



Bulli Pass Strategic Review

October 2015

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Executive Summary

The Illawarra region is separated from Sydney and inland transport corridors by the Illawarra escarpment, known for its steep inclines and complex geology which present challenges for constructing, maintaining and operating road infrastructure.

There are currently two road connections linking Wollongong to the north and west. These are Mount Ousley Road and Bulli Pass. Mount Ousley Road is the main connector route from Wollongong and Port Kembla, while Bulli Pass largely services local traffic from the coastal communities of the northern suburbs. Both routes cross the Illawarra escarpment and include lengths of steep gradients and tight bends.

The challenging features of the Illawarra escarpment combined with growth in road traffic volumes, means the existing routes are under increasing pressure.

In the long-term, the Illawarra road network is likely to require an additional escarpment crossing via a new route or by an upgrade of the existing routes.

Between 1996 and 2006 the then Roads and Traffic Authority carried out various investigations into the feasibility of providing a new crossing of the escarpment or improving the existing one at Bulli Pass (further details of these investigations can be found in Appendix One).

These reports have contributed to the planning needs for the Illawarra road network and include the following outcomes:

- Construction of a road tunnel is cost prohibitive, potentially unsafe due to steep grades and unlikely to provide value for money
- Investing in a high cost solution will not improve the steep grade of the road
- The need to integrate strategic planning for the Illawarra road network with the Outer Sydney Orbital corridor investigations.

Future steps include:

- Prepare a corridor strategy for Bulli Pass between George Avenue and Bulli Tops, to define how travel needs will be managed over the next 20 years (scheduled to be completed by mid-2016)
- Carry out a traffic and safety study of Princes Highway through Bulli (scheduled to be completed by mid-2016)
- Continue maintenance activities on Bulli Pass.

Our priority is the safety and reliability of the network for all road users.

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1 Introduction

1.1 Purpose of this report

In the past, a number of technical and feasibility studies regarding a potential alternative Illawarra escarpment crossing were carried out. Valuable insights were gained on the potential for an upgrade of Bulli Pass and helped to inform other projects such as the construction of Memorial Drive (Northern Distributor).

These studies have been re-examined to provide a clear understanding of the site constraints and provide a basis for further assessment.

This report provides:

- A summary of previous investigations
- An overview of options considered during previous investigations
- Future planning.

1.2 The current road network

There are two main roads that provide access between Wollongong and Sydney, shown in Figure 1. These are the Princes Highway via Bulli Pass, and Mount Ousley Road (now part of the M1 Princes Motorway). Both of these roads cross the steep Illawarra escarpment.

Bulli Pass services local traffic from the coastal communities of the northern suburbs of Wollongong. It functions as an alternative access between Wollongong and Sydney, to Mount Ousley Road; however this is restricted to light vehicles and trucks up to 19m long.

Mount Ousley Road is the main commuter and freight route into the Illawarra. It provides the inter-regional connection to Port Kembla, the Illawarra and the South Coast.

Bulli Pass

Bulli Pass provides access for local road users to the northern suburbs of Wollongong.

It is mainly a two lane undivided road with a steep, winding alignment through a geologically constrained area. The maximum grade on Bulli Pass is 14.6 per cent.

Traffic volumes on Bulli Pass increased between 1990 and 2014 from an annual average daily traffic volume of just over 8,000 to around 12,000 vehicles, an annual growth rate of 1.4 per cent. Heavy vehicles account for about five per cent of total vehicle movements on this route. The traffic growth which has been experienced on Bulli Pass has largely been in light vehicles servicing the residential needs of the local area.

Mount Ousley Road

Mount Ousley Road is the principal State road between the Illawarra and Sydney. It serves an inter-regional function and is the main freight, commuter and tourist route. It is suitable for Higher Mass Limit (HML) freight vehicles travelling between the Illawarra and Sydney or the Hume Motorway. Mount Ousley Road is part of the National Land Transport Network and is eligible for Australian Government funding.

Mount Ousley Road is mainly a four lane road divided by a central concrete median barrier. The climb northbound on Mount Ousley is three lanes and the descent southbound goes from three to two lanes near Mt Pleasant overbridge.

Traffic volumes on Mount Ousley Road increased between 1990 and 2014 from an annual average daily traffic of over 25,000 to around 48,000, an annual growth rate of 3.6 per cent. Heavy vehicle movements account for about 14 per cent of total vehicle movements on this route and this is represented by larger and heavier freight vehicles.

The maximum grade on Mount Ousley Road is 10.9 per cent. It is speed limited downhill for heavy vehicles, which often experience breakdowns due to the steep grades, impacting on traffic flow. The road is experiencing increasing pressure due to traffic growth and additional heavy vehicle traffic servicing Port Kembla.



