Feasibility Study

Marathon Palladium & Copper Project
Ontario, Canada

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Feasibility Study – Marathon Palladium & Copper Project

Revision #

Ontario, Canada

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1. SUMMARY

1.1 Introduction

The Technical Report for the Marathon Palladium-Copper project (the "Marathon Project" or "Project") located just outside the Town of Marathon on the shores of Lake Superior in Ontario, Canada was prepared by G Mining Services Inc. ("GMS") along with contributions from Ausenco Engineering Canada Inc. ("Ausenco"), Knight Piésold Ltd. ("KP") and P&E Mining Consultants Inc. ("P&E").

Generation Mining Limited (the "Company or "Gen Mining") currently owns an 80% interest in the Marathon Project, with the remaining 20% interest owned by Stillwater Canada Inc. ("Stillwater Canada"), a subsidiary of Sibanye Stillwater Limited ("Sibanye-Stillwater"). The Project is managed and operated by Gen Mining's 100%-owned subsidiary Generation PGM Inc. ("Gen PGM"). In this document, Gen PGM and Gen Mining will be used interchangeably for simplicity.

The Technical Report summarizes the results of the feasibility study ("FS") for the Marathon Project, outlining the development of an open pit mine, processing facilities and related infrastructures. This report also presents an updated Mineral Resource and Mineral Reserves Estimates for the Marathon Property (the "Marathon Property" or "Property").

This Technical Report was prepared pursuant to the requirements of Canadian National Instrument 43-101 ("NI 43-101"). The reported Mineral Resource and Mineral Reserves Estimates in this Technical Report were prepared in accordance with the guidelines of the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Standards (2014) on Mineral Resources and Reserves, Definitions and Guidelines (2019.

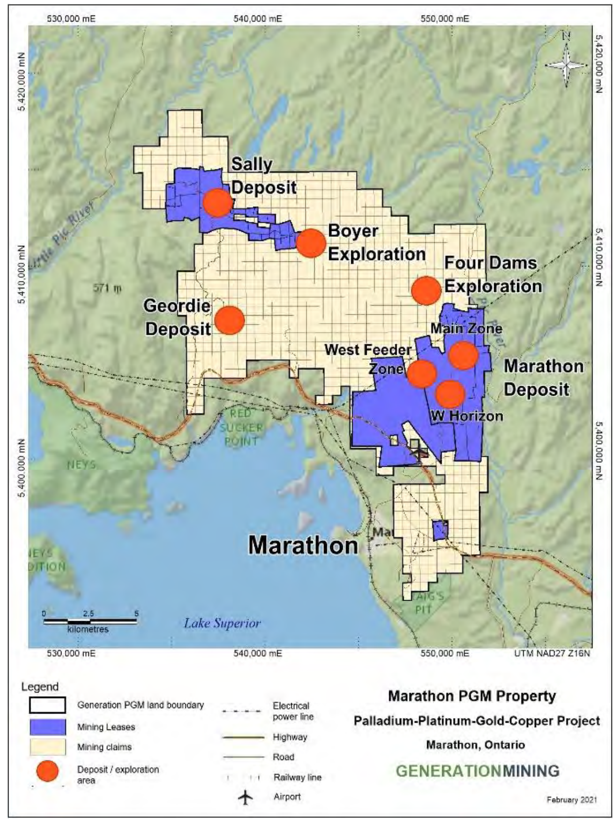
All dollar amounts are in Canadian dollars and stated on a 100% project ownership basis unless otherwise noted.

1.2 Property Location

The Marathon Project is located approximately 10 km north of the Town of Marathon, Ontario, adjacent to the Trans-Canada Highway No. 17 on the northeast shore of Lake Superior (Figure 1.1) Thunder Bay, a major industrial city in the area with a population of 100,000 people is located approximately 300 km westward along Highway 17. Marathon has a population of approximately 3,100 (2016 Census, Statistics Canada). Property access is by a gravel road from highway 17 (Figure 1.2), which lies just north of Marathon and immediately south of the Property.

Figure 1.1: Regional Location

Figure 1.2: Local Property Map



1.3 Land Tenure

The Property consists of a total of 21,965 ha, including 46 leases and 980 claim cells.

The Property is subject to Net Smelter Return ("NSR") royalties ranging from 1 to 4% (details described in Section 4). The top northern extent of the Marathon Deposit (the "Marathon Deposit") (specifically on the North pit) is subject to an NSR royalty of 4%.

The joint venture agreement between Gen Mining and Stillwater Canada outlines specific mechanisms for Stillwater Canada to buyback into the Project. The general terms of the buy-back are as follows: Following the completion of a FS, and the Joint Venture Management Committee making a positive commercial production decision, as long as Stillwater Canada has a minimum 20% interest in the Property, then Stillwater Canada will have 90 days to exercise an option to increase its participating interest in the joint venture from its current percentage to 51% (the "Percentage Differential") by agreeing to fund an amount of the total capital costs, as estimated in the FS multiplied by the Percentage Differential, in addition to its pro-rata proportion of costs that it would fund at its current participating interest level. Should this option be exercised, Stillwater Canada would also take over operatorship of the Project at such time.

1.4 Property Description

Access to the Property is directly off the Trans-Canada Highway No. 17 and is accessible via gravel road. The Property is characterized by moderate to steep hilly terrain with a series of interconnected creeks and lakes surrounded by dense vegetation. Outcrops are common on the Property and overburden ranges from 3 to 10 m in thickness. The general elevation around the mine site is slightly higher than the overall regional topography. Ground surface elevations in the area of the proposed site range from approximately 260 to over 400 masl with a gradual decrease in elevation from north to south.

The vegetation consists of northern hardwood and conifer trees as well as areas with muskeg, which are bogs or wetlands common to boreal forest regions. The Project area is bounded to the east by the Pic River and Lake Superior to the south and west.

The climate is typical of the northern Canadian Shield with long winters and short, warm summers. Average annual precipitation in the area of Marathon was 826 mm for the period 1952-1983, of which 240 mm fell as snow. Average annual surface runoff is approximately 390 mm. The annual average temperature is 1°C with the highest average monthly temperature of 15°C in August and lowest in January of -15°C (Environment Canada).

Electrical power and telephone communication are present at the Property and in the Town of Marathon, which is linked to the Ontario power grid. Additionally, work has commenced on the East-West Tie transmission project which is a 450 km double-circuit 230 kV transmission line connecting the Lakehead Transfer Station in the Municipality of Shuniah near the city of Thunder Bay to the Wawa Transfer Station located east of the Municipality of Wawa. It will also connect to the Marathon Transformer Station. It is anticipated that the East-West Tie transmission line project will be completed prior to the intended start of production of the Marathon Project.

The Marathon airport is located immediately north of the Town of Marathon and runs adjacent to Highway 17 near the southwest corner of the Property.

1.5 History

The Marathon Property was explored by various companies over the past 60+ years, and during this time, a total of 199,343 m of drilling was completed, with the majority of drilling delineating the Marathon Deposit.

Most of the drilling (617 holes and 113,030 m) was completed by Marathon PGM Corp. between 2004 and 2009 to expand the Mineral Resource and for condemnation holes outside of the proposed open pit area.

A FS was published in 2008 and updated in January 2010 by Micon / Met-Chem titled “Technical Report on the Updated Mineral Resource Estimate and Updated Feasibility Study for the Marathon PGM-Cu Project” dated January 8, 2010. The Micon FS completed on the Project demonstrated the potential to generate strong cash flow under appropriate metal price assumptions of US$2.91/lb Cu, US$1,346.65/oz Pt, US$321.44/oz Pd, US$819.22/oz Au, US$14.10/oz Ag, and an exchange rate of C/US = 1.099. The base case results showed that the Project generated an IRR of 21.2% before-tax and 17.4% after-tax. The undiscounted payback period was 4.4 years, and the discounted cash flow was positive after 6 years. The NPV at a 6% discount rate was $250.7 million after tax. Micon recommended that Marathon PGM Corp. proceed with the development of the Project.

Marathon PGM Corp. was acquired by Stillwater Mining Company (“Stillwater”) on December 1, 2010. Stillwater subsequently formed a Canadian corporation, Stillwater Canada Inc. (Stillwater Canada). From 2011 to 2017, Stillwater Canada developed trail access and conducted a systematic approach to prospecting, geological mapping, trenching, geophysics and diamond drilling. Stillwater Canada also re-logged over 150 drill holes. A total of 45 holes were drilled and 9,767 m of core was recovered from the holes. In 2017, SWC was acquired for US$2.2 billion by Sibanye Gold Limited and renamed Sibanye-Stillwater (NYSE: SBSW).

On July 11, 2019, Gen Mining (through its wholly-owned subsidiary) had completed the acquisition of a 51% initial interest in the Property, from Stillwater Canada, a wholly owned subsidiary of Sibanye Gold Limited, and entered into a joint venture agreement with respect to the Property.

Following the acquisition of the Project, Gen Mining retained P&E to complete an updated Mineral Resource Estimate and Preliminary Economic Assessment (“PEA”) on the Marathon Project. The NI 43-101 Technical Report - Updated Mineral Resource Estimate and Preliminary Economic Assessment of the Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada (effective date of January 6, 2020) was filed in February 2020. An amended Technical Report was filed in July 2020, which contained no material amendments to the original Technical Report filed in February 2020.

On November 30, 2020, Gen Mining announced that it had completed all the requirements under the joint venture agreement to increase its interest in the Property and Joint Venture to 80%.

No previous mining activity has taken place on the Property.

1.6 Geological Setting and Mineralization

The Marathon Property is situated along the eastern margin of the Proterozoic Coldwell Complex (“CC”), which is part of the Keweenawan Supergroup of igneous, volcanic and sedimentary rocks (Figure 1.3).

The Marathon Deposit is hosted by the Two Duck Lake Gabbro (“TDL Gabbro”), a late intrusive phase of the Eastern Gabbro (Figure 1.4). The Eastern Gabbro is a composite intrusion and occurs along the northern and eastern margin of the CC, which intrudes the much older Archean Schreiber-Hemlo Greenstone Belt. The entire CC is believed to have intruded over a relatively short period of time between 1108 and 1094 Ma.

The Marathon Deposit consists of several large, thick and continuous zones of disseminated sulphide mineralization hosted within the TDL Gabbro. The mineralized zones occur as shallow dipping sub-parallel lenses that follow the basal gabbro contact and are labeled as footwall, main, hanging wall zones and the W-Horizon. The Main Zone is the thickest and most continuous zone. For 516 drill hole intersections with mineralized intervals greater than 4 m thick, the average thickness is 35 m and the maximum is 183 m.

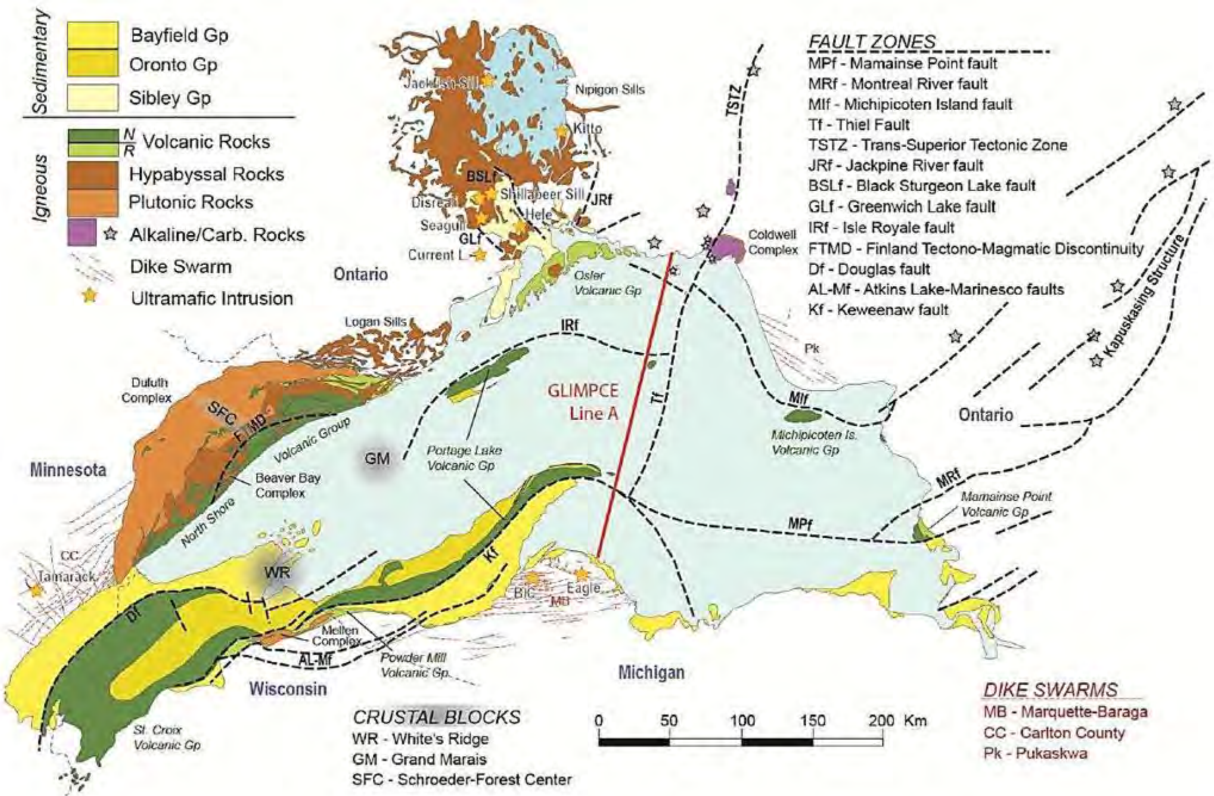
Sulphides in the TDL Gabbro consist predominantly of chalcopyrite, pyrrhotite and minor amounts of bornite, pentlandite, cobaltite and pyrite. The proportions of sulphide minerals as determined in a QEMSCAN survey of a bulk sample are 2.75% pyrrhotite, 0.79% copper-iron (“Cu-Fe”) sulphides (chalcopyrite and bornite), 0.09% pentlandite and trace amounts of pyrite, galena and sphalerite.

The relative proportions of pyrrhotite and chalcopyrite vary significantly across the Marathon Deposit; however, in general, the sulphide assemblage changes gradually up section from the base to the top of mineralized zones. Sulphides at the base of the TDL Gabbro consist predominantly of pyrrhotite and minor chalcopyrite but the relative proportion of chalcopyrite increases up section to nearly 100% chalcopyrite near the top. In the W-Horizon, sulphides consist mainly of chalcopyrite and bornite and minor to trace amounts of pentlandite, cobaltite, pyrite and pyrrhotite. In general, the variations in chalcopyrite to pyrrhotite ratio across the deposit, and from bottom to top of the deposit, correlates with variations in the copper/palladium (“Cu/Pd”) ratio, with the highest concentrations of palladium (“Pd”) occurring in samples with Cu-rich sulphide assemblages.

The model that best explains the Marathon Deposit is based on the accumulation of sulphides in basins and troughs of a magma conduit which underwent significant upgrading of Cu and Platinum Group Metals (“PGM”) contents by the process of multistage dissolution grading that was described for similar disseminated mineralization in the Noril'sk region, Russia by Kerr and Leitch (2005).

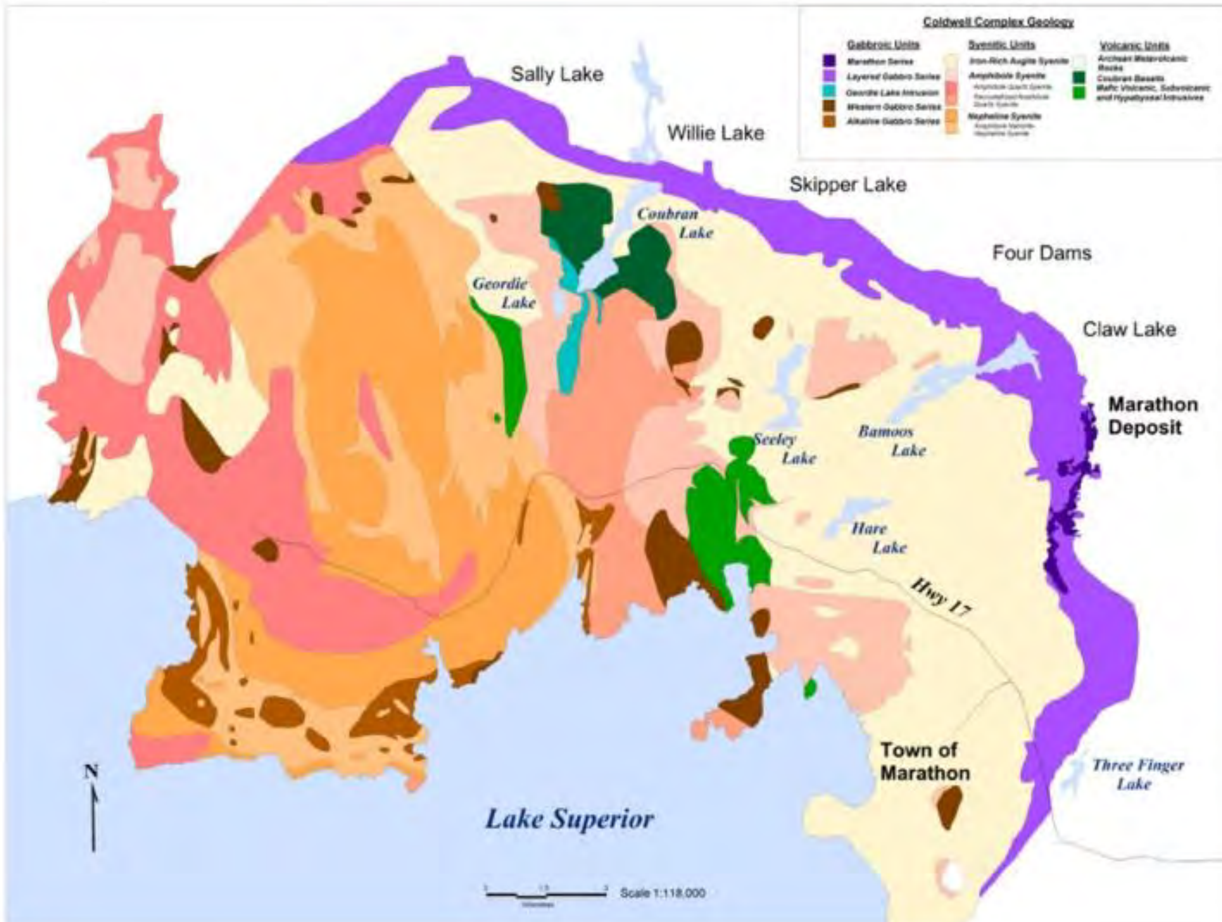
In addition to the Marathon Deposit, the Property hosts other PGM deposits / mineralization in four additional areas – Geordie, Sally, Boyer and Four Dams.

Figure 1.3: Regional Structural Geology



__Source__: Miller and Nicholson, 2013

Figure 1.4: Coldwell Complex (CC) Geology



***Source**: Modified after Walker et al. (1993)*

1.7 Deposit Types

The Marathon Deposit is one of several mafic to ultramafic intrusive bodies in the Mid-continent Rift System ("MRS") that host significant copper, nickel or PGM sulphide mineralization. These intrusions include the Yellow Dog peridotite (Eagle Deposit), the Tamarack Deposit, the Current Lake Intrusive Complex (Thunder Bay North Deposit), and the numerous intrusions located along the base of the Duluth Complex.

The intrusion and deposition of sulphides within magma conduits has recently been accepted as the dominant mineralization process chosen to explain rift related deposits and has been proposed for the Marathon, Thunder Bay North and the Eagle Deposits. The magma conduit model has grown in favour since it was proposed to explain deposits in the Noril'sk region and the deposits at Voisey's Bay, Newfoundland and Labrador, Canada.

Comparisons between the MRS and the Voisey's Bay and Noril'sk settings point to several similarities that suggest that the MRS is a likely setting for Ni-Cu mineralization. The continental rifting and associated voluminous igneous activity in all three regions formed in response to the rise of a hot plume of mantle material from deep in the Earth, fracturing the overlying continental crust. In the MRS, melting of the plume produced more than 2 million cubic km of mostly basalt lava flows and related intrusions.

1.8 Exploration

In 2018, Stillwater Canada partnered with PACIFIC (a consortium of industry, government and academic partners) completed a production-scale passive seismic survey of the Marathon Deposit which resulted in a 3-D velocity inversion model.

In 2019, exploration work by Gen Mining consisted of geologic mapping and prospecting at the Boyer zone and the northern extension of the Geordie Deposit. Three trenches were completed at Boyer exposing the continuation of mineralization at surface. A passive seismic survey was completed at Sally to help define deep high-density targets for potential drill testing. Borehole EM surveys were completed by Crone Geophysics on diamond drill holes SL-19-72, M-19-536 and M-19-537.

In 2020, to compliment the previous seismic surveys, a magnetotelluric survey was conducted over a portion of the Marathon Deposit and an area immediately west of the Marathon Deposit as well as over the Sally Deposit and the immediate surrounding area.

1.9 Drilling

In 2019, Gen Mining completed a 12,434.5 m exploration drilling program on the Marathon Property. The program tested several high-priority targets along a strike length of more than 25 km.

In 2020, Gen Mining completed 12 holes in 5,068 m. The drilling was focused on the Feeder Zone conduit associated with the Main Marathon Deposit and the northern limb of the W-Horizon. This drilling followed the successful completion, in 2019, of drill holes M-19-537 and M-19-538 which intercepted the down dip continuation of the Main Marathon Deposit for the first time. The 2020 drilling filled a 300 m gap between the historical drilling and the 2019 drilling south of the 5,404,900N fault. Additional targets included the conductive zone west of the Marathon Deposit identified in the 2020 MT survey and the down dip extension of high-grade PGM mineralization in the W-Horizon.

1.10 Sample Preparation, Analysis and Security

The core and trench cut sampling protocol (preparation, analysis and security procedures) instituted and used by past Project operator Marathon PGM Corp. in each of their drilling and other rock sampling programs were identical to those reported in prior NI 43-101 Technical Reports on the Property.

Prior to 2011, all drill core samples were sent for preparation and analysis to Accurassay in Thunder Bay. From 2011 to 2020, all drill core samples were sent for preparation to ALS Minerals in Thunder Bay and subsequent analysis to the ALS Vancouver facility.

Marathon PGM Corp. continued with a robust Quality Assurance/Quality Control ("QA/QC") program that had been implemented by that company in the mid-2000s. The QA/QC program consisted of the insertion of reference materials, field blanks and duplicate pair monitoring. All data from the 2009 and 2011 drill programs were examined by P&E. Drill data prior to 2009 were previously examined by P&E and accepted for use in previous Mineral Resource Estimates.

P&E has reviewed the corresponding laboratory QC data for Gen Mining's 2019 and 2020 drilling programs, including standards, blanks and duplicates, and does not consider that the laboratory QC data indicates issues with data accuracy, contamination or precision.

P&E considers the sampling methods from the current and past drilling programs to be satisfactory. P&E considers the data to be of good quality and acceptable for use in the current Mineral Resource Estimates for the Marathon, Geordie and Sally Deposits.

1.11 Data Verification

The Project was visited by Mr. David Burga, P.Geo. of P&E, an independent Qualified Person ("QP") as defined by NI 43-101 on April 4, 2012 and he collected 10 verification samples from nine holes. The samples were taken by Mr. Burga to AGAT Labs in Mississauga, ON for analysis. Copper, silver and nickel were analyzed using 4-acid digest with AAS finish. Gold, platinum and palladium were analyzed using lead collection fire assay with ICP-OES finish.

A site visit to the Project was undertaken by Mr. Bruce Mackie of Bruce Mackie Geological Consulting Services ("Mackie") on May 4, 2019. As part of the site visit, 12 verification samples from nine diamond drill holes intervals were taken by Mr. Mackie, P.Geo. and submitted to Activation Laboratories Ltd. in Thunder Bay and analyzed for Au, Ag, Pt, Pd and Cu.

For both site visits (Burga and Mackie), drill logs for the sections reviewed were found to be appropriately detailed and present a reasonable representation of geology, alteration mineralization and structure. No discrepancies in the sample tag numbers within the core trays and the intervals quoted in the aforementioned Excel spreadsheets were noted.

Based on the results of the Investigation, Messrs. Burga and Mackie are of the professional opinion that the mineralized drill hole assay results and corresponding drill hole logs reported by Stillwater Canada and Marathon PGM that were the subject of their investigations are verifiable and accurate and portray a reasonable representation of the types of mineralization encountered on the Marathon and Geordie Deposits.

Based on the review from P&E, there is good correlation between the independent verification samples and the original analyses in the Company database.

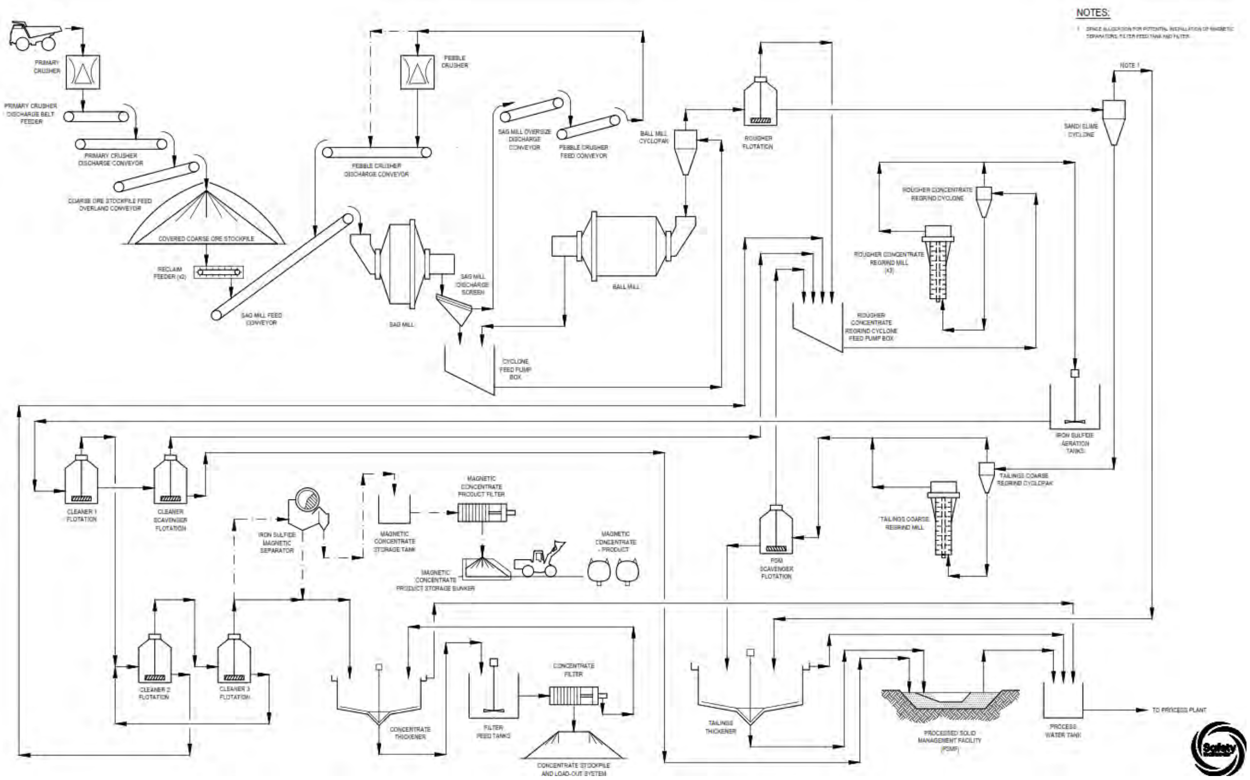
Based upon the evaluation of the Quality Assurance/Quality Control ("QA/QC") program undertaken by the Company, as well as database verification carried out by P&E, it is P&E's opinion that the data is robust and suitable for use in the Mineral Resource Estimates for the Marathon, Geordie and Sally Deposits.

1.12 Mineral Processing and Metallurgical Testing

Metallurgical testing and process flowsheet definition for the Marathon Project dates back to 1960. Historical testing has allowed for a thorough review of concepts and criteria to optimize process plant design and metallurgical performance. Tests included crushing, grinding, as well as batch, cycle and mini-pilot plant-scale flotation testing. The focus of the 2020 metallurgical test work programs was to initially validate then to optimize the process flowsheet and associated criteria with the priority of maximizing palladium and copper recovery. The 2020 metallurgical testing, along with data from historical results, were used to shape and optimize the process flowsheet. The 2020 metallurgical test work (in-lab work) was completed at SGS Canada Inc. ("SGS") in Lakefield, Ontario spanning the period June 2020 to December 2020.

The processing strategy and process flowsheet (Figure 1.5) established from 2020 test programs has defined an improvement over the prior proposed designs with specific improvement on the management and influence of pyrrhotite in the cleaner circuit, improved operability of the circuit, and higher Pd and Cu recovery.

Figure 1.5: Optimized Process Flowsheet (2020)



1.12.1 Metallurgical Recovery

Determination of a predictive GeoMet model for metal recovery to a Cu-PGM concentrate was established as part of the 2020 metallurgical testing programs. Estimated metal recovery used for Project financials, including the PGM-Scavenger flotation circuit, as follows (% Rec Metal = recovery to final concentrate):

% Rec Pd = 88.27 x (Pd head grade $^{Exp(0.0338)}$) to a maximum of 92%

% Rec Pt = 1.22 x (% Rec Pd) - 21.79

% Rec Au = 1.39 x (% Rec Pd) - 48.37

% Rec Cu = 93.0 (constant)

% Rec Ag = 71.5 (constant)

1.12.2 Recovery Methods and Plant Design

The Marathon Project process design is based on the optimized flowsheet as determined by operational considerations and the 2020 metallurgical test programs. The process plant is designed to operate at 9.2 Mt/yr. (25,200 t/d) and produce a marketable Cu-PGM concentrate.

The process plant flowsheet includes a conventional comminution circuit consisting of a SAG mill, pebble crusher followed by a ball mill ("SABC"). The flotation portion of the plant includes rougher flotation, concentrate regrind and three stages of cleaning. After an initial construction phase, the PGM-Scavenger circuit will be installed and will include cyclone classification of rougher tailings to reject the fine fraction and submit coarser fractions to additional regrinding and PGM scavenger flotation. The PGM-Scavenger circuit will provide an incremental recovery improvement (as noted in Subsection 1.12.1). The entire flotation circuit is designed to include the Woodgrove Direct Flotation Reactors ("DFR"). Concentrate thickening, concentrate filtering, tailings thickening, water management, and a Tailings Storage Facility ("TSF" or "PSMF") complete the flowsheet.

1.13 Mineral Resource Estimate

The Mineral Resource Estimate presented herein has been prepared following the guidelines of the Canadian Securities Administrators' NI 43-101 and Form 43-101F1 and in conformity with generally accepted "CIM Estimation of Mineral Resource and Mineral Reserves Best Practices" guidelines (2019).

The Mineral Resource Estimates in Table 1.1 were completed by P&E. P&E is not aware of any known permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource Estimate.

Table 1.1: Pit Constrained Mineral Resource Estimates for the Marathon, Geordie and Sally Deposits [1-8] (Effective date June 30, 2020)

Mineral Resource Classification	Tonnes	Pd		Cu		Au		Pt		Ag	
	k	g/t	k oz	%	M lbs	g/t	k oz	g/t	k oz	g/t	k oz
Marathon Deposit											
Measured	113,793	0.63	2,304	0.20	502	0.07	262	0.21	762	1.49	5,466
Indicated	89,012	0.45	1,296	0.19	373	0.06	182	0.16	449	1.77	5,078
Meas+Ind	**202,806**	**0.55**	**3,599**	**0.20**	**875**	**0.07**	**444**	**0.19**	**1,211**	**1.62**	**10,544**
Inferred	6,931	0.43	95	0.17	26	0.08	17	0.14	32	1.55	345
Geordie Deposit											
Indicated	17,268	0.56	312	0.35	133	0.05	25	0.04	20	2.4	1,351
Inferred	12,899	0.51	212	0.28	80	0.03	14	0.03	12	2.4	982
Sally Deposit											
Indicated	24,801	0.35	278	0.17	93	0.07	56	0.2	160	0.7	567
Inferred	14,019	0.28	124	0.19	57	0.05	24	0.15	70	0.6	280
Total Project											
Measured	113,793	0.63	2,304	0.20	502	0.07	262	0.21	762	1.49	5,466
Indicated	131,081	0.45	1,886	0.21	599	0.06	263	0.15	629	1.66	6,996
Meas+Ind	**244,874**	**0.53**	**4,190**	**0.20**	**1,101**	**0.07**	**525**	**0.18**	**1,391**	**1.58**	**12,462**
Inferred	33,849	0.40	431	0.22	163	0.05	55	0.10	114	1.48	1,607

Notes*:*

1. *Mineral Resources were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions (2014) and Best Practices Guidelines (2019) prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.*
2. *Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, marketing, or other relevant issues.*
3. *The Inferred Mineral Resource in this estimate has a lower level of confidence that that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.*
4. *Mineral Resources are reported within a constraining pit shell at a NSR cut-off value of $13/t.*
5. *NSR (C$/t) = (Ag x 0.48) + (Au x 42.14) + (Cu x 73.27) + (Pd x 50.50) + (Pt x 25.07) – 2.62.*
6. *The Mineral Resource Estimate was based on metal prices of US$3.00/lb copper, US$1,500/oz gold, US$18/oz silver, US$1,600/oz palladium, and US$900/oz platinum*
7. *Mineral Resources are inclusive of Mineral Reserves.*
8. *Contained metal totals may differ due to rounding.*

1.13.1 Mineral Resource Estimate – Marathon Deposit

Mineral Resources for the Marathon Deposit reported herein has been constrained within an optimized pit shell. The results within the constraining pit shell are used solely for the purpose of reporting Mineral Resources and include Measured, Indicated and Inferred Mineral Resources. Pit-Constrained Mineral Resources are reported using a NSR cut-off value of $13/t. Wireframe modeling utilized Seequent Leapfrog Geo™ software. Mineral Resource estimation was carried out using GEOVIA GEMS™ software. Variography was carried out using Snowden Supervisor™. Pit optimization was carried out using NPV Scheduler™ software.

The modeled Marathon mineralization domains extend along a corridor 2,000 m wide and 3,500 m in length. An orthogonal block model was established with the block model limits selected so as to cover the extent of the mineralized structures, the proposed open pit design, and to reflect the general nature of the mineralized domains. The block model consists of separate variables for estimated grades, rock codes, percent, bulk density and classification attributes. A volume percent block model was used to accurately represent the volume and tonnage contained within the constraining mineralized domains. The block size used in the estimate is 5 m (easting), 10 m (northing), 5 m (elevation) with no rotation assumed.

The Mineral Resource Estimate was constrained by mineralization domains that form hard boundaries between the respective composite samples. Block grades were estimated in a single pass with Inverse Distance Cubed ("ID3") interpolation using a minimum of four and a maximum of 12 composites with a maximum of three samples per drill hole. Composited samples were selected within a 200 m x 200 m x 50 m diameter search envelope oriented parallel to the overall orientation of the relevant domain. For each grade element, an uncapped Nearest Neighbor model ("NN") was also generated using the same search parameters. An NSR block model was subsequently calculated from the estimated block grades.

Blocks were classified algorithmically based on the local drill hole spacing within each domain. All blocks within 70 m of five or more drill holes were classified as Measured, and blocks within 120 m of four or more drill holes were classified as Indicated. All additional estimated blocks were classified as Inferred.

P&E considers that the information available for the Marathon Deposit is reliable, demonstrates consistent geological and grade continuity, and satisfies the requirements for a Mineral Resource Estimate.

1.13.2 Mineral Resource Estimate – Geordie and Sally Deposits

Mineral Resource Estimates were generated by P&E for the Geordie and Sally Deposits. The methodologies to create the block models were similar to those used for the Marathon Deposit. The GEOVIA GEMS™ V6.8.2 database was used for the Geordie and Sally Deposit Mineral Resource Estimates.

1.14 Mineral Reserve Estimate – Marathon Deposit

Table 1.2: Marathon Project Open Pit Mineral Reserve Estimates [1-8]
(Effective date September 15, 2020)

Mineral Reserves	Tonnes		Pd		Cu		Au		Pt		Ag	
	k	%	g/t	k oz	%	M lbs	g/t	k oz	g/t	k oz	g/t	k oz
Proven	85,091	72%	0.660	1,805	0.202	379	0.070	191	0.212	581	1.359	3,719
Probable	32,610	28%	0.512	537	0.213	153	0.061	64	0.168	176	1.541	1,616
Prov & Prob	**117,701**	**100%**	**0.619**	**2,342**	**0.205**	**532**	**0.067**	**255**	**0.200**	**756**	**1.410**	**5,334**

***Notes**:*

1. *CIM definitions were followed for Mineral Reserves.*
2. *Mineral Reserves are estimated at a cut-off grade varying from $18.00 to $21.33 NSR/t of ore.*
3. *Mineral Reserves are estimated using the following long-term metal prices (Pd = US$1,500/oz, Pt = US$900/oz, Cu = US$2.75/lb, Au = US$1,300/oz and Ag = US$16/oz) and an exchange rate of US$ / C$ 0.75).*
4. *A minimum mining width of 5 m was used.*
5. *Bulk density of ore is variable and averages 3.07 t/m^3.*
6. *The average strip ratio is 2.8:1.*
7. *The average mining dilution factor is 9%.*
8. *Numbers may not add due to rounding.*

The Mineral Reserve Estimate was prepared by GMS. The mine design and Mineral Reserve Estimate have been completed to a level appropriate for feasibility studies. The Mineral Reserve Estimate stated herein is consistent with the CIM definitions (2014) and is suitable for public reporting. As such, the Mineral Reserves are based on Measured and Indicated Mineral Resources which were considered for optimization purposes with mining dilution factors applied. the Mineral Reserve does not include any Inferred Mineral Resources which were classified as waste for reporting purposes.

The resource model (Subsection 1.13.1) was completed as a percent block model. For mine planning purposes, GMS regularized the block model to a standard SMU block size of 5 m x 10 m x 5 m.

Open pit optimization was conducted in GEOVIA Whittle™ to determine the optimal economic shape of the open pit with pit slopes applied according to Knight Piésold feasibility level pit slope design study. The conclusions of this study have been used as an input to the pit optimization and design process.

The Marathon Project uses an NSR value for the mineralization cut-off grade. The marginal cut-off grade corresponds to the ore-based cost. However, an elevated NSR cut-off value was applied of US$13.00/t (C$17.33/t) of ore for the main zones and a higher NSR cut-off value of US$18.00/t (for the remaining mineralized zones which are narrower). These elevated NSR cut-off values applied to select blocks prior to dilution will provide some operating margin and cover the impact of mining dilution.

A mining dilution assessment was made by evaluating the number of contacts for blocks above an economic cut-off grade. The block contacts are then used to estimate a dilution skin around ore blocks to estimate an expected dilution during mining. The dilution skin consists of 1.0 m of material in a north-south direction (across strike) and 1.0 m in an east-west direction (along strike). The dilution is therefore specific to the geometry of the ore body and the number of contacts between ore and waste. The ore body consists of two styles of mineralization. There are massive-mineralized envelopes such as for the main zone which incur relatively little dilution and other narrower mineralized envelopes (namely the W-Horizon) that incur higher mining dilutions with this estimation technique.

1.15 Mining Methods

Mining methods will employ conventional open pit, truck and shovel operating practise. Three pits will be mined over the 13-year mine life with an additional two years of pre-production mining to be undertaken where waste material is being mined for construction and ore will be stockpiled ahead of plant commissioning. The fleet will be owner-operated and will include outsourcing of certain support activities such as explosives manufacturing and blasting. Production drilling and mining operations will take place on a 10 m bench height. The primary loading equipment will consist of two hydraulic face shovels (29 m^3 bucket size) and one large front-end wheel loader (30 m^3 bucket size). The loading fleet is matched with a fleet of 13 x 216 t haulage trucks. A fleet of two 90 t excavators will be used to excavate the limited volume of overburden material and will also be allocated to mining of the narrow-thickness ore zones associated with the W-Horizon in the South Pit to mitigate additional dilution.

Mining production at peak capacity is 40 Mt/yr (110,000 tpd).

The Marathon Deposit is well defined and characterized by ore material outcropping on surface, wide, and moderately dipping mineralized zones. The mine plan includes the development of three open pits aligned generally to a north – south orientation (North pit, Centre pit and South Pit) over a total approximate strike length of 3 km. Each of the pits have been designed and included pit wall push backs or phases to allow for extraction over the 13-year mine life. The designs include in-Pit dumping for the South and Centre pits.

The open pit operation includes a waste rock dump immediately to the east of the open pits and an ore stockpile (peak capacity of approximately 12 Mt) to the west of the pits, proximal to the crusher location.

1.16 Production Profile

Table 1.3: High-Level Production Profile

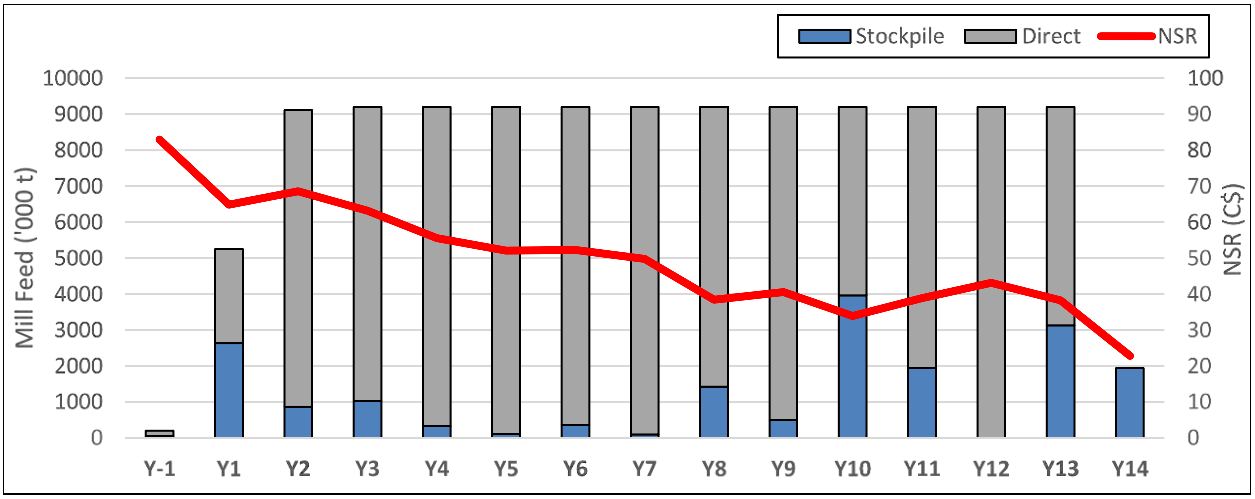
Operating Data	Units	Pre-Production	Operations	Total
Mine Life	years	2	12.6	14.6
Total Milled Tonnes	Mt	1.9	115.8	117.7
Total Mined Tonnes	Mt	25.4	421.8	447
Strip Ratio	waste:ore	3.33	2.77	2.80
Metal Production[1]	**Units**	**Recovered Metals**	**Payable Metal**	**% of Revenue**
Palladium	k oz	2,028	1,905	58.7%
Copper	M lbs	493	467	26.8%
Platinum	k oz	634	537	9.6%
Gold	k oz	183	151	3.8%
Silver	k oz	3,796	2,823	1.0%

***Note**: [1] LOM metal production including pre-production period*

1.16.1 Milling Schedule

Operating life for the Project is approximately 13 years. Design milling capacity is 9.2 Mt/yr. (25,200 t/d) with a ramp up from 5.3 Mt in the first year of operation prior to achieving nameplate capacity. Annual mill feed tonnage is kept constant with mined ore direct from the pits and rehandled ore from stockpiles to fill plant capacity. The final year of milling consists of low-grade material that was previously stockpiled.

Figure 1.6: Mill Production Profile



With the stockpile inventories medium- and high-grade ore is only stockpiled for the first 2 years of mining until it is rehandled to the mill as higher-grade ore is prioritized. The peak stockpile capacity is approximately 12 Mt. All material is milled by the end of project life.

1.16.2 Mine Production Profile – Key Metals

Figure 1.7: Palladium – Payable Metal

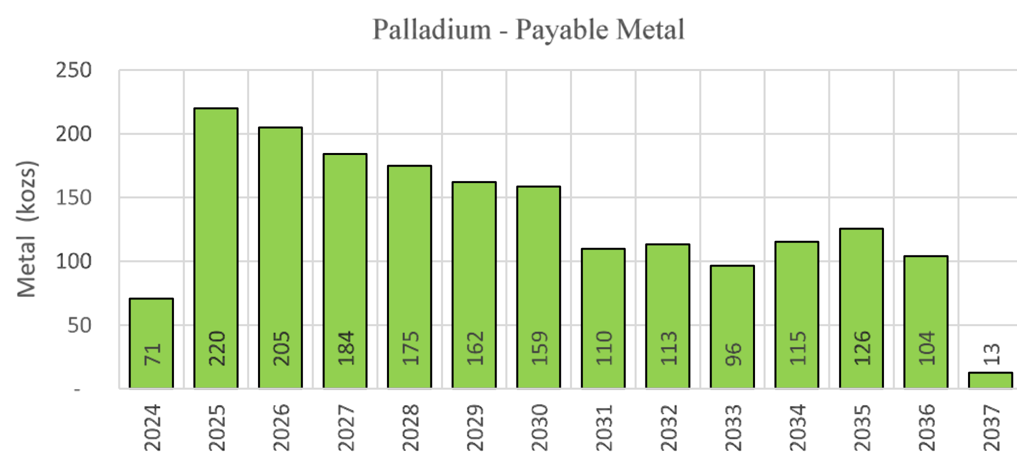


Figure 1.8: Copper – Payable Metal

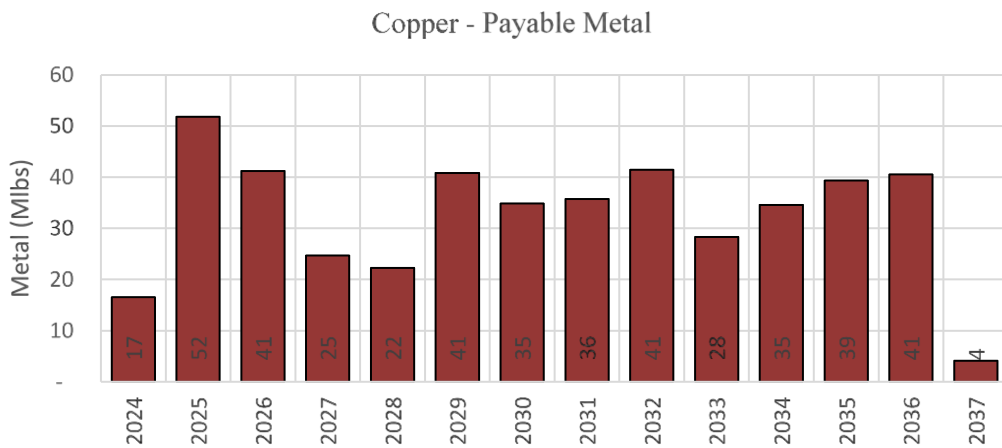


Figure 1.9: Platinum, Gold and Silver – Payable Metal

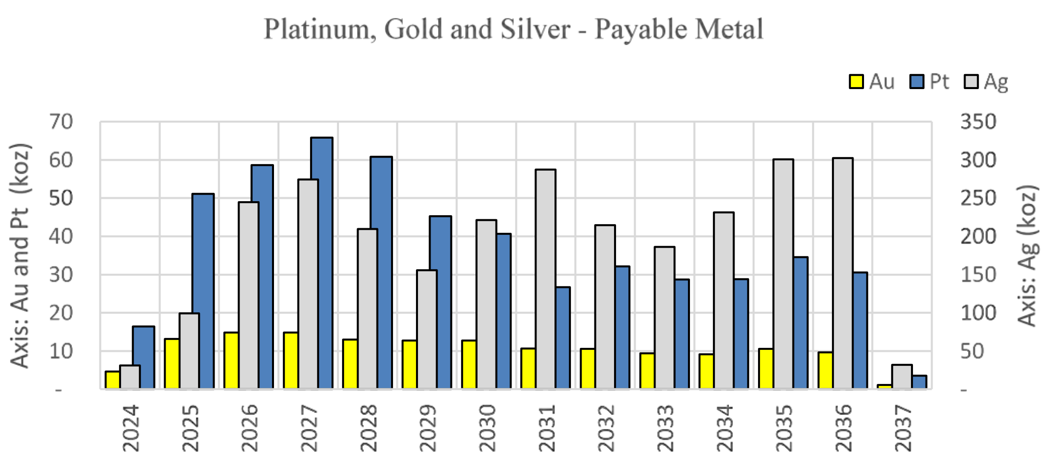


Table 1.4: Life-of-Mine Production Profile

		Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Total
Total Tonnage	Mt	3.0	10.4	24.0	40.0	40.0	40.0	39.8	40.0	39.2	40.0	40.2	35.2	29.3	18.7	7.4	-	**447.2**
Total Waste	Mt	2.6	8.4	18.0	26.8	27.3	29.5	30.5	31.2	29.3	32.2	30.8	29.9	22.1	9.5	1.3	-	**329.5**
Overburden	Mt	0.2	0.5	0.6	0.1	0.3	0.1	0.2	0.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-	**3.02**
NPAG	Mt	2.2	6.4	16.6	24.1	21.6	26.1	29.9	30.5	27.6	30.4	28.8	28.8	21.1	7.1	0.9	-	**302.2**
PAG	Mt	0.3	1.4	0.8	2.6	5.4	3.2	0.4	0.5	1.3	1.5	2.0	1.1	1.0	2.4	0.4	-	**24.28**
Strip Ratio	W:O	7.01	4.22	2.99	2.03	2.16	2.80	3.31	3.53	2.95	4.15	3.28	5.72	3.04	1.02	0.21	-	**2.81**
Ore Tonnage	Mt	0.38	1.98	6.01	13.1	12.6	10.52	9.23	8.83	9.92	7.77	9.39	5.23	7.25	9.27	6.07	-	**117.7**
Cu Grade	%	0.17	0.15	0.23	0.25	0.19	0.14	0.12	0.24	0.19	0.22	0.23	0.19	0.21	0.22	0.26	-	**0.21**
Ag Grade	g/t	0.59	1.25	0.75	0.81	1.54	1.64	1.41	1.13	1.39	1.81	1.37	1.35	1.49	1.73	1.99	-	**1.41**
Au Grade	g/t	0.06	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.06	0.07	-	**0.07**
Pt Grade	g/t	0.17	0.21	0.19	0.19	0.23	0.26	0.27	0.22	0.19	0.15	0.15	0.19	0.15	0.17	0.18	-	**0.20**
Pd Grade	g/t	0.60	0.62	0.70	0.73	0.67	0.70	0.72	0.67	0.64	0.50	0.46	0.52	0.52	0.53	0.53	-	**0.62**

1.17 Project Infrastructure

The existing regional infrastructure provides the Project with a number of logistical opportunities for project execution and operations including the availability and movement of personnel, materials, equipment and consumables to site, and the transport of Cu-PGM concentrate by rail or highway to third party smelters.

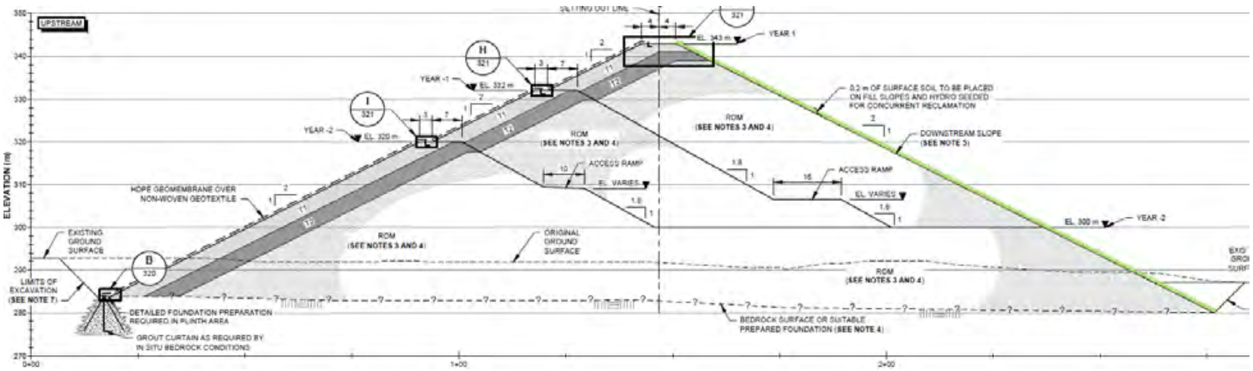
Project design for the FS has considered access roads, processing facilities, workshops, warehouse, administrative buildings, water treatment, explosive plant, communication systems, power and power transmission lines, water management and environmental controls. Off-site infrastructure (including transload concentrate facility, assay lab and accommodation units) to support the operation have also been included.

1.18 Tailings Storage Facility

The TSF and associated water management facilities have been designed to meet the requirements of the Lakes and River Improvement Act (“LRIA”) Ministry of Natural Resources (“MNR, 2011”) and the Canadian Dam Association guidelines (“CDA, 2019”). The TSF is located west of the processing plant and generally south-west of the open pits.

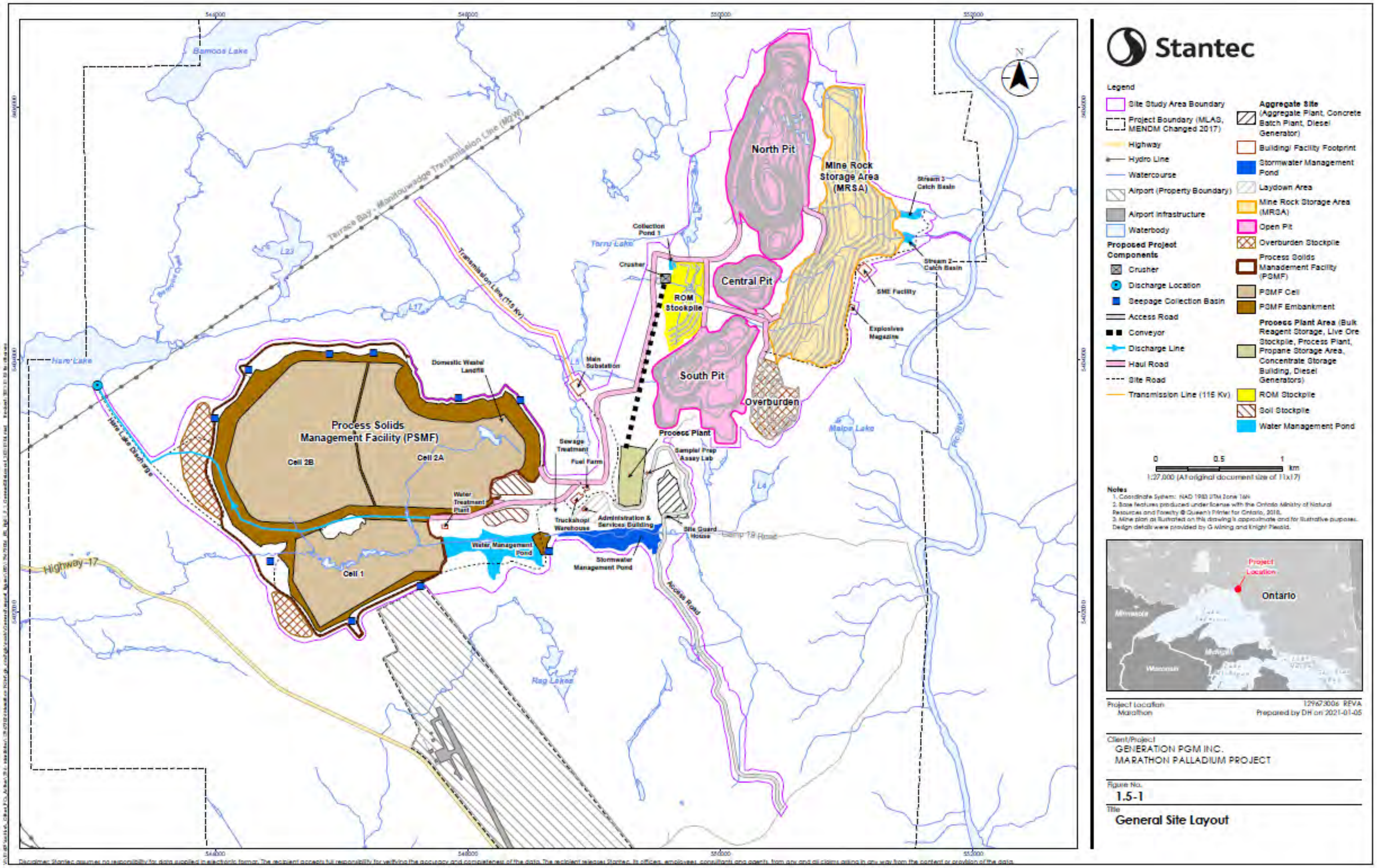
The TSF design methodology includes for perimeter embankments being raised using downstream construction with run-of-mine rockfill (Figure 1.10). The embankment will be founded directly on bedrock. The majority of TSF area provide for robust foundation conditions primarily consisting of exposed bedrock. A thin intermittent layer of glacial drift (sand and gravels) is present within localized areas. The upstream transition and filter zones are filtered graded to the tailings and a high-density polyethylene (“HDPE”) geomembrane is included on embankment face to minimize seepage. The embankments will be raised in stages through the life mine to provide the required storage capacity for tailings and temporary water management. The embankment stability exceeds the factor of safety requirements outlined in LRIA and CDA guidelines for all stages of mine life (construction, operation and closure).

