EMIRATES RESORTS AND HOTELS
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WOLGAN ROAD SAFETY AUDIT & TRAFFIC IMPACT ASSESSMENT FOR PROPOSED EMIRATES LUXURY RESORT, WOLGAN VALLEY

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1. INTRODUCTION

M^CLaren Traffic Engineering was commissioned in August 2005 to undertake an assessment of the traffic & parking impacts of the luxury resort in the Wolgan Valley, near the town Newnes in New South Wales.

A road safety audit of the existing travel route from the Castlereagh Highway to the site along Wolgan Road was also undertaken by M^CLaren Traffic Engineering in association with Lyle Marshall & Associates in order to address the requirements of the Roads & Traffic Authority.

The proposed development primarily involves the provision of 40 luxurious individual suites in an idyllic Australian bush setting. Ancillary facilities include administration, staff accommodation, amenities, restaurant / bar, conference centre, leisure centre, gymnasium and helicopter landing facility. The on-site parking need is expected to be well below 50 cars with the peak demand of between 10 to 20 vehicles at any one time. This is largely as a consequence of a combination of golf buggy type vehicles or minibus transport of guests between the various on-site facilities as well as from individual suites.

The site is located within the Lithgow Local Government Area (LGA) on the western edge of the Blue Mountains. The Lithgow LGA is relatively diverse in character and includes residential and rural development, tourist and resource based development.

During the conduct of the study discussions were held with RTA representatives (seeking accident data in July 2005, Lithgow City Council representatives (traffic department in August / September 2005), as well as project team members. The co-operation and assistance given by these representatives is appreciated.

1.1 SEPP 11 Requirements

The proposed development is neither a Schedule 1 nor a Schedule 2 development for the purpose of application of State Environmental Planning Policy Number 11 (SEPP11) in terms of the proposed development scale and on-site parking provision.

Accordingly, the proposed development does not require formal referral to the Roads & Traffic Authority for its consideration. Although the development scale in itself is low in terms of potential traffic generation and the site is well removed from the State's Arterial Road network, formal referral to the RTA is considered essential given the prevailing condition of the access road.

2. SITE LOCATION & EXISTING USE

The site is located 190km (approximately 3 hours drive) north-west of the Sydney Central Business District and The Sydney International Airport on the western escarpment of the Blue Mountains. It is 35 kilometres north of the town of Lithgow, and 8 kilometres south of the former industrial town of Newnes, within the Lithgow Local Government Area.

The site is contained within the 'Wolgan Valley' which is surrounded by spectacular rock outcrops and sheer cliff faces. The Wolgan Valley borders the Gardens of Stone National Park to the north and south and the Wollemi National Park to the east. These parks form part of The Greater Blue Mountains World Heritage area. Ben Bullen State Forest is located to the west and Newnes State Forest to the south-east.

The site has convenient access to Glow Worm Tunnel; a section of disused railway tunnel that is now inhabited by iridescent worms. 'Black Fellow Hand Rock' is also not far from the proposed site and features indigenous rock art.

Current access to the site is via Wolgan Road at the town of Lidsdale. Wolgan Road is partially tar sealed, and generally in poor state of repair. Wolgan Road is unsealed from approximately the Wolgan Gap to Newnes and beyond. The road surface from the foot of the pass is generally sub grade with formation only. Sections of the road along the valley floor are rutted and slippery when wet. Caution is required on the decent into the Valley due to the narrow and winding nature of the road.

The development site itself comprises a gently sloping valley floor and is currently cleared for grazing, with interspersed blue gum trees. A single family currently occupies the site. Two intersecting watercourses (Wolgan River and Carnes Creek) traverse the site. Road access is available via a single road through the narrow valley to the west. **Figures 1 & 2** illustrate the site location and the proposed development.

3. EXISTING TRAFFIC CONDITIONS

Wolgan Road is best described as a local collector road, which serves a combination of urban residences near the town of Lidsdale, Collieries, garbage tip and rural acreage properties. The overall distance from the Castlereagh Highway to the site is approximately 25.8 kilometres. The section of Wolgan Road from the Castlereagh Highway to the top of the descent into the Wolgan Valley is generally constructed as a variable width (4-6m) sealed roadway. This measures some 8.94 kilometres. Over the 2.46km length from the top to the bottom of the descent into the valley the seal width varies from 3.2 to 5m. The remaining 14.4 kilometres along the valley floor to the site is constructed as formation with very little gravel pavement.

The photos below depict the nature of the access conditions for Wolgan Road.

VIEW OF WOLGAN ROAD AT THE COMMENCEMENT OF THE DESCENT INTO THE VALLEY AT CHAINAGE 16.9 FROM THE PROPOSED ENTRY GATE TO THE RESORT

VIEW ALONG DESCENT INTO THE VALLEY AT NARROW SEGMENT

VIEW ALONG DESCENT INTO THE VALLEY

VIEW ALONG DESCENT INTO THE VALLEY SHOWING DROP OFF

VIEW ALONG DESCENT INTO THE VALLEY AT HAIRPIN BEND (CH 15.13 FROM RESORT)

VIEW ALONG DESCENT INTO THE VALLEY AT HAIRPIN BEND

VIEW OF SOME LOCALISED GUARD RAIL INSTALLATIONS

VIEW OF LOCALISED CRESTS ALONG THE ROUTE

VIEW OF ISOLATED SPOT HAZARDS WITHIN THE CLEAR ZONE (TREE STUMP)

VIEW ISOLATED SPOT HAZARDS WITHIN THE CLEAR ZONE (EXPOSED CULVERT)

VIEW OF BOX CULVERT HAZARD AT CH 10.22 FROM RESORT WITH INADEQUATE GUARD RAIL PROTECTION

VIEW OF BOX CULVERT HAZARD AT CH 10.22 FROM RESORT WITH INADEQUATE GUARD RAIL PROTECTION

APPROACH VIEW OF BOX CULVERT HAZARD AT CH 10.22 FROM RESORT

VIEW OF LOCALISED EROSION ALONG ROAD SHOULDER

VIEW OF ISOLATED SPOT HAZARDS WITHIN THE CLEAR ZONE (FENCE POST)

VIEW OF WOLGAN ROAD FROM ENTRY GATE TO THE PROPOSED RESORT

No daily traffic counts are available for the subject section of Wolgan Road. However, the road does provide direct access to some twenty (20) rural acreage properties in the Wolgan Valley. Of those fifteen (15) are permanent residents. There is also weekend and holiday camper traffic activity associated with local attractions, including the Glow Worm Tunnel, Newnes hotel and suites, rain-forested canyons, historic mining town ruins as well as the many bushwalking trails.

In order to assess the likely amount of traffic generated along Wolgan Road, without the benefit of traffic counts, surveys undertaken for another project in a similar rural environment for rural acreages in Lambs Valley Road in Singleton Shire LGA over a full week period indicate a daily traffic trip rate of 4.6 to 5.3 vehicles per day per lot.

Application of this range yields an estimated traffic volume of 70 to 80 vehicles per day. It is expected that the daily volume would increase at times during weekends and during school holidays due to the nearby attractions previously mentioned.

3.1 TRAFFIC VOLUMES

To validate the estimated traffic volume activity along Wolgan Road, a number of tube counts were laid along the route to record daily and peak hourly classified traffic volumes at the following locations, over a two week period:

1. Wolgan Road, after garbage tip access (Ch 7.19 from Skelly Road Ch 00).
2. Wolgan Road, top of Pass (Ch 8.97 from Skelly Road Ch 00).
3. Wolgan Road, bottom of Pass (Ch 11.45 from Skelly Road Ch 00).
4. Wolgan Road, just past site (Webb) access (Ch 25.86 from Skelly Road Ch 00).

The recorded daily volumes, peak hourly volumes and the proportion of light, heavy and articulated vehicles are presented in **Table 1a** on the following page. The count summary sheets are presented in **Figures 3, 4, 5 & 6** for each of the segments listed above. Two sheets are presented for each count location, the first for week 1 and the second for week 2 details.

TABLE 1a: EXISTING TWO WAY TRAFFIC VOLUME RANGE FOR WEEK 1 & WEEK 2 (WOLGAN ROAD)

Count Location*	Maximum Daily Volume	Maximum Peak Hour (Two Way)		Percentage Light By Direction	Number Heavy (Articulated)
Chainage 7.19	Weekday 66 to 77	5 to 9 (7-9am)	12 to 13 (2-4pm)	96-97% North 87-89% South	0 to 3 2
After Tip	Weekend day (98 to 126)	11 to 21 (11-12pm)	16 to 36 (2-3pm)	97-98% North 91-92% South	0 to 1 0 to 1
Chainage 8.97	Weekday 54 to 67	5 to 6 (7-9am)	7 to 8 (2-4pm)	91-96% North 95-98% South	0 to 3 0 to 1
Top of Pass	Weekend day (80 to 111)	7 to 18 (11-12pm)	18 to 20 (1-4pm)	93-96% North 96-99% South	0 0 to 1
Chainage 11.45	Weekday 52 to 61	5 to 6 (7-9am)	6 to 8 (2-4pm)	93-97% North 94-96% South	0 to 3 1 to 2
Bottom of Pass	Weekend day (80 to 99)	8 to 12 (9-12pm)	16 to 18 (1-5pm)	97-99% North 97% South	0 to 1 0 to 1
Chainage 25.86	Weekday 22 to 24	2 to 3 (7-9am)	4 to 5 (12-2pm)	100% North 100% South	0 0
After site access	Weekend day (63 to 77)	11 to 13 (10-12pm)	14 to 16 (12-1pm)	100% North 100% South	0 0

* Chainage distance measured from Skelly Road junction with Wolgan Road

It is evident from **Table 1** above that:

- In the order of 22 to 61 vehicles travel along Wolgan Road between the bottom of the pass and the site during weekdays, increasing to 77 to 99 on the weekend days recorded.
- The peak hour flow along Wolgan Road along the steep decline into the valley is in the order of 16 to 20 vehicles per hour with up to 99 to 111 vehicles on the weekend days recorded. On weekdays the peak hour flow on the steep section is in the order of 5 to 8 vehicles per hour with up to 60 to 70 vehicles on the week days recorded.
- The majority of traffic travelling along Wolgan Road are light vehicles (i.e. cars, sedans, utes etc).
- There is also some articulated vehicle use of the Wolgan Road corridor, typically 0 to 3 semi-trailer vehicles per day.

The average traffic flows along Wolgan Road by the critical three segments, during relevant peak hour periods for the subsequent impact assessment during the construction and operational phases of the proposed development are as follows:

TABLE 1b: EXISTING AVERAGE PEAK HOURLY & DAILY TRAFFIC VOLUME DETAILS FOR WOLGAN ROAD

Peak Hour	After Tip		Top of Pass		Bottom of Pass		After Site	
	Week 1	Week 2	Week 1	Week 2	Week 1	Week 2	Week 1	Week 2
Weekday 6-7am	1	1	1	1	1	1	0	0
Weekday 3-4pm	4	5	3	4	3	3	1	2
Weekday 4-5pm	9	4	5	4	6	4	2	2
Weekday Daily	61	58	42	46	46	43	13	14
Saturday 11-noon	21	11	18	7	12		11	13
12-1pm		18		17	18	13		
2-3pm						15		
Saturday Daily	110	98	111	80	99	80	66	63
Sunday noon-1pm							16	14
1-2pm				18		16		
2-3pm	36	16	16		16			
3-4pm			20					
Sunday Daily	126	87	104	70	96	68	77	52

Therefore the average daily details are as follows:

Weekdays

- **83** vehicles per day for the Tip to the Top of the Pass segment.
- **44** vehicles per day for the Top of the Pass to the Base of the Pass segment.
- **29** vehicles per day for the Base of the Pass to the Site segment.

Weekend days

- **105** vehicles per day for the Tip to the Top of the Pass segment.
- **91** vehicles per day for the Top of the Pass to the Base of the Pass segment.
- **75** vehicles per day for the Base of the Pass to the Site segment.

Seasonal variations do occur along Wolgan Road, associated with weekend campground use in the Newnes area. Advice received from operators of the suites indicate that on long weekends and particularly during spring and autumn periods as well as during Easter and October, there can be in the order of 400 campers in the area, with about 100 cars (4 persons per car) arriving for a 2 to 4 day stay with up to an additional 100 vehicles per day arriving at the start of the long weekend or Easter period, with the same number returning at the end of the holiday period.

Thus the additional traffic load along Wolgan Road can fluctuate and increase markedly at times, estimated to be in the order of 200 to 250 vehicles per day with peak hourly flows along the steep descent segment into the valley estimated to increase to 30 to 40 peak hour trips.

4. PLANNED ROAD NETWORK

The RTA has advised that works are currently being undertaken for the reconstruction of the Castlereagh Highway through Lidsdale including the intersection of the Highway and Wolgan Road as well as the intersection of Wolgan Road and Skelly Road. Both intersections will be reconstruction to provide safer road conditions.

Council officers have advised that no road works are planned in the foreseeable future in the immediate vicinity of the site.

5. ROAD SAFETY AUDIT PROCEDURE

During the conduct of the assessment of the proposed resort in the Wolgan Valley and in response to the RTA's request, a formal road safety audit of the existing travel route from the Castlereagh Highway to the development site has been undertaken.

As required by the RTA's request, the audit concentrates on the *"roadway widths, sign posting and generated vehicle sweep paths and the impact of accommodating two way vehicle flows along the local road".*

5.1 APPROACH USED

The approach used in undertaking the audit involved the following tasks:

1. Review of accident data supplied by the RTA.

2. Clusters of three or more accidents did not occur along the route. A summary of the accident statistics, identified trends and accident costs are discussed in **Section 5.2** of this report.

3. A reconnaissance windscreen inspection was then undertaken of the route.

4. A low speed detailed inspection of road conditions, recording identified road safety and maintenance deficiencies as well as chainages of hazardous locations along the route was undertaken during the inspection period. The road safety audit was undertaken by **two experienced traffic engineers**, which ensured that none of the less prominent safety deficiencies were overlooked. A video recording of selected locations was also undertaken.

   The record of deficiencies identified during the road safety audit are listed in **Section 5.3.2** of this report. Each deficiency listed in the route inspections has been allotted a **Corrective Action Report (CAR)** number and these **CAR's** are contained in **Annexure A**.

5. The major road safety deficiencies were identified from the field notes and are listed in **Section 5.3.3** of this report.

5.2 ACCIDENT ANALYSIS

5.2.1 Summary

Crash data statistics covering the 5 year period from the year 2000 to 2004 were obtained from the Roads and Traffic Authority.

An analysis of this data has been undertaken for all intersections and links along the study corridor. In this regard all accidents occurring within 30 metres of an intersection are assumed to be related to the intersection characteristics itself.

A summary of the overall number of accidents occurring along this route over the 5 year period by accident severity is provided in **Table 2**.

Table 2 also incorporates the generic costs per accident in 2003$, based on the RTA's Economic Analysis Manual (March 1999), but with updated 2003 accident costs. Incident costs include vehicle repair, insurance administration, accident investigation/reporting, legal costs, alternate transport, but excludes other property damage costs.

Table 2:**Accident Severity & Generic Costs (2003 $)**
For Rural Accidents (2000 to 2004)

ACCIDENT SEVERITY	NO. OF ACCIDENTS		AVERAGE COST (2003 $)	TOTAL COSTS (2003 $)	
	INTERSECTION	LINKS		INTERSECTIONS	LINKS
FATAL	-	-	1,899,630	-	-
TREATED INJURY	-	6	136,750	-	820,500
TOW-AWAY	-	9	7,150	-	64,350
TOTALS	0	15	N/A	0	884,850

The major points arising from **Table 2** are as follows:

- A total of 15 accidents occurred along the route over the 5 year period of which all occurred along road links (not at intersections).

- The total accidents costs along the route for the 5 year period is $884,850 in 2003 $, all occurring along road links (not at intersections).

- The majority of accidents were tow-away (60%), with injury accidents representing 40% of the total number of accidents.

No fatal accidents occurred along the study corridor.

5.2.2 Accident Types and Trends

There are no specific spots along the corridor with more than three accidents over the 5 year accident period.

The predominant type of accident along the Wolgan Road corridor was the *"Out of Control On Bend"* (Series 800) accident type which accounted for ten (10) of the 15 accidents (representing 67% of accidents).

The second most prominent accident type was the *"Out of Control On Straight"* (Series 700) accident type, which accounted for three (3) of the 15 accidents (representing 20% of accidents).

The remaining accidents were *"Head On"* type, which accounted for two (2) of the 15 accidents (representing 13% of accidents).

The other accident trend contributing factors, involving road alignment, light and weather conditions were as follows:

- A curve road alignment was highly represented in the accident data, contributing to 12 of the 15 accidents (i.e. 80%) compared with straight road segment accidents.

- The majority of accidents occurred in daylight hours, representing 60% of accidents, with 33% of accidents at night and 7% at dusk.

- The majority of accidents occurred in fine weather conditions, representing 80% of accidents, with 13% of accidents during rain and 7% during overcast conditions.

It is apparent, following detailed site inspections, that a number of low cost measures are required to reduce the accident potential. These measures include, but are not limited to, the following:

1. Advance curve warning and advisory speed signs at all bends along the corridor.

2. Installation of guide posts at spacings compliant with relevant standards.

3. Reduced speed zoning for each segment of the route commensurate with the prevailing road and adjacent land use condition. It is highly recommended that the steep descent into the valley be signposted at a maximum speed of 35km/h, with the general speed limit along the valley floor signposted as a 50km/h zone.

