Town of Caledon IFRQ #23-142 Peer Review of the Transportation Impact Study and Haul Route Assessment

Date:	Monday, November 25, 2024
Project:	Town of Caledon IFRQ #23-142 – Peer Review of the Transportation Impact Study and Haul Route Assessment for Proposed Official Plan Amendment (POPA 2022-0006) and Zoning By-law Amendment (RZ 2022-0010) – CBM Caledon Quarry
To:	Town of Caledon
Cc:	Peel Region
From:	HDR
Subject:	Peer Review of the Transportation Impact Study and Haul Route Assessment – CBM Caledon Quarry

1 Introduction

HDR has been retained by the Town of Caledon to undertake peer review of a report entitled **Transportation Impact Study and Haul Route Assessment prepared by T.Y. LIN International Canada Inc. (TYLin)** dated December 2022 (Revised July 2023) and referred to herein as the “Transportation Study”. A draft peer review was submitted to the Town, dated July 2, 2024 based on the review of two reports (referred as #1 to #3 listed below).

The Town of Caledon and the Region of Peel reviewed the draft peer review as well as the TYLin Transportation Impact Study and provided comments (item #5 below) which have been incorporated into this update peer review memorandum. In response to the Town and Region comments, TYLin also provided responses and collision analysis (item #4 below) which has also been reviewed by HDR and our peer review comments of the collision analysis have been incorporated into this memorandum.

Below is a list of all documents which comprised the peer review:

1. Transportation Impact Study and Haul Route Assessment prepared by T.Y. LIN International Canada Inc. (TYLin) dated December 2022 (Revised July 2023)
2. Air Quality Impact Assessment (including dust and odour, and long-term monitoring per BMPP) prepared by Golder Associates Ltd. dated December 2022 (Revised July 2023)
3. Noise Assessment Report prepared by Golder Associates Ltd. dated December 2022 (Revised July 2023)
4. Caledon Pit/Quarry Peer Review of Traffic Impact Study prepared by Tatham Engineering dated September 20, 2023.

5. Response to the Town of Caledon and Cuesta Planning Consultants Inc. – Aggregate Resources Act Comments of November 17, 2023 - St. Marys Cement Inc. (Canada) - Proposed Caledon Pit/Quarry Class A Licence #626600 OUR FILE 8816AF – Attachment D (Collision History Review by TYLin) dated August 13, 2024
6. TIS and Peer Review Comments – Local Official Plan and Zoning Bylaw Amendment Proposed Below Water Limestone Quarry Glen Schnarr & Associates on behalf CBM – Caledon 18667 Mississauga Rd, 18722 Main St, 0 Main St, 18501 Mississauga Rd, 1055 Charleston Sideroad, 18221 Mississauga Rd, 0 Charleston Sideroad,1455 Charleston Sideroad, and 1420 Charleston Sideroad Town File: POPA 2022-0006 and RZ 2021-0010 Region File: OZ-22-006C dated August 21, 2024

This memo documents our review of the contents, methodology, conclusions, and recommendations from the TYLin Study and provides recommended refinements or further analysis to be incorporated into an updated study. This report also highlights topics and report sections which may require clarification and/or further explanation from the applicant.

Sections 2 through **Section 11** are duplicates of the major headings contained within the TYLin study and matches the section numbering, and under each header we have provided our findings and recommendations. For sections that do not have any comments, the major heading is shown and a clarification note is provided indicating that there were no comments, recommendations, requests for clarification, or action items. **Section 12** of this report documents HDR's review of the other documents listed above.

Regarding the approved scope of work, one item missing from the original TYLin report was a collision analysis. A collision analysis has since been conducted by TYLin and was provided in document #6 listed above and a review has been incorporated into this document in **Section 12.4**. Additional commentary has been incorporated into this document in response to item #5 above.

2 Site Characteristics

The TIS and Peer Review Comments provided by the Region noted that there is a concern regarding the potential for site truck traffic to utilize Regional Road 136 (Main Street) to travel northbound from Charleston Sideroad to avoid congestion in Caledon Village at Highway 10 (Hurontario Street) and Charleston Sideroad. The concern is that trucks will avoid delays and travel north of Main Street through Alton Village which is located approximately midway between Charleston Sideroad and Orangeville to the north.

Main Street is a designated Rural Road which converts to a Rural Main Street through Alton Village. Rural Roads are designated for aggregate movement; however, Rural Main Streets are only designated for local deliveries which makes the route discontinuous from a functional perspective. Additionally, north of Queen Street, Main Street is not designated for aggregate movements and there is a "No Trucks" signage posted at Main Street and Queen Street which forces trucks to turn left or right at Queen Street. At this point, Main Street continues north while Regional Road 136 turns to the east and continues north to Orangeville as Porterfield Road.