Figure 1.10: TSF Typical Design Section



The TSF arrangement includes two storage cells. Cell 1 and Cell 2A will provide storage for the initial production years; Cell 2A and 2B will provide storage for the remaining production years. Potentially acid generating ("PAG" or "Type 2") material will be stored in Cell 2A (designed to ensure PAG material is saturated for closure conditions and in perpetuity).

Figure 1.11: General Arrangement of Site, TSF and Water Management system



The TSF will provide permanent, secure and confinement for approximately 120 Mt of tailings material and 30 Mt of PAG mine rock. The available storage capacity within the TSF has been aligned with production profile requirements for the life of mine.

The water management facilities (Figure 1.11) associated with the TSF include a Water Management Pond ("WMP") and a Stormwater Management Pond ("SWMP"). The WMP is located east of Cell 1 and will be the source of plant operating water, manage contact water from the site and allow for seasonal discharge to Hare lake as required. The SWMP will collect contact water from the plant area.

1.19 Market Studies and Contracts

1.19.1 Metal Price Data

The following information outlines the considerations used for determining the metal price assumptions for the Economic Analysis (Section 22).

Table 1.5: Metal Price

Element	Unit	3-Year Trailing Average [1]	2-Year Trailing Average[1]	Spot Price[2]	Long-Term Consensus Pricing[3, 4]	Metal Price used in Economic Analysis
Palladium	US$/oz	1,582	1,860	2,395	1,726[3]	1,725
Copper	US$/lb	2.82	2.76	3.99	3.20[4]	3.20
Gold	US$/oz	1,478	1,582	1,807	1,672[4]	1,400
Platinum	US$/oz	874	872	1,268	1,023[4]	1,000
Silver	US$/oz	17	18	27.45	21.81[4]	20.00
Exchange Rate	US$ /C$	n/a	n/a	0.7897	0.75	0.78

[1] Source: Comex as of Dec. 31, 2020.

[2] Spot prices as of 22 Feb 2021; LME for Cu price; LBMA closing price for other metals; F/X rate Bank of Canada average for week ending 22 Feb 2021

[3] See Table 19.2: Consensus Price for Palladium *(average of data set)*.

[4] Source Maxit Capital and Haywood Securities dataset from various contributors; see Section 19 *(average of data set collected in December 2020)*.

1.19.2 Concentrate Sale

Indicative terms for concentrate sales from the Project have been received by Gen Mining. These were received from potential buyers (including metal traders and smelters both within Canada and internationally) for the purchase of the Cu-PGM concentrate from the Project.

As smelting terms are confidential in nature, the source of smelting terms is specifically excluded. The net payable for a specific metal is calculated as the lesser of (i) the payable rate of the contained metal content in the concentrate and (ii) the contained metal content less a minimum deduction (in g/t for palladium, gold, platinum and silver and a % for copper). See Table 1.6.

Table 1.6: Payable Metals in Concentrates

Payable Element	Net Payable Rates (%)
Palladium	94%
Copper	94%
Gold	75%
Platinum	77%
Silver	75%
Rhodium	TBD

1.20 Environmental Studies, Permits, and Social or Community Impacts

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 ("JRP") pursuant to the Canada-Ontario Agreement on Environmental Assessment Cooperation (2004).

In July 2012, Stillwater Canada (the proponent at the time) prepared and submitted an Environmental Impact Statement ("EIS") Report and supporting documents which assessed the potential effects of the Project. Following a review of this information and subsequent responses to information requests, the JRP determined (in 2013) that sufficient information was available to proceed to a public hearing. However, prior to the hearing, the process was put on hold in 2014.

Detailed and comprehensive environmental baseline studies had been undertaken and essentially completed between 2005 to 2014, when the Project was put on hold in 2014. Since that time, ongoing baseline monitoring and sampling has continued with fieldwork undertaken in 2020 validating the past baseline work.

As part of the development of the 2012 EIS Report, fourteen Indigenous communities were identified by the CEAA as having a potential interest in the Project based on Treaty rights, asserted traditional territory and proximity to the Project.

As part of the development of the EIS Report Addendum, Gen Mining has made additional consultation efforts with the six communities that participated in 2012 EA process. In addition, IAAC is in the process to contact the other communities to determine if there is community interest to participate in the JRP process currently being progressed. Gen Mining will update the Project consultation plan as directed by Impact Assessment Agency of Canada ("IAAC") and continue with consultation efforts throughout the JRP Process. The results of the consultation will be incorporated into the updated Project description and mitigation measures will be developed as required.

Agreements such as memorandums of understanding, consultation protocols and confidentiality agreements were developed by Stillwater Canada with some of the Indigenous groups to help formalize the working relationship between these communities and the Project.

As of the effective date of this document, no Community Benefit Agreements ("CBAs") have been executed with Indigenous groups specific to the construction and operation of the Project. It is the intention of the Project to establish mutually beneficial relationships with the Indigenous communities involved in the Project.

1.21 Communities Proximal to the Project

The Project is situated within the geographic territory of the Robinson Superior Treaty area. It is also within lands claimed by Biigtigong Nishnaabeg ("BN") as its exclusive Aboriginal Title. In 2003, BN brought legal action (known as the Michano litigation) against Canada and Ontario seeking a declaration of unextinguished exclusive Aboriginal Title to an area north of Lake Superior, claiming they did not enter the Robinson Superior Treaty in 1850 and did not adhere to the Robinson Superior Treaty subsequent to 1850. In 2016, the three parties began exploratory discussions to try to find a resolution outside of the court process. As a result of these discussions, the parties entered into formal negotiations in May 2019 and the Michano litigation was put into abeyance (on hold) in December 2019. Negotiations between BN, Ontario and Canada are ongoing.

Agreements such as memorandums of understanding, consultation protocols and confidentiality agreements were developed by Stillwater Canada with some of the Indigenous groups to help formalize the working relationship between these communities and the Project. The Company has assumed the commitments in these documents. To date, no agreements (CBAs) have been signed with Indigenous groups specific to the construction and operation of the Project. The Company is currently in the process of negotiating an Approval In Principle ("AIP") Agreement with BN. Discussions with other Indigenous communities regarding Project related agreements has also been started. It is the intention of the Company to establish mutually beneficial relationships with the Indigenous communities involved in the Project. It is anticipated that the Project will provide significant economic and development opportunities for Indigenous communities.

The Town of Marathon is centrally located on TransCanada Highway ("Hwy 17") between Thunder Bay and Sault Ste. Marie on the North Shore of Lake Superior in Northwestern Ontario. The Town is the closest population centre to the Project site, located 10 km south of the site. The Project plans to continue to work in partnership with the Town of Marathon to develop the Project. It is anticipated that the Project will provide a significant positive economic influence on the Town.

1.22 Capital and Operating Costs

The summary of the Project's capital and operating costs are presented in Table 1.7 and Table 1.8.

Table 1.7: Capital Costs

Capital Costs	Units	
Initial Capital[1]	$ M	**665**
LOM Sustaining Capital	$ M	**423**
LOM Total Capital	$ M	**1,087**
Closure Costs	$ M	**66**

***Note**:*

[1] Initial Capital shown after equipment financing. Contingency at approx. 11% of initial Capital.

Table 1.8: Operating Costs

Operating Costs[1]	Units	
Mining[2]	$/t mined	**2.53**
Processing	$/t milled	**9.08**
General & Administration	$/t milled	**2.48**
Transport & Refining Charges	$/t milled	**2.80**
Royalties	$/t milled	**0.03**
Total Operating Costs	$/t milled	**23.63**
LOM Average Operating Cost[3]	US$/oz Pd Eq	**687**
LOM Average AISC	US$/oz Pd Eq	**809**

***Note**:*

[1] Refer to Non-IFRS Financial Measures.

[2] Mining cost also noted as $9.23/t milled.

[3].PD eq grade is calculated based on:

$$((Pd\ US\$1{,}725/31.10348 \times Pd\ grade\ g/t + Cu\ US\$3.20/2204.6 \times Cu\ grade\ \%/100 + Au\ US\$1{,}400/31.10348 \times Au\ grade\ g/t + Pt\ US\$1{,}000/31.10348 \times Pt\ grade\ g/t + Ag\ US\$20/31.10348 \times Ag\ grade\ g/t))/(Pd\ US\$1{,}725/31.10348)$$

1.23 Execution Plan

The Project will be executed using an “Owner-managed” project delivery model. All aspects of engineering, procurement and construction for the Project will be managed directly by the Owner. Detailed engineering and a portion of the procurement will be outsourced. The Project construction period is 23 months and the total pre-production period is estimated at 42 months which includes detailed engineering, procurement, construction and commissioning activities up to commercial production being declared. Construction labour estimates a total of 2,255,400 labour hours; this represents an estimated average number of 356 and a peak of 870 contractors and employees on the Project.

The operating organization consists of three departments: Mine - including mine operations, geology, engineering and maintenance; Process Plant - process operations, process technical and analytical and fixed plant maintenance; and General and Administrative - including human resources, environment, health and safety, site services, warehouse and logistics and accounting. Operating labour estimate includes a total steady-state labour count of 429 employees.

1.24 Economic Analysis

The economic analysis is carried out in real terms (i.e., without inflation factors) in Q1 2021 Canadian dollars without any project financing but inclusive of equipment financing and costs for closure bonding. The economic results are calculated as of the beginning of Q2 Year -3, which corresponds to the start of the pre-production CAPEX phase (over 13 quarters), including engineering and procurement, with all prior costs treated as sunk costs but considered for the purposes of taxation calculations. The economic results such as the net present value (“NPV”) and internal rate of return (“IRR”) are calculated on an annual basis.

Key results and assumptions used in the FS are summarized in Table 1.9 and Table 1.10.

Table 1.9: Key Economic Input Assumptions

Price Assumptions	Units	
Palladium	US$/oz	**$1,725**
Copper	US$/lb	**$3.20**
Platinum	US$/oz	**$1,000**
Gold	US$/oz	**$1,400**
Silver	US$/oz	**$20.00**
Exchange Rate	C$/US$	**1.28**
Diesel Fuel	$/L	**0.77**
Electricity	$ / kWhr	**0.08**

***Note**: Commodities listed in order of revenues.*

Table 1.10: Economic Analysis (Base Case)

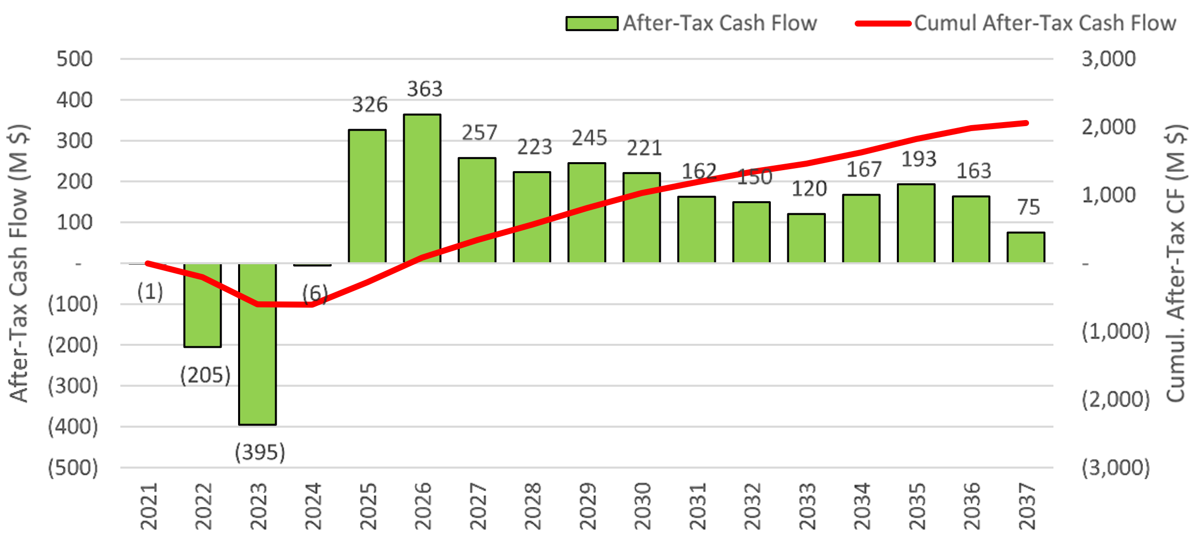
Economic Analysis Base Case	Units	Base Case	Spot Price[1]
Pre-tax Undiscounted Cash Flow	$ M	**3,004**	**5,305**
Pre-tax NPV6%	$ M	**1,636**	**3,042**
Pre-tax IRR	%	**38.6**	**59.9%**
Pre-tax Payback	Years	**1.9**	**1.2**
After-tax Undiscounted Cash Flow	$ M	**2,060**	**3,626**
After-tax NPV6%	$ M	**1,068**	**2,025**
After-tax IRR	%	**29.7**	**46.5%**
After-tax Payback	Years	**2.3**	**1.5**

***Note**:*

Spot Price on 22 February 2021: Pd = US$2,395/oz; Cu = US$3.99/lb; Pt = US$1,268/oz; Au = US$1,807/oz; Ag = US$27.45/oz; Pd, Pt, Au and Ag prices sourced LBMA; Cu price sourced on LME Copper.

1.24.1 Project Cash Flow (After Tax)

Figure 1.12: Project Cash Flow (After Tax)



1.24.2 Sensitivities

The after-tax valuation sensitivities for the key metrics are shown below.

Table 1.11: Economic Sensitivity Tables

After-Tax Results	OPEX Sensitivity				
	-20%	-15%	0%	15%	20%
NPV 6% ($ M)	1,270	1,220	**1,068**	916	866
Payback (years)	2.1	2.1	**2.3**	2.4	2.5
IRR (%)	33.0%	32.2%	**29.7%**	27.1%	26.2%

After-Tax Results	CAPEX Sensitivity				
	-20%	-15%	0%	15%	20%
NPV 6% ($ M)	1,195	1,163	**1,068**	972	940
Payback (years)	1.9	2.0	**2.3**	2.6	2.7
IRR (%)	37.7%	35.4%	**29.7%**	25.3%	24.1%

Discount Rate Sensitivity	NPV (After Tax) ($M)
0%	2,060
5%	1,191
6%	**1,068**
8%	859
10%	689

Palladium Price US$/oz	1,000	1,250	1,500	1,725	1,850	2,000	2,500
NPV 6% ($ M)	356	601	847	**1,068**	1,190	1,337	1,831
Payback (years)	4.3	3.2	2.6	**2.3**	2.1	2.0	1.6
IRR (%)	14.8%	20.2%	25.3%	**29.7%**	32.1%	34.8%	43.7%

Copper Price US$/lb	2.00	2.50	3.00	3.20	3.50	4.00	4.50
NPV 6% ($ M)	792	907	1,022	**1,068**	1,137	1,251	1,365
Payback (years)	2.7	2.5	2.3	**2.3**	2.2	2.1	2.0
IRR (%)	24.7%	26.8%	28.9%	**29.7%**	30.9%	32.9%	34.8%

1.25 Interpretations and Conclusions

The completion of this Technical Report has confirmed the technical and economic viability of the Marathon Project, based on an open pit mining operation with a production rate of 40 Mt/yr and an SABC / flotation plant operating at 9.2 Mt /yr.

1.26 Risks and Opportunities

Table 1.12 outlines the significant risks and uncertainties that could reasonably be expected to affect the reliability of confidence in the projected economic outcome for the FS.

Table 1.12: Risks

Risk Category	Description	Potential Impact[1]
Mineral Resource Estimate	There is some uncertainty to the reliability of the Mineral Resource Estimate due to the irregular nature of the hanging wall and footwall mineralized contacts.	• Reduction in Mineral Resources available for conversion to Mineral Reserves
Environment Assessment and Permitting	There is uncertainty associated with the timing and expected approval conditions for the Project.	• A delay to the schedule for project construction. • Additional operating constraints or additional costs.
COVID-19	The duration and impact of the COVID-19 pandemic is uncertain.	• Reduced efficiency of the construction workforce or delayed construction schedule.
Construction Costs	Construction costs are based on the FS designs; final designs and construction methodology may change.	• Increased construction costs.
Operating Costs	Operating efficiency, operating time and productivity are assumed based on similar benchmark operations; any reduction in operating efficiency will increase operating costs.	• Increased operating costs.
Labour and Skilled Resources	There is a national and international shortage of skilled and technical expertise in mining.	• Increased labour costs. • Increase in remote employees with an increase in camp requirements.
Metal Prices and Exchange Rates	For each payable element and the exchange rate, the economic assumptions are sensitive (both positively and negatively impacted) by metal prices and changes in C$ /US$ exchange rates.	• Variability in economic results with changing metal prices. • Strengthening of the C$ as compared to the US$ will negatively impact economic results.

***Note**: [1] This is not intended to outline all potential impacts, simply the impacts that could reasonably be expected to occur in the event the risk item results in an impact.*

Table 1.13 outlines the significant opportunities that could reasonably be expected to have a positive impact on improving the Project economics in the future.

Table 1.13: Opportunities

Opportunity	Description	Potential Impact[1]
Mineral Resource Estimate	Unrealized local variability due grade interpolation smoothing may lead to opportunities to extract somewhat more metal from fewer tonnes	• Higher value per tonne of ore.
Smelter Terms	The terms included in the Technical Report are based on indicative terms from smelters; that is, final terms have not been negotiated. With the Cu-concentrate that is clean of significant deleterious elements, and high in PGM-elements, it is expected that improved terms (over the indicative terms included) will be realized.	• Improved value realized due to increased payable metals in the marketed concentrate.
Rh included in the Concentrate	Negotiations with smelters will include a request for payable Rh in the concentrate (Note: While many smelters, do not recover Rh, the smelters do have the possibility to on-sell the products that they do not recover).	• Improved value realized due to increased payable metals in the marketed concentrate.
Plant Throughput	The Process Design Criteria ("PDC") meets the requirements on average for the plant capacity of 9.2 Mt per year. It is anticipated that there is approximately 5-10% increased throughput per hour possible with little capital.	• Increased production rate would imply increased value and cash flow.
Exploration Success on the Property	With the conversion of the property resources to reserves, it would be expected to increase material feed to the plant and increase either mine life beyond the 13 years or allow for increased throughput over the same operating life.	• Increased production rate would imply increased value and cash flow • Increased mine life would extend employment opportunities and increase operating cash flow.
Trolley Assist ("TA") to the Mining Fleet	The concept of TA was evaluated with CAT and Komatsu equipment suppliers but was not included in the Base Case operating design. TA would conceptually increase up-ramp truck speed and allow for additional tonnage (with a reduced cycle time) or reduce capital requirements.	• Improved operating efficiency and lower mine operating costs • Reduction in the generation of green house gases from operations (reduced diesel consumption).
Automation of the Mining Fleet	With the truck fleet being relatively small, autonomous haulage is not expected to be viable; however, the automation of drills and dozers would improve operating efficiency or reduce operating costs.	• Reduced operating costs on a $/t basis.

***Note**: [1] This is not intended to outline all potential benefits but those that could reasonably be expected to occur or possibly realized.*

1.27 Recommendations

The Project has been thoroughly reviewed by the Company, taking into account technical studies and economic evaluations completed previously by other Parties on the property. Following completion of the FS, the QPs recommend progressing work required to allow for funding and subsequently to construct the Project as defined in this Technical Report. The high-level recommendations include:

1.27.1 Production Decision

With the demonstrated and positive economic analysis:

- Progress to the next phase of project development and advance the property towards construction and production.

1.27.2 Environmental Assessment, Permitting and Indigenous Affairs

- Complete the EA process under the Joint Review Panel.
- Progress the critical path permitting activities to provide adequate time frames for submission, review and approval with a commitment to environmental obligations and an intention to develop a definitive schedule for construction.
- Progress Community / Impact and Benefits agreements with the impacted and eligible Indigenous communities.

1.27.3 Basic Engineering and Detailed Engineering Design

- Complete basic engineering for the process plant and associated site infrastructure design.
- Progress the project through detailed engineering including formal bidding and equipment selection, final facility construction details, construction scheduling and regional construction logistics.

2. INTRODUCTION

2.1 Introduction

The Technical Report for the Marathon Palladium-Copper Project (the "Marathon Project" or "Project") located just outside the Town of Marathon on the shores of Lake Superior in Ontario, Canada was prepared by G Mining Services Inc. ("GMS") along with contributions from Ausenco Engineering Canada Inc. ("Ausenco"), Knight Piésold Ltd. ("KP") and P&E Mining Consultants Inc. ("P&E").

Generation Mining Limited (the "Company or "Gen Mining") currently owns an 80% interest in the Marathon Project, with the remaining 20% interest owned by Stillwater Canada Inc. ("Stillwater Canada"), a subsidiary of Sibanye Stillwater Limited ("Sibanye-Stillwater"). The Project is managed and operated by Gen Mining's 100%-owned subsidiary Generation PGM Inc. ("Gen PGM").

On behalf of the Joint Venture and the partners (Gen PGM and Stillwater Canada), Gen Mining commissioned the consultants to prepare and issue a Feasibility Study ("FS") as well as a Technical Report to be prepared in accordance with disclosure and reporting requirements set forth in the Canadian Securities Administrators' current "Standards of Disclosure for Mineral Projects" under the provisions of National Instrument 43-101 ("NI 43-101"), Companion Policy 43-101 CP and Form 43-101F1.

The objective of this Technical Report and FS is the evaluation of the technical feasibility and economic viability of the development of an open pit mine at the Marathon Project, including processing facilities and related infrastructures. The Technical Report summarizes the results of the FS for the Project, and also presents an updated Mineral Resource and Mineral Reserves Estimates for the Marathon Property (the "Marathon Property" or "Property").

2.2 Scope and Terms of Reference

The scope of this Technical Report and FS includes the geology and Mineral Resource of the Marathon Property, including the Marathon Deposit and the Geordie and Sally Deposits. The Mineral Reserves, mining, infrastructure, processing and financial analysis sections of this Technical Report consider only the Marathon Deposit.

The Technical Report supports the disclosure by Gen Mining in the news release dated March 3, 2021 entitled "Generation Mining Delivers Positive Feasibility Study for Marathon Palladium-Copper Project".

The monetary units are in Canadian dollars, unless otherwise stated.

Mineral Resources and Mineral Reserves are reported in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Definition Standards for Mineral Resources and Mineral Reserves (May 2014; the 2014 CIM Definition Standards).

Estimates of Mineral Resources and Mineral Reserves follow industry best practices as defined by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM, 2019). Classification of Mineral Resources and Mineral Reserves conform to CIM Definition Standards (CIM, 2014).

2.3 Source of Information and Data

Previous Technical Reports issued on the Marathon Project include the following:

- P&E Mining Consultants Inc.: (Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of the Marathon Deposit Thunder Bay Mining District, Northwestern Ontario, Canada for Generation Mining Ltd., effective date January 6, 2020.
- Nordmin Engineering Ltd.: Marathon PGM-Cu Feasibility Study (Draft Report), document dated March 14, 2014 for Stillwater Canada Inc.
- Micon International Limited: Technical Report on the Updated Feasibility Study for the Marathon PGM-Cu Project, Marathon, Ontario, Canada, dated January 8, 2010.
- Micon International Limited: Technical Report on the Updated Mineral Resource Estimate and Feasibility Study for the Marathon PGM-Cu Project, Marathon, Ontario, Canada, dated February 2, 2009.
- P&E Mining Consultants Inc., 2006b: Technical Report and Preliminary Economic Assessment of the Marathon PGM-Cu Property, Marathon Area, Thunder Bay Mining district, Northwestern Ontario, Canada, June 30, 2006, revised July 8, 2006.
- P&E Mining Consultants Inc., 2006a: Technical Report and Resource Estimate on the Marathon PGM-Cu Property Marathon Area, Thunder Bay Mining District, Northwestern Ontario, Canada for Marathon PGM Corporation, dated March 24, 2006.

2.4 Technical Report Responsibilities

The Technical Report and FS responsibilities of the engineering consultants are as follows:

Table 2.1: Consultants Used and Area of Responsibility

Consultant Company	Area of Responsibility
GMS	Overall report and FS coordination, Mineral Reserve Estimate, mining methods, infrastructure, concentrate logistics, economic analysis, operating costs pertaining to mining, infrastructure, general and administrative and power capital cost estimates and project execution plan.
Ausenco	Recovery methods, processing plant capital and operating cost.
KP	Tailings Storage Facility, water balance, geotechnical studies (mine rock storage piles, open pit and local infrastructure and foundations).
P&E	Property description and location, accessibility, history, geological setting and mineralization, deposit types, exploration, drilling, sample preparation and security, data verification, and Mineral Resource Estimates and adjacent properties.
Haggarty Technical Services ("HTS")	Metallurgical testing.
WESC Inc. ("WESC")	Environment, permitting and communities and social aspects.

2.5 Summary of Qualified Persons

The authors and co-authors of each section of the Technical Report, who acting as a QP as defined by NI 43-101, take responsibility for those sections of the Technical Report as outlined in Section 28 "Certificate of Author" attached to this Technical Report.

Table 2.2: Qualified Persons (QPs)

Name of Qualified Person	Company	Technical Report Section[1]
Mr. Louis-Pierre Gignac, Ing.	GMS	1, 2, 3, 19, 22, 25, 26
Mr. Paul Murphy, Ing.	GMS	18, 20, 21, 24, 26
Mr. Antoine Champagne, Ing.	GMS	15, 16, 26
Mr. Robert Raponi, P.Eng	Ausenco	13,17, 21, 26
Mr. Craig Hall, P.Eng	KP	18, 20, 21
Mr. Eugene Puritch, P.Eng., FEC, CET	P&E	1, 2, 3, 4, 5, 6, 9, 10, 14, 23, 26
Ms. Jarita Barry, P.Geo.	P&E	11,12
Mr. Fred Brown, P.Geo.	P&E	14
Mr. David Burga, P.Geo.	P&E	12
Mr. Bruce Mackie, P.Geo.	Bruce Mackie Geological Consulting Services	12
Mr. Paul Pitman, P.Geo.	P&E	7,8

[1] *Co-authored sections may be listed multiple times.*

The Technical Report has the following effective dates:

- Date of information on mineral tenure, surface rights and agreements: Nov 25, 2020.
- The effective date of the Mineral Resource Estimate: June 30, 2020.
- The effective date of the Mineral Reserve Estimate: September 15, 2020.
- The effective date of the financial analysis: March 3, 2021.

The overall effective date of this Technical Report is the effective date of the financial analysis: March 3, 2021.

2.6 Site Visit

The following independent QPs as defined by NI 43-101 visited the site as described below:

Table 2.3: QP Site Visit Dates

Name of Qualified Person	Consultant Company	Site Visit Date
Louis-Pierre Gignac, Ing.	GMS	August 2020
Paul Murphy, Ing.	GMS	August 2020
Robert Raponi, P.Eng	Ausenco	August 2020
Craig Hall, P.Eng	KP	April 2011 and March 2012
David Burga, P.Geo.	P&E	April 2012
Bruce Mackie, P.Geo.	Independent	May 2019
Eugene Puritch, P.Eng, FEC, CET	P&E	Various visits between 2005 and 2010

2.7 Units of Measure, Abbreviations and Nomenclature

The units of measure presented in this Technical Report, unless noted otherwise are in the metric system.

A list of the main abbreviations and terms used throughout this Report is presented in Table 2.4.

Table 2.4: List of Main Abbreviations

Abbreviations	Full Description
Ag	Silver
As	Arsenic
Au	Gold
Ba	Barium
Bi	Bismuth
°C	Degrees Celsius
C	Carbon
Ce	Cerium
cm	Centimetre(s)
CAD or C$	Canadian Dollar
Co	Cobalt
Cr	Chromium
Cu	Copper
dB	Decibel
dmt	Dry Metric Tonne
°F	Degrees Fahrenheit

Abbreviations	Full Description
F	Fluorine
ft	Feet
FA	Fire Assay
Fe	Iron
FEL	Front End Loader
FS	Feasibility Study
G	Giga – (000,000,000's)
g	Gram(s)
gpt or g/t	Grams per tonne
g/L	Gram(s) per litre
G&A	General & Administration
gpm	Gallons per minute (US)
GPS	Global Positioning System
ha	Hectares
Hg	Mercury
h or hr	Hour
h/d or hr/d	Hours per day
h/y or hr/y	Hours per year
H/wk or hr/wk	Hours per week
hp	Horsepower
HQ	HQ sized core (63.5 mm diameter)
Hz	Hertz
IRR	Internal Rate of Return
IP	Induced Polarization
ISO	International Organization for Standardization
Ir	Iridium
k	Thousand(s)
k	Kilo(s) (000's)
kg	Kilogram(s)
kg/t	Kilograms per tonne
kV	Kilovolts
km	Kilometre(s)
km^2	Square Kilometre(s)
km/h	Kilometre per hour
kPa	Kilopascal
kV	Kilovolts
kW	Kilowatts
kWh	Kilowatts per hour

Abbreviations	Full Description
LOM	Life of Mine
L or l	Litre(s)
µm	Micron(s)
M	Mega or Millions (000,000's)
masl	Metres above sea level
m	Metre(s)
m/min	Metre(s) per minute
m/s	Metre(s) per second
m^2	Square metre(s)
m^3	Cubic metre(s)
Mg	Magnesium
mg	Milligram(s)
mg/L	Milligram(s) per litre
Mi	Hoek-Brown material constant
mm	Millimetre(s)
ml	Milliliter(s)
min	Minute(s)
Mn	Manganese
Mo	Month(s)
Mo	Molybdenum
MPa	Megapascal
Mt	Million tonnes
Mtpd	Metric tonnes per day
Mtpy	Metric tonnes per year
MVA	Megavolt-ampere
MW	Megawatt
Nb	Niobium
Ni	Nickel
NAG	Non Acid Generating
Non-PAG	Non-Potentially Acid Generating
NPI	Net Profit Interest
NPV	Net Present Value
NSR	Net Smelter Return
NQ	Drill Core Diameter (47.6 mm)
Ø	Diameter
OK	Ordinary Kriging Methodology
OPEX	Operating Expenditures

Abbreviations	Full Description
OSA	On-stream analyzer
oz	Troy Ounce (31.10348 grams)
PAG	Potentially Acid Generating
PEA	Preliminary Economic Assessment
Pb	Lead
Pd	Palladium
PFS	Pre-feasibility Study
PGM	Platinum Group Metals
PLC	Programmable Logic Controller
ppb	Parts per billion
ppm	Parts per million
psi	Pounds per square inch
Pt	Platinum
PV	Present Value
Rb	Rubidium
RC	Reverse Circulation
Rh	Rhodium
RoM	Run-of-mine
rpm	Revolutions per minute
S	Sulphur
SAG	Semi-Autogenous Grinding
Sb	Antimony
Se	Selenium
Sec	Second(s) (time)
Si	Silicon
Sm	Samarium
Sn	Tin
t	Tonne(s) (1,000 kg) (metric ton)
t/y or tpy	Tonne(s) per year
t/d or tpd	Tonne(s) per day
t/h or tph	Tonne(s) per hour
t/m^3	Tonne(s)s per cubic metre

Abbreviations	Full Description
Te	Tellurium
Th	Thorium
UCS	Unconfined Compressive Strength
USD or US$	United States Dollar
V	Vanadium
V	Volt
VAT	Value Added Tax
wk	Week
wmt	Wet Metric Tonne
XRF	X-ray Fluorescence
yr	Year
Y	Yttrium
Yb	Ytterbium
Zn	Zinc
Zr	Zirconium

3. RELIANCE ON OTHER EXPERTS

The Technical Report has been prepared by independent QPs as follows: GMS along with Ausenco, KP and P&E with the information, conclusions, opinions and estimated container herein are based on:

- Information available to the Authors and QPs at the time of the preparation of the Technical Report.
- Assumptions, conditions and qualifications as set forth in this Technical Report.
- Data, reports, and other information supplied by the Company and other third-party sources has been vetted and verified where possible; where it was not possible to confirm past information, this material was taken at a lesser / reduced consideration.

In preparing the Technical Report, the QPs have relied upon certain work, opinions and statements of experts. The Authors consider the reliance on other experts as described in this section as being reasonable based on their knowledge, experience and qualifications. The QPs that authored this Technical Report disclaim responsibility for the expert report content used in the following areas:

- Steve Haggarty, P.Eng, Haggarty Technical Services, who worked on the test program with SGS-Lakefield, who summarized the Metallurgy section, and also prepared the estimate for metal recovery, and the interpretation of expected metallurgical performance and for the definition of process design criteria which in turn overlaps with other disciplines and areas of the FS.
- John McBride, Generation PGM, Senior Geologist, who worked to include the geological structure and domain wireframes into the update Mineral Resource Model and property and claim tenure status.
- Ruben Wallin, P.Eng, WESC Inc., worked in the area of environment, permitting and Indigenous interactions.
- Andrew Falls acted in the capacity as a subject matter expert related to concentrate marketing.
- Liam Fitzgerald, Partner, Tax, PwC, worked on the tax section of the FS Model reviewed by PricewaterhouseCoopers LLP for the Company based on a final draft of the FS Model for the Marathon Project provided by GMS for inclusion in the financial analysis and the tax narrative for the Technical Report, both prepared as at February 19, 2021. This information is used in support of the financial analysis.

The results and opinions expressed in this Technical Report are conditional upon the information provided by the Experts listed as being current, accurate and complete as of the effective date of the Technical Report.

The Experts believe that information supplied to be reliable, but does not guarantee the accuracy of conclusions, opinions, or estimates that rely on third party sources for information that is outside the area of technical expertise. As such, responsibilities for the various components of the Summary, Conclusions and Recommendations are dependent on the associated sections of the Technical Report from which those components were developed.

GMS has relied on the Company and its direct advice for guidance on applicable taxes, First Nations consultations, and other government levies or interests, applicable to revenue or income from the Project.

The authors wish to emphasize that they are QPs only in respect of the areas in this Technical Report identified in their “Certificates of Qualified Persons” submitted with this Technical Report to the Canadian Securities Administrators.

This Technical Report is intended to be used by the Company as a “Technical Report” with Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes contemplated under provincial securities laws, any other use of this Technical Report by any third party is at the party’s sole risk.

Permission is given to use portions of this Technical Report to prepare advertising, press releases and publicity material, provided such advertising, press releases and publicity material does not impose any additional obligations upon, or create liability for the Experts.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Marathon Property is located approximately 10 km north of the Town of Marathon, Ontario, which is situated adjacent to the Trans-Canada Highway No. 17 on the northeast shore of Lake Superior. Marathon has a population of approximately 3,200 (2016 census). The Property is approximately 300 km east of Thunder Bay, along Highway 17 and 400 km northwest of Sault Ste. Marie along the same Highway 17.

Local access to the Property is by a gravel road from Highway 17 (Figure 4.1 and Figure 4.2), which lies just north of the Town of Marathon and immediately south of the Property. The centre of the proposed Project footprint sits at approximately 48° 45’ N Latitude, 86° 19’ W Longitude. The primary industry supporting the Town of Marathon is mining.

Figure 4.1 : Regional Location Map

Source: Marathon PGM Corp. (2006).

Figure 4.2: Regional Mining Activity Map

Source: Generation Mining Limited (2019).

4.2 Project Ownership

In 2010, the Property was acquired by Stillwater (NYSE: SWC) from Marathon PGM Corporation (TSX: MAR) for US$118 million. At that time, Stillwater was a palladium and platinum mining company with headquarters located in Littleton, Colorado, USA. Stillwater mined PGMs from the Stillwater igneous complex in south central Montana known as the J-M Reef and recovered metals from spent catalytic converters. In 2017, Stillwater was acquired by Sibanye Gold Limited (NYSE: SBSW) for US$2.2 billion.

On July 11, 2019, Gen Mining (through its wholly-owned subsidiary) had completed the acquisition of a 51% initial interest in the Property, from Stillwater Canada, a wholly owned subsidiary of Sibanye Gold Limited, and entered into a joint venture agreement with respect to the Property. Gen Mining paid to

Stillwater $2.9 million in cash (in addition to the $100,000 previously paid upon signing the letter of intent) and issued 11,053,795 common shares of Gen Mining at a deemed price per common share of $0.2714 (totalling approximately $3 million), for a total consideration payment to Stillwater of $6 million for the initial 51% interest. Gen Mining is now the operator of the joint venture and the Property (unless its interest in the joint venture reduces to a minority interest) and will assume all liabilities of the Property in such operatorship capacity.

On November 30, 2020, Gen Mining (now listed on TSX: GENM) announced that it had completed all the requirements under the joint venture agreement (completing a PEA and spending all joint venture expenditures aggregating $10 million within a period of four years) to increase its interest in the Property and Joint Venture to 80% (the "Second Interest").

With Gen Mining having earned the Second Interest, the joint venture parties will fund expenditures on a pro rata basis (80% funded by Gen Mining and 20% funded by Stillwater Canada) in order to maintain their respective interests in the joint venture, subject to normal dilution provisions.

Following the issuance of the FS (subject of this Technical Report), should the management committee of the joint venture make a positive commercial production decision (as long as Stillwater Canada has a minimum 20% interest in the Property), then Stillwater Canada will have 90 days to exercise an option to increase its participating interest in the joint venture from its current percentage up to 51% (the "Percentage Differential") by agreeing to fund an amount of the total capital costs as estimated in the FS, multiplied by the Percentage Differential, in addition to its pro rata proportion of costs that it would fund at its current participating interest level. Should this option be exercised, Stillwater Canada would have a 51% interest in the Project and become the operator of the Project at such time.

At the effective date of this Technical Report, Gen Mining is the operator of the Project.

4.3 Property Description and Tenure

The original Marathon Property held by Stillwater Canada Inc. from 2010 to 2019 has since been enlarged by Gen Mining through the periodic staking of unpatented mining claims. As summarized in the Appendices, and illustrated in Figure 4.3 below, Gen Mining during the summer of 2019 staked an additional 215 claim blocks totalling 4,558 ha. This increased the land position to 46 leases and 980 claims, or 21,965 ha (219.65 km^2) at the effective date of this Technical Report (Figure 4.3).

The 46 leases are located in Seeley Lake, Pic, O'Neill, Grain and Martinet Lake Townships and total 4,810.2 ha. Claim information, recorded dates and expiry dates are listed in the Appendices.

All claims have been renewed to their respective anniversary dates ranging from 2021 to 2026. Assessment work by the Company will have to be applied by these dates to retain the claims in good standing. The claims are registered in the name of Generation PGM Inc. (Gen PGM) a subsidiary of Gen Mining.

In 2014, Stillwater Canada initiated the conversion of mineral claims comprised of surveyed area CLM509, to a mining lease with surface rights. The survey area CLM509 is west of the Marathon Deposit. The timing for the conversion of CLM509 extended through the implementation of the Ministry of Energy, Northern Development and Mines new MALS system in 2017. The lease was granted on November 25, 2020, lease number 109919. However, since the conversion was initiated with legacy claims, there is no connection to current claim cells in the new MLAS system referencing which cells comprise the new lease 109919. The conversion of claims to lease for 42 boundary cell mining claims is pending clarification from the MENDM. The 42 pending boundary cell mining claims are referenced in the Appendices.

Ontario Mineral Tenure

The Ontario claims information presented in this section is valid as of the effective date of this Technical Report. Currently, the Ministry of Energy, Northern Development and Mines ("MENDM") is in the process of converting from a system of ground staking to a system of online registration of mining claims. The MENDM implemented the new system on April 10, 2018.

Crown lands are available to licensed prospectors for the purpose of mineral exploration. A licensed prospector must first stake a mining claim to gain the exclusive right to explore on Crown land. Claim staking is governed by the Ontario Mining Act and is administered through the Provincial Mining Recorder and Mining Lands offices of the MENDM.

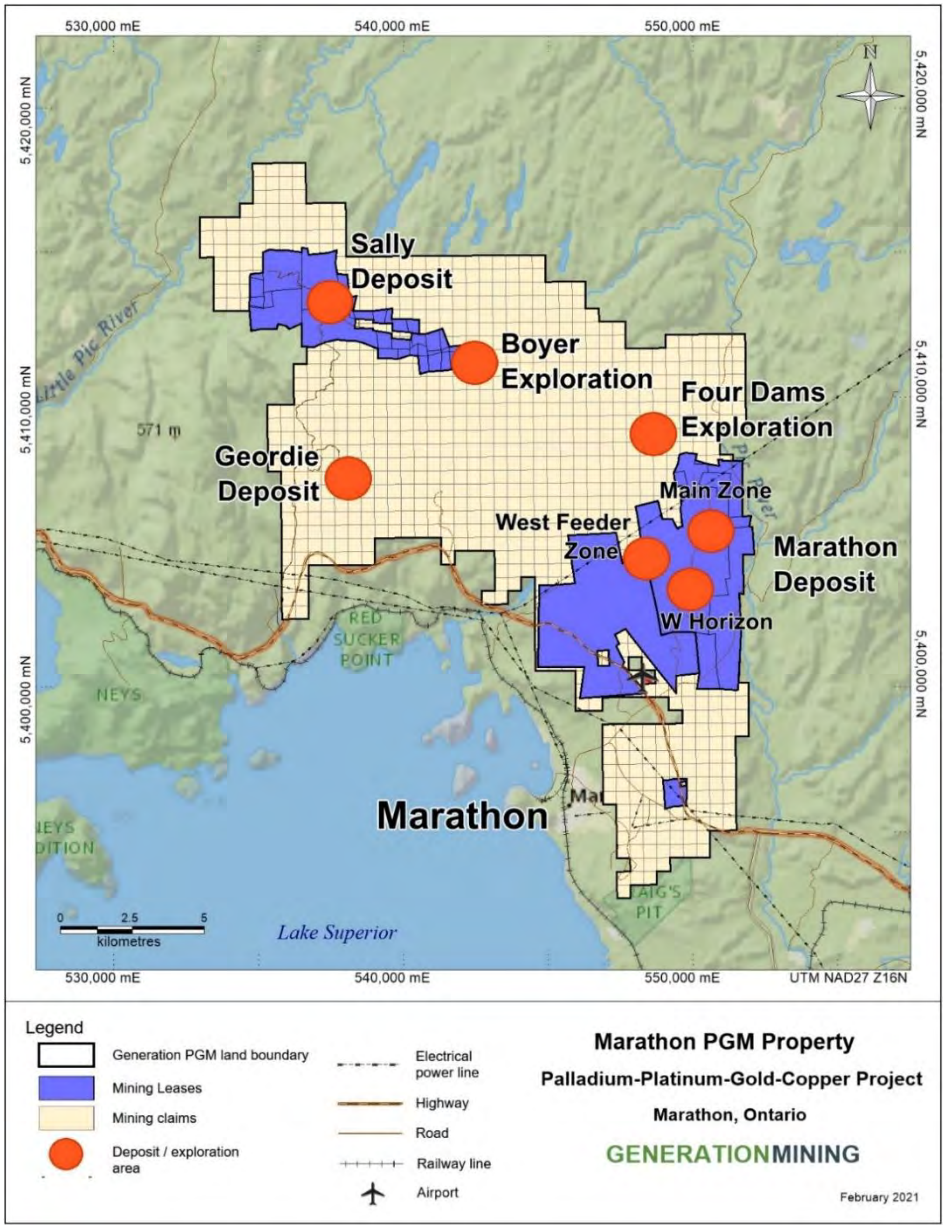
Mining claims can be staked either in a single unit or in a block consisting of several single units. In un-surveyed territory, a single unit claim is laid out to form a 16 ha (40-acre) square with boundary lines running 400 m (1,320 ft) astronomic north, south, east and west. Multiples of single units, up to a maximum of 16 units (256 ha), may be staked with only a perimeter boundary as one block claim.

Upon completion of staking, a recording application form is filed with payment to the Provincial Recording Office. All claims are liable for inspection at any time by the MENDM. A claim remains valid as long as the claim holder properly completes and files the assessment work as required by the Mining Act and the Minister approves the assessment work. A claim holder is not required to complete any assessment work within the first year of recording a mining claim. In order to keep an unpatented mining claim current, the mining claim holder must perform $400 worth of approved assessment work per mining claim unit, per year.

Immediately following the initial staking date, the claim holder has two years to file one year's worth of assessment work. Claims are forfeited if the assessment work is not completed.

A claimholder may prospect or carry out mineral exploration on the land under the claim. However, the land covered by these claims must be converted to leases before any development work or mining can be performed. Mining leases are issued for 21-year terms and may be renewed for further 21-year periods. Leases can be issued for surface and mining rights, mining rights only or surface rights only. Once issued, the lessee pays an annual rent to the province. Furthermore, prior to bringing a mine into production, the lessee must comply with all applicable federal and provincial legislation.

Figure 4.3: Marathon Deposit Claim Location Map



Source: *Gen Mining (2021).*

4.4 Royalties

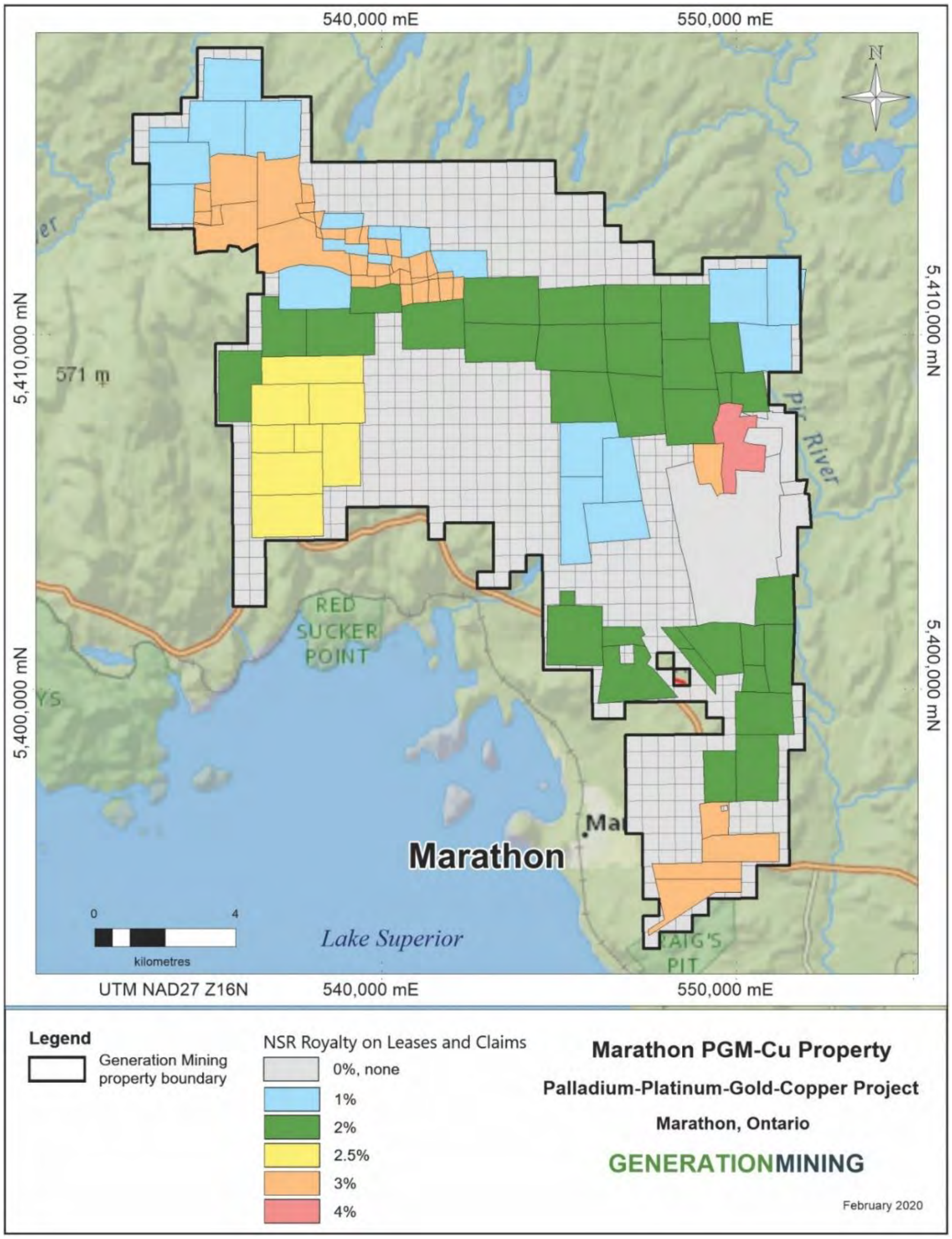
The Property is subject to NSR royalties ranging from 1% to 4% (Figure 4.4). In particular, the top northern extent of the Marathon Deposit (specifically on the North pit) is subject to a NSR royalty of 4%. A complete summary of the encumbrances can be found in Table 4.1.

Table 4.1: Royalties and Agreements Upon Sale of Property to the Current Ownership by Gen PGM

Marathon Project Area – Royalty Agreements			
Party	**Date**	**NSR Value**	**Details**
Fenwick/ Leishman	Aug. 16, 2005	3%	Royalty in favour of Kenneth Fenwick and Don Leishman on mining claims TB 1247007, TB 1247010-11. Gen Mining has the right at any time to acquire up to one-third of the royalty (up to an aggregate of 1% of the royalty) upon a payment of $500,000 for every 0.5% of the royalty purchased.
Seafield	Nov. 2, 2004	2%	Royalty in favour of Seafield Resources Ltd. on mining claim TB 1205330. Gen Mining has the right at any time to acquire up to half of the royalty (up to an aggregate of 1% of the royalty) upon a payment of $1,000,000.
Dunlop	Mar. 21, 2006	3%	In favour of W. Bruce Dunlop on mining claims TB 104122 and TB 104118-104121 inclusive. Gen Mining has the right at any time to acquire up to one half of the royalty (an aggregate of 1.5% NSR royalty) upon payment of $500,000 for every 0.5% of the royalty purchased.
Gionet	May 2007	1%	With a right of first refusal on the sale of the royalty in favour of Brian D. Gionet and Michael Dorval on mining claims 4208442 and 3014935.
Michano/ Gionet	Apr. 21, 2005	2%	In favour of Michano/Gionet on mining claims TB 3012177, TB 3006862, TB 3012173, TB 3019790, TB 4204047-49. Gen Mining has the right at any time to acquire up to one half of the royalty (an aggregate of 1% NSR royalty) upon payment of $1,000,000.
Benton	Mar. 25, 2009	4% and $0.05/t waste mgmt fee	Certain conditions of which were modified by the Benton Resources/Stillwater Mining Co. Agreement dated December 16, 2010 - 2% NSR and $0.05/t waste manage fee in favour of Teck Resources on mining claims 1240016, TB101224-25, TB101578-81, TB101583, TB103572-75, TB103583-84, TB106983, TB103657 and TB107641.
Michano/ Gionet/ Dorval	Jul. 12, 2011	2%	On mining claims TB 4246277, TB 4242127 and TB 4246285. Gen Mining has the right at any time to acquire up to one half of the royalty (an aggregate of 1% NSR royalty) upon payment of $1,000,000.
Michano/ Gionet	Jul. 12, 2011	2%	On mining claims TB 4246283-84. Gen Mining has the right at any time to acquire up to one half of the royalty (an aggregate of 1% NSR royalty) upon payment of $1,000,000.
Yozipovic	Nov. 14, 2011	2%	On mining claim TB3006106. Gen Mining has the right at any time to acquire the 2% NSR from the vendor for a fee of $1,000,000.
Sally Project Area – Royalty Agreements			
Benton/ Gold Royalties Corp.	Dec. 13, 2011	1%	Pursuant to the Benton Agreement dated March 25, 2009, certain conditions of which were modified by the Benton Resources/Stillwater Mining Co. Agreement dated December 16, 2010 - 1% NSR in favour of Stephan Stares on mining leases CLM 121-124, TB101845-47, TB101849-50, TB101864-66, TB101869-71, TB101891-905, TB101910, TB101915-17, TB101924, TB108223-24 and mining claims

Marathon Project Area – Royalty Agreements			
			4204476-78, 4207280-83, 4209025-26, 1240550-55, 1240548-49, 1240017-19, 4207863, 4207856-59, 4207860-61, 4203971-72, 1245401, and 1246640-43. Note: In December 2011, Stares sold one half of the subject royalty (an aggregate of 0.5% NSR) to Gold Royalties Corp. are included in the sale, plus "all lands, interested in lands and mining claims within a 1 km radius from the outside boundaries" in schedule B of the agreement.
Benton "Newmont Royalty"	Dec. 16, 2010	2%	In favour of Newmont (Franco-Nevada) on mining leases CLM 121-124, TB101845-47, TB101849, TB101850, TB101864-66, TB101869-71, TB101891-905, TB101910, TB101915-17, TB101924, and TB108223-24. Note: an annual report to Franco-Nevada is required on the Par Lake property.
Benton	Dec. 16, 2010	1%	In favour of Benton Resources on mining leases CLM 121-124, TB101845-47, TB101849-50, TB101864-66, TB101869-70, TB101871, TB101845, TB101891-905, TB101910, TB101915-17, TB101924, TB108223-24 and mining claims 4204476-78, 4207280-81, 4207282-83, 4209025-26, 1240550-55, 1240548-49, 1240017-19,4207863, 4207856-61, 4203971-72, 1245401, and 1246640-43.
Geordie Project Area			
Wahl	Jul. 8, 2008	2%	In favour of Rudy Wahl, on mining claims 3015131-33. Gen Mining has the right at any time to acquire up to one half of the royalty (an aggregate of 1% NSR royalty) after commencement of commercial production and payment of $1,000,000.
Discovery	Mar. 3, 2008	2.5%	Pursuant to underlying Agreements of record that remained in effect subsequent the acquisition of Discovery PGM Corp. by a predecessor of Stillwater Canada, the Geordie Lake property is encumbered by a 2.5% NSR in favor of Superior Prospects Inc. and Melvin Joa (in aggregate) on mining claims 1184283, 1184297, 1209682-84, and 1237697-99.
Gryphon/ L.E.H. Ventures	Jun. 3, 1999	0%	Gryphon Metals Corp. retains the right upon the completion and presentation of a definitive FS on the Geordie Lake Property to back into a 12.5% interest on the property by paying Stillwater Canada a total of 31.25% of all exploration and development costs incurred on the property to that point.

Figure 4.4: Summary Royalty ("NSR") Map



Source: *Gen Mining (2019).*

4.5 Comment of Property Description and Location

To the extent known to the QP, there are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the Project that have not been discussed in this Technical Report.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY

5.1 Access and Infrastructure

The Property is located at latitude 48°45’ N and longitude 86°19' W. The Property is accessed by paved and gravel roads, approximately 10 km north of the Town of Marathon (Figure 5.1). Regional infrastructure is considered very good with the Trans-Canada highway, CPR railway and a municipal airport all in close proximity to the Marathon Property.

The local site access will be developed off the Camp-19 road minimizing water impacts.

Figure 5.1 : Access Road Photograph

Source: *Gen Mining (2019).*

There are sufficient surface rights available for mining operations inclusive of the processing plant and tailings associated and waste rock storage facilities.

5.2 Climate

The Property climate is typical of northern areas within the Canadian Shield with long winters and short but warm to hot summers. Average annual precipitation in the area was 826 mm for the period 1952-1983, of which 240 mm fell as snow. Average annual surface runoff is approximately 390 mm. The annual average temperature is 1°C with the highest average monthly temperature of 15°C in August and lowest in January of -15°C (Environment Canada).

Operations in this climate require covered buildings. Adverse weather conditions are rarely severe enough to halt an open pit operation for any more than a few hours during low-traction surface conditions during winter storms. Winter conditions are not expected to be noteworthy nor to have a significant impact on annual production.

5.3 Local Resources

Thunder Bay is the largest regional city and is largely the hub for the communities north of Lake Superior. Thunder Bay is approximately 300 km west of the Marathon Property with good connections via the Trans-Canada highway.

The Town of Marathon has a population of 3,273 (2016 census) and is the closest municipality to the Project. There are several active mines in the general area and therefore some local mining services are available in the Town of Marathon.

Electric power from Ontario power grid is readily available for the Project with a new East-West tie crossing the southern limits of the Property. In early 2019, the Minister of the Environment, Conservation and Parks approved the environmental assessment for the East-West Tie transmission project which (once completed) will be a 450 km double-circuit 230 kV transmission line connecting the Lakehead Transfer Station in the Municipality of Shuniah near Thunder Bay to the Wawa Transfer Station located east of the Municipality of Wawa. It will also connect to the Marathon Transformer Station. In addition to this line, the Manitouwadge (M2W) high voltage power line transects the Property northwest of the Marathon Deposit.

A rail line runs a few km south of the Property and shallow water dock facilities are available at Marathon and Heron Bay (Figure 5.2). Telephone and mobile communication infrastructure are readily available regionally and in close proximity to the Property boundary.