4. Install hazard markers on all exposed trees, tree stumps and fence posts that are located at or near bends in Wolgan Road, within the required clear zone.

The number of accidents recorded along the entire route disaggregated by road segment are shown in **Table 3**.

TABLE 3: Mid Block (or Link) Accidents

ROAD SEGMENT	NUMBER OF ACCIDENTS PER YEAR					
	2000	2001	2002	2003	2004	Total
Lidsdale	-	1	1	-	-	2
Wolgan Gap	1	1	-	-	-	2
Wolgan Valley	2	-	2	2	-	6
Newnes	2	1	1	-	1	5
Total	1	2	4	2	2	15

The road segment, which exhibited the highest number of accidents, was that section along the floor of the Wolgan Valley. This segment resulted in a total of six (6) accidents over the 5 year accident period.

The accidents are generally spread along the route.

5.2.3 Accident Rate

The study corridor has been divided into three segments. The following formulae were used to determine million vehicle kilometres (MVKm) of travel and the accident rate for each road section

A = Million Vehicle Kilometres (MVKm) = Distance Km x Daily Volume x no. of days per year/1,000,000.

B = Accident Rate (acc/MVKm) = No. Of Accidents/A.

The study corridor currently functions as a two lane undivided carriageway within a rural environment for the entire segment from the Tip to the subject site.

The **RTA's "Road Design Guide"** provides information in regard to normalised accident rates for the 1988 accident database for the **whole** of the road network, including links and nodes. The normalised accident rates are shown in **Table 4.**

Table 4: Normalised Accident Rates for Various Types of Road During 1988(1)

ROAD TYPE	ACCIDENT RATES ** PER 100 MVKm		
	FATAL ACCIDENTS	*SERIOUS CASUALTY ACCIDENTS	TOTAL ACCIDENTS
Urban			
Freeway	0.87	5.28	39.3
Divided Road (≥4L)	1.42	12.54	152.1
Undivided Road (≥4L)	3.07	25.23	256.7
Undivided Road (<4L)	3.96	18.55	131.9
Rural			
Freeway	1.26	2.29	21.9
Divided Road (≥4L)	1.59	8.05	32.2
Undivided Road (<4L)	2.11	11.52	49.3

*Serious Casualty Accidents numbers are the sum of Fatal Accidents and Serious Injury Accidents
**The rates are averages with a large standard deviation
(1) Source "Road Design Guide" Section 4, Table 4.6.1, page 4-29, RTA 1991.

It is evident from **Table 4** that an accidents threshold rate of **0.493** accidents per MVKm applies for an undivided road carriageway in a rural environment with less than four lanes.

The subject study corridor (between the top of the pass to the site) accommodates an estimated **ADT** of 91, 80 and 72 vehicles per day in 2005, as calculated in Section 3.1 of this report.

Hence in view of the foregoing, the calculated accident rate for the study route (i.e. Wolgan Road) is as follows:-

1. Accident Rate Calculation for Segment From Tip Access to Top of Pass

Million Vehicle Kilometres (MVKm) = $\frac{1.78 \times 91 \times 5 \times 365}{1{,}000{,}000}$

MVKm = 0.296

Accident Rate = $0/_{0.296}$ = **0** accidents per MVKm

2. Accident Rate Calculation for Segment From Top of Pass to Base of Pass

Million Vehicle Kilometres (MVKm) = $\frac{2.48 \times 80 \times 5 \times 365}{1{,}000{,}000}$

MVKm = 0.362

Accident Rate = $2/_{0.362}$ = **5.524** accidents per MVKm

3. Accident Rate Calculation for Segment From Base of Pass to Site Access

Million Vehicle Kilometres (MVKm) = $\frac{14.41 \times 72 \times 5 \times 365}{1{,}000{,}000}$

MVKm = 1.89

Accident Rate = $^{6}/_{1.89}$ = **3.169** accidents per MVKm

Hence, in view of the above, it is evident that the segment of the along the descent into the Wolgan Valley, as well as along the Wolgan Valley floor operate with an accident rate above the threshold level.

Accordingly, measures are currently needed to reduce this accident rate.

5.3 ROAD SAFETY AUDIT

5.3.1 Road Safety Auditors Involvement

The audit team comprised:-

Mr Craig M^CLaren - M^CLaren Traffic Engineering
Mr Lyle Marshall - Lyle Marshall & Associates

The site inspection was undertaken on Monday, 25 July, 2005. The site inspection occurred during the 10am to 8pm period.

The weather conditions were fine during the day and evening during the conduct of the audit.

5.3.2 Route Inspection Observations and Assessment

The road safety problems and issues that were observed during the day and night route inspections have been documented as described in the following paragraphs. The deficiencies have been identified and a **Corrective Action Request (CAR)** number has been allocated where it has been deemed necessary.

Each type of deficiency or safety problem has been placed in one of the usual hazard category. Each category has been assessed in regard to the checklists of **SAA HB430** for **Stage 5, Existing Roads.** The **CAR** forms are included in **Annexure A.**

The record of route findings prepared during the inspection in chainage sequence from the proposed entry gate to the proposed resort are presented in **Annexure B**.

5.3.3 Summary of Deficiencies, Estimated Costs of Suggested Solutions & Benefit Cost Analysis

A summary of the observed deficiencies, estimated costs and benefit cost analysis is shown in **Table 5**. The estimated costs of the treatments are based on 2003 rates. The unit rates for Road and Traffic Improvements are listed in **Annexure C**.

It is considered that some remedial measures would not require maintenance during a ten year design life once incorporated whilst others, for example guide posts and localised road seal resurfacing and road shoulder restoration (particularly after scouring due to heavy rain periods), would require maintenance during that period. Finally, regrading of the unsealed segments is required annually.

TABLE 5: AUDIT FINDINGS & RECOMMENDED TREATMENTS

ITEM #	CAR REF #	LOCATION*	TREATMENT	ESTIMATED COST $	BENEFIT	BCR 4%	BCR 7%	PRIORITY	RANK
1	CAR# 1	Various	21 Guide Posts + 40 bridge reflectors + Chevron on bullnose	$1,500			6.1*	Medium High	2
2	CAR# 2	Various	Install Thrie Beam Guardrail (2,433m)	$486,600	One potential fatality over 25 years		3.9*	Very High	1
3	CAR# 3	Top & Base of Pass (CH14.4 to CH16.9)	Install Permanent Traffic Signals with a minimum “Red” signal duration of 8 minutes for a single vehicle.	TBA	One potential fatality over 25 years		7.6	Very High	1
4	CAR# 4	Various	Replace broken pipes / culverts plus headwall	$5,000			3.9*	Moderate	3
5	CAR# 5	Various	Scour regrading of gravelled road segments along Valley floor and at other spot locations	$8,000			3.9*	Moderate	3
6	CAR# 6	CH 7.14	Replace exposed cattle grid	$3,500			6.1*	Medium High	2
7	CAR# 7	Various	Regrade rutted / corrugated segments along Valley floor. Import gravel, excavate, trim & compact the gravel where necessary to 150mm	$135 per lineal km			3.9*	Moderate	3
8	CAR# 8	CH 10.15 to CH 10.22	Replace inadequate & damaged guardrail with Thrie beam guardrail across Reinforced Concrete Box Culvert (both sides) plus extend guardrail to CH 10.22 east side, include RRPM’s on guardrail. Include advance warning signs of narrow (single lane) bridge as well as curve warning signs on both approaches. Test load bearing structural strength of box culvert.	$25,000 (100m guardrail included in costs)	One potential fatality over 25 years		76.0	Very High	1

ITEM #	CAR REF #	LOCATION*	TREATMENT	ESTIMATED COST $	BENEFIT	BCR 4%	BCR 7%	PRIORITY	RANK
9	CAR# 9	Various	Stabilise falling rock & unstable cut batters	Detailed investigation required to determine extent of works to be carried out.			TBA	Medium High	2
10	CAR# 10	CH 17.95 to CH 18.1	Repair poor seal (705m^2)	$7,050			3.0*	Moderate	3
11	CAR# 11	CH 00 to CH14.4	Install 50km/h signs along the Wolgan Valley floor (2 every 2km)	$3,500			14.3*	Medium High	2
12	CAR# 12	CH00 to CH14.4	New Guide Posts (GP) at regular spacing along Valley floor (530 costed @ 150m spacing on straights and @ 20m on curves) plus curve warning (W) (100 costed) and crest signs (50 costed) where necessary	$15,000 GP $37,500 W			7.9	Medium High	2
13	CAR# 13	CH 22.14 & CH 22.17	Replace 80km/h signs	$500			14.3*	Medium High	2
14	N/a	CH00 to CH14.4	Regrading of gravel roadway along valley floor 2 to 3 times a year and after heavy rain	Ongoing Maintenance Cost			3.0*	Moderate	2

* Chainage distance measured from proposed entry gate to the resort from Wolgan Road

NOTE: Where the BCR is denoted by an asterisk (*), this is based on the BCR ratio listed in **Section 5.4.3 "Traffic Control Devices"** of the AUSTROADS Guide to Traffic Engineering Practice - Part 4 Road Crashes"

5.4 SUMMARY OF PRIORITY TREATMENTS

The recommended treatments listed in **Table 5** in the previous section have been ranked on the basis of both priority and of BCR in order to eliminate or to ameliorate hazardous locations along the Wolgan Road route to the proposed development. The highest ranked treatments are **Item #'s 2, 3 & 8** which includes the following items:

- The installation of guardrail over much of the 2.48 kilometre distance for the descent down the steep pass into the Wolgan Valley as well as at other spot locations. This is needed to prevent an errant vehicle from travelling down the steep embankment along the descent into the Wolgan Valley from the top of the pass.

- The installation of traffic signal control for vehicles using the steep descent, as the road width is insufficient for two vehicles to pass at numerous locations along the descent. The alternative of widening the pass to achieve adequate passing opportunities is cost prohibitive.

- The installation of standard Thrie beam guardrail on either side of the reinforced concrete box culvert at Chainage 10.15, which is extremely hazardous as the existing guardrail is non compliant.

The second highest ranked treatments are all items requiring provision of signage (warning & speed zone), reflectors, RPM's, guide posts to improve day and night time delineation, as well as rock and batter stabilisation. The regular regrading of the gravelled road corridor along the Wolgan Valley has also been ranked as a moderate priority treatment.

The third highest ranked treatment are those treatments involving repairs to broken pipes / culverts / headwalls as well as repairs to localised gravelled road corridors (associated with corrugation & scouring effects) and localised deterioration of sealed road corridor segments.

6. PROPOSED DEVELOPMENT

The Master plan report, prepared on behalf of Emirates Resorts and Hotels explains the evolution of the design. The Master plan is based on the successful Emirates Al Maha Resort in Dubai, which captures the essence of the environment and is designed to blend in with the landscape.

The proposed Emirates Luxury Resort at Wolgan Valley includes:

- An exclusive and idyllic resort facility set within 1,457 hectares of dedicated conservation area, with absolute guest privacy, full security and personalised service 24 hours a day;
- A facility that provides a unique experience of total peace, solitude and contact with nature, allowing guests to fully relax. The design and operation is based on the ability to provide excellence in service and guest satisfaction, with a ratio of three staff to every guest suite;
- Provision of 40 luxurious individual suites in an idyllic Australian bush setting, each utilising natural lighting with floor to ceiling windows affording uninterrupted vistas from each suite. They will also feature private pools, fine dining, exquisite wines and an intimate connection with indigenous flora and fauna;
- A 2,360m^2 main administration building;
- A main restaurant and bar;
- A 860m^2 conference centre and state of the art facilities with exceptional technology standards;
- Provision of a spa, gymnasium and leisure centre with the latest professional fitness equipment;
- Provision of a number of on site and off site guest activities which complement the environment in which the facility is located;
- Purpose and thoughtful design to harmonise with spectacular surroundings, influenced by traditional architecture and offering informal elegance;
- Restoration of degraded creeks and provision of bushfire asset protection areas;
- Staff, service and maintenance facilities;
- Infrastructure including an access road, pedestrian and cart network, helicopter landing pad, stormwater and waste management facilities. The resort will also treat and reuse grey water generated by the sewerage treatment facility.

The proposed development, as depicted in **Figure 2**, is disaggregated into three precincts as follows:

Site No. 1 – Main Resort site:

- [A] 40 villas
- [B] Main Reception Building, Restaurant and Bar
- [C] Conference Centre and parking
- [D] Spa

Site No. 2 – Managers (8) and on-site staff (20)

- [E] Manager's accommodation (8 people)
- Helipad, parking (6) and shelter

Site No. 3 – Staff and Maintenance

- [F] Staff accommodation (120 staff), staff parking
- [G] Maintenance Building and Yard
- Parking for staff and maintenance vehicles (20)

Although the formalised on-site parking is for some 40 cars for the resort, it will be required that resort staff and guests will be transported to and from the resort in 4WD (7 seater) or Minibuses (15 seater) vehicles. Some guests may arrive via helicopter (4 guests per week envisaged by this transport mode). On site transport of staff and guests between the on-site facilities will be via minibus or golf cart type buggies in order to reduce the impact on local fauna and flora.

7. TRAFFIC GENERATION & ACCESS PROVISION

Given the distance of the site from Sydney's Kingsford Smith Airport (KSA), where the majority of guests using the resort will arrive and be transported either via minibus to Lithgow or via helicopter (VIP guests only) to the site. Those arriving via minibus will transfer to 7 seater luxury 4WD vehicles whilst the staff will predominately arrive via 15 seater minibuses. The 4WD or minibus travel mode will also be used by departing staff and guests (other than those using helicopter).

The estimated traffic generation for the construction and operational phases of the project are outlined below:

CONSTRUCTION PHASE

It is expected that the following vehicle numbers per day for a 40-week work program:

1. Delivery trucks (2 to 4 axle medium size) – 2 to 3 on average (To be confirmed)
2. Construction staff 13 by 15 seater minibuses.
3. Construction staff 25 private vans/utes.
4. **Total of 40 to 45 vehicle visits or 80 to 90 vehicle trips per day.**

Hence a total of some 40 to 45 construction vehicles are expected to enter the site between 6am to 8am on weekdays and some Saturday mornings, and leave the site between 2pm to 4pm on weekdays or around 1pm to 3pm on some Saturday afternoons.

It is expected that no construction activity would occur during public holidays.

OPERATIONAL PHASE

AT 90% OCCUPANCY (i.e. 36 Suites occupied) @ 2.5 persons per suite, staying on average 4 days. Assume 50% of these suites turnover every 2 days. All guests arrive via 4WD vehicles, driven by resort employees. Assume practical capacity of 6 guests per vehicle (plus driver), plus a luggage trailer. Staff of 120, with at least 100 staying for 7 to 10 days, with 50% turnover of long stay staff every 3 to 5 days. The residual 20 day staff arrive/depart in 2 by 15 seater minibuses. The estimated highest activity daily movement is:

1. 7am – 2 minibuses (15 seater) bring in day staff. Up to 4 by 4WD depart with up to 24 guests to KSA for departing flight. 1 arriving delivery truck with perishables.

2. 8am – 1 delivery truck leaves.

3. 10am – up to 4 by 4WD bring in up to 24 guests that have arrived at KSA at 6am.

4. Noon – up to 3 by 4WD bring in up to 18 guests that have arrived at KSA at 8am. Up to 3 by 4WD depart with up to 18 guests to KSA for departing flight.

5. 2pm – On third or fifth day up to 4 minibuses (15 seater) depart with long term staff to Lithgow.

6. 3pm – 2 minibuses (15 seater) depart with day staff.

7. 4pm – On third or fifth day up to 4 minibuses (15 seater) arrive with long term staff from Lithgow.

8. **Total of 28 daily vehicle trips and up to 7 peak hour vehicle trips on the worst case peak day.**

It is evident from the above that anticipated daily traffic levels associated with the proposed development ranges from about 30 vehicle trips per day once the resort is fully operational to 90 vehicle trips during the construction phase. A layover parking area in Lithgow will be identified for the temporary storage of one (1) minibus and two (2) luxury 4WD vehicles. An arrangement will be organised with a service station or similar guest transfer area. The alternative may involve the use of a single transport vehicle from KSA to the site.

The peak hourly traffic flow will be less than 10 vehicle trips during the 7am to 8am operational period, reducing to between 2 to 6 vehicle trips per hour at other activity times (operationally).

During the construction phase, the additional peak hourly load would equate to 20 to 30 vehicle trips.

These traffic flow levels are very low, equating to an additional 1 vehicle trip every 6 minutes at the peak time, reducing to 1 vehicle trip every 15 to 30 minutes at other activity times (operationally).

During the construction phase, the additional peak hourly traffic load equates to an additional 1 vehicle trip every 2 to 3 minutes at the peak time

Hence, under the construction and operational phases for the proposed development, the impact upon the critical segments of Wolgan Road is shown in **Tables 6 & 7**.