Porterfield Road then continues into Orangeville where it meanders and is not continuous to Highway 10 but does provide a connection to Highway 10 to the east via Dufferin Road 109. Dufferin Road 109 can also be used to navigate around the west side of Orangeville. This makes this alternative route undesirable for trucks as an option to reduce travel times since there may be congestion at Alton Village as well as within Orangeville. In our opinion, this route is not conducive to cut-through truck traffic generated by the proposed development but does not completely negate the potential for trucks to use this route. In general, trucks should remain on the designated haul routes unless they are destined locally and justifies utilizing alternative routes. The potential for trucks to use Regional Road 136 (Main Street) to access non-local destinations is unlikely given the surrounding road network and the alignment of Regional Road 136 which is not continuous to the north.

The site traffic projections presented in Figure 6-1 show the following trip assignment of vehicles traveling to/from the north, as shown in **Table 1**.

Table 1: Site Trips to/from the North

To/From the North via	Weekday AM		Weekday Mid		Weekday PM	
	In	Out	In	Out	In	Out
Mississauga Road	0	0	0	0	0	0
Main Street (Regional Road 136)	1	1	0	1	0	0
Hurontario Street (Highway 10)	6	6	2	17	2	2
Total	7	7	2	18	2	2
Total Two-Way	14		20		4	

The total number of vehicles expected to enter and leave from the north is 14 vehicles during the AM peak hour, 20 vehicles during the Midday peak hour, and 4 vehicles during the PM peak hour. These volumes are relatively low and equate to approximately one vehicle every three minutes combined, if these vehicles were to be consolidated on Main Street. This volume is relatively low and not expected to cause operational concerns. Furthermore, these volumes are the combination of regular passenger vehicles and trucks, which results in lower truck volumes when proportioned from these total volumes.

Future total traffic volumes along Main Street are provided below in **Table 2** based on Figure 7-1, along with the potential increase in traffic if all site traffic (from / to the north) was diverted from Hurontario Street to Main Street. The potential increase is limited to 9% or less which is within typical daily variations in traffic volumes.

Table 2: Total Traffic on Main Street if all Proposed Development Traffic Used Main Street to Travel to/from the North

To/From the North	Weekday AM		Weekday Mid		Weekday PM	
	In	Out	In	Out	In	Out
Main Street Total Traffic Volumes	107	89	138	171	115	95
Proposed Site Volumes using Hurontario Street	6	6	2	17	2	2

To/From the North	Weekday AM		Weekday Mid		Weekday PM	
	In	Out	In	Out	In	Out
New Main Street Total Traffic Volumes if all site traffic from / to the north used Main Street	113	95	140	188	117	97
% Increase	5%	6%	1%	9%	2%	2%

Regarding the potential routes to the south, all routes are discontinuous and/or indirect and are not conducive to encouraging cut-through. Only Hurontario Street provides a continuous and direct route to/from the south.

3 Baseline Traffic Conditions

3.1 Road Network

We have no comments on this section.

3.2 Baseline 2023 Traffic Volumes

The baseline turning movement counts used in the analysis were collected in 2023 for weekday and Saturday peak periods. However, the Saturday peak hour counts in the report do not match the counts presented in Appendix B (Existing Traffic Data) beginning on page 63 of the PDF. Clarification/explanation of why the counts in the main body of report does not match the counts in the appendix should be provided. Alternatively, the analysis should be revised using the latest 2023 Saturday traffic data.

4 Site Access Considerations

The Transportation Study has considered three access-points for the quarry but ultimately recommends a single access point along Charleston Sideroad. The study assesses the viability of three options which includes the three surrounding roadways: Charleston Side Road along the southern edge of the subject site, Mississauga Road along the western edge of the subject site, and Main Street (Regional Road 136) along the eastern edge of the subject site. Ultimately, the study concludes that Charleston Sideroad is the preferable access location and provides supporting rationale for that conclusion.

4.1 Haul Route Restrictions

No comments. As per Official Plan, haul routes through Charleston Sideroad are preferred. A graphic showing the existing truck restrictions and haul routes would be supportive. Figure 4-3 shows roads with truck restrictions in Section 4.7 and may be more appropriate in this section.

4.2 Access Spacing Requirements

The Transportation Study states that the desirable intersection spacing as outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDG) is 200 metres. However, this spacing is more appropriate for signal spacing in urban

conditions, while for suburban conditions a minimum intersection spacing of 400 metres would be desirable according to TAC.

The Transportation Study also references the desirable intersection spacing noted in the Peel Region Road Characterization Study. The Peel Region Road Characterization Study Table 2 (page 45) has larger spacing requirements and indicates that a spacing of 600 metres is desirable for 'Full to Full' Movement intersections on rural roadways.

Based on this criterion the Transportation Study designates a midblock section along Charleston Sideroad which would be the preferred location for a contemplated midblock entrance for the subject quarry. This midblock segment is located on a horizontal curve along Charleston Sideroad where there is an existing facility referred to as a snow storage facility which circulates one-way counter-clockwise and has separate inbound and outbound driveways.