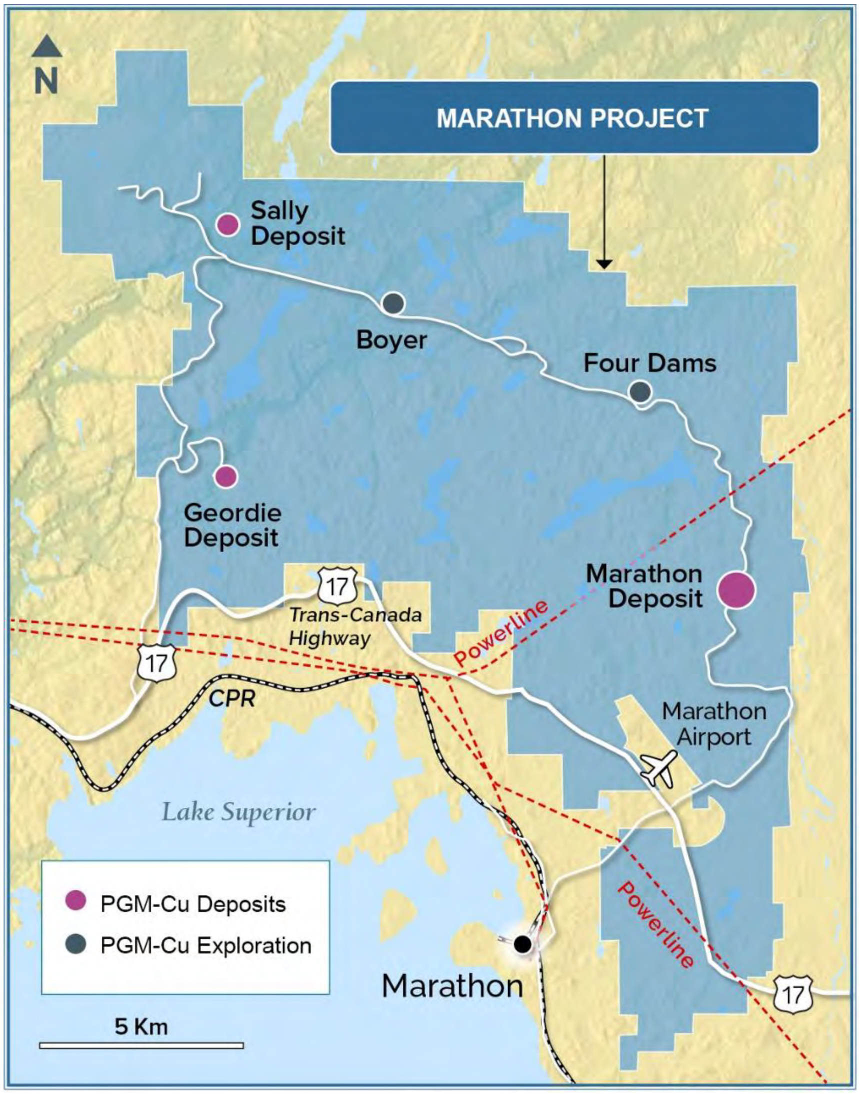
Water is readily available on site from various sources including local lakes and creeks in the area.

The Marathon airport is located immediately north of the Town of Marathon and runs adjacent to Highway 17, near the southwest corner of the Property. Marathon Municipal Airport (CYSP) operates as a Registered Airport (Aerodrome class) under the Canadian Aviation Regulations (CARs; Subsection 302).

The airport is used by private aircraft owners and a few commercial helicopter companies. As of the effective date of this Technical Report, no commercial flight service is available.

Land-use activities in the area include hunting, fishing, trapping and snowmobiling. The existing Property access road is used by anglers to access the Pic River and by snowmobile users in the winter. Sport fishing activity is focused on the Pic River which contains a variety of warm water fish species and in Hare and Bamoos Lakes located northwest of the Property. Pukaskwa National Park is located near the mouth of the Pic River approximately 20 km downstream of the Property.

Figure 5.2: Access, Topography, Physiography Marathon Project Map



Source: *Gen Mining (2020).*

5.4 Physiography

The Property is located in an area of moderate to steep, hilly terrain typical of glaciated areas of the Canadian Shield (Figure 5.3) The surrounding terrain is typical boreal forest cover with significant topographic relief characterized by relatively flat plateaus, truncated at steep cliffs adjacent to a series of creeks and ponds. The vegetation consists of northern hardwood and conifer trees as well as muskeg areas, which are bogs or wetlands common to all boreal forest regions. The land is not used for agriculture. Wildlife includes black bear, wolves, moose, rabbits and various migratory birds.

The site is bounded to the east by the Pic River (Figure 5.4) and Lake Superior to the south and west. The Project site is drained by a total of six primary sub-watersheds, four of which drain to the Pic River whereas the remaining two drain directly to Lake Superior. All other small creeks in the area drain into the Pic River. The interior of the Project site is isolated from both the Pic River and Lake Superior by steep relief (i.e., topography) and therefore many of the higher elevation lakes and streams of this area is fishless. In the instances where fish do occur, the community is limited to small-bodied (forage) fish (EcoMetrix, 2012).

The general elevation around the Project site is slightly higher than the overall regional topography. Ground surface elevations in the area of the Property range from approximately 260 m to over 400 m above sea level with a gradual decrease in elevation from north to south.

Occasional outcrops of gabbro are present on the Property and overburden which consists of boulder till with gabbro and mafic volcanic boulders, ranges from 3 m to 10 m in thickness.

Figure 5.3: Topography Photograph

Source: *Sibanye-Stillwater Website.*

Figure 5.4: Pic River Photograph

Source: *Stillwater Canada (2012).*

5.5 Sufficiency of Surface Rights

There is sufficient surface area for all the required facilities as stated in this Technical Report, including topsoil stockpiles, ore and waste rock storage facilities, tailings storage facilities, processing plant sites and other associated infrastructure.

6. HISTORY

6.1 Exploration History

The Marathon area exploration for copper and nickel deposits started in the 1920s and continued until the 1940s with the discovery of titaniferous magnetite and disseminated chalcopyrite occurrences.

Exploration at the Marathon Project and within the CC began in the early 1960s but it became relatively consistent since 2003. There have been several changes in the approach to exploration over the years, which reflects the evolving understanding of the geology and the deposit model. Early exploration was focused on iron and copper. With the rise in PGM prices, the Project was reevaluated for its PGM potential, expanding the zones of interest. Additionally, the development of access over time has allowed for more continued and lower cost exploration, especially along the northern margin of the CC.

6.1.1 Summary 1964 - 2019

During the past five decades, the Project underwent several phases of exploration and economic evaluation, including geophysical surveys, prospecting, trenching, diamond drilling programs, geological studies, Mineral Resource Estimates, metallurgical studies, mining studies, and economic analyses. These studies have successively enhanced the knowledge base on the Marathon Deposit. The following historical summary of work is taken, in part, from an internal Nordmin Marathon PGM-Cu FS dated March 14, 2014.

In 1963, Anaconda Copper acquired the Property and carried out systematic exploration work including diamond drilling of 32,741 m in 151 drill holes from 1964-1966. This culminated in the discovery of a large copper-PGM deposit. Many of the holes were drilled in areas off the present Property. Anaconda carried out a test pitting program that recovered 23 t of mineralized material and sent it for testing to its Extraction Metallurgy Research Division ("EMRD") facilities. Anaconda conducted a number of metallurgical tests intermittently from 1965 to 1982, as described under in Section 13 - Mineral Processing and Metallurgical Testing. Anaconda's primary objective was to improve metallurgical recoveries of copper and increase the copper concentrate grade. Anaconda discontinued further work on the Project in the early 1980s due to low metal prices at the time.

In 1985, Fleck Resources Ltd. ("Fleck") purchased a 100% interest in the Property with the objective of improving the Project economics by focusing on the PGM values of the Marathon Deposit. Fleck carried out an extensive program, which included re-assaying of the Anaconda drill core, further diamond drilling, surface trenching of the mineralized zones, bulk sampling and a pilot plant testing, at Lakefield Research Limited ("Lakefield"). Fleck drilled a total of 3,627 m in 37 diamond drill holes.

In 1986, H.A. Symons carried out a FS for Fleck based on a 9,000 tpd conventional flotation plant with marketing of copper concentrate. The study indicated a low internal rate of return. In 1987, Kilborn Limited carried out a Pre-feasibility Study ("PFS") for Fleck that included preliminary results from the Lakefield pilot plant tests (Kilborn Limited, 1987). The study envisaged a 13,400 tpd conventional flotation plant with marketing of copper concentrate but the study indicated a low IRR, later confirmed by Teck Corporation ("Teck").

In late 1987, Teck prepared a Preliminary Economic Feasibility Report on Fleck's Marathon Project based on a conventional open pit operation and concluded that the Project was uneconomic due to low metal prices at that time.

In 1987, Euralba Mining Ltd. ("Euralba"), an Australian junior mining company, entered into a joint venture agreement with Fleck.

In 1989, BHP Engineering Pty Ltd. ("BHP") carried out a PFS for Euralba, compiled some 2,500 samples of drill core and had them assayed at Lakefield. Euralia retained Geostat Systems International ("Geostat") to develop a Mineral Resource block model of the Marathon Deposit that was used by BHP to design an optimized open pit. BHP considered several metallurgical processes, including an on-site smelter process.

In 1998, Fleck changed its name to PolyMet Mining Corp.

In 2000, Geomaque Exploration Ltd. ("Geomaque") acquired certain rights to the Project through an option agreement with PolyMet. Under the terms of the November 7, 2000 option agreement, Geomaque could earn a 50% interest in the Property by spending $2,750,000 on exploration or completing a FS by October 31, 2004. The terms of the option agreement also allowed Geomaque to earn an additional 10% interest in the Project by making a payment of $1,000,000 within three months of the fourth anniversary of the option agreement.

Geomaque and its consultants carried out a study of the economic potential of the Project. The study included a review of the geology and drill hole database, interpretation of the mineralized zones, statistics and geostatistics, computerized block model, Mineral Resource estimation, open pit design and optimization, metallurgy, process design, environmental aspects, capital and operating cost estimates and financial modeling. Geomaque also completed 15 diamond drill holes totalling 3,158 m; however, results were not available for incorporation in the study. The internal Geomaque study was presented as a NI 43-101 compliant Technical Report titled "Marathon Palladium Project Preliminary Assessment and Technical Report" dated April 9, 2001.

Marathon PGM Corp. acquired the Project from PolyMet in December 2003 and carried out exploration and various studies from 2004 through 2010. On December 23, 2003, Roscoe Postle Associates Inc. ("RPA") was retained by Marathon PGM Corp. to prepare an independent Technical Report on the Project including an independent Updated Mineral Resource Estimate. The purpose of the Technical Report was to provide an independent assessment of the Project in relation to an initial public offering by Marathon PGM Corp. As part of their assignment, RPA prepared a Mineral Resource Estimate of the Marathon Deposit using the same drill hole database that Geomaque used for its 2001 Mineral Resource Estimate. In addition to the drill hole database, RPA used the assay database from trenches on the Marathon Deposit that were excavated by Anaconda and Fleck.

Marathon PGM Corp. funded programs of advanced exploration and diamond drilling on a continuous basis between June 2004 and 2009. Approximately 617 holes and 113,030 m were drilled from 2004 to 2009 to expand the Mineral Resource and for condemnation holes outside of the proposed open pit area. In 2006, a Technical Report titled "Technical Report and Resource Estimate on the Marathon PGM-Cu Property, Marathon" was prepared by P&E Mining Consultants ("P&E") and dated March 24, 2006. In 2007, P&E authored a second Technical Report titled "Updated Technical Report and Preliminary Economic Assessment on the Marathon PGM-Cu Property, Marathon Area" for Marathon PGM Corp. dated February 19, 2007. An internal study on the Mineral Resource update of the Geordie Palladium-Copper Property was produced on June 4, 2008 and filed on SEDAR. A FS was published in 2008 and updated in January 2010 by Micon/Metchem titled "Technical Report on the Updated Mineral Resource Estimate and Updated Feasibility Study for the Marathon PGM-Cu Project" dated January 8, 2010. P&E was one of the authors of the 2008 Technical Report.

Stillwater and Marathon PGM Corp. entered into an agreement on September 7, 2010 pursuant to which Stillwater would acquire all of the outstanding shares of Marathon PGM Corp. The agreement closed on December 1, 2010. Stillwater subsequently formed a Canadian corporation, Stillwater Canada Inc. (Stillwater Canada). In March 2012, Mitsubishi Corp Mining Ltd. of South Africa (formerly called Coal of Africa Limited) purchased a 25% interest in Stillwater Canada. In March 2014, Nordmin Engineering Ltd. provided Stillwater Canada with an internal FS on the Project. Stillwater Canada drilled a total of 45 holes totalling 10,285 m.

From 2011 to 2017, Stillwater Canada developed trail access and conducted a systematic approach to prospecting, geological mapping, trenching, geophysics and diamond drilling. Stillwater Canada also re-logged over 150 drill holes. A total of 45 holes were drilled and 9,767 m of core was recovered from the holes.

In 2017, Stillwater was acquired for US$2.2 billion by Sibanye Gold Limited (NYSE: SBGL) and renamed Sibanye-Stillwater (NYSE: SBGL).

On July 11, 2019, Gen Mining had (through a wholly-owned subsidiary), completed the acquisition of a 51% initial interest in the Property from Stillwater Canada, a wholly owned subsidiary of Sibanye Gold Limited (which trades as Sibanye-Stillwater), and entered into a joint venture agreement with respect to the Property. Gen Mining has increased its interest in the Property and Joint Venture to 80% by spending $10 million and completing a PEA.

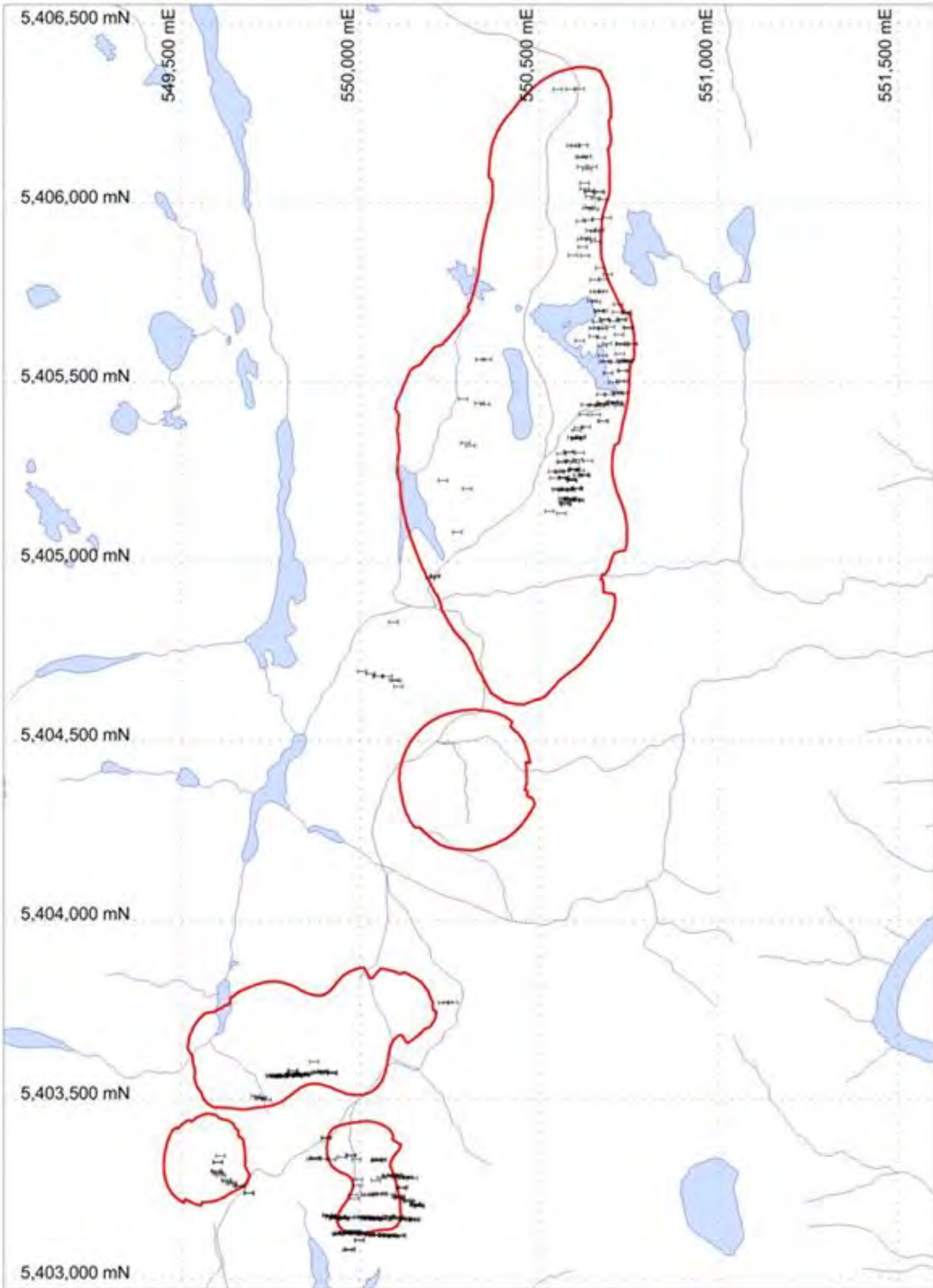
6.2 Historical Trenching

Trenching and the respective channel sampling at the Marathon Deposit were integral to developing an understanding of the mineralization. Special care was taken during preparation of the channel cuts to ensure representative and continuous sampling. The entire trench-related channels were used in the preparation of the historical 2012 Mineral Resource Estimate prepared by P&E. The location of historical trenches with respect to the planned pit outline is presented in Figure 6.1.

Fleck conducted a significant trenching program at approximately 50 m intervals along the length of the Main Zone. Marathon PGM Corp. applied trenching in the southern area of the Marathon Deposit between 2004 and 2006 to help define and delineate the Main Zone and W-Horizon at the surface. Marathon PGM Corp. continued trenching in 2008 just west of the Main Zone to delineate continuity of mineralization located higher up in the stratigraphic section.

A summary of trenching details can be found in Table 6.2.

Figure 6.1: Location Map of Trench Samples Used in Preparation of the 2012 Mineral Resource Estimate



Source: *Generation PGM Inc. (2021).*

6.2.1 Validation of Trench Assay Data in the Main Zone

The Marathon Deposit database contains 1,736 surface sample assays collected from channels that were saw cut along lines spaced 30 to 50 m apart along approximately 2 km of strike length. The channels were cut in approximately straight lines located close to and perpendicular to the base of the Marathon Deposit during the years 1985 to 1986 and 2005 to 2009.

It is assumed that the operator did not add bias to the sampling. This seems reasonable given the disseminated nature of the Marathon Deposit and that the Footwall and Main Zones of the Marathon Deposit are tens of metres thick.

To validate channel samples cut by Fleck, a total of 17 duplicate channel samples were cut beside the historic channels. A comparison of the 1986 and 2012 field duplicate sample data is presented in Table 6.1 and in Figure 6.2.

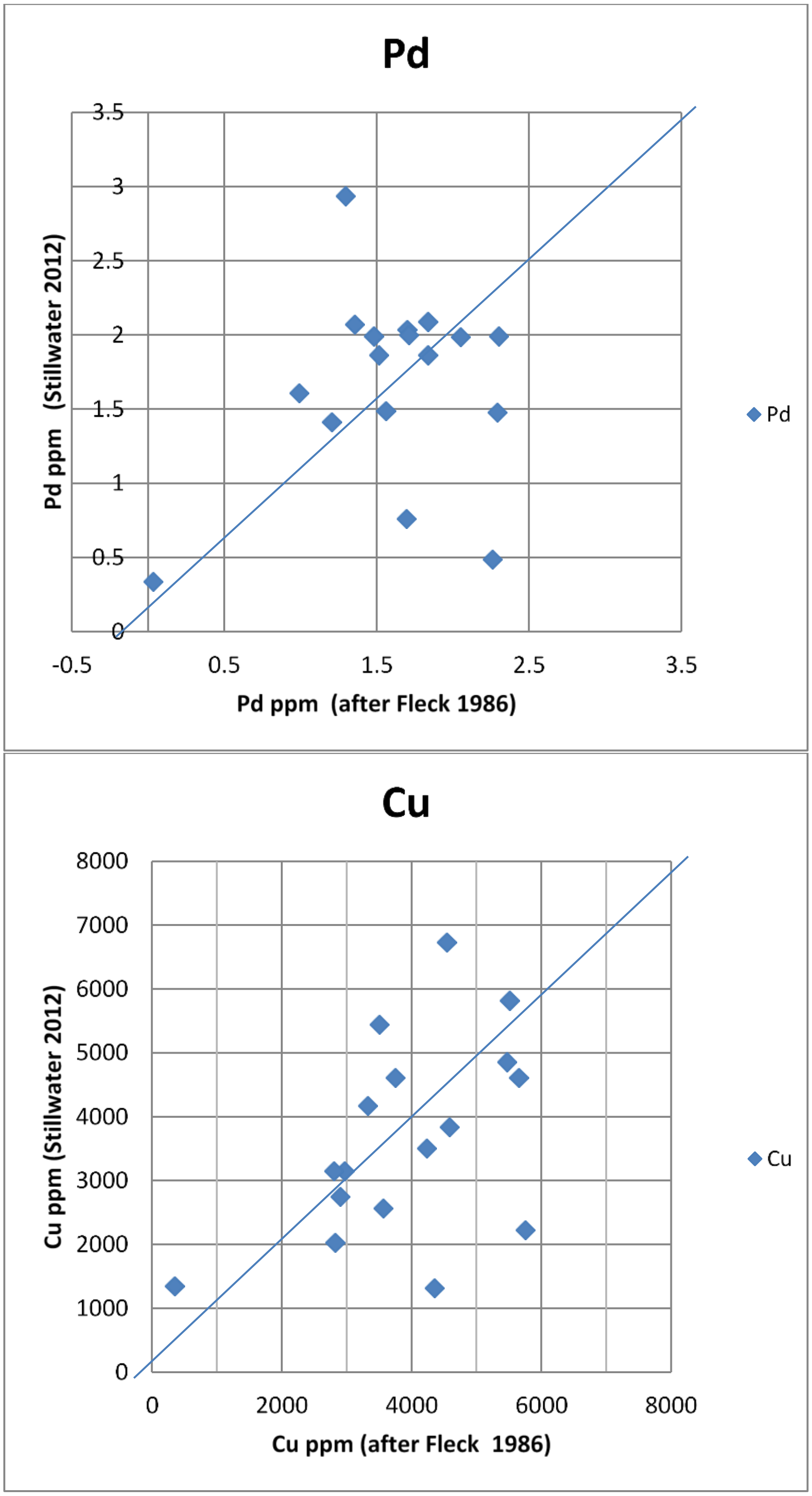
Although the Cu-Cu and Pd-Pd plots (Figure 6.2) exhibit scatter that is typical of field duplicates, the points are distributed in a cluster close to a curve for 1:1 on each plot and the averages for the two sample groups are very close (Table 6.1) and confirms the reliability of using the trench channel cuts in the 2012 Mineral Resource Estimate.

Table 6.1: Comparison of Field Duplicate Channel Samples from 1986 with Samples from 2012

Fleck Trench	From (m)	To (m)	1986 Sample No.	2012 Sample No.	198 Au (g/t)	2012 Au (g/t)	1986 Pt (g/t)	2012 Pt (g/t)	1986 Pd (g/t)	2012 Pd (g/t)	1986 Cu (ppm)	2012 Cu (ppm)
272-1	0.0	1.3	F-3965	K004973	0.090	0.082	0.349	0.334	1.478	2.290	2,030	2,820
272-1	1.3	5.2	F-3966	K004974	0.130	0.116	0.640	0.310	2.938	1.295	6,730	4,540
270-0	0.0	4.1	F-3996	K004975	0.130	0.208	0.383	0.611	2.035	1.700	2,570	3,560
270-0	4.1	9.5	F-3997	K004976	0.085	0.127	0.256	0.224	1.609	0.989	2,750	2,900
270-0	9.5	11.4	F-3998	K004977	0.139	0.199	0.272	0.546	1.992	2.300	4,610	5,650
270-9	0.0	3.2	F-3998	K004978	0.139	0.159	0.272	0.368	1.992	1.480	4,610	3,750
270-9	3.2	5.7	F-3999	K004979	0.119	0.093	0.252	0.343	2.072	1.355	5,450	3,500
270-9	5.7	7.6	F-4000	K004980	0.140	0.181	0.340	0.462	2.001	1.710	5,820	5,510
270-25	0.0	1.9	F-9801	K004981	0.103	0.226	0.302	0.552	1.986	2.050	4,860	5,470
270-25	1.9	6.0	F-9802	K004982	0.310	0.095	0.310	0.464	2.089	1.835	4,170	3,320
270-25	6.0	10.5	F-9803	K004983	0.280	0.141	0.640	0.431	1.865	1.835	3,150	2,970
270-25	10.5	15.4	F-9803	K004984	0.280	0.135	0.640	0.573	1.865	1.515	3,150	2,800
270-25	15.4	20.3	F-9804	K004985	0.048	0.144	0.550	0.611	1.489	1.560	3,510	4,230
270-25	20.3	25.1	F-9805	K004986	0.068	0.092	0.216	0.230	1.413	1.205	3,840	4,580
270-9	7.6	12.1	F-9806	K004987	0.073	0.134	0.234	0.563	0.762	1.695	2,230	5,750
270-9	12.1	17.0	F-9807	K004988	0.073	0.299	0.150	0.345	0.487	2.260	1,320	4,350
270-9	17.0	19.4	F-9808	K004989	0.034	0.015	0.116	0.038	0.339	0.034	1,350	345
Average					0.132	0.144	0.348	0.412	1.671	1.595	3,656	3,885

Note: 1 g/t = 1 ppm.

Figure 6.2: Comparison of Duplicate Field Channel Samples from 1986 and 2012



Source: *Stillwater Canada (2012).*

6.3 Historical Drilling

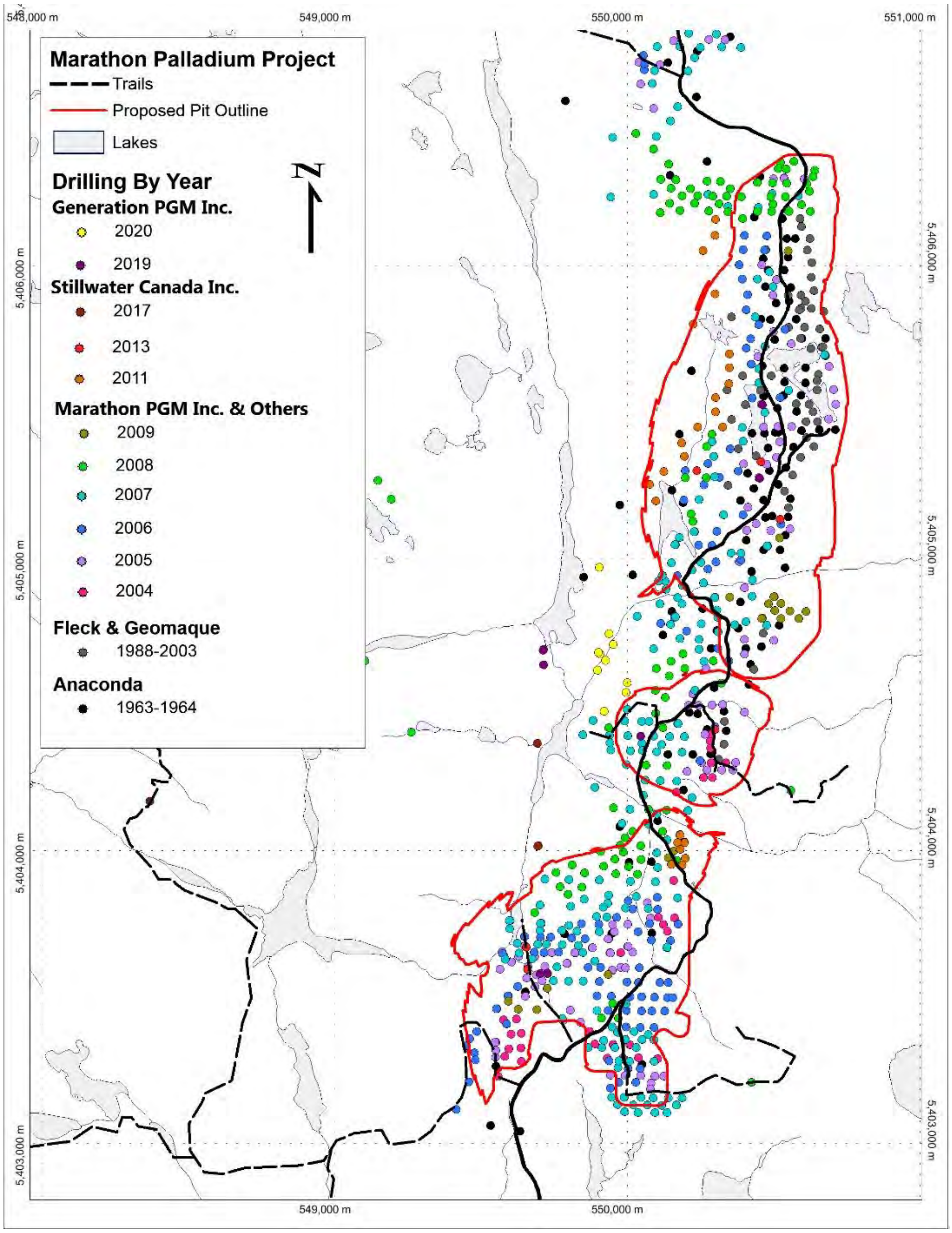
A summary of previous diamond drilling (prior to July 11, 2019) on the Project is listed in Table 6.2. All historical drill holes are plotted in UTM NAD 27 Zone 16N (Figure 6.3).

Table 6.2: Summary of Historical Drilling and Trenching on the Marathon Property, 1964-2019

Company	Year	No. of Holes / Trenches	Total Length (m)
Drilling Data			
Anaconda	1964-1966	151	32,741.3
Fleck	1980s	37	3,627.2
Geomaque	2000	15	3,158.0
Marathon	2004	32	4,080.0
Marathon	2005	102	14,601.9
Marathon	2006	108	21,799.0
Marathon	2007	205	39,781.1
Benton	2005-2007	50	9,198.0
Various - Geordie	1987-2010	61	9,647.2
Various - Sally	1991-2017	82	16,975.1
Marathon	2008	99	21,238.8
Marathon	2009	21	2,333.3
Stillwater Canada	2011	35	6,552.5
Stillwater Canada	2013	6	1,399.5
Stillwater Canada	2017	22	5,925.0
Sub-Total		**1,026**	**193,057.9**
Trenching by Location			
Marathon Trenches	2004-2009	62	4,221.1
Sally Trenches	1991-2017	59	1,870.7
Total		**1,147**	**199,149.7**

RPA (2004) stated that it was its understanding that all drill hole collars in the area of the Marathon Deposit have been surveyed; however, exploration holes outside of that area have not been surveyed. All drill hole collar co-ordinates use the Universal Transverse Mercator ("UTM") NAD 27 Zone 16N grid system in the Geomaque database. The Anaconda holes appear to have been surveyed for downhole dip only. The Fleck holes also appear to have been surveyed downhole; however, for dip only. The Geomaque holes were surveyed down-hole using a gyroscopic instrument and little hole-deviation was noted.

Figure 6.3: Diamond Drill Hole Locations, Marathon Deposit, Organized by Exploration Companies



Source: Gen Mining (2021)

6.4 Historical Geophysical Surveying

Several geophysical surveys have been conducted over the Marathon Property. These are summarized in Table 6.3.

Table 6.3: Summary of Geophysical Surveys

Year	Survey Type
2005	IP/Resistivity & Magnetics by JVX
2007	Geophysical Survey Report: Insight Section Array Induced Polarization and Resistivity Surveys. February 2007 Insight Geophysics Inc.
2007	Geophysical Survey Report: Insight Section Array Induced Polarization and Resistivity Surveys May 2007 Insight Geophysics Inc.
2008	Heliborne AeroTEM System EM and Magnetic Survey Superior Block March 2008 by Aeroquest International
2011	Heliborne High Resolution Aeromagnetic and Spectrometric Survey June 2011 Geo Data Solutions GDS Inc.
2012	Gravity Survey of the Marathon PGM-Cu Deposit August 2012
2015	Hole to hole 3D Borehole IP, July 2015, Abitibi Geophysics
2016	Surface pulse-EM survey, Oct 2016, Crone Geophysics
2018	Passive seismic tomography survey, Aug 2018, PACIFIC
2018	High resolution ground gravity survey, Oct 2018, Abitibi Geophysics

In 2005, induced polarization (“IP”) / Resistivity and magnetometer surveys were carried out over portions of the Property by JVX Limited (“JVX”). The survey results are presented in a report by JVX titled "IP/Resistivity and Magnetic Surveys Marathon PGM-Cu Project Marathon Area, Ontario". The work involved approximately 14.7 km of IP / Resistivity survey on a grid of east/west lines spaced on either 50 or 100 m centers. In addition, three more widely spaced lines were surveyed. The purpose of the survey was to delineate disseminated sulphide zones believed to contain copper and PGM mineralization. A magnetometer survey was also carried out on the same lines that were surveyed by IP / Resistivity.

Observations Concluded:

1. The Property, from an IP perspective, is divided along a north-south axis near the grid centre. East of this line the resistivity is generally higher than to the west probably reflecting a more felsic lithology. The resistivity on the west side of the Property is quite variable with north-south trending zones of low resistivity especially apparent in the southern part of the survey where these zones can be traced across adjacent lines.

2. The total magnetic intensity map is similar to the resistivity map with generally higher magnetic intensities recorded to the east and variable results with north-south trending magnetic lineations to the west. Magnetic dipole pairs are oriented east-west, consistent with near surface, linear north-

south trending sources. The margins of magnetic highs tend to be spatially associated with the resistivity lows.

3. The chargeability map reveals a clear zoning similar to that shown in the magnetic and resistivity maps. Chargeability is localized into a broad north-south band. Based on the survey results, exploration targets were selected and recommendations made for drill testing.

3-D magnetic inversion modeling was performed on the Property by JVX during the early part of 2005. The modeling was performed on merged aeromagnetic data covering the Project area. The underlying aeromagnetic data was derived from the data produced during "Operation Treasure Hunt" (Ontario Geological Survey, 2002) and from the Master Aeromagnetic Dataset for Ontario (Ontario Geological Survey, 1999). Small cell sizes (25 m cells) were used in an effort to provide better resolution of target geometry.

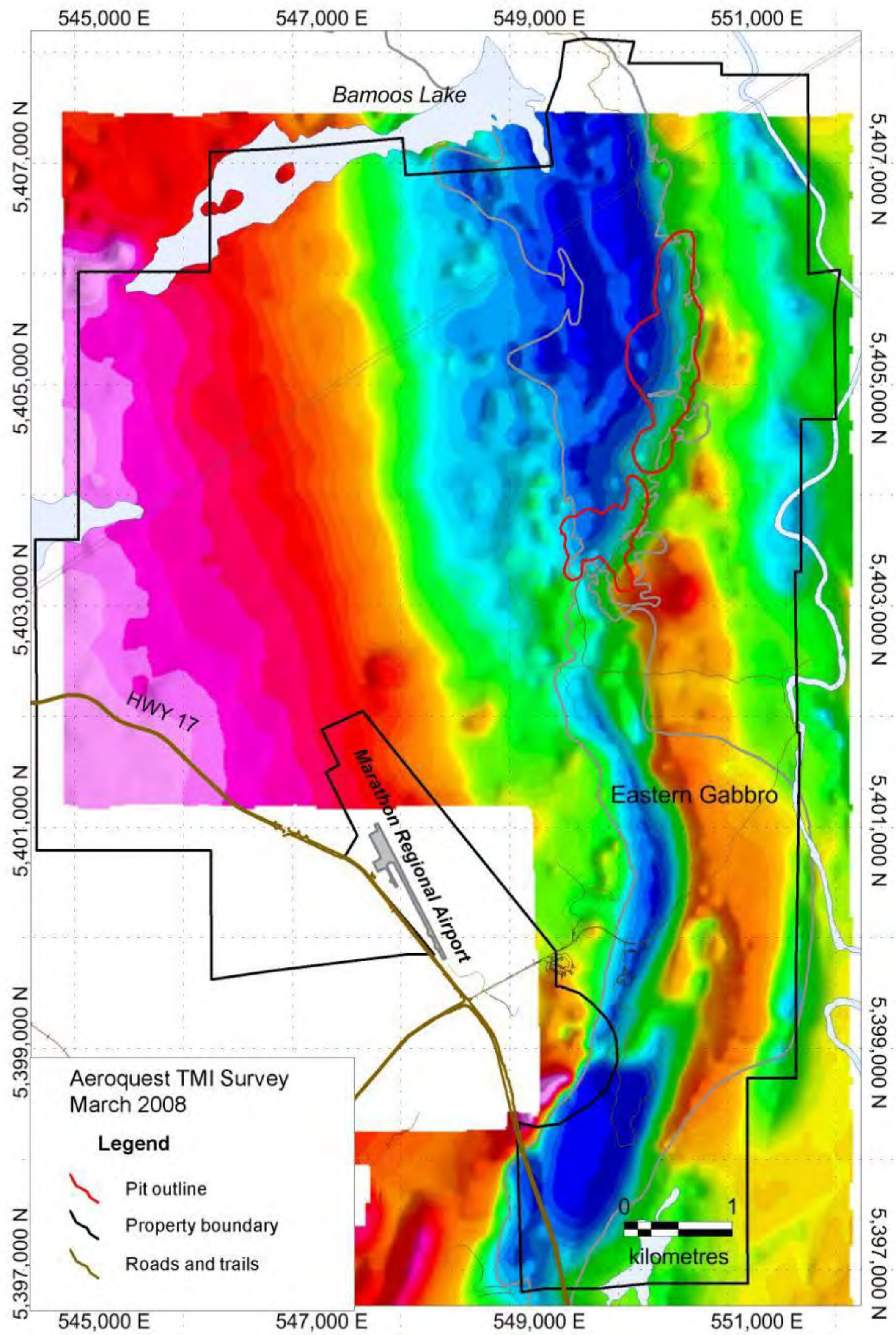
The PGM mineralization appears to be associated with a strong north-south negative magnetic trend. The main objective of the modeling was to determine the geometry of the source producing the negative magnetic trend with the possibility of outlining any embayment that could be favourable to hosting wider zones of the targeted mineralization.

A time domain IP/resistivity survey was conducted by Insight Geophysics Inc. (“Insight”) on the Property (Figure 6.4). The purpose of the survey was to acquire high density apparent resistivity and chargeability measurements from near surface to depths up to 500 m. The survey was conducted from January 21, 2007 through to February 21, 2007 and consisted of seven lines orientated east-west and covered a total of 6,725 m.

A second survey was conducted by Insight between May 4 and May 20, 2007 to extend the previous survey to the north with an additional east-west line (5,405,450 N) and to join all the surveys with a north-south line. Two lines totalling 4,000 m were surveyed.

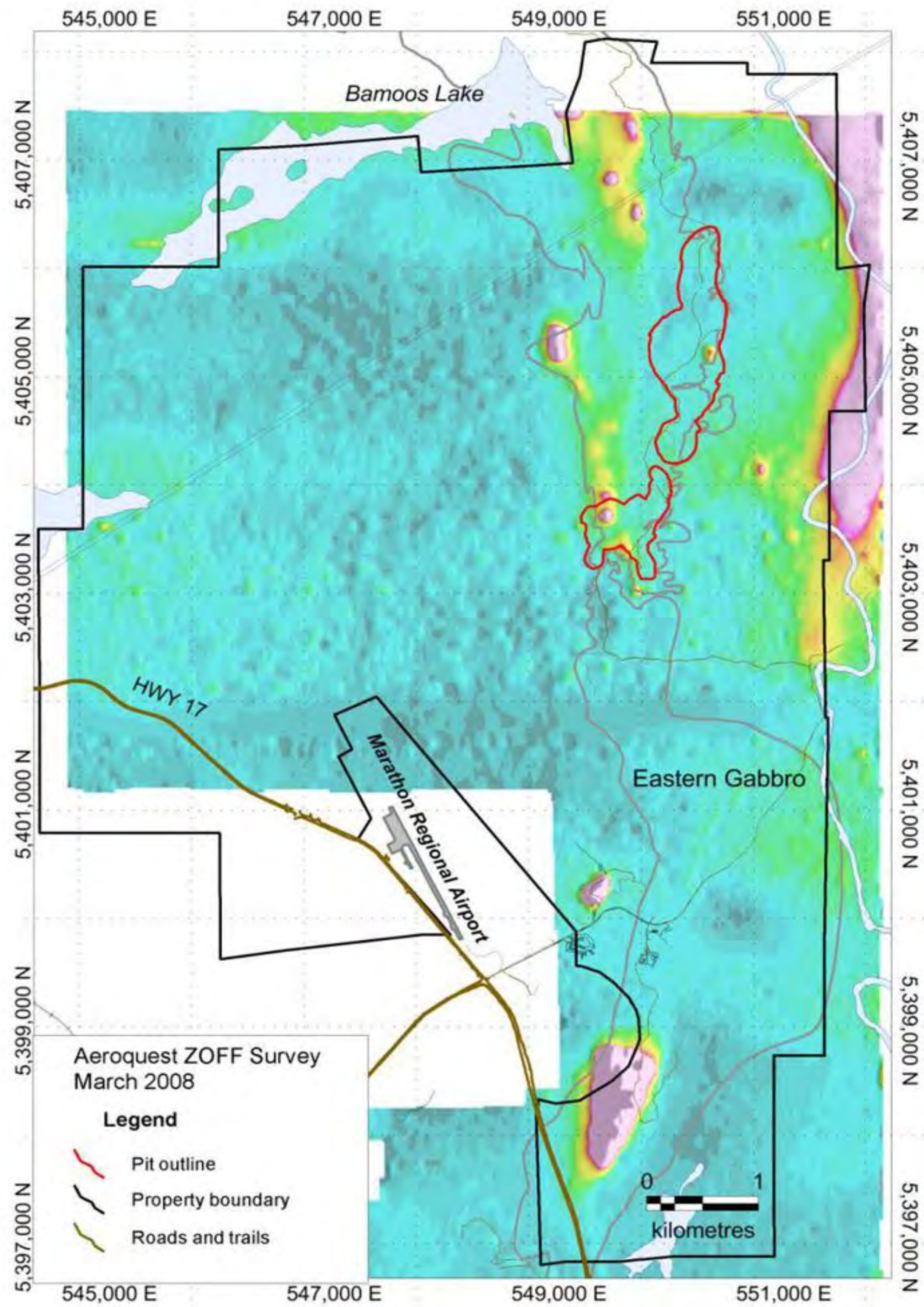
A high resolution, helicopter-borne aeromagnetic (total magnetic field) and AeroTEM electromagnetic survey was conducted by Aeroquest International Inc. between December 20, 2007 and January 12, 2008 (Figure 6.5). Traverses were spaced 100 m with an orientation of 090° and control lines were flown perpendicular to the survey lines with a spacing of 850 m. A total of 844 line-km was flown for the survey.

Figure 6.4: Magnetometer Survey Results Over the Marathon Property



Source: *Stillwater Canada Inc. (2014).*

Figure 6.5: AeroTEM Survey Results Over the Marathon Property



Source: *Stillwater Canada (2017).*

A high resolution, helicopter-borne aeromagnetic (total magnetic field) and spectrometric (gamma-ray spectrometric) survey was conducted by Geo Data Solutions GDS Inc. (“GDS”). The survey was conducted between June 3 and June 9, 2011. Traverses were spaced 100 m with an orientation of N0°E and control-lines were spaced 1,000 m with an orientation of N90°E. In total 2,505 km were flown for the survey. The survey was conducted in collaboration with Rare Earth Metals Inc. and covers the Coldwell Complex. Data is useful in exploration over the Bermuda Property; however, over the Property the total magnetic data duplicated data collected previously by Aeroquest.

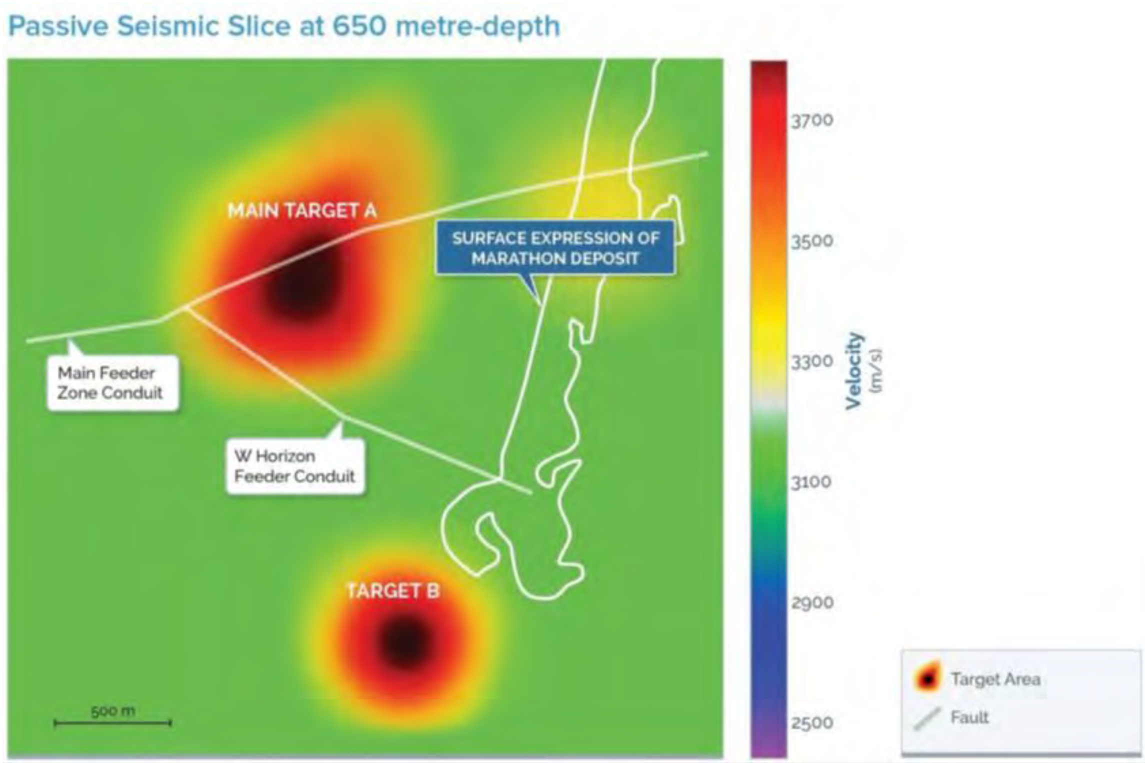
Hole to hole borehole IP was utilized in 2015 conducted by Abitibi Geophysics at the W-Horizon to attempt to define a conductive zone within the higher sulphide portion of the high-grade PGM Zone. However, due to magnetite content the Two Duck Lake Gabbor, the chargeability of the zone was not informative.

Following up on conductive zones identified at the Marathon Project by the Geo Data Solutions GDS Inc. aeromagnetic survey, a surface pulse-EM survey was completed by Crone Geophysics in 2016. The survey confirmed and modeled three conductive zones below the W-Horizon. Historic drilling pierced several of the conductive zone, which correlate to massive pyrrhotite zones along the basement contact.

In 2018, a 3-D passive seismic survey was conducted over a portion of the Property covering the feeder zones. Past drilling had identified two of the likely conduits for the magma that originally formed the Main Zone and W Horizon Deposits which contain the majority of the historic Mineral Resources on the Property.

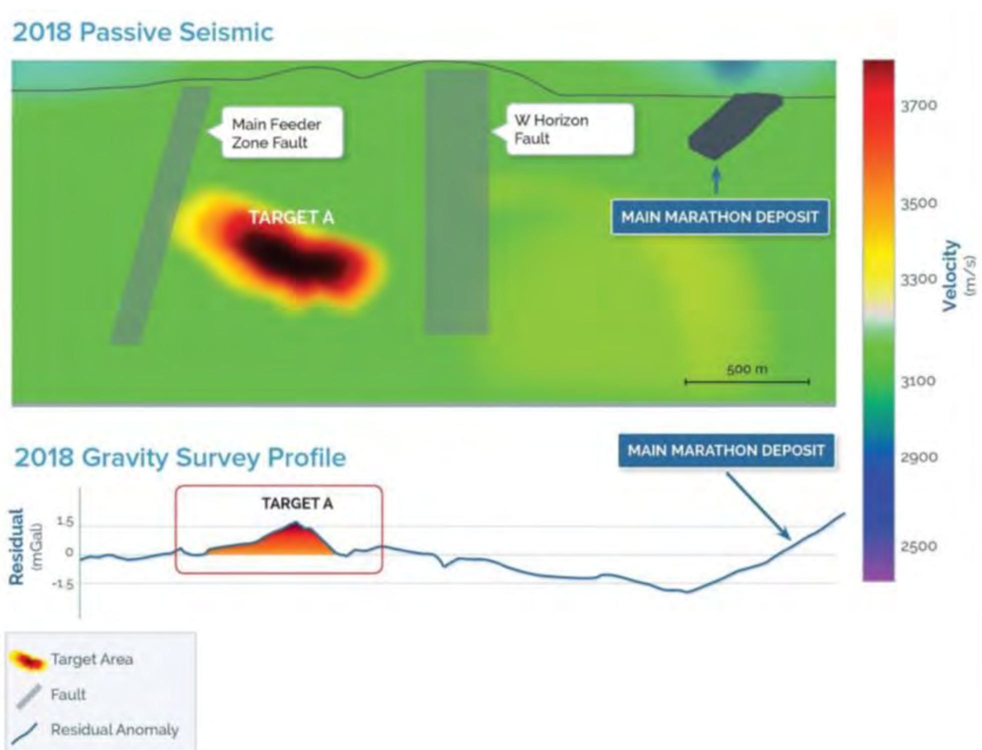
The survey defines high velocity zones which correlate to higher density lithologies. Gabbros of the Marathon Deposit are slightly higher in density than the volcanic footwall and overlying syenites. The survey was able to model the boundary of the footwall topography to the Marathon intrusion and defined the down dip extension of the deposit in a stepping formation. The survey also outlined high density zones at depth below the Marathon Deposit and down dip along the feeder zones. One of the velocity anomalies located approximately 1 km west of the Main Zone proximal to the Main Feeder Zone Fault measures approximately 800 m x 400 m horizontally and is shown at about 650 m in depth with the top of the target at approximately 500 m below surface. The accompanying idealized section view is presented in Figure 6.5 and Figure 6.7. Abitibi Geophysics completed a 1.5 km high resolution ground gravity survey over the central portion of the passive seismic survey. A positive residual gravity feature is coincident with the high velocity seismic anomaly referred to Main Target A as shown in Figure 6.6 and Figure 6.7.

Figure 6.6: Seismic Data Revealing Potential Feeder Zones



Source: *Generation Mining Limited (2019).*

Figure 6.7: Seismic Data Profile on Potential Feeder Zones



Source: *Gen Mining (2019).*

6.5 Geological Mapping

As part of the 2005 summer exploration program, a detailed geological survey was carried out over the same grid that was established for the geophysical surveying. Approximately 15.0 line-km of mapping and prospecting was conducted. The results of the geological mapping program were incorporated into the existing geological database. Geological mapping also continued through 2007-2009 summer exploration programs. Geological mapping was carried out between 2014-2018 at Sally, Four Dams to Boyer to update historic mapping into the current geological legend.

6.6 Historical Mineral Resource and Mineral Reserve Estimates

Historical Mineral Resource Estimates on the Marathon Deposit are summarized in Table 6.4. The estimates are difficult to compare because some utilize cut-off grades, and some are without, and they are at different metal prices and recovery assumptions. They are not necessarily compliant with NI 43-101.

Table 6.4 : Historical Mineral Resource Estimates - Marathon Deposit

Estimator Date	Tonnes (M)	Pd (g/t)	Pt (g/t)	Cu (%)	Cut-off Value
Anaconda, 1984	31.3	1.34 combined		0.47	N/A
Kilborn, 1986	42.6	1.51	0.41	0.46	N/A
Kilborn, 1987	36.9	1.10	0.27	0.38	$12/t NSR
Geostat, 1988	29.4	1.02	0.26	0.36	$16/t NSR
Geomaque, 2001	21.3*	1.32	0.34	0.40	0.8 g/t Pd
RPA, 2004	62.5*	0.79	0.20	0.30	0.15% Cu
P&E, 2006	68.3*	0.91	0.25	0.32	$12/t NSR
Micon, 2009	114.8*	0.78	0.23	0.24	$10.50/t NSR

** Measured + Indicated.*

6.6.1 Geomaque 2001 Mineral Resource Estimate

Walford and Hendry (2001) estimated Mineral Resources for the Marathon Deposit at a series of Cu cut-off grades, most of which are listed in Table 6.5.

Subsequent to the April 2001 Mineral Resource Estimate, Geomaque added its drill holes to the database and modified the geological interpretation by defining a high-grade zone (>0.7 Pd+Pt+Au) within the previously defined broader mineralized zone. Instead of kriging, Geomaque used ID3 to interpolate block grades within each zone using only drill hole composites within the respective zones. Geomaque used the same search strategy and Mineral Resource classification parameters as for the April 2001 estimate. The September 2001 Mineral Resource Estimate, as shown in Table 6.5, was reported in a Geomaque press release dated October 16, 2001.

Table 6.5: Marathon Deposit Mineral Resource Estimate, Geomaque (September 2001)

Classification	Tonnes (M)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)
Measured	8.1	1.40	0.37	0.12	0.41%
Indicated	13.1	1.28	0.33	0.11	0.39%
Measured + Indicated	**21.3**	**1.32**	**0.34**	**0.12**	**0.40%**
Inferred	8.2	1.24	0.32	0.12	0.39%
Mineral Resource Estimate reported at 0.8 g/t Pd cut-off grade					

Source: *Geomaque (2001).*

6.6.2 RPA 2004 Mineral Resource Estimate

RPA prepared a Mineral Resource Estimate on the Marathon Deposit using the same drill hole database that Geomaque used for its 2001 Mineral Resource Estimates.

RPA's Mineral Resource Estimate used a geostatistical approach, whereby grades were interpolated into a block model by ordinary kriging. Variography was used to develop the kriging parameters.

The RPA Mineral Resource Estimate was classified as Measured, Indicated and Inferred based on drill hole spacing relative to the variogram ranges, and apparent continuity of the mineralized lenses. In general, Measured Mineral Resources were near-surface where drill hole and trench spacing is in the order of 25 m. The RPA Mineral Resource Estimate is presented in Table 6.6.

Table 6.6: Marathon Deposit Mineral Resource Estimate, RPA 2004

Classification	Tonnes (M)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)
Measured	11.1	0.91	0.22	0.08	0.29%
Indicated	51.4	0.76	0.20	0.07	0.31%
Measured + Indicated	**62.5**	**0.79**	**0.20**	**0.07**	**0.30%**
Inferred	10.3	0.53	0.19	0.06	0.22%
Mineral Resource Estimate reported at 0.15% Cu cut-off grade					

6.6.3 P&E 2006 Mineral Resource Estimate

P&E prepared a Mineral Resource Estimate on the Marathon Deposit using an additional 21,800 m in 108 holes drilled in 2006. Approximately 60% to 65% of the drilling was in-fill and delineation on the Main, South Resource, Malachite and RD Zones on a 25 to 50 m spacing. The remaining 35% to 40% of the drilling was exploration in the Walford, BR, Splat and SW Malachite Zones on spacing from 25 to 50 and 100 m.

P&E's Mineral Resource Estimate used a geostatistical approach, whereby grades were interpolated into a block model by the inverse distance squared ("ID2") method. Variography was used to develop the search ellipsoid parameters.

The P&E Mineral Resource Estimate was classified as Measured, Indicated and Inferred based on drill hole spacing relative to the variogram ranges and geological/geometrical continuity of the mineralized domains. Measured Mineral Resources were developed where drill hole and trench spacing was in the order of 25 to 60 m depending on domain. The P&E Mineral Resource Estimate is presented in Table 6.7.

Table 6.7: Marathon Deposit Mineral Resource Estimate, P&E 2006

Classification	Tonnes (M)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)
Measured	37.5	0.99	0.26	0.10	0.35
Indicated	30.8	0.80	0.24	0.09	0.30
Measured + Indicated	**68.3**	**0.91**	**0.25**	**0.09**	**0.32**
Inferred	1.9	1.02	0.33	0.13	0.23
Mineral Resource Estimate reported at $12/t NSR cut-off					

6.6.4 Micon 2009 Updated Mineral Resource Estimate

The revised Micon 2009 Mineral Resource Estimate for the Marathon Deposit was undertaken by Sam Shoemaker, MAusIMM, and Charley Murahwi, P.Geo., of Micon with the assistance of David Good, Ph.D., P.Geo., V.P. Exploration of Marathon PGM Corp.

