2ND ANNUAL TRAFFIC & SAFETY REVIEW

CODRINGTON PIT

FINAL ▪ NOVEMBER 2018

REPORT PREPARED FOR

VOTORANTIM CIMENTOS (CBM AGGREGATES)
55 INDUSTRIAL STREET
TORONTO, ON M4G 3W9

REPORT PREPARED BY

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TMIG PROJECT NUMBER 18237

this report has been formatted for double-sided printing

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November 19, 2018

PROJECT NUMBER 18237

Votorantim Cimentos (CBM Aggregates)
ATTN: Mr. Mike Lebreton
55 Industrial Street
Toronto, ON M4G 3W9

Dear Mr. Lebreton

Re: Codrington Pit Second Annual Traffic & Safety Review

TMIG is pleased to submit the enclosed Second Annual Traffic & Safety Review for the Codrington Pit in Northumberland County. The Pit site is located south of the hamlet of Codrington on the east side of County Road 30, between of County Road No. 27 and Old Wooler Road.

As part of the approved and executed Development Agreement with the County, CBM Aggregates is to complete an annual traffic and safety review for County Road 30:

This Review has been prepared to ensure that the new Codrington Pit entrance and County Road 30 in the vicinity of the new access are operating as anticipated. The report includes information on how the operation of the Pit is not impacting traffic on County Road 30 and confirms that safety on County Road 30 has not been compromised as a result of the Pit activity, given the upgrades and mitigation that was completed during the development of the site.

TMIG finds the Codrington Pit access is operating as intended, providing a high degree of efficiency and safety

We trust the enclosed is sufficient for your needs, but please do not hesitate to contact the undersigned should you require any additional assistance.

Sincerely,
THE MUNICIPAL INFRASTRUCTURE GROUP LTD.

Liban Mohamed, B.E.S., LEED Green Associate
Transportation Planner
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J.A. (Jim) Bacchus, B.A., MITE
Director of Transportation Services
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EXECUTIVE SUMMARY

This study represents the second annual Traffic and Safety Review of the now-operating Codrington Pit access to County Road 30.

This report concludes:

- ✓ Codrington Pit truck activity has been measured to be less than forecasted in the approved traffic impact study. Measured volumes are also less than the approved annual extraction amount, which has been confirmed by the 2018 shipping activity records obtained from CBM
- ✓ County Road 30 (non-Pit related) traffic volume was also observed to be less than forecasted in the original traffic study and there has been virtually little growth in traffic along this section of roadway over the last ten years
- ✓ During the A.M. and P.M. rush hour periods, intersection analyses continues to indicate very good peak hour traffic operations are being experienced at the Pit access, and there is excess capacity available for future traffic growth and/or maximum extraction level Pit activity (should it occur in the future)
- ✓ Neither the County, the Ministry of Transportation, nor the Ontario Provincial Police have any available records of collisions in the study area since last year's Annual Review, nor indeed since the opening of the Pit access
- ✓ An incident report record was filled out in regard to a trucking complaint on June 21, 2018. This complaint was in regard to a tractor trailer driver who allegedly failed to stop his truck at the internal stop sign located inside of the site entrance at County Road 30. A driver of a private auto approaching the Pit access claimed they almost collided with the truck. As a result of the complaint, CBM suspended the driver from the site for three days. CBM then notified driver of the private auto of the truck driver's suspension and received a positive response.
- ✓ Based on the data collected and analyzed, and on all the available information, TMIG concludes the Codrington Pit access is operating as intended (or better), and provides an acceptable degree of efficiency and safety.

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1 INTRODUCTION

1.1 Retainer and Objective

The Municipal Infrastructure Group Ltd. (TMIG) was retained by Votorantim Cimentos (CBM Aggregates) to prepare the second annual Traffic and Safety Review for Codrington Pit, herein after referred to as the 'Pit', in Northumberland County. The Pit site is located south of the hamlet of Codrington on the east side of County Road 30, between of County Road No. 27 and Old Wooler Road, as illustrated on **Figure 1-1.**

Figure 1-1 Site Location

This Review has been prepared to examine the Codrington Pit entrance and County Road 30 intersection performance and safety in order to assess if the Pit access is operating as anticipated. The report includes information on how the operation of the Pit is not impacting traffic on County Road 30 and confirms that safety on County Road 30 has not been compromised as a result of the Pit activity, given the upgrades and mitigation that was completed during the development of the site.