As a result of using the intersection spacing from the Road Characterization Study to determine the allowable location for the proposed entrance, the location lands near the snow storage facility which means that the proposed driveway design could impact the snow storage facility particularly if auxiliary lanes and tapers overlap the existing driveways to the snow storage facility. Additionally, there is a chance that the snow storage facility is used at the same time as the proposed site driveway which could also result in conflicting traffic movements and interactions between vehicles that needs to be considered in the identifying the preferred quarry entrance location.

While the Road Characterization Study specifies desirable intersection spacing, in our opinion the proposed quarry entrance location should be evaluated against other criteria in addition to intersection spacing, such as sightlines and the design of the proposed entrance, given the horizontal deflection in the roadway as well as the presence of a snow storage facility and truck turnaround. If other criteria suggest a location outside of the midblock segment may be preferable for an access, then a spacing that is less than 600 metres away from adjacent 'Full to Full' Movement intersections (Main Street and Mississauga Road) may be acceptable based on a comparison of the trade-offs between meeting intersection spacing and avoiding design and operations conflicts with adjacent driveways.

In this case, reducing the number of overlapping design elements between the snow storage facility and the proposed entrance may be preferable over strict compliance with intersection spacing. The Transportation Study should assess the alternative of shifting the proposed driveway location to the west to avoid the design and operations impacts to the snow storage driveways. The shifted entrance would likely result in an intersection spacing with the intersection of Charleston Sideroad and Mississauga Road to the west that exceeds 500 metres.

4.3 Traffic Signal Infrastructure and Existing Intersection Improvements

This section describes and characterizes the existing traffic signals and infrastructure and focuses discussion on potential mitigation in advance of the analysis and findings. The discussion of mitigation and responsibility is eventually needed should the conclusions and recommendations be accepted by the Town , Region, and the MTO.

4.4 Horizontal and Vertical Sightlines

Sight distance requirements for the surrounding roadways are presented in Table 4-1 and is characterized as “Left-Turn ISD”, “Right-Turn ISD”, and “Left/Right-Turn SSD”. The “Left/Right-Turn SSD” should be characterized as Stopping Sight Distance only as it is not related to turning vehicles.

Sight distance requirements for both 90 km/h and 100 km/h design speeds are presented assuming that the posted speed limit for these roadways is 80 km/h and that the design speed may range from 10 km/h to 20 km/h higher than the design speed, which is an acceptable assumption. For a more conservative analysis, the 20 km/h design speed should be selected.

The locations of the sight distance measurements are presented in Figure 4-1 within the report. The sight distance measurements were taken in the field at the presumed location of the proposed signal entrance rather than for the full midblock segment. In our opinion, a range of locations should have been tested to identify all locations within the midblock segment that provide acceptable sight distances, independent of other selection criteria.

The purpose of Figure 4-1 is unclear as it may be showing the required sight distances or the available sight distance, or the range of locations where acceptable sight distances are available. This graphic is missing a legend that describes the colour coding of the linework (red compared to green), as well as the numbering. The sightline requirements in addition to the available sight distances should be better documented and presented in visual and table formats that are more informative and do not require cross referencing with the appendices where the available sight distances are documented.

The note under table 4-1 states that the table shows sight distance requirements for regular vehicles and not trucks. It further states that trucks have greater sight distance requirements and states that this is due to the cabin position. This assertion is not applicable in environments with very little vertical deflection (i.e. flat roadways with no vertical obstructions). As a result, we do agree that the use of regular passenger vehicle stopping sight distance requirements is appropriate in these circumstances, but the note should be revised.

It is not clear why left-turn ISD at the Mississauga Road entrance was not captured, since the majority of trucks will be turning left on to Mississauga Road to continue south towards Charleston Sideroad. However, given the conclusion of the report that Charleston Sideroad is the preferred location for an entrance, this would not impact the conclusions of the study.

Additional figures and/or tables may be beneficial to better document the sight distances observed in the field in relation to the required sight distance.

The sight distances measured in the field should use the existing property line as an obstruction to reflect that in future conditions the site may have buildings or objects blocking the sightline up to the property line. The property line can be roughly estimated as being in the same location as the existing fence which runs along the north side of Charleston Sideroad (i.e. on the south side of the subject site property).

4.5 Safety and Route Considerations

This section provides rationale against the provision of a site access on Mississauga Road and uses the argument that there will be overlapping conflicts with traffic destined to Belfountain Village. This argument is not well documented by providing supporting volumes or technical analysis to support the claim regarding Belfountain Village.

In our opinion, the source of the traffic is not relevant. However, we do agree that placing the access on Mississauga Road would introduce an additional turn for truck traffic that is destined to the east, since the trucks would have to travel through the intersection of Mississauga Road at Charleston Sideroad, and outbound traffic would need to complete a southbound left-turn. As a result, providing the access on Mississauga Road does have the undesirable impact of adding an additional point of delay and conflict (intersection) along the truck haul route.

Finally, the potential for southbound trucks on Mississsauga Road waiting to merge on to Charleston Sideroad to proceed to the east would cause delays to other vehicles behind the trucks due to the single lane southbound approach on Mississauga Road.