A review of the basis for the previous Mineral Resource Estimate (geologic cross-sections) was completed by Micon with an additional 21 new drill holes (effective date December 16, 2009). The new in-fill drilling required that an updated cross-sectional interpretation be completed before an updated Mineral Resource Estimate could be established. In order to better represent the geology of the Marathon Deposit, a new block model was constructed which used an unfolding technique on the sample search ellipsoid. This approach allowed a search ellipsoid to better reflect the actual trend of the mineralization. In addition, smaller block sizes were used in the mineralized zones to further help delineate the Mineral Resources.

The diluted block model was exported to Whittle where the model was prepared for optimization. A number of pit optimization runs were completed along with extensive sensitivity analysis. Table 6.8 shows the Mineral Resources contained within the selected optimized pit shell.

Table 6.8: Marathon Deposit Mineral Resource Estimate, Micon 2009 (Diluted Block Model)

Classification	Tonnes (M)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)
Measured	94.3	0.85	0.24	0.09	0.26
Indicated	20.5	0.45	0.16	0.06	0.14
Measured + Indicated	**114.8**	**0.78**	**0.23**	**0.08**	**0.24**
Inferred	6.2	0.31	0.10	0.05	0.15
Mineral Resource Estimate reported at $10.50/t NSR cut-off					

6.6.5 Micon 2019 Mineral Reserve Estimate

The Mineral Resource model used for the pit optimization, pit design, and production scheduling was the diluted block model developed and updated by Micon in 2009 and used to estimate the Mineral Resources. Only material in the block model with the Mineral Resource classification of 'Measured' or 'Indicated' were considered as potential process plant feed. In addition to the estimated grade values for Cu, Pd, Pt, Au, Ag, and Rh contained within the diluted block model, other variables were calculated or input into the diluted block model. These included the NSR, geotechnical parameters, block economic net value, haulage simulation results, block material type, and Whittle rock types.

Pit optimization was completed using a Lerchs-Grossmann algorithm ("LG") on the block model. Once a pit optimization was completed, the selected pit shell was used as a design basis for the open pit. Three major mining pit areas were designed; the North pit, South pit, and Malachite pit. For each pit a production schedule was prepared, followed by equipment selection and estimation of operating costs, capital costs and personnel requirements.

Mineral Reserves were estimated for the North, South and Malachite pits and are summarized in Table 6.9.

6.6.6 Micon 2010 Feasibility Study

Marathon PGM Corp. retained Micon to update a FS on the Marathon Property. The prior FS had been completed in December 2008 (Technical Report on the Updated Mineral Resource Estimate and Feasibility Study for the Marathon PGM-Cu Project, Marathon, Ontario, Canada, dated February 2, 2009). As part of this update of the FS, Micon prepared an updated Mineral Resource Estimate, a new open pit mine design and new mine schedule, and a new Mineral Reserve Estimate. The Technical Report presented the updated Mineral Resource and Reserve estimates and discussed the results of the updated FS for the Marathon Project. The effective date of the updated FS was November 24, 2009 (Technical Report on the Updated Feasibility Study for the Marathon PGM-Cu Project, Marathon, Ontario, Canada, dated January 8, 2010).

The design of a 22,000 tpd process plant comprised primary crushing, secondary crushing, high pressure grinding rolls (“HGPR”), ball milling, flotation, concentrate dewatering and process solids (tailings) disposal. The concentrator was designed to produce a copper sulphide flotation concentrate containing PGM and gold. The LOM capital cost estimate was $495 million comprising $351 million of pre-production capital and $144 million of sustaining and closure capital. The estimated total average LOM unit operating cost was $16.64/t.

The Micon FS completed on the Project demonstrated the potential to generate strong cash flow under appropriate metal price assumptions of US$2.91/lb Cu, US$1,346.65/oz Pt, US$321.44/oz Pd, US$819.22/oz Au, US$14.10/oz Ag, and an exchange rate of C$/US$ = 1.099. The base case results showed that the Project generated an IRR of 21.2% before-tax and 17.4% after-tax. The undiscounted payback period was 4.4 years, and the discounted cash flow was positive after 6 years. The NPV at a 6% discount rate was $250.7 million after tax. The sensitivity studies demonstrates that the Project was quite sensitive to adverse changes in price assumptions and moderately sensitive to changes in operating cost or capital expenditure. As a result of its FS on the Project, Micon recommended that Marathon PGM Corp. proceed with the development of the Project.

Table 6.9: Marathon Deposit Mineral Reserve Estimate, Micon 2010

Category	Tonnes (M)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)
Proven	76.5	0.91	0.25	0.09	0.27
Probable	15.0	0.44	0.15	0.06	0.14
Proven & Probable	**91.5**	**0.83**	**0.24**	**0.09**	**0.25**
Mineral Reserve Estimate reported at $10.50/t NSR cut-off					

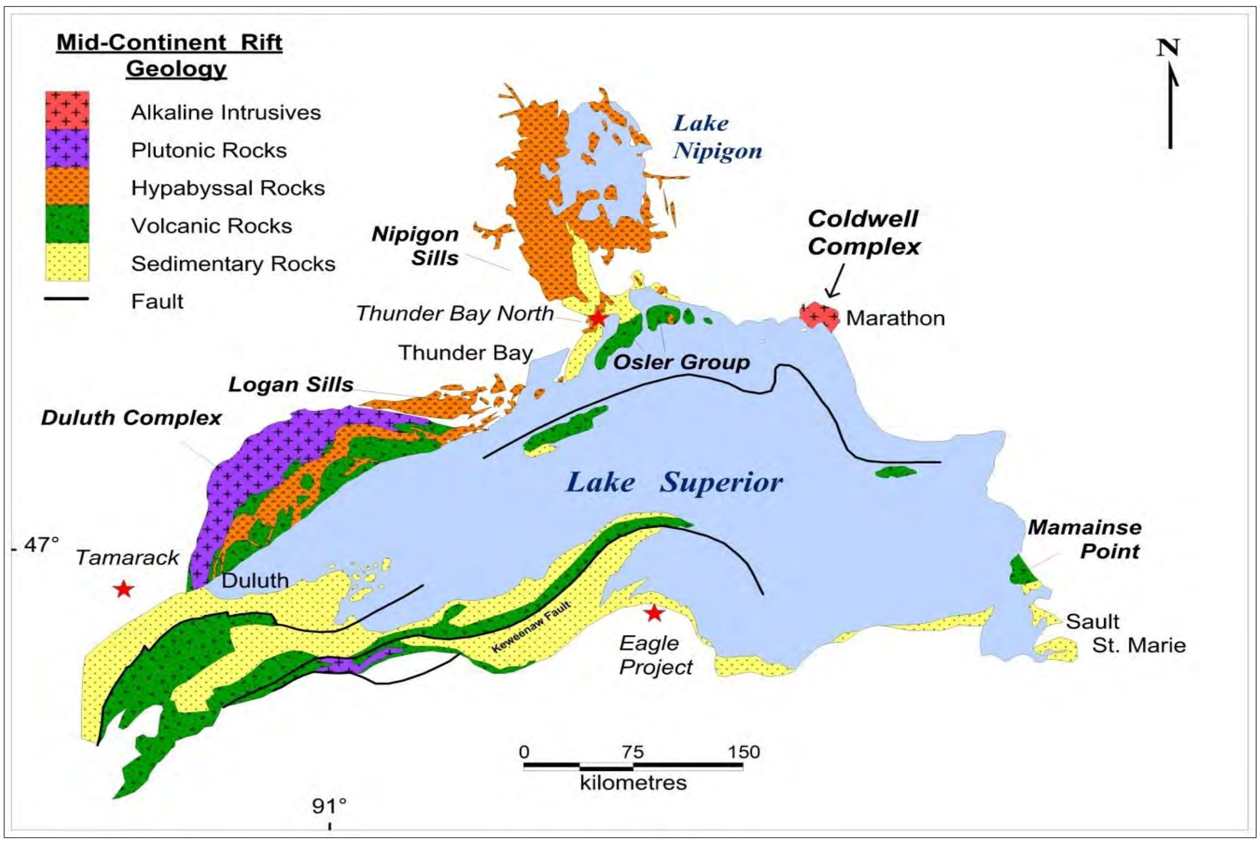
7. GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Marathon Deposit is hosted by the TDL Gabbro, a late intrusive phase of the Eastern Gabbro. The Eastern Gabbro has recently been described as a composite intrusion by Good et al. (2012) and occurs along the northern and eastern margin of the Proterozoic Coldwell Complex (CC) which intrudes the much older Archean Schreiber-Hemlo greenstone belt (Figure 7.1). The sub-circular CC has a diameter of 25 km and a surface area of 580 km^2 and is the largest alkaline intrusive complex in North America (Walker et al. 1993).

The CC is believed to have intruded over a relatively short period of time near the beginning of the main stage of the Mid-Continent Rift magmatism that occurred between 1108 and 1094 Ma (Heaman and Machado, 1992 and Heaman et al., 2007).

Figure 7.1: Regional Geology of the Mid-Continent Rift in the Lake Superior Area



Source: *Marathon PGM Corp. (2010).*

7.1.1 Geology of the Coldwell Complex

The CC was first described as a lopolith by Puskas (1967) and as three intrusive centres by Mitchell and Platt (1977). The intrusive centres were later described as three superimposed rings by Currie (1980). Detailed mapping across the CC by Walker et al. (1993) supported the multiple intrusive centre model of previous interpretations. Walker et al. also proposed that the CC has a sub-horizontal structure or stratigraphy.

The major rock units of each magmatic centre of the CC, as summarized by Shaw (1994) after Walker (1993), and as shown in Figure 7.2, include the following:

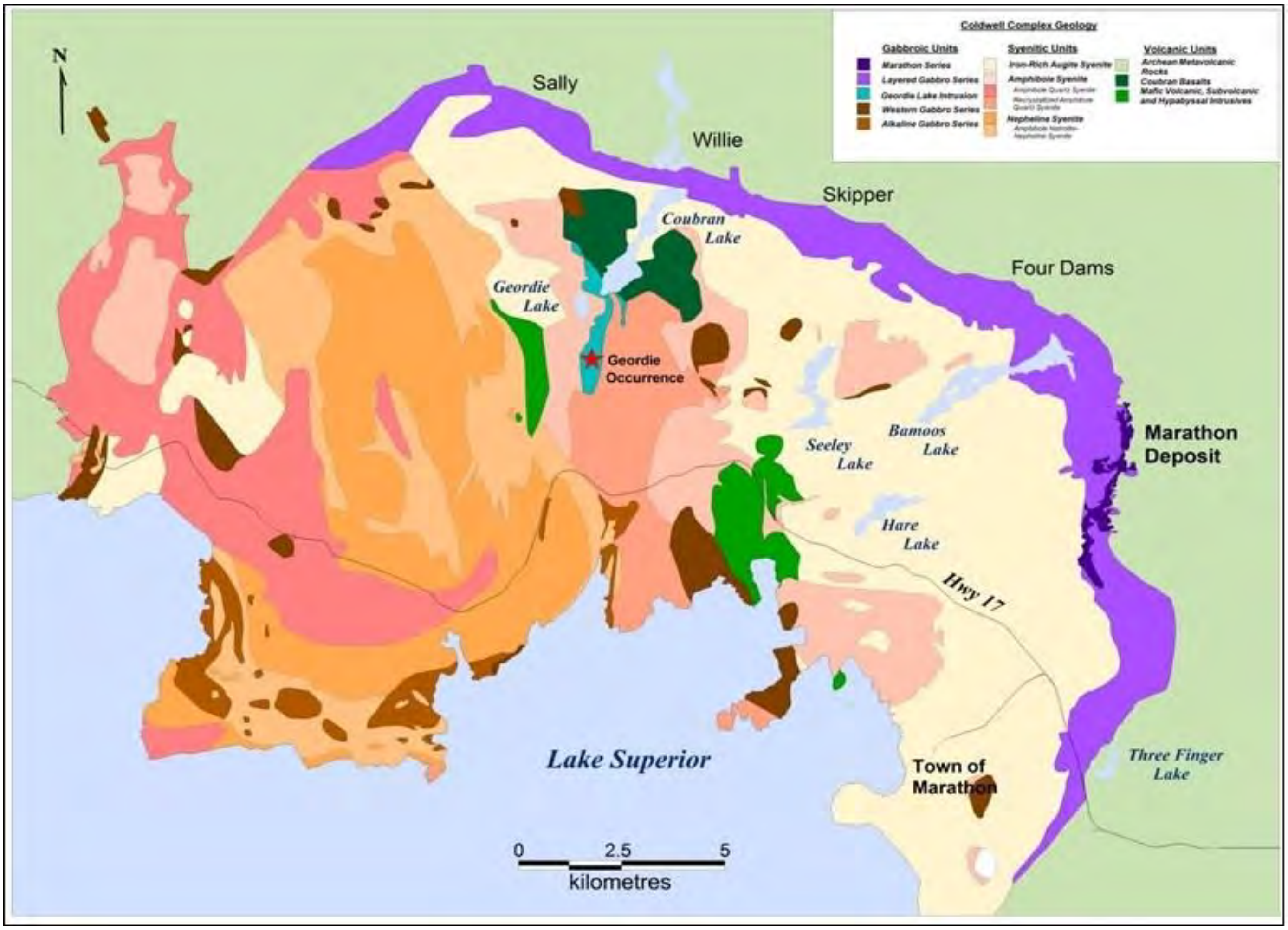
- Centre I: Eastern and Western Gabbros, Amphibole Quartz Syenite, Iron rich Augite Syenite, Monzodiorite and mafic volcanic and subvolcanic rocks.
- Centre II: Amphibole Nepheline Syenite and Alkaline Gabbro.
- Centre III: Quartz Syenite and Amphibole Quartz Syenite.

Work by Kern et al. (2012) and Kulakov et al. (2012) suggests Centres I and III were intruded prior to Centre II. These two studies presented comprehensive paleomagnetic data from the CC and included measurements from intrusive syenitic to gabbroic rocks of Centres I, II and III. The results of Kern et al. indicate that paleomagnetic signatures for Centres I and III are statistically indistinguishable, and that rocks of Centre II were emplaced after the magnetic reversal that occurred about 1103-1104 Ma. The study by Kulakov et al. examined the package of volcanic rocks located in the centre of the CC and determined that the paleomagnetic signature for the basalts is very similar to that for intrusive rocks of Centres I and III as determined by Kern et al. and is consistent with a deposition age of 1107 Ma.

Most recently passive seismic surveys were completed at the Marathon Deposit in 2018 and 2019 and at the Sally Deposit in 2019. This technique utilizes wave velocity contrasts between lithologies based on density variation. The density contrast between basement Archean footwall, syenites, gabbros and oxide melagabbros is sufficient to distinguish between lithologies. The survey results showed a large sub-horizontal, undulating high-velocity zone dipping to the west, extending from the Eastern Gabbros (Good et al., 2020). In 2019, an exploration drill hole tested the velocity model with a 1,000 m deep hole through the syenites of Center I. The stratigraphy intersection started with syenites from surface to 300 m depth followed by layered series gabbro showing inward dipping layering and flattening to a sub-horizontal sheet (Good et al, 2020). This does not support an outer ring dyke structure or a larger lopolith with basalt roof pendants. The complex most likely formed by intrusions of alkaline gabbro or syenite sills into a basalt pile.

The features of the Complex, sub-horizontal emplacement, circular shape of the complex and coincident gravity high, are most consistent with emplacement within a volcanic caldera (Good et al., 2020).

Figure 7.2: Geology of the Coldwell Complex



Note: *Shows the locations of the Marathon Deposit and the Geordie Deposit. Geology modified after Walker et al. (1993).*
Source: *Marathon PGM Corp. (2010).*

7.1.2 Geology of the Eastern Gabbro

The Eastern Gabbro forms part of a very large magmatic system and contains numerous Cu-PGM occurrences along its entire length. It is up to 1,500 m thick and strikes for 33 km around the eastern margin of the CC (Figure 7.3). It is considered the oldest intrusive phase of the Complex and was interpreted to have formed by multiple intrusions of magma into restricted dilatant zones within volcanics, possibly associated with ongoing caldera collapse (Walker et al, 1993; Shaw, 1997 after work by Puskas (1967 and 1970); and Currie (1980). Shaw (1997) concluded the Eastern gabbro consists of evolved basaltic magma with a sub-alkaline parentage.

The magnetic signature of the Eastern Gabbro in the area of the Marathon Deposit is shown in Figure 7.3, which highlights the segmented or discontinuous character of various phases of the Eastern Gabbro.

The Eastern Gabbro is overlain by massive to layered augite syenite (Puskas, 1970; and Walker et al., 1993). The layering in the gabbro and the augite syenite dip moderately towards the center of the complex.

7.1.2.1 Historic Classification of the Eastern Gabbro

Puskas (1970) subdivided the Eastern Gabbro into three groups: the Outer Border Zone of chilled gabbro; the Inner Border Zone A of massive gabbro; and the Inner Border Zone B of layered gabbro. Based on detailed regional mapping, Walker et al. (1993) subdivided the Eastern Gabbro into three dominant intrusive bodies: the Eastern Layered Gabbro Series; the TDL Gabbro; and the Malpa Lake Gabbro. Further detailed study of two stratigraphic sections through the Layered Gabbro Series by Shaw (1997) resulted in the definition of at least three intrusive phases separated by thick zones of xenolith-laden massive gabbroic bodies. The lower zone consists of a fine-grained chill (Sequence I) that grades upward into modally layered gabbro at the metre scale (Sequence II) to the centimetre scale (Sequence III).

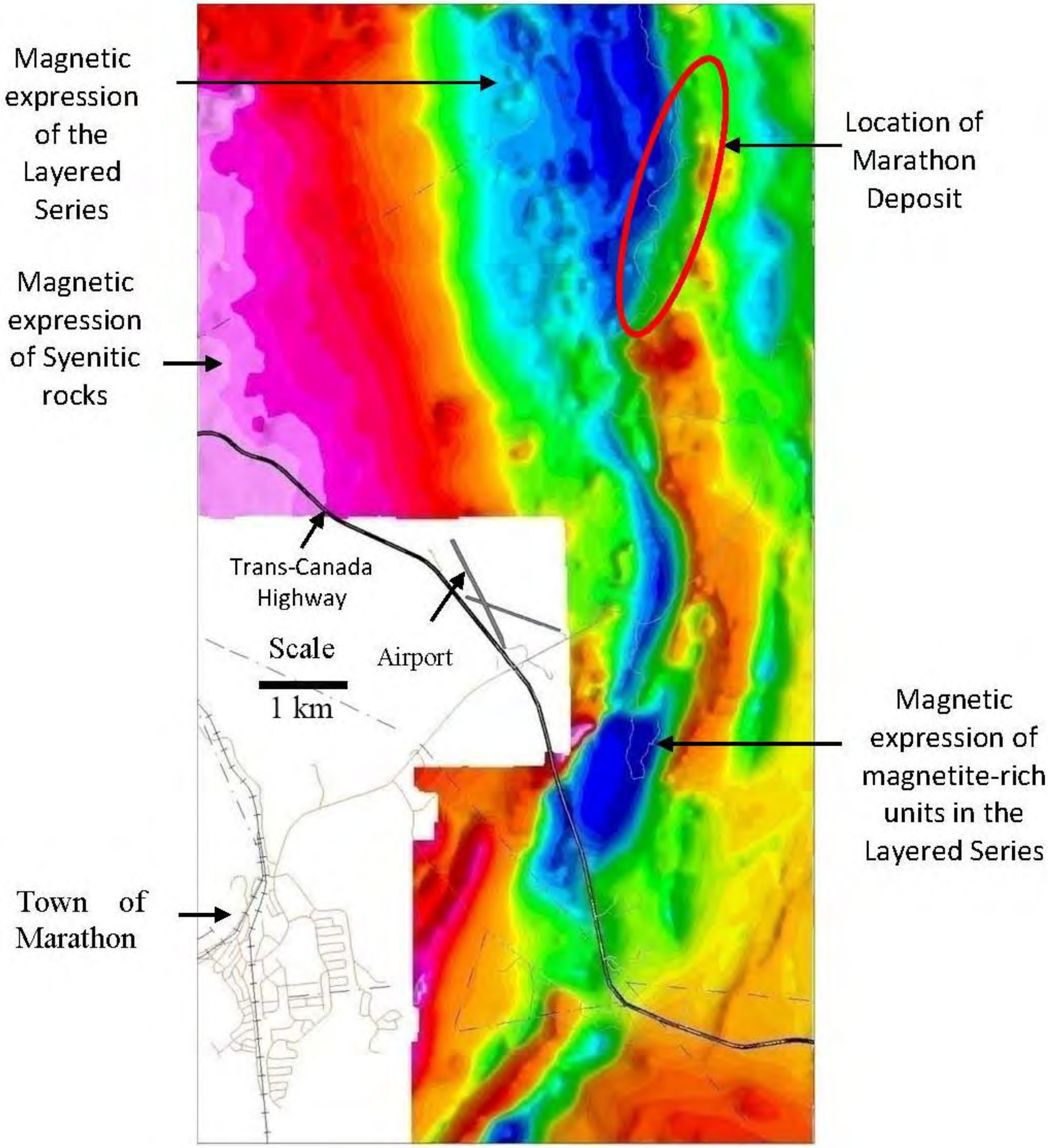
7.1.2.2 New Classification of the Eastern Gabbro

A new classification of the Eastern Gabbro, as proposed by Good et al. (Economic Geology 2015), includes the Fine Grained Series, Layered Series and Marathon Series. The new classification is based on distinctive petrographic features, geochemical characteristics and cross-cutting relationships. The three series largely maintain the subunits of the Eastern Gabbro as presented by Puskas (1970) and Shaw (1997) but with the main differences that the units are not necessarily co-genetic. The Marathon Series is the youngest intrusive phase and is defined here to include all mafic and ultramafic intrusive rocks that host copper and PGM mineralization in the vicinity of the Marathon Deposit. The Fine Grained Series is the oldest phase and is equivalent to the outer boundary chill gabbro of Puskas or Sequence I rocks of Shaw. The Layered Gabbro Series matches the Inner Zones A and B of Puskas or Sequences II and III of Shaw (Table 7.1).

Table 7.1: New Classification Scheme for the Eastern Gabbro

Good et al.'s Classification for Eastern Gabbro				Previous Classification Strategies		
Series	**Unit**	**No. of Sub-units**	**Relative Age**	**Puskas, 1970**	**Wilkinson, 1983**	**Shaw, 1997**
Fine Grained Series	Metabasalt	4	Oldest	Outer border zone of chilled gabbros	Fine Grained Gabbro	Layered Gabbro Series I
	Peridotite	2				
Layered Series	Olivine gabbro	2		Inner Border Zone B of Layered gabbro	Banded Gabbro	Layered Gabbro Series II and III
	Oxide augite melatroctolite	1				
Marathon Series	Gabbroic anorthosite	1		Inner Border Zone A of massive gabbro	Mottled Gabbro	
	Wehrlite	4				
	Augite troctolite	7				
	Oxide melatroctolite	2			Magnetite olivinite	
	Two Duck Lake Gabbro	6			Heterogeneous gabbro	Two Duck Lake Gabbro
	Apatitic clinopyroxenite	3	Youngest			

Figure 7.3: Total Magnetic Image Over Eastern Boundary of the Coldwell Complex



Source: *Marathon PGM Corp. (2010).*

7.1.3 Detailed Geology of the Marathon PGM-Cu Property

The Property geology is defined to a large extent by the intrusive cross-cutting relationships between the Marathon Series and the earlier Fine Grained Series, and by the complicated nature of the basal contact with the partially melted Archean rocks. The geology of the Property is shown on a plan map (Figure 7.4).

The TDL Gabbro is the dominant host rock for Cu-PGM mineralization. Additional accumulations of Cu-PGM mineralization are associated with oxide ultramafic intrusions of the Marathon Series that consist of clinopyroxene + / - olivine + / - magnetite + / - apatite cumulate rocks. These ultramafic bodies occur predominantly in the hanging wall of the Marathon Deposit and were formerly referred to as Layered Magnetite Olivine Cumulates.

7.1.4 Archean Country Rock and Rheomorphic Intrusive Breccia

The footwall of the Marathon Deposit is comprised of Archean intermediate pyroclastic rocks that have undergone partial melting as a result of the heat of intrusion of the Eastern Gabbro. At the contact with the Eastern Gabbro, the footwall is referred to as Rheomorphic Intrusive Breccia ("RIB"). The RIB/gabbro contact is not a simple contact as blocks of RIB material occur within the gabbroic series and intrusions of gabbro extend deep below the footwall contact. Also, a few thin near vertical promontories of RIB extend into the gabbroic series (Figure 7.4).

In a detailed study of the RIB, Uldis Abolins (1967) described the breccia as a matrix supported heterogeneous mixture of angular and sub-rounded fragments composed of fine to coarse grained gabbroic material, quartzite, pyroxenite and layered quartz pyroxenite. A distinguishing feature of the RIB is the common occurrence of elongate curved pyroxenite fragments. Abolins estimated the composition of the breccia matrix to be close to that of a quartz norite.

Locally, the footwall forms basins and ridges under the TDL Gabbro. This paleo surface played an important role in the formation of the Marathon Deposit by encouraging accumulation of sulphides through physical processes such as settling out of sulphide droplets in the magma conduit (refer to Section 8 – Deposit Types for a detailed discussion).

The Archean country rock varies along strike from the Marathon Deposit to the north and includes amphibolite, granodiorite, mafic to felsic volcanics and metasediments; however, in all areas RIB can be observed in surface mapping and drill core.

7.1.5 Metabasalt (Fine Grained Series)

The most abundant rock type in the hanging wall overlying the Marathon Deposit is metabasalt. Layering can be detected at the metre scale by gradational change in grain size. Contacts with other gabbro units are sharp.

The metabasalt consists of equigranular clinopyroxene, olivine, plagioclase and minor magnetite. Intergranular angles are near 120° indicating the fine metabasalt is re-crystallized. Re-crystallization would require very high temperature metamorphism perhaps of pyroxene hornfels grade. Metamorphism occurred during intrusion of Layered Series and TDL Gabbro.

An important and remarkable feature of metabasalt is the extremely low level of secondary alteration. In a survey of 50 thin sections, only a few sections contained serpentine alteration of olivine and one section contained amphibole alteration of olivine. Tremolite was not observed. Trace to less than trace amounts of secondary minerals such as chlorite and muscovite occur in the vicinity of olivine or cross-cutting fractures.

Locally, the occurrences of flattened pipe shaped features that resemble amygdules imply the unit originated as basaltic flows that were recrystallized during pyroxene hornfels grade metamorphism.

A common feature within metabasalt, particularly close to intrusions of TDL Gabbro, is the formation of 1-2 cm sized zoned amoeboid shaped blebs with either a clinopyroxene or olivine core or a thin plagioclase rich rim. This texture is interpreted to have formed either by migration of material from the TDL magma along a very fine 3-D network or by pyroxene hornfels metamorphism related to intrusion of the TDL magma.

An early intrusive peridotite associated geochemically with to early metabasalt phase occurs at the Sally Deposit and is adjacent to mineralization. The peridotite is composed of medium to coarse grained euhedral clinopyroxene, fine to medium sized euhedral olivine, interstitial tabular to irregular plagioclase and minor accessory magnetite. There are multiple occurrences emplaced as vertical pipes to horizontal sills and change orientation over short distances. They can be up to 100 m thick and they are homogenous with little compositional variation.

7.1.6 Layered Olivine Gabbro and Oxide Augite Melatroctolite (Layered Series)

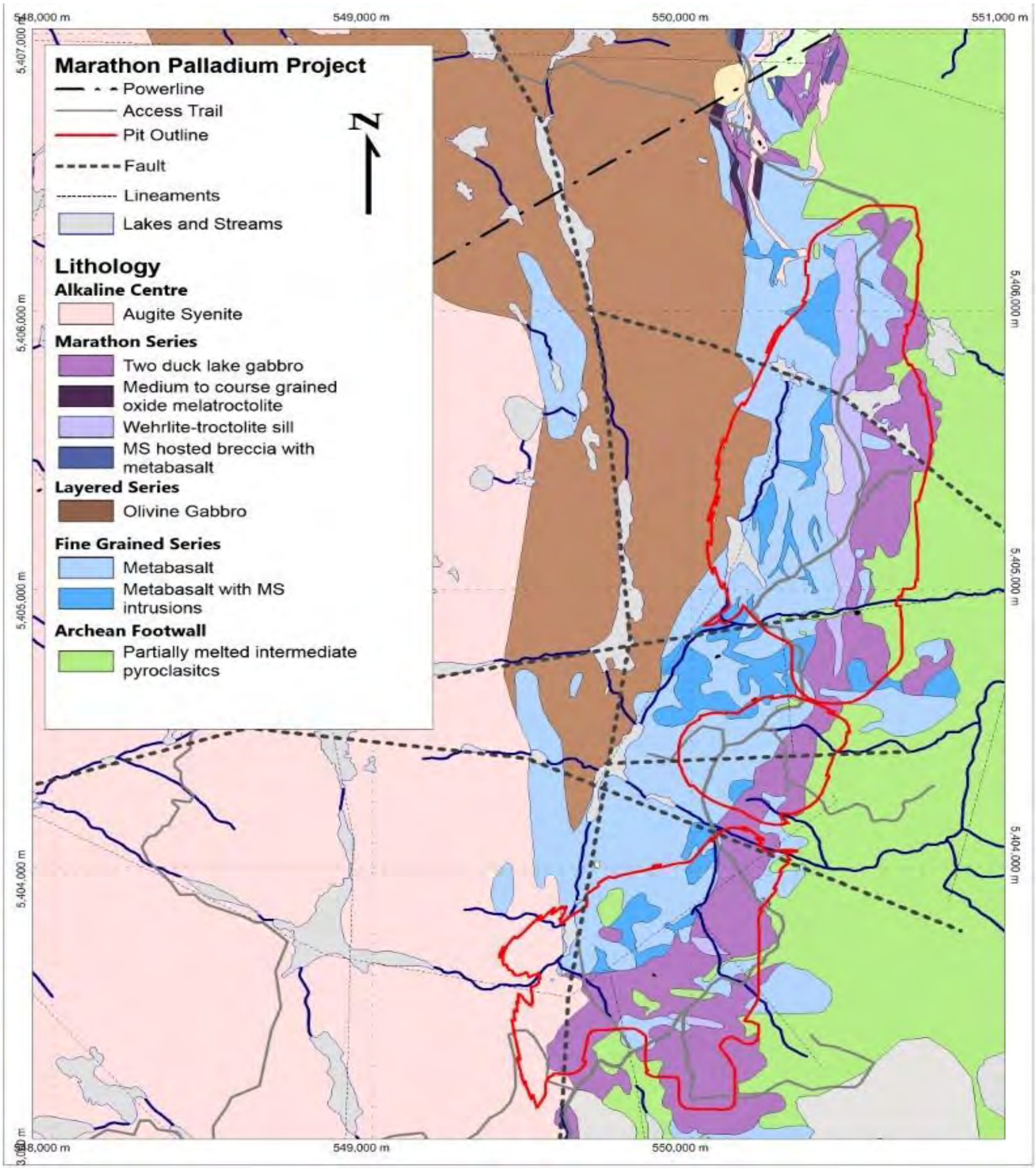
The Layered Series makes up the majority of the Eastern Gabbro and only occurs along the western edge of the Property. It is compositionally, geochemically and texturally similar along the entire strike length of the complex. The Layered Series is dominated by massive to modally layered olivine gabbro with lesser amounts of inter-layered thick units of oxide augite melatroctolite. Contacts between these units are typically gradational.

The olivine gabbro is medium to coarse grained and is characterized by intergranular texture, plagioclase alignment, and modal layering. The modal layering is defined by a gradational increase in the abundance of plagioclase and ranges in composition from olivine melagabbro to olivine gabbroic anorthosite. The lower contact of modal layers is not sharp but shows strong contrast. The modal layers are variable on a decimetre to metre scale and may show continuous to lenticular rhythmic layering. Cross-bedded, wavy or convoluted layering may also be present.

The olivine gabbro has an intergranular texture and is composed of, in decreasing order of abundance, plagioclase, clinopyroxene, olivine, magnetite and apatite. Medium to coarse grained plagioclase is euhedral to subhedral, whereas olivine and clinopyroxene crystals are medium grained and subhedral. The gabbro includes up to 10%, fine grained, euhedral and interstitial apatite and up to 10% interstitial magnetite. Alteration of plagioclase and mafic minerals to sericite and chlorite or actinolite, respectively, is weak to moderate.

The oxide augite melatroctolite is texturally similar and gradational to the layered olivine gabbro and is distinguished by abundant magnetite (15 to 25 modal %). The oxide augite melatroctolite occurs as discontinuous and irregular pods and lenses within the layered olivine gabbro. The unit is typically medium to coarse grained and may exhibit plagioclase alignment.

Figure 7.4: Geological Map of the Marathon Deposit



Note: *Mapping by geologists of Marathon PGM Corp and Stillwater Canada Inc, 2012.*
Source: *Gen Mining (2021).*

7.1.7 Wehrlite-Troctolite Sill (Marathon Series)

The Wehrlite-Troctolite (WT) Sill located immediately above the main mineralization-bearing TDL Gabbro (Figure 7.5 and Figure 7.6) is an important marker horizon and is thought to have important implications with regard to the origin of the Marathon Deposit mineralization. Further, of equal or greater significance, the excellent continuity of the unit across a total of 128 carefully logged drill holes negates the possibility of numerous post mineralization faults as proposed by Dahl et al. (2001). The sill is 30 to 50 m thick and is composed of an upper wehrlite and lower augite troctolite unit and does not contain any significant sulphides.

The WT Sill is an excellent marker horizon and provides the only evidence for normal faulting along the surface lineaments located near 5,404,900 N and 5,404,500 N as illustrated in Figure 7.5.

The WT Sill occurs along the entire strike length of the Marathon Deposit and forms an important marker horizon above the Main Zone of mineralization. This relationship changes at the south end of the Marathon Deposit (near 5,403,800 N) where the dip of the sill is sub-horizontal and the TDL Gabbro cross cuts the sill to form the southwest limb of the Marathon Deposit.

The wehrlite typically occurs immediately above the augite troctolite unit. The wehrlite consists of, in decreasing order of abundance, olivine, clinopyroxene, plagioclase, and magnetite. Olivine and clinopyroxene are medium to very coarse grained but olivine is generally subhedral and clinopyroxene is anhedral. Plagioclase is interstitial and medium to coarse grained, and magnetite is anhedral to subhedral. Plagioclase comprises 5–25% of the rock. Thin layers of coarse grained oxide wehrlite commonly occur within the wehrlite.

The augite troctolite is distinguished by the presence of coarse grained olivine, clinopyroxene and magnetite oikocrysts. The nature of plagioclase varies from euhedral laths to anhedral, interstitial networks; the latter feature giving the augite troctolite a mottled appearance.

7.1.8 Two Duck Lake Gabbro (Marathon Series)

The TDL Gabbro is the host rock for the Marathon Deposit. It occurs as a massive and poorly layered unit approximately 50 to 250 m thick that strikes near north for greater than 6 km (Figure 7.5, Figure 7.6 and Figure 7.7) and in general dips west at angles from 5 to 45°. The TDL Gabbro intruded the Fine-Grained Series beneath the WT sill and near the basal contact with Archean Footwall. The TDL Gabbro is intruded by very thin dykelets of RIB that are partial melt derivatives of the Archean basement and also by late north-northwest trending quartz syenite dykes.

The modal mineralogy of a composite sample that is representative of the Marathon Deposit mineralization (and TDL Gabbro) was determined in a QEMSCAN survey by XPS (Kormos, 2008). A total of nine aliquots of material were analyzed. In decreasing order of abundance, the composite sample was comprised of 42.0% plagioclase, 25.7% clinopyroxene, 7.8% amphibole, 5.5% iron oxides, 4.6% olivine, 2.6% other silicates (quartz, epidote, talc, and serpentine), 2.2% orthoclase, 0.7% biotite, and the remainder of various sulphides (pyrrhotite, chalcopyrite and pentlandite). Orthopyroxene is rare and where present occurs as late reaction rims on olivine (Good, 1993).

The TDL Gabbro is distinguished from other gabbro types by cross-cutting relationships and mineral textures resulting from the respective crystallization histories. In TDL Gabbro, plagioclase crystallized first and forms elongate laths that are surrounded by ophitic textured clinopyroxene or olivine. Pegmatitic textured TDL Gabbro occurs locally as pods within coarse grained gabbro or as rims on Fine Grained Series xenoliths. Mineralized pegmatite makes up less than about 5% of all mineralized zones. The composition of pegmatitic TDL Gabbro was compared to that of coarse grained, TDL Gabbro by Good (1992), and found to be similar.

An important aspect of TDL Gabbro relative to other Cu-PGM deposits such as at the Lac des Iles Mine is the fresh unaltered nature of primary minerals and textures. There is some local development of secondary minerals such as chlorite, amphibole, serpentine and calcite but the abundance of these minerals is not greater than about 10% for the Marathon Deposit (Kormos, 2008).

There is only a minor fluctuation in mineral compositions across the TDL Gabbro (Good and Crocket, 1994a; Ruthart, 2013). Plagioclase crystals are normally zoned with compositions between 52% and 65% anorthite; however, the Main mineralized zone typically exhibits replacement at grain margins by a more calcic plagioclase (69-79% anorthite). The average olivine composition is 56.9% forsterite and 540 ppm Ni. Clinopyroxene and orthopyroxene lie respectively within the fields of augite and hypersthene with Mg numbers between 0.6 and 0.7.

7.1.9 Oxide Ultramafic and Apatitic Clinopyroxenite Intrusions (Marathon Series)

The thickest accumulations of magnetite rich oxide melatroctolite are located between approximately 5,404,500 N and 5,405,200 N and occur to the north and south of the normal fault along the surface lineaments located near 5,404,900 N.

Oxide ultramafic intrusions frequently contain disseminated chalcopyrite and pyrrhotite and make up an important but very irregular component of the Marathon Series. The intrusions typically occur as discontinuous sills and irregular pods that crosscut Fine Grained Series, the WT sill, and the TDL Gabbro.

The intrusions are less than 200 m in strike length and up to 100 m thick but are commonly a few to tens of metres thick and less than 50 m along strike. The size, irregular shape and mineralogy of these intrusions resemble the oxide ultramafic intrusions ("OUI") that occur in the Duluth Complex (Ripley et al., 1998) and Sept Isles Intrusive Suite (Tollari et al., 2008).

The numerous cumulate phases and combinations thereof in oxide ultramafic intrusions are best described using the cumulate terminology of Miller et al. (2002). For example, the intrusive units vary in composition from oxide melatroctolite (FOCpA to FCOpA) to apatitic clinopyroxenite (CCoFAp to CCFoAp) to apatitic olivine clinopyroxenite (COFAp to OCFAp). Magnetite content varies from 5% in the clinopyroxenite to 25% in the oxide melatroctolite. Semi-massive or massive bands of magnetite are common and vary from 2 to 50 cm in thickness. Apatite is ubiquitous and varies in abundance from 5% to 30%. Massive apatite cumulate bands up to 30 cm thick are rare but found in apatitic clinopyroxenite.

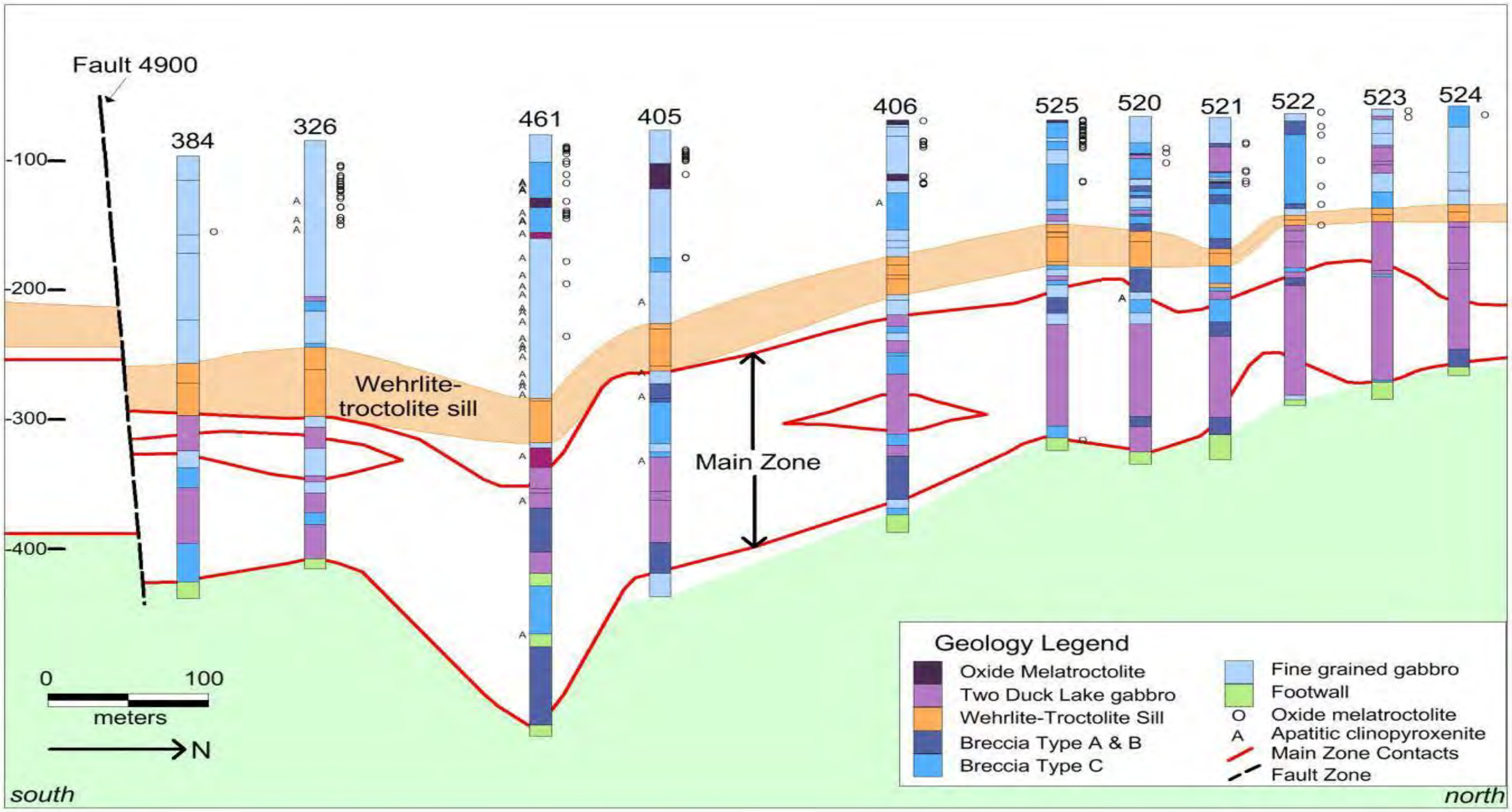
In general, these intrusions occur throughout the stratigraphy at the Marathon Deposit, however, units located high up in the stratigraphy are predominantly oxide melatroctolite and have higher overall magnetite content. These oxide melatroctolite intrusions are typically intermixed with plagioclase-rich gabbro bands (PcOf to PFoc) which display ophitic and/or flow aligned textures. Units lower down in the stratigraphy are composed primarily of apatitic clinopyroxenite and apatitic olivine clinopyroxenite. Compositional zonation is not evident within the lower intrusions.

7.1.10 Breccia Units (Marathon Series)

The TDL Gabbro intruded along planes of weakness in earlier metabasalt and the Archean pyroclastic or rheomorphic footwall breccia to form numerous sills and intrusive breccias. Four types of intrusive breccias are recognized at the Marathon Deposit: Type A consists of TDL Gabbro matrix and angular xenoliths of fine grained series; Type B is similar to type A but also includes xenoliths of footwall material; Type C consists of metabasalt that is cut by multiple thin dykelets of TDL Gabbro, or higher up in the stratigraphic section, typically oxide melatroctolite, and type D consist of TDL Gabbro matrix and angular xenoliths of WT Sill only observed south of the 5,404,500 N fault. In general, the main body of TDL Gabbro progresses outward from a central uniform gabbro without xenoliths to breccia Type A and lastly to breccia Type C near the upper contact with metabasalt. Breccia Type B typically occurs along the basal contact, however, not always present. However, it should be noted that the distribution of breccia units is not regular, and reversals are common, as illustrated for example, by the distribution of breccia units down holes 461 and 514 in Figure 7.5.

Breccia Types A, B, C and D typically contain sulphide-bearing TDL Gabbro, or higher up in the stratigraphy, sulphide-bearing oxide melatroctolite. Hence, breccia units are an important host rock for Cu-PGM mineralization.

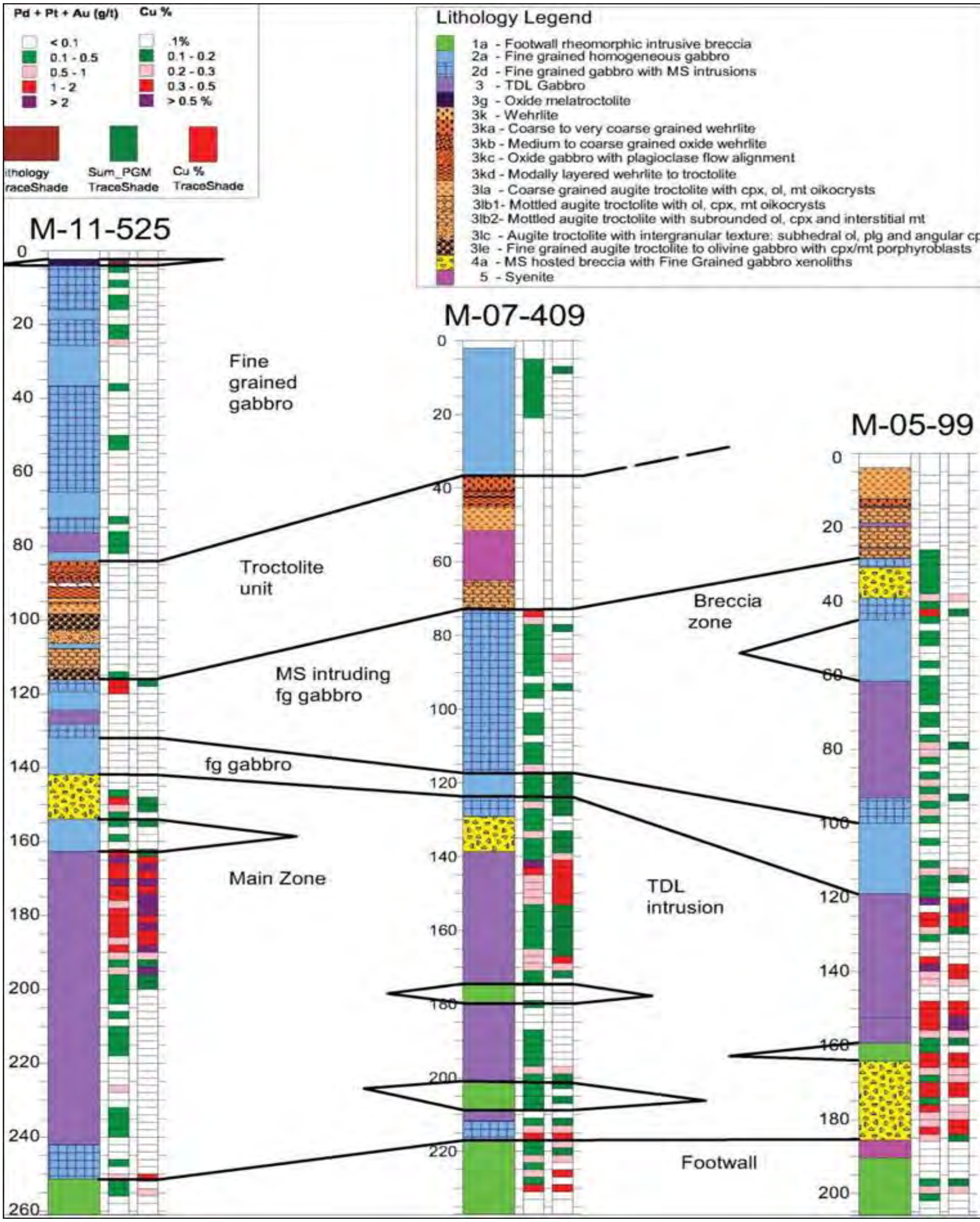
Figure 7.5: Longitudinal Projection through the Central Portion of the Marathon Deposit (Looking West)



Note: *Figure highlights the complicated sequence of rock units within the Marathon Series and the relative location of the WT sill above the Main Zone of TDL Gabbro. Note the offset along the normal fault close to 5,404,900N. Note the distribution of apatitic clinopyroxenite immediately above the central portion of the Main Magma conduit as indicated by the position of hole M08-461. Hole numbers indicated without prefix example 525 is M-11-525. Note that for Figure 7.5, breccia Types A and B are described as Breccia with Marathon Series matrix, and breccia type C is described as Fine-grained gabbro with Marathon Series intrusions.*

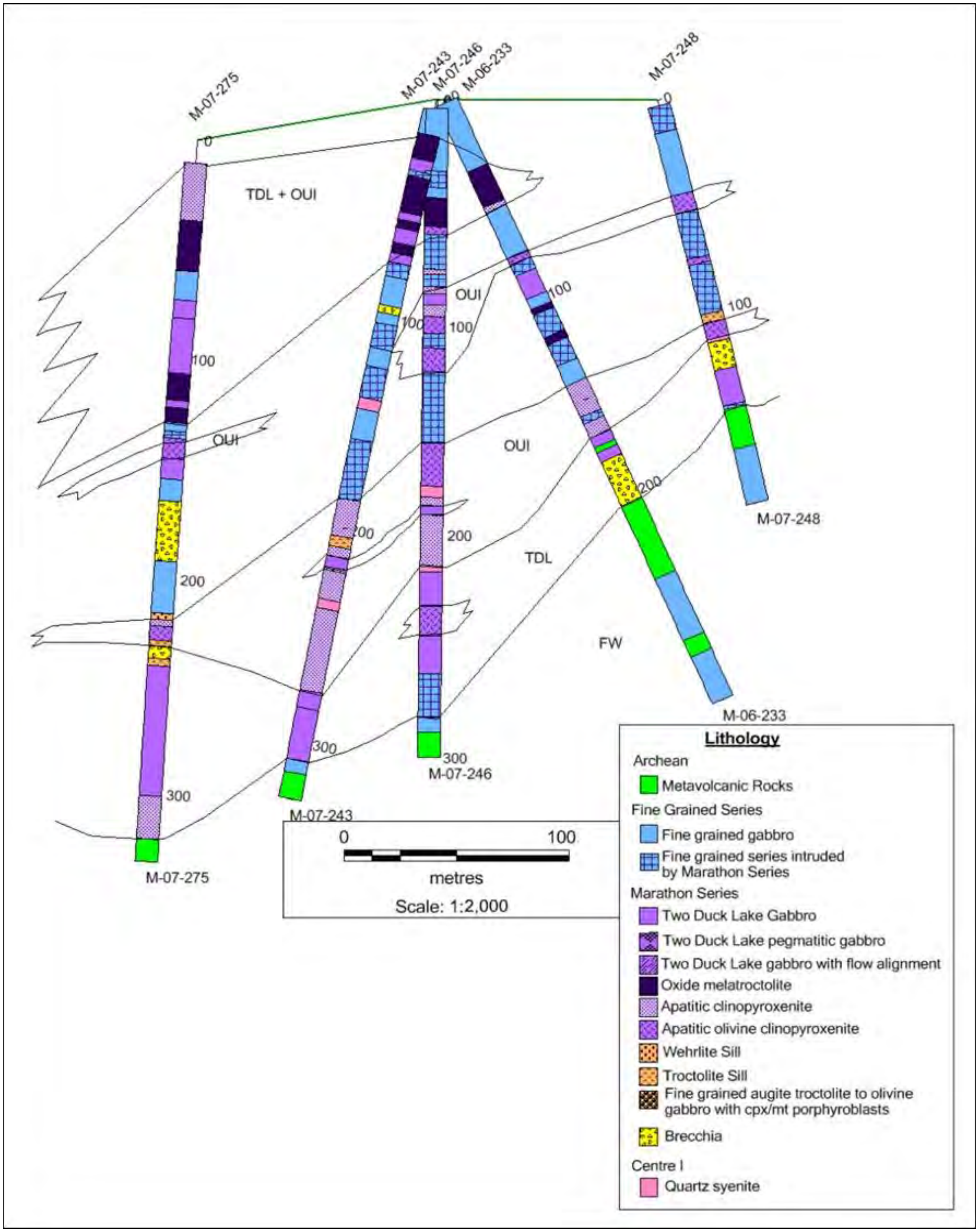
Source: *Stillwater Canada (2014).*

Figure 7.6: Vertical Cross Section Through the Main Zone at Section 5,405,450 N (Looking North)



Note: Figure highlights the complicated sequence of rock units within the Marathon Series and the relative location of the WT sill above the Main Zone mineralization. Note that hole M-11-525 is also located in the longitudinal projection in Figure 7.5.
***Source:** Stillwater Canada (2012).*

Figure 7.7: Vertical Cross Section at 5,403,750 N (Looking North)



Note: *Figure shows the irregular but complicated nature of the oxide +/- apatite bearing ultramafic intrusions (OUI) of the Marathon Series.*

Source: *Stillwater Canada (2012).*

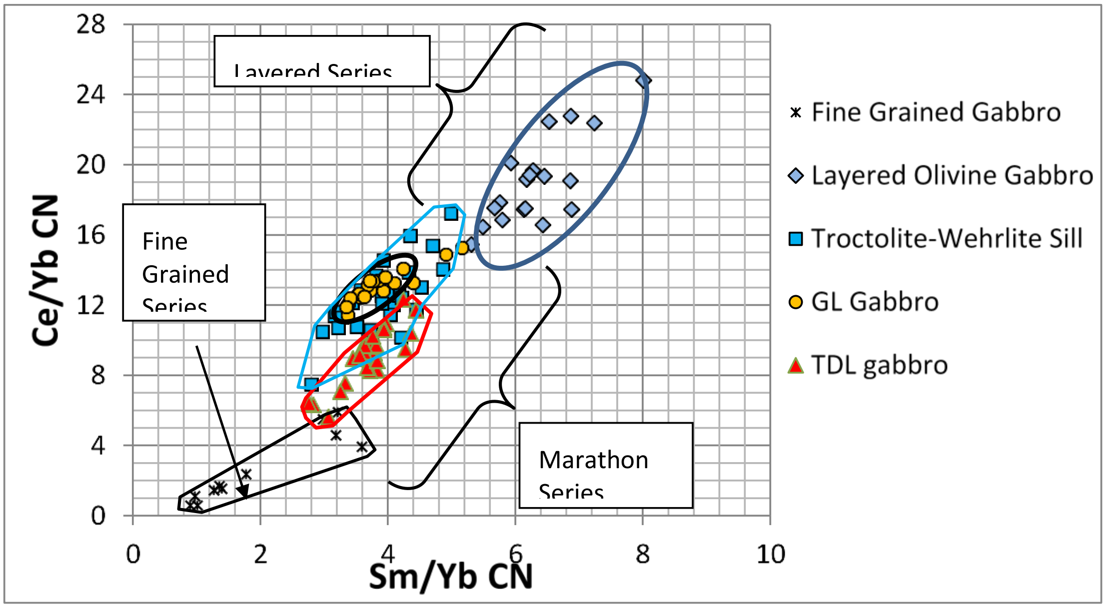
7.2 Geochemical Discrimination Diagrams for the Eastern Gabbro

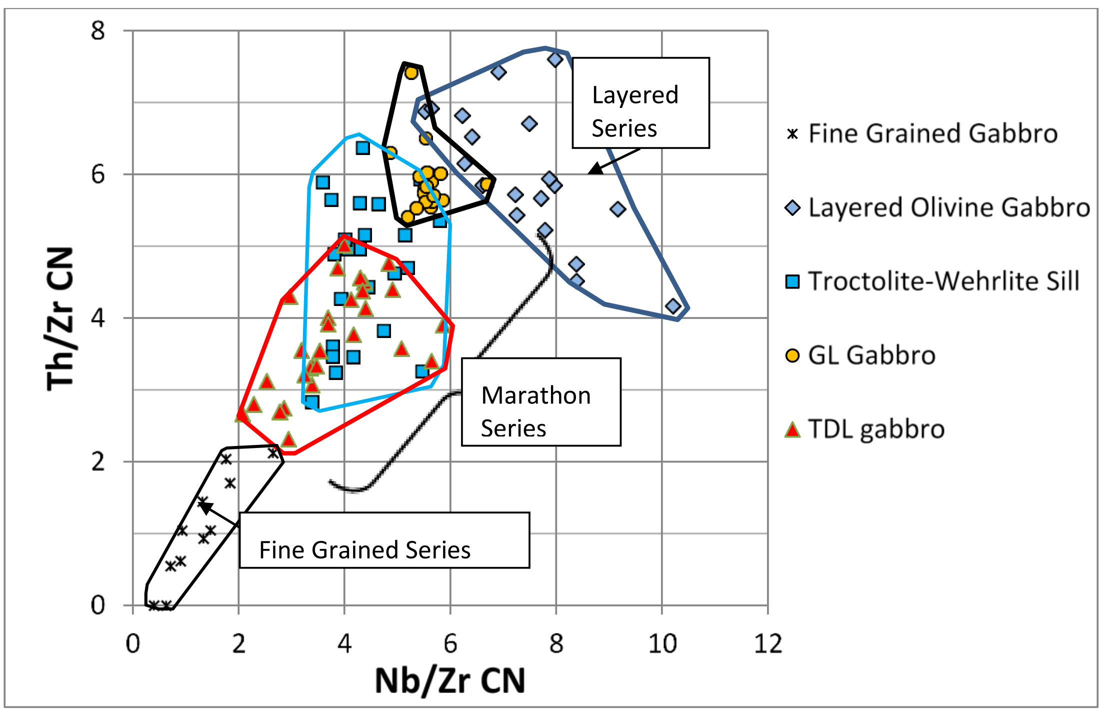
Trace element data, together with cross-cutting relationships, provide clear evidence that the Eastern Gabbro is a composite intrusion. Each of the three magmatic series (Fine Grained, Layered and Marathon Series) previously characterized by textural, petrographic and cross-cutting relationships have recently been shown to have distinctive trace element signatures that can only be explained by intrusion of distinct magma types.

