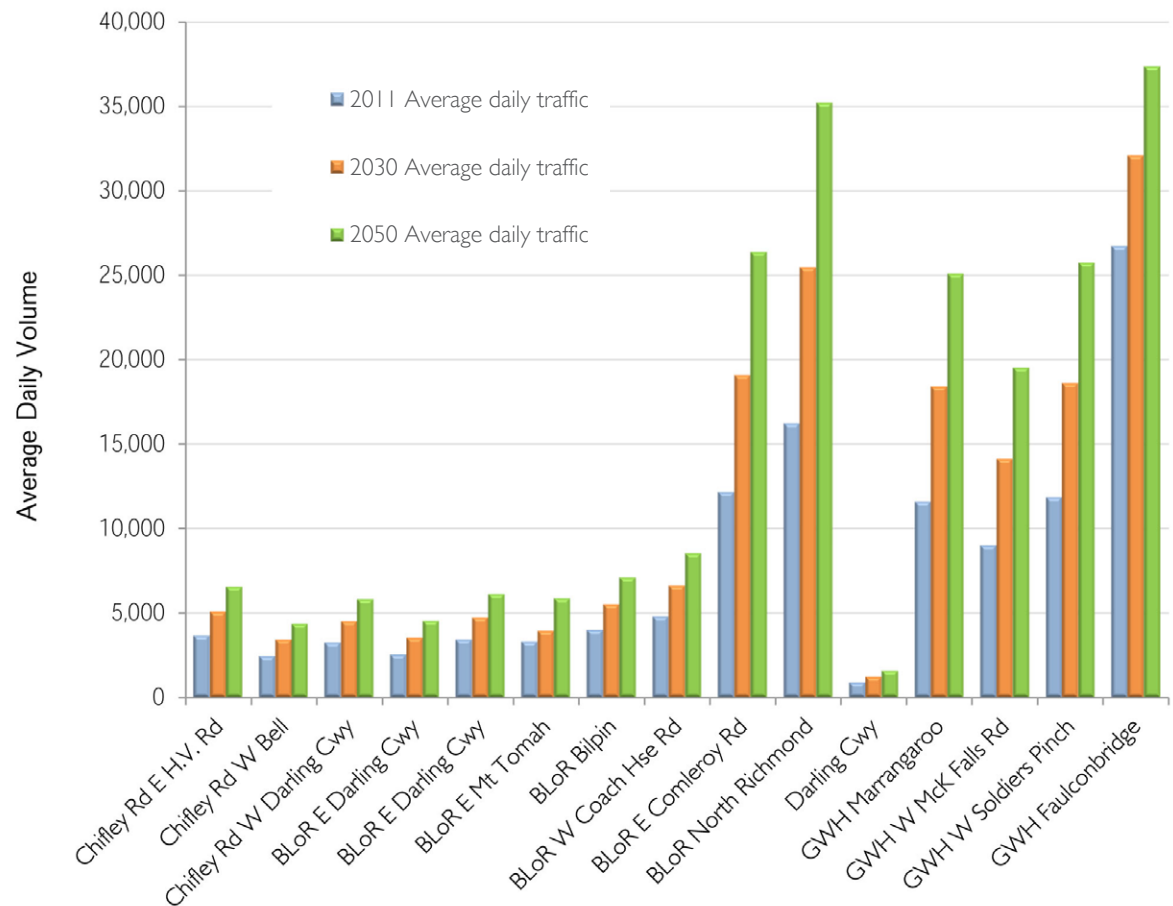


Figure 4.6
Forecast average daily traffic volumes –
high growth case

Induced travel is defined as new trips that have been created by road improvements. Induced travel can be caused by:

- > New trips that had not been made before.
- > Additional travel resulting from changes in land use and development.
- > Reductions in car sharing, and reductions in vehicle occupancy, which lead to increased numbers of car trips.

Generated and induced demand impacts tend to occur over different time horizons:

- > Generated traffic occurs in the short run soon after road improvements are made because people are able to easily change their route and time decisions.
- > Induced travel tends to take longer as many people are not able to quickly make large lifestyle changes – eg the number of cars they own, where they live, etc. Land use changes that take advantage of transport infrastructure improvements also take time to develop.