4.6 Physical Constraints

This section discusses the available turn lanes at Charleston Sideroad and Main Street, and this does not appear relevant to the discussion related to the proposed entrance. It also discusses existing driveways along Charleston Sideroad and along Main Street which suggests that an access to Mississauga road has already been disqualified. This section then provides a graphic showing roadway segments that are not desirable for an access based on the desired intersection spacing from the Road Characterization Study and includes Mississauga Road. The spacing shown on Mississauga Road does not correlate with the spacing shown on Main Street. The purpose of this section should be better documented as it appears to be a repeat of Section 4.2 but includes discussion on existing left-turn lanes. The purpose of discussing the left turn lanes should be elaborated upon. Figure 4-2 requires more details and measurements to describe the purpose and provide more guidance to the reader.

4.7 Preferred Future Site Access Location

We agree with the overall conclusions of this section regarding the conclusion to place the access along Charleston Sideroad. However, this section appears to provide a graphic that would be better suited in Section 4.1 which discusses truck restrictions on surrounding

roadways. The graphic should include all roadways rather than the three segments which are shown.

This report section would be better suited with a graphic that captures all the criteria which were considered in the selection of the preferring access location: sightlines, physical constraints, vehicular conflicts, traffic operations, haul routes, roadway classifications etc.

4.8 Existing Access to 1420 Charleston Sideroad

The traffic generated from staff working at this site (6 employees) should be considered as a component of site traffic. This is currently missing from the site traffic volume.

5 Future Background Conditions

5.1 Study Horizon Years

As indicated in the Agency Correspondence, planning horizon should be 10 years post built-out. The 2032 was adopted as the future analysis horizon year. The horizon year should be adjusted to represent 10-years post build-out as opposed to 10-years beyond existing conditions.

5.2 Study Area Road Network Improvements

No comments. If the planning horizon is changed, then network improvement information until the planning horizon year will have to be confirmed.

5.3 Background Developments

Development traffic from 1420 Charleston Sideroad can be considered as background development traffic and should have been incorporated into the traffic analysis. This section states that no background development is considered and it was agreed upon through pre-consultation correspondence. Some of the scoping correspondence details are missing in Appendix A.

5.4 Background Corridor Growth

Growth factors applied to the forecasting were agreed upon with the relevant review agencies, however, correspondence details relating to the background growth assumptions are missing in Appendix A and cannot be verified.

5.5 Future Background Traffic Volumes

We have no comments on this section.

6 Site Generated Traffic

6.1 Site Trip Generation

Site traffic would be preferentially separated for trucks compared to regular passenger vehicles within all of the trip generation tables as well as differentiated in separate figures. This may be helpful for the noise and air quality assessments.

6.1.1 Passenger Car Peak Hour Trips

This section appears to be accurately described assuming that the employee and contractor estimates are accurate.

Our understanding is that the weekday AM peak period trips will not capture inbound or outbound employees since they will arrive earlier than the peak period at 5:00am. The AM trips are therefore comprised of the contractor trips associated with 20 contractors and it is assumed that 75% of these contractors will enter and leave the site during the AM peak hour, resulting in 15 trips in and 15 trips out during the AM peak hour.

For the PM peak hour, it is assumed that the entire day shift of 30 employees will leave the site and that the entire night shift of 20 employees will enter the site. In addition to the typical day and night shift employees, the remaining 25% of contractors (5 contractors) are assumed to enter and leave during the site during the PM peak hour, resulting in 25 inbound trips and 35 outbound trips during the PM peak hour.

Since the Saturday peak hour is during the middle of the day, it is assumed that there will be no passenger car trips during the Saturday peak hour.

As previously mentioned, a graphic specific to regular passenger vehicle trips should be provided.

6.1.2 Truck Peak Hour Trips

It is mentioned that the data was received and was used to identify July as the peak month. Clarification is required about the source data, and the data processing should be summarized in the report. Despite the reference to monthly data, the calculation of hourly truck volumes appears to be based on first principles – the yearly tonnage limits, the capacity of a truck, the operating hours of the facility – and does not appear to use any other data that was referred to.

The trip generation calculation also appears to assume an evenly distributed demand of vehicles throughout the day, with the exception of the weekday AM peak hour where a surge factor was applied to the outbound volume.

Attempts at reproducing the hourly truck volume resulted in an estimated 33 trucks per hour compared to the 30 trucks per hour indicated within the report in Table 6-2.

More details on the time-of-day distribution of truck trips should be provided by incorporating a review of historical data (presumably weigh scale data if available from other existing and

operating quarries), developing a rate based on the existing tonnage, and adjusting for a peak day/month and for seasonality, or using a comparable approach, as opposed to assuming even distribution of trucks throughout the week and throughout the year with an arbitrary adjustment factor of a 50% increase applied to the weekday AM peak hour.

6.1.3 Passenger Car Equivalent Factors

The Passenger Car Equivalent (PCE) adjustments for loaded and unloaded trucks are reasonable based on industry values.