TABLE 6 : COMPARISON OF DAILY & PEAK HOURLY FLOWS ON WOLGAN RD FOR THE SEGMENT FROM THE TOP & BASE OF THE PASS (THE DESCENT)

SCENARIO	DAILY TRAFFIC FLOW (TWO WAY)	PEAK HOUR FLOW (TWO-WAY)
PEAK HOLIDAY PERIOD		
EXISTING	210 to 260	30 to 40
CONSTRUCTION PHASE	No Change	No Change
OPERATIONAL PHASE	240 to 290	40 to 50
NON-HOLIDAY PERIOD		
EXISTING	<50	<5 to 10
CONSTRUCTION PHASE	<140	<25 to 40
OPERATIONAL PHASE	<80	<15 to 20

TABLE 7 : COMPARISON OF DAILY & PEAK HOURLY FLOWS ON WOLGAN RD FOR THE SEGMENT ALONG THE VALLEY FLOOR

SCENARIO	DAILY TRAFFIC FLOW (TWO WAY)	PEAK HOUR FLOW (TWO-WAY)
PEAK HOLIDAY PERIOD		
EXISTING	200 to 250	30 to 40
CONSTRUCTION PHASE	No Change	No Change
OPERATIONAL PHASE	230 to 280	40 to 50
NON-HOLIDAY PERIOD		
EXISTING	<30	<5 to 10
CONSTRUCTION PHASE	<120	<25 to 40
OPERATIONAL PHASE	<60	<15 to 20

It is evident from **Table 6** above that a maximum peak hour flow of less than **40** vehicles per hour could occur along Wolgan Road associated with the construction phase of the project, if no construction occurred during peak holiday periods, otherwise the maximum peak hourly flows along the critical segments of Wolgan Road could reach **60** to **70** vehicles per hour at critical times. This would only occur at spot times and not during the bulk of the day

The forecast peak hourly volumes equate to a condition where vehicles flows along Wolgan Road could rise to 1 vehicle per 1.5 minutes at peak times, during the

operational phase, compared to 1 vehicle per 6 minutes currently occurring at peak times.

The RTA's Road Design Guide and AUSTROADS guidelines specify that unsealed roads are permissible when the annual average daily traffic (AADT) flow is less than 150 vehicles per day. It is evident that the present unsealed road condition along the Wolgan Valley floor is generally acceptable as the forecast existing plus proposed development daily traffic flow along Wolgan Road will give rise to a traffic flow generally below 150 vehicles per day for the operational phase, except during peak holiday periods when daily volumes along the Valley floor could rise to just under 300 vehicles per day.

It is acknowledged that during the construction phase that traffic volumes along Wolgan Road may increase about 150 vehicles per day, however, the construction period is for a limited duration. A construction management plan will be required to lessen the impact of this phase of the project on Wolgan Road and nearby properties.

It is noted that the road safety audit has recommended a series of works required to either remove or to ameliorate current hazardous conditions along the Wolgan Road route to the site.

8. PARKING PROVISION

Lithgow City Council Car Parking Development Control Plan specifies the following parking rates for the proposed uses:

- Tourist Accommodation (suites, camping grounds etc)
  - One space per manager
  - Plus bus parking
  - Plus 1 space per site (camping ground / suite etc)
  - Plus visitor parking at 1 space per 10 tourist sites and / or 1 space per 5 permanent sites.
- Restaurant
  - One space per 6.5m^2 GFA, or 1 per 3 seats (whichever is greater).

The proposed resort will not operate in the manner inherent in the above listed parking rates. The proposed resort and facilities including the restaurant, gymnasium, conference facility and leisure centre will not operate in a manner accessible to the general public.

It will operate as an exclusive luxury resort with guests and most of the staff chauffer driven to and from the site. Internal movement between the various facilities will also be via golf buggy type vehicles or via minibuses.

Accordingly, application of Council's parking requirements is not relevant in the circumstances. The formalised on-site parking will reflect the managed operation of staff and guest movement. A total of some **35** parking spaces for 4WD, minibuses and golf buggies are proposed dispersed around the site as follows:

- 2 spaces at the conference centre
- 6 spaces at the helipad
- 20 spaces at the staff / maintenance area
- 5 spaces at the main reception area
- 2 spaces at the Managers accommodation

9. INTERNAL ACCESS DESIGN

The proposed on-site roadways and paths will be constructed in suitable all weather material in line with the low impact treatment desired on the local landscape.

The proposed main driveway off Wolgan Road serving the resort development should be at least 6 metres wide for the first 10 to 15 metres before narrowing to a 3.5m one lane wide unsealed roadway with passing opportunities every 80 to 100 metres or at closer spacing where sight lines are restricted. This is considered highly desirable, as it will minimise impact and disturbance upon natural landscaping, much of which is to be retained. Sight lines are more than adequate for the proposed main entry / exit driveway location off Wolgan Road.

Gravelled pathways serving the suite component of the proposed development for use by golf type buggies is considered reasonable and is in accordance with the

desired treatment envisaged for the project. It is understood that Lithgow City Council requires all weather gravel standard only for rural development. Tourist development of a nature similar to that proposed is not inconsistent with a rural type development where impact upon the natural environment is a primary concern. Indeed gravelled driveways exist for many similar type developments in similar rural settings within other local government areas, so that adoption of this standard would not be inconsistent.

Internally the gravelled pathways serving the suites should have a width of 2 metres for buggy cart access.

The other driveways serving other components of the development, such as staff and maintenance areas shall comply with appropriate standards in terms of access width and sight lines along Wolgan Road.

10. TRAFFIC IMPACT

The current risks along the Wolgan Road corridor are high, particularly along the descent to the valley and at locations listed in the audit report detailed earlier in Section 5 of this report. In particular, the following treatments, inter alia, are needed:

- The installation of guardrail over much of the 2.48 kilometre distance for the descent down the steep pass into the Wolgan Valley as well as at other spot locations. This is needed to prevent an errant vehicle from travelling down the steep embankment along the descent into the Wolgan Valley from the top of the pass.

- The installation of traffic signal control for vehicles using the steep descent, as the road width is insufficient for two vehicles to pass at numerous locations along the descent. The alternative of widening the pass to achieve adequate passing opportunities is cost prohibitive.

- The installation of standard Thrie beam guardrail on either side of the reinforced concrete box culvert at Chainage 10.15, which is extremely hazardous as the existing guardrail is non compliant.

10.1 Amenity Impact

The traffic volumes generated by the proposed development will not adversely affect the local amenity of nearby residences, subject to regular maintenance of Wolgan Road.

Regular maintenance of Wolgan Road involving, *inter alia*, regrading the unsealed segment along the Wolgan Valley floor, replacement of damaged warning signs & guide posts, should be the subject of a 2 to 3 times a year inspection schedule, subject to weather and other conditions (or after heavy rainfall) and should be undertaken by Council or accredited contractors.

10.2 Road Safety Considerations

The road safety recommendations listed in Sections 5.3.3 & 5.4 will need to be implemented on the basis of the existing conditions with or without the proposed development.

10.3 Construction Traffic Management

A construction traffic management plan will need to be developed which gives due consideration to the following desirable principles:

1. Maximise the use of minibus (15 seater) transport of construction staff to and from the site.

2. Maximise the use of smaller delivery vehicles, given the condition of the steep and narrow descent along the Wolgan Road corridor into the Valley from the south.

3. Implement a either the recommended permanent traffic light system or a temporary traffic light system (until the permanent system is installed) at the top and bottom of the steep descent into the Wolgan Valley possibly with manned assistance to allow only a one directional stream of traffic along the narrow segment. The manned operation may need to employ walkie talkie type communication.

In the event that large trucks are required to deliver materials to the site then a controlled trial of the route should be undertaken by a trial vehicle. Whilst the traffic counts conducted appear to suggest that articulated vehicles utilise the Wolgan Road descent into the Valley, this aspect requires further investigation.

Notwithstanding the findings of that further investigation, it is recommended that trucks serving either the construction or operational phases of the proposed development be restricted to 12.5m length large rigid trucks.

If the recommended traffic light system is not provided, then passing bays at varying intervals will be needed, subject to seal width and sight distance requirements.

11.0 CONCLUSION

Traffic Management & Road Safety Measures

The proposed development is supportable on traffic grounds subject to:

(a) Implementation of the road safety audit recommendations, detailed in Sections 5.3.3 & 5.4 of this report, for the operational & construction phases of the project.

(b) The preparation of a construction traffic management plan that, inter alia, takes into account the principles contained in Section 10.3 of this report and maximizes the use of smaller delivery vehicles and employs minibuses to transport construction staff to and from the site. In addition a temporary traffic signal system should be employed to permit only a single directional stream of traffic at a time along the steep and narrow descent into the valley during the construction period. Once the proposal is operational the signals should be a permanent facility.

If the recommended traffic light system is not provided, then passing bays at varying intervals will be needed, subject to seal width and sight distance requirements.

The current risks along the Wolgan Road corridor are high, particularly along the descent to the valley and at locations listed in the audit report detailed earlier in Section 5 of this report. In particular, the following treatments, inter alia, are needed:

- The installation of guardrail over much of the 2.48 kilometre distance for the descent down the steep pass into the Wolgan Valley as well as at other spot locations. This is needed to prevent an errant vehicle from travelling down the steep embankment along the descent into the Wolgan Valley from the top of the pass.

- The installation of traffic signal control for vehicles using the steep descent, as the road width is insufficient for two vehicles to pass at numerous locations along the descent. The alternative of widening the pass to achieve adequate passing opportunities is cost prohibitive.

- The installation of standard Thrie beam guardrail on either side of the reinforced concrete box culvert at Chainage 10.15, which is extremely hazardous as the existing guardrail is non compliant.

It is apparent, following detailed site inspections, that a number of low cost measures are required to reduce the accident potential. These measures include, but are not limited to, the following:

1. Advance curve warning and advisory speed signs at all bends along the corridor.

2. Installation of guide posts at spacings compliant with relevant standards.

3. Reduced speed zoning for each segment of the route commensurate with the prevailing road and adjacent land use condition. It is highly recommended that the steep descent into the valley be signposted at a maximum speed of 35km/h, with the general speed limit along the valley floor signposted as a 50km/h zone.

4. Install hazard markers on all exposed trees, tree stumps and fence posts that are located at or near bends in Wolgan Road, within the required clear zone.

The proposed development will have a minimal impact on the surrounding road network in terms of traffic flow efficiency and road safety considerations, subject to implementation of the road safety audit recommendations, detailed in Sections 5.3.3 & 5.4 of this report, for the operational and construction phases of the project.

The traffic volumes generated by the proposed development will not adversely affect the local amenity of nearby residences, subject to regular maintenance of Wolgan Road. Regular maintenance of Wolgan Road involving, *inter alia*, regrading the unsealed segment along the Wolgan Valley floor, replacement of damaged warning signs & guide posts, should be the subject of a 2 to 3 times a year inspection schedule subject to weather and other conditions (or after heavy rainfall) and should be undertaken by Council or accredited contractors.

The road safety audit list of recommended works is required on the basis of existing conditions with or without the proposed development.

Whilst the proposed development will give rise to an increase in traffic activity along Wolgan Road, the road currently accommodates some variance in traffic flow conditions attributed to campers and other groups that are generated by the local attractions in the vicinity of the subject site.

The road safety measures listed should be predominantly funded by the State and local government agencies, given the significance of the area.

In the event that large trucks are required to deliver materials to the site then a controlled trial of the route should be undertaken by a trial vehicle. Whilst the traffic counts conducted appear to suggest that articulated vehicles utilise the Wolgan Road descent into the Valley, this aspect requires further investigation.

Notwithstanding the findings of that further investigation, it is recommended that trucks serving either the construction or operational phases of the proposed development be restricted to 12.5m length large rigid trucks.

Internal Access Design

The proposed on-site roadways and paths will be constructed in suitable all weather material in line with the low impact treatment desired on the local landscape.

The proposed main driveway off Wolgan Road serving the resort development should be at least 6 metres wide for the first 10 to 15 metres before narrowing to a 3.5m one lane wide unsealed roadway with passing opportunities every 80 to 100 metres or at closer spacing where sight lines are restricted. This is considered highly desirable, as it will minimise impact and disturbance upon natural landscaping, much of which is to be retained. Sight lines are more than adequate for the proposed main entry / exit driveway location off Wolgan Road.

Gravelled pathways serving the suite component of the proposed development for use by golf type buggies is considered reasonable and is in accordance with the desired treatment envisaged for the project. It is understood that Lithgow City Council requires all weather gravel standard only for rural development. Tourist development of a nature similar to that proposed is not inconsistent with a rural type development where impact upon the natural environment is a primary concern. Indeed gravelled driveways exist for many similar type developments in similar rural settings within other local government areas, so that adoption of this standard would not be inconsistent.

Internally the gravelled pathways serving the suites should have a width of 2 metres for buggy cart access.

The other driveways serving other components of the development, such as staff and maintenance areas shall comply with appropriate standards in terms of access width and sight lines along Wolgan Road.

On-Site Parking

The proposed resort will not operate in the manner inherent in the above listed parking rates. The proposed resort and facilities including the restaurant, gymnasium, conference facility and leisure centre will not operate in a manner accessible to the general public.

It will operate as an exclusive luxury resort with guests and most of the staff chauffer driven to and from the site. Internal movement between the various facilities will also be via golf buggy type vehicles or via minibuses.

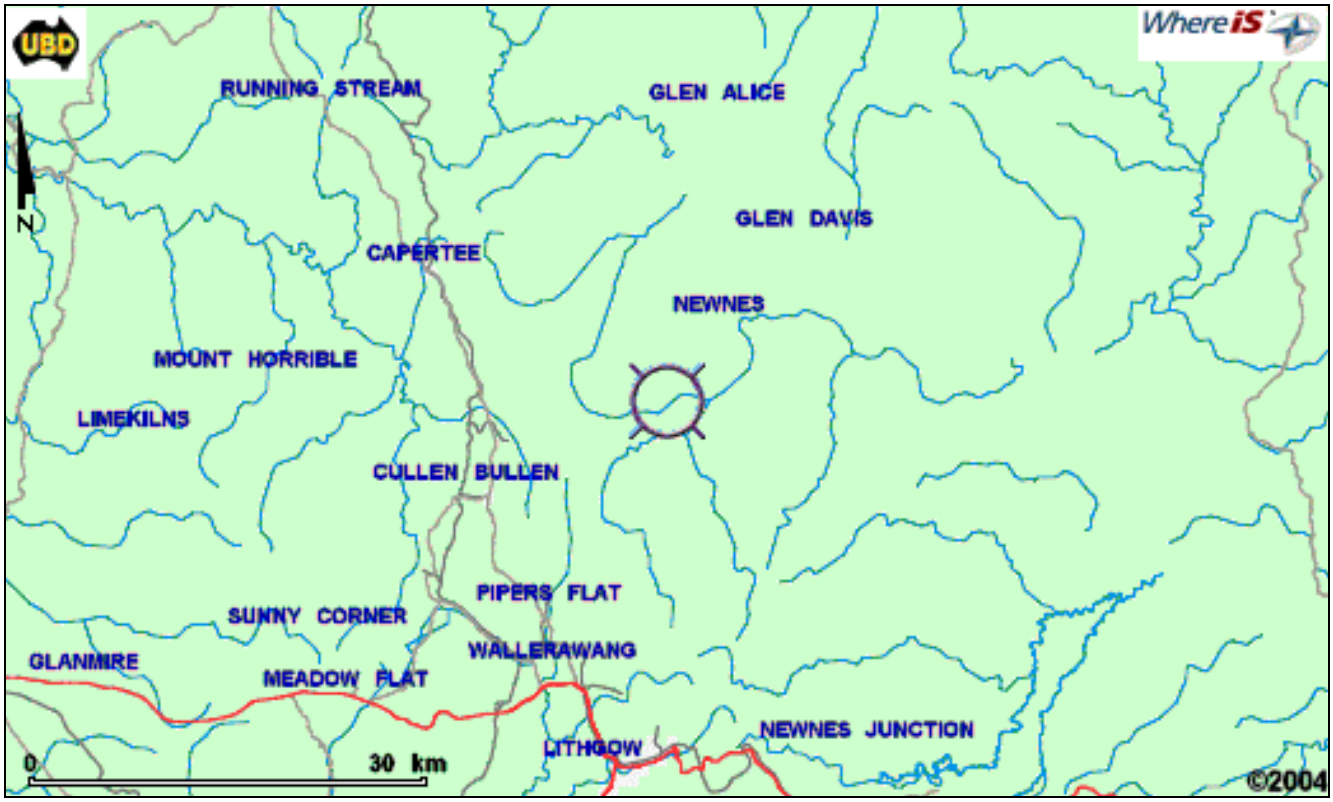
Accordingly, application of Council's parking requirements is not relevant in the circumstances. The formalised on-site parking will reflect the managed operation of staff and guest movement. A total of some **35** parking spaces for 4WD, minibuses and golf buggies are proposed dispersed around the site as follows:

- 2 spaces at the conference centre
- 6 spaces at the helipad
- 20 spaces at the staff / maintenance area
- 5 spaces at the main reception area

- 2 spaces at the Managers accommodation

Internally, gravelled driveways will be sufficient for the suite component as long as potential dust effects are controlled.

The internal road widths serving the suites should be a minimum of 3 metres except where 90 degree parking is provided.