Figure 1 - Road access to Wollongong/Port Kembla

1.3 Regional Growth

Continued growth in traffic, especially freight, is expected with the expansion of Port Kembla and the desire to connect with the Hume Motorway (via Picton Road), M7 and Western Sydney.

The Port Kembla Growth Plan provides for the development of the Outer Harbour as a common user multipurpose wharf. Growth of import and export activities as well as development of the site as a cruise ship destination will increase the region's use of the road network.

Other factors which are influencing growth in the Illawarra are:

- Major new residential developments, such as the construction of 19,000 new homes as part of the West Dapto land release and development in the Shellharbour council area, including the Calderwood land release.
- A number of other completed major local developments, such as the Stockland Shellharbour retail expansion and GPT's Keira West shopping centre expansion.
- Development of the Macarthur area, Sydney's south west growth centre and the proposed airport at Badgerys Creek which will increase interaction between the Illawarra and south-west Sydney.
- Growth of the University of Wollongong and associated development in the nearby Innovation Campus precinct.
- Growth in tourism to Wollongong and the South Coast.

2 Maintenance of Bulli Pass

Bulli Pass descends the escarpment with steep slopes both above and below the road.

In 2007 work was completed on drainage and fencing works as part of the ongoing strategic treatment and slope management plan for the road.

This work involved installation of protection fencing and clearing vegetation to assist in managing the road environment.

Understanding the geological conditions of the escarpment, and the management of Bulli Pass, has developed through a number of studies.

The maintenance of a safe corridor for Wollongong and the Illawarra region will always be ongoing, as it is for all corridors.

3 Previous studies

Between 1996 and 2006 the former Roads and Traffic Authority conducted a number of technical studies to examine potential new corridors for an alternative escarpment crossing (refer to Figure 2). These studies included:

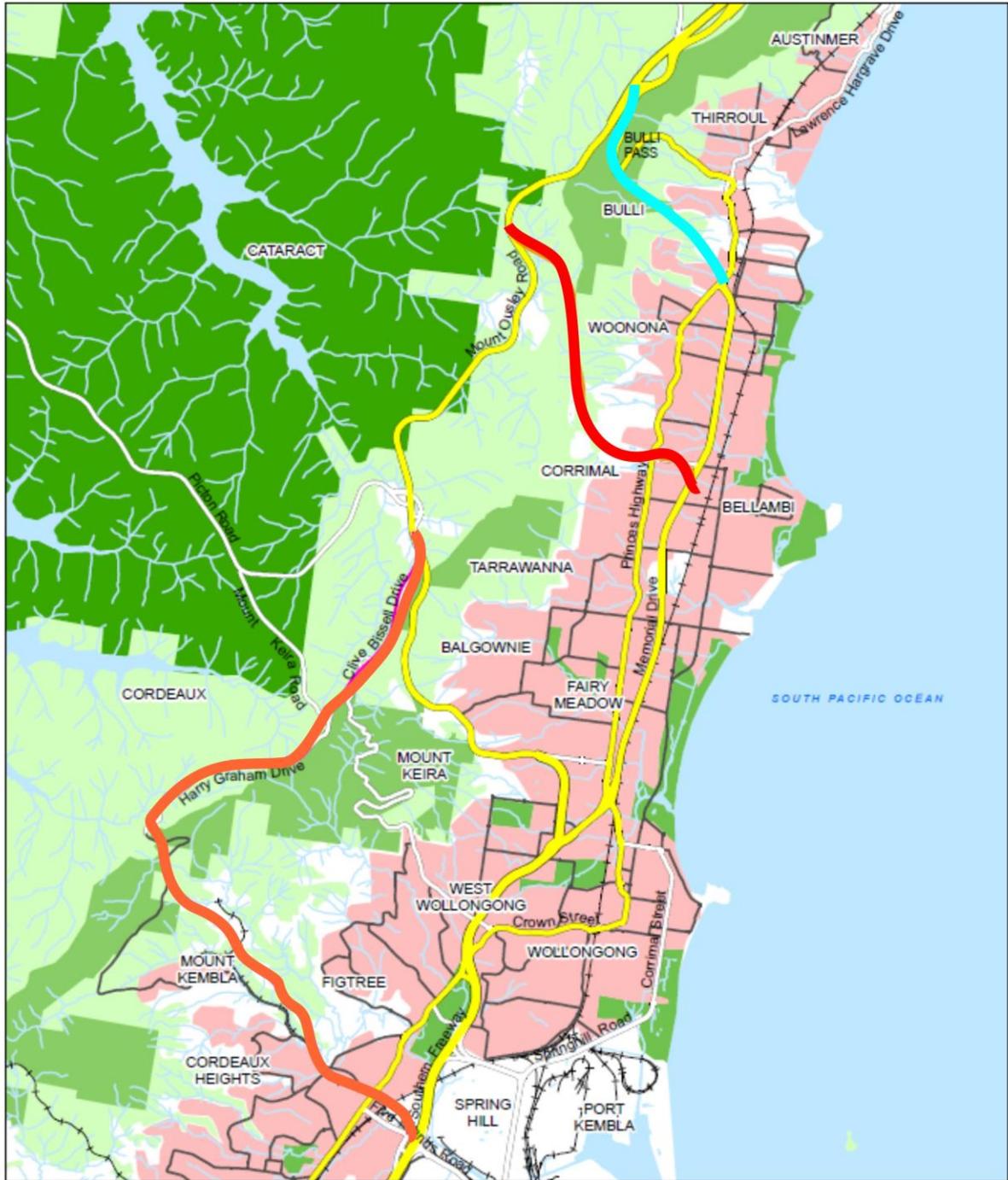
- Geotechnical studies based on historical information.
- Traffic analysis to determine traffic movements and growth trends.
- Feasibility studies to investigate the potential alignments for new routes.
- Design reviews to test potential new routes.