Pearce element diagrams (Figure 7.8) are very useful as discrimination diagrams because they neatly characterize the three intrusive series of the Eastern Gabbro into separate fields. In each figure, rock units of the Marathon Series plot in a field that lies between those for Fine Grained and Layered Series with the Fine Grained Series having lower Ce/Yb, Sm/Yb, Th/Zr and Nb/Zr and conversely, the Layered Series having higher Ce/Yb, Sm/Yb, Th/Zr and Nb/Zr ("Ce" = cerium, "Yb" = ytterbium, "Sm" = Samarium, "Th" = thorium, "Zr" = zirconium, "Nb" = niobium).

In Figure 7.9, three prominent units from the CC are compared to other Mid-continent Rift Systems (MRS) related intrusive and extrusive rock units located along the north shore of Lake Superior (Figure 7.1 and Figure 7.2). In Figure 7.9, the representative samples of TDL Gabbro are compared to Fine Grained Series, Coubran basalt and MRS related intrusive sills and dykes of the Logan and Nipigon Sills located near Thunder Bay, Ontario (after Hollings et al. 2011). It is interesting that the data for the Fine Grained Series overlie the fields for the Nipigon and Logan sills, whereas the rocks of the Marathon Series have somewhat higher Ce/Yb, Sm/Yb, Th/Zr and Nb/Zr. Since the Fine Grained series is the earliest intrusive phase in the CC, then the similarity of the Fine Grained Series to the Logan and Nipigon sills suggests that timing of the two events were simultaneous.

Figure 7.8: Pearce Element Ratio Diagrams for the Three Major Intrusive Suites in the Eastern Gabbro Suite

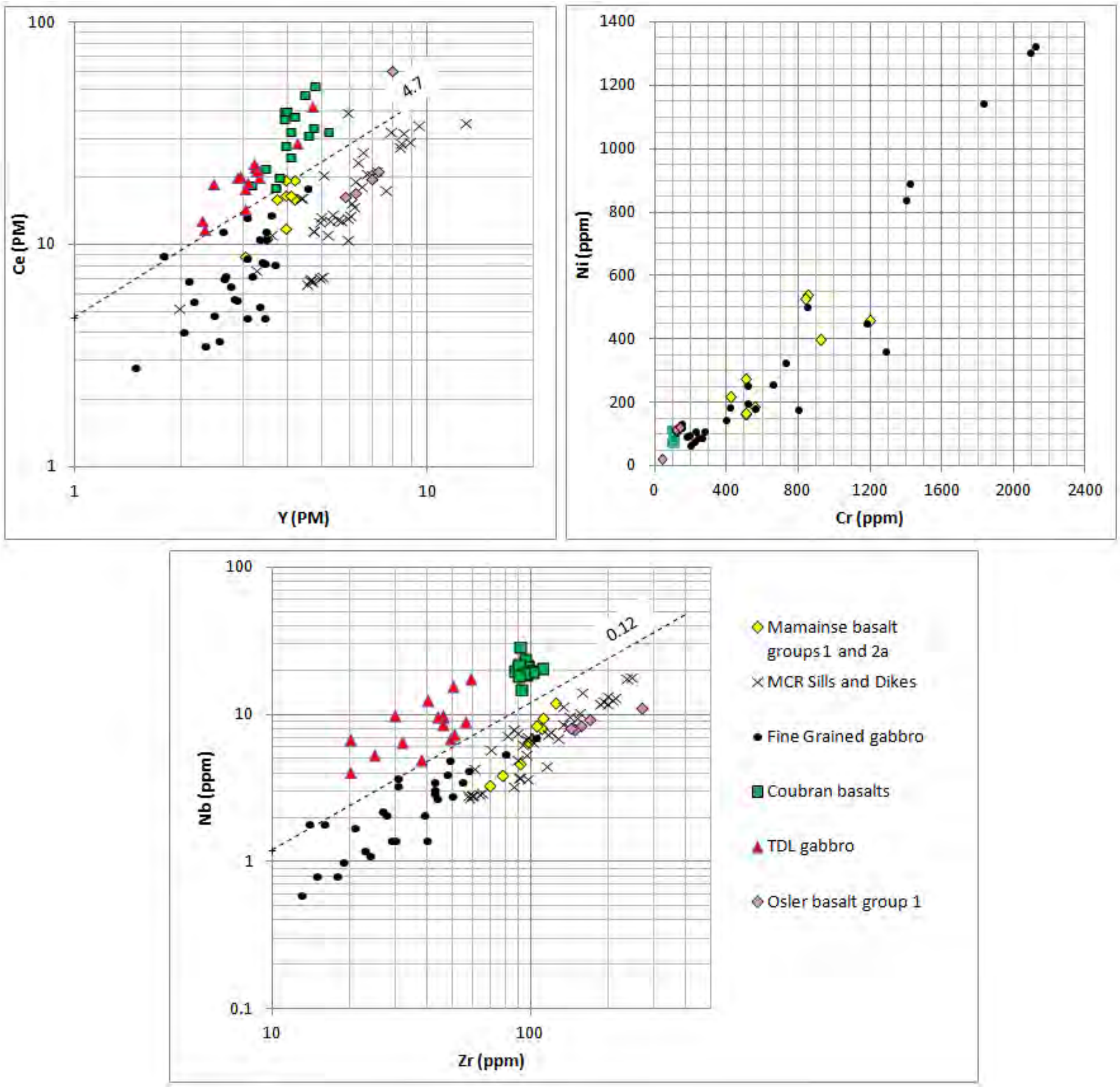




***Note**: These diagrams very nicely characterize the units into three groups that could be considered as least evolved (Fine Grained Series) to most evolved (Layered Series). Note the element in the denominator for axes on both figures is considered to be the least incompatible, respectively. Some data for TDL Gabbro after Ruthart (2013). Ratios are chondrite normalized after Sun and McDonough (1989).*

***Source**: Stillwater Canada (2012).*

Figure 7.9: Comparison of TDL Gabbro and Coubran Basalt to Intrusive and Extrusive Rocks of Mid-continent Rift



***Note**: Comparison of Coldwell Units (TDL Gabbro and basaltic flows north of Coubran Lake) to Mid-continent Rift related intrusive Sills (Nipigon sills) in the vicinity of Thunder Bay and basalt flows from Mamainse Point located along the eastern shoreline of Lake Superior and Osler basalt. Data for Nipigon Sills after Hollings et al. (2011), and Mamainse Point after Lightfoot et al. (1999). Some data for TDL Gabbro after Ruthart (2013). Ratios are chondrite normalized after Sun and McDonough (1989).*

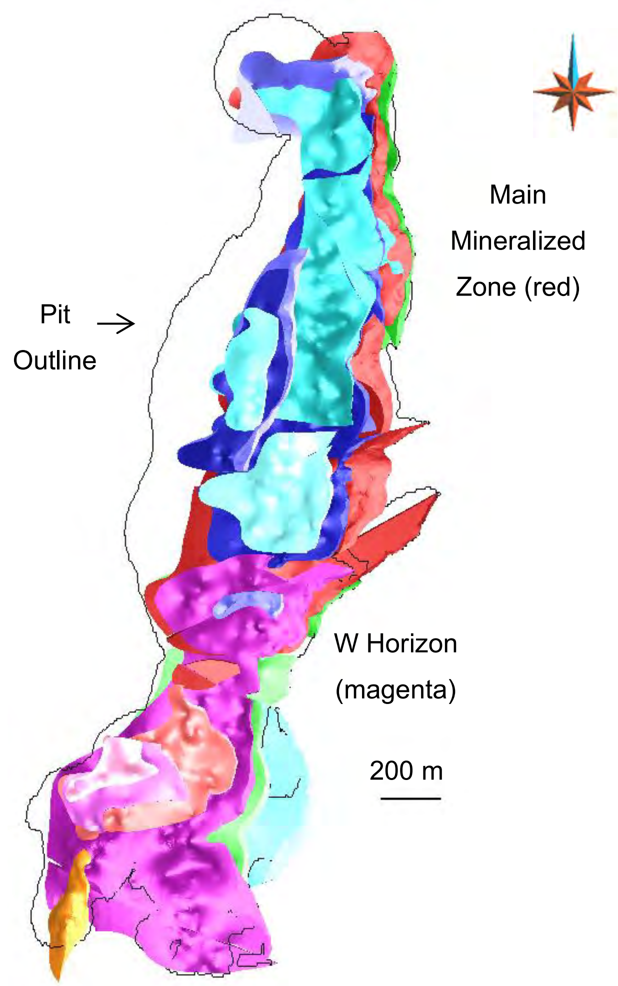
***Source**: Stillwater Canada (2014).*

7.3 Mineralized Showings and Occurrences

7.3.1 Mineralized Zones

The Marathon Deposit consists of several large, thick and continuous zones of disseminated sulphide mineralization hosted within the TDL Gabbro (Figure 7.10 and Figure 7.27). The mineralized zones occur as shallow dipping sub-parallel lenses that follow the basal gabbro contact and are labeled as footwall, main, hanging wall zones and the W Horizon. The Main Zone is the thickest and most continuous zone. For 69 drill hole intersections with mineralized intervals greater than 4 m thick, the average thickness is 36.6 m and the maximum thickness is 209.6 m.

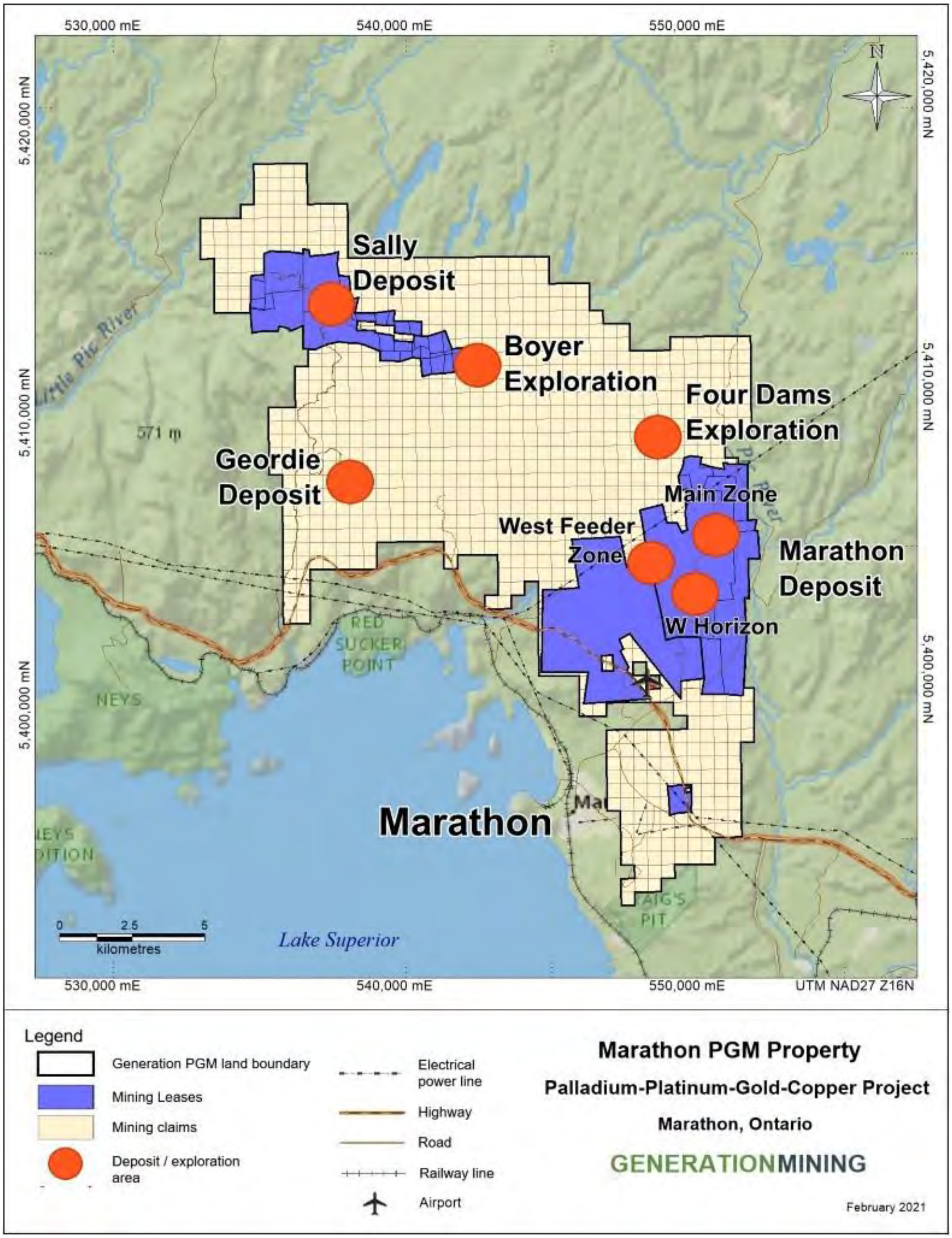
Figure 7.10: Plan View of the Marathon Deposit Mineralized Zones



***Source**: Gen Mining (2021)*

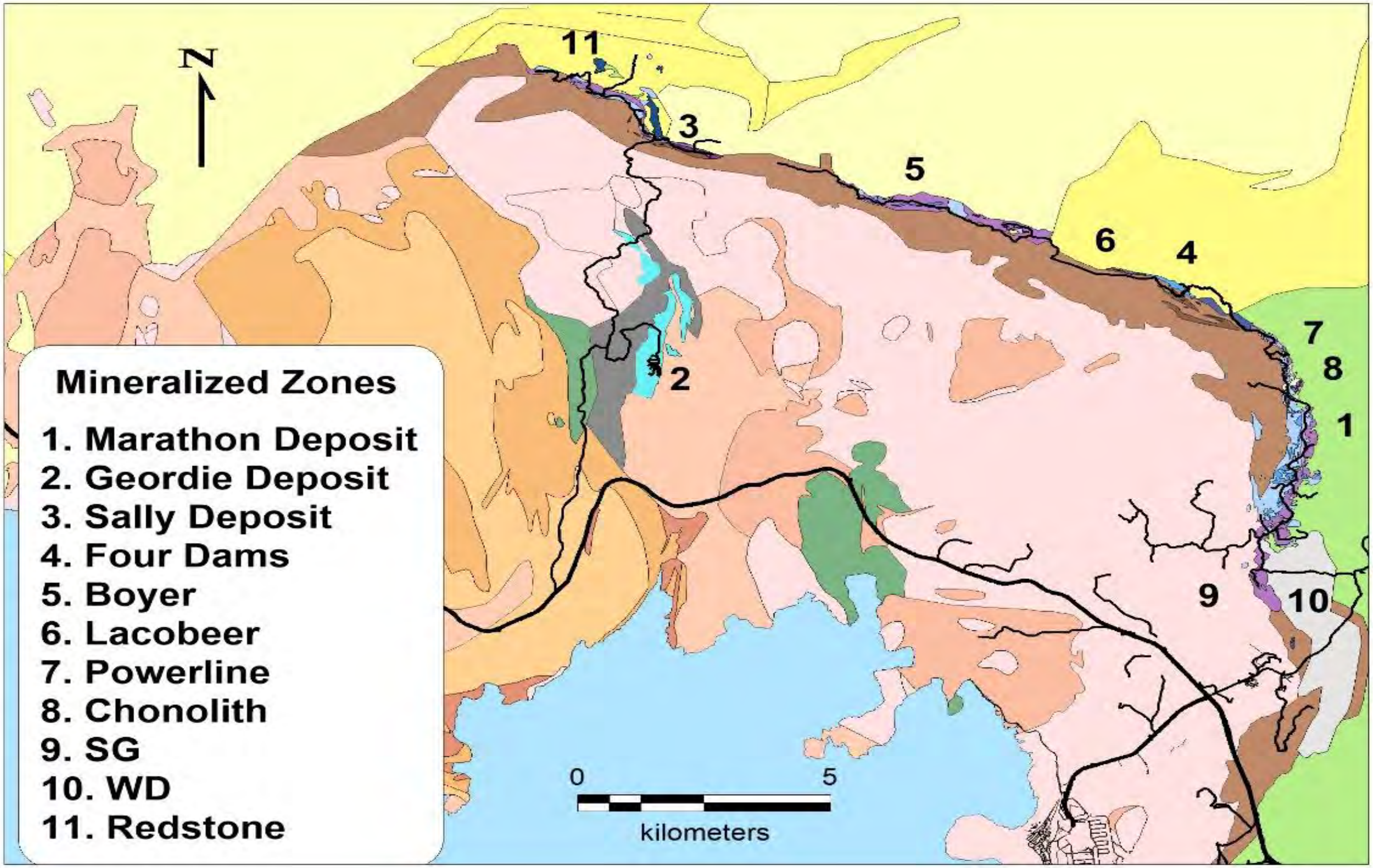
Figure 7.11 and Figure 7.12 illustrate the location of the main mineralized areas on the Property.

Figure 7.11: Locations of Mineralized Deposits and Those Areas Identified for Exploration



Source: *Gen Mining (2021).*

Figure 7.12: Geology Map of the CC (Coldwell Complex) and Location of all Known Cu-PGM Occurrences as of January 6, 2020



Source: *Gen Mining (2019).*

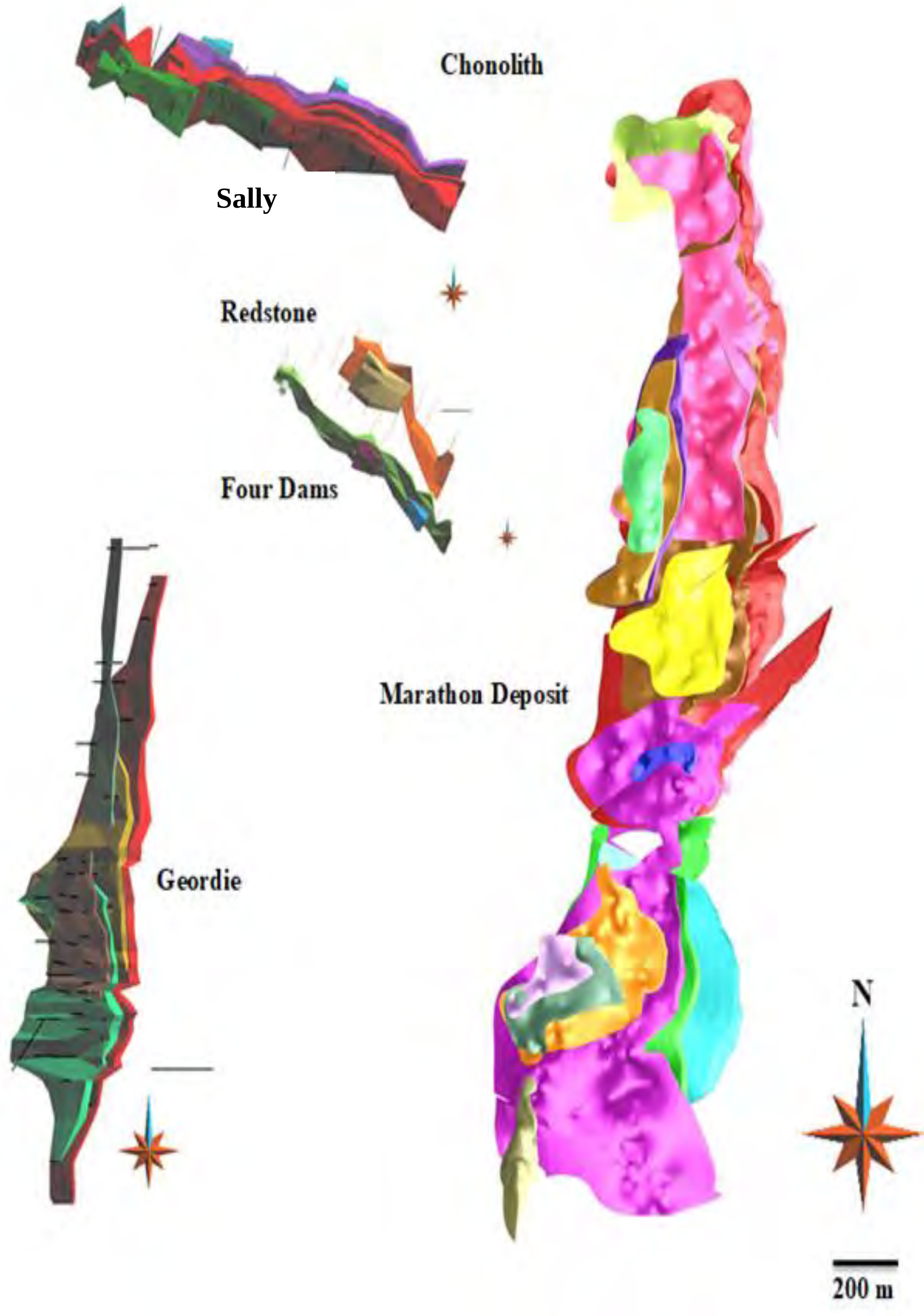
This section will describe Cu and PGM occurrences located in the vicinity of the Marathon Deposit; for instance, the Geordie and Sally Deposits, and other occurrences located along the outer margin of the CC.

Each of these occurrences displays at least some of the many characteristics described at the Marathon Deposit. Given that these prospects share a common origin, then similarities between them are expected. However, in detail, there is much dissimilarity in the respective petrography or metal compositions that imply, for instance, that a dominant intrusive or mineralization forming process at one location might have played a minimal role at another. These factors are assessed at every locale and used to determine deposit significance and relevant exploration criteria.

Mineralized domains have been defined by drilling and 3-D modeling at several, but not all, locations. These mineralized domains are displayed with the Marathon Deposit in Figure 7.13. The figures are reproduced to the same scale in order to illustrate their relative size, and each body is oriented in their true position with north pointing toward the top of the page.

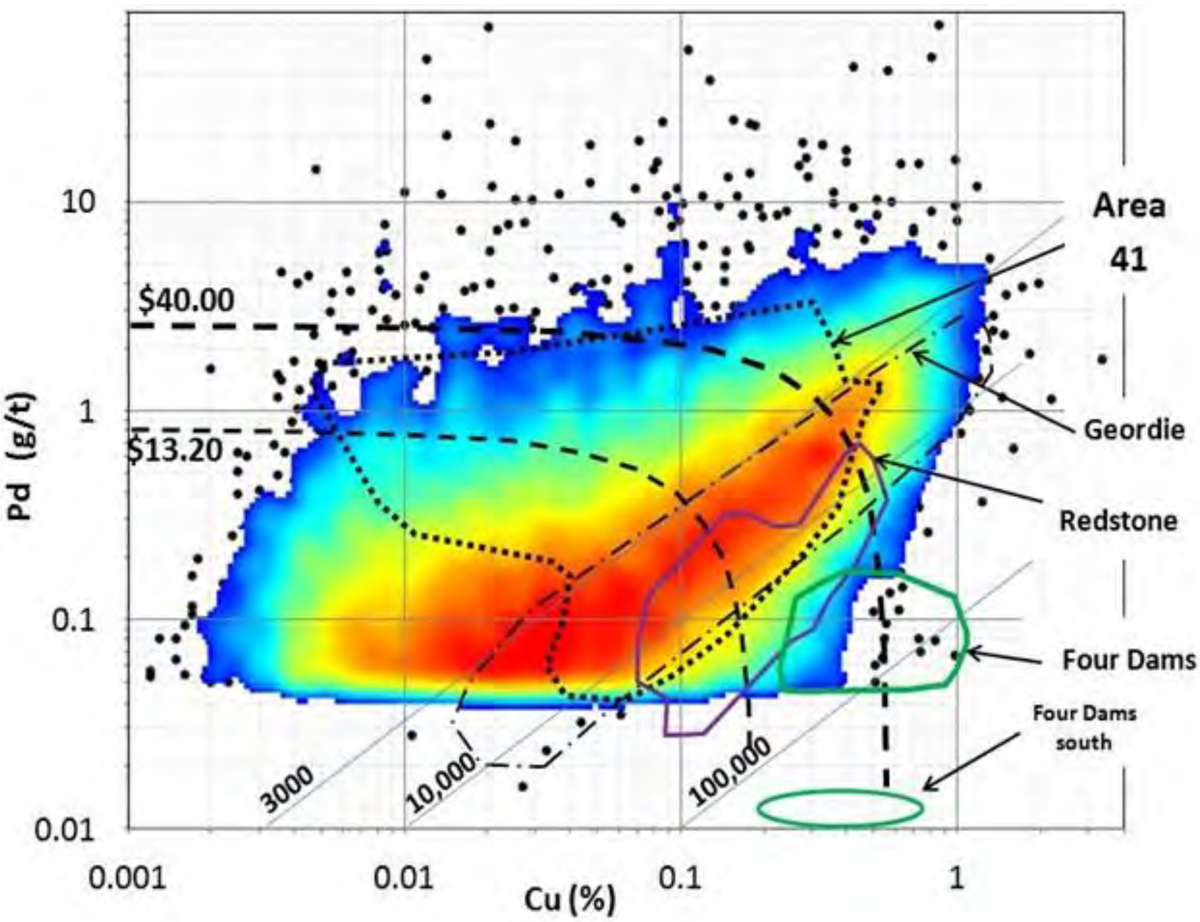
There are significant differences in the Cu and PGM abundances between the various Coldwell Deposits. These differences are best illustrated in the plot of Cu vs. Pd (Figure 7.14). For instance, the distribution of Cu and Pd at Sally closely matches the distribution observed at the Marathon Deposit. The abundance of Cu relative to Pd is much higher at Four Dams compared to other deposits. Samples such as those at Four Dams (north) have Cu/Pd ratios of 20,000 to 200,000 and Cu/Pd at Four Dams South is greater than 200,000. The distribution of Cu and Pd at Geordie shows a strong positive correlation and the average Cu/Pd is slightly higher than the average Cu/Pd at the Marathon Deposit. Similarly, at Redstone, there is a strong positive correlation and the average Cu/Pd is greater than at either Geordie or Marathon.

Figure 7.13: Scaled 3-D Models of Coldwell Mineralized Domains Compared to Marathon Deposit



Note: *The scaled 3-D models are oriented correctly with north pointing up as shown by individual north arrows. Trace of drill holes at each location except for the Marathon Deposit are indicated by faint grey lines.*

Figure 7.14: Comparison of Cu vs. Pd for CC (Coldwell Complex) Deposits



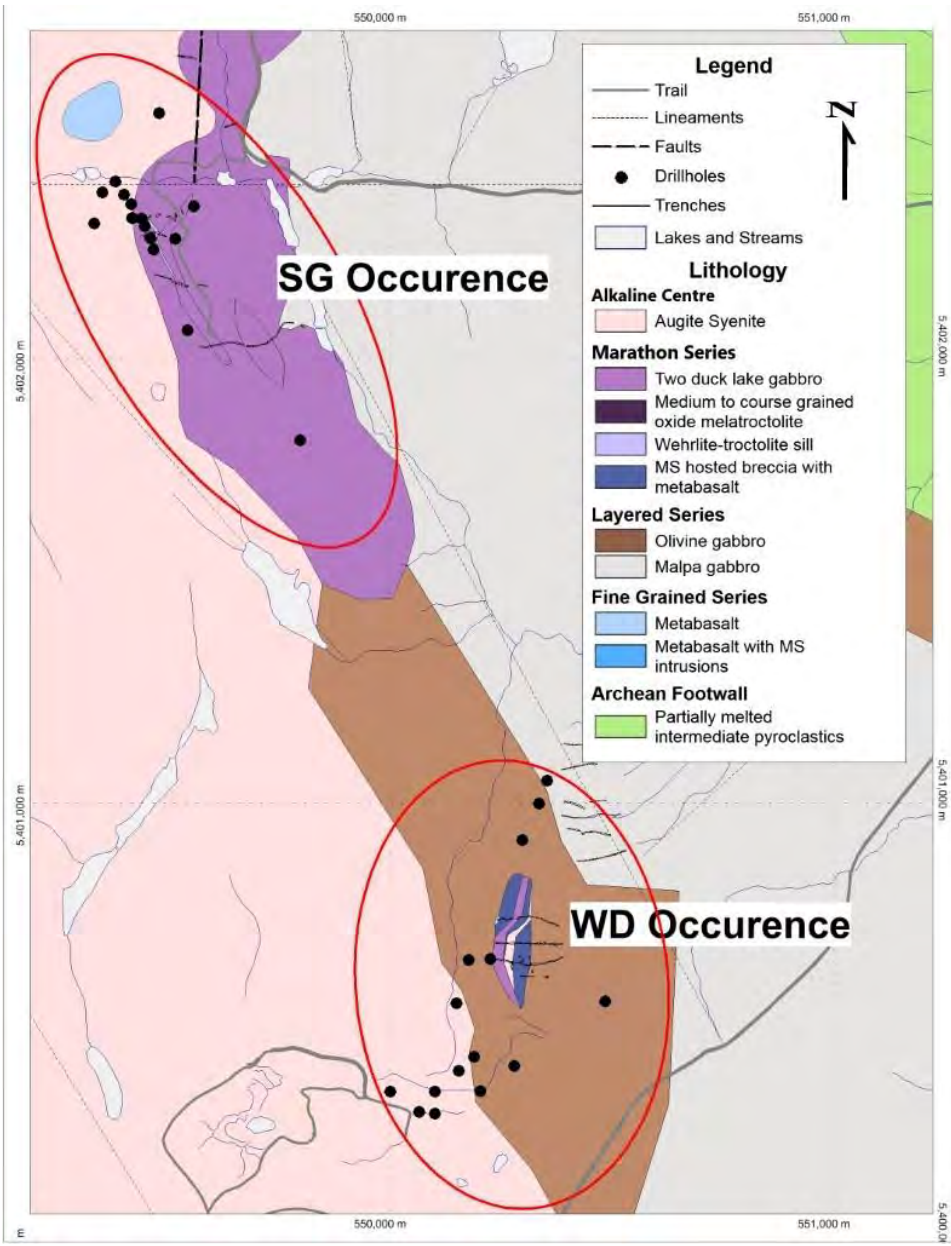
Notes: *The coloured contours represent the point density map for Marathon Deposit assays (black dots). Fields for assays from other occurrences are represented by individual curves. Dashed curves labelled as $13.20 and $40.00 represent calculated NSR $/t values using the 2010 Mineral Resource Estimate metal prices and process recoveries. Diagonal blue lines represent constant Cu/Pd values, for example 3,000.*
Source: *Micon (2010).*

7.3.2 SG and WD Occurrences

The SG and WD occurrences are located south of the Marathon Deposit as shown in Figure 7.12 and Figure 7.15. These zones are hosted by TDL Gabbro, but unlike at the Marathon Deposit where mineralization occurs directly above the footwall, mineralized TDL Gabbro at the SG and WD zones occur along the west margin of the Eastern Gabbro close to the contact with the overlying Augite Syenite. The depth to footwall and nature of the contact in this area are unknown.

The change in stratigraphy south of the Marathon Deposit is interpreted to be related to faulting at 5,402,350 N resulting in the footwall offset to the east by 2 km. A southeast trending fault connects the SG and WD zones; both zones also encompass additional converging faults (Figure 7.15). The area between these two zones lacks exploration due to thick overburden which makes prospecting, trenching and drilling difficult.

Figure 7.15: Lithology Map Showing the SG and WD Occurrences



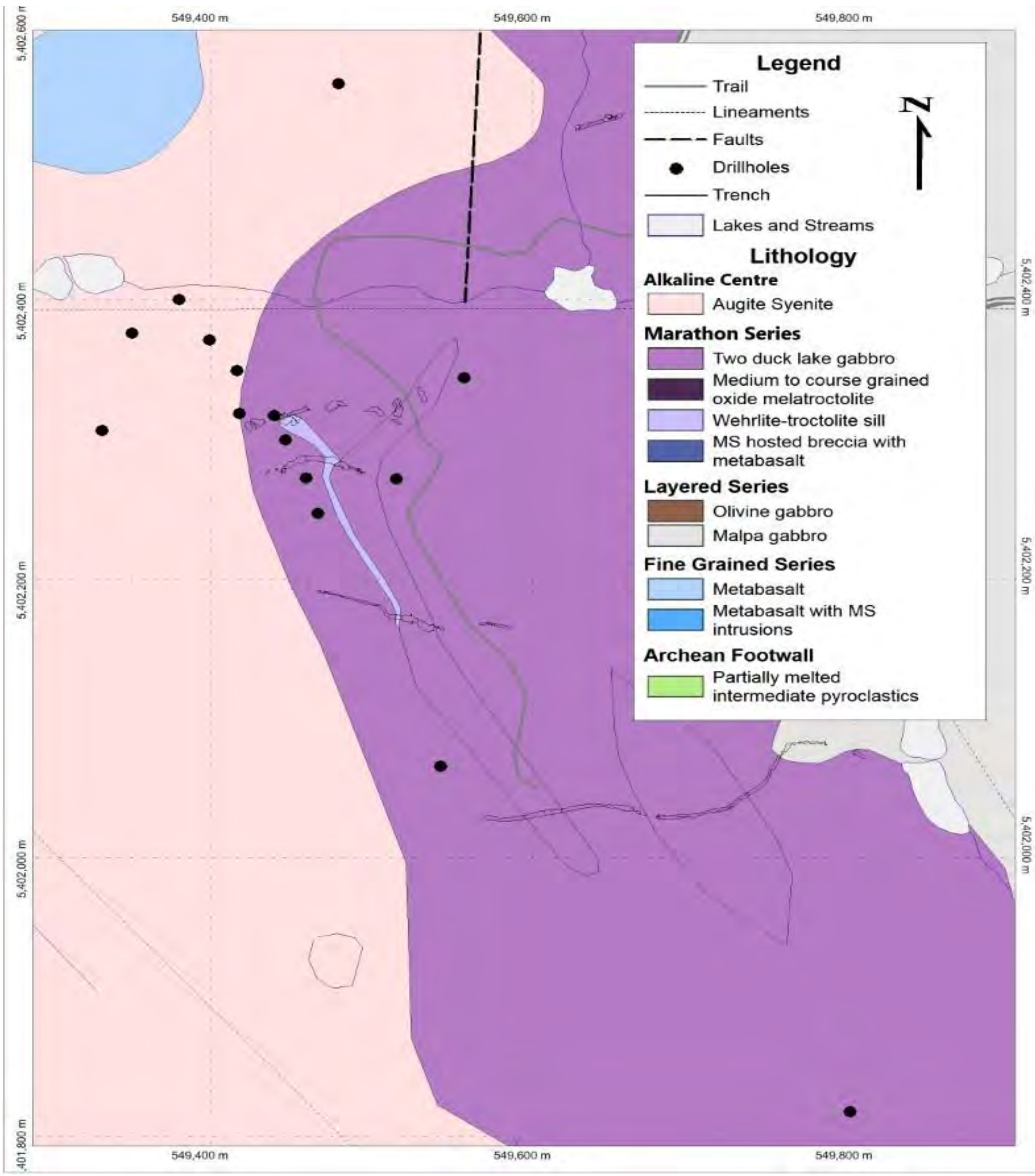
Source: *Gen Mining (2021).*

7.3.2.1 <u>SG Zone</u>

The SG Zone is characterized by near-surface mineralization in TDL Gabbro (Figure 7.16), similar to that at the Marathon Deposit. Previous work included 16 drill holes, 56 grab samples and 600 m of outcrop stripping. The mineralized zone has a strike of 160 to 170°, dips at 30-45° west and extends for 120 m along strike.

The SG Zone includes a thick sequence of TDL Gabbro. Mineralization typically occurs in zones where TDL Gabbro is intermixed with lenses of oxide ultramafic rocks. The best drill hole intersection to date is shallow with an average grade of 1.33 g/t total PGM and 0.27% Cu over 18 m.

Figure 7.16: SG Occurrence Showing Lineaments, Trenches and Drill Holes

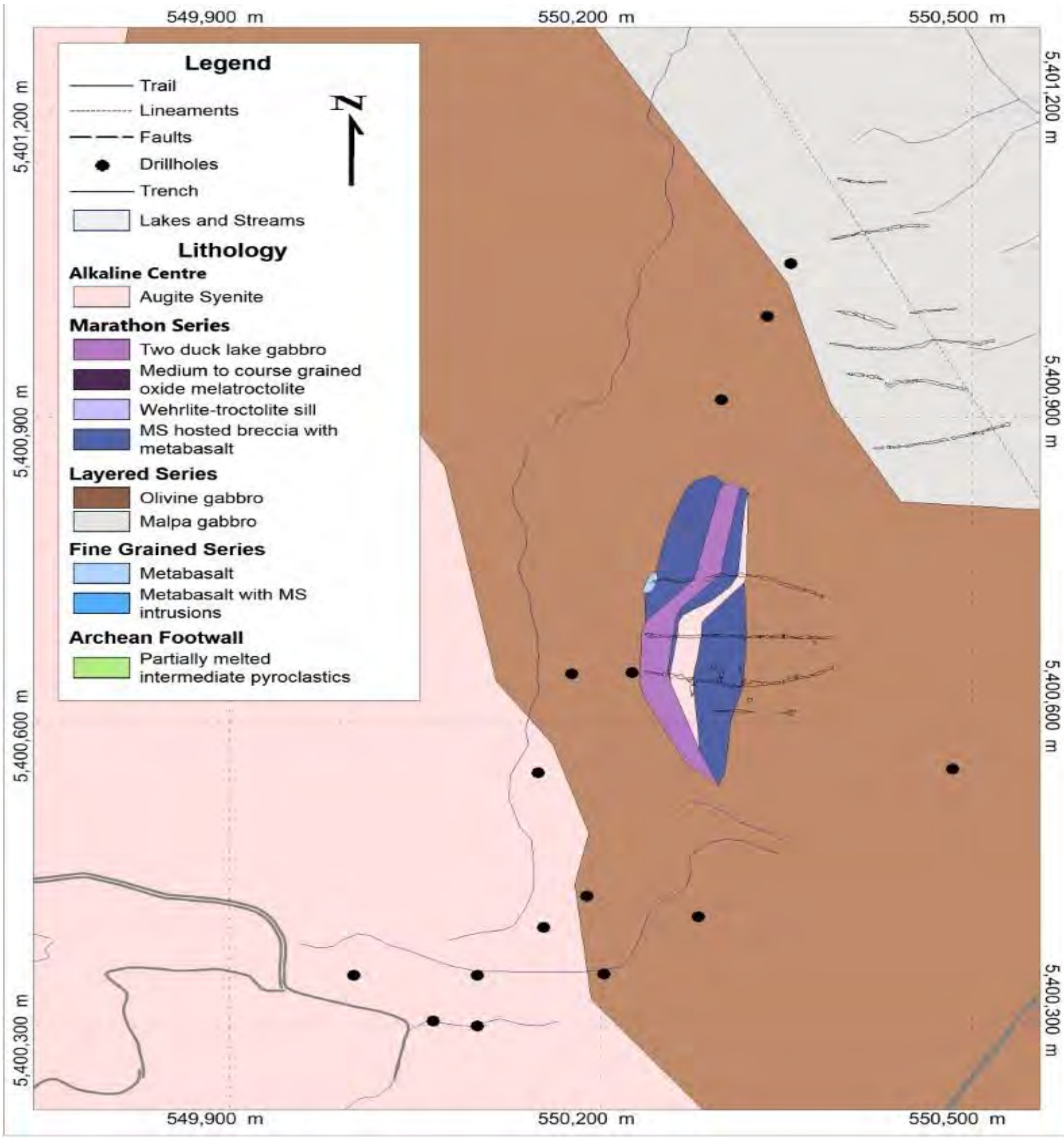


Source: *Gen Mining (2021).*

7.3.2.2 WD Zone

The WD Zone is located southeast of the SG Zone (Figure 7.17). Previous work included 15 drill holes, 1,000 m of outcrop stripping and channel sampling, and 48 grab samples. Mineralization in this area occurs at two stratigraphic positions: TDL Gabbro and Layered Series Gabbro. These two mineralized zones are easily classified using Cu/Pd ratios. The Cu/Pd for mineralization in the Layered Series is much higher than for mineralization in the TDL Gabbro owing to the negligible Pd values and higher average copper content in the Layered Series rocks. Strike length for the mineralized zones is 100 m in the Layered series and 150 m in the TDL Gabbro. Both zones are open to the north. All mineralization strikes north-south. The Marathon Series mineralization dips steeply west at 70°. Dip for Layered Series mineralization is shallow at 45° west.

Figure 7.17: WD Occurrence Showing Lineaments, Trenches and Drill Holes

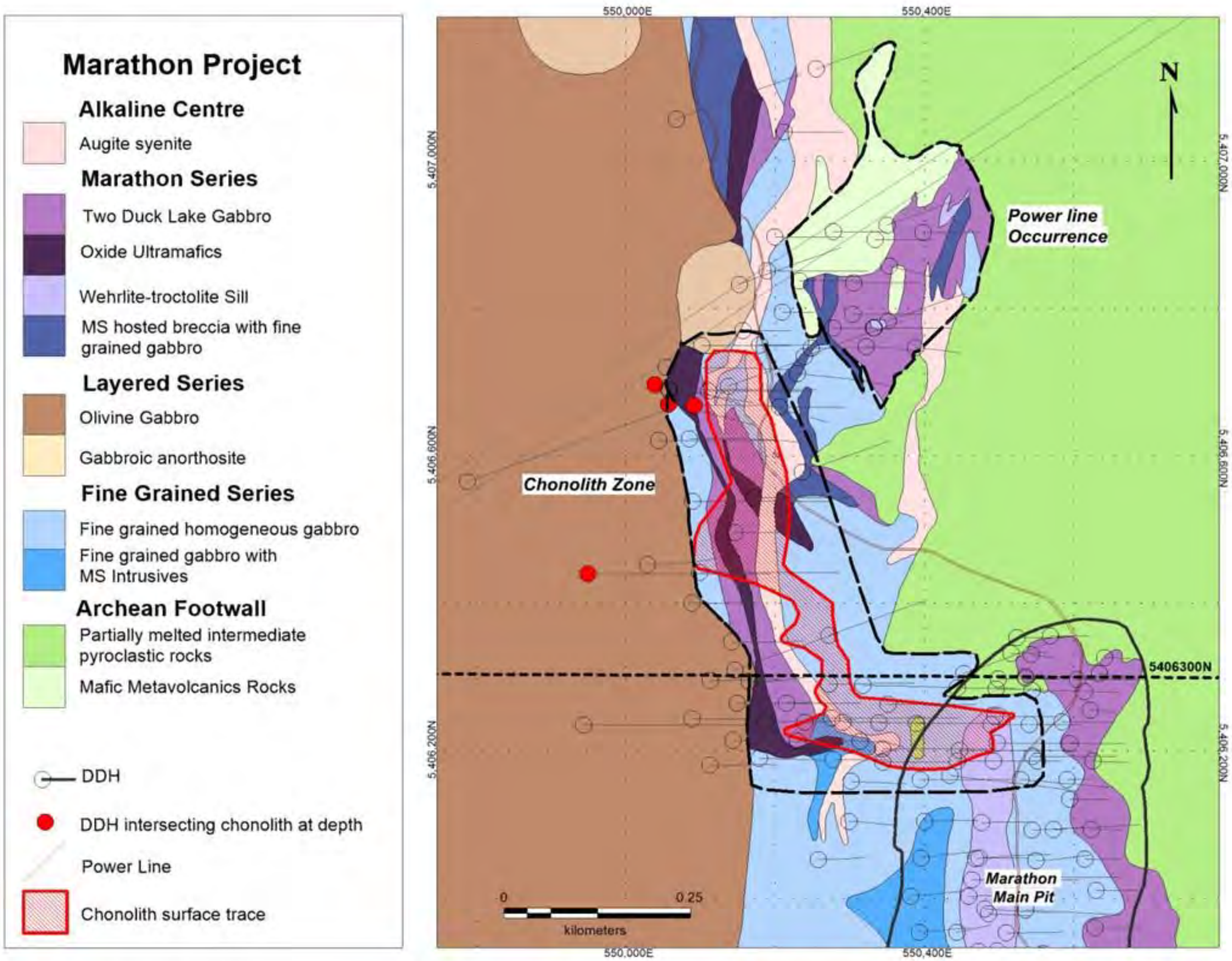


Source: *Gen Mining (2021).*

7.3.3 The Chonolith Zone

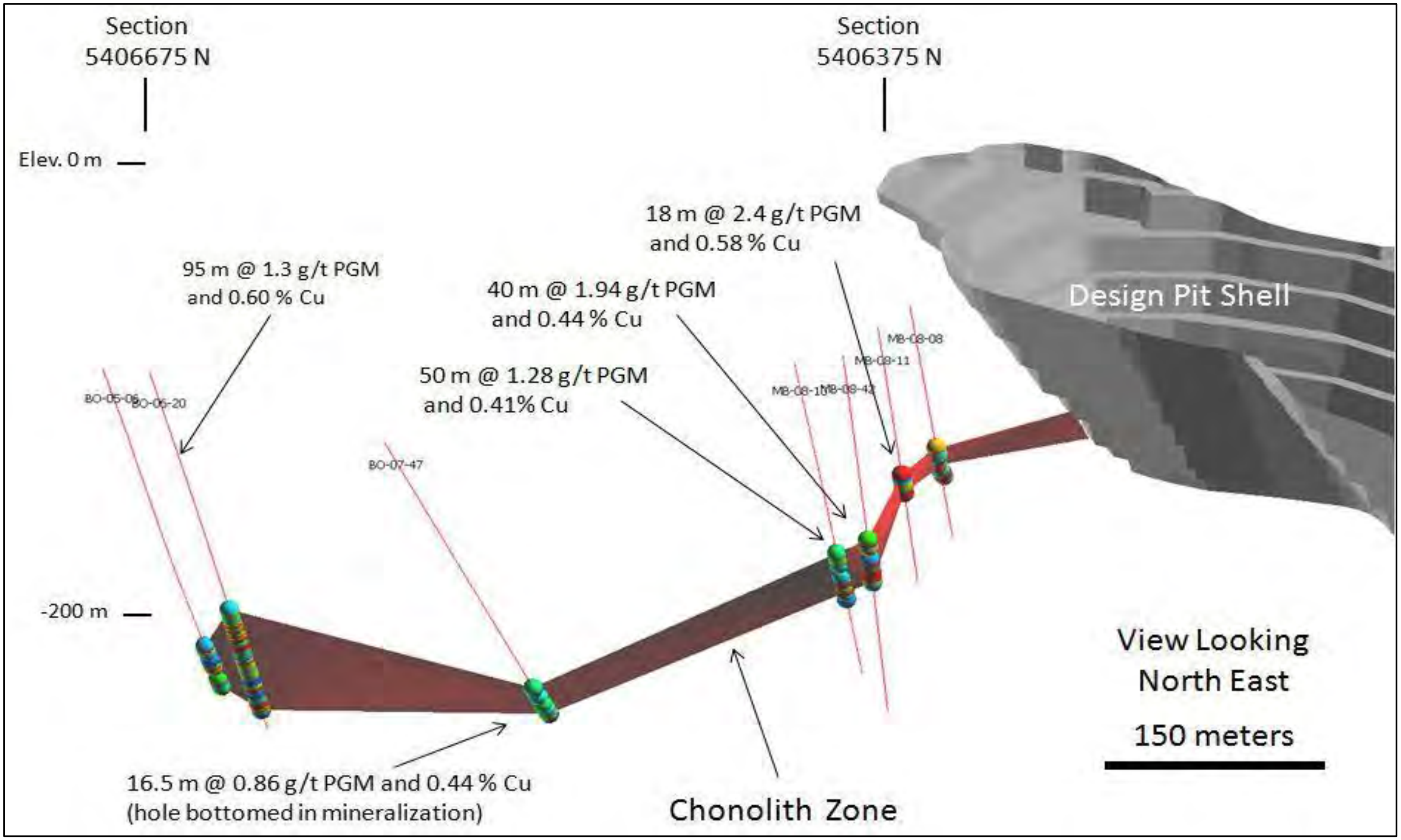
The Chonolith Zone is presumed to be continuous with the north end of the Main Zone and this relationship will need to be confirmed by drilling. In general, the Main Zone follows the footwall contact north along the edge of the Main pit and at 5,406,300 N changes direction and continues down dip to the west. The mineralization continues for 350 m west before turning north where it is interpreted to connect to a 200 m deep channel of mineralization referred to as the Chonolith (Figure 7.18). The Chonolith Zone is up to 120 m thick and begins in the north at a depth of 200 m. The north-south trending section of the Chonolith is 500 m long and cut by only four drill holes. The best intersection in the north south section is 1.3 g/t total PGM and 0.6% Cu over 95 m (Figure 7.19). The section of the Chonolith that strikes west and connects with the Main Zone inside the open pit is intersected by a total of 10 drill holes. The best intersection in this area is 1.28 g/t total PGM and 0.41% Cu over 50 m.

Figure 7.18: North End of the Marathon Deposit Showing the Chonolith and Power Line Zones



***Source**: Stillwater Canada (2014).*

Figure 7.19: 3-D View of Drill Hole Intersects for the Chonolith and the Marathon Pit Shell (Looking East)

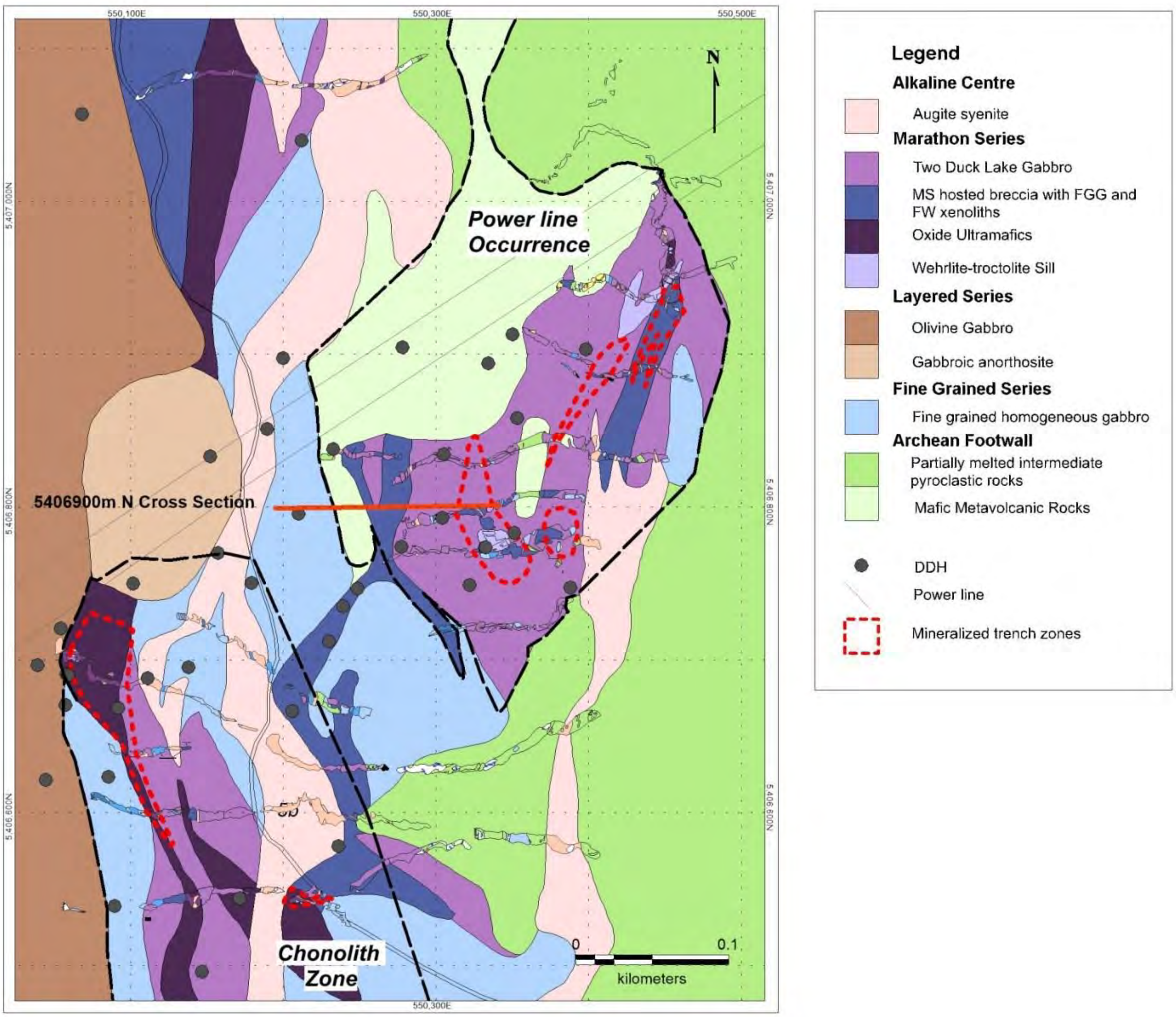


Source: *Stillwater Canada (2014).*

7.3.4 The Power Line Occurrence

The Power Line Occurrence, located northeast of the Chonolith Zone, consists of a flat lying bowl shaped body of TDL Gabbro that sits in a trough in the footwall (Figure 7.20). The Chonolith Zone and Power Line Occurrence are separated by a shift in the footwall to the east and a syenite dyke. The Power Line Zone consists of multiple lenses including intervals such as 0.44 g/t total PGM and 0.2% Cu over 18 m.

Figure 7.20: Power Line Occurrence Showing Trenches and Mineralized Surface Zones



Note: *Mineralized zones defined on the trenches with a cut-off of $12 NSR/t value.*
Source: *Stillwater Canada (2014).*

7.3.5 Geordie Deposit

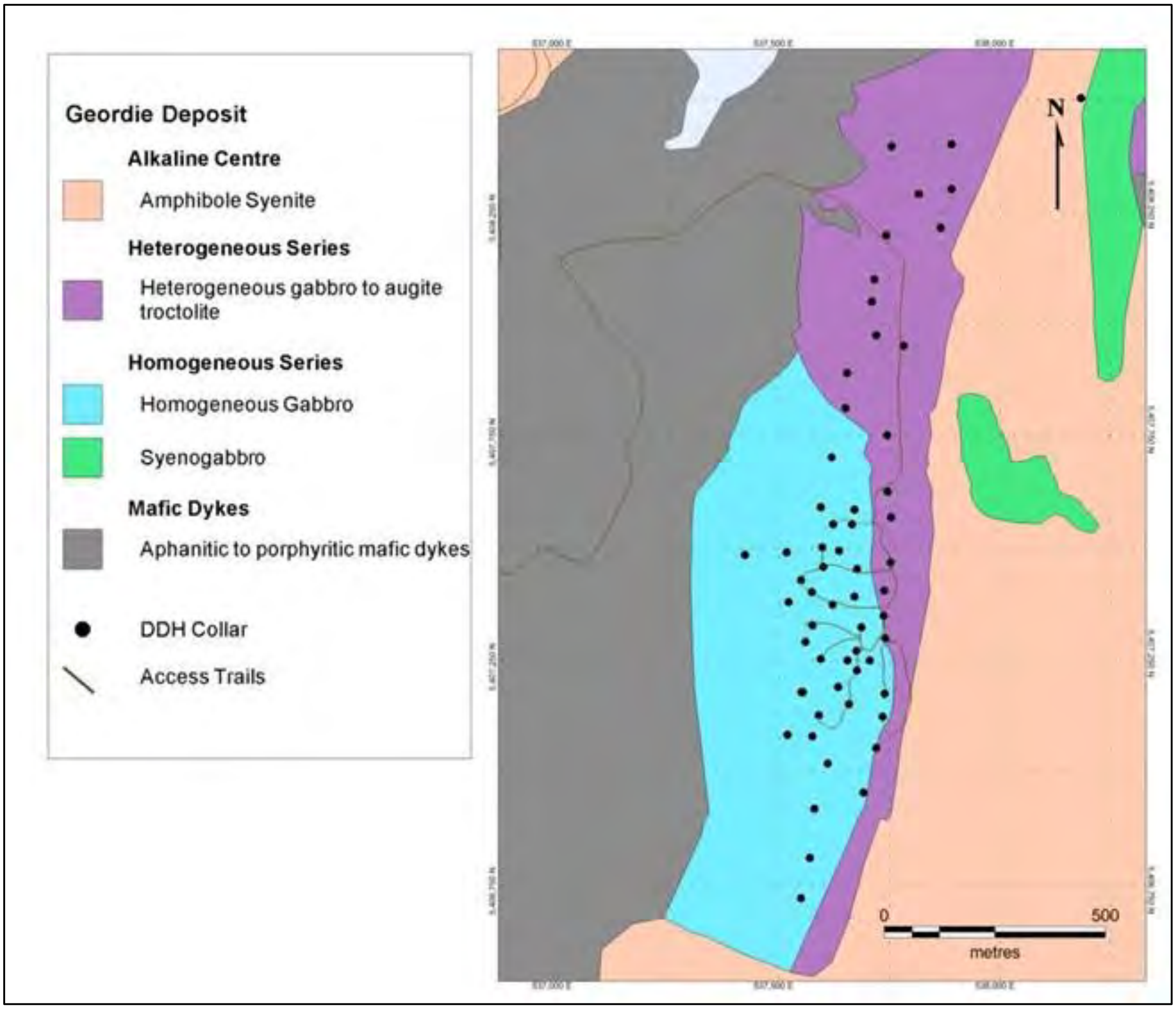
The Geordie Deposit is located near the centre of the CC (Figure 7.12). Mineralization occurs along the base of the Geordie Intrusion, a large layered gabbro with a basal zone of heterogeneous augite troctolite and gabbro. A simplified geology map of the Geordie Deposit is shown in Figure 7.21 and a cross-section through the middle of the deposit is shown in Figure 7.22.