EMIRATES RESORT, WOLGAN VALLEY

FIGURE 1 : SITE LOCATION

PREPARED FOR : EMIRATES RESORTS & HOTELS

BY : M^CLAREN TRAFFIC ENGINEERING

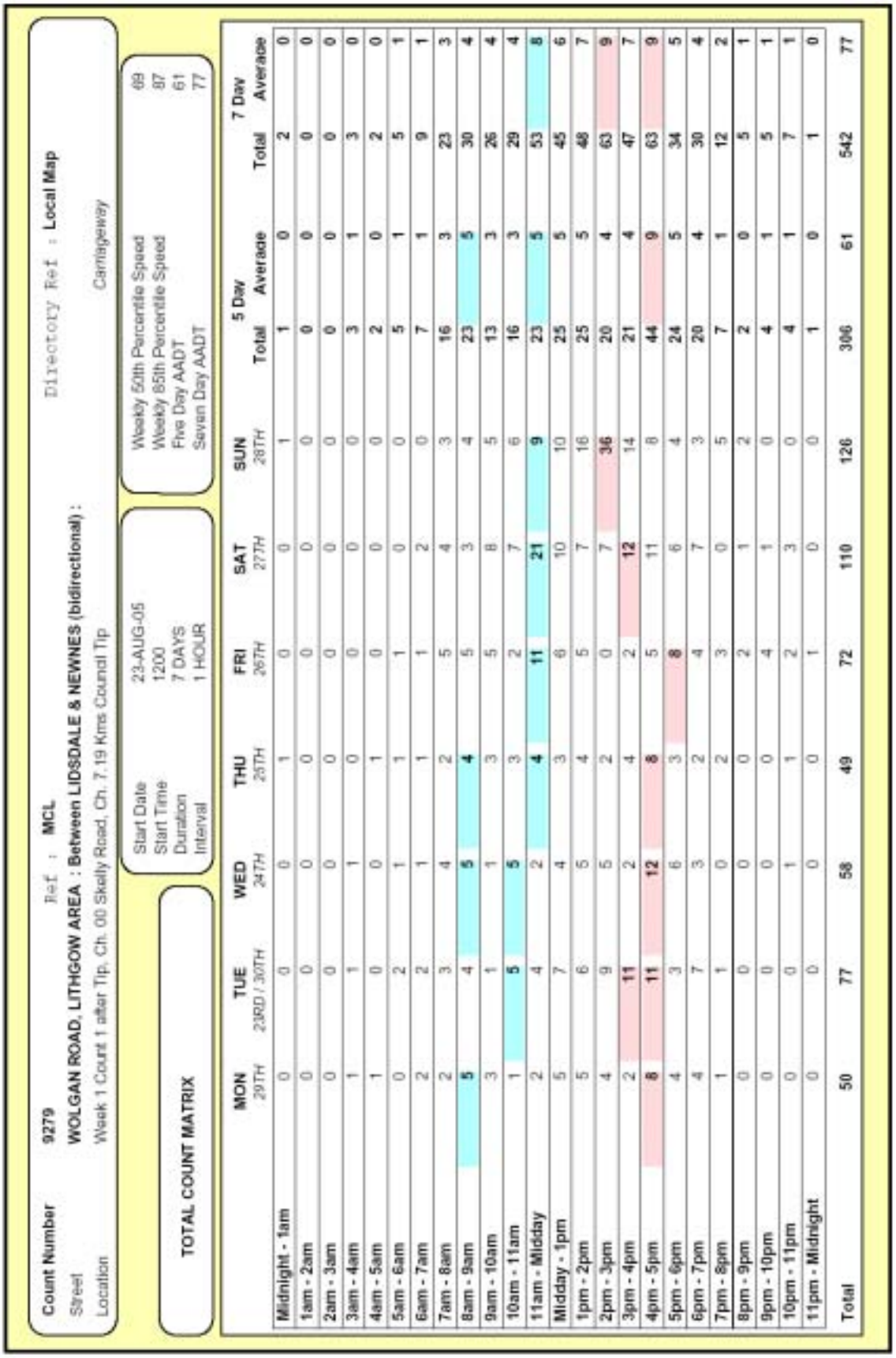
Refer to plans submitted by Conybeare Morrison International for further details

EMIRATES RESORT, WOLGAN VALLEY

FIGURE 2 : PROPOSED DEVELOPMENT

PREPARED FOR : EMIRATES RESORTS & HOTELS

BY : M^CLAREN TRAFFIC ENGINEERING



Count Number 9279 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 1 Count 1 after Tip, Ch. 00 Skelly Road, Ch. 7.19 Kms Council Tip Carriageway

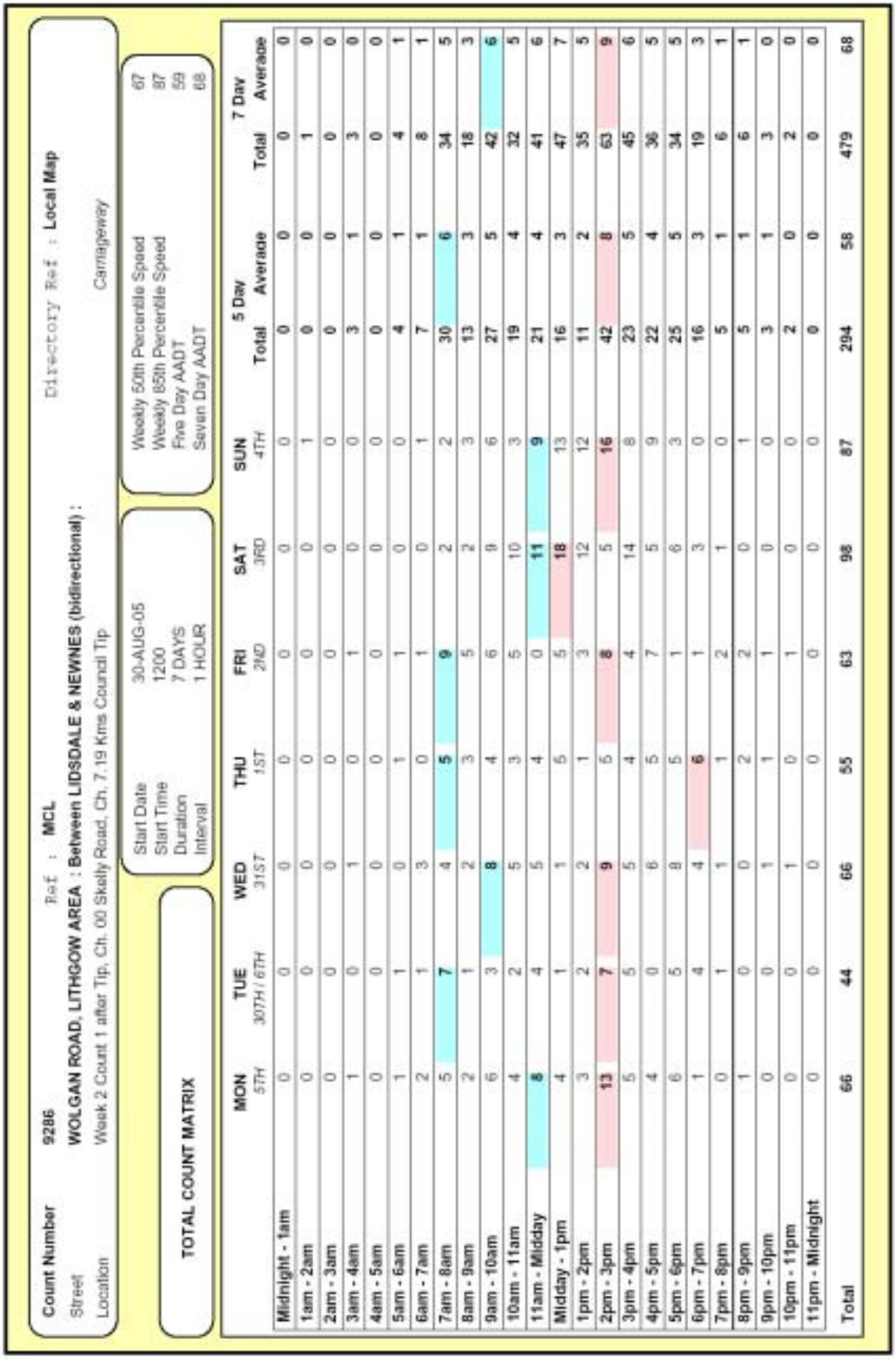
TOTAL COUNT MATRIX

Start Date 23-AUG-05
Start Time 1200
Duration 7 DAYS
Interval 1 HOUR

Weekly 50th Percentile Speed 69
Weekly 85th Percentile Speed 87
Five Day AADT 61
Seven Day AADT 77

	MON 29TH	TUE 23RD / 30TH	WED 24TH	THU 25TH	FRI 26TH	SAT 27TH	SUN 28TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	1	0	0	1	1	0	2	0
1am - 2am	0	0	0	0	0	0	0	0	0	0	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	1	1	0	0	0	0	3	1	3	0
4am - 5am	1	0	0	1	0	0	0	2	0	2	0
5am - 6am	0	2	1	1	1	0	0	5	1	5	1
6am - 7am	2	2	1	1	1	2	0	7	1	9	1
7am - 8am	2	3	4	2	5	4	3	16	3	23	3
8am - 9am	5	4	5	4	5	3	4	23	5	30	4
9am - 10am	3	1	1	3	5	8	5	13	3	26	4
10am - 11am	1	5	5	3	2	7	6	16	3	29	4
11am - Midday	2	4	2	4	11	21	9	23	5	53	8
Midday - 1pm	5	7	4	3	6	10	10	25	5	45	6
1pm - 2pm	5	6	5	4	5	7	16	25	5	48	7
2pm - 3pm	4	9	5	2	0	7	36	20	4	63	9
3pm - 4pm	2	11	2	4	2	12	14	21	4	47	7
4pm - 5pm	8	11	12	8	5	11	8	44	9	63	9
5pm - 6pm	4	3	6	3	8	6	4	24	5	34	5
6pm - 7pm	4	7	3	2	4	7	3	20	4	30	4
7pm - 8pm	1	1	0	2	3	0	5	7	1	12	2
8pm - 9pm	0	0	0	0	2	1	2	2	0	5	1
9pm - 10pm	0	0	0	0	4	1	0	4	1	5	1
10pm - 11pm	0	0	1	1	2	3	0	4	1	7	1
11pm - Midnight	0	0	0	0	1	0	0	1	0	1	0
Total	50	77	58	49	72	110	126	306	61	542	77

FIGURE 3a: Week 1 AT CHAINAGE 7.19 (After Tip)



Count Number 9286 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 2 Count 1 after Tip, Ch. 00 Skelly Road, Ch. 7.19 Kms Council Tip Carriageway

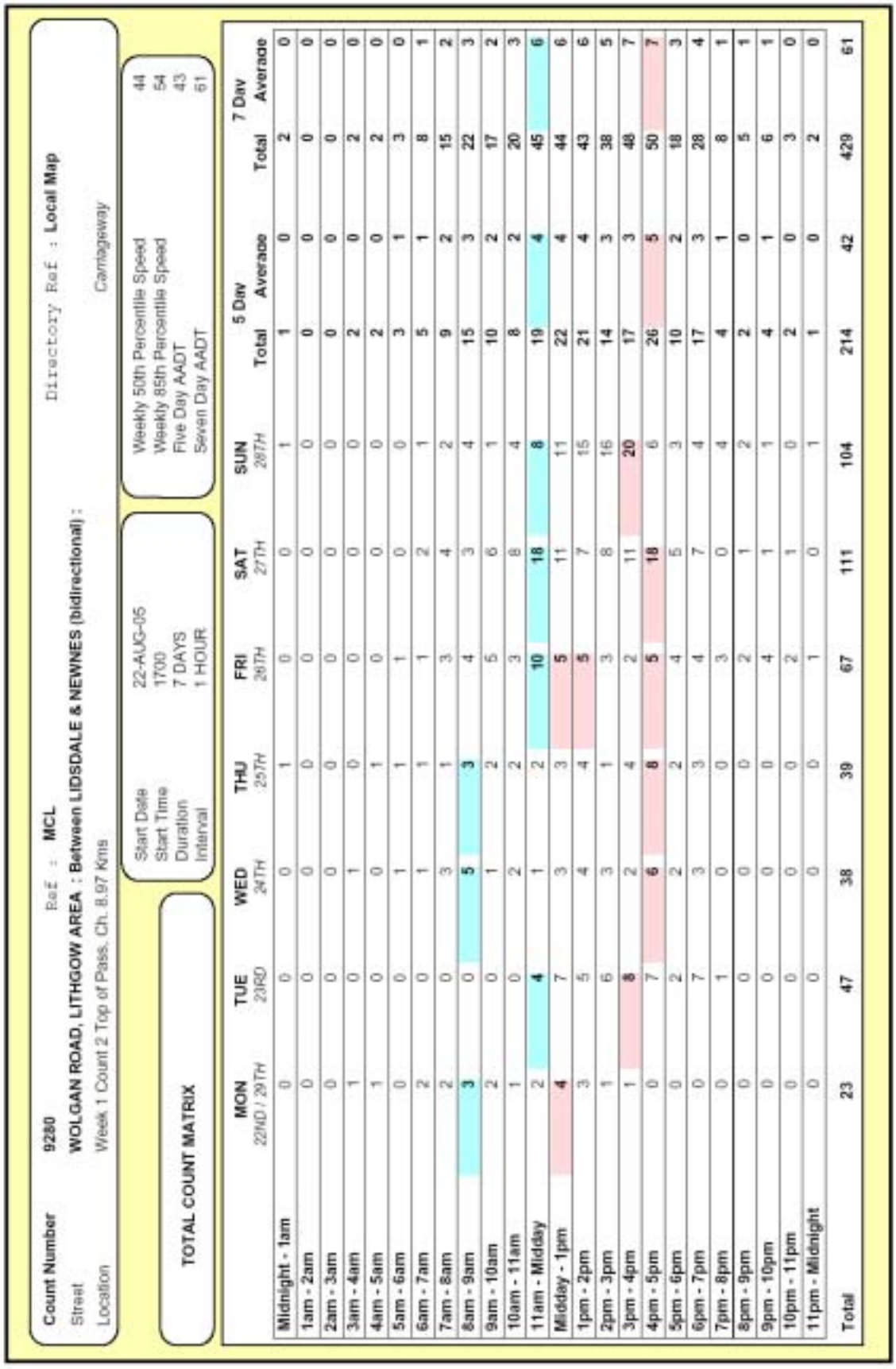
TOTAL COUNT MATRIX

Start Date 30-AUG-05
Start Time 1200
Duration 7 DAYS
Interval 1 HOUR

Weekly 50th Percentile Speed 67
Weekly 85th Percentile Speed 87
Five Day AADT 59
Seven Day AADT 68

	MON 5TH	TUE 30TH / 6TH	WED 31ST	THU 1ST	FRI 2ND	SAT 3RD	SUN 4TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	0	0	0	0	0	0
1am - 2am	0	0	0	0	0	0	1	0	0	1	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	0	1	0	1	0	0	3	1	3	0
4am - 5am	0	0	0	0	0	0	0	0	0	0	0
5am - 6am	1	1	0	1	1	0	0	4	1	4	1
6am - 7am	2	1	3	0	1	0	1	7	1	8	1
7am - 8am	5	7	4	5	9	2	2	30	6	34	5
8am - 9am	2	1	2	3	5	2	3	13	3	18	3
9am - 10am	6	3	8	4	6	9	6	27	5	42	6
10am - 11am	4	2	5	3	5	10	3	19	4	32	5
11am - Midday	8	4	5	4	0	11	9	21	4	41	6
Midday - 1pm	4	1	1	5	5	18	13	16	3	47	7
1pm - 2pm	3	2	2	1	3	12	12	11	2	35	5
2pm - 3pm	13	7	9	5	8	5	16	42	8	63	9
3pm - 4pm	5	5	5	4	4	14	8	23	5	45	6
4pm - 5pm	4	0	6	5	7	5	9	22	4	36	5
5pm - 6pm	6	5	8	5	1	6	3	25	5	34	5
6pm - 7pm	1	4	4	6	1	3	0	16	3	19	3
7pm - 8pm	0	1	1	1	2	1	0	5	1	6	1
8pm - 9pm	1	0	0	2	2	0	1	5	1	6	1
9pm - 10pm	0	0	1	1	1	0	0	3	1	3	0
10pm - 11pm	0	0	1	0	1	0	0	2	0	2	0
11pm - Midnight	0	0	0	0	0	0	0	0	0	0	0
Total	66	44	66	55	63	98	87	294	58	479	68

FIGURE 3b: Week 2 AT CHAINAGE 7.19 (After Tip)



Count Number 9280 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 1 Count 2 Top of Pass. Ch. 8.97 Kms Carriageway