Appendix One includes a summary of each of the studies.

A summary of findings are as follows:

Issue	What the previous investigations found	What this means
<p>Geotechnical conditions</p>	<p>The Illawarra Escarpment is known for its unique topographical, geological and meteorological setting.</p> <p>These conditions lead to the various naturally occurring events that impact on the roads in this area of the Illawarra.</p>	<p>Bulli Pass has historically been a challenging road, due to its location and alignment across the Illawarra escarpment.</p> <p>Due to the steep topography, many of the route options considered between 1996 and 2006 included tunnels, usually through and underneath the higher faces of the Illawarra escarpment.</p> <p>Roads and Maritime considers constructing a road tunnel not value for money or a technically viable solution, with the most feasible option investigated estimated to cost between \$1 billion and \$1.5 billion.</p>
<p>Tunnel operation</p>	<p>A key challenge identified was the grade, or steepness of any new proposed road. In an effort to reduce the grade of the routes, tunnels were considered.</p> <p>Of the options considered, the most feasible road option included a tunnel that was 310 metres long with a grade of 10 per cent. This has been identified as challenging because of its steepness and</p>	<p>The road design, construction and operation industry accepts tunnels with grades greater than 5 per cent have undesirable safety risks.</p> <p>All tunnel alignment options considered for this area had grades higher than 5 per cent.</p> <p>Issues associated with steep tunnels include ventilation management.</p>

Issue	What the previous investigations found	What this means
<p>Road alignment</p>	<p>Road design and vertical alignment options were investigated with a maximum grade of 10 per cent in two sections and 1600 metres long.</p> <p>The horizontal alignment would include a minimum curve radius of 460 metres.</p>	<p>Current road design standards state target maximum grades should be no greater than 8 per cent.</p> <p>Some of the road options investigated were too steep and impractical, with early design options being marginally less steeper than the existing Bulli Pass but steeper than Mount Ousley.</p> <p>The horizontal road alignment would be acceptable in an 80 km/h speed zone.</p> <p>The small improvements in vertical and horizontal alignment would be cost prohibitive for only minimal road safety gains.</p>
<p>Traffic demand</p>	<p>The majority of traffic analysis data was undertaken in 1996 and is now outdated. Changes in land use, traffic distribution and composition have taken place since these studies were completed.</p> <p>Traffic demands are likely to increase on both Mount Ousley Road and Bulli Pass through the expansion of Port Kembla and growth in the Illawarra.</p>	<p>A new strategic traffic analysis is required for (i) the area between Wollongong and Bulli and (ii) the corridor options connecting Wollongong and Sydney.</p>
<p>Related corridor investigations</p>	<p>The NSW Long Term Transport Master Plan includes consideration of preservation of a future transport corridor that could ultimately link Wollongong, Camden, Badgerys Creek, Penrith, Windsor and the Central Coast.</p>	<p>Transport for NSW has begun exploring a suitable corridor for the Outer Sydney Orbital to provide a north-south connection for a future motorway, freight rail and, if appropriate, a passenger rail line.</p> <p>Any future consideration of a new Illawarra escarpment crossing needs to reflect these investigations.</p>



