Marathon Palladium Project Environmental Transportation Updated Baseline Report

FINAL

November 13, 2020
File: 129673006

Prepared for:

Generation PGM Inc. (GenPGM)

Prepared by:

Stantec Consulting Ltd.

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LIST OF APPENDICES

Abbreviations

CEAA, 2012	*Canadian Environmental Assessment Act*
CIAR	Canadian Impact Assessment Registry
Cu	copper
EA Act	*Environmental Assessment Act*
EIS	environmental impact statement
Fe	iron
GenPGM	Generation PGM Inc.
MRSA	Mine Rock Storage Area
MTO	Ministry of Transportation of Ontario
NAG	non-acid generating
PAG	potentially acid generating
PGM	platinum group metals
PSMF	Process Solids Management Facility
the “Project”	Marathon Palladium Project
TIS	Traffic Impact Study (Marathon PGM – Cu Project Traffic Impact Study)
VEC	Valued Ecosystem Components

1.0 INTRODUCTION

Generation PGM Inc. (GenPGM) proposes to develop the Marathon Palladium Project (the "Project"), which is a platinum group metals (PGM), copper (Cu) open-pit mine and milling operation near the Town of Marathon, Ontario. The Project is being assessed in accordance with the *Canadian Environmental Assessment Act* (CEAA, 2012) and Ontario's *Environmental Assessment Act* (EA Act) through a Joint Review Panel (the Panel) pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (2004).

Stantec Consulting Ltd. (Stantec) has been retained by GenPGM to conduct an updated assessment of transportation baseline conditions for the Project. This report provides an update to the baseline conditions as described in the information currently on the record, including:

- Supplemental Information Document #10: Marathon PGM – Cu Project Traffic Impact Study prepared by Engineering Northwest Ltd. Consulting Engineers (July 2012) (CIAR #227)

This transportation baseline study has been completed to inform the Addendum to the Marathon PGM-Cu Environmental Impact Statement (EIS Addendum) as input to the Joint Review Panel process. It has been prepared pursuant to the *Canadian Environmental Assessment Act, 2012* and in consideration of the *Guidelines for the Preparation of an Environmental Impact Statement – Marathon Platinum Group Metals and Copper Mine Project* (EIS Guidelines) (Canadian Environmental Assessment Agency and Ontario Ministry of the Environment (MOE), 2011).

The information presented in this report is intended to summarize and document changes to the existing environmental conditions relating to traffic operations and impacts to the Trans-Canada Highway (Highway 17) relative to those conditions considered in the previous assessment, in order to support the updated assessment of potential environmental effects provided in the EIS Addendum.

The information presented herein was obtained from a review of historical information and the updated design plans for the Project provided by GenPGM.

1.1 PROJECT LOCATION

The Project is located approximately 10 kilometres (km) north of the Town of Marathon, Ontario (Figure 1, Appendix A). Marathon is a community of approximately 3,300 people (Statistics Canada, 2017) located adjacent to the Trans-Canada Highway (Highway 17) on the northeast shore of Lake Superior approximately 300 km east of Thunder Bay and 400 km northwest of Sault Ste. Marie. The centre of the Project footprint sits at approximately 48° 47' N latitude, 86° 19' W longitude (UTM NAD83 N16 Easting 550197 and Northing 5403595). The footprint of the proposed mine location is roughly bounded by Highway 17 and the Marathon Airport to the south, the Pic River and Camp 19 Road to the east, Hare Lake to the west, and Bamoos Lake to the north (Figure 1, Appendix A). Access is currently gained through Camp 19 Road.

The Project is proposed within an area characterized by relatively dense vegetation, comprised largely of a birch and spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east-west oriented valleys. Several watercourses and lakes traverse the area, with drainage flowing either eastward to the Pic River or westward to Lake Superior. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

The Project is proposed on Crown Land, with GenPGM holding surface and mineral rights for the area. Regional land-use activities in the area include hunting, fishing, trapping and snowmobiling, as well as mineral exploration (and mining) and forestry. Other localized land uses in the area include several licensed aggregate pits, the Marathon Municipal Airport, the Marathon Landfill, a municipal works yard and several commercial and residential properties.

The primary industries in the area have historically been forestry, pulp and paper, mining and tourism. Exploration for copper and nickel deposits in the area extend as far back as the 1920s. A large copper-PGM deposit was discovered in 1963. Advanced exploration programs have continued across the site since then. These programs have been supported by various feasibility studies to confirm the economic viability of extracting the deposits.