The Traffic and Safety Review will address the following items:

- Review traffic volumes generated by Codrington Pit and the forecasted County Road 30 background traffic.
- Monitor performance of the Pit access during the periods of typical shipping activity.
- Review available collision statistics at the new Pit access.
- Summarize information on / about traffic incidents / collisions (if any) that have been reported by or to CBM through its own internal reporting system by independent truckers or by residents / travelling public.
- Provide commentary on the traffic operations / functioning of the Pit access in regard to the forecasted performance contained in the traffic study submitted during the Pit's approval process.

1.2 Study Background

CBM Aggregates operates Codrington Pit, located in Codrington, Municipality of Brighton, Northumberland County. The property is known (municipally) as 2851 County Road 30. The existing Pit is permitted to ship a maximum of 650,000 tonnes per year.

As part of the approved and executed Development Agreement with the County (excerpt copied below), CBM Aggregates is to complete an annual traffic and safety review for County Road 30:

"St. Marys [CBM] *agree that it shall, at its sole cost, provide the County with an annual report with respect to traffic operations and road safety on County Road 30 in the vicinity of the intersection. The report shall be based on traffic and accident information obtained from the Ontario Provincial Police, the County Roads Department and St. Marys".*

The enclosed report is the second annual examination following the opening of the Pit in 2016. TMIG prepared the 1st annual review in November 6, 2017, which was subsequently approved by the County.

TMIG continues to rely on the approved Traffic Impact Study conducted by Grant A. Bacchus Ltd. (GAB Ltd.) dated June 2007 as well as an approved Road Safety Assessment conducted by GHD, dated March 2013, both of which contain still-relevant information with regard to the enclosed report and analyses.

1.3 Site Area

The study area includes the following unsignalized intersection:

- County Road 30 at Codrington Pit Access

1.4 Study Team

The TMIG team involved in the preparation of this study are:

- J.A. (Jim) Bacchus, B.A., MITE, Director of Transportation Services
- Michael Dowdall, C.E.T., Project Manager
- Liban Mohamed, B.E.S., LEED Green Associate, Transportation Planner

2 BASELINE TRAFFIC

This section summarizes the approved haul route, the data collection program, and presents the existing traffic volumes at the study intersection (County Road 30 / Codrington Pit Access).

2.1 Primary Haul Route

The 'haul route' for the purpose of this study is the Codrington Pit access to County Road 30.

County Road 30 is a north-south provincial highway with a posted speed limit of 80 km/h, a two-lane rural cross section and is a designated haul route as per the Northumberland County Official Plan (and approved for use by Codrington Pit-generated truck traffic).

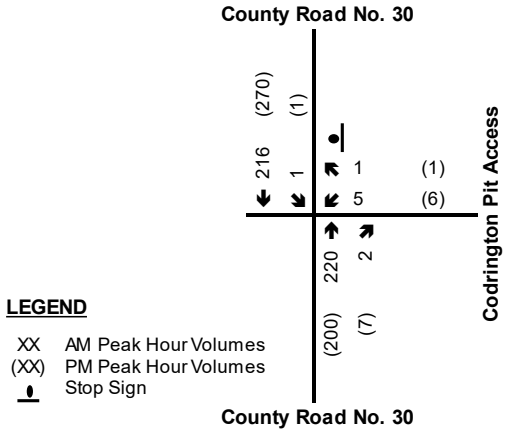
As part of the OMB settlement for the Pit, as stipulated in the Development Agreement, CBM has constructed the Codrington Pit access to County Road 30 with a northbound auxiliary right turn deceleration and storage lane of approximately 120 metres plus a southbound acceleration lane of approximately 485 metres (excluding tapers). A section of the shoulder on both sides of County Road 30 has also been paved in proximity of the Pit access to facilitate active transportation (pedestrians and cyclists).

The auxiliary lanes have been designed and constructed to facilitate safe and efficient access/egress of heavy trucks generated by the Pit in the primary direction of travel to/from the aggregate market (i.e., to/from the south). The original (as approved) traffic studies posited that local deliveries of material (either into or out of the Pit) could very well occur to/from the north, however the majority of truck traffic was forecasted to come from, and be destined to, points south on County Road 30.