6.2 Site Trip Distribution and Assignment

The queries used to support the employee (passenger car) distribution shown in Table 6-4 should be provided in the appendices for review. As previously mentioned, separate traffic figures should be prepared to show the passenger car and truck traffic trips separately.

As discussed in **Section 2**, it is our expectation that trucks will adhere to the available designated haul routes unless there are major impacts to the primary haul route that necessitates use of alternative routes (i.e. roadway closures). Congestion would not constitute an appropriate reason for utilizing alternative routes. However, if there are local deliveries then utilizing alternative routes would be necessary.

Furthermore, employee (regular vehicle) traffic may utilize any roadways surrounding the site. There is no way to control or designate access routes for passenger vehicles. The TYLin study considers passenger vehicles in the forecasting and has assigned these vehicles to the surrounding road network. A nominal number of passenger vehicle trips have been distributed throughout the surrounding road network and based on the volumes it appears that these vehicles may utilize surrounding roads such as Main Street if they are destined to Orangeville or otherwise locally destined. In our opinion this is appropriate and reasonable.

7 Future Total Traffic Conditions

We find the conclusions of this section acceptable. The Region’s comments reiterated the concern for the potential of vehicles to utilize alternative haul routes such as Main Street to travel northbound and this is discussed in **Section 2**.

Regarding the potential to travel south using alternative routes, we believe the same logic applies. The roadways that extend to the south such as Willoughby Road (truck restriction), McLaren Road (truck restrictions), Cataract Road (truck restrictions), Mississauga Road (truck restrictions), all have truck restrictions south of Charleston Sideroad. Trucks should not be using these routes. Furthermore, these roadways are generally not continuous to the south and would not be conducive to encouraging cut-through.

8 Site Access Warrant Analysis

8.1 Signal Warrant

The report utilizes the PCE adjusted traffic volumes within a signal warrant and the signal warrant is found to be not warranted. The conversion of vehicle volumes and specifically truck volumes to PCE is appropriate. The sub-warrant compliance is as follows:

- Warrant 1A – All Approach Lanes: 82%
- Warrant 1B – Minor Street Both Approaches: 19%
- Warrant 2A – Major Street Both Approaches: 75%
- Warrant 2B – Traffic Crossing Major Street: 61%

The warrant requires all four sub-warrants to be 80% met for the signal to be justified, or either warrant 1 (A and B) or warrant 2 (A and B) to be 100% met for the signal to be justified.

The compliance indicates that it is the traffic volume to/from the proposed site access that is the primary limiting factor for the warrant (warrant 1B and warrant 2B). However, warrant 1A that considers traffic passing by the site along Charleston Sideroad is just above the threshold while warrant 2A which also considers traffic along Charleston Sideroad is just below the threshold required to justify a signal.

The report then goes on to conclude that a signal is still recommended to facilitate the movement of trucks in and out of the site access. This recommendation is reasonable given the size of the trucks and the expectation that the trucks will be burdened when leaving the access. However, the provision of a traffic signal instead of stop control is up to the discretion of the Town of Caledon and is not justified according to the signal warrant.

8.2 Left-Turn Warrant Analysis

We have no comments on this section and agree with the conclusions regarding provision of left-turn lanes.

8.3 Auxiliary Right-Turn Lane

We have no comments on this section and agree with the conclusions regarding provision of a right-turn lane.

9 Proposed Site Access Conceptual Design

9.1 Left-Turn and Right-Turn Auxiliary Lane Requirements

The recommended storage for the proposed westbound right-turn lane at the site access is 15 metres according to the report, however, an articulated truck can be longer than 15 metres. The storage requirements should be revisited to ensure that at least one truck length can be accommodated in the proposed storage for all turn lanes at the site access. The assumed design vehicle should be the largest/longest truck expected to enter the site.

The design elements of the functional design for the entrance, including the right-turn lane and left-turn lane design (taper, deceleration, and taper) appear to be correct based on our review of the Transportation Association of Canada Geometric Design Guide for Canadian Roads and Chapter 9.1 of the Transportation Study.

9.2 Access Spacing and Snow Storage Access Considerations

The desirable access spacing provided in the Road Characterization Study should not be used as the only criteria when selecting the preferred access location. In our opinion, the presence of the snow storage/truck turnaround facility may override the recommendation to place the access within the mid-segment location along Charleston Sideroad and may warrant shifting the access to the west so that none of the design elements of the westbound right-turn lane entering the quarry entrance would overlap with the snow storage facility outbound driveway.

Shifting the access to the west may result in an intersection spacing of less than 600 metres, which is not a major concern in our opinion given that the spacing would likely still remain greater than 500 metres. This would require the functional design of the driveway to be revised, as well as the sight distance checks to be revised to reflect the new location.

