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TECHNICAL MEMO RE: Review of BURNCO McDougall Ranches Pit, October 2013 Transportation Impact Assessment

As requested by BURNCO Rock Products Ltd.(BURNCO), we have completed a Technical Memo as a review of our October 2013 Transportation Impact Assessment (TIA) that was prepared for BURNCO's McDougall Ranches Pit. This Technical Memo is intended to support a re-designation that is needed for BURNCO's West Cochrane Gravel Pit expansion. The expansion will add an additional 966 acres to the existing 151 acre approval. BURNCO has indicated that the pit will continue to use the site access at Range Road 51 for those portions of the project located west of Grande Valley Creek. Development of the lands east of the Grande Valley Creek would require a new TIA for development of a second access point. Our understanding from BURNCO is that throughout the development of the pit, the total number of daily truck trips will remain less than the 400 truck trips per day (500,000 tonnes per year) that was anticipated and analyzed in our October 2013 TIA. In the future, when a second access is permitted east of the creek, the total number of trips would be divided between two access points, and therefore the trips at Range Road 51 would be reduced.

The pit uses the existing intersection of Highway 1A and Range Road 51 that was the focus of our October 2013 TIA. Since 2013, the intersection has been upgraded to a Type IVb intersection as recommended by the TIA.

Trip Generation

Our October 2013 TIA assumed that the gravel pit would generate up to 400 truck trips and 4 employee trips for a total of 404 trips per day at the 20 year time horizon (year 2033). It was assumed that trucks would be spread out evenly throughout a 10 hour operating day, resulting in peak hour movement of 40 trucks trips and 2 employee trips. These numbers were provided by BURNCO as an estimate based on their 20 year plans for the pit.

In 2020, BURNCO has confirmed that the pit, including its currently proposed expansion would generate no more than the estimated 404 daily trips, therefore this base assumption and the calculations that were made on it is still valid.

Based on our understanding of the site use, we believe that the trip generation rate used in our 2013 TIA are still valid or conservative estimates for this type of business.

Trip Distribution

Our October 2013 TIA assumed that 95% of gravel pit traffic would be travelling to and from the east. This assumption was made based on the higher intensity of population, employment, and construction activities east of the site, when compared to west of the site.

Based on our review of aerial photography, and knowledge of the region, our understanding is that the trip distribution and assignment in our 2013 TIA remains valid.

Background Traffic

Our October 2013 TIA reviewed background traffic volumes along Highway 1A using Alberta Transportation daily traffic count data that was available from 2003 to 2012. Data was available both west and east of the site; west of the site at the intersection of Highway 1A/Highway 40 and east of the site at the intersection of Highway 1A/Highway 22. Background traffic On Highway 1A was found to have a linear growth rate of approximately 2.6% over ten years and it was noted that some significant residential development within Cochrane was starting to occur west of Highway 22, which would affect the counts at that intersection.

To represent the daily traffic at the site's access at Range Road 51, the 2013 TIA used the 2012 AADT at the west side of the intersection of Highway 1A/Highway 22. To represent the PM Peak hour traffic at the site's access at Range Road 51, the 2013 TIA used the 2012 PM Peak hour traffic at the east side of the intersection of Highway 1A/Highway 40.

The 2012 traffic movement assumptions were increased using a 2.5% linear growth rate to obtain the 2023 and 2033 background traffic projections. The following background traffic projections on Highway 1A are taken out of the 2013 TIA.

Table 1 - 2013 TIA Project Background Traffic on Highway 1A

	2014	2023	2033
Daily Traffic/AADT	4,860	5,900	7,060
PM Peak Traffic	601	730	873

Alberta Transportation's current traffic count data includes counts and projections from 2013 to 2019. These are summarized in Tables 2 and 3 and discussed below.

Table 2 - Alberta Transportation Traffic Count Data – Highway 1A east of Highway 40

	2013	2014	2015	2016	2017	2018	2019
Daily Traffic/AADT	3,470	3,650	4,330	4,080	3,780	3,620	3,780
PM Peak Traffic	526	569	779	588	562	513	558

The daily traffic on Highway 1A east of Highway 40 has grown at a linear rate of 1.5% since 2013. The PM peak hour traffic has grown at a linear rate of 1.0% since 2013. This is slower than predicted in our 2013 TIA and if the trend continues, it would result is less background traffic on Highway 1A than what was assumed in our 2013 TIA.