2.2 2018 Traffic Data

A weekday turning movement count was conducted by TMIG in September 2018 during the hours of 06:30 and 19:00 at the intersection of County Road 30 and the Pit Access. The weekday a.m. and p.m. peak hour existing total traffic volumes (the combination of Pit-generated truck traffic and traffic traveling County Road 30) are shown in **Figure 2-1.** The a.m. peak hour was observed to be 07:15 to 08:15, while the p.m. peak hour was 15:30 to 16:30. The complete traffic survey summary is provided in **Appendix A.**

Figure 2-1 2018 Existing Traffic Volumes

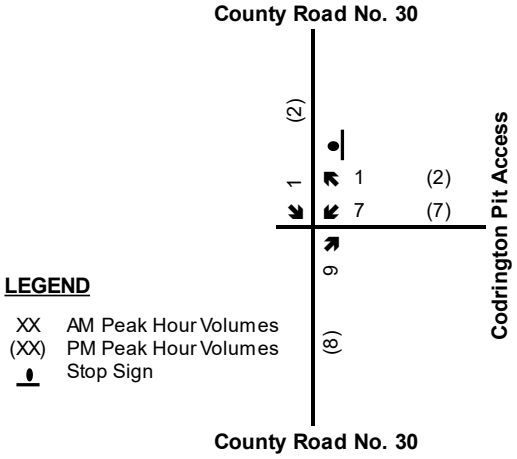


2.3 Peak Truck Activity

The peak hour of truck traffic entering and exiting the Pit site access was extracted from the September 2018 tuning movement count in order to isolate the busiest period of truck traffic activity from the peak periods of total vehicular traffic. The trucking peak periods occurred between 09:45 to 10:45 and 14:00 to 15:00, when a total of 18 and 19 heavy trucks respectively were observed generated by the Codrington Pit. These truck traffic volumes were confirmed as representative of a typical day, based on a review of the shipping activity records provided by CBM.

The busiest peak hours of heavy truck activity traffic are shown in **Figure 2-2**.

Figure 2-2 Peak Truck Activity



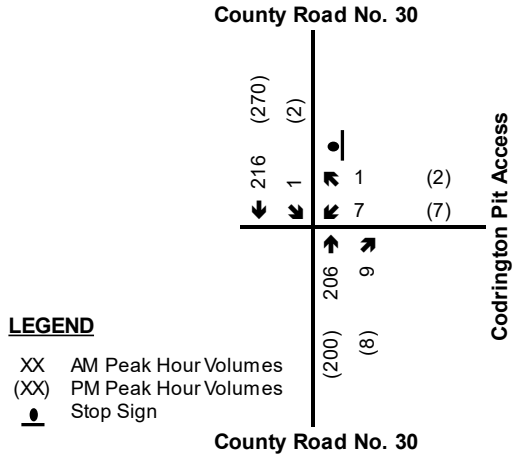
The directional distribution of peak truck activity continues to be consistent with the forecasted haulage of material in the approved 2007 Traffic Study, which predicted the vast majority of truck trips to be destined to, and originating from, the south along County Road 30.

2.4 Baseline Traffic Volume Model

Baseline traffic conditions to be examined for this report were derived by combining the existing County Road 30 peak hour passing traffic with the highest overall peak hour of heavy truck activity. This combined baseline traffic condition represents a 'hybrid' peak demand traffic model. It is important to note that this hypothetical peak hour did not actually occur, but we have nonetheless adopted it to represent a 'worse case' scenario of busiest combined County Road 30 corridor flows plus busiest Pit activity.

Figure 2-3 summarizes the baseline traffic volumes utilized in the analysis.

Figure 2-3 2018 Baseline Traffic Volumes



2.5 County Road 30 Traffic Growth Review

The 2018 traffic data was reviewed and compared with the 2017 traffic data collected from the 1st Annual Traffic and Safety Review prepared by TMIG.