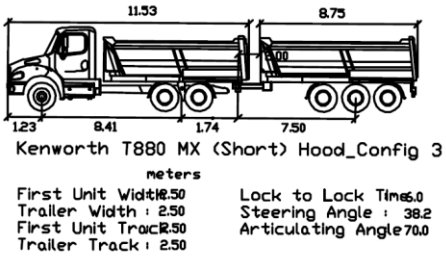
The quarry entrance right turn lane and taper design should ideally avoid impacts or adjustments to the existing snow storage/turnaround facility access design. Additionally, shifting the entrance to the west would eliminate potential overlap of right turning movements and outbound right and left movements if the snow storage facility is in use at the same time as the quarry.

The proposed right turn lane design for the quarry entrance would add an additional 3m minimum of distance for outbound left turns from the snow storage facility to travel and would also add the corresponding additional gap time. Moreover, the outbound right turns from the snow storage facility would now have to look at two lanes of approaching WB traffic to merge onto Charleston Sideroad.

9.3 Left-Turn Lane Design and Curb Radii

Figure 9-1 does not show the existing edge of pavement and should be revised to include the existing and future edge of pavement. The graphic should also indicate the required widening through the section of the roadway where the access is proposed. If the entrance location is shifted west, then widening should still be identified on the drawing.

The swept path analysis contained in Appendix H was undertaken using a “truck and pony trailer” and “dump-truck”. It would be more appropriate to use an articulated dump truck that accurately reflects the largest design vehicles anticipated to enter the site. The larger design vehicle should be used to determine the curb radius requirements. An example articulated dump truck is the “T880 MX (Short) Hood_Config 3” which is contained in the AutoTURN library and is presented below:



10 Capacity Analysis

The capacity analysis used Synchro 2000 software and Highway Capacity Manual 2000 methodology for the outputs. This approach is acceptable. The operational thresholds were taken from the Region of Peel Traffic Impact Study Guidelines which is acceptable. However, we note that the intersection of Charleston Sideroad and Highway 10 is an MTO intersection and therefore must adhere to the requirements of the MTO.

The report indicates that a lost time adjustment of -2 seconds was applied to all movements at the intersection of Hurontario Street and Charleston Sideroad. More information on this assumption and support for the calibration adjustment should be provided, including presentation of the operations without the adjustment applied. Lost time adjustment calibration should only be applied if the existing operations are indicating over-capacity operations when the demand was known to be served, and the adjustment can be supported through field observations which demonstrate that vehicles are turning during the amber phase.

The storage indicated in Table 10-2 appears to be specific to the intersection of Hurontario Street and Charleston Sideroad and is not accurately representative of existing conditions. The calculation of effective storage should be revisited so that none of the taper or deceleration components of the turn lanes are reproportioned as storage. Queues should be first reported directly using the existing storage. When there are opportunities to increase storage through adjustments to painted lines, this should be indicated as a form of mitigation and should be tied to the scenario (i.e. existing conditions, background conditions, or site-related total conditions).

The proposed site access on Charleston Sideroad should be analyzed under stop control prior to analysis under signal control. This should be provided for comparison with signalized operations. Additionally, the analysis can account for heavy vehicle percentages to reflect the design vehicles entering the site, or the truck volumes can be converted to Passenger Car Equivalents to capture the differences in acceleration for loaded trucks compared to unloaded trucks.

Overall, and subject to the validation of the calibration adjustments at Hurontario Street and Charleston Sideroad, the conclusions of this section appear reasonable.

11 Queueing Analysis

The queue storage shown in Table 10-2 may be more logically incorporated into Section 11 where the available storage is used to determine if mitigation is required, and as previously mentioned, the effective storage calculations should be removed and the highlighted queues which are expected to exceed the available storage should be revisited without the effective storage adjustments to more clearly show impacts and required mitigation as well as the required storage lane extension.

It may be beneficial to include a comparison of 95th percentile queues from Synchro in addition to the SimTraffic queues. Synchro queues are missing in the synchro outputs in the relevant appendix.

Overall we agree with the conclusions of this section which indicates that the site will have negligible impact on the queues and is not causing the queues to exceed existing storage.

12 Review of Other Study Reports

In addition to reviewing the Transportation Study, the Noise Assessment Report and the Air Quality Impact Assessment Report were also reviewed:

- Air Quality Impact Assessment (including dust and odour, and long-term monitoring per BMPP) prepared by Golder Associates Ltd. dated December 2022 (Revised July 2023)
- Noise Assessment Report prepared by Golder Associates Ltd. dated December 2022 (Revised July 2023)

For these reports, the traffic data that was utilized in the respective assessments were reviewed to confirm that they were extracted from the Transportation Study and representative of the findings or recommendations from the Transportation Study.

12.1 Air Quality Impact Assessment

The Air Quality Impact Assessment report estimated impact of emissions caused by the site operations including the site traffic which comprises only trucks (‘Shipping Trucks’) and does not consider regular vehicles. Table 6 of this report relies on an estimated peak hour truck activity of 68 two-way trips. Shipping Trucks are defined as the trucks which carry the processed aggregate material from the crushing plant to offsite using highway and travel along the Site's access roads. The Transportation Study estimates a total of 75 truck trips in the AM peak hour which is 7 additional trucks per hour.