Several First Nation and Métis groups were originally identified as having a potential interest in the Project based on Treaty Rights, asserted traditional territory, and proximity to the Project. Traditional uses which they have identified as occurring in the area include hunting, trapping, fishing and plant harvesting, with activities generally focused on the larger waterways, such as the Pic River, Bamoos Lake and Hare Lake.

1.2 PROJECT OVERVIEW

The Project is based on the development of an open pit mining and milling operation for copper and platinum group metals. Ore will be mined from the pits and processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via existing roadways and/or rail to a smelter and refinery for subsequent metal extraction and separation. An iron sulfide concentrate may also be produced, depending upon the results of further metallurgical testing and market conditions at that time.

The construction workforce will average approximately 450-550 people, with a peak workforce of an estimated 900 people, and will be required for between 18 and 24 months. During operations, the workforce will comprise an estimated 350 workers. The mine workforce will reside in local and surrounding communities, as well as in an accommodations complex that will be constructed off-site.

Most of the mine rock[1] produced through mining activities is non-acid generating (NAG) and will be permanently stored in a purposefully built Mine Rock Storage Area (MRSA). The NAG (also referred to as

[1] Mine rock: rock that has been excavated from active mining areas but does not have sufficient ore grades to process for mineral extraction.

Type 1 mine rock) will also be used in the construction of access roads, dams and other site infrastructure, as needed. Drainage from the MRSA will be collected in a series of collection basins and treated, as necessary, to meet applicable water quality criteria prior to discharge to the Pic River. The remaining small portion of the mine rock is considered to be potentially acid generating (PAG) (also referred to as Type 2 mine rock) and will be stored in the open pits or the Process Solids Management Facility (PSMF). This will ensure that drainage from the Type 2 mine rock will be contained during operations. Following closure, the Type 2 mine rock will be permanently stored below water by flooding the open pits and maintaining saturated conditions in the PSMF to prevent acid generation in the future.

Most of the process solids[2] produced at the site will be NAG (Type 1 process solids) with the minority being PAG (Type 2 process solids). Both the Type 1 and Type 2 process solids will be stored in the PSMF and potentially within the open pits. In both cases, the Type 2 process solids will be managed to prevent acid generation during both the operation and closure phases of the Project. Water collected within the PSMF as well as water collected around the mine site (other than the MRSA), such as water pumped from the pits or run-off collected from the plant site, will be managed within the PSMF. Excess water not needed for processing ore will be discharged, following treatment as necessary, to Hare Lake.

Access to the Project is currently provided by the Camp 19 Road, opposite Peninsula Road at Highway 17. The existing road will be upgraded and utilized from its junction with Highway 17 to a new road running north that will be constructed to access the Project site. The Project will also require the construction of a 115 kV transmission line that will connect to the Terrace Bay-Manitouwadge transmission line (M2W Line). The width of the transmission corridor will be approximately 30 m.

Disturbed areas of the Project footprint will be reclaimed in a progressive manner during all Project phases. Natural drainage patterns will be restored as much as possible. The ultimate goal of mine decommissioning will be to reclaim land within the Project footprint to permit future use by resident biota and as determined through consultation with the public, Indigenous people and government. A certified Closure Plan for the Project will be prepared as required by Ontario Regulation (O. Reg.) 240/00 as amended by O. Reg. 194/06 “Mine Development and Closure under Part VII of the Mining Act” and “Mine Rehabilitation Code of Ontario”.

A further description of the Project and associated activities and phases will be provided under separate cover in the EIS Addendum.

1.3 STUDY OBJECTIVES

This updated transportation baseline study provides information to inform the EIS Addendum for the Project. The objectives of this update were to describe and present available information and characterize changes to the baseline conditions of traffic volumes and the configuration of the intersection of

[2] Process solids: solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

Highway 17 and Peninsula Road/Camp 19 Road intersection. The scope of the updated transportation baseline study includes the following:

- summary of findings of the existing baseline studies (Section 2.0)
- confirmation of spatial boundaries (Section 3.0)
- description of the data collection methods and a review of available background information and data, including any additional and/or on-going data collection efforts (Section 4.0)
- analysis of baseline traffic volumes and Highway 17 & Peninsula Road/Camp 19 Road intersection conditions to determine any changes that have occurred since 2012 (Section 5.0)
- provide an updated summary of baseline conditions in the Site Study Area (SSA), Local Study Area (LSA) and Regional Study Area (RSA) specific to conditions relevant to the effects being assessed in the EIS Addendum (Section 6.0)

2.0 PREVIOUS CHARACTERIZATION OF EXISTING CONDITIONS

The Marathon PGM–Cu Project Traffic Impact Study (TIS) prepared by Engineering Northwest Ltd. Consulting Engineers (July 2012) report summarized the existing conditions of the site and area as they relate to how the Marathon PGM–Cu Project would affect the operations on Highway 17.