Exploration on the Geordie Deposit includes 69 diamond drill holes totaling 12,234 m, trenching, mapping, magnetic and radiometric airborne survey and soil sampling.

The sulphides consist predominantly of chalcopyrite and bornite, and minor pyrite, millerite, cobaltite, siegenite, sphalerite and galena. Sulphides are disseminated with angular to blebby grain shapes. Thin veins of chalcopyrite occur near the base of the intrusion and also in the underlying syenite. The mineralization occurs within a thick continuous basal zone that dips 45 to 60° and traced over a strike length of 1.7 km. Minor thin discontinuous zones occur higher up in the stratigraphy.

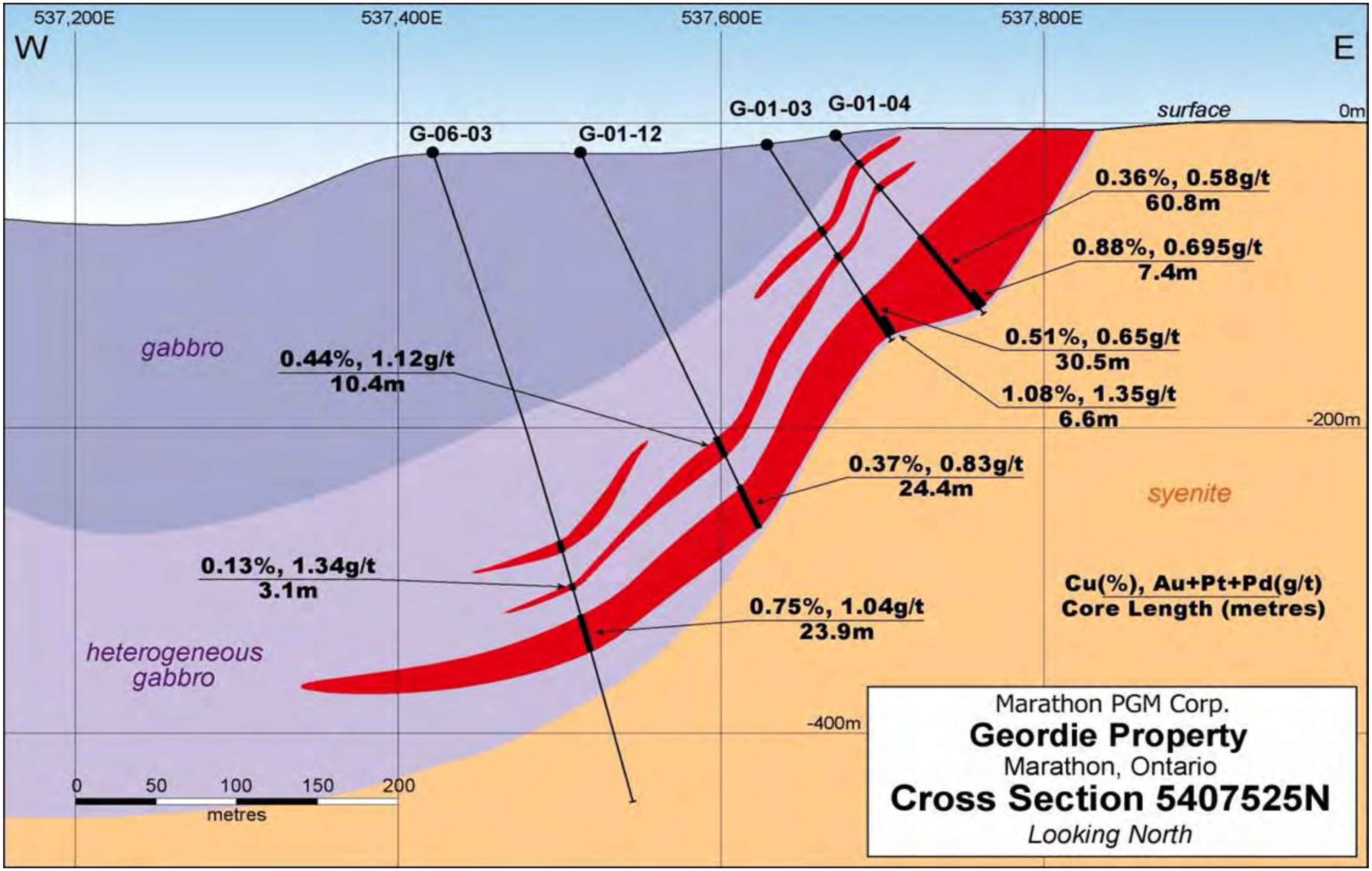
Drilling has outlined a series of sub-parallel mineralized zones within the gabbroic/troctolite body. Mineralization is mainly chalcopyrite with lesser amounts of bornite, pyrite, magnetite, and supergene chalcocite. Associated with concentrations and disseminated grains of chalcopyrite are a wide variety of PGM and precious-metal tellurides, bismuthinites and alloys. The abundance of Pt is very low, however, for samples with greater than 45 ppb Pt or Pd (three times the detection limit of Pd) the average Pd/Pt is 11. There is a strong positive correlation between Cu and Pd and the average ratio for Cu/Pd is 6,500.

Figure 7.21: Geologic Map of the Geordie Deposit



Source: *Stillwater Canada (2014).*

Figure 7.22: Vertical Cross Section at the Geordie Deposit (Looking North)



Source: *Stillwater Canada (2014).*

7.3.6 Four Dams Prospect

The Four Dams Prospect is located 4 km northwest of the Marathon Deposit on the northern rim of the CC (Figure 7.12). Four Dams is subdivided into three mineralized zones, as follows: Four Dams North, Four Dams South and Lacobeer Lake (Figure 7.23).

The Four Dams North mineralization occurs in a 100 m thick lens of Marathon Series ultramafic rocks that strikes northwesterly for 350 m and dips 60° to the southwest. The intrusion has a thin marginal zone of melagabbro and a core of apatitic clinopyroxenite to apatitic wehrlite.

Sulphides in the Four Dams North Zone include disseminated to blebby chalcopyrite with lesser pyrrhotite and trace bornite. The mineralization includes intervals such as 0.16 g/t PGM and 0.39% Cu over 74 m, and 0.23 g/t PGM and 0.40% Cu over 85 m. Higher PGM grades occur in the central apatitic wehrlite zone.

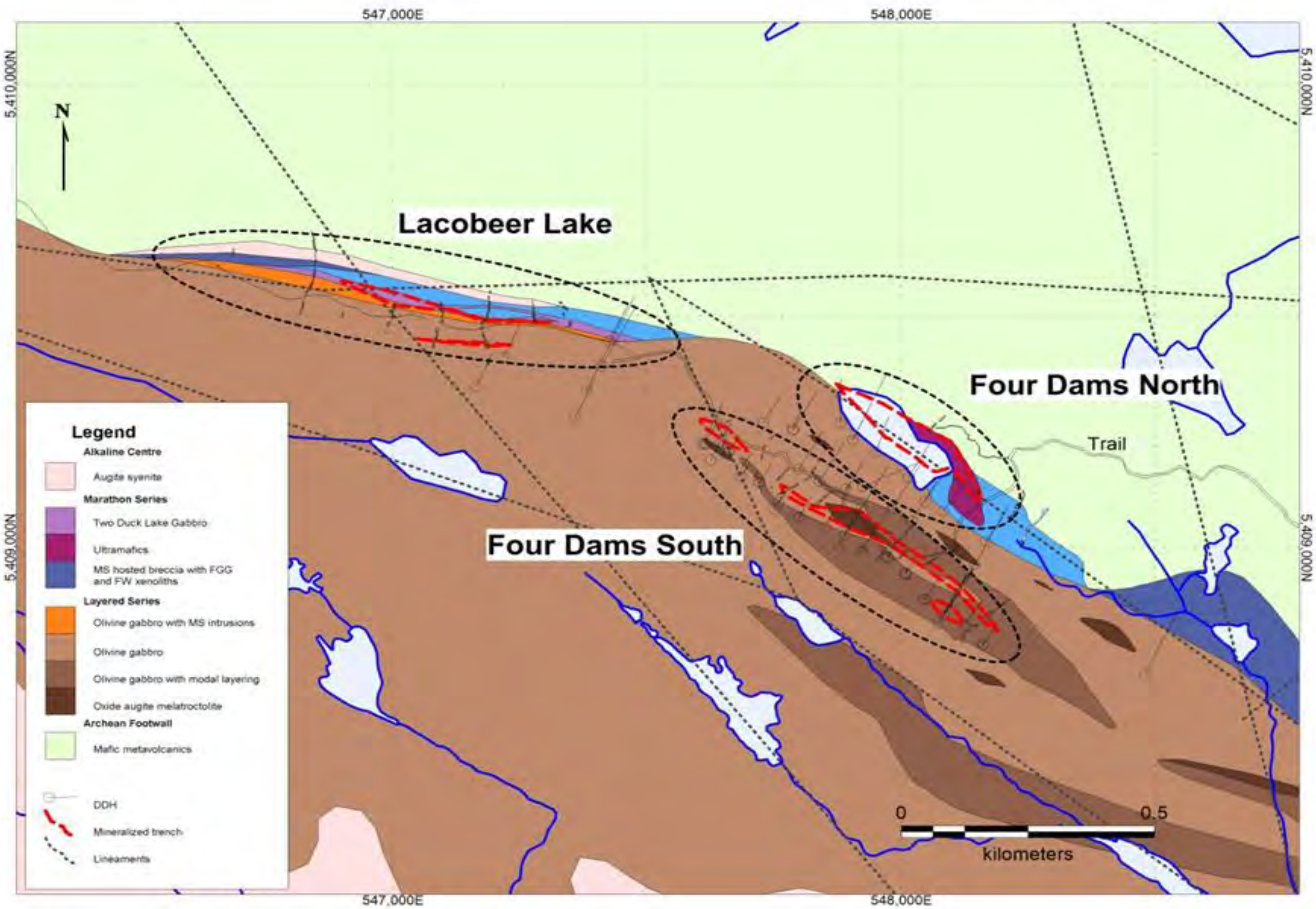
The Four Dams South mineralization is hosted by the Layered Series rocks, located approximately 150 m south of the Four Dams North mineralization. The mineralization occurs in homogeneous or modally layered olivine gabbro inter layered with magnetite rich lenses.

The Four Dams South Zone is continuous for 700 m along strike, dips 40° to the southwest and pinches and swells from thicknesses of up to 50 m and down to 4 m. The zone was defined by 32 short diamond drill holes in 2013. Best intersections included 0.33% Cu over 48 m. The zone contains only trace Pd.

The sulphide minerals consist of fine to medium grained disseminated pyrrhotite and chalcopyrite, which are associated with actinolite and albite alteration. The Four Dams South mineralization is believed to be a result of hydrothermal remobilization.

The Lacobeer Zone is poorly defined owing to thick overburden. Work to date includes five trenches with only one of them intersecting mineralization. The zone is inferred to be a maximum of 25 m thick on surface with complicated textural relationships within Marathon Series gabbros. Best grab samples from prospecting included 2.6 g/t PGM and 0.53% Cu.

Figure 7.23: Three Mineralization Zones at Four Dams



Note: *Mineralized surface zones were determined using projected drill hole data (Four Dams North) and surface sampling.*
Source: *Micon (2010).*

7.3.7 Sally Occurrence

The Sally Deposit occurs along the northern margin of the Eastern Gabbro (Figure 7.12). The Sally Deposit strikes east-southeast, dips at 45-50° south and extends for over 1.2 km along strike. The Sally Deposit is open to the east and west. P&E completed an initial Mineral Resource Estimate of the Sally Deposit in 2019, which is presented in Subsection 14.3 of this Technical Report.

A total of 65 holes have been drilled in the Sally Deposit area, of which 48 were drilled into Sally Main Zone (Figure 7.24). The drilling at Sally Main Zone is considered to be sufficient to define the thickness and continuity of the mineralized envelope. Closer spaced drilling will be required to define and characterize zones of higher-grade material.

Drilling has thus far intersected four main mineralized horizons at Sally, referred to in descending order from top to bottom, as Zones 1 to 4 (Figure 7.25):

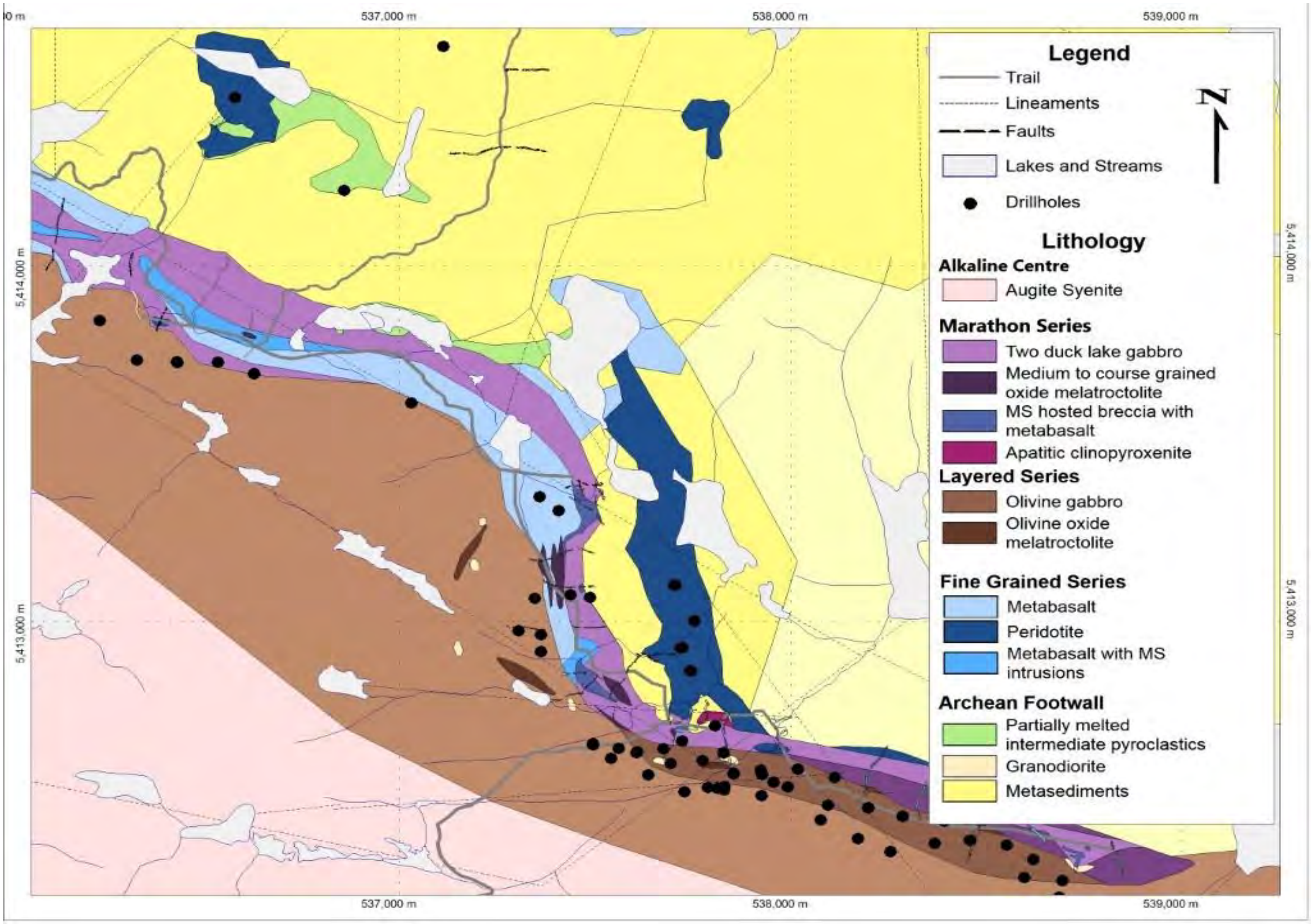
Zone 1: The uppermost mineralized zone contains Cu and trace amounts of Pd, and is commonly less than 10 m thick. Zone 1 is hosted by fine grained early intrusion TDL Gabbro that is intermixed with Marathon Series oxide melatroctolite.

Zone 2: The second mineralized zone is hosted by TDL Gabbro and clinopyroxenites that generally includes xenoliths of the Fine Grained Series. This second mineralized zone is typically 40 to 50 m thick and contains some of the highest Pd grades in the Sally Deposit, particularly at the contact between the Marathon Series (Breccia unit A) and the peridotite unit of the Fine Grained Series. Grab samples include sample K008054, 188.3 g/t PGM+Au and 9.11% Cu.

Zone 3: Zone 3 occurs below the peridotite unit and is referred to as the Main Zone because it is normally over 40 m thick and is the most continuous over the strike length of the Sally Deposit, except at the far west end where mineralization is cut by multiple faults. The mineralization is hosted by TDL Gabbro.

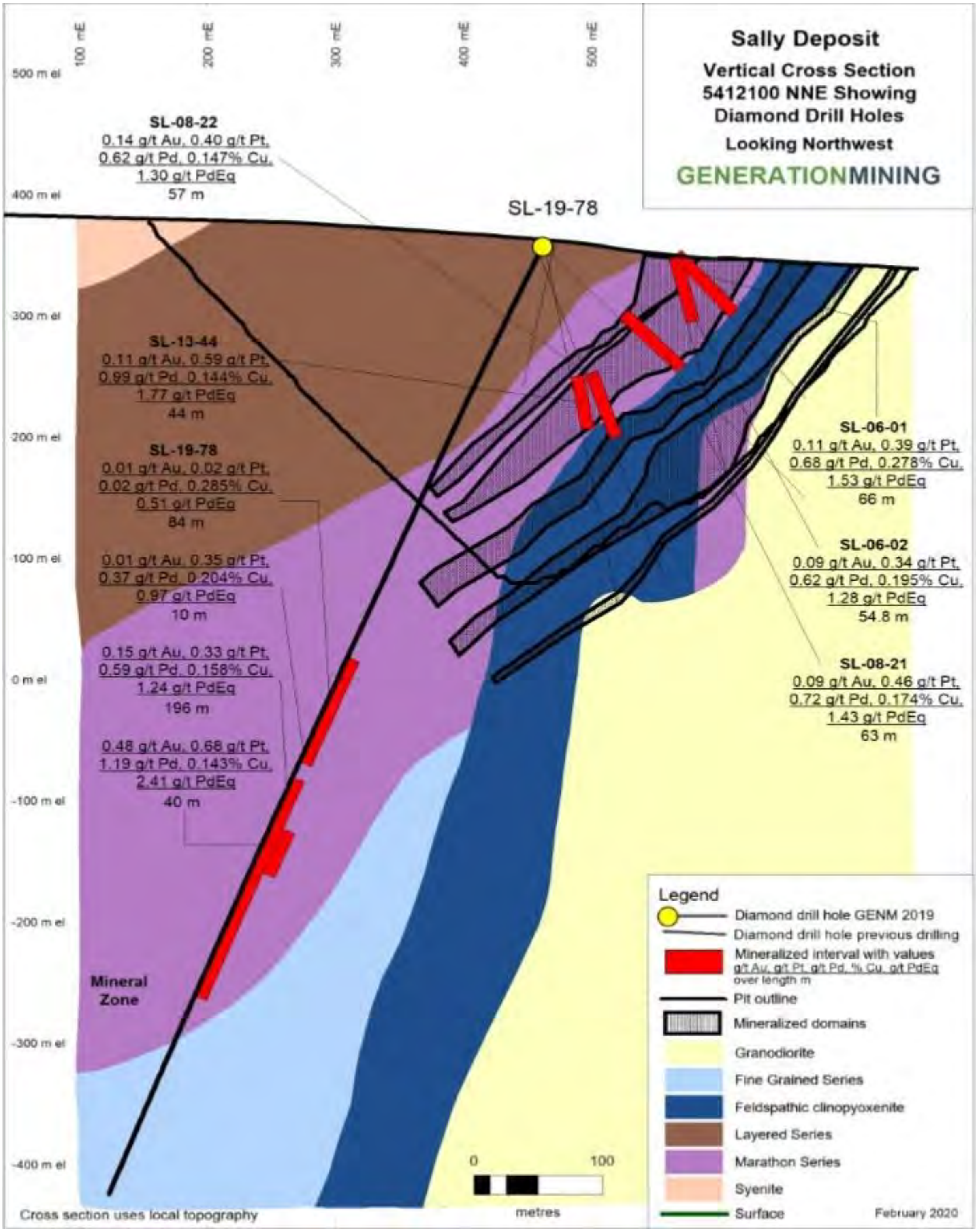
Zone 4: Zone 4 occurs below the main mineralized zone, where Fine Grained Series and/or Archean footwall are crosscut by Marathon Series intrusions. Mineralization contains Cu and Pd values that are similar to the Main Zone, but has increased pyrrhotite content, and thus is considered to be lower tenor.

Figure 7.24: Geology Map of Sally with Drill Hole Collars



Source: *Gen Mining (2021).*

Figure 7.25: Vertical Cross Section of Sally Showing Stratigraphy of Geological Units and Mineralization



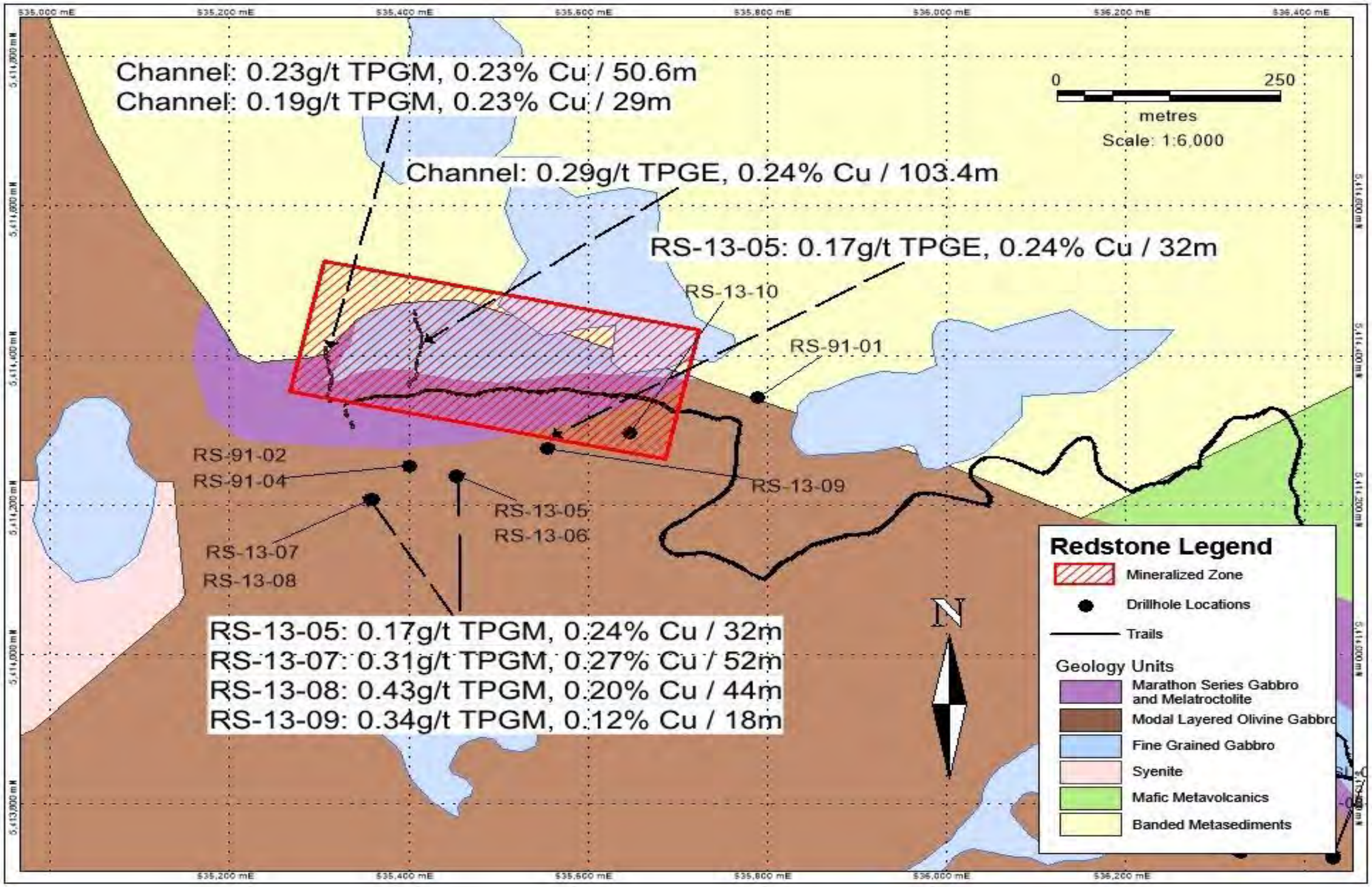
Source: *Gen Mining (2020).*

7.3.8 Redstone Prospect

The Redstone Prospect is situated along the outer margin of the Eastern Gabbro in the northwest corner of the CC (Figure 7.12). The mineralized zone strikes near east-west, dips between 30 and 45° south and is continuous along strike for 450 m (Figure 7.26). The zone extends down dip for at least 200 m and is open to the west.

The mineralization consists of disseminated chalcopyrite, pyrrhotite and trace bornite and is hosted in a complicated assemblage of Marathon Series rocks. The upper portion of the sequence is dominated by oxide melatroctolite with minor TDL Gabbro and the lower zone is composed predominantly of Marathon Series breccia units. The lower breccia units are composed of TDL Gabbro intermixed with oxide melatroctolite and numerous xenoliths of the Fine-Grained Series and/or metavolcanic footwall.

Figure 7.26: Geology of the Redstone Prospect with 2013 Drill Hole and Surface Channel Assays



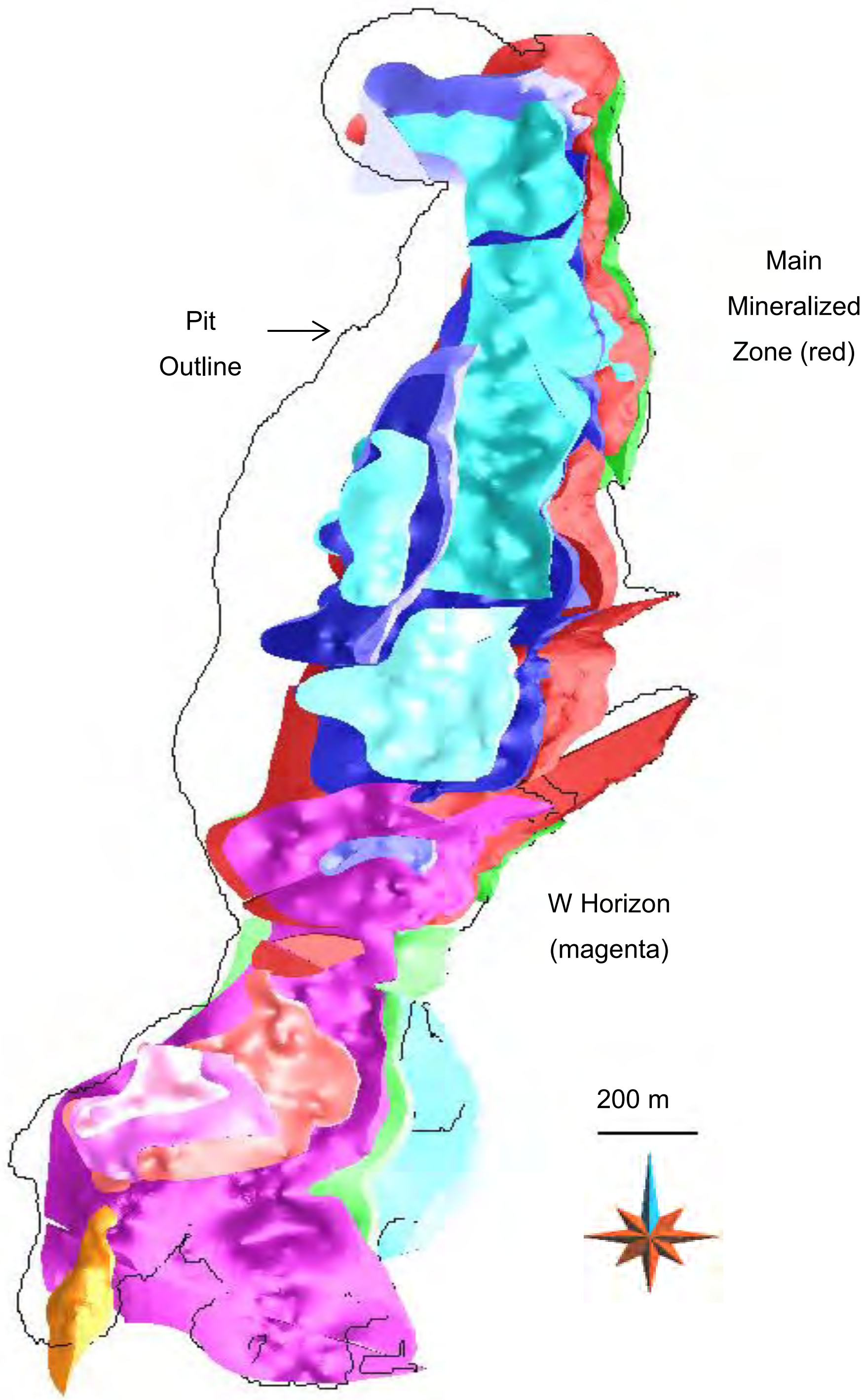
Source: *Stillwater Canada (2014).*

7.3.9 The W Horizon

The W Horizon forms a nearly continuous sheet of mineralization that strikes north-south for 1.5 km from section 5,403,100 N to section 5,404,600 N and continues down dip for over 700 m. The zone is open at depth. It ranges in thickness from 0.40 to 108.0 m and occurs near the top of the mineralized zones (Figure 7.27). The zone is difficult to identify in drill core because it commonly contains only trace sulphides, (chalcopyrite and bornite). Continuity of the W Horizon between drill holes is shown by minimum PGM abundances of 1 g/t and by Cu/(Pt+Pd) ratios less than 3,500.

Several very high-grade lenses ranging from 30 to 200 m in length occur within the W Horizon. The best intersections to date include 107 g/t PGM+Au, 1.04 g/t Rh and 0.02% Cu over 2 m (hole M07-239) and 45.2 g/t PGM+Au and 0.49% Cu over 10 m (hole M07-306).

Figure 7.27: Plan View of the Surface Models Outlining the Mineral Resource for the Marathon Deposit and Location of the W Horizon



***Source**: Gen Mining (2021).*

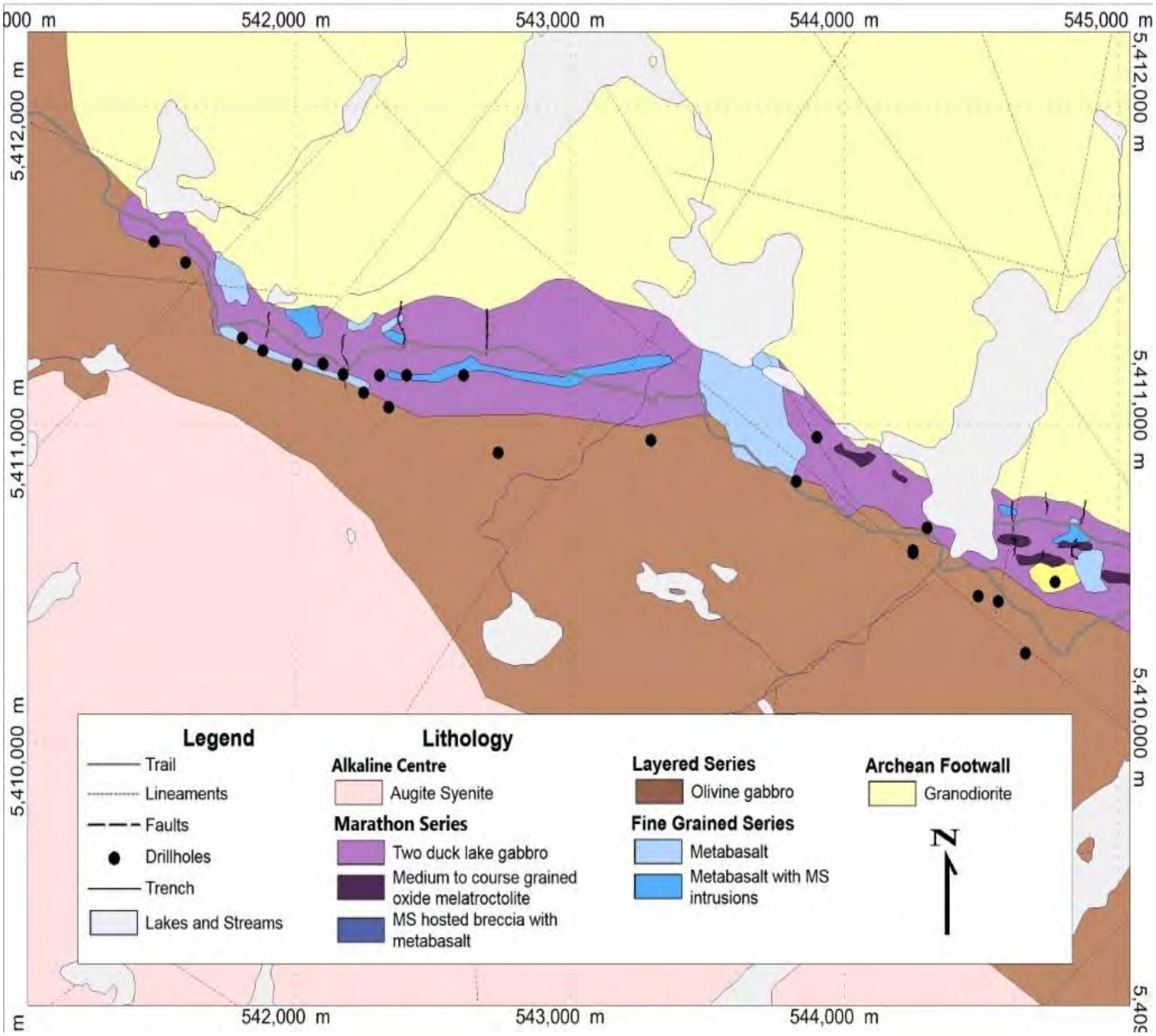
7.3.10 Boyer Prospect

The Boyer Prospect is located 10 km north and along strike from the Marathon Deposit to the roughly E-W trending northern margin of the CC and 4 km east of the Sally Deposit. The zone was discovered in 2016 and work completed includes surface mapping, six trenches and 14 diamond drill holes. Channel samples from various trenching programs include total PGM+Au values up to 3.1 g/t over 2.02 m, 0.82 g/t over 21.78 m, and 1.11 g/t over 7.69 m, with surface grab samples yielding up to 6.78 g/t.

The Boyer area has the largest intrusion of Two Duck Lake Gabbro outside of the Marathon and Sally Deposits and has a prominent reversely magnetized signature. The TDL intrusion has a strike length of 3 km extending from the Skipper Zone to the east and is up to 150 m thick. It dips to the south and varies between 45 to 20 degrees. The occurrence is currently open to the west (Figure 7.29).

The TDL gabbro at Boyer is similar to Marathon and Sally Deposits, but there is an increased proportion of pegmatitic material, brecciation and fragments of troctolites, wehrlites and dunnites. The TDL gabbro intrudes through the metabasalt along the basal granodiorite footwall.

Figure 7.28: Geology Map of Boyer Zone with Drill Hole Collars



Source: *Gen Mining (2021).*

7.4 Sulphide Mineralization

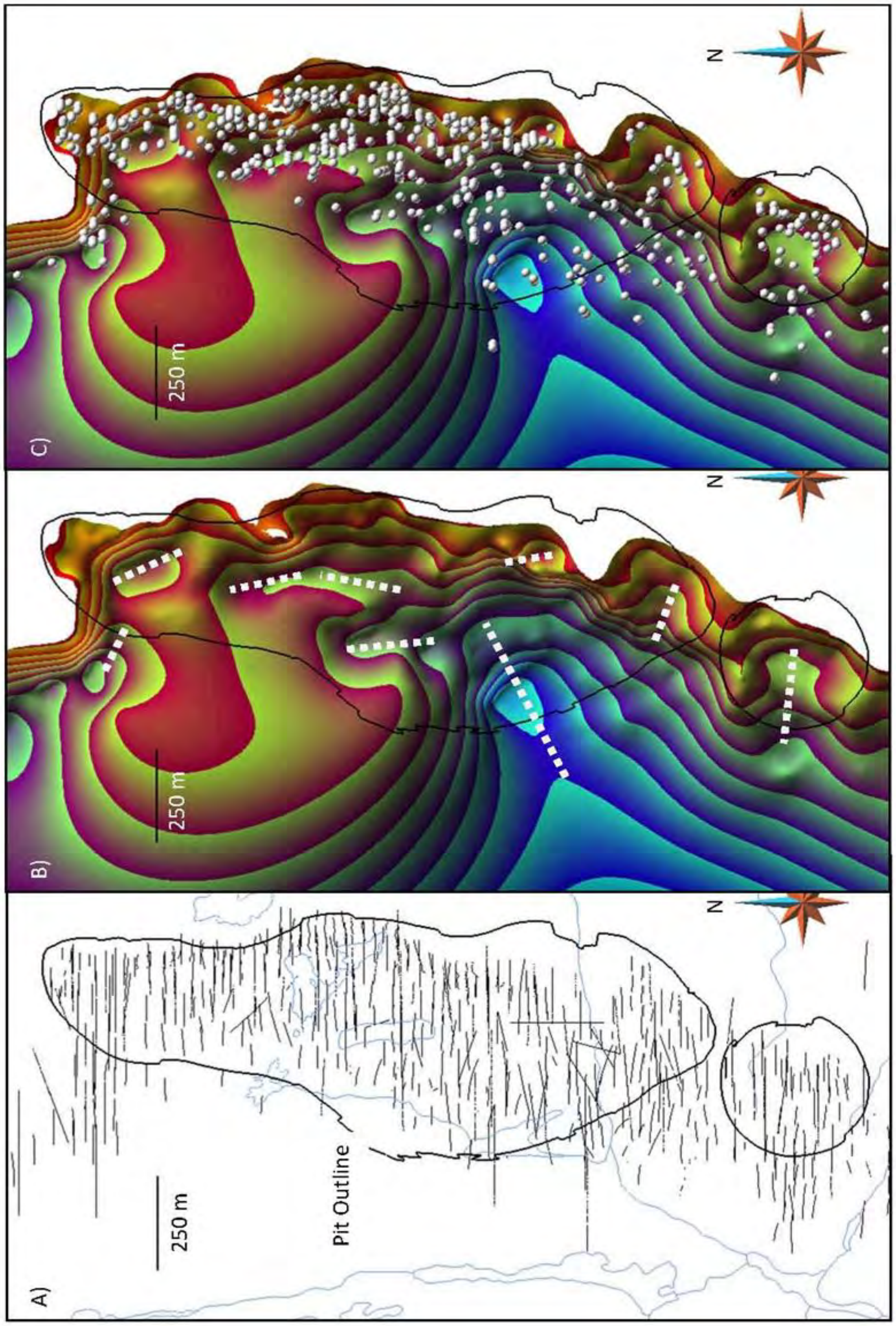
Sulphides in the TDL Gabbro consist predominantly of chalcopyrite, pyrrhotite and minor amounts of bornite, pentlandite, cobaltite, and pyrite. They occur in between primary silicates and to a lesser extent in association with secondary calcite and hydrous silicates such as chlorite and serpentine (Watkinson and Ohnenstetter, 1992). Chalcopyrite occurs as separate grains or as replacement rims on pyrrhotite grains. Some chalcopyrite is intergrown with highly calcic plagioclase (An70 to An80) in replacement zones at the margins of plagioclase crystals (Good and Crocket, 1994).

The modal mineralogy of a composite sample that is representative of the Marathon Deposit mineralization (and TDL Gabbro) was determined in a QEMSCAN™ survey by XPS (Kormos, 2008). A total of nine aliquots of material were analyzed. In decreasing order of abundance, the sulphide component of the composite sample consists of 2.75% pyrrhotite, 0.79% Cu-Fe sulphides (chalcopyrite and bornite), 0.09% pentlandite and trace amounts of pyrite, galena and sphalerite.

The relative proportions of pyrrhotite and chalcopyrite vary significantly across the Marathon Deposit, but in general, the sulphide assemblage changes gradually up section from the base to the top of mineralized zones. Sulphides at the base of the TDL Gabbro consist predominantly of pyrrhotite and minor chalcopyrite but the relative proportion of chalcopyrite increases up section to nearly 100% chalcopyrite near the top. In the W Horizon, sulphides consist mainly of chalcopyrite and bornite and minor to trace amounts of pentlandite, cobaltite, pyrite and pyrrhotite.

There is a relationship between mineralization and the paleo topography of the footwall contact as demonstrated in Figure 7.29. For example, mineralization is best developed within basins or troughs (b and c) of the footwall and thins or pinches out above prominent footwall ridges. It is important to note that although the mineralized zones are almost continuous from the north to south extents of the Marathon Deposit, assays with the best grades (combined Pd+Cu recalculated and presented as NSR) in Figure 7.30, fall along trends that mimic the alignment of troughs or ridges.

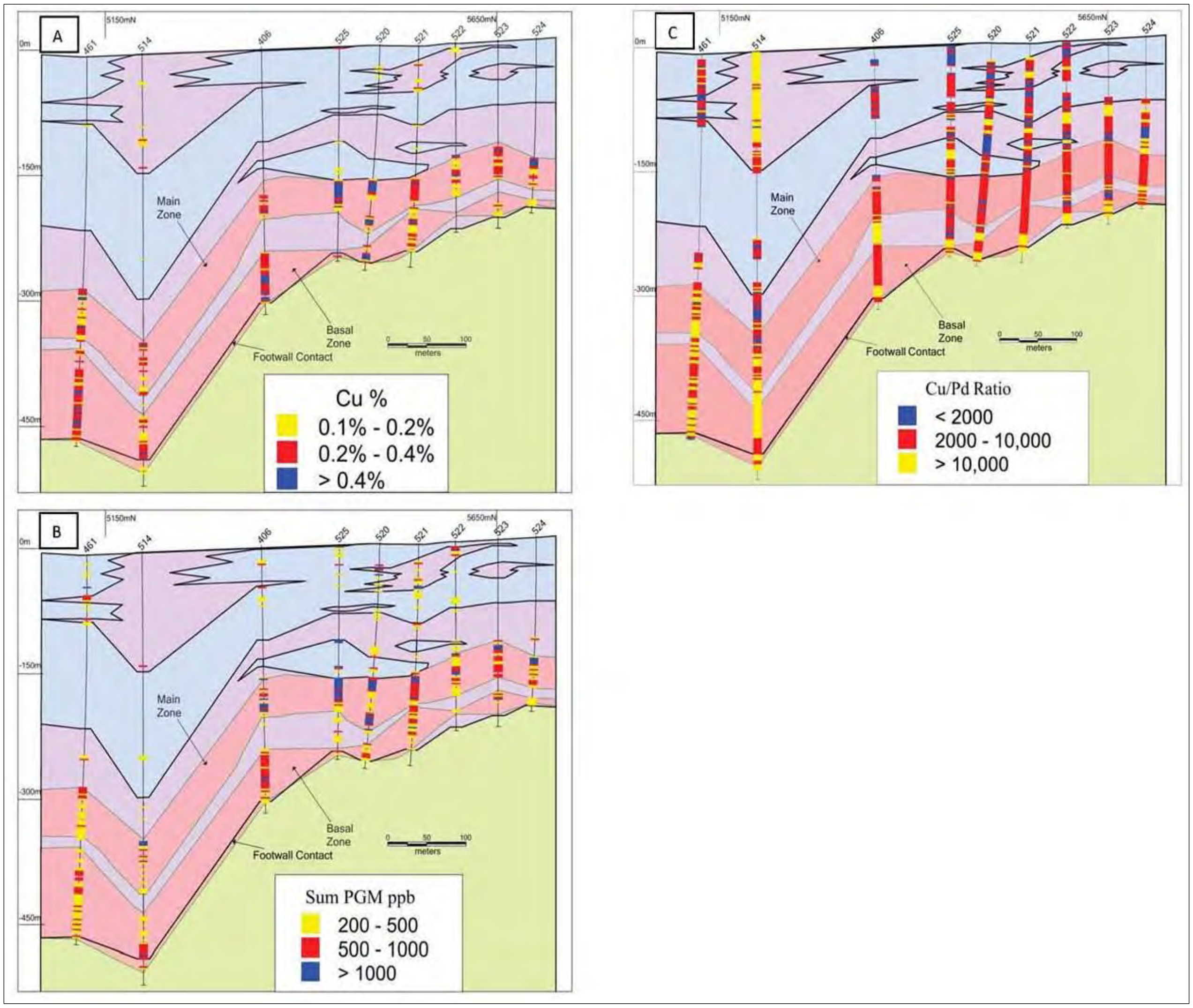
Figure 7.29: Plan Views of the Proposed Pit Outline (2010) Beneath the Marathon Main Zone



Note: *Figure A) includes all diamond drill holes and outlines for small lakes and streams. Figure B) includes the contoured 3-D surface model for the footwall contact. The white dashed lines highlight the trough axes in the footwall. Figure C) includes white spheres that represent drill hole assays that are filtered to show only those with NSR values greater than $75/t.*

Source: *Marathon PGM Corp. (2010).*

Figure 7.30: Marathon Deposit North-South Vertical Cross Section Along the Western Edge of the Main Open Pit (Looking West)



Note: *Figures show the Main and Footwall zones hosted within TDL Gabbro. Detailed geology along the drill stems for this section is located in Table 7.5. Numbers along the top of drill stems are drill hole numbers (example, M11-514). Numbers at top of figure are deposit section indicator (example 5150 m N corresponds to 5405150 m N, NAD 27 Zone 16N). Figures A, B and C contain assay values along the drill stem for Cu, Pd and Cu/Pd, respectively.*

Source: *Marathon PGM Corp. (2010).*

7.4.1 Platinum Group Minerals

The following summary was prepared from the detailed petrographic and SEM studies conducted at Lakehead University by Liferovich (2006, 2007). Two sample groups from the Main Zone and W Horizon are described and compared. A total of 2,304 grains from 55 thin sections were analyzed and 39 different platinum group minerals and gold, silver alloys were identified.

The grain size distribution for platinum group minerals in the Main Zone is similar to that in the W Horizon (Table 7.2). In general, approximately 60% of PGM grains are less than five micrometres (microns) in size. 40% of the PGM are greater than 5 microns.

The type and proportion of host minerals for the PGM are presented in Table 7.3. The dominant host minerals for the PGM in both areas are sulphides and other PGM. Similar proportions occur within the boundaries of plagioclase crystals, but note that the 25% proportion is by count and not by volume (mass) and it is expected that the volume percent of grains in plagioclase margins is less than 25% because included grains are smaller. The relatively high proportion (38%) of PGM in hydrous silicates (chlorite and serpentine) in the Main Zone contrasts with the much lower proportion in the W Horizon (4.3%).

The suite of PGM in the Main Zone is very different from that of the W Horizon (Table 7.4). Indeed, of the 12 dominant PGM that comprise 85% of the PGM reported in the W Horizon, none were found in the Main Zone. Conversely, of the 10 dominant minerals found in the Main Zone (91% of all PGM found), only 2.6% occurred in the W Horizon. This remarkable difference in the ranges of PGM for the two zones implies different conditions of PGM mineral crystallization.

The finding from Lakehead is supported by work completed in 2014 (Cabri L.) and 2016 (Ames et al.). The two studies apply two various techniques to separate sulphide phases from silicates, Cabri’s work utilized hydro separation while Ames utilized energy pulse disaggregation. Both methods then took the separated grains, mounted them on a thin section and completed mineral identification by SEM. Both studies observed that the main Pd mineralogy at the Main Marathon Deposit was dominantly antimony-arsenide, arsenides, bismuthides, telluride and stannite. Only Ames study contained samples from the W Horizon but found a very different mineral assemblage: arsenides, sulphides, antimony-arsenides, plumbide, and tellurides. The was also a higher variety of palladium, platinum and rhodium species in the W Horizon relative to the Main zone.

Table 7.2: Size Distribution for PGM Minerals in the Main Zone Compared with the W Horizon

Zone	No. of Grains	< 5 Microns (%)	5-10 Microns (%)	10-20 Microns (%)	>20 Microns (%)
Main	573	64.9	16.9	12.5	5.7
W Horizon	1731	58.3	27.1	9.6	5.0

Source: *Ruthart (2013).*

Table 7.3: Proportion of PGM Minerals Spatially Associated with Silicates, Sulphides or Other PGMs

Zone	No. of Grains	Plagioclase Boundaries (%)	Sulphides (%)	Other PGMs (%)	Hydrous Silicates (%)
Main	573	22.4	34.9	4.36	38
W Horizon	1731	25	53.7	16.5	4.3

Note: *This does not represent volume percent as grains included in plagioclase boundaries are smaller than those located elsewhere.*
Source: *Ruthart (2013).*

Table 7.4: Dominant PGM Mineral Phases in the Main Zone Compared to the W Horizon

Mineral	Formula	W Horizon	Main Zone
Zvyagintsevite	(Pd,Pt,Au)3Pb	41.8%	-
Palladinite	(Pd,Cu,Au)O	15.5%	-
Telargpalite	(Pd,Ag)3Te	5.5%	-
Skaergaardite	PdCu	3.9%	-
Kotulskite, Pb-rich	Pd(Te,Bi,Pb)	3.8%	-
Isoferroplatinum	(Pt,Pd)3(Fe,Cu)	3.7%	-
Keithconnite, Pb-rich	Pd3-x(Te,Pb,Sb)	3.5%	-
Tetraferroplatinum	PtFe	3.4%	-
Plumbopalladinite	Pd3Pb2	1.2%	-
Vysotskite	PdS	1.2%	-
Laflammeite	Pd3Pb2S2	1.1%	-
Atokite, Pb-rich	(Pd,Pt)3(Sn,Pb)	0.9%	-
Au, Ag and alloys		7.0%	3.3%
Stilwaterite	Pd8As3	0.4%	0.9%
Arsenopalladinite	Pd8(As,Sb,Pb)3	0.3%	1.7%
Cotunnite, Ru-rich	(Pb,Ru)Cl2	-	2.1%
Hessite	Ag2Te	-	3.7%
Hollingworthite	(Rh,Pt,Pd)AsS	0.2%	5.6%
Sperrylite	PtAs2	1.1%	6.3%
Kotulskite	Pd(Te,Bi)	-	9.9%
Sobolevskite	PdBi	0.1%	10.1%
Mertierite-II	Pd8(Sb,As,Pb)3	0.3%	16.1%
Kotulskite-Sobolevskitess	Pd2Te(Bi,Pb)	0.2%	34.9%

Note*: A total of 2,304 grains from 55 thin sections were analysed from the two zones.*
Other minerals with less than 1% distribution in both zones were excluded from this list.
Source*: Ruthart (2013).*

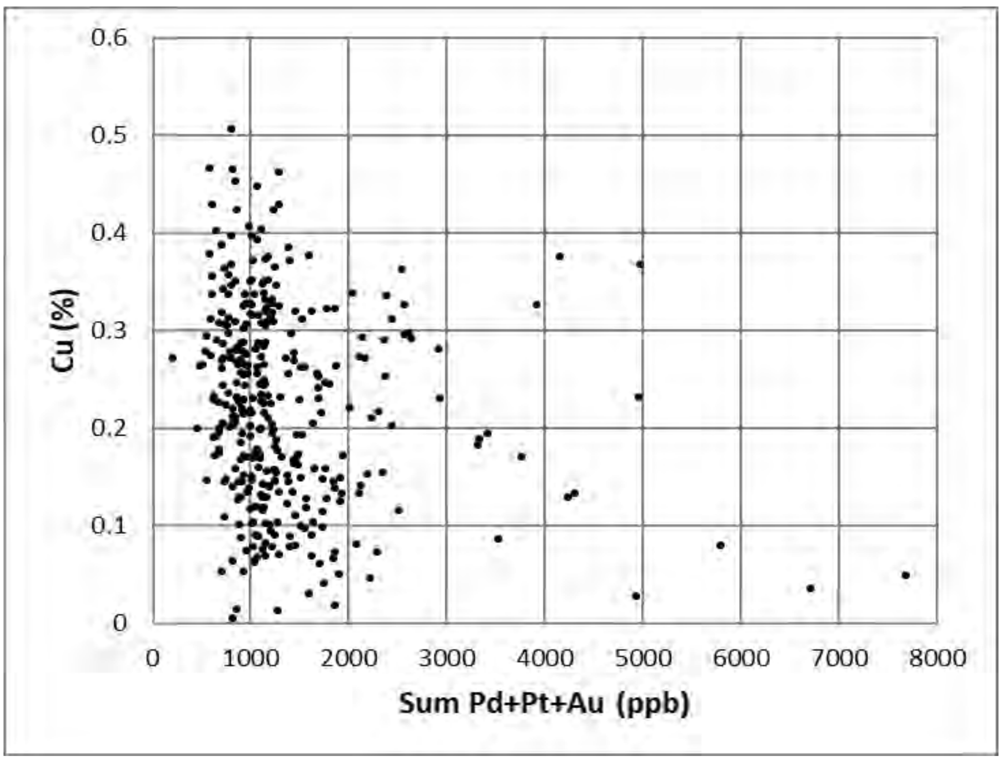
7.4.2 Distribution of Cu, Ni and PGM within the Marathon Deposit

A very prominent feature of the Marathon Deposit is the local and extreme enrichment of PGM with respect to Cu and Ni. For example, high-grade samples from the W Horizon that contain between 25 and 50 g/t Pd (1 g/t = 1 part per million) might also contain very low concentrations of Cu and Ni (<0.02%). The separation of PGM from Cu is observed throughout the Marathon Deposit but is most common near the top of the mineralized zone. In the southern half of the Marathon Deposit, PGM enrichment is most prominent in the W Horizon.

The separation of PGM from Cu is shown by the very poor correlation between Cu and the sum of PGM for the average of 356 intersections in the Marathon Deposit (Figure 7.31). The disparity in the relative behavior of PGM and Cu and Ni is unusual for contact type magmatic sulphide deposits. Barrie et al. (2002) attributed the PGM enrichment to high temperature zone refining process, but this process is inconsistent with mass balance calculations and the close correlation between Pd and the other PGM metals.

An understanding of the separation of PGM from Cu is important to define the model for deposition of the Marathon Deposit. In this section, the trends for S, Cu, Ni and PGM concentrations in these zones are described and three mechanisms for metal concentration during magmatic processes are proposed.

Figure 7.31: Plot of Cu Vs. the Sum of Pd+Pt+Au for Average Values of 356 Diamond Drill Hole Intersections (NSR Cut-off of $15/t)



***Note**: Each point represents an intersection of between 4 and 160 m thickness. All of the points represent 14,485 m of drill core or approximately 8,000 samples.*
***Source**: Marathon PGM Corp. (2010).*

7.4.3 Metal Ratios for the Marathon Deposit

Inter element ratios for metals that show positive and significant correlation are calculated for a subset of samples representative of the Deposit (Table 7.5).