Generated and induced demand from upgrading the Bells Line of Road

There has been considerable discussion prior to the preparation of this Plan as well as during consultation for the Plan regarding whether traffic volume increases above trend growth would occur if the corridor was upgraded to a higher standard (such as a four-lane dual carriageway highway) for its entire length. Specific sources of additional traffic volume that have been identified include:

- > Traffic (both light and heavy vehicles) choosing to travel on Bells Line of Road rather than the Great Western Highway because it offers a more efficient route.
- > Trucks from some parts of the Central West of NSW that currently use the Hume Highway instead choosing to access Sydney via Bells Line of Road.
- > An upgraded Bells Line of Road corridor acting as a catalyst for increased economic development and population growth west of the Blue Mountains, which would in turn generate higher levels of cross-mountain traffic.

This potential generated and induced demand is evaluated below on the basis of previous research that relates travel time savings to traffic volume increases.

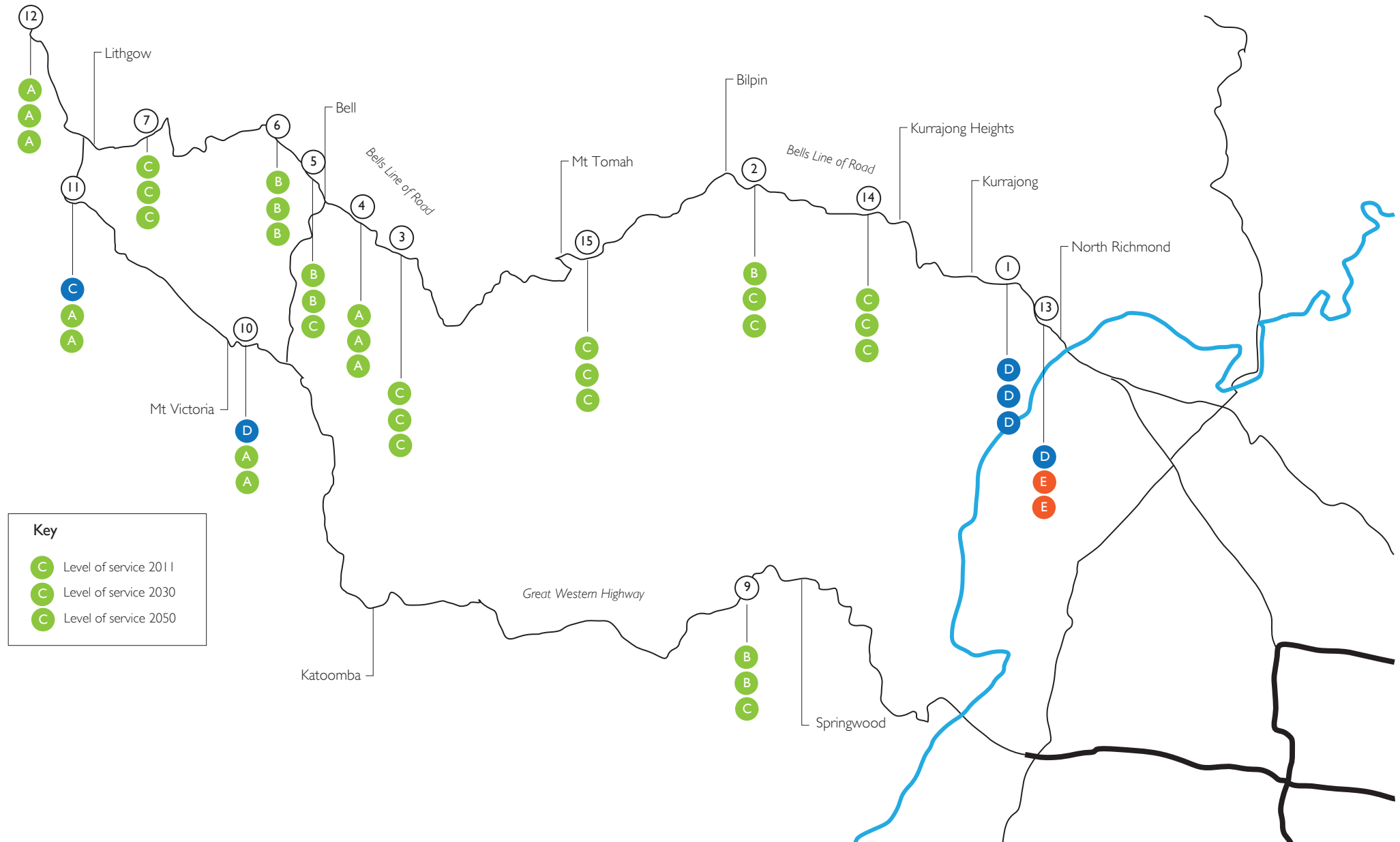


Figure 4.7
Forecast level of service – basic growth scenario

The Bells Line of Road serves a range of different trip types with varying trip lengths. Work by Sinclair Knight Merz (2004) indicates that development of the Bells Line of Road into a high-standard four-lane divided road would result in travel time savings for cross-mountain trips of around 20 per cent.

