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CHARTERED PROFESSIONAL ENGINEERS & SCIENTISTS

OUR REF: S: 09094_LET_18

YOUR REF: 2011.34

April 27, 2012

General Manager
Kyogle Shire Council
PO Box 11
KYOGLÉ NSW 2474

Attention: John Hession

Re: Edenville Road, Cedar Point Bridge, Proposed Extractive Industry, Lot 12 DP 582916 and Lot 1 DP 366036, 904 Edenville Road, Cedar Point

John,

As you are aware, we have been engaged to provide additional information to address the “trigger” for the upgrading or replacement of the Cedar Point bridge. The original development application made with Council, dated September 2010, proposed that the single lane load limited bridge would be satisfactory for the annual extraction rate of $47,000\text{m}^3$ provided a 10tonne load limits were applied to all quarry trucks leaving the proposed quarry.

The difference between this development application and those that had previously been lodged for this land, were that our clients Grahams Concrete of Kyogle, a small but significant regional business in Kyogle, proposed to use only trucks of less than 10tonne pay load. In this way the integrity of the bridge was protected. The critical issue then became the number of quarry trucks that would use the bridge, in serving the proposed quarry “delivery of product” requirements.

The suggested condition put forward to the Joint Regional Planning Panel (JRPP), by Council, was that the annual extraction rate be reduced by half to $23,500\text{m}^3$. While we don’t necessarily support this arbitrary figure, we understand our clients would accept this lower extraction rate provided there was a means of upgrading to the requested amount if performance of the quarry, and market demand justified such an increase, without having to prepare and lodge a new development application. To be conservative we have carried out our traffic assessment of the performance of the bridge against the higher annual extraction figure, ($47,000\text{m}^3$ per annum) see below:

Report:

1. The Guide to Traffic Management Part 3, Traffic Studies and Analysis, (GTM) has been used as a reference document for this assessment. In particular section 5.1.2 provides an equation for the calculation of queue lengths and delays, at a metering point, as a negative exponential distribution.
2. Using the equation in section 5.1.2, we have prepared a spreadsheet, see attached, which examines the Cedar Point Bridge as a “metering point”. In this assessment three options have been used for the vehicle travel speed, 10kph, 20kph and 40kph. Also we have keep the “utilisation factor” below 0.8, as required by GTM Part 3.
3. The GTM Part 3 formula gives the following results:

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For 10kph

number of cars queued 5.3
 queue length 36.8m
 for a volume of 60vph arriving at bridge.

For 20kph

number of cars queued 5.3
 queue length 36.8m
 for a volume of 120vph arriving at bridge.

For 40kph

number of cars queued 2.0
 queue length 13.9m
 for a volume 190vph arriving at bridge.

4. Assuming a conservative speed for the truck over the bridge of 20kph, then 120 vehicles per hour could arrive at the bridge with an acceptable delay time.
5. Given the background traffic volume of 30vph and the proposed traffic volume figure of 12vph, as a result of the quarry. The total traffic volume is 42vph, which is well below the lowest figure of 60vph, and even further below the conservative design figure of 120vph, both as determined by the GTM Part 3.
6. To arrive at a suitable trigger for the point at which the bridge should be upgraded, then this should be 120vph. That is the traffic volume when the bridge should be widened to two lanes is 120vph.
7. Assuming a growth of in traffic continues at the same rate as previously measured, see 2.5.4 of the Traffic Impact Assessment, by GA&A, August 2010, of 7.8% $(100/19) \times (1750/1180)$.
8. The quarry traffic cannot grow as a result of the development application as the proposal was for a fixed extraction rate and it would be expected that the development consent conditions would limit the annual extraction rate. Thus the only growth in traffic will be in the background traffic volume over the bridge.
9. Assuming the traffic on the Cedar Point bridge grows at the same rate as the Summerland Way, then the time taken to reach total traffic trigger volume at the bridge of 120vph, would be calculated to be 46.15 years, at the development application extraction rate. See table below:

Development Application Extrcation Rate						
annual extraction Rate	47000 m3				Austrorads Delay by Negative Exponential Distribution	
number of days per year	250 days				120 vph	
Density of product	2.2 t/m3					
Truck size	10 tonne					
Number of trucks	83 per day		12 vph			
current traffic volume	30 vph					
Permitted traffic volume	108 vph		(excluding quarry traffic, ie delay traffic goal 120 - 12 quarry trucks/hour)			
growth rate	0.078		7.80%			
years	46.15					

10. Assuming the traffic on the Cedar Point bridge grows at the same rate as the Summerland Way, then the time taken to reach total traffic trigger volume at the

bridge of 120vph would be expected to be 48.72years, at the Council extraction rate.
See table below:

Council Lower Extrcation Rate							
annual extraction Rate	23500 m3						
number of days per year	250 days						
Density of product	2.2 t/m3						
Truck size	10 tonne						
Number of trucks	41 per day	6					
current traffic volume	30 vph						
Permitted traffic volume	114 vph	(excluding quarry traffic, ie delay traffic goal 120 - 6 quarry trucks/hour)					
growth rate	0.078	7.80%					
years	48.72						

11. Assuming the quarry does not operate at all, and the traffic on the Cedar Point bridge grows at the same rate as the Summerland Way, then the time taken to reach total traffic trigger volume at the bridge of 120vph, at which time the bridge needs to be upgraded to two lanes, would be expected to be 51.28years. See table below:

Life of Bridge without quarry							
annual extraction Rate	1 m3			Austrroads Delay by Negative Exponential Distribution			
number of days per year	250 days			120 vph			
Density of product	2.2 t/m3						
Truck size	10 tonne						
Number of trucks	0 per day	0					
original amount	30 vph						
final amount	0 vph						
interest	0.078	7.80%					
years	51.28			Difference in years between quarry and no quarry			
				Council rate		2.56 years	
formula	simple interset	120		DA Rate		5.13 years	

12. It is important to note that the quarry has the effect on the requirement to upgrade the bridge to two lanes, by increasing the time when this is required by between 2.56 and 5.13years.
13. The life of the quarry at the proposed extraction rate of 47,000m³ per year is estimated at 43years. If the rate is halved as per Council's figure, then the life doubles to 87 years.
14. The percentage of impact on the bridge of the quarry, with respect to the need to widening of the bridge, is 10% (5.13 years/51.28years). Thus it would be reasonable to require a 10% contribution by the quarry towards the widening of the bridge, paid over a 51.28 year period, with the remainder being provided by other developments through S94 contributions and Council.
15. While it is not in our brief to prepare a cost of the construction of an extra lane for the Cedar Point bridge, we would expect that this would be in the order of \$1million. We have assumed that this would be provided by constructing a new bridge adjacent to the existing bridge.
16. Thus the quarries share of the extra lane of the bridge would be \$100,000 paid over the life of the satisfactory operation of the single lane bridge, 50 years, results in an annual figure of \$2000 per year.
17. Council would be expected to collect Section 94 contributions from all development that benefit from the bridge. From our calculations the bridge would have a daily

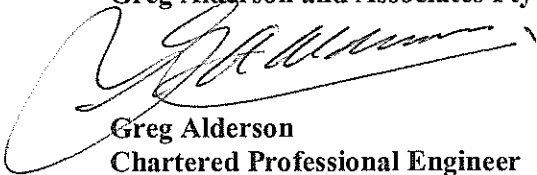
traffic load of 800vpd at the time when it requires widening to two lanes. It is typical to allow between 9 and 10vpd per equivalent tenement (ET). Thus the section 94 contribution per ET is \$11,873 ($\$900,000 / (800 - 30 - 12) / 10$). This figure would need to be adjusted by any contribution made by Council for the existing traffic volume, or any grants etc.

18. There is no need for a trigger with respect to the lifting of the load limit on the Cedar Point Bridge. A fundamental principle of the Development Application has been the use of small trucks, with quarry product loads such that the truck does not exceed the load limit of the bridge. Therefore the quarry development application as lodged does not require a high load allowance on the bridge.

If you have any questions, please contact this office.

Yours faithfully,

Greg Alderson and Associates Pty Ltd



Greg Alderson

Chartered Professional Engineer

CC: R and K Graham; P and R Carlill