This report also estimates the impact on air quality resulting from vehicular movements within the site. HDR has not reviewed these internal vehicular movements within the site and these estimates are not provided within the Transportation Study.

12.2 Noise Assessment Report

The Noise Assessment Report estimates whether the noise generated by site activities are in compliance with the applicable noise limits and what noise controls are required. Table 1 of this report states 38 hourly shipping truck round trips which equates to 74 two-way trips. Shipping Trucks are defined as the trucks which carry the processed aggregate material from the crushing plant to offsite using highway and travel along the Site's access roads. The report states that the site traffic volumes were referenced from Transportation Study. We agree with the assumptions made within this section regarding truck trip generations to estimate impact on noise. We agree with the haul route assessment, as in Section 7.4, that Charleston Side Road is the most preferred route.

This report also estimates the impact on noise levels resulting from vehicular movements (Haul trucks) within the site. HDR has not reviewed these internal vehicular movements within the site and these estimates are not provided within the Transportation Study.

12.3 Peer Review

The Peer Review of the original Transportation Study was also reviewed:

- Caledon Pit/Quarry Peer Review of Traffic Impact Study prepared by Tatham Engineering dated September 20, 2023.

The Peer Review provided 4 major action items and conclusions from the Transportation Study:

- The location of the proposed access on Charleston Sideroad was deemed appropriate, pending more detailed sight distance checks in the field for the ultimate access location. We agree with this conclusions with the exception that a shift in the driveway westerly away from the snow facility would require additional sight distance checks in the field.
- The recommendation for a signal control at the entrance was deemed appropriate despite the warrant not being met. We also agree with this conclusion given the presence of heavy vehicles carrying loads.
- The recommended lane configuration at the proposed signalized entrance was deemed appropriate in terms of the provision of westbound right-turn and eastbound left-turn lanes. We also agree with this recommendation given the presence of large heavy vehicles.
- The identified transportation impacts to the external road network as a result of the proposed development indicates that there will be no need for external mitigation resulting from site traffic, with the exception of the provision of a new access point on Charleston Sideroad. We agree with this conclusion, however, better documentation of the uncalibrated operations at Charleston Sideroad and Hurontario Street as well as more accurate documentation of the existing turn lane storage at the intersection would assist with the confirmation that queueing issues at this intersection are not caused by the subject site traffic.

With respect to other assessments noted above, we find the inputs into the noise and air quality assessments to be reasonable and based on the forecasts developed within the conclusions and Transportation Study, with the exception that the site traffic may be slightly underestimated based on the revised Transportation Study site traffic forecasts. However, the more recent forecasts are only marginally higher than used in these other reports.

Regarding the peer review, we generally agree with the conclusions but have identified the need for further detail and refinements to the Transportation Study which may impact the design of the proposed entrance on Charleston Sideroad.

12.4 Collision History Review

Each of the following sections are duplicates of the major headings contained within the Collision History Review of TYLin study and matches the section numbering, and under each header we have provided our findings and recommendations. For sections that do not have any comments, the major heading is shown and a clarification note is provided indicating that there were no comments, recommendations, requests for clarification, or action items.

12.4.1 Introduction and Background

We have no comments on these sections of the report. These sections accurately capture the excerpts from the Transportation Study.

12.4.2 Site Access

We have no comments on this section of the report. It accurately captures the excerpts from the Transportation Study.

12.4.3 Collision Data

Collision data was collected only for two intersections along Charleston Sideroad (Charleston Sideroad and Main Street intersection and Charleston Sideroad and Highway 10) and the segment of Main Street between Charleston Sideroad and Beech Grove Sideroad. Clarification for why the collision data was not requested and analyzed for midblock segments of Charleston Road between Mississauga Road and Highway 10 is needed. Additionally, as the site access is also proposed on this segment of Charleston Sideroad, it is crucial to present collision history for this segment.

The collision data collected from Region of Peel and Ministry of Transportation Ontario is for the period from January 1, 2019 to December 31, 2023 (five years). This time period includes the COVID 19 pandemic period and does not represent the ideal traffic condition for all five years. Hence it is advisable to undertake collision analysis for five-year period before and after the pandemic which would represent typical conditions.

12.4.4 Collision Data Analysis

The last paragraph on Page 6 contains the statement *“A review of available historical turning movement count data shows that the haul route intersection was active with aggregate truck hauling within the study period. This shows that although the route has an elevated volume of*

dump truck traffic due to its haul route designation and the abundance of quarry operations surrounding the route, dump trucks contribute to a relatively small proportion of the accidents at the key intersections." We don't fully agree with the statement as the total traffic during the study period was less because of the pandemic, and the truck traffic could have been reduced commensurately.

It would be advisable to separate the intersection collisions and segment collisions and analyze the collision types at each individual location to identify concentrations of a given collision type, or concentrations of collisions on a given approach or for a given turning movement. This focused analysis would be more conducive to identifying mitigation, if appropriate.