2.1 TRAFFIC VOLUMES

The traffic volumes utilized in the initial TIS incorporated site-recorded intersection traffic counts as well as information provided by the Ministry of Transportation Ontario (MTO); this information was modelled to analyze the intersection operations in 2015 and 2025. A background growth of 0.5% per annum was provided by the MTO to be used in the modelling.

2.2 GEOMETRIC CONDITIONS

The existing conditions of the intersection are thoroughly documented in the TIS. The Camp 19 Road approach to the intersection was under stop control and consisted of a simple open throat design with no tapers or additional turning lanes. The intersection was fully paved, and Camp 19 Road was paved northward for approximately 100 m. The sight distance requirements were deemed to have been met for the intersection.

3.0 STUDY AREA

For the purposes of this assessment, the spatial boundaries are considered to include the direct and indirect effects related to site preparation, construction, operation, and decommissioning/closure of the Project. These areas are generally consistent with the spatial boundaries used in the EIS (2012) and associated supporting information documents, with appropriate revisions/refinements and rationale provided below.

3.1 SITE STUDY AREA (SSA)

The Site Study Area (SSA) is the direct footprint of the Project. Based on refinements to the Project footprint, and in recognition of project components originally located outside of the SSA, a revised SSA has been developed that encompasses the immediate area in which Project activities and components may occur and, as such, represents the area within which direct physical disturbance may occur as a result of the Project, whether temporary or permanent. The SSA is consistent for all Valued Ecosystem Components (VECs) as depicted on Figure 1.

3.2 LOCAL STUDY AREA (LSA)

The Local Study Area (LSA) is the maximum area within which environmental effects from Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. It consists of the SSA and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgment.

The LSA used in this baseline report is consistent with the LSA used in the original EIS and the Marathon Project – Traffic Impact Study prepared by Engineering Northwest Ltd. Consulting Engineers (July 2012) (Supporting Information Document 10).

3.3 REGIONAL STUDY AREA (RSA)

The Regional Study Area (RSA) is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present, and future (i.e., certain or reasonably foreseeable) physical activities. The RSA is based on the potential for interactions between the Project and other existing or future potential projects.

The RSA used in this baseline report is consistent with the RSA used in the original EIS and the Marathon Project – Traffic Impact Study prepared by Engineering Northwest Ltd. Consulting Engineers (July 2012) (Supporting Information Document 10).

4.0 METHODOLOGY

The baseline report update was made using the original information presented in the Marathon PGM–Cu Project Traffic Impact Study completed by Engineering Northwest Ltd. Consulting Engineers (July 2012). The information within the TIS was acquired through consultation with the MTO, and supplemental field reviews of the existing conditions and intersection traffic volumes.

A request for information to update the original information was made to the MTO, but no additional information was provided at the time of writing of this report. Instead, the report's baseline information was supplemented using available online resources, including the MTO's online traffic volume database and Google Streetview, and additional traffic modelling using the SYNCHRO program.

4.1 DESKTOP REVIEW AND DATA SOURCES

Following the review of the original TIS report, the assumptions made within the TIS with respect to the anticipated traffic volumes were reviewed.

The original site Development Stages were reviewed for traffic type, traffic volume, and traffic origin/destination. These four stages include:

1. Phase 1 – Site Preparation
2. Phase 2 – Construction
3. Phase 3 – Operations
4. Phase 4 – Decommissioning and Closure

It was confirmed that the assumed traffic type, volume, and distribution were still valid and applicable to the updated baseline condition. In addition, the timelines for each of the above phases was confirmed to remain. The background information regarding the area developments was also reviewed and the assumptions made in the TIS were found to still be applicable relative to the anticipated traffic volumes in the area.