Table 7.5: Calculated Ratios for Cu, Ni and the PGM Metals

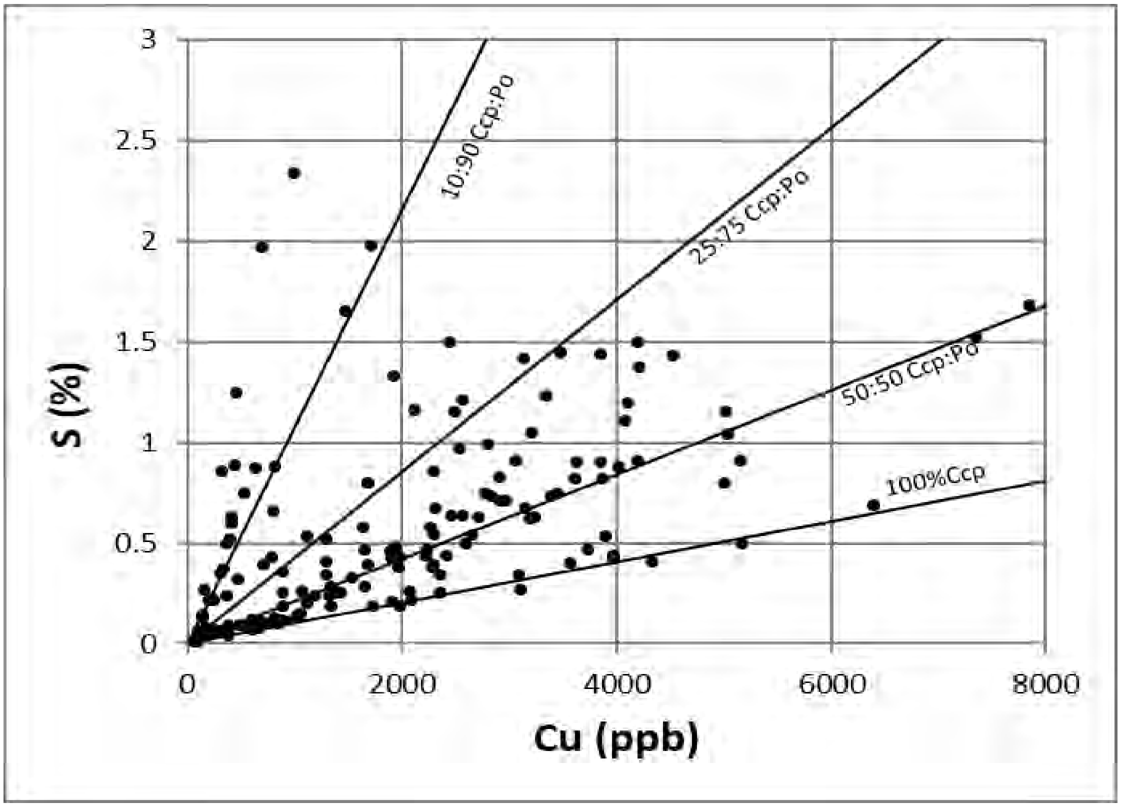
Ratio	Average	Standard Deviation	Minimum	Maximum	No. of Samples
Cu/Ni	14.5	2.8	8.2	21	40
Pd/Pt	2.99	1.02	0.83	9.2	8,663
Pd/Rh	40	19	10	84	32
Pd/Ir	910	636	147	2,573	28
Pd/Au	9.6	6.6	0.3	80	8,663

Note: *Cu/Ni ratio calculated for samples with >3,000 ppm Cu. Pd/Pt ratio calculated for intersection data. Pd/Rh and Pd/Ir calculated using high precision and high accuracy data by Good (1993) and 10 high grade samples analyzed by Activation Labs.*
Source: *Gen Mining (2019).*

7.4.4 Distribution of Cu in TDL Gabbro

The sulphide assemblage in the Marathon Deposit is comprised predominantly of chalcopyrite and pyrrhotite with minor pentlandite and bornite. Chalcopyrite is the dominant copper mineral and bornite occurs locally, particularly in the W Horizon. In general, sulphides at the base of the Main Zone are comprised of pyrrhotite and the proportion of chalcopyrite increases up section. On average, the majority of mineralized samples contain greater than 25% chalcopyrite and less than 75% pyrrhotite as shown in Figure 7.32. Samples with the highest concentrations of PGM fall along or close to the curve representing 100% chalcopyrite.

Figure 7.32: Sulphur vs. Copper for Samples Representative of Marathon Deposit Mineralization



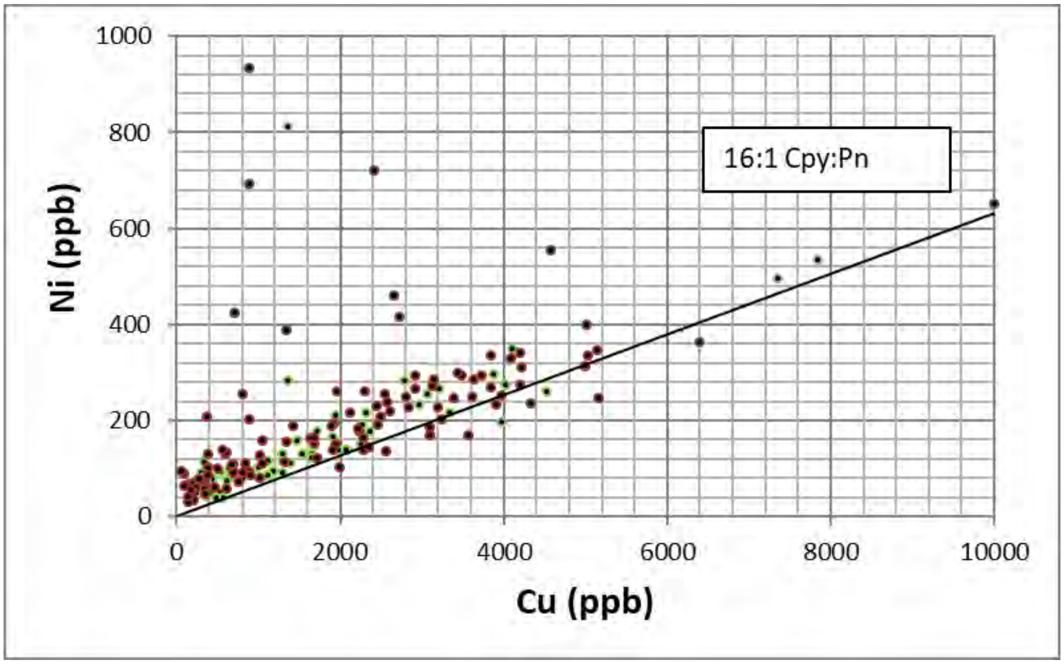
Note: *The lines represent the location where samples with the specified chalcopyrite: pyrrhotite ratios would plot.*
Source: *Marathon PGM Corp. (2010).*

7.4.5 Distribution of Ni Relative to Cu

Pentlandite is the dominant nickel-bearing mineral and is present as a minor component of the sulphide assemblage. Based on whole rock data for Ni vs. Cu, as shown in Figure 7.33, the chalcopyrite to pentlandite ratio for mineralized samples is relatively constant at approximately 16:1. For whole rock data where Cu is >3,000 ppm, the Cu/Ni ratio is relatively constant at 14.5. A small proportion of samples in the Marathon Deposit reveals that the abundance of nickel is normally less than approximately 1,200 ppm and rarely greater than 1,500 ppm, (see Figure 7.33).

In Figure 7.33, the abundance of nickel, where the abundance of copper is 0%, corresponds to the amount of nickel (60-100 ppm) held by olivine and clinopyroxene. The nickel content of olivine, as measured by Good (1993) for samples in the Main Zone and Ruthart (2013) for samples in the W Horizon, is between 400 and 600 ppm.

Figure 7.33: Plot of Ni Against Cu for a Subset of Main Zone Samples for which S (wt %) was Determined



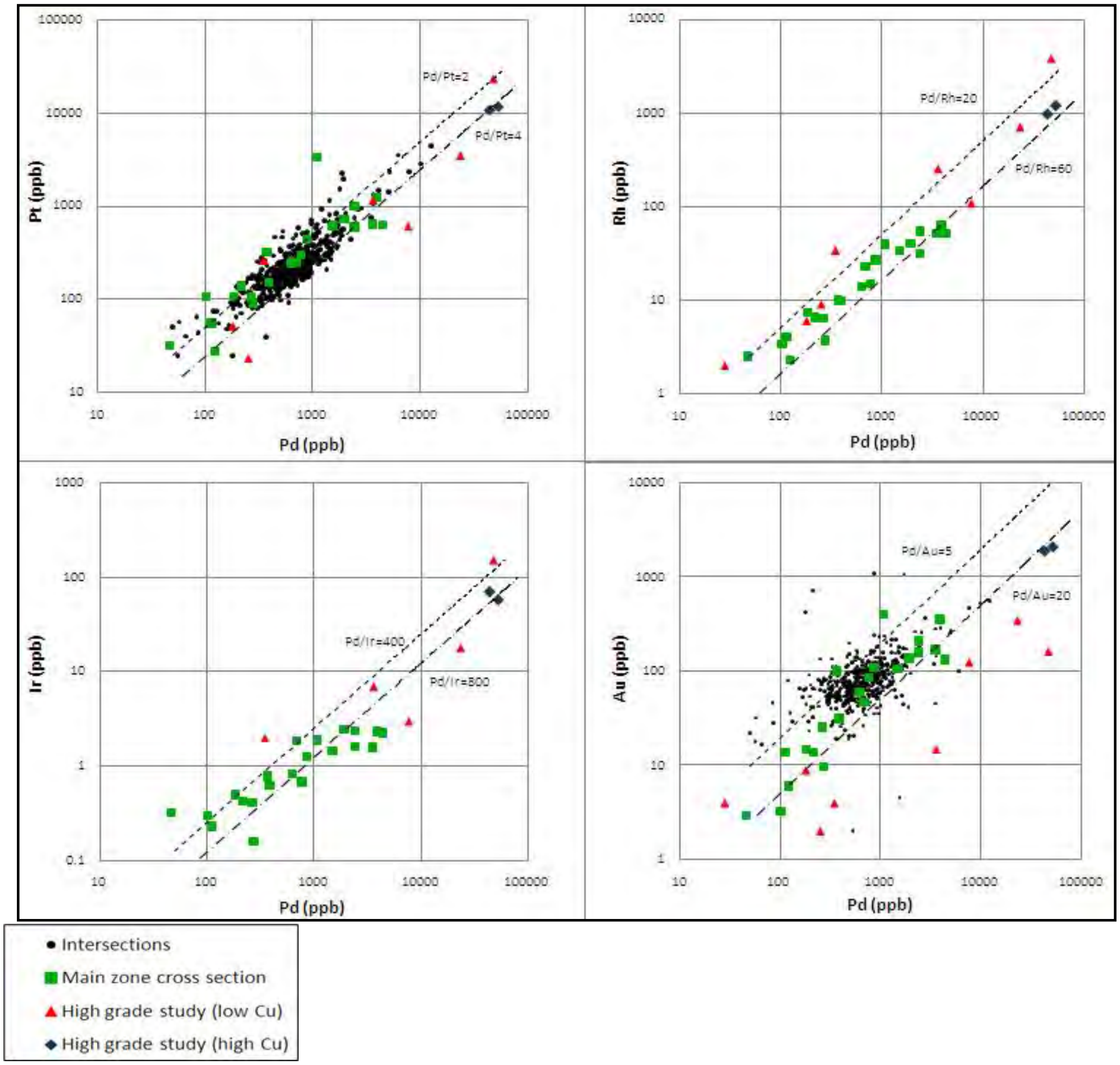
Note: *In general, the nickel content increases with increasing Cu. The majority of samples lie along a trend parallel to a calculated line representing samples with 94% chalcopyrite and 6% pentlandite or an approximate ratio of 16:1.*
wt % = weight percent.

Source: *Marathon PGM Corp. (2010).*

7.4.6 Distribution of PGMs

There is a strong and positive correlation between Pd and the other PGM metals (Pt, Rh and Ir) and Au for all types of mineralization in the Marathon Deposit (Figure 7.34).

Figure 7.34: Plot of Pd vs. Rh, Ir and Au for Representative Sample Groups of the Marathon Deposit



Note: *Intersections are averages of drill core intervals of between 4 and 160 m of mineralization. Main Zone cross-section samples were analyzed by Good (1993). 10 high-grade study samples are subsamples of 2 m thick, high grade intersections (analyzed by Activation Labs). Low Cu samples represent 50 cm splits from interval at 184-186 m in hole M-07-237 which contained 121 ppm Cu. High Cu samples are 10 cm of quartered core that were selected from the interval between 152-156 m in hole M-07-306 which contained 0.8% (8,000 ppm) Cu. The Main Zone cross section samples and high-grade study samples are considered to be high precision and high accuracy analyses.*

Source: *Marathon PGM Corp. (2010).*

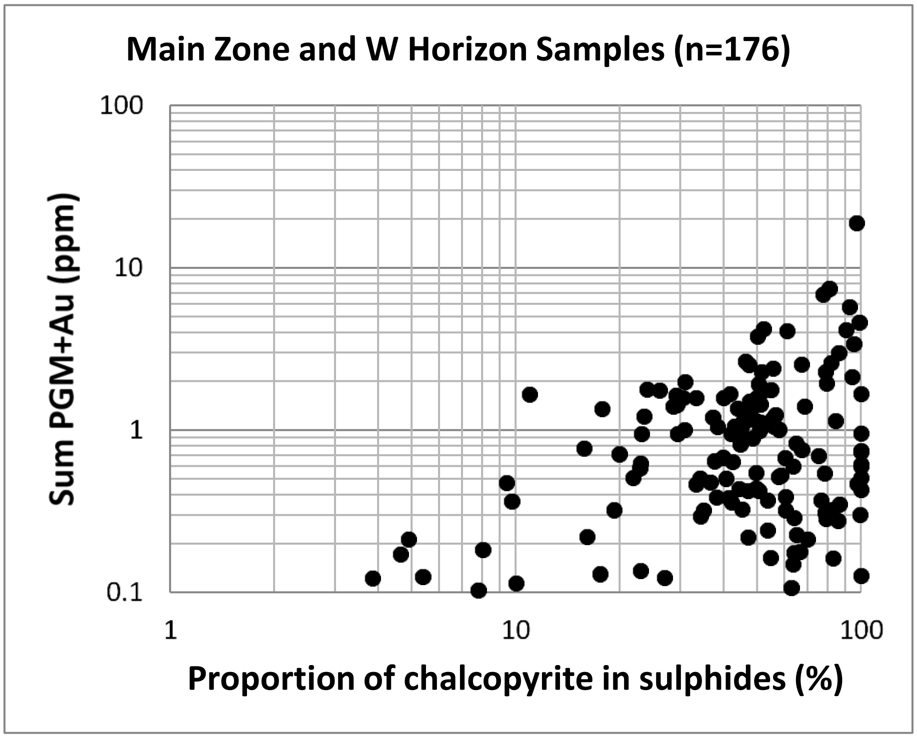
7.4.7 Relationship Between Sulphide Assemblage and PGM

The composition of the sulphide assemblage is in general indicative of PGM enrichment. For example, a pyrrhotite rich sulphide assemblage is typically poor in PGM whereas chalcopyrite rich (up to 100%) or bornite-bearing sulphide assemblages are typically high in PGM. This general field relationship is verified in Figure 7.35 where the values for the sum of PGM + Au are highest in samples with high calculated proportions of chalcopyrite in total sulphides. Note this relationship is different than that shown in

Figure 7.38 where it shown that there is no correlation between Cu and Pd. Also note that the increasing proportion of chalcopyrite is not always a sign of increasing PGM+Au.

That there is a relationship between chalcopyrite and total PGM+Au, but no correlation between copper and Pd, implies multiple concentrating mechanisms acted to concentrate Cu and PGM+Au.

Figure 7.35: Sum of Pt+Pd+Au vs. Calculated Proportion of Chalcopyrite in Sulphide Assemblage



Note: *Data set is representative of Main Zone and W Horizon.*
Source: *Marathon PGM Corp. (2010).*

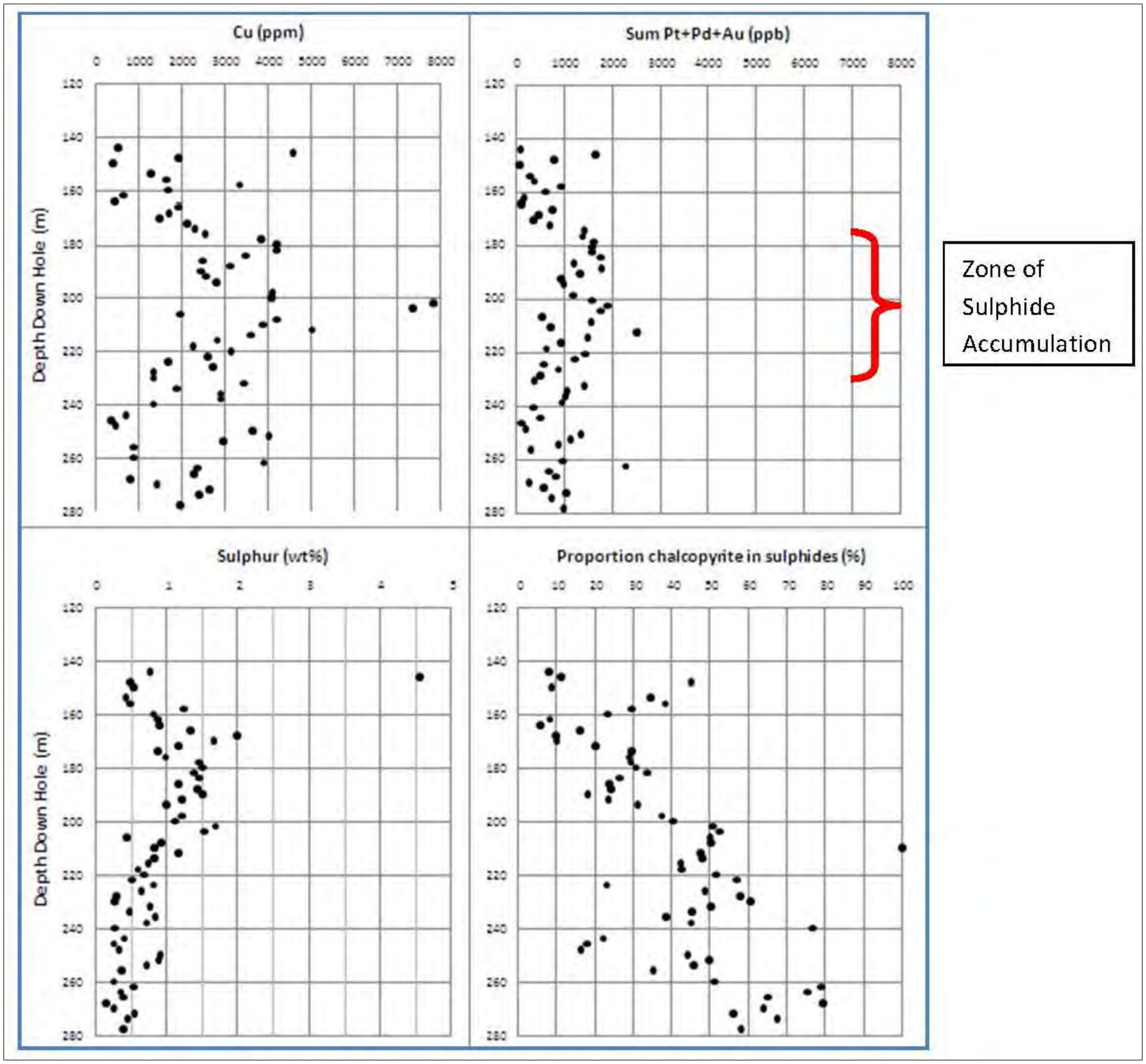
7.4.8 Variations of Cu, PGM, Sulphur and Chalcopyrite Across Mineralized Zones

Two different trends are shown by metal variation plots across mineralized zones in Figure 7.36 and Figure 7.37.

In Figure 7.36, the abundances of S and PGM increase systematically up section and can be attributed to the simple accumulation of sulphides. The change in the abundance of Cu is less obvious, but there is a systematic decrease in the proportion of chalcopyrite in the sulphide assemblage. In summary, the abundance of sulphides and PGM are increasing, but sulphides are becoming more pyrrhotite rich.

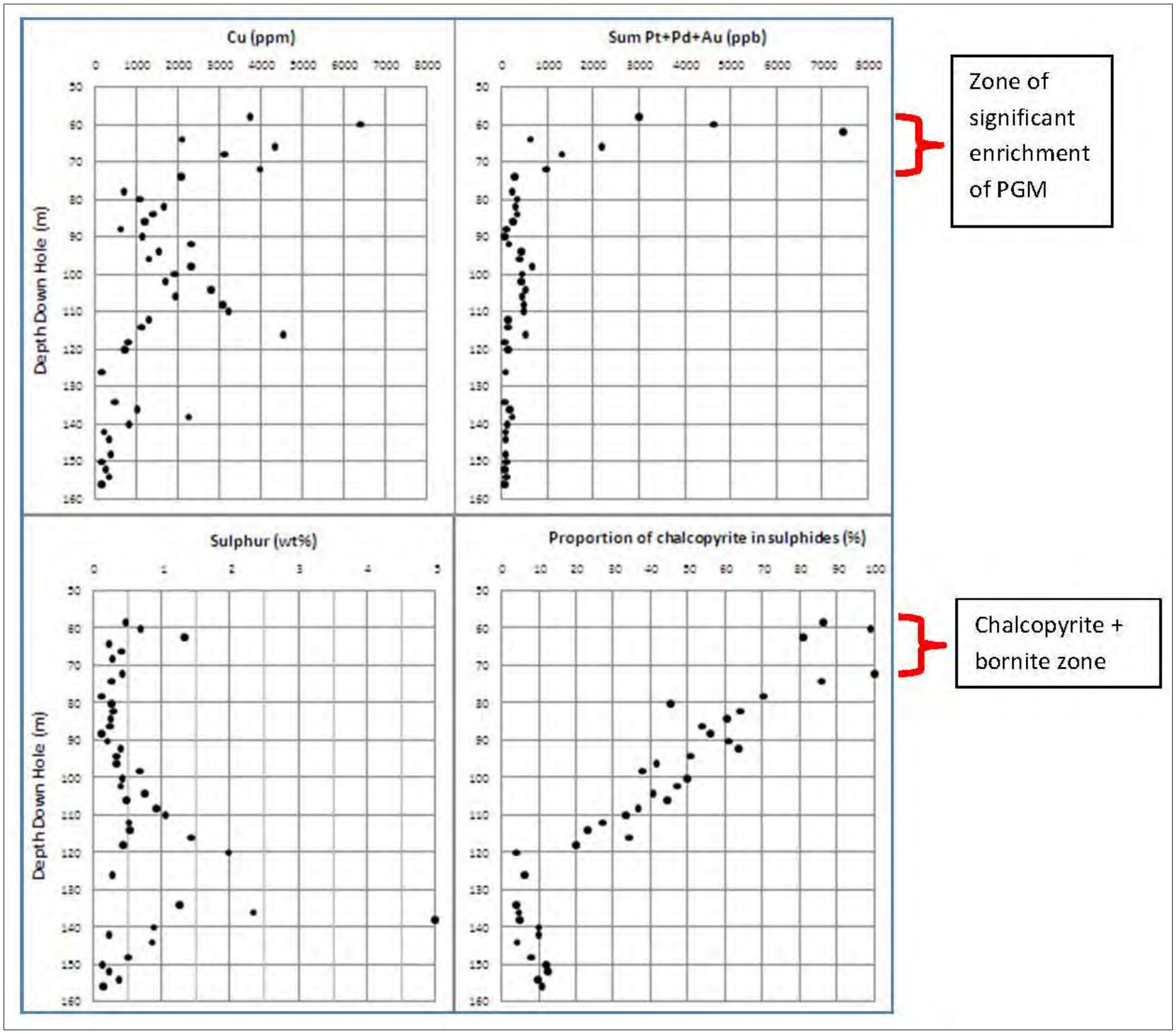
In Figure 7.37, the abundance of Cu and the proportion of chalcopyrite increase up section, the abundance of S stays flat or decreases and the Pd stays low but increases dramatically in the uppermost 12 m where the samples contain the highest proportion of chalcopyrite.

Figure 7.36: Metal Variation Down Diamond Drill Hole MB-08-10



Note: *Each sample represents 2 m of split drill core. Shows elevated PGM and Cu with increasing sulphur (sulphides) regardless of proportion of chalcopyrite.*
Source: *Marathon PGM Corp. (2010).*

Figure 7.37: Metal Variation Down Diamond Drill Hole G9



Note: *Each sample is 2 m of split drill core. Shows significant PGM enrichment in zones with highest proportion of chalcopyrite.*
Source: *Marathon PGM Corp. (2010).*

7.4.9 Mechanisms for Cu-PGM Concentration in the Marathon Deposit

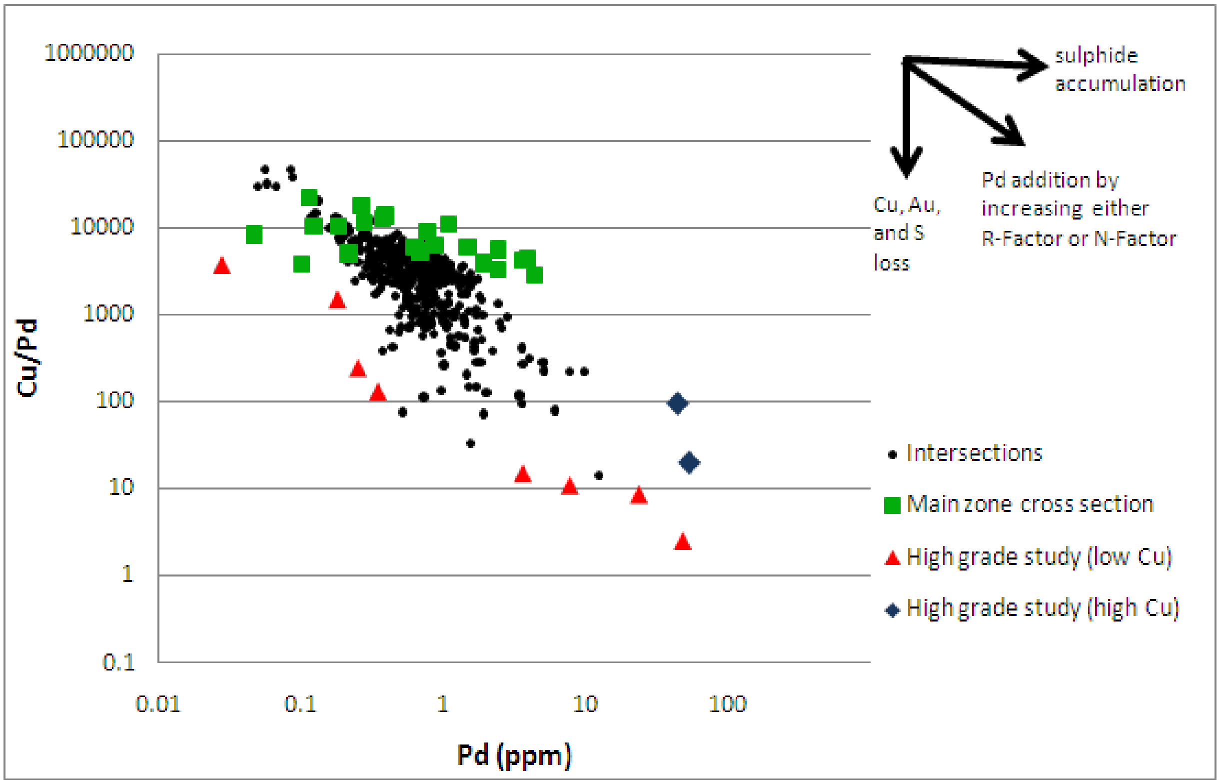
At least three mechanisms for sulphide and PGM precipitation have been proposed for the Marathon Deposit including hydrothermal (Watkinson and Ohnenstetter 1992), magmatic (Good and Crocket (1994a) and zone refining (Barrie 2002). A hydrothermal mechanism at low or intermediate temperatures (<600°C) is not possible owing to the near total absence of hydrous minerals in the W Horizon and the significant correlations between Pd-Pt, Pd-Rh and Pd-Ir. The high temperature zone refining mechanism suggested by Barrie (2002) is compelling but there is insufficient experimental evidence to use PGM correlation as support for or against the model and the implied redistribution and concentration of PGM by zone refining does not fit with a mass balance calculation. There is just too much PGM and too little gabbro for a zone refining mechanism to have played a significant role.

Based on petrographic and geochemical evidence, it seems most likely that more than one process operated at high temperatures (>700°C) to concentrate metals in the Marathon Deposit. Three possible mechanisms include:

- Accumulation of sulphide liquid in fluid dynamic traps in the magma conduit.
- Ongoing interaction of sulphides with magma that is flowing through the conduit (R-factor).
- Removal of S, Cu, and Au from the sulphide assemblage.

The effects of the three mechanisms on the abundance of Cu and Pd are shown in Figure 7.38. The effect of accumulating sulphides is shown by the trend for the Main Zone samples (green squares). The effect of the R-factor is the rapid increase in Pd relative to Cu (pulls samples toward the lower right corner of Figure 7.38). The intersection data (dots) represent the average affects due to sulphide accumulation and R-factor enrichment. Finally, the removal of Cu in PGM enriched zones (W Horizon) is shown by the downward displacement of the samples from the low Cu, high grade zone (red triangles). The removal of Au is inferred from the Pd-Au variation diagram in Figure 7.34.

Figure 7.38: Dominant Mechanism Diagram for Cu and PGM Concentration

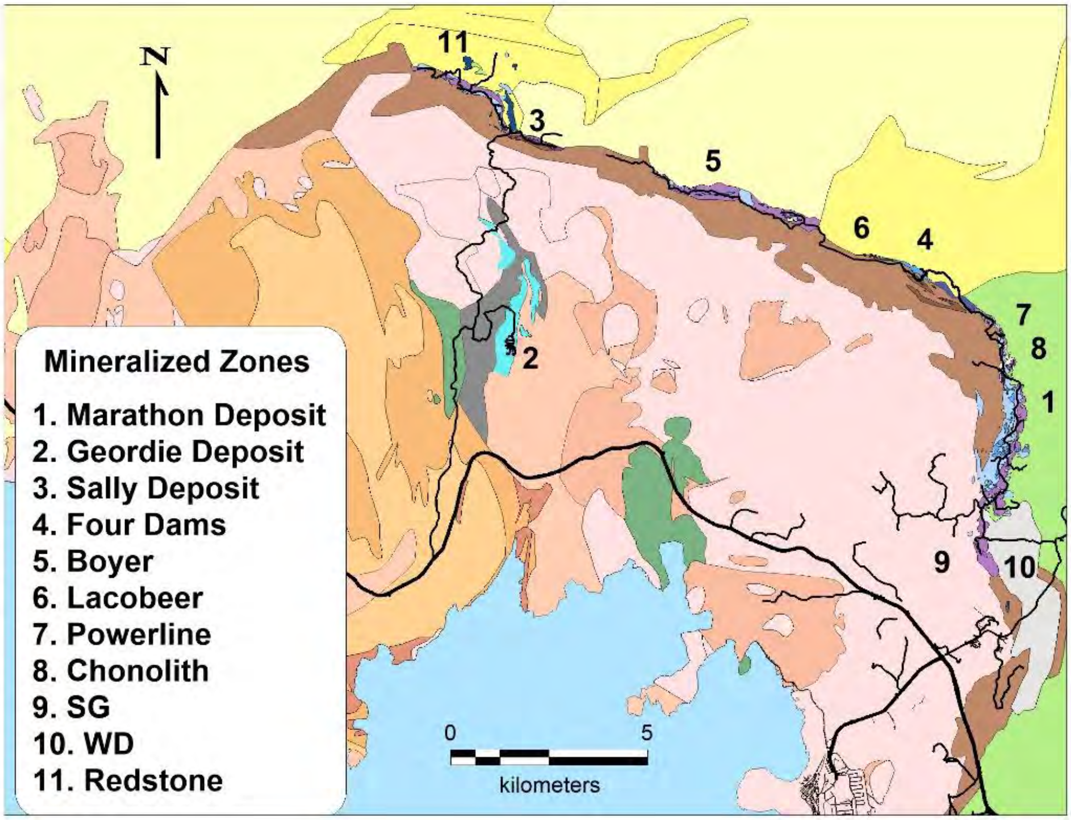


Note: *Figure highlights the effects on metal values of the three dominant mechanisms proposed to explain the concentration of Cu and PGM in the Marathon Deposit.*
Source: *Marathon PGM Corp. (2010).*

7.4.10 Other Mineralized Cu and PGM Prospects in the Coldwell Complex

Figure 7.39 illustrates the locations of all other Cu-PGM occurrences found on the Property.

Figure 7.39: Geology Map of the CC (Coldwell Complex) and Location of all Known Cu-PGM Occurrences



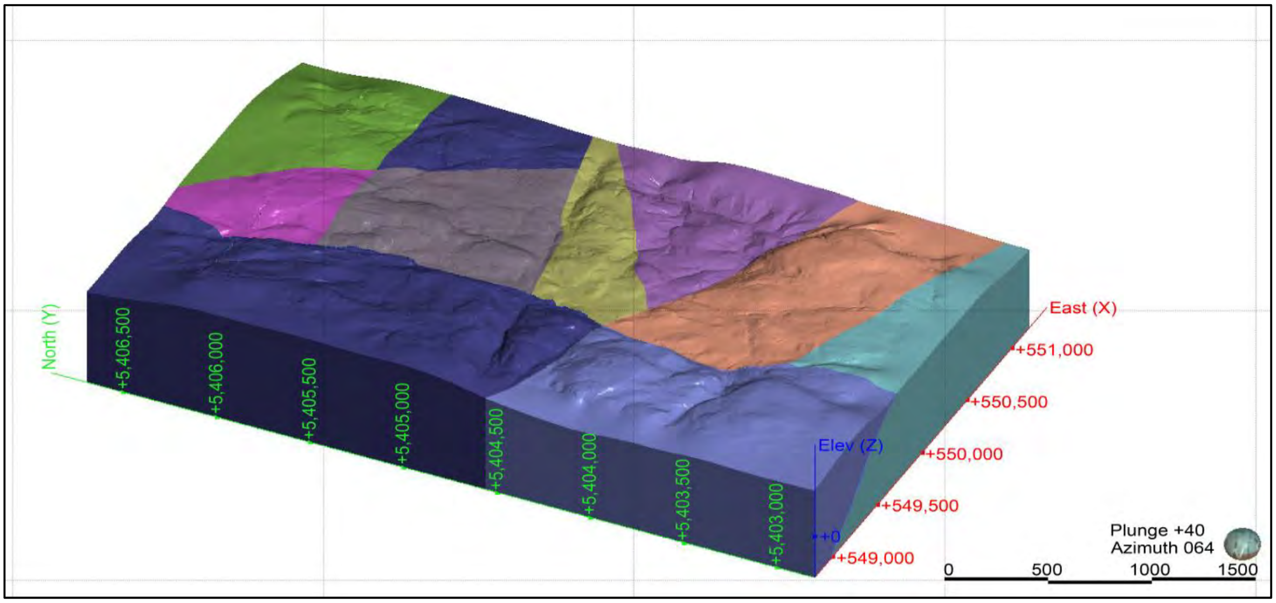
Source: *Generation Mining Ltd. (2021).*

7.5 Marathon Structure

Based on the interpretation of drill hole contacts and surface geology, Gen Mining has developed a preliminary structural model that incorporates 11 fault blocks for the Marathon Deposit (Figure 7.40). Lineament structures are prominent throughout the CC and are associated with brittle faulting. They occur it two series; radial and concentric. The radial faults extend from a central location on the southwest of the CC below Lake Superior. There are five prominent large continuous faults that extend beyond the lithological boundary of the CC, as well as less prominent secondary and tertiary splays off the larger faults. The concentric faulting occurs as discontinuous faulting perpendicular to the radial faulting. The two series of lineaments create a mosaic of various blocks throughout the CC but is most prominent along central, east and northern margin. From surface geology it is recognized that there is offset between the blocks; however, only at the Marathon Deposit is the offset measurable due to the continuous WT sill. The radial faulting at the Marathon Deposit are normal faults, with up to 50 m offset and rotation of north side down of between 7-12°. The radial faulting is less defined as they do not pass through the Marathon Deposit but based on exploration drilling dip towards the center of the CC at shallower angle than 65°.

Faulting is believed to be a critical component to the emplacement of the Marathon Deposit. The thickest drill intercepts of the Marathon Series are adjacent to known faulting and surface lineaments. Mineralization is also thickest within footwall embayments which show a spatial relationship and similar orientation to known lineaments and faulting. Faulting acts as the structural control for magma emplacement within a conduit setting.

Figure 7.40 : Modeled Marathon Fault Blocks



8. DEPOSIT TYPES

8.1 Deposit Type Magma Conduit Model

The Marathon Deposit is one of several mafic to ultramafic intrusive bodies in the MRS System that host significant copper, nickel or PGM sulphide mineralization. These intrusions include the Yellow Dog peridotite (Eagle Deposit), the Tamarack Deposit, the Current Lake Intrusive Complex (Thunder Bay North Deposit), and the numerous intrusions located along the base of the Duluth Complex.

Intrusion and deposition of sulphides within magma conduits has recently become the dominant mineralization forming process chosen to explain the rift related deposits. For example, a magma conduit deposit model has been proposed for the Marathon Deposit by Good (2010), Thunder Bay North by Goodgame et al. (2010) and the Eagle Deposit (Ding et al., 2012). The magma conduit model has grown in favour since it was proposed to explain deposits in the Noril'sk region, Siberia by Naldrett et al. (1995) and Naldrett and Lightfoot (1999) and the deposits at Voisey's Bay by Li and Naldrett (1999). Further, an important contribution to the understanding of magma conduits and the formation of very high tenor PGM deposits was presented by Kerr and Leitch (2005). They derived a sophisticated geochemical model for an open system multiple stage process expected in a magma conduit. This model was applied to explain the extreme PGM concentrations found in the W Horizon at the Marathon Deposit by Good (2010).

8.2 Magma Conduit Model for Marathon Mineralization

In the magma conduit deposit model, the present exposure of the TDL and Eastern Gabbro series represents only a fraction of the magma that was generated in the mantle and made its way up through the crust. Most of the magma actually passed through the magma conduits and erupted on the surface as basaltic volcanic flows. The gabbroic units and associated Cu-PGM mineralization represent material that crystallized or settled out of the magma as it moved through the conduit.

It is envisaged that a very large volume of magma, perhaps greater than 10,000 times the volume of gabbro present in-situ, passed through the conduit and formed the TDL Gabbro. On the basis of mass balance calculations, and considering the TDL Gabbro is less than 250 m thick, only a very large magmatic system such as this can explain the excessive enrichments of platinum metals with up 45 g/t of combined platinum, palladium and gold over 10 m or the accumulations of disseminated sulphide layers that are up to 160 m thick. Similarly, in the case of the oxide ultramafic intrusions, very large volumes of magma are required to deposit the very thick layers (tens of metres) of massive magnetite (>75% magnetite).

In the magma conduit model, fluid dynamic factors that affected magma flow are relevant to exploration. Features such as pooling of TDL magma in basins within the footwall or brecciation of Eastern Gabbro by TDL magma as it stopes its way upward during ascent are important examples of how the magma flow was slowed resulting in the precipitation of the denser sulphide liquid from the magma. Conversely above ridges or crests in the footwall, where TDL Gabbro thins and the magma velocity increased, sulphides were unable to settle out of the magma and mineralized horizons thin or pinch out. Accumulation of sulphide by fluid dynamic processes can explain the bulk of the mineralization in the Marathon Deposit and metal trends such as that shown in diamond drill hole MB-08-10. Metal trends show increasing Cu and PGM+Au with increasing total sulphides regardless of the proportion of chalcopyrite in the sulphide assemblage.

After sulphides settled out of the magma, a second process acted to upgrade the sulphides with PGM+Au, particularly in the upper portions of the mineralized zone (as described in drill hole G9). The upgrading occurred as magma passed through the conduit and interacted with sulphides in the crystal pile possibly by stirring up early formed sulphides. This process of sulphide upgrading was used to describe the extreme enrichments of PGM relative to copper in disseminated sulphides at the Noril'sk deposits by Naldrett et al. (1995). Naldrett et al. described the mathematical model whereby the ratio of magma in the conduit that interacted with sulphides to the amount of sulphides is referred to as the R factor. Under conditions where the R Factor is very high, continued interaction of fresh magma with sulphides will continue to increase the grade of PGM while the Cu concentration remains constant. Very high PGM concentrations in the W Horizon such as 45 g/t over 10 m (hole M07-306) and metal trends such as the gradual increase in the proportion of chalcopyrite and the matching rapid increase in PGM+Au are interpreted to be a result of continuous upgrading.

A third process of PGM upgrading by sulphide dissolution (after Kerr and Leitch, 2005) is envisaged to have occurred in the W Horizon in order to account for samples with extreme PGM content and only trace copper. For example, in many instances the PGM enrichment of up to 75 ppm Pd occurs in samples with only 0.01% to 0.02% Cu. These levels of Pd when re-calculated to abundances in 100% sulphides correspond to untenable concentrations of between 2% and 4% Pd in 100% sulphide. The sulphide dissolution process involves the progressive removal of Cu and S from the pre-existing sulphides when they interact with magma that is sulphur under saturated. The Pd and Pt remain behind with the remnant sulphides. Evidence of Au loss in samples of the W-Horizon imply that Au was also removed along with Cu and S by this same process.

8.3 Comparison of Marathon Deposit with Mid-Continent Rift-Related Deposits

There are many striking petrologic and geochemical similarities between the TDL Gabbro and the Partridge River Intrusion, located at the base of the Duluth Complex, Minnesota (Good and Crockett, 1994). The

Partridge River intrusion is the best described gabbroic intrusion in the Duluth Complex and is host to the Minnamax (Babbit) and Dunka Road Cu-Ni-PGM Deposits. The relevant features described from the Partridge River Intrusion that are also observed in the TDL Gabbro, include the following:

- The textures and abundance of minerals in the Partridge River Intrusion and the inferred crystallization path are remarkably similar to those of the TDL Gabbro.
- The compositions of plagioclase, pyroxene, and olivine are restricted relative to other mafic intrusions and overlie values for the TDL Gabbro.
- The coherent behavior of Zr, Rb, and Y, indicative of control by variable proportions of intercumulus liquid, is consistent with observations in the TDL Gabbro.
- Chalcopyrite and PGM are intergrown with calcic plagioclase that replaces less calcic plagioclase.
- Pyrrhotite, but not pentlandite, is replaced by chalcopyrite.
- Sulphides are predominantly interstitial to unaltered plagioclase, olivine, and pyroxenes and chalcopyrite and PGM are associated with Cl-enriched biotite and apatite, and altered minerals, such as chlorite, epidote, and calcite.
- Variable Cu/Ni ratios within deposits and between deposits and a trend of increasing ratios with increasing Cu are indicative of chalcophile element fractionation as shown for the TDL Gabbro.
- The occurrence of more than one type of disseminated sulphide zone, one being relatively sulphur rich is analogous to the main and basal sulphide zones in the TDL Gabbro.

The many similarities between the Partridge River Intrusion and the TDL Gabbro imply that they formed by analogous processes. Four mechanisms have previously been proposed to account for features observed in the Partridge River Intrusion:

1. Chalockwu and Grant (1990) proposed that the magma of the Partridge River Intrusion was emplaced as a plagioclase plus olivine crystal mush that crystallized in situ.
2. Grant and Chalockwu (1992) provided geochemical and isotopic evidence implying that the Partridge River Intrusion consists of a mechanical mixture of cumulus plagioclase, olivine, and intercumulus liquid which were not in equilibrium with each other.
3. Foose and Weiblen
4. (1986), and Ripley (1986) proposed various mechanisms for the mixing of magmas of similar compositions, but at different stages of crystal fractionation, to account for compositional irregularities.
5. Finally, an external source for sulphur is well documented in the available literature and Andrews and Ripley (1989) argue that sulphur assimilation occurred prior to intrusion of the host gabbro.

These mechanisms are, to some extent, analogous to those proposed in the model for the formation of the Marathon Deposit.

8.4 Comparisons of Mid-Continent Rift Deposits and Voisey Bay and Noril'sk Deposits

Comparisons between the MRS and the Voisey Bay and Noril'sk settings point to several similarities that suggest that the Mid-Continent Rift is a likely setting for Ni-Cu mineralization. The continental rifting and associated voluminous igneous activity in all three regions formed in response to the rise of a hot plume of mantle material from deep in the earth, fracturing the overlying continental crust. In the Mid-Continent Rift, melting of the plume produced more than two million km^2 of mostly basalt lava flows and related intrusions.

In all three regions, basalts derived from the mantle plume are enriched in trace elements, particularly in comparison to the most common basalts erupted on earth, those formed at rifts in the oceans. Like basalts in the Noril'sk region, early basalts of the Mid-Continent Rift have compositions characterized by relatively high abundances of magnesium, chromium, nickel, and platinum, and relatively low abundances of sulphur. Such metal-rich but sulphur-poor basalt magmas can carry metals (such as Ni, Cu, and PGM) to high levels in the crust because sulphur is not available to form a separate sulphide liquid that would scavenge metals from the magma while it is still deep below the surface. If these metal-rich basalts encounter a source of sulphur near the surface, and sulphur is incorporated into the basalt magma, they would be ripe for sulphide mineral formation.

8.5 Deposit Model Conclusions

A possible model for the emplacement and crystallization history of the TDL magma and genesis of sulphides is proposed as outlined below.

Step one: Crystallization of plagioclase and olivine occurred in a deep magma chamber prior to emplacement into its present site. Due to density differences, plagioclase did not settle out of the magma column but much of the olivine did. During crystallization and sporadic replenishment with unfractionated magma, the magma chamber becomes compositionally stratified.

Step two: Sulphur migrated out of the country rock into the magma chamber resulting in the formation of sulphide droplets. The Ni/S ratio of the sulphide droplets will be high in the lower layers of the chamber, and low in the upper layers of residual magma.

Step three: The Two Duck Lake intrusion and sulphide deposit is formed when magma is forced out of the deep chamber upward into its present site. The more fractionated, plagioclase-rich upper layers become mixed with the less fractionated lower layers by the turbulent movement out of the deep chamber. The sulphide droplets grow as they come into contact with other droplets during transport. At the time of intrusion, the crystal mush consists of plagioclase crystals of nearly uniform composition, interstitial silicate magma, and droplets of sulphide liquid; there was little, if any, crystal-free magma in the chamber.

Step four: After intrusion, some minor settling of plagioclase crystals occurred, and plagioclase formed a framework for crystallization of the interstitial melt. The crystal mush cooled rapidly thereby inhibiting post-cumulus processes, such as complete internal equilibration of the system. A very small amount of volatile-rich interstitial melt migrated toward the center of the intrusion, crystallized granophyre, and released water into the surrounding gabbro, resulting in the formation of pegmatite.

Step five: Subsolidus reactions occurred involving local migration of components in deuteric fluid. This process results in features such as the replacement of pyrrhotite by chalcopyrite and the deposition of PGM in association with hydrous silicates; the last to form are microscopic chalcopyrite, calcite, and chlorite veinlets. The numerous documented features presumably reflect reactions that occur as the temperature decreases and the fluid evolves.

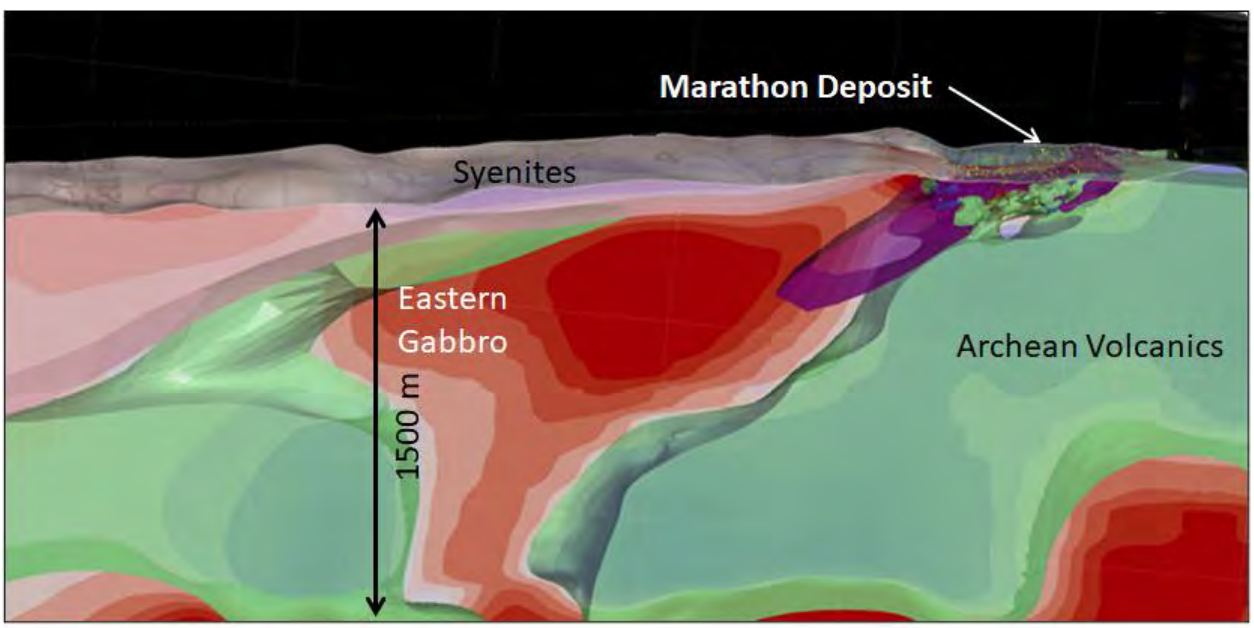
9. EXPLORATION

9.1 Exploration Work by Gen Mining

Shortly after acquiring the Marathon Property from Stillwater Canada in July 2019, Gen Mining initiated follow up of exploration targets previously developed by Stillwater Canada. Exploration work by Gen Mining began to focus on the exploration for high-grade mineralization, as either density accumulated semi-massive to massive sulphides or highly enriched PGM zones similar to the W Horizon. Geological controls on these types of higher-grade mineralization require focused exploration along feeder conduits and provide opportunities for target generation at greater depths.

Exploration for density accumulated semi-massive to massive sulphides was in part guided by a partnership, established in 2018, between Stillwater Canada partnered PACIFIC, a consortium of industry, government and academic partners to conduct fundamental and applied research to develop passive seismic techniques for mineral exploration. The purpose of this work was to image the Complex to a depth of 2 km, modeling the geometry of the Eastern Gabbro as a guide for future exploration. A production-scale survey was completed at the Marathon Deposit and resulted in a 3-D velocity inversion model (Figure 9.1). The survey successfully imaged the stepping boundary between the Archean Footwall and Eastern Gabbro. The resolution of the passive seismic survey was also much improved over the gravity survey and is the first model showing the west dipping footwall contact to the Complex.

Figure 9.1: Passive Seismic 3-D Velocity Inversion Showing the Marathon Deposit Relative to the CC (Coldwell Complex)



***Source**: Gen Mining (2021).*

In 2019, exploration work by Gen Mining consisted of geologic mapping and prospecting at the Boyer zone and the northern extension of the Geordie Deposit. Three trenches were completed at Boyer exposing the continuation of mineralization at surface. A passive seismic survey was completed at Sally to help define deep high-density targets for potential drill testing. Borehole EM surveys were completed by Crone Geophysics on diamond drill holes SL-19-72, M-19-536 and M-19-537.

In 2020, to compliment the previous seismic surveys, a magnetotelluric ("MT") survey was completed over a portion of the Marathon Deposit and an area immediately to the west, which was believed to be underlain by one of the feeder zone conduits of the Marathon Deposit. A MT survey was also completed over the Sally Deposit and immediate environs. The 2020 MT survey at Marathon delineated one target for drill testing. MT targets at Sally are, as of the effective date of this Technical Report, under development. Borehole EM surveys were completed by Crone Geophysics on diamond drill holes M-20-539, M-20-543 and M-20-547.

Refer to Section 6 for information on pre-2019 exploration activities and Section 10 for current drilling activities.

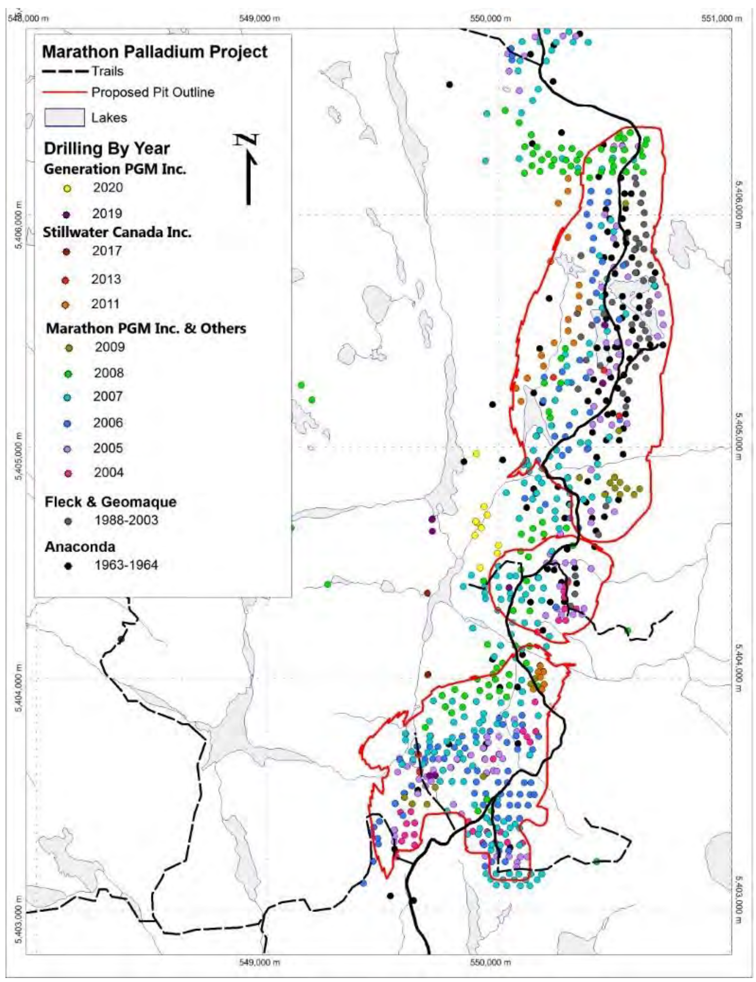
10. DRILLING

In 2019, Gen Mining completed a 39 hole, in aggregate, 12,434.5 m exploration drilling program on the Marathon Property. The program tested several high-priority targets along a strike length of more than 25 km. In 2020, an 11 hole, totaling 4,507 m, exploration drilling program focused on a portion of the feeder zone conduit to, and immediately west of, the Marathon Deposit.

The results from the 2019 drilling program were incorporated where appropriate in the 2020 Mineral Resource Estimates. The results from the 2020 drilling program are not included in the 2020 Mineral Resource Estimate (effective date of June 30, 2020)

Previous drilling activities are discussed in Section 6 of this Technical Report. Collar locations of all previous and current drill holes at the Marathon Deposit are included in Figure 10.1.

Figure 10.1: Diamond Drilling by Year at the Marathon Palladium Project



Source: *Gen Mining (2021).*

10.1 2019 Exploration Drilling Program

The Property had been under-explored for the past several years during a time of unprecedented low palladium prices. The Company's goal in 2019 was to confirm historical results, evaluate the potential to expand known resources and drill test several exploration targets. The Company completed 39 holes in 12,434.5 m as presented in Table 10.1

Table 10.1: 2019 Drilling Program

Deposit	Target	Holes Drilled	Metres Drilled
Marathon	Confirmation/Infill	5	1,023.0
Marathon	West Feeder Zone near Main Zone	6	3,484.0
Boyer	Greenfield exploration drilling	14	3,063.3
Geordie	Two offsets	8	2,586.5
Sally	High- grade samples and massive sulphides	6	2,277.7
Total		**39**	**12,434.5**

The confirmation drill and infill drill hole were completed at Marathon for a total of 1,023 m. Results were consistent with and validated historical drill results.

Drilling of various geophysical targets within the West Feeder Zone, and approximately 1.4 km west of the Marathon Deposit, confirmed that Target A, as described in Subsection 6.4 Historical Geophysical Surveying and shown in Figure 6.6 and Figure 6.7, most probably represents a high-density olivine and magnetite rich phase of the Layered Series Gabbro. Drill holes M-19-537 and M-19-538, which were drilled approximately 350 m west of the Marathon Deposit, intersected significant widths, 102 m and 80 m, respectively of Marathon Series rocks down dip from the Marathon Deposit. Results from holes M-19-537 and M-19-538 confirm the continuation of the deposit to the south side of the 5,404,900 N fault which is believed to have provided a locus for the feeder conduit to the Marathon Deposit and the north part of the W Horizon which hosts high-grade PGM mineralization.

Additionally, Gen Mining completed 14 holes totaling 3,063 m on the Boyer Zone; six holes totaling 2,278 m in the Sally Deposit area, and eight holes totaling 2,587 m in the Geordie area.

Drilling at Sally significant extended the mineralized zone along strike and down dip. Boyer, which had not been previously drilled, is currently a 500 m long prospective horizon displaying anomalous but currently contains subeconomic PGM concentrations. No significant mineralization was intersected at Geordie where the program focused on reconnaissance drill testing of gabbroic intrusions proximal and similar to the gabbro which hosts the Geordie Deposit.

Data from the 2019 drill program were incorporated where appropriate in the 2020 Mineral Resource Estimates for the Marathon Deposit; however, they were not incorporated in the Sally Deposit 2020 Mineral Resource Estimate. In 2019, no drilling was completed within the Geordie Deposit Mineral Resource domains.