Analysis showing any pedestrian involvement in collisions should be highlighted.

12.4.5 Conclusion

Almost 20% of the collisions occurred when drivers were driving properly. This suggests that there may be roadway design implications causing the collisions and this could provide insight into mitigation. The analysis should be expanded to capture all segments and intersections along Charleston Sideroad to Highway 10.

13 Conclusions & Recommendations

In general, we agree with the conclusions of the Transportation Study in terms of the overall impacts to the external road network and the preferred location for the proposed signalized entrance on Charleston Sideroad generally between Main Street and Mississauga Road. However, the conclusions are dependent on the following reanalysis, revisions and clarifications which we have outlined and recommend captured within an updated study:

1. Adjust the future horizon year to represent 10-years beyond build-out as per the approved scope of work. The current horizon year is 2032 which represents 10-years from 2022 existing conditions.
2. The recommended driveway entrance location should consider intersection spacing but should not rigidly rely on the desired spacing when other evaluation criteria may override the desire to provide the minimum spacing. In our opinion, shifting the entrance to the west so that the westerly spacing to Charleston Sideroad and Mississauga Road is less than 600 metres but still greater than 400 metres should be considered to eliminate overlapping design elements with the snow storage facility entrances, as well as to avoid overlapping vehicular movements between the snow storage facility and the proposed entrance. This shift of the driveway location is pending re-evaluation of the available sightlines.
3. The sightline analysis should be revisited to provide more detail in graphical format, and to indicate all areas of the roadway where the required sight distance are available, rather than only checking sight distances at specific locations. The sightline graphic provided within the report does not have a legend and it is not clear what it is depicting.

4. The sight distance checks in the field should use the property line (i.e. the fencing on the north side of Charleston Sideroad) as a control point to protect against further obstructions which may be within the property, and this should be stated in the report to confirm that this is accounted for.
5. Support and rationale for the calibration adjustments used in the operations analysis (Synchro) – specifically the lost time adjustments – should be better detailed, including presenting the uncalibrated operations prior to showing the calibrated (adjusted) results and documenting relevant MTO guidelines, standards or MTO approval to apply these calibration adjustments.
6. The proposed new intersection which will provide access to the site should be analyzed under stop control for comparison with the signalized operations.
7. The queueing analysis for Charleston Sideroad at Hurontario Street should be revisited based on more accurate storage lane values that reflect the existing painted storage. If extensions of the storage lanes are required, this should be documented as mitigation caused by existing, background or site traffic. The concept of effective storage should not be relied upon.
8. Highway 10 and Charleston Side Road intersection is expected operate with v/c ratio ranging from 0.75 to 0.88 depending on the time period (average of 0.82) in the year 2032. The average increase in v/c ratio from year 2023 is +0.13 over 9 years. The intersection is approaching capacity and warrants monitoring. However according to the current analysis, there will be residual capacity. The Region has noted that there are concerns with congestion at this intersection and limited opportunity for mitigation and has further noted that this is an MTO intersection. Truck traffic must continue to use the designated haul routes while other vehicles may reroute as needed. Trucks should only use other roadways for local deliveries or when roadways are unusable. This should be stated in the TIS with rationale (direct vs. indirect routing, truck restrictions etc.)
9. Required widenings should be indicated on the functional design drawing for the driveway. Widenings in the vicinity of the snow storage facility should preferentially be avoided.
10. The swept path analysis should be revisited with a design vehicle that is a more accurate representation of the largest vehicles which will access the site. The truck with pony trailer may only be used if it is demonstrated that the swept path would be equal to the articulated dump trucks or the other largest design vehicles which will enter the site. In our experience, there are dump trucks with trailers within AutoTurn software which should be preferentially used for the swept path analysis in support of the entrance design.
11. The site traffic forecasts should be better detailed in the report with enough detail to be reproducible, particularly for trucks. The current forecasts appear to assume even distribution of truck activity throughout the day. Additionally, the report states that data was reviewed to assist in the development of site generated truck trips, however, no data is presented in the report and the truck trips are based on truck capacity and the permitted tonnage limits.

12. The air quality assessment report should be revisited with the revised (higher) site truck traffic forecasts of 75 trucks per hour, compared to the 68 truck per hour which was analyzed in the respective studies. Alternatively, it should be demonstrated that the additional truck volume will have negligible impact on these assessments. The noise report should also be revisited if there are changes to the site truck trip generation.
13. Collision history review was undertaken for a five-year period from 2019 until 2023. According to the collision review, from a total of approximately 120 collisions, only 6 involved dump trucks which represent a 5.1% collision rate and approximately 1.2 dump truck collisions per year. The review is undertaken for a five-year period from 2019 until 2023 which includes the COVID-19 pandemic and may not have reflected the appropriate traffic conditions to draw conclusions on collision patterns. Additional analysis years outside of the Covid-19 pandemic should supplement and validate the initial collision findings. The analysis should include additional intersections and midblock segments along Charleston Sideroad from Mississauga Road to Highway 10.