The geometric layout of the Highway 17 and Peninsula Road/Camp 19 Road intersection was reviewed relative to the report, current design standards, and compared to the available data on Streetview. The MTO has undertaken pavement rehabilitation work on Highway 17 since the 2012 TIS was completed, though the intersection configuration remained the same. Comparing the recommended intersection improvements in the TIS to the current MTO standards, it was confirmed that the entrance standard CSAS-23 remains applicable.

4.2 MODELLING

In the absence of updated information provided by MTO or updated traffic counts (which were not considered appropriate in 2020 due to the expected impact on traffic volumes as a result of the COVID-19 pandemic), the future traffic volumes at the Highway 17 and Peninsula Road/Camp 19 Road intersection noted in the report were projected and analyzed using SYNCHRO software, in accordance with MTO standard practices. using SYNCHRO software, in accordance with MTO standard practices.

The TIS incorporated a 0.5% growth rate per annum to the 2010 traffic volumes, as agreed to by MTO. In the absence of updated MTO information, Stantec undertook additional modelling to investigate if further impacts to the TIS recommendations would result from traffic growth through to 2040. The horizon year of 2040 was chosen based on establishing a timeline of 15 years from a 2025 project initiation to cover the future four phases of the mine.

It was felt that a conservative approach to projecting the 2040 traffic volumes would be professionally responsible to help account for potential changes in the area in future years, and to minimize risks associated with anticipating the required intersection improvements. In addition, the same conservative growth rate was applied to the anticipated traffic volumes generated by the mine site itself for continuity. It is noted that per the 2016 census, the population of Marathon fell by 2% over the prior census in 2011.

The results of the modelling indicate that although a very conservative approach was taken in terms of traffic growth, the intersection delays varied only slightly and that the intersection will continue to operate as anticipated and well within acceptable levels of service. Details of the conservative analysis can be found in Appendix B.

5.0 UPDATED BASELINE TRANSPORTATION CONDITIONS

Most of the assumptions and analysis outlined within the transportation baseline report remain applicable. The following items summarize the changes to the baseline conditions related to the transportation component of the study.

5.1 TRAFFIC VOLUMES

The baseline traffic volumes utilized within the original TIS will require updating, and a new analysis will be required by MTO. A review of the traffic volumes was undertaken to confirm that by using a conservative approach to the estimation of the traffic growth, no additional improvements (i.e. turning lanes, signalization) would be warranted beyond the recommendations outlined in the TIS.

5.2 GEOMETRIC CONDITIONS

It was observed that the geometric configuration of the Camp 19 Road intersection itself has not changed since the time of the TIS; therefore, the recommendations outlined in the TIS would be considered valid. This also confirms that the sightline measurements undertaken in the TIS are still being met with the proposed improvements. The only change in condition is that Camp 19 Road is now paved farther north than the previous 100 m limit.