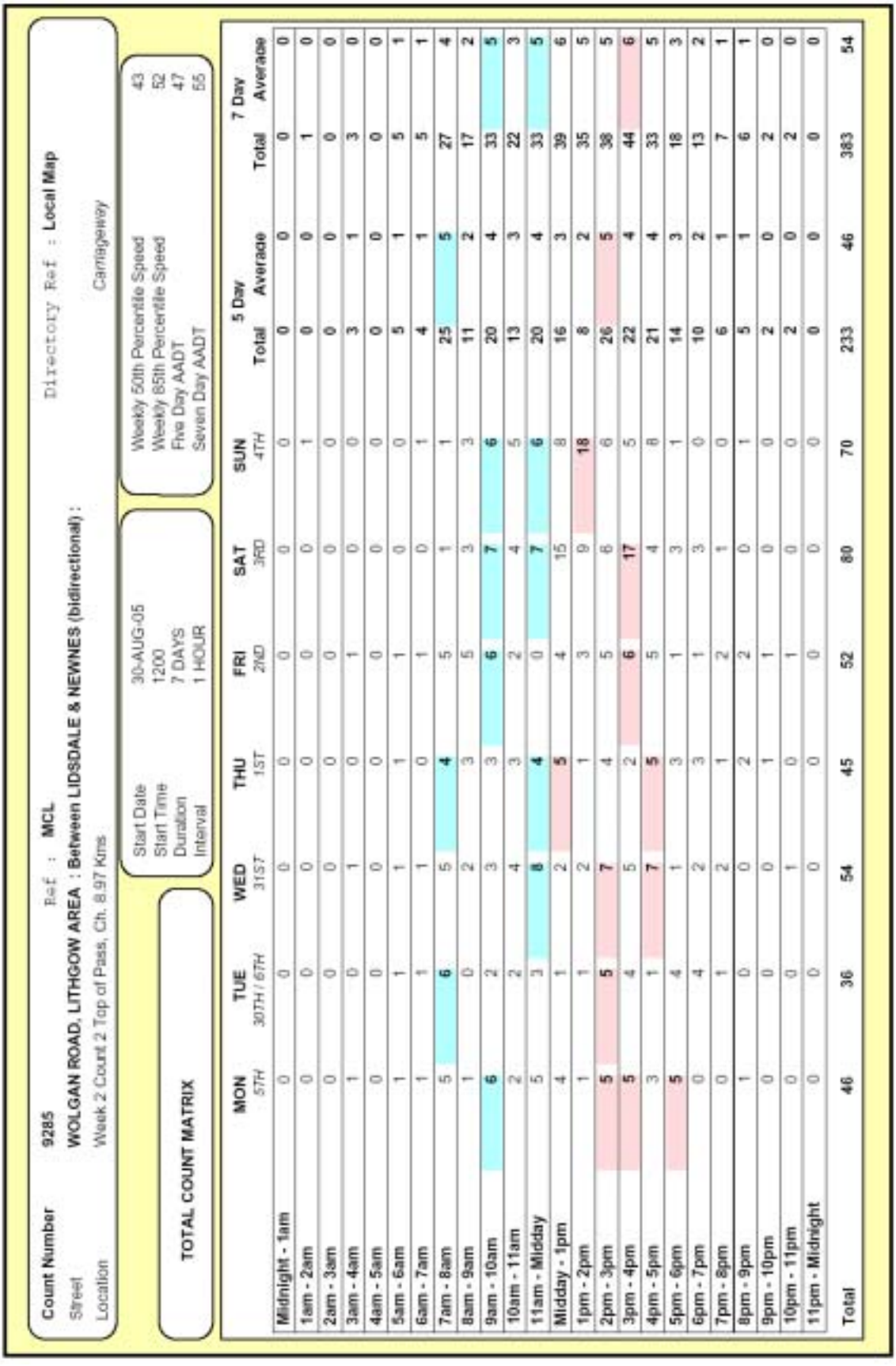
TOTAL COUNT MATRIX

	MON 22ND / 29TH	TUE 23RD	WED 24TH	THU 25TH	FRI 26TH	SAT 27TH	SUN 28TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	1	0	0	1	1	0	2	0
1am - 2am	0	0	0	0	0	0	0	0	0	0	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	0	1	0	0	0	0	2	0	2	0
4am - 5am	1	0	0	1	0	0	0	2	0	2	0
5am - 6am	0	0	1	1	1	0	0	3	1	3	0
6am - 7am	2	0	1	1	1	2	1	5	1	8	1
7am - 8am	2	0	3	1	3	4	2	9	2	15	2
8am - 9am	3	0	5	3	4	3	4	15	3	22	3
9am - 10am	2	0	1	2	5	6	1	10	2	17	2
10am - 11am	1	0	2	2	3	8	4	8	2	20	3
11am - Midday	2	4	1	2	10	18	8	19	4	45	6
Midday - 1pm	4	7	3	3	5	11	11	22	4	44	6
1pm - 2pm	3	5	4	4	5	7	15	21	4	43	6
2pm - 3pm	1	6	3	1	3	8	16	14	3	38	5
3pm - 4pm	1	8	2	4	2	11	20	17	3	48	7
4pm - 5pm	0	7	6	8	5	18	6	26	5	50	7
5pm - 6pm	0	2	2	2	4	5	3	10	2	18	3
6pm - 7pm	0	7	3	3	4	7	4	17	3	28	4
7pm - 8pm	0	1	0	0	3	0	4	4	1	8	1
8pm - 9pm	0	0	0	0	2	1	2	2	0	5	1
9pm - 10pm	0	0	0	0	4	1	1	4	1	6	1
10pm - 11pm	0	0	0	0	2	1	0	2	0	3	0
11pm - Midnight	0	0	0	0	1	0	1	1	0	2	0
Total	23	47	38	39	67	111	104	214	42	429	61

Start Date	22-AUG-05
Start Time	1700
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	44
Weekly 85th Percentile Speed	54
Five Day AADT	43
Seven Day AADT	61

FIGURE 4a: Week 1 AT CHAINAGE 8.97 (Top of Pass)



Count Number 9285 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 2 Count 2 Top of Pass, Ch. 8.97 Kms Carriageway

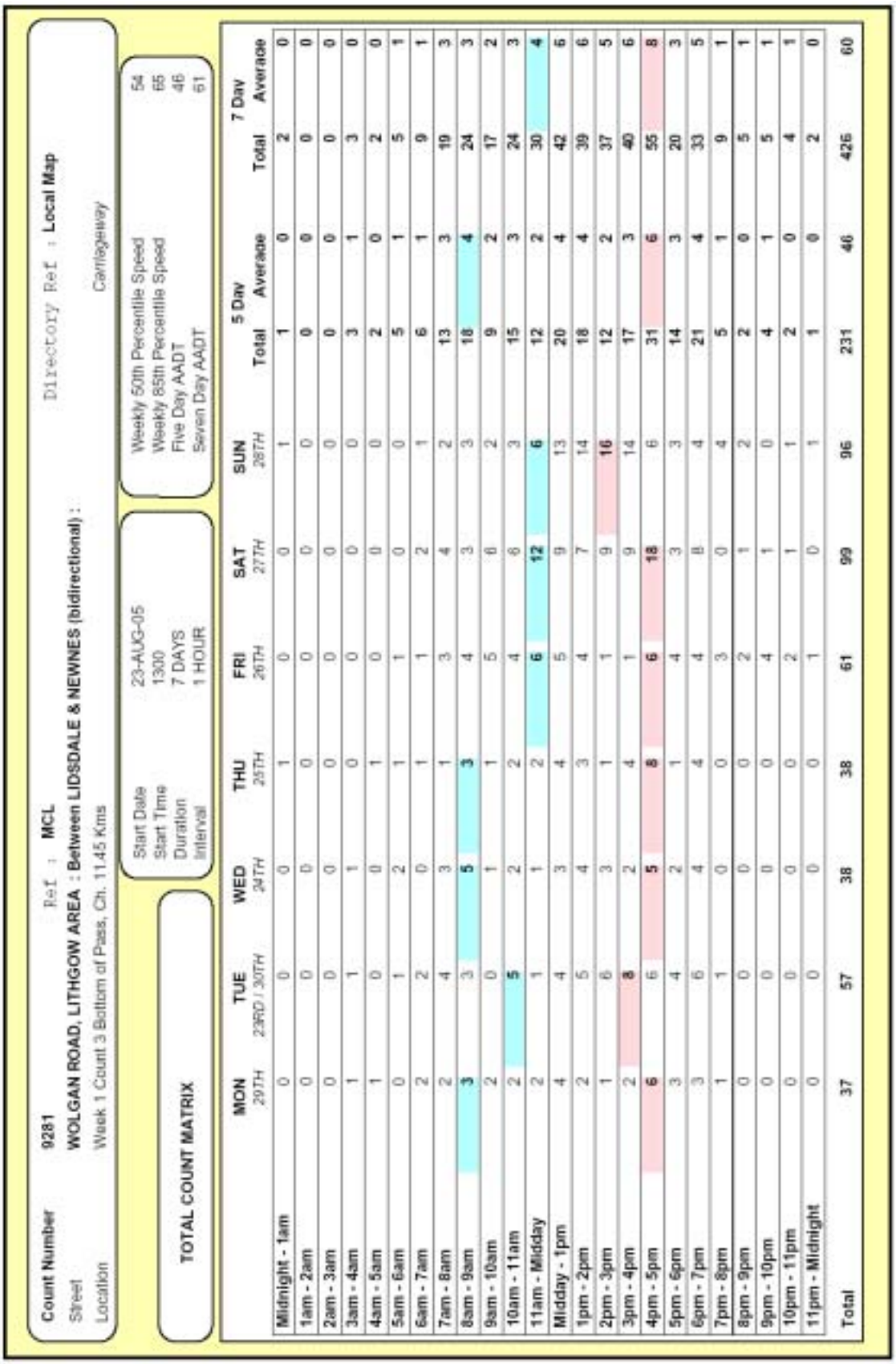
TOTAL COUNT MATRIX

Start Date 30-AUG-05
Start Time 1200
Duration 7 DAYS
Interval 1 HOUR

Weekly 50th Percentile Speed 43
Weekly 85th Percentile Speed 52
Five Day AADT 47
Seven Day AADT 55

	MON 5TH	TUE 30TH / 6TH	WED 31ST	THU 1ST	FRI 2ND	SAT 3RD	SUN 4TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	0	0	0	0	0	0
1am - 2am	0	0	0	0	0	0	1	0	0	1	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	0	1	0	1	0	0	3	1	3	0
4am - 5am	0	0	0	0	0	0	0	0	0	0	0
5am - 6am	1	1	1	1	1	0	0	5	1	5	1
6am - 7am	1	1	1	0	1	0	1	4	1	5	1
7am - 8am	5	6	5	4	5	1	1	25	5	27	4
8am - 9am	1	0	2	3	5	3	3	11	2	17	2
9am - 10am	6	2	3	3	6	7	6	20	4	33	5
10am - 11am	2	2	4	3	2	4	5	13	3	22	3
11am - Midday	5	3	8	4	0	7	6	20	4	33	5
Midday - 1pm	4	1	2	5	4	15	8	16	3	39	6
1pm - 2pm	1	1	2	1	3	9	18	8	2	35	5
2pm - 3pm	5	5	7	4	5	6	6	26	5	38	5
3pm - 4pm	5	4	5	2	6	17	5	22	4	44	6
4pm - 5pm	3	1	7	5	5	4	8	21	4	33	5
5pm - 6pm	5	4	1	3	1	3	1	14	3	18	3
6pm - 7pm	0	4	2	3	1	3	0	10	2	13	2
7pm - 8pm	0	1	2	1	2	1	0	6	1	7	1
8pm - 9pm	1	0	0	2	2	0	1	5	1	6	1
9pm - 10pm	0	0	0	1	1	0	0	2	0	2	0
10pm - 11pm	0	0	1	0	1	0	0	2	0	2	0
11pm - Midnight	0	0	0	0	0	0	0	0	0	0	0
Total	46	36	54	45	52	80	70	233	46	383	54

FIGURE 4b: Week 2 AT CHAINAGE 8.97 (Top of Pass)



Count Number 9281 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 1 Count 3 Bottom of Pass, Ch. 11.45 Kms Carriageway

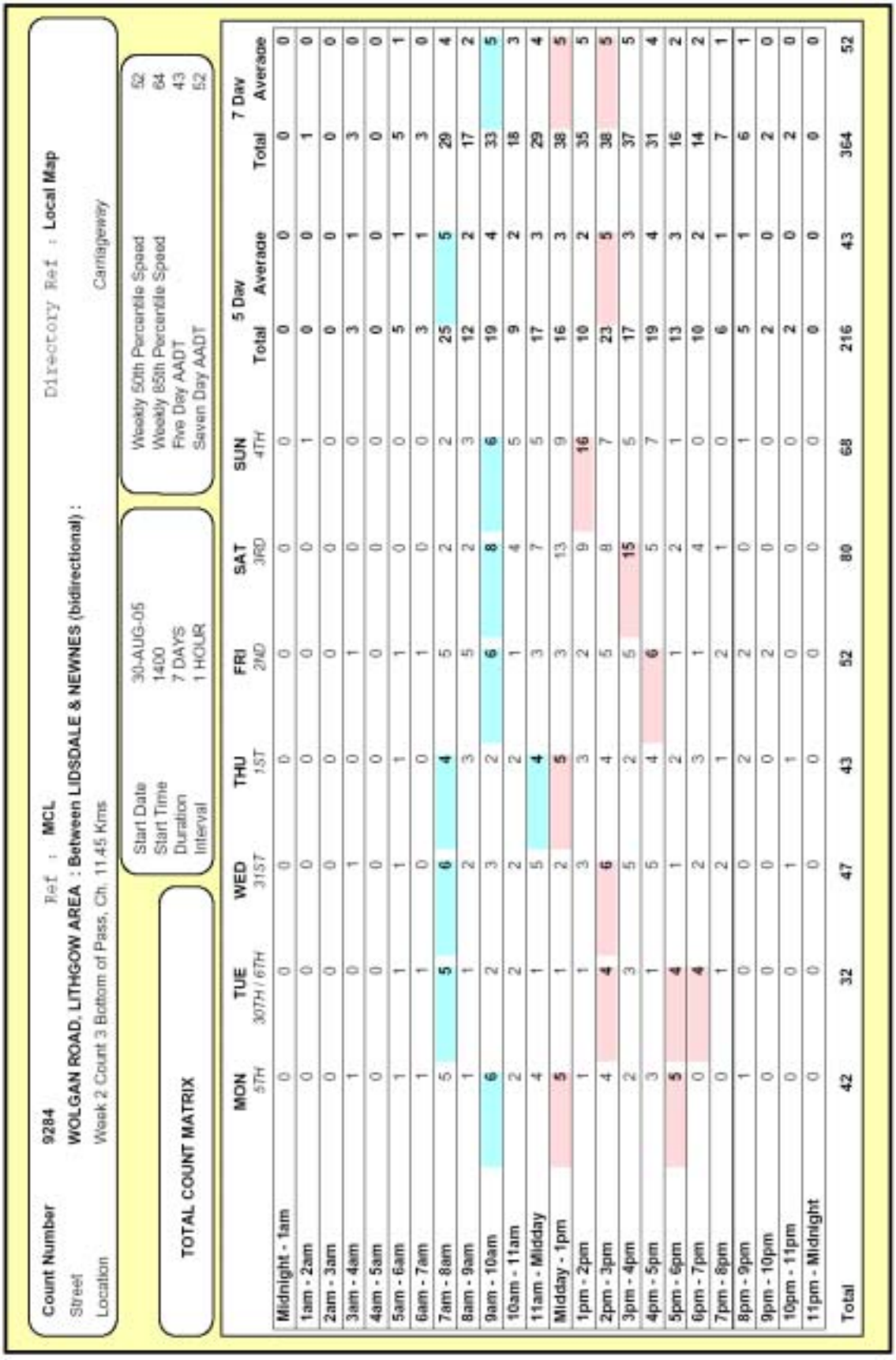
TOTAL COUNT MATRIX

Start Date	23-AUG-05
Start Time	1300
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	54
Weekly 85th Percentile Speed	65
Five Day AADT	46
Seven Day AADT	61

	MON 29TH	TUE 23RD / 30TH	WED 24TH	THU 25TH	FRI 26TH	SAT 27TH	SUN 28TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	1	0	0	1	1	0	2	0
1am - 2am	0	0	0	0	0	0	0	0	0	0	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	1	1	0	0	0	0	3	1	3	0
4am - 5am	1	0	0	1	0	0	0	2	0	2	0
5am - 6am	0	1	2	1	1	0	0	5	1	5	1
6am - 7am	2	2	0	1	1	2	1	6	1	9	1
7am - 8am	2	4	3	1	3	4	2	13	3	19	3
8am - 9am	3	3	5	3	4	3	3	18	4	24	3
9am - 10am	2	0	1	1	5	6	2	9	2	17	2
10am - 11am	2	5	2	2	4	6	3	15	3	24	3
11am - Midday	2	1	1	2	6	12	6	12	2	30	4
Midday - 1pm	4	4	3	4	5	9	13	20	4	42	6
1pm - 2pm	2	5	4	3	4	7	14	18	4	39	6
2pm - 3pm	1	6	3	1	1	9	16	12	2	37	5
3pm - 4pm	2	8	2	4	1	9	14	17	3	40	6
4pm - 5pm	6	6	5	8	6	18	6	31	6	55	8
5pm - 6pm	3	4	2	1	4	3	3	14	3	20	3
6pm - 7pm	3	6	4	4	4	8	4	21	4	33	5
7pm - 8pm	1	1	0	0	3	0	4	5	1	9	1
8pm - 9pm	0	0	0	0	2	1	2	2	0	5	1
9pm - 10pm	0	0	0	0	4	1	0	4	1	5	1
10pm - 11pm	0	0	0	0	2	1	1	2	0	4	1
11pm - Midnight	0	0	0	0	1	0	1	1	0	2	0
Total	37	57	38	38	61	99	96	231	46	426	60