It is evident from a review of this data that volumes along County Road 30 have fluctuated somewhat in both the a.m. and p.m. peak hour since 2007, as evident from the following summaries:

- Two-way traffic 2007 – 507 and 446 vehicles during the a.m. and p.m. peak hours respectively
- Two-way traffic 2017 – 368 and 424 vehicles during the a.m. and p.m. peak hours respectively
- Two-way traffic 2018 – 436 and 470 vehicles during the a.m. and p.m. peak hours respectively

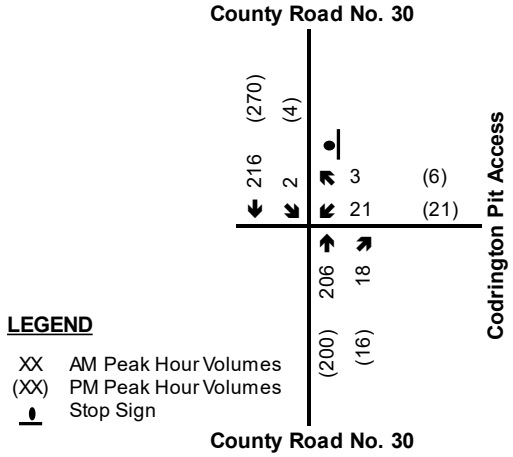
It is noteworthy that p.m. volumes have only increased 5% since 2007, and a.m. volumes have actually decreased. We also note that the original traffic study (conservatively) forecasted growth on County Road 30 at the rate of 2% per year, and that the recommendations for the Pit access design were partially driven by predicted future County Road 30 traffic volumes. Since the predicted growth has not occurred at the rate predicted back in 2007, the Pit access turn lanes constructed to accommodate that future condition are more than adequate to handle present day peak traffic flows.

3 CAPACITY ANALYSIS

For the purpose of the operational analyses, we have employed Passenger Car Equivalent (PCE) factors to account for the additional time it takes a heavy vehicle (in this case, different PCE's for each the loaded and empty gravel trucks) to travel through the study intersection. Based on our experience, and consistent with previously approved studies for the Codington Pit, we have adopted a PCE of 3.0 for loaded trucks and a PCE of 2.0 for empty trucks and applied it to baseline turning movement volumes to/from the Pit access.

The truck traffic volumes expressed as PCEs are shown in **Figure 3-1**.

Figure 3-1 2018 Total Traffic Volumes – PCE Adjusted



The capacity analysis identifies how well an intersection is operating. The analysis contained within this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 10 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement. The existing heavy vehicle proportions are included in the intersection analyses. Detailed capacity sheets are attached in **Appendix B**.

The peak hour entrance operations are summarized in **Table 3-1**.

Table 3-1 Capacity Analysis of Codrington Pit Access and County Road 30

Traffic Condition	Movement v/c (LOS) 95th Percentile Queue, Delay in Seconds	
	AM Peak Hour	PM Peak Hour
Baseline 2018	WBLR: 0.06(B) 2m, 14s SBLT: 0.00 (A) 1m. 1s	WBLR: 0.07 (B) 2m, 14s SBLT: 0.00 (A) 1m. 1s

Under 2018 'hybrid' baseline peak period conditions, the intersection of County Road 30 and the Codrington Pit Access is operating with little delay and substantial reserve capacity during both a.m. and p.m. peak hours. There are no critical movements or queuing issues to report. The outbound movements from the Pit are operating at LOS 'B' during both weekday a.m. and p.m. peak hours. These results indicate the physical improvements and Pit access design delivered as part of the Pit approvals are easily accommodating the peak hour demands of the Pit and County Road 30 traffic flows.

4 INCIDENT REPORTS

4.1 Collision Reports

TMIG have consulted with the three agencies responsible for collision reports within vicinity of site. The following summarizes the responses received:

- Ontario Provincial Police (OPP):
  - The Freedom of Information Coordinator advised that information can be obtained from the MTO, as OPP are not able to release this information due to privacy concerns.
- Ministry of Transportation of Ontario (MTO):
  - Confirmed that County Road 30 is under County of Northumberland jurisdiction, therefore MTO has no collision report records to share.
- County of Northumberland:
  - Road supervisors for this area have confirmed that they haven't had any complaints from the public or know of any safety incidents or collisions recorded for this area.

Regarding the collision reports, at this time the County still does not have access to collision data. As indicated to TMIG in preparation of last year's review, they are still in the process of obtaining access to MTO's collision database, however, it will still be some time before they are granted access to this data. It is suggested that once the County of Northumberland gains access to the MTO's collision database, it forward the information to CBM for review and inclusion in future annual reporting.