A variety of research into the effect of time savings on generated and induced demand has been reviewed as part of this Plan. This review has shown that if the highest of the scenarios identified by this research is used, a 20 per cent time saving can be regarded as resulting in up to a 27 per cent increase in traffic on rural roads.

To take this into account, traffic forecasts described in Section 4.4.3 were recalculated, assuming that 80 per cent of cross-mountain traffic using the Great Western Highway (around 2,400 vehicles) would divert to an upgraded Bells Line of Road, and then factoring in this induced demand figure. This diversion percentage is considered to be the maximum number that would divert to Bells Line of Road under any foreseeable circumstance.

Figures 4.8 and 4.9 show the traffic projections with the induced demand estimate added to the basic growth case and high growth case volumes at the Bells Line of Road and Chifley Road sites respectively.

Figures 4.8 and 4.9 show that, even with these highly optimistic estimates of induced demand that may result from a major upgrade of the Bells Line of Road, traffic volumes on the Bells Line of Road and Chifley Road corridor west of Kurrajong are likely to be at or below around 12,000 vehicles per day in 2050.

Forecast volumes to the east of Kurrajong Heights are higher, and indicate that an upgrade would be warranted under the current RMS management guidelines.

This alone is unlikely to form a basis for the justification of a major upgrade to the Bells Line of Road to four-lane standard through

these sections, and any investigation of an upgrade of these sections will need also to consider engineering, construction cost, economic, social and environmental factors.

4.6 Overview of the transport analysis

The transport analysis of the Bells Line of Road found that:

- > Long term traffic growth rates on the Bells Line of Road have generally been below 1.0 per cent per annum. Growth rates have picked up since 2005, but have generally remained below 1.5 per cent per annum. Traffic growth rates on the Great Western Highway to the west of the Darling Causeway have been stronger than on the Bells Line of Road.
- > The central and western sections of the Bells Line of Road are generally operating at good levels of service.
- > The portion of Bells Line of Road in the vicinity of North Richmond is currently performing poorly, with high levels of traffic congestion in peak periods.
- > Existing traffic between Bells Line of Road and the Sydney motorway network is evenly divided between the Windsor Road/Old Windsor Road corridor, and the Blacktown Road/Richmond Road corridor.
- > Forecast traffic numbers based on an optimistic growth trend do not reach the levels that would trigger a need to upgrade the full length of Bells Line of Road to four-lanes in any foreseeable planning horizon.
- > Forecast traffic numbers based on an optimistic growth trend plus potential induced demand also do not reach the levels that would trigger a need to upgrade the full length of Bells Line of Road to four-lanes in any foreseeable planning horizon.