FIGURE 5a: Week 1 AT CHAINAGE 11.45 (Bottom of Pass)



Count Number 9284 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 2 Count 3 Bottom of Pass, Ch. 11.45 Kms Carriageway

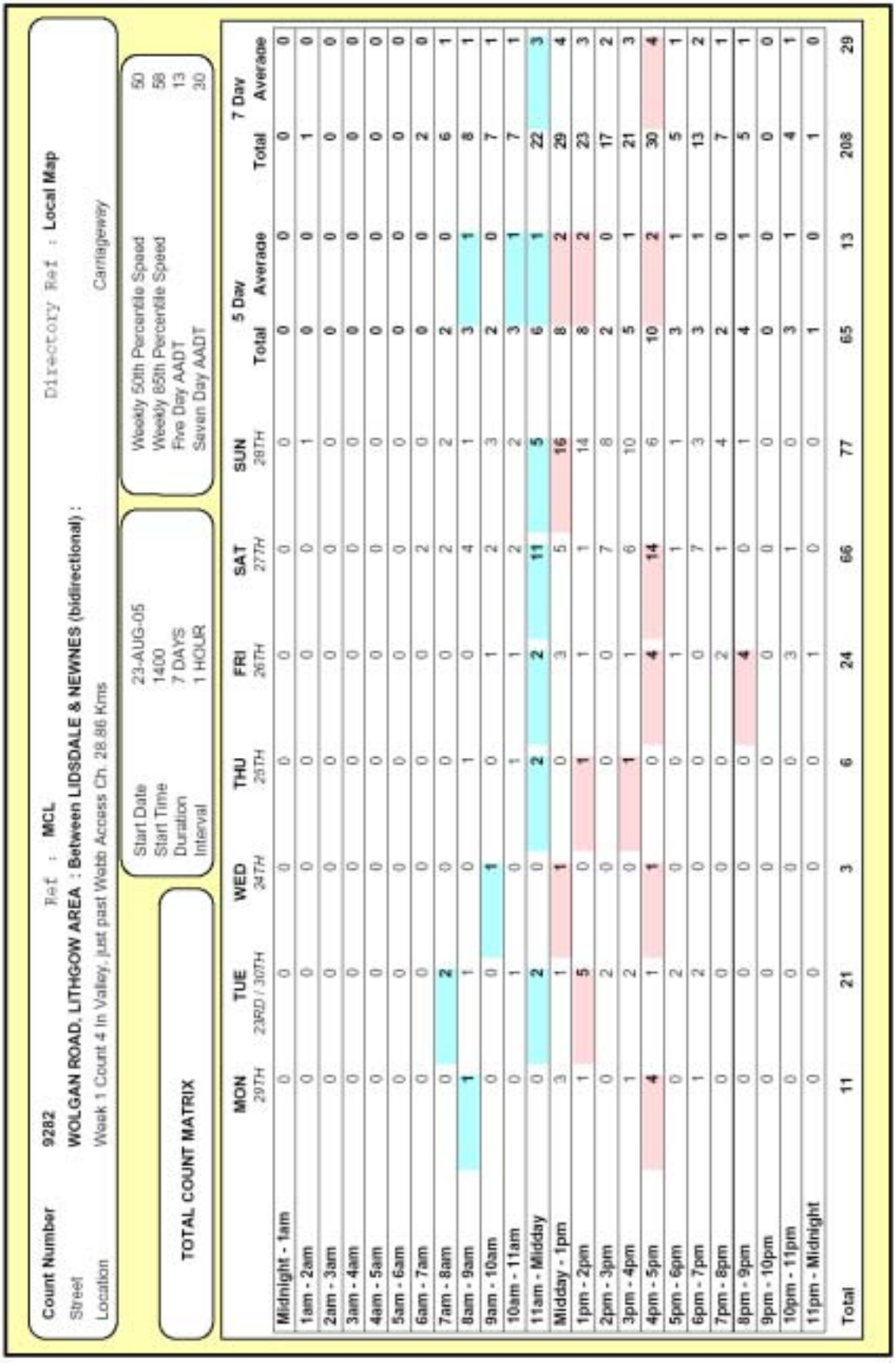
TOTAL COUNT MATRIX

	MON 5TH	TUE 30TH / 6TH	WED 31ST	THU 1ST	FRI 2ND	SAT 3RD	SUN 4TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	0	0	0	0	0	0
1am - 2am	0	0	0	0	0	0	1	0	0	1	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	1	0	1	0	1	0	0	3	1	3	0
4am - 5am	0	0	0	0	0	0	0	0	0	0	0
5am - 6am	1	1	1	1	1	0	0	5	1	5	1
6am - 7am	1	1	0	0	1	0	0	3	1	3	0
7am - 8am	5	5	6	4	5	2	2	25	5	29	4
8am - 9am	1	1	2	3	5	2	3	12	2	17	2
9am - 10am	6	2	3	2	6	8	6	19	4	33	5
10am - 11am	2	2	2	2	1	4	5	9	2	18	3
11am - Midday	4	1	5	4	3	7	5	17	3	29	4
Midday - 1pm	5	1	2	5	3	13	9	16	3	38	5
1pm - 2pm	1	1	3	3	2	9	16	10	2	35	5
2pm - 3pm	4	4	6	4	5	8	7	23	5	38	5
3pm - 4pm	2	3	5	2	5	15	5	17	3	37	5
4pm - 5pm	3	1	5	4	6	5	7	19	4	31	4
5pm - 6pm	5	4	1	2	1	2	1	13	3	16	2
6pm - 7pm	0	4	2	3	1	4	0	10	2	14	2
7pm - 8pm	0	1	2	1	2	1	0	6	1	7	1
8pm - 9pm	1	0	0	2	2	0	1	5	1	6	1
9pm - 10pm	0	0	0	0	2	0	0	2	0	2	0
10pm - 11pm	0	0	1	1	0	0	0	2	0	2	0
11pm - Midnight	0	0	0	0	0	0	0	0	0	0	0
Total	42	32	47	43	52	80	68	216	43	364	52

Start Date 30-AUG-05
Start Time 1400
Duration 7 DAYS
Interval 1 HOUR

Weekly 50th Percentile Speed 52
Weekly 85th Percentile Speed 64
Five Day AADT 43
Seven Day AADT 52

FIGURE 5b: Week 2 AT CHAINAGE 11.45 (Bottom of Pass)



Count Number 9282 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 1 Count 4 In Valley, just past Webb Access Ch. 28.86 Kms Carriageway

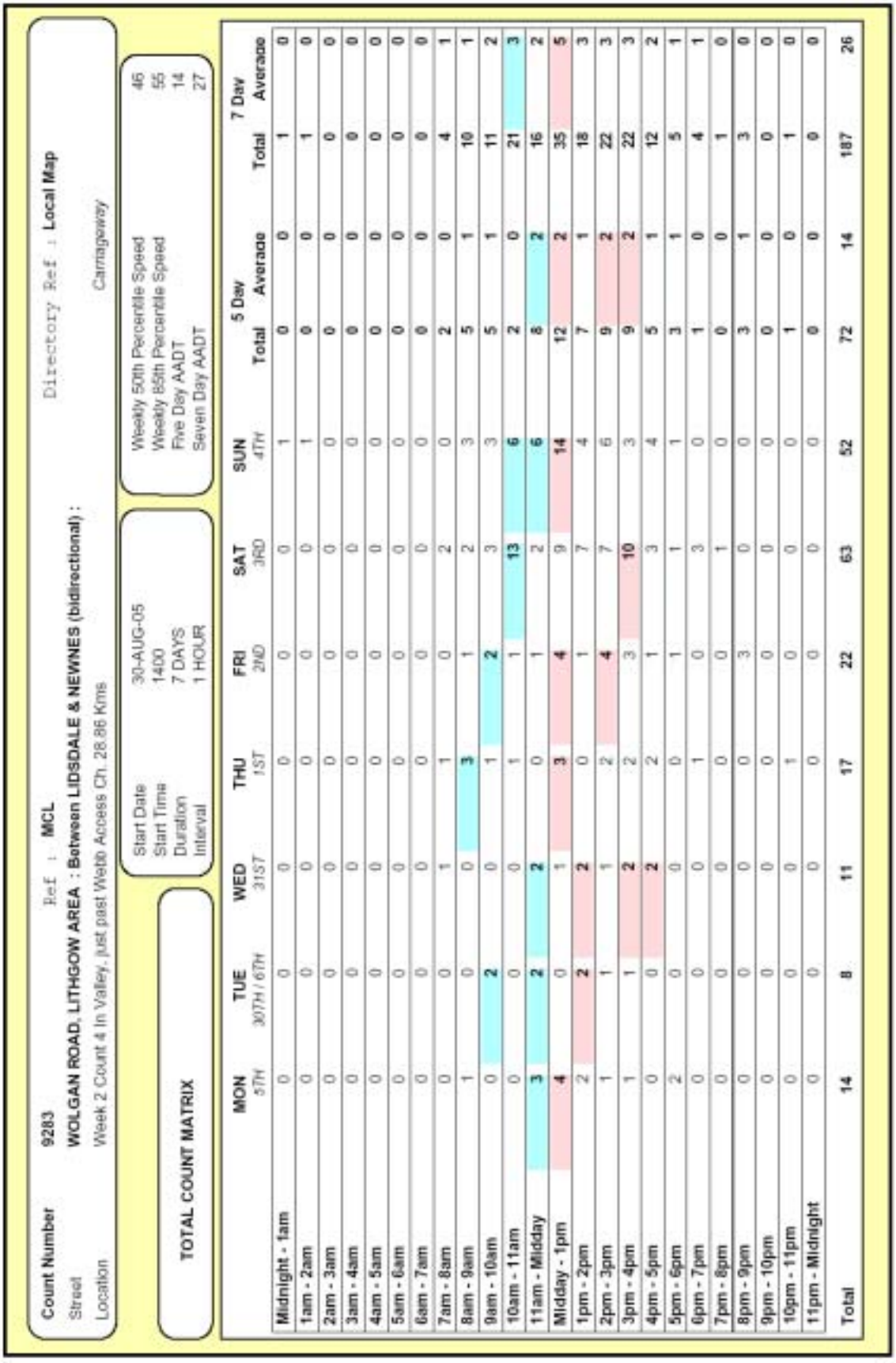
TOTAL COUNT MATRIX

	MON 29TH	TUE 23RD / 30TH	WED 24TH	THU 25TH	FRI 26TH	SAT 27TH	SUN 28TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	0	0	0	0	0	0
1am - 2am	0	0	0	0	0	0	1	0	0	1	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	0	0	0	0	0	0	0	0	0	0	0
4am - 5am	0	0	0	0	0	0	0	0	0	0	0
5am - 6am	0	0	0	0	0	0	0	0	0	0	0
6am - 7am	0	0	0	0	0	2	0	0	0	2	0
7am - 8am	0	2	0	0	0	2	2	2	0	6	1
8am - 9am	1	1	0	1	0	4	1	3	1	8	1
9am - 10am	0	0	1	0	1	2	3	2	0	7	1
10am - 11am	0	1	0	1	1	2	2	3	1	7	1
11am - Midday	0	2	0	2	2	11	5	6	1	22	3
Midday - 1pm	3	1	1	0	3	5	16	8	2	29	4
1pm - 2pm	1	5	0	1	1	1	14	8	2	23	3
2pm - 3pm	0	2	0	0	0	7	8	2	0	17	2
3pm - 4pm	1	2	0	1	1	6	10	5	1	21	3
4pm - 5pm	4	1	1	0	4	14	6	10	2	30	4
5pm - 6pm	0	2	0	0	1	1	1	3	1	5	1
6pm - 7pm	1	2	0	0	0	7	3	3	1	13	2
7pm - 8pm	0	0	0	0	2	1	4	2	0	7	1
8pm - 9pm	0	0	0	0	4	0	1	4	1	5	1
9pm - 10pm	0	0	0	0	0	0	0	0	0	0	0
10pm - 11pm	0	0	0	0	3	1	0	3	1	4	1
11pm - Midnight	0	0	0	0	1	0	0	1	0	1	0
Total	11	21	3	6	24	66	77	65	13	208	29

Start Date 23-AUG-05
Start Time 1400
Duration 7 DAYS
Interval 1 HOUR

Weekly 50th Percentile Speed 50
Weekly 85th Percentile Speed 58
Five Day AADT 13
Seven Day AADT 20

FIGURE 6a: Week 1 AT CHAINAGE 25.86 (After site)



Count Number 9283 Ref : MCL Directory Ref : Local Map
Street WOLGAN ROAD, LITHGOW AREA : Between LIDSDALE & NEWNES (bidirectional) :
Location Week 2 Count 4 In Valley, just past Wolgo Access Ch. 28.86 Kms Carriageway

TOTAL COUNT MATRIX

	MON 5TH	TUE 30TH / 6TH	WED 31ST	THU 1ST	FRI 2ND	SAT 3RD	SUN 4TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	0	0	0	0	0	0	1	0	0	1	0
1am - 2am	0	0	0	0	0	0	1	0	0	1	0
2am - 3am	0	0	0	0	0	0	0	0	0	0	0
3am - 4am	0	0	0	0	0	0	0	0	0	0	0
4am - 5am	0	0	0	0	0	0	0	0	0	0	0
5am - 6am	0	0	0	0	0	0	0	0	0	0	0
6am - 7am	0	0	0	0	0	0	0	0	0	0	0
7am - 8am	0	0	1	1	0	2	0	2	0	4	1
8am - 9am	1	0	0	3	1	2	3	5	1	10	1
9am - 10am	0	2	0	1	2	3	3	5	1	11	2
10am - 11am	0	0	0	1	1	13	6	2	0	21	3
11am - Midday	3	2	2	0	1	2	6	8	2	16	2
Midday - 1pm	4	0	1	3	4	9	14	12	2	35	5
1pm - 2pm	2	2	2	0	1	7	4	7	1	18	3
2pm - 3pm	1	1	1	2	4	7	6	9	2	22	3
3pm - 4pm	1	1	2	2	3	10	3	9	2	22	3
4pm - 5pm	0	0	2	2	1	3	4	5	1	12	2
5pm - 6pm	2	0	0	0	1	1	1	3	1	5	1
6pm - 7pm	0	0	0	1	0	3	0	1	0	4	1
7pm - 8pm	0	0	0	0	0	1	0	0	0	1	0
8pm - 9pm	0	0	0	0	3	0	0	3	1	3	0
9pm - 10pm	0	0	0	0	0	0	0	0	0	0	0
10pm - 11pm	0	0	0	1	0	0	0	1	0	1	0
11pm - Midnight	0	0	0	0	0	0	0	0	0	0	0
Total	14	8	11	17	22	63	52	72	14	187	26

Start Date	30-AUG-05
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	46
Weekly 85th Percentile Speed	55
Five Day AADT	14
Seven Day AADT	27

FIGURE 6b: Week 2 AT CHAINAGE 25.86 (After site)

ANNEXURE A: CORRECTIVE ACTION REQUEST FORMS

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 1**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **INADEQUATE DELINEATION**

MISSING GUIDE POSTS at CHAINAGES 1.55, 3.22, 3.33, 3.6, 4.08 (both sides), 8.5,8.67,9.2,10.22 (2), 10.3, 11.1, 11.53, 11.88, 12.84, 13.69, 13.9, 14.35 & 21.18(2) Plus 20 Reflectors on bridge (10 both sides) at CHAINAGE 21.64 Plus Chevron reflector sheet on guardrail bullnose at CHAINAGE 13.59 (Note all chainages measured from proposed entry gate to resort)

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
REPLACE MISSING GUIDE POSTS & DELINEATORS	**6.1**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 2**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**

REASON FOR AUDIT

EXISTING ROAD SAFETY UPGRADE

PROJECT MANAGER	AUDITORS	AUDIT TYPE
	Craig M^CLaren **Lyle Marshall**	**STAGE 5 : Existing Road**

NON-CONFORMANCE **HAZARDOUS CONDITIONS IN THE CLEAR ZONE**

INSTALL THRIE BEAM GUARDRAIL AT THE FOLLOWING START CHAINAGES (& DISTANCES): CH1.95(50m); CH10.05(60m); CH12.2(100m); CH12.43(90m); CH13.57(93m); CH13.69(80m); CH14.51(100m); CH14.61(20m); CH14.67(360m); CH15.08(70m); & CH15.3 to CH16.71(1,410m).
(Note all chainages measured from proposed entry gate to resort, Check Annexure B for further details of installation locations)

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	BENEFIT COST RATIO
INSTALL GUARDRAIL	**3.9**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 3**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **INSUFFICIENT ROAD WIDTH**

BETWEEN TOP (CH16.9) & BASE (CH14.4) OF PASS
(Note all chainages measured from proposed entry gate to resort

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	BENEFIT COST RATIO
INSTALL TRAFFIC SIGNALS	**7.6**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 4**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **DAMAGED PIPES & CULVERTS**

CHAINAGES 2.88, 3.10, 11.10 & 12.68
(Note all chainages measured from proposed entry gate to resort)
Check Annexure B for further details of repair locations