4.2 CBM Incident Reports

Only one incident occurred at the site access that was reported to CBM:

- The incident occurred on June 21, 2018. This complaint was in regard to a tractor trailer driver who allegedly failed to stop his truck at the internal stop sign located inside of the site entrance at County Road 30. A driver of a private auto approaching the Pit access claimed they almost collided with the truck. As a corrective measure in response to this near-miss, the truck driver's access to the Pit was suspended by CBM for three days.

CBM Management contacted the individual to make them aware of the truck driver's suspension, and no further action was requested by the auto driver.

APPENDIX A

Traffic Data

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period
From: 6:30:00
To: 12:30:00

One Hour Peak
From: 7:15:00
To: 8:15:00

Municipality: Codrington
Site #: 1832700001
Intersection: CR 30 & Pit Access
TFR File #: 1
Count date: 26-Sep-18

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: CR 30 runs N/S

North Leg Total: 438
North Entering: 217
North Peds: 0
Peds Cross: ⋈

Cyclists	0	0	0
Trucks	12	1	13
Cars	204	0	204
Totals	216	1	

Cyclists	0
Trucks	15
Cars	206
Totals	221

East Leg Total: 9
East Entering: 6
East Peds: 0
Peds Cross: ⋈

CR 30

Cars	Trucks	Cyclists	Totals
0	1	0	1
0	5	0	5
0	6	0	

N
W E
S

Pit Access

Cars	Trucks	Cyclists	Totals
0	3	0	3

CR 30

Cars	204
Trucks	17
Cyclists	0
Totals	221

Cars	206	0	206
Trucks	14	2	16
Cyclists	0	0	0
Totals	220	2	

Peds Cross: ⋈
South Peds: 0
South Entering: 222
South Leg Total: 443

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 12:30:00
To: 19:00:00

One Hour Peak
From: 15:30:00
To: 16:30:00

Municipality: Codrington
Site #: 1832700001
Intersection: CR 30 & Pit Access
TFR File #: 1
Count date: 26-Sep-18

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: CR 30 runs N/S

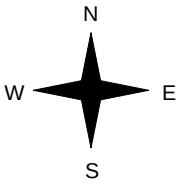
North Leg Total: 472
North Entering: 271
North Peds: 0
Peds Cross: ⋈

Cyclists	0	0	0
Trucks	16	1	17
Cars	254	0	254
Totals	270	1	

Cyclists	0
Trucks	15
Cars	186
Totals	201

East Leg Total: 15
East Entering: 7
East Peds: 0
Peds Cross: ⋈

Cars	Trucks	Cyclists	Totals
0	1	0	1
0	6	0	6
0	7	0	



Pit Access

Cars	Trucks	Cyclists	Totals
0	8	0	8

Cars	254
Trucks	22
Cyclists	0
Totals	276

Cars	186	0	186
Trucks	14	7	21
Cyclists	0	0	0
Totals	200	7	

Peds Cross: ⋈
South Peds: 0
South Entering: 207
South Leg Total: 483

Comments

APPENDIX B

Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	3	206	18	2	216
Future Volume (Veh/h)	21	3	206	18	2	216
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	23	3	222	19	2	232
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	458	222			241	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	458	222			241	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	94	100			100	
cM capacity (veh/h)	416	624			914	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	26	222	19	234
Volume Left	23	0	0	2
Volume Right	3	0	19	0
cSH	432	1700	1700	914
Volume to Capacity	0.06	0.13	0.01	0.00
Queue Length 95th (m)	1.5	0.0	0.0	0.0
Control Delay (s)	13.9	0.0	0.0	0.1
Lane LOS	B			A
Approach Delay (s)	13.9	0.0		0.1
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	6	200	16	4	270
Future Volume (Veh/h)	21	6	200	16	4	270
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	23	6	215	17	4	290
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	513	215			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513	215			232	
tC, single (s)	7.4	7.2			5.1	
tC, 2 stage (s)						
tF (s)	4.4	4.2			3.1	
p0 queue free %	94	99			100	
cM capacity (veh/h)	382	630			922	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	29	215	17	294
Volume Left	23	0	0	4
Volume Right	6	0	17	0
cSH	416	1700	1700	922
Volume to Capacity	0.07	0.13	0.01	0.00
Queue Length 95th (m)	1.7	0.0	0.0	0.1
Control Delay (s)	14.3	0.0	0.0	0.2
Lane LOS	B			A
Approach Delay (s)	14.3	0.0		0.2
Approach LOS	B			

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		