6.0 SUMMARY AND CONCLUSIONS

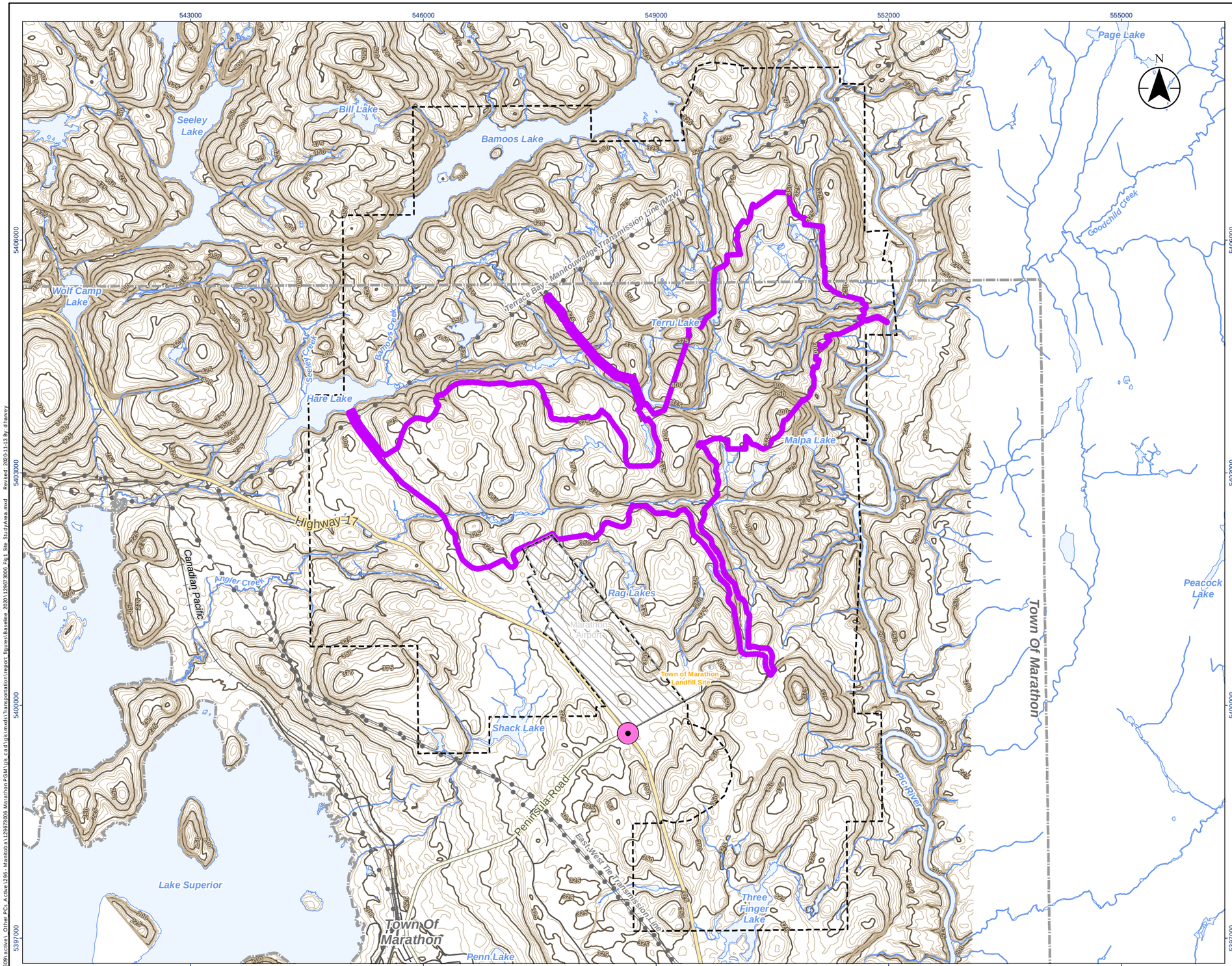
Through the conservative extrapolation of the traffic volumes, the conditions documented and assessed as part of the TIS are anticipated to remain valid moving forward, with minimal impacts to the projected intersection level of service. It remains recommended that no major intersection improvements will be required to accommodate the proposed mine development. Some upgrades were made to the Camp 19 Road intersection between 2012 and 2013, including many of the upgrades recommended in the TIS; however an 85 m taper should be included to meet an MTO CSAS-23 (Truck Access) standard. Aerial photography does not suggest that construction of a taper was completed as part of the 2012-2013 Highway 17 improvements.

7.0 REFERENCES

Statistics Canada. 2017. Marathon, Town [Census subdivision], Ontario, Ontario (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed September 8, 2020)

Technical Publications. Ministry of Transportation of Ontario. Traffic Volumes 1998-2016. https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx

APPENDIX A
Figure



Stantec

Legend

- Project Boundary (MLAS, MENDM Changed 2017)
- Site Study Area Boundary
- Intersection of Hwy 17 and Peninsula Road / Camp 19 Road
- Topographic Contour (5 m Intervals)
- Topographic Contour (25 m Intervals)
- Highway
- Major Road
- Minor Road
- Hydro Line
- Railway
- Watercourse
- Airport
- Municipal Boundary, Lower Tier
- Waterbody

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

Project Location
Marathon

129673006 REVA
Prepared by DH on 2020-11-13
Technical Review by DH on 2020-09-21

Client/Project
GENERATION PGM INC.
MARATHON PALLADIUM PROJECT

Figure No.
1

Title
Site Study Area

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APPENDIX B
Modelling Outputs