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
REPLACE BROKEN PIPES / CULVERTS & HEADWALLS	**3.9**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 5**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **PAVEMENT DEFECTS**

CHAINAGES 3.81, 5.3, 6.95, 7.14 to 7.20, 7.93, 8.3, 9.2, 12.84 & 17.18 to 17.2
(Note all chainages measured from proposed entry gate to resort)
Check Annexure B for further details of repair locations

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	BENEFIT COST RATIO
SCOUR REGRADING	**3.9**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 6**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **HAZARDOUS OBJECT**

CHAINAGE 7.14
(Note chainage measured from proposed entry gate to resort)

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
REPAIR EXPOSED CATTLE GRID	**6.1**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
SIGNATURE ..... DATE .....
(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 7**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **PAVEMENT DEFECTS**

CHAINAGES 9.39, 9.86, 11.3, 11.5 to 12.05, 12.84 to 14.1 & 14.27 to 14.35
(Note all chainages measured from proposed entry gate to resort)
Check Annexure B for further details of repair locations

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
REGRADE CORRUGATED SEGMENTS (Import 150mm compacted gravel where necessary)	**3.9**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
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(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 8**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **HAZARDOUS OBJECT**

CHAINAGE 10.15
(Note chainage measured from proposed entry gate to resort)

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SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
INSTALL THRIE BEAM GUARDRAIL, CURVE WARNING & NARROW BRIDGE SIGNS (Test load bearing strength)	**76.0**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

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LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 9**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **HAZARDOUS OBJECT**

CHAINAGES 14.72, 15.1, 15.77, 15.95, 16.33, 16.41, 16.52, 16.6 & 16.86
(Note all chainages measured from proposed entry gate to resort)
Check Annexure B for further details of repair locations

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
STABILISE FALLING ROCK & UNSTABLE CUT BATTERS	**TBA**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

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(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 10**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**
NON-CONFORMANCE	**PAVEMENT DEFECTS** **CHAINAGE 17.95 to 18.1** **(Note all chainages measured from proposed entry gate to resort)** **Check Annexure B for further details of repair locations**	
SIGNATURE ..... (Project Manager)	SIGNATURE ..... (Auditor)	
SOLUTIONS TO NON-CONFORMANCE **REPAIR SEAL**	**BENEFIT COST RATIO** **3.0**	
ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE		
DATE FOR COMPLETION OF NON-CONFORMANCE ACTION ..... SIGNATURE ..... (Council Representative)	DATE	
FOLLOW-UP AND CLOSE OUT PROPOSED FOLLOW-UP DATE ..... FOLLOW-UP DETAILS: CAR CLOSE OUT: SIGNATURE ..... (Council Representative)	DATE	

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 11**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **APPROPRIATE SPEED ZONING FOR CONDITIONS**

INSTALL 50km/h SIGNS WITH TWO PROVIDED (ONE FACING EACH DIRECTION) ALONG THE WOLGAN VALLEY FLOOR FROM CH 00 TO CH14.4(Note all chainages measured from proposed entry gate to resort) Check Annexure B for further details of repair locations

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
INSTALL 50KM/H SIGNS	**14.3**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

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CAR CLOSE OUT:
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(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 12**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**

NON-CONFORMANCE **INADEQUATE DELINEATION**

New Guide Posts (GP) at regular spacing along Valley floor (530 costed @ 150m spacing on straights and @ 20m on curves) plus curve warning (W) (100 costed) and crest signs (50 costed) where necessary. CHAINAGE FROM 00 to 14.4 along Wolgan Valley Floor
Check Annexure B for further details of installation locations. (Note all chainages measured from proposed entry gate to resort)

SIGNATURE ..... SIGNATURE .....
(Project Manager) (Auditor)

SOLUTIONS TO NON-CONFORMANCE	**BENEFIT COST RATIO**
INSTALL GUIDE POSTS, CURVE WARNING & CREST SIGNS	**7.9**

ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE

DATE FOR COMPLETION OF NON-CONFORMANCE ACTION .....

SIGNATURE ..... DATE .....
(Council Representative)

FOLLOW-UP AND CLOSE OUT

PROPOSED FOLLOW-UP DATE .....

FOLLOW-UP DETAILS:

CAR CLOSE OUT:
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(Council Representative)

LITHGOW CITY COUNCIL ROAD SAFETY AUDIT		
CORRECTIVE ACTION REQUEST	**CAR No**	**CAR# 13**
PROJECT **WOLGAN ROAD, WOLGAN**	**AUDIT No** **AUDIT DATE**	**SEPTEMBER 2005**
DIVISION	**REGION**	**WOLGAN**
REASON FOR AUDIT **EXISTING ROAD SAFETY UPGRADE**		
PROJECT MANAGER	**AUDITORS** **Craig M^CLaren** **Lyle Marshall**	**AUDIT TYPE** **STAGE 5 : Existing Road**
NON-CONFORMANCE **INADEQUATE NON REFLECTIVE SIGNS** **INSTALL REPLACEMENT 80km/h SIGNS AT CH22.14 & CH22.17 (Note all chainages measured from proposed entry gate to resort)** SIGNATURE ..... (Project Manager) SIGNATURE ..... (Auditor)		
SOLUTIONS TO NON-CONFORMANCE **INSTALL REPLACEMENT 80KM/H**	**BENEFIT COST RATIO** **14.3**	
ACTION TAKEN TO PREVENT RECURRENCE OF NON-CONFORMANCE DATE FOR COMPLETION OF NON-CONFORMANCE ACTION ..... SIGNATURE ..... (Council Representative) DATE		
FOLLOW-UP AND CLOSE OUT PROPOSED FOLLOW-UP DATE ..... FOLLOW-UP DETAILS: CAR CLOSE OUT: SIGNATURE ..... (Council Representative) DATE		

ANNEXURE B: DETAIL OF AUDIT ROUTE FINDING FIELD NOTES

GLOSSARY OF ABBREVIATIONS FOR FOLLOWING TABLES

P# ……. Photograph & number

SD …….Sight Distance

TP …….Tangent Point

CTP ……Common Tangent Point

TD …….Table Drain

HW …….Head Wall

RHS ……..Right Hand Side

LHS …….Left Hand Side

RCBC ……Reinforced Concrete Box Culvert

SD…….Sight Distance

GR …….Guard Rail

Bold Red font in the following tables indicate hazard required for corrective action.

Ch 00	View south along Wolgan Road from Resort entry gate **P1 Photos south and north P2,** SD restriction to south to 60-70m. Width 7m TD to TD (formation) Formation only – no pavement. Curve to right.
Ch .300 Km	Curve to right and left **Photo P3.** Width formation TD to TD 7.4m
Ch .340	Pipe Culvert Guide Posts
Ch .590	Pipe Culvert Guide Posts.
Ch .710	TP curve to right SD restricted.
Ch .870	TP curve to left Photo P4
Ch .980	Pipe culvert with guide posts.
Ch .108	Pipe culvert with guide posts. Crest ahead **Photo P5**.
Ch 1.18	Crest
Ch 1.26	TP curve to left **Photo P6**
Ch 1.35	Pipe culvert and TP curve to left. Photo P7
Ch 1.49	TP
Ch 1.55	Pipe culvert. **GP missing on left**
Ch 1.68	TP curve to right.
Ch 1.78	TP
Ch 1.86	TP Sharp curve to left SD restricted
Ch 1.95	TP downgrade **Photo P8** curve to right. Steep embankment on right. **50m safety barrier required**.
Ch 2.08	TP Width TD to TD 7.8m
Ch 2.14	Pipe culvert
Ch 2.15	TP curve to left, SD restricted - **Photo P9.**
Ch 2.26	TP pipe culvert
Ch 2.30	TP curve to left
Ch 2.38	Crest
Ch 2.47	Pipe culvert TP curve to right and crest ahead
Ch 2.52	Crest
Ch 2.59	Pipe culvert and TP curve to left. **Photo P10**
Ch 2.68	**Pipe culvert GP missing on right** Width TD to TD 6.6m TP curves to right with slight crest ahead. **Photo P11**
Ch 2.75	CTP and curve to left
Ch 2.88	Pipe culvert and TP curve to right **Photo P12** Width TD to TD 5.7m **Pipe broken on left – No headwalls**
Ch 3.03	TP Cattle grid ahead
Ch 3.10	GP **No culvert, missing on left.**
Ch 3.22	Road narrows, **post on right, no reflector**. Width 4.6m
Ch 3.28	Slight crest
Ch 3.33	**Pipe culvert GP missing on left.**
Ch 3.48	Crest
Ch 3.54	CPT curve to right
Ch 3.60	Pipe culvert GP's. **GP missing on left.** Width TD to TD 7.4m Formation.
Ch 3.78	Pipe culvert with GP's and TP end of curve to right.
Ch 3.81	**TD badly scoured on left danger to traffic.**
Ch 3.92	Two GP's at Ch 3.92
Ch 4.08	**Tree on edge formation on right** **No reflectors on both sides, damaged GP** Width TD to TD 6.1m

PHOTO P1 - Ch 00 View south at gate.

PHOTO P2 - Ch 0.00 View north at Gate

PHOTO P3 - Ch 0.30 Km

PHOTO P4 - Ch 0.87 Km

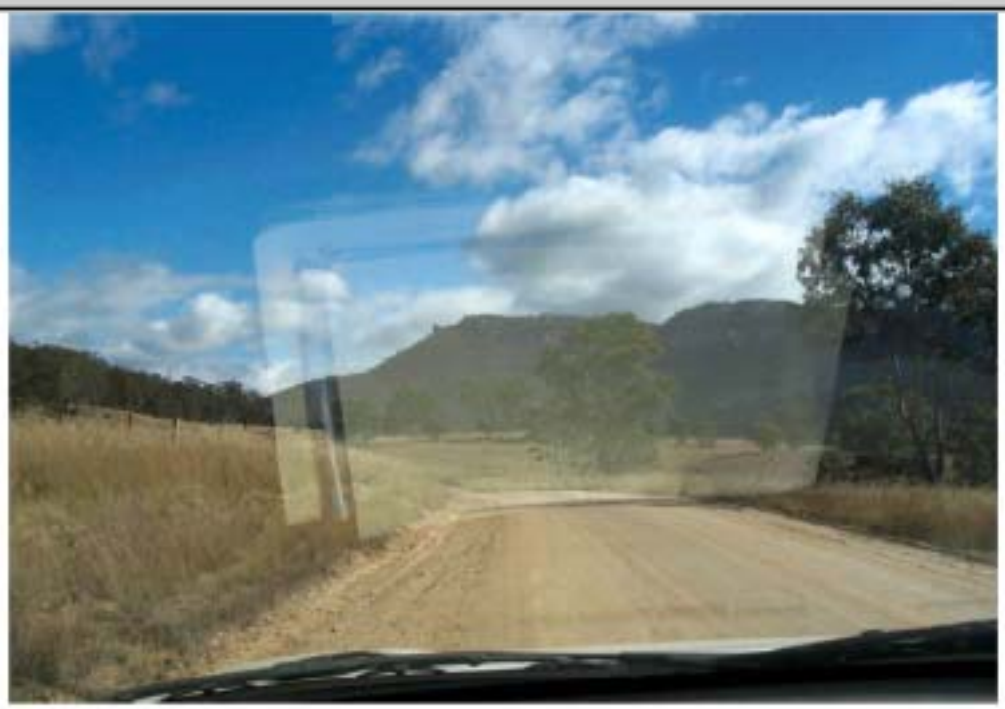

PHOTO P5 - Ch 1.08 Km

PHOTO P6 - Ch 1.26Km

PHOTO P7 - Ch 1.35 Km

PHOTO P8 - Ch 1.95 Km

PHOTO P9 - Ch 2.15 Km

PHOTO P10 - Ch 2.59 Km

PHOTO P11 - Ch 2.68 Km

PHOTO P12 - Ch 2.88 Km

Ch 4.17	Tree on right Direction sign Lithgow / Newnes
Ch 4.19	TP curve to right
Ch 4.28	TP
Ch 4.37	TP curve to left.
Ch 4.42	Crest.
Ch 4.49	Pipe Culvert GP's pipe broken on left CTP width 5.4m Curve to right
Ch 4.60	TP
Ch 4.64	TP curves to left & cutting in formation 50metres.
Ch 4.70	TP curve to left
Ch 4.77	CTP curve to left
Ch 4.90	TP embankment on right 1.5m
Ch 4.91	Pipe culvert GP missing on left
Ch 4.97	TP curve to left.
Ch 5.06	TP
Ch 5.20	TP curve to right. **Photo P13**
Ch 5.28	Pipe culvert Width 4.5m
Ch 5.30	TP start of incline **TD scoured on right to crest**
Ch 5.47	Crest
Ch 5.64	Crest. Tree on left. **Photo P14** crest on curve to left Width TD to TD 6m
Ch 5.70	TP
Ch 5.71	Pipe culvert GP's
Ch 5.88	Pipe culvert TP curve to right
Ch 6.03	Crest on straight
Ch 6.06	TP curve to left
Ch 6.21	TP and pipe culvert with GP's 450 dia.
Ch 6.30	TP curve to right
Ch 6.40	Crest GP on right
Ch 6.43	TP
Ch 6.58.	TP curve to left
Ch 6.68	TP
Ch 6.77	TP curve to right. Dam on right
Ch 6.88	TP
Ch 6.95	**TD's badly scoured both sides Photo P15.** Top bank to top bank 6.4m. 600 deep
Ch 7.06	TD's scoured 6.90 to 7.06 Narrow opening ahead. **Photo P16.**
Ch 7.08	TP curve to right. SD restricted.
Ch 7.14	Post narrow road. Width 3.2m **Cattle grid Photo P17 hazard.**
Ch 7.18	**CTP curve to left TD badly scoured on right from Ch 7.14.**
Ch 7.20	**Pipe culvert drain scoured on left 1 metre pipe exposed**. Creek on left. Flow right to left 450 dia.
Ch 7.24	TP
Ch 7.32	To curve to left.
Ch 7.37	GP on right on bend
Ch 7.42	CTP shown curve on right crest ahead
Ch 7.47	Crest.
Ch 7.52	CTP sharp curve on left.
Ch 7.58	Pipe culvert with GP's
Ch 7.62	TP

Ch .7.64	Crest
Ch .7.71	Pipe culvert with GP's Width 5.3m.
Ch .7.80	TP curve to right.
Ch .7.93	CTP curve to left. **Scour on left TD**
Ch .8.00	Crest
Ch .8.06	Pipe culvert with GP's TP
Ch 8.14	Crest **Photo P18** SD restricted TP curve to right.
Ch 8.28	TD pipe culvert with GP's
Ch 8.30	TP curve to left - incline. **TD's scoured both sides to crest**
Ch 8.40	TP
Ch 8.45	Crest
Ch 8.50	Pipe culvert **GP missing on left** Width TD to TD 6.5m Pipe dia 300
Ch 8.56	TP curve on left
Ch 8.60	CTP curve to left
Ch 8.67	Pipe culvert scour hole through H/W Width 5.4m. **GP missing on right**
Ch 8.68	CTP curve to right
Ch 8.72	Crest
Ch 8.78	TP descent
Ch 8.90	TP curve to right – steep descent
Ch 9.10	CTP curve to left
Ch 9.20	**Pipe culvert scoured on left to edge travelled way. GP missing on right**, creek on left. Width 6.2m.
Ch 9.28	CTP sharp curve on right. **Photo P19** Creek on LH side road ahead.
Ch 9.38	Bend – width 5.6m
Ch 9.39	Pipe culvert - width TD to TD 5.5m Embankment on right. **Formation rutted Photo P20**
Ch 9.40	CTP curve to left – incline. Creek on RHS.
Ch 9.47	Embankment on RHS
Ch 9.52	TP and crest.
Ch 9.86	Pipe culvert with GP's. **Rutting in formation.** TP curve to left.
Ch 9.92	Crest sharp steep descent. CTP sharp curve to right
Ch 10.04	CTP curve to left.
Ch .10.05	Pipe culvert with GP's, steep embankment on right. 3 metre drop. Width 6m. **Photo P21. Barrier required 60m**.
Ch 10.08	TP curve to right. Culvert and guardrail on left. Steep embankment on left **Photo P22. Guardrail required beyond existing.**
Ch 10.15	Creek crossing with guardrail. Concrete box culvert. Width 4.1m Depth 3.1m. **Hazard. Guardrail a hazard. Single lane on culvert.** **TP curve to left. Widen RCBC, No hazard markers**. **Video and P23**
Ch 10.22	Twin pipe culvert. Steep TD's both sides. **Hazard on left GP's.** Width 5.3m. **Photo P24** CTP curve on right.
Ch 10.30	Bend. **Fence post on right – no reflectors.** GP on left. Road width TD to TD 6.9m. with hazard marker on left.
Ch 10.38	TP
Ch 10.39	Pipe culvert with GP's
Ch 10.78	TP gentle curve to right. 2 houses on right.
Ch 10.86	TP earth formation
Ch 10.91	GP on right TP curve to left.