- LEGEND
- Bulli Pass Corridor (various options investigated)
 - Rixons Pass Corridor (1998)
 - Mt Kembla Corridor (1998)

Figure 2 – Previously investigated escarpment corridor options (see Appendix One for further details)

4 Future Steps

Based on this review of previous documentation the following recommendations are made:

Corridor strategy	A corridor strategy for Bulli Pass between George Avenue and Bulli Tops is currently being developed and is due to be completed by the end of 2016. This strategy will define how the travel needs of this corridor will be managed over the next 20 years, in the broader context of statewide growth and traffic demand.
Traffic and safety study of Princes Highway through Bulli	A traffic and safety study of the Princes Highway through Bulli will be carried out and is due to be completed by the end of 2016 financial year, to determine what is required to maximise road network efficiency.
Strategic network analysis	Investigation and strategic planning for the Illawarra road network with the Outer Sydney Orbital Corridor is scheduled due to commence in late 2016.
Continued asset management	Management and maintenance of Bulli Pass remains ongoing and includes:- <ul style="list-style-type: none">• Construction of preventative debris fences above the road• Investigation of possible technology solutions to improve road safety• Installation of a new weather station to assist with gathering live weather data.



<http://www.rms.nsw.gov.au/projects/illawarra/bulli-pass/index.html>



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APPENDIX ONE – Planning investigations 1996 to 2006

Report	Summary
Feasibility Study: Princes Highway Northern Distributor to F6 Freeway at Bulli Tops (1996)	<p>Route options were considered that could potentially provide increased traffic flow between Sydney and Wollongong.</p> <p>Several options were considered during this feasibility study with six outlined in detail.</p> <p>Due to the challenges associated with climbing from near sea level over the Illawarra Escarpment all the options except one included tunnels. At that time, tunnelling was considered the most suitable way to overcome the excessively steep road alignment that would result from constructing on the surface.</p> <p>The most feasible option at the time was a new route from the Northern Distributor interchange through the brickworks/colliery and crossing the existing Bulli Pass below the hairpin turn. This option included a 330 metre tunnel (with a 10 per cent grade) at the escarpment and crossed the Bulli fault line.</p>
Strategic Feasibility Report: Extension of Northern Distributor Possible Route Options (1998)	<p>This examined two additional corridor options, which were Rixons Pass and Mt Kembla (refer to Figure 2) but concluded they were less feasible than the 1996 study's most feasible option (see above).</p>
Geotechnical Feasibility Study: Possible New Route at Bulli Pass (1999)	<p>Further examination of the feasibility of the above option which was renamed the Brickworks option. The Brickworks option included:</p> <ul style="list-style-type: none"> • Amending the road design • Aligning further away from the base of the escarpment above Bulli Pass • Flatter grades • Reduced excavation depths • Twin bridges • Use of a gazetted road corridor north of Molloy Street at Bulli. • An interchange with the F6 at Bulli Tops.
Strategic Design Report: Bulli Pass Alternative Plans (2000)	<p>Reviewed all previously considered options and noted the Brickworks option was the shortest and most affordable.</p> <p>This option still included numerous undesirable features; therefore three other options were investigated with the most feasible one being a refinement of the Brickworks option, now referred to as the Colliery West option.</p>

Report	Summary
<p>Justification Report: Princes Highway Alternative Illawarra Escarpment Crossings at Bulli (2005)</p>	<p>Discussion report found that if the two existing routes to the north of Wollongong (Mount Ousley Road and Bulli Pass) were closed due to an unplanned event, any remaining route would be restricted in its capacity to carry the additional traffic.</p> <p>Furthermore, this report found there was a risk of investing in the previously considered options because of:</p> <p>Rixons Pass option</p> <ul style="list-style-type: none"> • Varying ground conditions • This route would not attract sufficient traffic to justify the expenditure, compared to options closer to the existing Bulli Pass and was not value for money • High visual, access, noise and property impacts. <p>This report also identified that the option to upgrade Bulli Pass on the existing alignment was equally challenging due to:</p> <ul style="list-style-type: none"> • Inability to improve the steep incline • Construction issues associated with traffic using the road • High visual impacts on the Illawarra escarpment from large parts of the northern suburbs. <p>The three alternative escarpment crossing options considered included:</p> <ul style="list-style-type: none"> • Widening Mount Ousley Road to three lanes in each direction • A longer tunnel on the Colliery West option • A combined road and rail tunnel. <p>At the time, the report concluded that the Colliery West option was the most feasible with a recommendation to consider the potential of rezoning of an appropriate road corridor on the revised Local Environmental Plan, an instrument of Wollongong City Council.</p>