Table 3 - Alberta Transportation Traffic Count Data – Highway 1A west of Highway 22

	2013	2014	2015	2016	2017	2018	2019
Daily Traffic/AADT	6,160	6,480	7,220	7,280	7,280	11,040	11,180
PM Peak Traffic	742	793	798	1,127	795	1,144	1,140

The daily traffic on Highway 1A west of Highway 22 has grown at a linear rate of 13.6% since 2013. The PM peak hour traffic has grown at a linear rate of 9.0% since 2013. These are much higher than the 2.5% used in our 2013 TIA, however as noted in our 2013 TIA, the traffic growth at the intersection of Highway 1A/Highway 22 is heavily impacted by the residential development that has occurred within Cochrane directly west of the intersection. From aerial photo analysis, the residential development appears to be in the range of 50ha, which could generate in the range of 5,000 trips per day, mostly east towards the intersection. For this reason, the traffic at the intersection, and the growth rate at the intersection are not representative of the traffic or growth at the site's access further west at Range Road 51. Furthermore, the traffic generated by the BURNCO pit at the signalized intersection of Highway 1A/Highway 22 is minor when compared to the traffic generated by the urban development that is occurring on all sides of it.

The traffic on Highway 1A east of Highway 40 is representative of the traffic at Range Road 51 as there are no significant traffic sources in between them. The 2019 traffic volume east of Highway 40 of 3,780vpd is much lower than the 5,460 vpd that would be forecast at Range Road 51 for 2019 using the 2013 TIA assumptions. The growth rate observed east of Highway 40 over the past 6 years of 1.5% is also lower than the 2.5% that was used to forecast growth in the 2013 TIA. If this lower rate persists, the 2040 traffic volume east of Highway 40 would be 4,970vpd, which is lower than what was projected for both the 2023 and 2033 time horizons in the 2013 TIA. If a 2.5% growth rate occurred starting in 2019, the 2040 traffic volume east of Highway 40 would be 5,765 vpd which is also lower than what was projected for both the 2023 and 2033 time horizons in the 2013 TIA.

Based on the above discussion, the background traffic assumptions and forecasts used in our 2013 TIA appear to be conservatively high, when compared to current traffic data.

Design Vehicle/Turn Template
The 2013 TIA used a WB-21 truck as the design vehicle for the proposed Type IVb intersection.

The existing Type IVb intersection can accommodate the WB-21 design vehicle.

AT Intersection Layout Analysis
The 2013 TIA completed intersection layout analysis using the Alberta Transportation Highway Geometric Design Guide. The analysis found that a Type IIb intersection would be warranted by 2018 and a Type IVb intersection would be warranted for the 2023 and 2033 time horizons. The existing intersection has been upgraded to a Type IVb intersection with a westbound left turn lane with 100m of storage and bypass lane, and an eastbound right turn lane with 100m of storage. A sensitivity analysis was completed and confirmed that with the conservatively assumed background traffic from the 2013 TIA, approximately 50% more left turning traffic would be needed before additional storage length was warranted. With the lower background traffic that has been observed since 2013, there would be additional safety factor at this intersection.

As the proposed trip generation from the site is within the limits assumed in the 2013 TIA, and the background traffic growth is below the growth assumed in the 2013 TIA, the intersection layout analysis is still valid and conservative.

Intersection Capacity Analysis
The 2013 TIA found that the intersection of Highway 1A and Range Road 51 with left turn lane, would operate at a LOS A in 2033 during PM peak hour. The eastbound and westbound legs were shown to operate at at LOS A and the northbound at LOS B with 14.9s average delay. The overall intersection ICU was 34.8% indicating that the intersection would have ample capacity in the year 2033.

As the proposed trip generation from the site is within the limits assumed in the 2013 TIA, and the background traffic growth is below the growth assumed in the 2013 TIA, the intersection capacity analysis showing ample capacity is still valid.

Intersection Lighting Warrant
The 2013 TIA completed an intersection lighting warrant at the intersection of Highway 1A/Range Road 51 using Transportation Association of Canada's (TAC) Guide for the Design of Roadway Lighting 3. The resulting warrant score was 98, which indicated that illumination of the intersection was not warranted by 2033.

We have reviewed the 2013 Lighting Warrant calculation and confirmed that the analysis is still valid in not requiring intersection lighting.

Conclusion
We have reviewed our 2013 TIA for the site, and the current traffic volumes on Highway 1A as reported by Alberta Transportation. Our review shows that background traffic growth on Highway 1A has been slower than what was assumed in 2013. In addition, BURNCO has confirmed that the maximum number of trips assumed to be generated by the pit development in 2013 are still valid. For these two reasons, the intersection layout, intersection capacity, and intersection lighting warrant calculations from the 2013 TIA are still valid today.

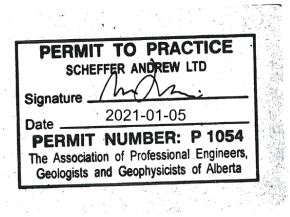
The south leg of the intersection of Highway 1A and Range Road 51 has been constructed to a Type IVb intersection as recommended by the 2013 TIA. This intersection layout is adequate for the forecast traffic. When the pit expands east of the Grande Valley Creek, a transportation impact assessment will be required to determine the configuration of the second access point on that side of the creek. This second access will reduce the number of trips using the Range Road 51 access.

If you have any further questions, please feel free to contact me.

Scheffer Andrew Ltd.

2021-01-05

Permit to Practice:



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