Ch 11.00	Crest descent **Photo P25**
Ch 11.08	TP curve to right.
Ch 11.10	**Pipe culvert broken pipe on right GP missing on right. Photo P26**
Ch 11.20	CTP curve to left end descent.
Ch 11.24	Pipe culvert, G Post missing on left.
Ch 11.28	TP
Ch 11.30	TP curve to left. **Formation corrugated to crest on inside of centre line.**
Ch 11.40	Crest and TP
Ch 11.50	TP gentle curve to left
Ch 11.53	Pipe culvert **GP missing on left. Formation corrugated from Ch 11.50.**
Ch 11.64	Pipe culvert with GP's. Embankment on left. **Barrier required for 60m. Formation corrugated** CTP curve on right.
Ch 11.68	**Corrugations continue**.
Ch 11.78	TP gentle curve to left – **corrugations continue**.
Ch 11.79	Pipe culvert with GP's.
Ch 11.88	Pipe culvert **GP missing on left**. TP
Ch 11.95	TP curve to right. **Formation uneven and corrugated.**
Ch 12.05	TP. Crest steep descent **corrugations continue.**
Ch 12.20	GP pipe culvert. Width 6m. Embankment both sides 3m drop. **Guardrail required 50m both sides, batter badly eroded on left.** Video & **Photo P27**
Ch 12.36	TP curve to left descent.
Ch 12.43	Pipe culvert with GP's in creek Embankment both sides 3m drop. **Guardrail required both sides 45 metres** Width 6m.
Ch 12.48	CTP curve to right.
Ch 12.50	Crest steep descent TP straight.
Ch 12.68	Pipe culvert. **Pipe broken on right.** TP curve to right.
Ch 12.75	Crest. Steep descent.
Ch 12.82	TP curve to left.
Ch 12.84	Pipe culvert **GP missing on left. Batter scoured on left.**
Ch 12.94	Pipe culvert GP's
Ch 13.00	TP curve to right, **formation corrugated to crest.**
Ch 13.05	Crest steep descent ahead **Photo P28 & Video**
Ch 13.13	TP steep descent. **Formation scoured.**
Ch 13.24	TP curve to right.
Ch 13.43	TP road surface corrugated from Ch 13.13
Ch 13.46	Pipe culvert with GP's.
Ch 13.50	TP curve to right, **corrugated road surface.** Guardrail ahead on left steep embankment. **Photo P29**
Ch 13.57	Pipe culvert with GP's. Video towards guardrail and narrow formation ahead. **Guardrail should extend 93m beyond pipe culvert.** Width 6.2m, very deep drop beyond fence to creek bed. **Photo P30**
Ch 13.59	Start guardrail. **Surface corrugated. No chevron on bullnose**.
Ch 13.69	End guardrail, **corrugations continue. Guardrail should be extended.** Steep drop over 3 metres on left. Cut batter needs scour protection on right. **Photo P31 Power pole on right – no reflector**.
Ch 13.77	Pipe culvert. **Continue Guardrail on left to culvert. Corrugations continue.**
Ch 13.90	**G. post on right only. Corrugations and potholes continue. Poor subgrade.**
Ch 13.98	Pipe culvert GP's. **Corrugations and potholes continue.**
Ch 14.10	GP's corrugations end.

Ch 14.15	Curve to right. GP left side only.
Ch 14.22	GP on left.
Ch 14.27	CTP curve to left. **Road corrugated** GP on left. Pipe culvert.
Ch 14.35	Pipe culvert with **GP on left only. Surface corrugated**, embankment on left 2 metres drop.
Ch 14.40 (2 Signs) Falling Rks next 3K	Sign. Start bitumen. Width bitumen 5.7m. TP curve to right. **Photo P32 & Video.** Start incline **pass**.
Ch 14.41	GP with reflector on left.
Ch 14.46	Embankment on left.
Ch 14.48	GP's culvert with H Wall both sides. Seal width 4.8m
Ch 14.52	TP curve to left.
Ch 14.54	GP's both sides. Embankment on left height varies to 3m. **Trees obstruct SD on left. Guardrail required from Ch 14.51**
Ch 14.60	GP's both sides. Pipe culvert **continue guardrail on left to Ch 14.61. Guardrail required on right 20m.** Seal 3.5m + 0.7m sealed shoulder on right hand side. **Photo P33 & Video**
Ch 14.63	TP curve to right incline.
Ch 14.68	G post both sides. Steep embankment on left. **Guardrail required from Ch 14.67**
Ch 14.72	GP's both sides, seal width 4.8m. **Falling rocks on cut batter. Photo P34**
Ch 14.76	GP's both sides. TP curve to right.
Ch 14.80	Pipe culvert, GP's both sides.
Ch 14.89	GP's both sides. CTP curve to left. **Continue guardrail on left.**
Ch 14.95	GP's both sides. Steep ascent.
Ch 15.03	GP's both sides. Pipe culvert. Width seal 3.2m. **End guardrail on left**. Gravel shoulders 1m wide - both sides. TP
Ch 15.06	TP sharp curve to left.
Ch 15.09	GP's both sides. Pipe culvert.
Ch 15.10	Bend. Width seal 3.6m GP, LH side. Traffic runs on LH shoulder ½ m l**oose rocks on cut batter on RHS.**
Ch 15.13	GP on left. Steep embankment on left. Sharp bend to right CTP at Ch 15.12. Photo **Video & Photo P35** uphill and down. **Start guardrail on left at Ch 15.08**
Ch 15.16	GP on left. Apex of bend.
Ch 15.19	TP **Continue guardrail on left to Ch 15.15.**
Ch 15.23	TP curve to left.
Ch 15.26	GP's both sides. Pipe culvert. TP curve to left.
Ch 15.31	GP's both sides large pipe culvert.
Ch 15.40	CTP curve to right. Steep embankment on left. Seal 5.0m. **Start guardrail Ch 15.3**
Ch 15.36	GP on left. **Continue guardrail on left.**
Ch 15.38	CTP curve to left.
Ch 15.40	Tree on left and CTP curve to right.
Ch 15.41	GP on left. **Continue guardrail on left**, steep embankment. Steep cutting on RHS.
Ch 15.45	GP on left. **Continue guardrail on left.**
Ch 15.47	CTP curve to left. **Continue guardrail on left.**
Ch 15.50	GP on both sides. Seal 3.9. Shoulders 0.5 each
Ch 15.56	CTP curve to right **Continue guardrail on left.**
Ch 15.59	GP on left. Loose rocks on steep cut batter on right. **Continue guardrail**
Ch 15.60	CTP curve to left, **continue guardrail**.
Ch 15.66	GP on left. **Continue guardrail**. CTP curve to right.
Ch 15.69	GP on left – traffic runs on shoulder.
Ch 15.72	CTP curve to left. **Continue guardrail.**

Ch 15.73	GP's pipe culvert.
Ch 15.77	CTP curve to right. **Continue guardrail.** Traffic runs on shoulder $^{1}/_{2}$m, **cut batter unstable**.
Ch 15.79	GP's both sides
Ch 15.82	GP's both sides. Pipe culvert.
Ch 15.83	CTP curve to left. Traffic on shoulder on left, **continue guardrail.**
Ch 15.85	GP's both sides. **Continue guardrail**.
Ch 15.90	GP on left.
Ch 15.92	CTP curve to right.
Ch 15.93	GP on left.
Ch 15.95	GP on left. **Cut batter on right unstable**.
Ch 15.97	GP on left
Ch 16.00	GP's both sides, pipe culvert. TP seal 4.2m.
Ch 16.01	GP on left. **Continue guardrail.**
Ch 16.05	TP curve to left. **Continue guardrail.**
Ch 16.07	GP on left
Ch 16.10	Pipe culvert on sharp bend GP's on left side.
Ch 16.12	CTP curve to right. **Continue guardrail.**
Ch 16.18	GP on left. **Continue guardrail.**
Ch 16.20	GP on left. CTP curve to left.
Ch 16.22	GP on left. **Continue guardrail.**
Ch 16.27	GP's both sides. Pipe culvert. **Continue guardrail**
Ch 16.29	CTP curve to right. **Continue guardrail.**
Ch 16.30	GP on left. **Continue guardrail.**
Ch 16.33	GP on left. **Continue guardrail. Cut batter unstable.**
Ch 16.35	GP on left. Road very narrow.
Ch 16.36	GP on left. **Continue guardrail.**
Ch 16.37	GP on left.
Ch 16.41	GP's both sides culvert. **Continue guardrail**. **Cut batter unstable**.
Ch 16.46	GP on left. TP curve to left. **Continue guardrail.**
Ch 16.48	GP on left. **Continue guardrail.**
Ch 16.50	GP's both sides, pipe culvert. **Continue guardrail.**
Ch 16.52	TP. GP on left. **Cut batter unstable. Continue guardrail.**
Ch 16.60	GP on left. **Vertical rock face on right. Rock face unstable.**
Ch 16.66	GP on left. **Continue guardrail.**
Ch 16.68	TP. Post & **chainwire fence badly damaged on left**, curve to right.
Ch 16.70	GP on left. **Continue guardrail to existing.**
Ch 16.71	GP's on right pipe culvert. Road width 3.6m. **Guardrail to edge batter on RHS**.
Ch 16.73	TP curve to left.
Ch 16.80	CTP curve to right.
Ch 16.86	Guardrail ends on left. 3 chevron hazard signs on left. Vertical face ends on right. **Unstable.** 3km Winding Road sign on right.
Ch 16.88	CTP curve to left. 3Km Winding Road sign on right.
Ch 16.91	GP's both sides. Steep descent sign on RHS. Improved Seal 4.5m wide.
Ch 17.09	GP's both sides, pipe culvert on gentle RH curve.
Ch 17.16	TP curve to right
Ch 17.18	GP's both sides. **Eroded T Drain on RHS**.
Ch 17.20	GP's both sides. Seal width 5.6m. **Erosion ends.**
Ch 17.22	GP's both sides. TP
Ch 17.39	GP's both sides on straight.
Ch 17.46	GP's both sides on straight.
Ch 17.53	GP's both sides. Pipe culvert with headwalls.
Ch 17.64	TP curve to left. GP's both sides.
Ch 17.71	GP's both sides on bend. Seal 4.2m.

Ch 17.76	TP curve to right.
Ch 17.88	Pipe culvert with HW's both sides diagonal crossing with GP's & unsealed side road on RHS
Ch 17.90	GP's both sides. Pipe culvert with headwalls. Blackfellows Hand Track to left unsealed. Seal 4.7m with 1m shoulders.
Ch 17.95.	GP's both sides. Pipe culvert with Headwalls on curve. **Poor seal surface. Rough.**
Ch 18.10	TP **poor seal surface. Rough.**
Ch 18.15	GP's both sides. Pipe culvert with headwalls. Seal 5.0m
Ch 18.28	GP's both sides.
Ch 18.34	GP's both sides. TP gentle curve to right.
Ch 18.48	GP's both sides. Pipe culvert Headwall on RHS.
Ch 18.54	GP's both sides.
Ch 18.62	GP's both sides. Tip on left.
Ch 18.64	TP curve to right.
Ch 18.66	Road entrance to Garbage Tip. Sign on RHS.
Ch 18.70	GP's both sides.
Ch 18.77	GP's both sides. TP
Ch 18.84	TP curve to left.
Ch 18.88	GP's both sides.
Ch 18.94	GP on left. Kangaroo sign on RHS. Ben Buller State Forest Access Track on RHS.
Ch 19.00	GP on right.
Ch 19.01	GP's both sides. Pipe culvert with headwalls. TP
Ch 19.18	GP's both sides. Twin pipe culvert with headwalls. Seal 5.9m.
Ch 19.24	GP's both sides.
Ch 19.36	GP's both sides.
Ch 19.50	GP's both sides. Pipe culvert with headwalls.
Ch 19.56	GP's both sides.
Ch 19.69	GP's both sides.
Ch 19.80	GP's both sides.
Ch 19.88	GP's both sides. Pipe culvert with headwalls.
Ch 19.93	GP's both sides. Pipe culvert with headwalls.
Ch 20.04	GP right side only.
Ch 20.10	GP's both sides. Seal 5.9m. Good surface.
Ch 20.22	Pipe culvert with headwalls and GP's
Ch 20.32	GP left side
Ch 20.48	GP's both sides.
Ch 20.58	GP left side. Pipe culvert.
Ch 20.74	GP's both sides. Pipe culvert with headwalls.
Ch 20.82	GP on left.
Ch 20.87	GP on left.
Ch 20.93	Pipe culvert in creek GP's on both sides.
Ch 21.00	Side road access. Barrier centre lines start on curve to right.
Ch 21.06	GP's both sides TP. Barrier lines continue.
Ch 21.18	Pipe culvert with headwalls. **No GP's and pedestrian walking sign on low post at culvert.** Barrier lines continue.
Ch 21.21	TP curve to left. Small car park access on right.
Ch 21.23	Sealed access road on left with GP's. End of barrier centre lines.
Ch 21.24	Barrier lines start.
Ch 21.30	GP's both sides. BB lines continue.
Ch 21.48	GP's on both sides. TP curve to right. Barrier lines continue.
Ch 21.50	Pipe culvert. GP on right.
Ch 21.54	Sealed access road on left. BB lines end. Angus Place Colliery.
Ch 21.56	BB lines start.
Ch 21.59	Kangaroo warning sign on left. GP's both sides.
Ch 21.62	TP

Ch 21.64	Guardrail both sides on watercourse Bridge over watercourse with New Jersey low kerb & rails. **No reflectors on rails.**
Ch 21.69	Centre of bridge. BB lines continue
Ch 21.73	GP's both sides. BB lines continue.
Ch 21.88	GP's both sides. BB lines continue.
Ch 21.93	GP's both sides. BB lines continue.
Ch 22.01	GP's both sides. BB lines continue.
Ch 22.10	GP's both sides. BB lines continue.
Ch 22.14	**80 Km/hr sign on left. Not retro-reflective.**
Ch 22.17	**80 Km/hr sign on left. Not retro-reflective.**
Ch 22.30	GP's both sides. Pipe culvert with headwalls BB lines continue. TP curve to left.
Ch 22.34	GP's both sides. BB lines continue
Ch 22.40	GP's both sides. BB lines end. Dashed on left side. Overtaking.
Ch 22.47	GP on left. Pipe culvert. Start of dashed centre line.
Ch 22.50	GP's both sides. Pipe culvert with headwalls. Seal 6.1m. Good surface.
Ch 22.68	GP's both sides.
Ch 22.73	GP's both sides. Barrier on left of centre crest ahead. TP curve to left.
Ch 22.84	BB lines on curve GP on right, gravel side road on left.
Ch 22.93	CTP curve to right.
Ch 22.99	GP's both sides. BB lines continue.
Ch 23.20	TP
Ch 23.08	TP curve to left and GP's both sides.
Ch 23.17	GP's both sides. BB lines
Ch 23.29	GP's both sides. BB lines
Ch 23.41	GP's both sides. BB lines
Ch 23.50	GP's both sides. Pipe culvert BB lines.
Ch 23.63	GP's both sides. BB lines continue
Ch 23.70	GP's both sides. Pipe culvert BB lines continue.
Ch 23.80	GP's both sides. BB lines continue
Ch 23.84	GP on right. BB lines continue.
Ch 23.90	GP's both sides. Barrier line end. Continuous BB line on RHS
Ch 23.93	GP on right
Ch 24.01	GP on right
Ch 24.03	GP on right
Ch 24.05	GP on left. Barrier line ends. Dashed line only
Ch 24.11	GP on right
Ch 24.12	GP on right
Ch 24.15	Pipe culvert with GP's both sides.
Ch 24.20	GP on right
Ch 24.22	GP's both sides
Ch 24.30	GP's both sides and BB lines start.
Ch 24.35	GP on left. Crest BB lines continue on RHS. Dashed on left.
Ch 24.40	GP' both sides.
Ch 24.46	GP on left. Dashed line only starts.
Ch 24.64	50 Km/hr signs both sides.
Ch 24.66	GP's both sides.
Ch 24.73	Kangaroo and Wombat warning sign on right.
Ch 24.78	Culvert with GP's (2) both sides. Directional sign on Right Angus Place colliery 3 Km. 4-Way intersection Maddox Lane. Street lights start. Kerb and gutter LHS.
Ch 24.80	Bus Stop on right. Start of Angus Place urban area.
Ch 25.85	Skilly Road intersection and Main Road 86 to Mudgee.
END	
Valley	**20 properties; 15 permanent residents; 10 beyond Webbs Gate Tourist traffic holidays and weekends.**

PHOTO P13 - Ch 5.20 Km

PHOTO P14 - Ch 5.64 Km

PHOTO P15 - Ch 6.95 Km

PHOTO P16 - Ch 7.06 Km

PHOTO P17 - Ch 7.14 Km

PHOTO P18 - Ch 8.14 Km

PHOTO P19 - Ch 9.28 Km

PHOTO P20 - Ch 9.39 Km

PHOTO P21 - Ch 10.05 Km

PHOTO P22 - Ch 10.08 Km

PHOTO P23 – Ch 10.15km

PHOTO P24 – Ch 10.22km

PHOTO P25 – Ch 11.00km

PHOTO P26 – Ch 11.10km

PHOTO P27 – Ch 12.2km

PHOTO P28 – Ch 13.05km

PHOTO P29 & P30 – Ch 13.5 & Ch13.57km

PHOTO P31 – Ch13.69km

PHOTO P32 – Ch14.4km

PHOTO P33 – Ch14.6km

PHOTO P34 – Ch14.72km

PHOTO P35 – Ch15.13km