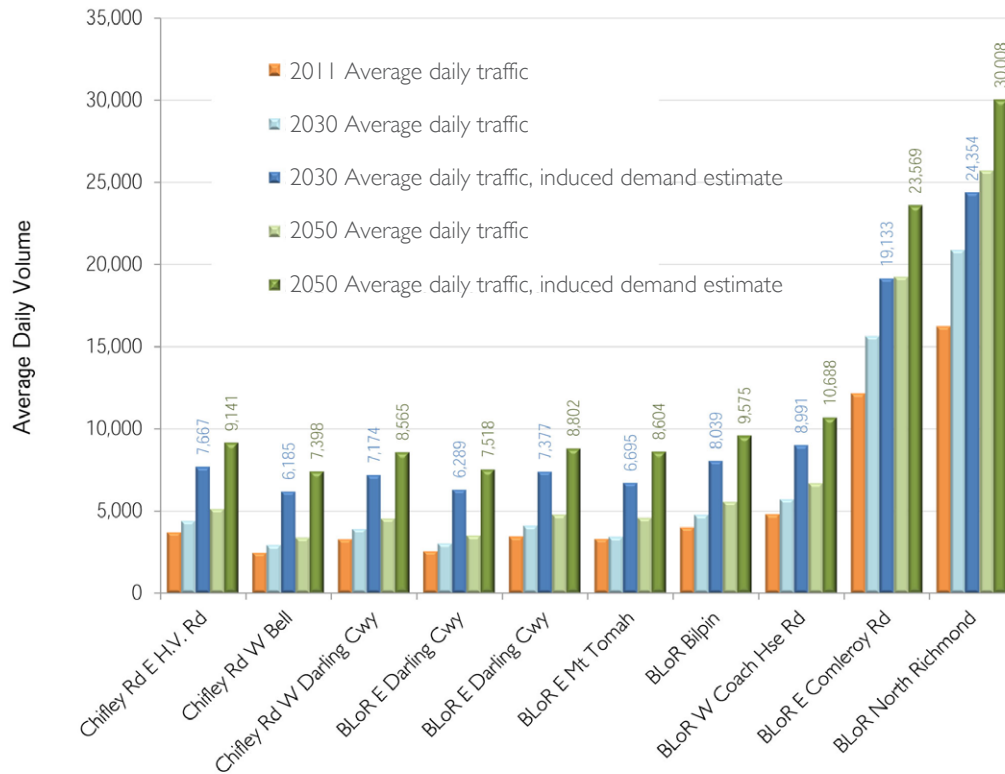


Figure 4.8
Forecast average daily traffic volumes –
basic growth case with induced traffic from road upgrade

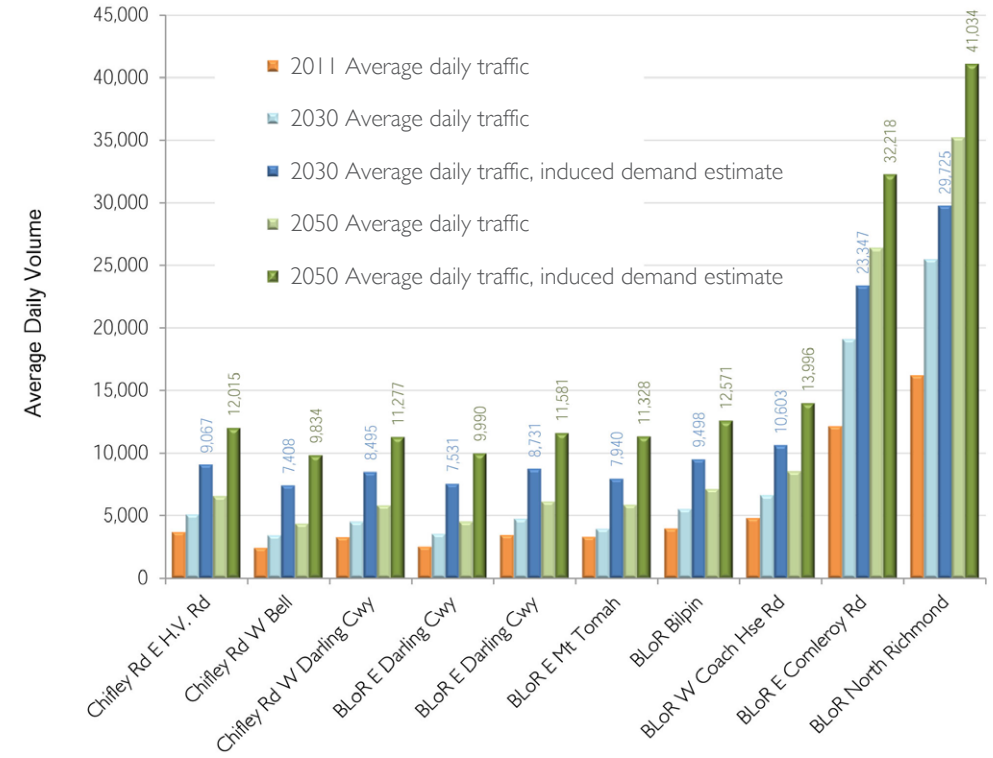


Figure 4.9
Forecast average daily traffic volumes –
high growth case with induced traffic from road upgrade

- > Forecast traffic numbers suggest that there may be a need to upgrade a portion of Bells Line of Road (east of approximately Kurrajong Heights) to four-lanes in the long term.