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	71	38	14	71	6	13	8	21	12	22	20
Future Vol, veh/h	27	71	38	14	71	6	13	8	21	12	22	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	90	48	18	90	8	16	10	26	15	28	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	162	126	-	171	138	23	53	0	0	36	0	0
Stage 1	58	58	-	55	55	-	-	-	-	-	-	-
Stage 2	104	68	-	116	83	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	-	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	803	764	0	792	753	1054	1553	-	-	1575	-	-
Stage 1	954	847	0	957	849	-	-	-	-	-	-	-
Stage 2	902	838	0	889	826	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	712	749	-	709	738	1054	1553	-	-	1575	-	-
Mov Cap-2 Maneuver	712	749	-	709	738	-	-	-	-	-	-	-
Stage 1	944	839	-	947	841	-	-	-	-	-	-	-
Stage 2	792	830	-	786	818	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	10.7	2.3	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1553	-	-	738	-	748	1575	-	-
HCM Lane V/C Ratio	0.011	-	-	0.167	-	0.153	0.01	-	-
HCM Control Delay (s)	7.3	-	-	10.9	0	10.7	7.3	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	-	0.5	0	-	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	71	32	21	73	12	51	38	14	6	24	28
Future Vol, veh/h	26	71	32	21	73	12	51	38	14	6	24	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	90	40	26	92	15	64	48	18	8	30	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	285	240	-	294	266	57	65	0	0	66	0	0
Stage 1	46	46	-	185	185	-	-	-	-	-	-	-
Stage 2	239	194	-	109	81	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	-	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	667	661	0	658	640	1009	1537	-	-	1536	-	-
Stage 1	968	857	0	817	747	-	-	-	-	-	-	-
Stage 2	764	740	0	896	828	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	561	630	-	566	610	1009	1537	-	-	1536	-	-
Mov Cap-2 Maneuver	561	630	-	566	610	-	-	-	-	-	-	-
Stage 1	927	853	-	783	716	-	-	-	-	-	-	-
Stage 2	628	709	-	798	824	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	12.3	3.7	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1537	-	-	610	-	628	1536	-	-
HCM Lane V/C Ratio	0.042	-	-	0.2	-	0.213	0.005	-	-
HCM Control Delay (s)	7.4	-	-	12.4	0	12.3	7.4	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	-	0.8	0	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	21	36	1	2	0	19	14	3	1	27	13
Future Vol, veh/h	31	21	36	1	2	0	19	14	3	1	27	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	39	26	45	1	3	0	24	18	4	1	34	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	106	106	-	125	120	20	50	0	0	22	0	0
Stage 1	36	36	-	68	68	-	-	-	-	-	-	-
Stage 2	70	70	-	57	52	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	-	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	873	784	0	849	770	1058	1557	-	-	1593	-	-
Stage 1	980	865	0	942	838	-	-	-	-	-	-	-
Stage 2	940	837	0	955	852	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	860	771	-	817	758	1058	1557	-	-	1593	-	-
Mov Cap-2 Maneuver	860	771	-	817	758	-	-	-	-	-	-	-
Stage 1	965	864	-	928	825	-	-	-	-	-	-	-
Stage 2	923	824	-	925	851	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	9.7	3.9	0.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1557	-	-	822	-	777	1593	-	-
HCM Lane V/C Ratio	0.015	-	-	0.08	-	0.005	0.001	-	-
HCM Control Delay (s)	7.3	-	-	9.8	0	9.7	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	-	0	0	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	5	51	2	26	1	147	57	2	0	49	46
Future Vol, veh/h	50	5	51	2	26	1	147	57	2	0	49	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Free	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	0	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	6	64	3	33	1	185	72	3	0	62	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	523	507	-	538	564	74	120	0	0	75	0	0
Stage 1	62	62	-	444	444	-	-	-	-	-	-	-
Stage 2	461	445	-	94	120	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	-	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	465	468	0	454	435	988	1468	-	-	1524	-	-
Stage 1	949	843	0	593	575	-	-	-	-	-	-	-
Stage 2	581	575	0	913	796	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	392	409	-	405	380	988	1468	-	-	1524	-	-
Mov Cap-2 Maneuver	392	409	-	405	380	-	-	-	-	-	-	-
Stage 1	829	843	-	518	503	-	-	-	-	-	-	-
Stage 2	474	503	-	906	796	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.1	15.2	5.6	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1468	-	-	393	-	390	1524	-	-
HCM Lane V/C Ratio	0.126	-	-	0.176	-	0.094	-	-	-
HCM Control Delay (s)	7.8	-	-	16.1	0	15.2	0	-	-
HCM Lane LOS	A	-	-	C	A	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.6	-	0.3	0	-	-