10.2 2020 Exploration Drilling Program

In 2020, the Company completed 12 holes in 5,068 m. The drilling was focused on the feeder zone conduit associated with the Main Marathon Deposit and the northern limb of the W Horizon. This drilling followed the successful completion, in 2019, of drill holes M-19-537 and M-19-538 which intercepted the down dip continuation of the Main Marathon Deposit for the first time. The 2020 drilling filled a 300 m gap between the historical drilling and the 2019 drilling south of the 5404900 N fault. Additional targets included the conductive zone west of the Marathon Deposit identified in the 2020 MT survey and the down dip extension of high-grade PGM mineralization in the W Horizon.

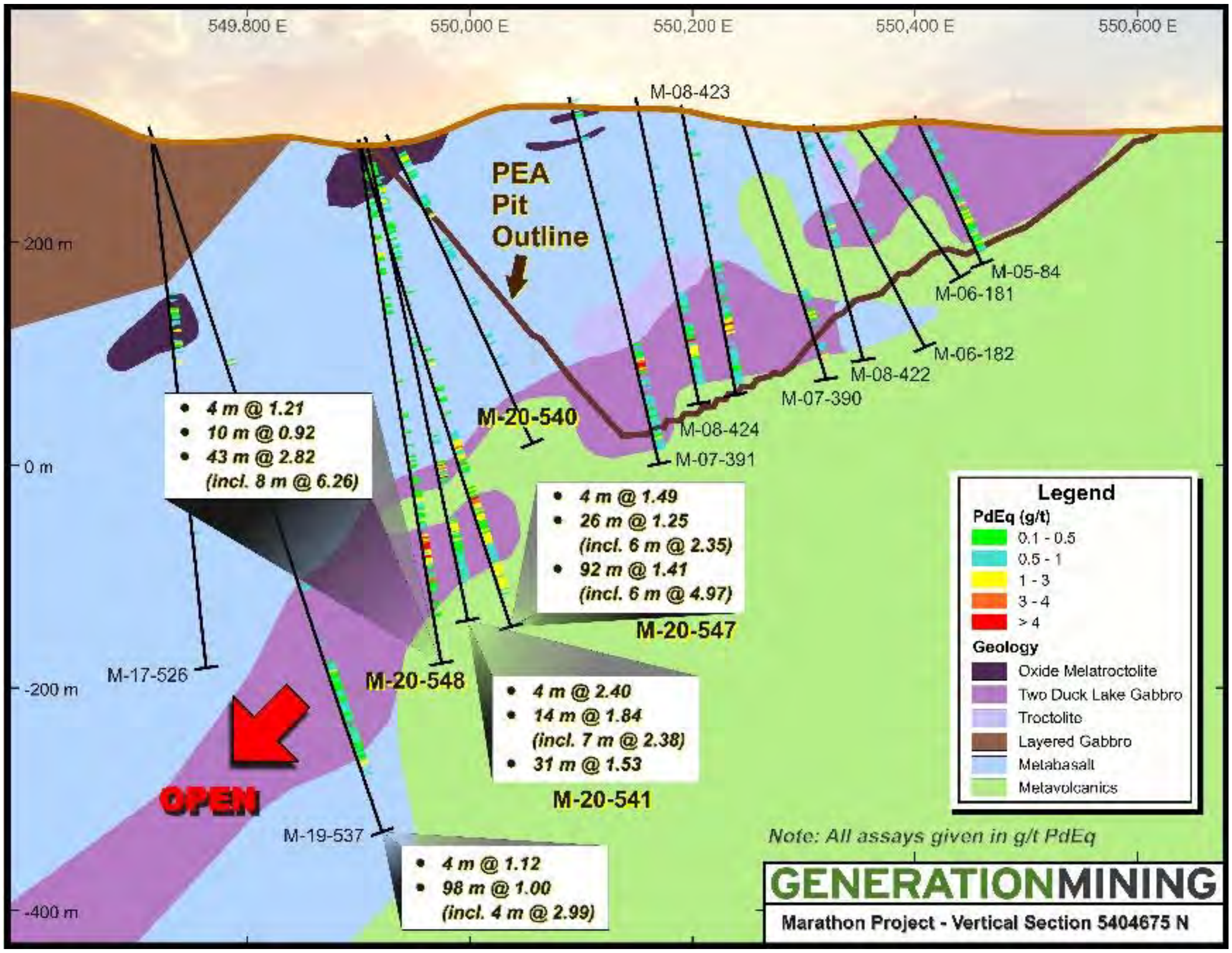
Table 10.2: 2020 Drilling Program

Deposit	Target	Metres Drilled
Marathon	MT Target	711.0
Marathon	West Feeder Zone	2,987.7
Marathon	W-Horizon	1,369
Total		**5,068**

The principal aim of the 2020 exploration drill program was to test for the potential of near-surface, ramp accessible mineralization. No PGM mineralization was intersected in hole M-20-539 that tested the MT target north of the 54048900N fault; however, significant intervals of PGM mineralization were intersected in drill holes testing the West Feeder Zone and extensions to the W-Horizon south bracketed by the 5404900N and 5404500 N faults. Assay results from selected drill holes (shown as g/t Pd Eq) are shown in a vertical section (Table 10.2) and in a plan view of the West Feeder Zone area (Table 10.3). True widths approximate down-hole lengths. The calculation is as follows:

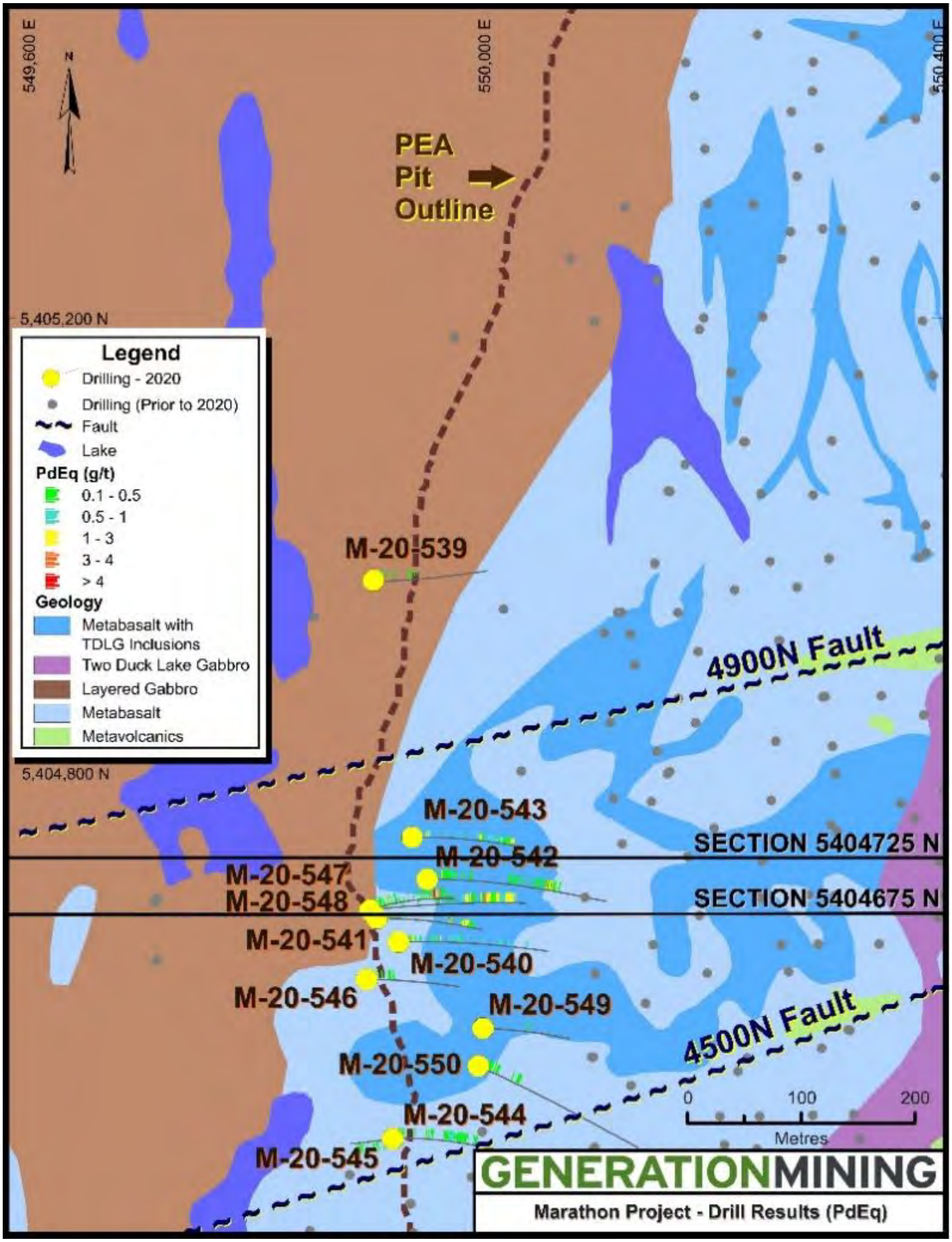
The palladium equivalent calculation expressed as g/t is the sum of the theoretical in situ value of the constituent metals (Au+Pt+Pd+Cu) divided by the value of 1 g of Pd. The calculation makes no provision *for expected metal recoveries or smelter payables. The following commodity prices were used: US$1,300/oz Au, US$900/oz Pt, US$1,275/oz Pd and US$3.00/lb Cu.*

Table 10.3: Marathon Deposit – Vertical Section 540675



Source: *Gen Mining (News release January 5, 2021).*

Figure 10.3: Marathon Deposit – Plan Views of the West Feeder Zone (Drill Results Pd Eq)



***Source**: Gen Mining (News release January 5, 2021).*

11. SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Sample Preparation, Analysis and Security

The following section of this Technical Report is largely taken from the 2010 Technical Report completed by Python Mining Consultants Inc. (“Python”) and the 2014 internal FS draft report completed by Nordmin Engineering Ltd. (“Nordmin”) and outlines sampling protocol (preparation, analysis and security procedures) instituted and used by Marathon PGM Corp. in each of their drilling and other rock sampling programs since at least 2007. These protocols are identical to those reported in earlier Canadian NI 43-101 compliant Technical Reports issued by Marathon PGM Corp. on the Property.

11.1.1 Sampling Method and Approach

During the earlier drilling campaigns, drill core was logged and sampled on the Property. In more recent campaigns (including the Company’s 2019 and 2020 drilling programs), drill core was transported from the Property to a drill core logging facility in the Town of Marathon. A geologist was responsible for logging the drill core and marking sample intervals. Samples were collected at 1 or 2 m intervals in all significant mineralized zones and from known mineralized rock units. Some samples were shortened to less than 1 m at the logging geologist’s discretion and samples from known non-mineralized zones were sampled at up to 3 m intervals. Sampling was continuous wherever possible to minimize potential continuity problems during Mineral Resource modeling. At least two samples were collected before and after each mineralized domain in order to estimate dilution.

The beginning and end of each sample was marked with a wax crayon, and then a sample tag was placed at the beginning of each sample. The drill core was also marked with a line along the length of the drill core to indicate where the drill core was to be cut in half. The drill core was then cut using a wet saw with a diamond blade. One half was placed in a sample bag and sent for assay and the other half remained in the box as a permanent record. The duplicate samples were prepared by splitting the remaining halved core leaving only quartered drill core in the box.

Each sample bag had a numbered identification (“ID”) tag placed inside along with the sample before being sealed. The sample ID number was also written on the outside of the sample bag. The position of the samples on the remaining half drill cores was marked with a corresponding ID tag. Samples were then grouped into batches before being placed into rice bags. Each rice bag was also sealed and labeled before being dispatched. From 2011 to present, samples were no longer grouped in batches, instead each drill hole was its own batch.

11.1.2 Laboratory Protocols

Prior to 2011, all drill core samples were sent for preparation and analysis to Accurassay in Thunder Bay. From 2011 to 2020, all drill core samples were sent for preparation to ALS Minerals in Thunder Bay and subsequent analysis to the ALS Vancouver facility.

During the 2006 to 2010 drilling campaigns, samples were delivered either by Marathon PGM Corp. personnel or shipped via courier to Accurassay's facilities (acquired by AGAT Labs in 2017) in Thunder Bay, Ontario. When samples were deemed to be high priority, they were transported from the Property by helicopter to the Greyhound Bus Lines station in the Town of Marathon, from where they were shipped via bus to Accurassay in Thunder Bay. Upon receipt of the samples, Accurassay personnel would ensure that the seals on rice bags and individual samples had not been tampered with.

Accurassay (now AGAT) is independent of Gen Mining and provides analytical services to the mining and mineral exploration industry. Accurassay has been accredited for analysis of gold, platinum, palladium, copper, nickel and cobalt under ISO/IEC Guideline 17025 by the Standards Council of Canada and is registered under ISO 9001:2000 quality standard.

In 2011, Stillwater Canada changed assay labs and initiated analyses at ALS Chemex Labs Ltd. in Thunder Bay ("ALS Minerals"). ALS Minerals used a similar lab protocol with the exception that PGM analyses were conducted by ICP-AES instead of Atomic Absorption utilized at Accurassay.

At the time of delivery, the laboratory acknowledged receipt of the sample shipment being in good order and logged all samples into their Laboratory Information Management System ("LIMS"). Samples were both prepared and analyzed at the Accurassay or the ALS Minerals laboratory in Thunder Bay, Ontario.

All samples were analyzed for Cu, Ni, Ag, Au, Pt and Pd. Rh was requested on samples within an intersection of two or more consecutive samples with an NSR value greater than $8/t, as well as the two samples on either side of the intersection, even though the values were likely to be below detection limit. The two samples outside of the mineralized intersection were requested for dilution information purposes.

11.1.3 Sample Preparation

11.1.3.1 Accurassay

The samples provided to Accurassay by Marathon PGM Corp. were drill core samples, rock samples and pulp samples. The samples were dried, if necessary, crushed to approximately minus 10 mesh and split into 250 to 450 g sub-samples using a Jones Riffler. The sub-samples were then pulverized to 90% passing 150 mesh using a ring and puck pulverizer and homogenized prior to analysis. Silica sand cleaning between each sample was performed to prevent cross-contamination.

Fire Assay Precious Metals

For flame atomic absorption spectroscopy ("AAS") determinations, preliminary concentration for Au, Pt and Pd by fire assay (lead collection) was the preferred method. The standard operating procedure for fire assaying at Accurassay involved weighing, fluxing, fusion and cupellation of each sample.

A 30.2 g sample mass was routinely used, although select sample masses may have been altered to accommodate sample chemistry, if required.

A furnace load consisted of 23 or 24 samples with a check done every 10th sample (by client ID), along with a laboratory blank and a Quality Control Standard. Duplicate checks were performed on pulverized samples.

Samples provided to Accurassay by Marathon PGM Corp. did not require preliminary treatment and were mixed directly with the assay flux and fused. Accurassay used a premixed basic flux purchased from Reliable Industrial Supply. The composition of the flux is as follows: Litharge (PbO), 50.4%, soda ash (dense), 35.9%, borax, 10%, and silica flour, 3.6%. It is standard practice for laboratories to use a premixed flux and adjust the ingredients when necessary.

Samples were typically fused for 1¼ h at 1,800 to 2,000°F. The fusion time may have been increased if needed.

Samples were typically cupelled for 50 minutes at 1,900°F. The cupellation time may have been increased if needed.

Digestion – Precious Metals

Precious metal beads were digested using a nitric/hydrochloric acid digestion at Accurassay and bulked up with a 1% lanthanum oxide ("La_2O_3") solution and distilled water. The use of lanthanum in the concentration of 0.2-1.0% is an acceptable practice and complies with accepted published methods. A final volume of 3 ml was used for analysis.

Digestion – Base Metals

For flame AAS determinations of Cu, Co, Ni, Pb, and Ag at Accurassay, an acid digestion consisting of aqua regia (one part nitric to three parts hydrochloric acid) was the preferred method. A sample mass of 0.25 g and a final volume of 10 ml was used for analysis. For samples requiring a full assay digestion (high grade); a sample mass of 2.5 g and a final volume of 250 ml was used. A full assay was required whenever the concentration of any given element was greater than 1% for any of the above noted elements.

Flame Atomic Absorption Spectrometric Measurement

Accurassay used a Varian AA240FS with manual sample introduction for the determination of Au, Pt and Pd. A Varian 220FS or 240FS with SIPS and auto-diluter was used for the determination of base metals.

Calibration standards were made from 1,000 ppm certified stock solutions. Quality assurance ("QA") solutions were made up from separately purchased 1,000 ppm certified stock solutions. All stock solutions were prepared commercially by ISO certified suppliers.

Reporting

Laboratory reports were produced using Accurassay's LIMS program. All duplicate assays were reported on the certificate of analysis. Quality control ("QC") standards and blanks were not reported unless requested by the client.

Control Charts for Quality Control Standards

All Accurassay data generated for quality control standards, blanks and duplicates were retained with the client's file and used in the validation of results. For each quality control standard, control charts were produced to monitor the performance of the laboratory. Warning limits were set at +/-2 standard deviations, and control limits were set at +/-3 standard deviations. Any data points for the quality control standards that fell outside the warning limits, but within the control limits, required 10% of the samples in that batch to be re-assayed. If the results from the re-assays matched the original assays the data were validated, if the re-assay results did not match the original data, the entire batch was rejected, and new re-assays were performed. Any QC standard that fell outside the control limits was automatically re-assayed and all of the initial test results were rejected.

Standards

Accurassay's in-house standard used for Au, Pt, Pd and Rh was made up from a rock source provided to Accurassay by a third party. The standard names were APG1 and APP7. The CANMET standards used for the analysis of Au, Pt, Pd and Rh were WMS-1 and WMG-1. All standards used to certify base metal values were provided by CANMET. The following standards were used: CZN3, RTS-2, and RTS-3.

Two in-house standards (MPG1 and MPG2) were used for control of Au, Pt, Pd and Cu determinations. The standards were made up from a composite of core sample reject material provided to Accurassay by Marathon PGM Corp. from the Marathon Deposit and were representative of the metal abundances in the CC deposits. The values for MPG1 and MPG2 were developed by Accurassay and verified through round-robin analysis with other laboratories in Canada.

The QA sample was made in the laboratory from certified stock solutions purchased from an ISO 9000 certified supplier. The solution was made from a completely different lot number than the solutions used to calibrate standards. The QC standards were used to monitor the processes involved in analyzing the samples. The QA samples were used to verify the initial calibration of the instruments and monitor the calibration throughout the analysis.

It should be noted that although a standard or QA standard may not have been listed by batch number on the control charts, a standard and QA sample was run with each batch.

The values for APG1 and APP7 were developed by Accurassay and verified through round-robin analysis with other laboratories in Canada. The values for CANMET certified reference materials were obtained from their respective certificates of analysis.

11.1.3.2 ALS Minerals

Since 2011, all drill core samples were sent to ALS Minerals sample preparation facility in Thunder Bay. Pulp sample material was then sent to the Vancouver ALS facility for analysis. ALS Minerals is independent of Gen Mining and operates with a quality management system and complies with the requirements of ISO 9001:2008. The quality management system of ALS is audited both internally and by external parties.

The samples were prepared and sent for multi-element analyses (Table 11.1).

Table 11.1: Sample Analysis Methods

Procedure	Description	Element Analyzed and Range (ppm)		
Prep 31	Crush to 70% less than 2 mm, riffle split off 250 g, pulverize split to better than 85% passing 75 microns.			
PGM-ICP23	Pt, Pd and Au by fire assay and ICP-AES finish. 30 g nominal sample weight.	Pt 0.005-10 Pd 0.001-10 Au 0.001-10		
ME-ICP41	Aqua Regia Digestion – first pass exploration tool, dissolution of base metals.	Ag 0.2-100 W 10-10,000 Ca 0.01%-25% La 10-10,000 Sb 2-10,000 Zn 2-10,000 Cd 0.5-1,000 Mg 0.01%-25% Sc 1-10,000 Co 1-10,000 Mn 5-50,000 Sr 1-10,000	Al 0.01%-25% Cr 1-10,000 Mo 1-10,000 Th 20-10,000 As 2-10,000 Cu 1-10,000 Na 0.01%-10% Ti 0.01%-10% B 10-10,000 Fe 0.01%-50% Ni 1-10,000 Tl 10-10,000	Ba 10-10,000 Ga 10-10,000 P 10-10,000 U 10-10,000 Be 0.5-1,000 Hg 1-10,000 Pb 2-10,000 V 1-10,000 Bi 2-10,000 K 0.01%-10% S 0.01%-10%
OG46-OL	Aqua regia is a powerful solvent for sulphides, which dissolves Ag and base metals but may not completely dissolve more resistive elements. Minimum sample weight 0.5 g.	Ag 1-1,500 ppm Co 0.001-20 Mn 0.01-50 Pb 0.001-20 As 0.01-60 Cu 0.001-40 Mo 0.001-10	S 0.01-10 Cd 0.001-10 Fe 0.01-100 Ni 0.001-10 Zn 0.001-30 Ag 1-1,500 ppm Bi 0.001-30	Fe 0.01-100 Pb 0.001-30 As 0.01-30 Cu 0.001-50 Mo 0.001-10 Zn 0.001-60
S-IR08 OL for S > 10%	Total sulphur by combustion furnace.	Total S 0.01% - 50%		

Source: *Geochemistry Service Schedule (2013).*

11.1.4 <u>Conclusions</u>

It is P&E's opinion that the sample preparation, analysis, and security measures taken at the Marathon, Geordie and Sally Deposits were adequate.

11.2 Marathon Quality Assurance/Quality Control

11.2.1 2009 and 2011 Programs

Marathon PGM Corp. continued with a robust QA/QC program that had been implemented by that company in the mid-2000s. The QA/QC program consisted of the insertion of reference materials, field blanks and duplicate pair monitoring.

Two standards, named MPG1 and MPG2, were prepared by Accurassay in Thunder Bay. Material was sourced from the Marathon Project. 375 samples were analyzed for the characterization of MPG1, and 325 samples were analyzed for the characterization of MPG2. Mean and standard deviation values were calculated for each reference material.

All data from the 2009 and 2011 drill programs were examined by P&E. Drill data prior to 2009 was previously examined by P&E and accepted for use in previous Mineral Resource Estimates.

11.2.1.1 Performance of Reference Materials

For the 2009 data, there were 31 data points for MPG1 and 18 data points for MPG2. All data points fell between +/- two standard deviations from the mean for Au, Cu, Pd and Pt.

For the 2011 data, there were 35 data points for MPG1 and 32 data points for MPG2. All data points fell between +/- two standard deviations from the mean.

11.2.1.2 Performance of Blank Material

The blank material used for the 2009 and 2011 programs was commercially prepared nepheline syenite sand. There were 49 data points in 2009 and 68 in 2011. All blank results were below five times the detection limit for the commodity in question.

11.2.1.3 Performance of Duplicates

There were 81 pulp duplicate pairs analyzed at ALS Chemex for Au, Pt and Pd for the 2011 drilling program. All duplicate pairs were plotted on a simple scatter graph. The precision on the gold pulp pairs was acceptable, with less precision (as is to be expected) on the very low grades. Both platinum and palladium demonstrated excellent precision at the pulp level. There were no duplicates available for copper.

11.2.2 Surface Trench Samples

The Marathon Deposit database contains 1,736 surface trench sample assays collected from channels that were cut by saw along lines spaced 30 to 50 m apart along approximately 2 km strike length. The channels were cut in approximately straight lines located close to and perpendicular to the base of the Marathon Deposit during the years 1985, 1986 and 2005 to 2009.

After a comparison of the trench samples with the diamond drill holes in the same vicinity, the channel samples were included in the Mineral Resource Estimate. In a report titled, “Trench vs. Core Assay Data in the Marathon Deposit Main Zone,” authored by D. Good, Ph.D., P. Geo. (March 18, 2012), it was clearly shown that channel samples should not be excluded from the database since a sampling bias could not be proven. The test sample set included channel samples cut from a relatively Pd-rich zone of the Main Zone, and when compared to the core samples drilled in the immediate vicinity, there was no sampling bias demonstrated. P&E has reviewed the report by Dr. Good and has accepted the methodology and conclusions.

11.2.3 Gen Mining 2019 and 2020 Drilling Programs

11.2.3.1 Performance of Reference Materials

The analyses for elements Au, Pt, Pd, Ag and Cu for standards MPG1 and MPG2 are plotted in Figure 11.1 to Figure 11.10.

A few minor outliers beyond the set control limits can be noted; however, the overall performance of both standards for all elements was excellent and no bias or temporal variation in the 2019 and 2020 data were noted.

Figure 11.1: Performance of MG1 for Au

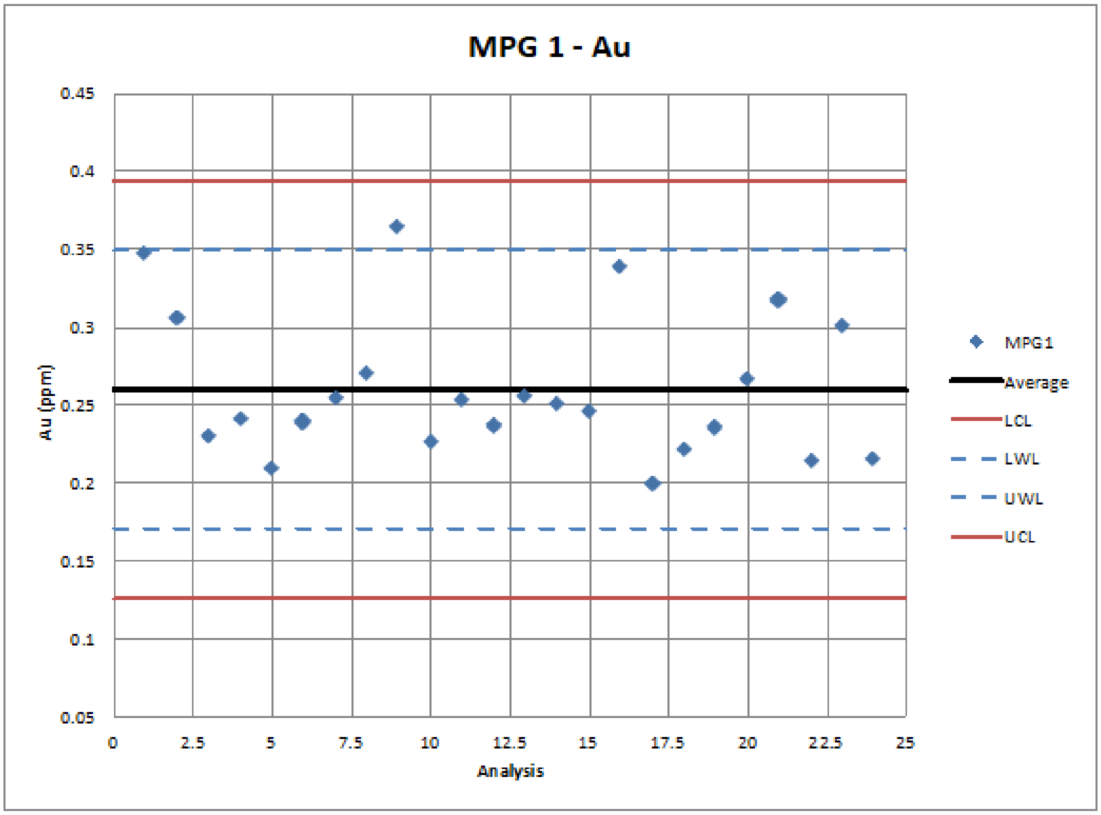


Figure 11.2: Performance of MPG1 for Pt

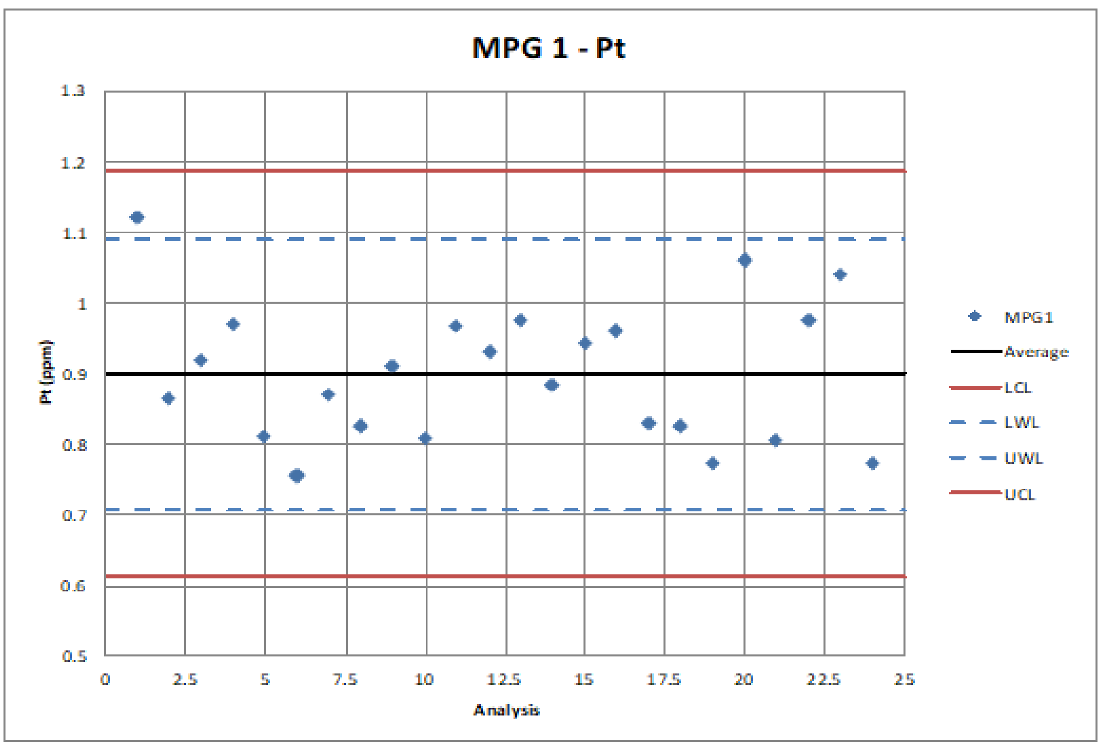


Figure 11.3: Performance of MPG1 for Pd

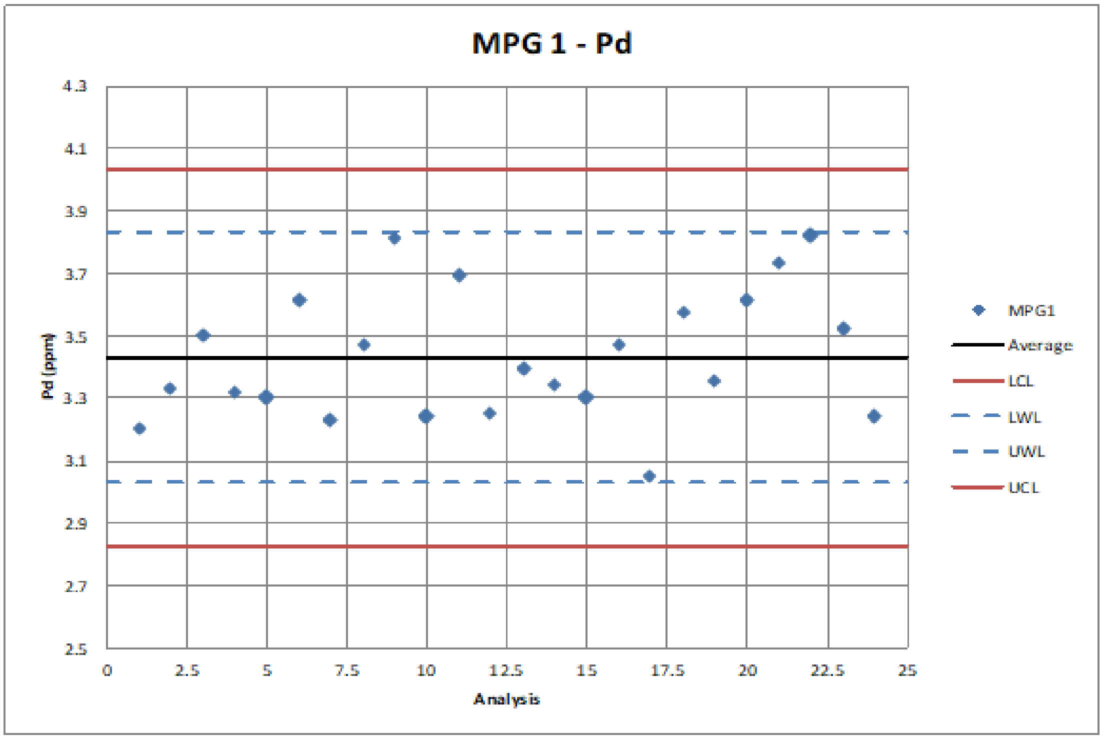


Figure 11.4: Performance of MPG1 for Ag

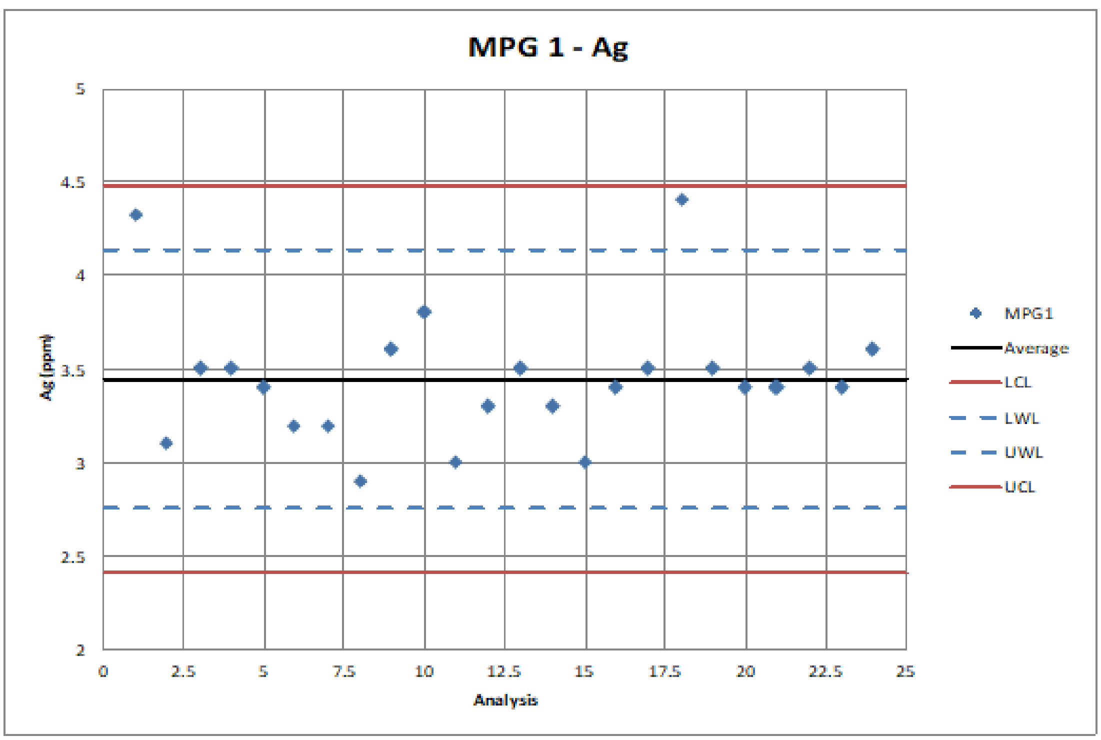


Figure 11.5: Performance of MPG1 for Cu

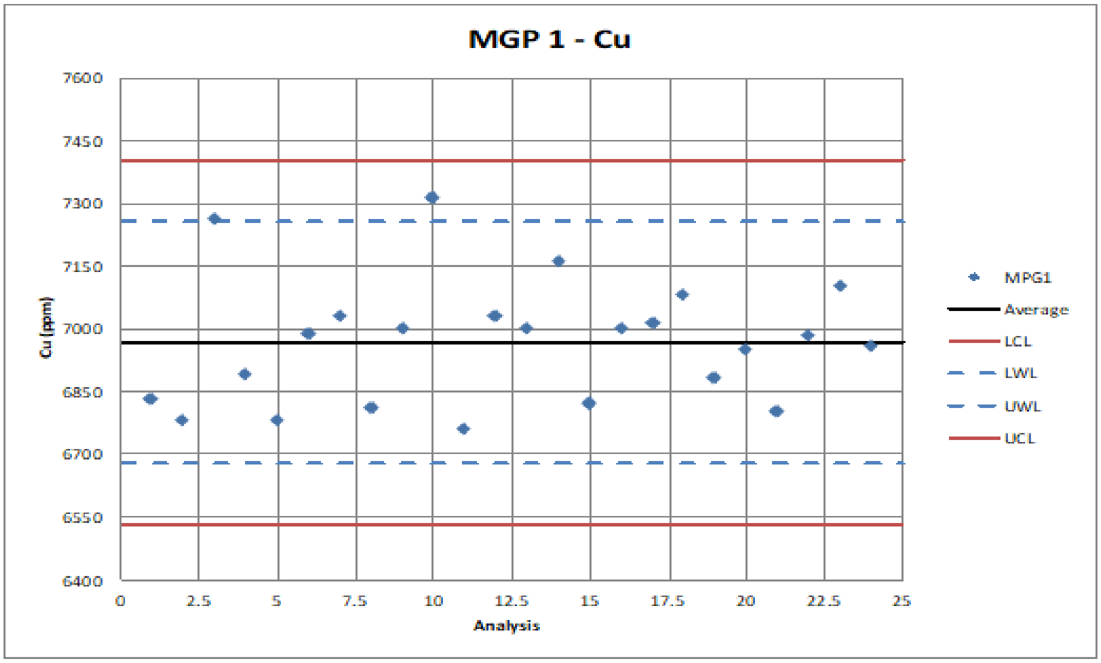


Figure 11.6: Performance of MPG2 for Au

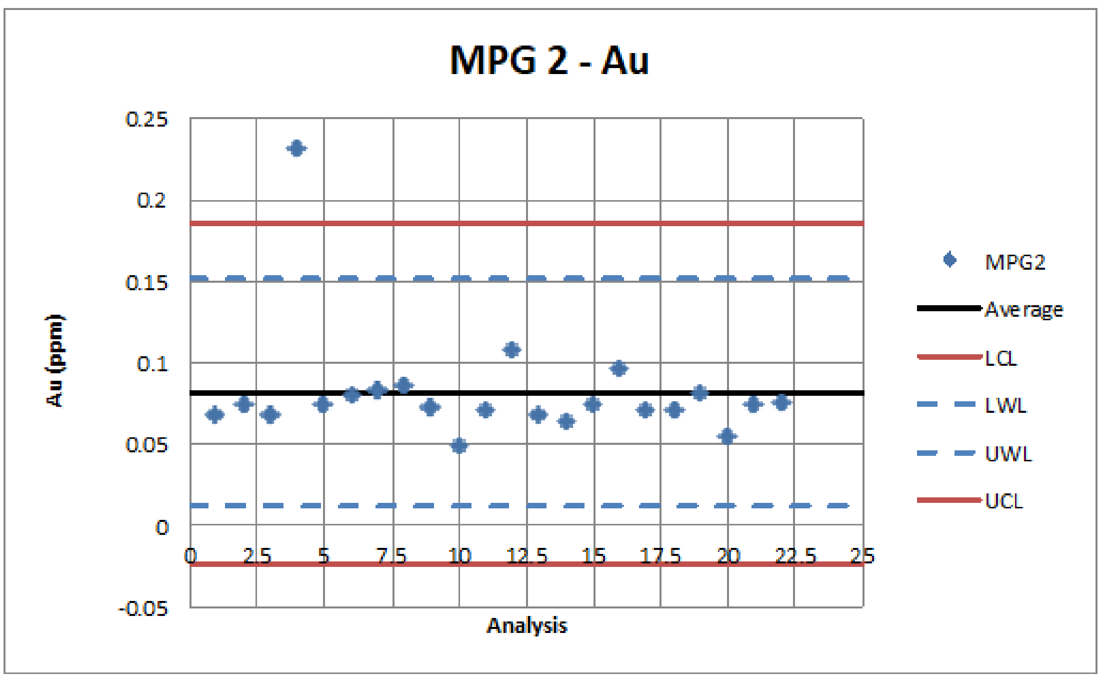


Figure 11.7: Performance of MPG2 for Pt

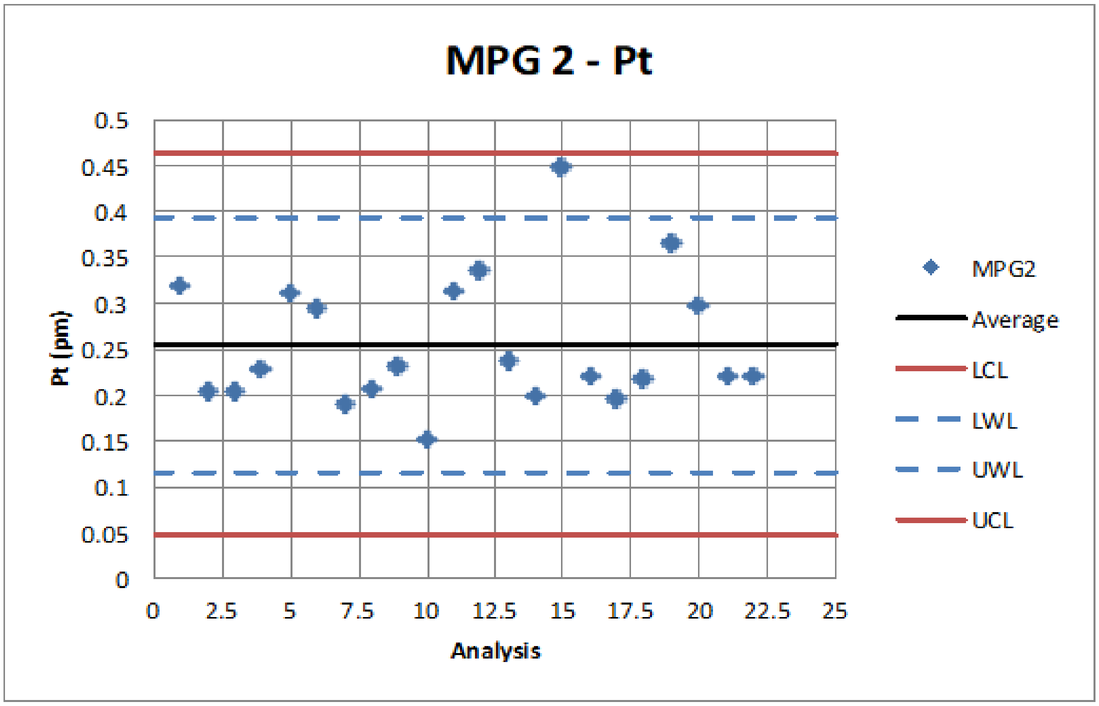


Figure 11.8: Performance of MPG2 for Pd

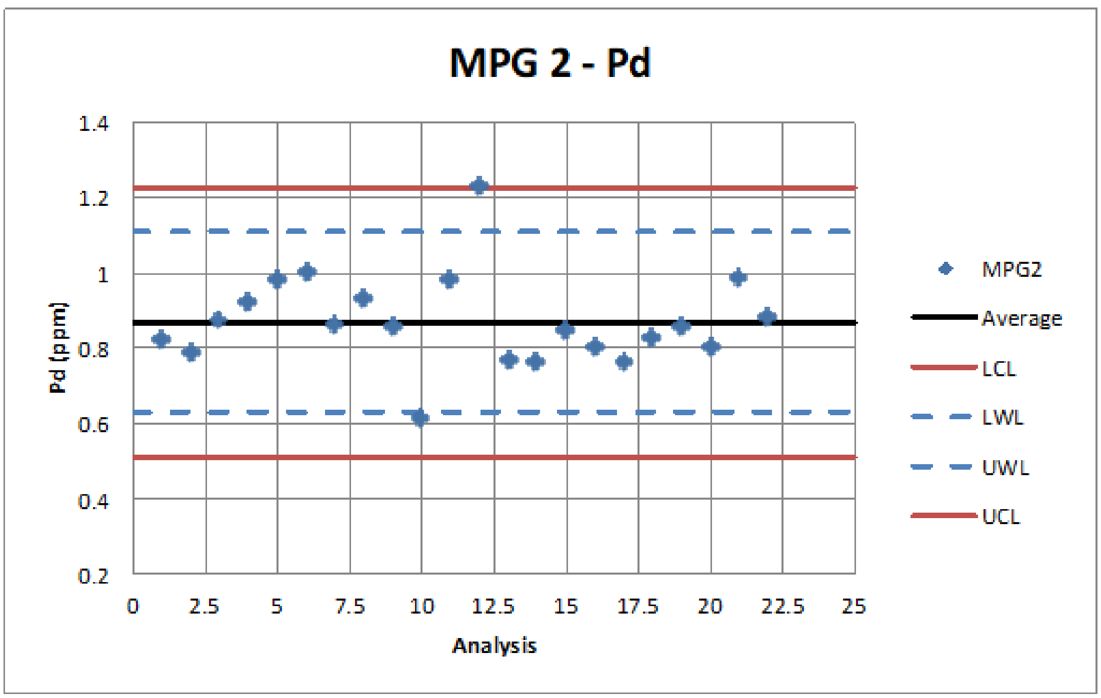


Figure 11.9: Performance of MPG2 for Ag

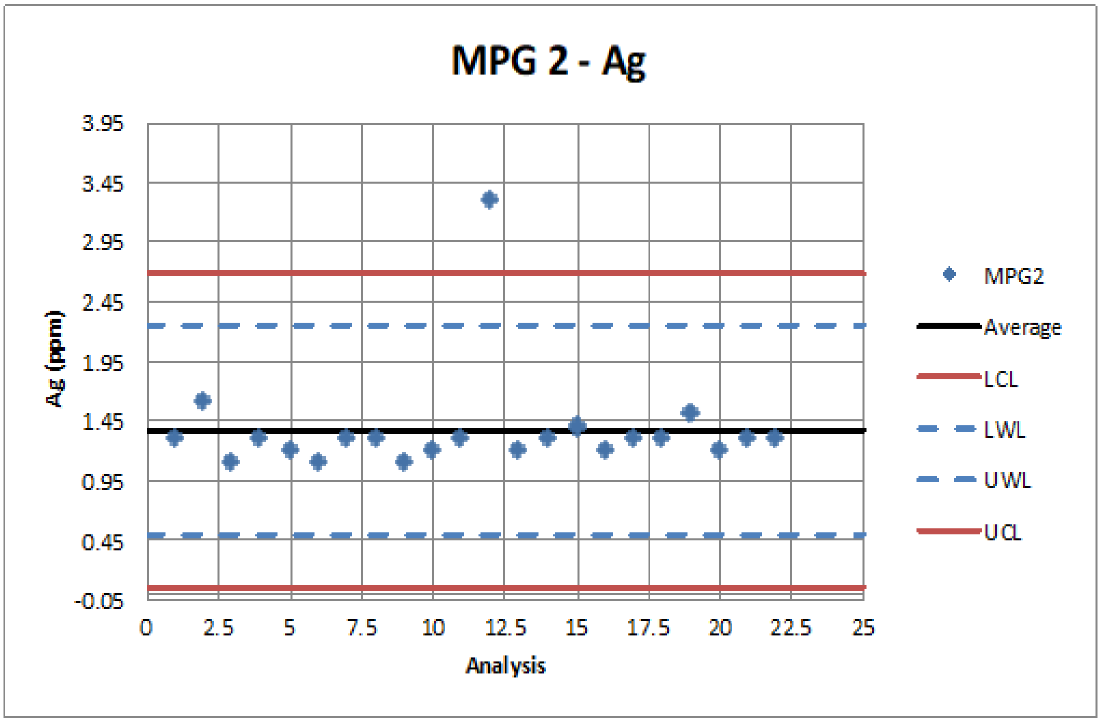
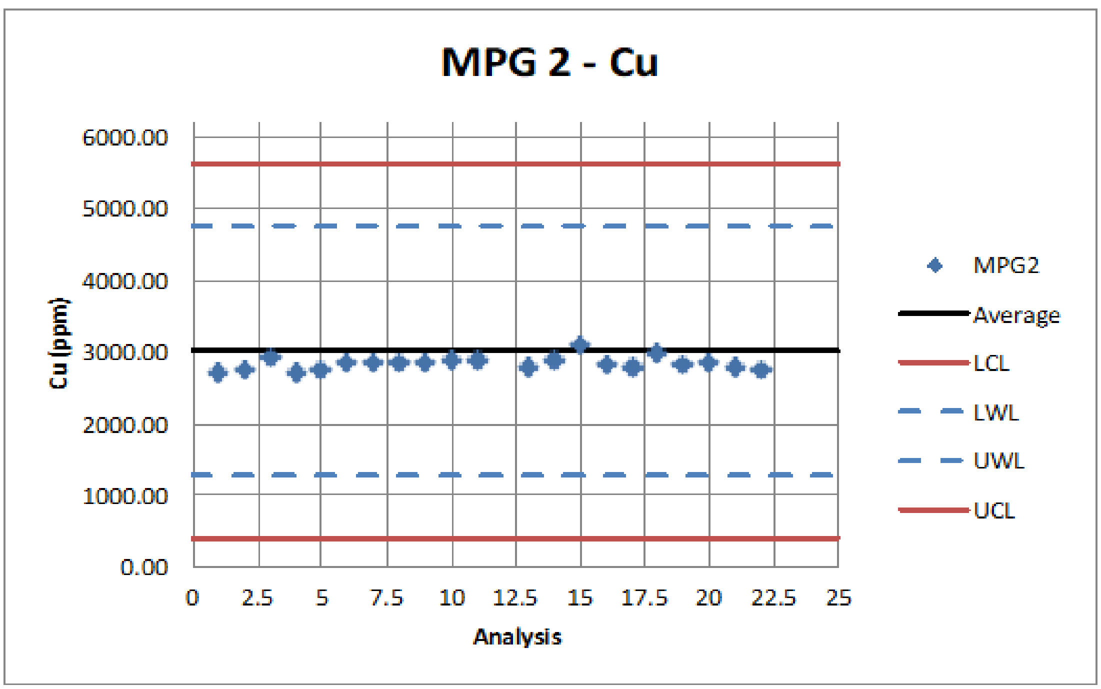


Figure 11.10: Performance of MPG2 for Cu



11.2.3.2 Performance of Blank Material

The results of the blank sample analyses (Figure 11.11 to Figure 11.15) were considered excellent, with the vast majority of the Au, Pt, Pd, Ag and Cu determinations falling below the respective upper working limit of two times the standard deviation of the mean of each element. The occasional result falling above the upper working limit was not considered to be of material impact to the Mineral Resource Estimate and contamination was not considered to be an issue with the 2019 and 2020 data.

Figure 11.11: Performance of Blanks for Au

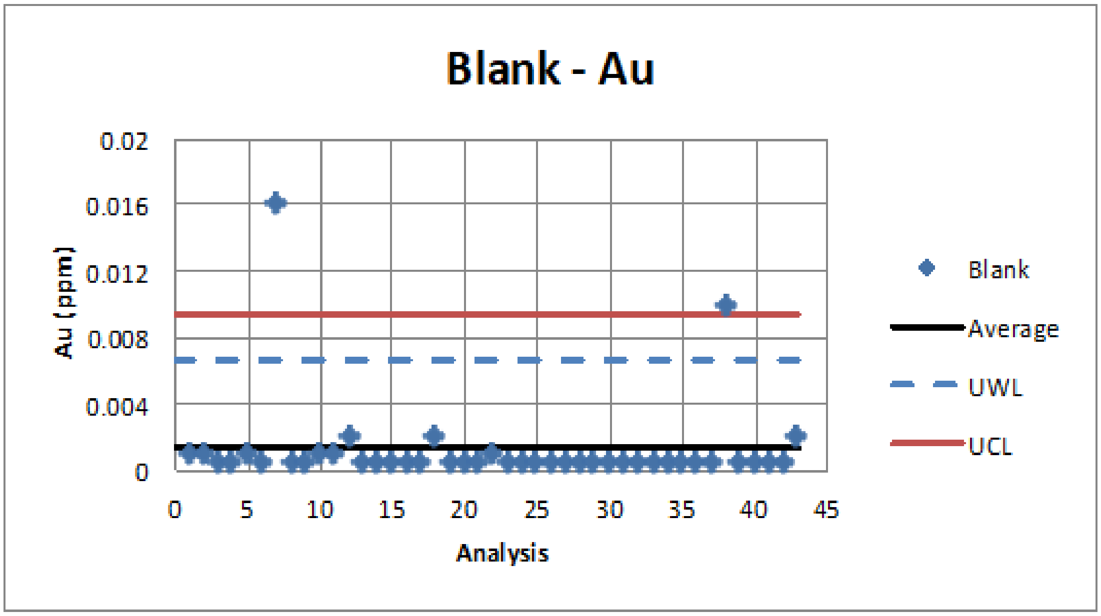


Figure 11.12: Performance of Blanks for Pt

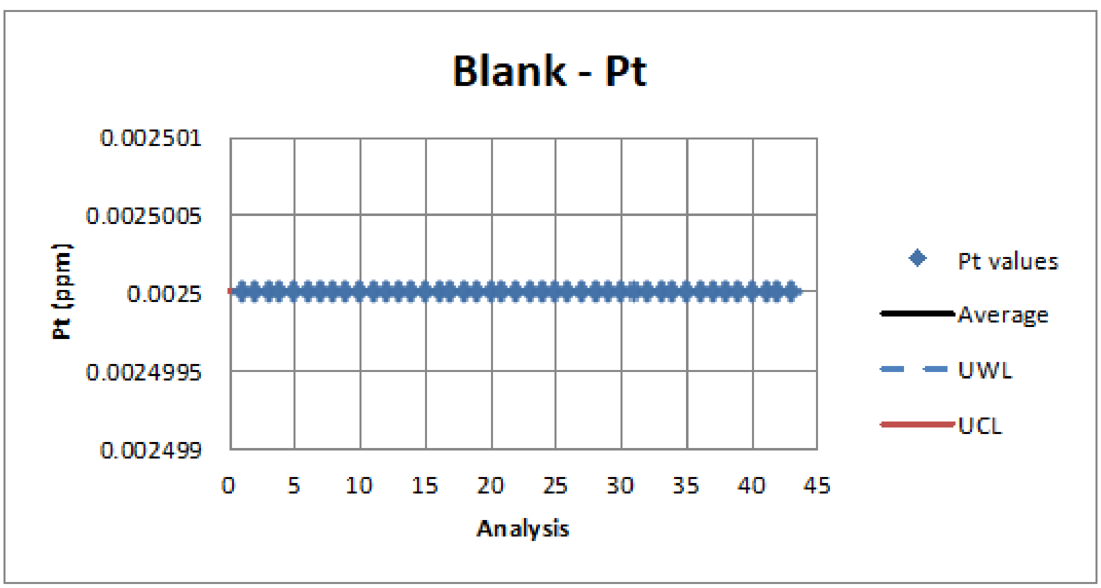


Figure 11.13: Performance of Blanks for Pd

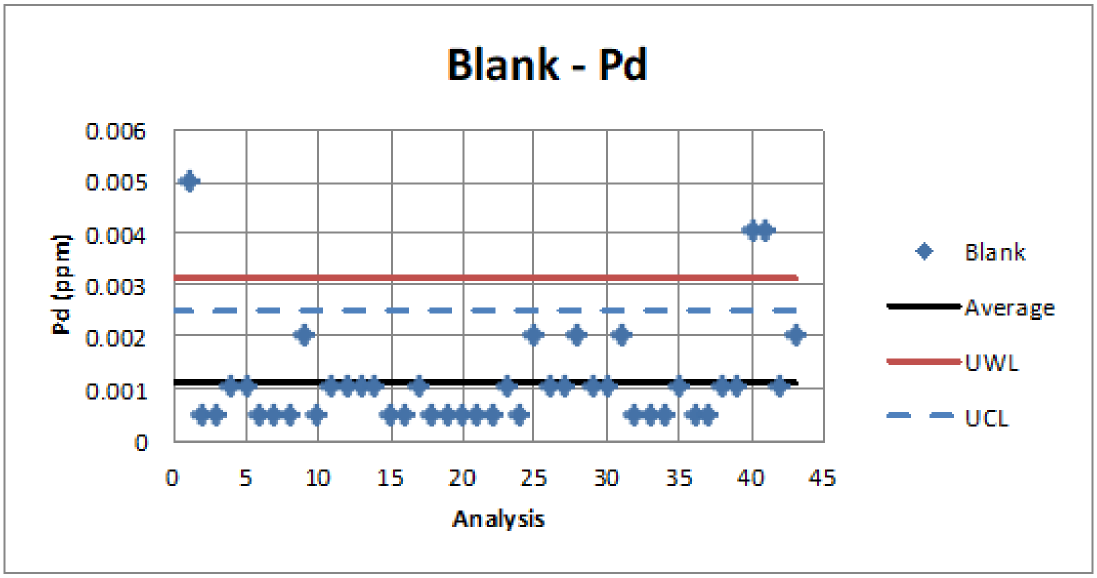


Figure 11.14: Performance of Blanks for Ag

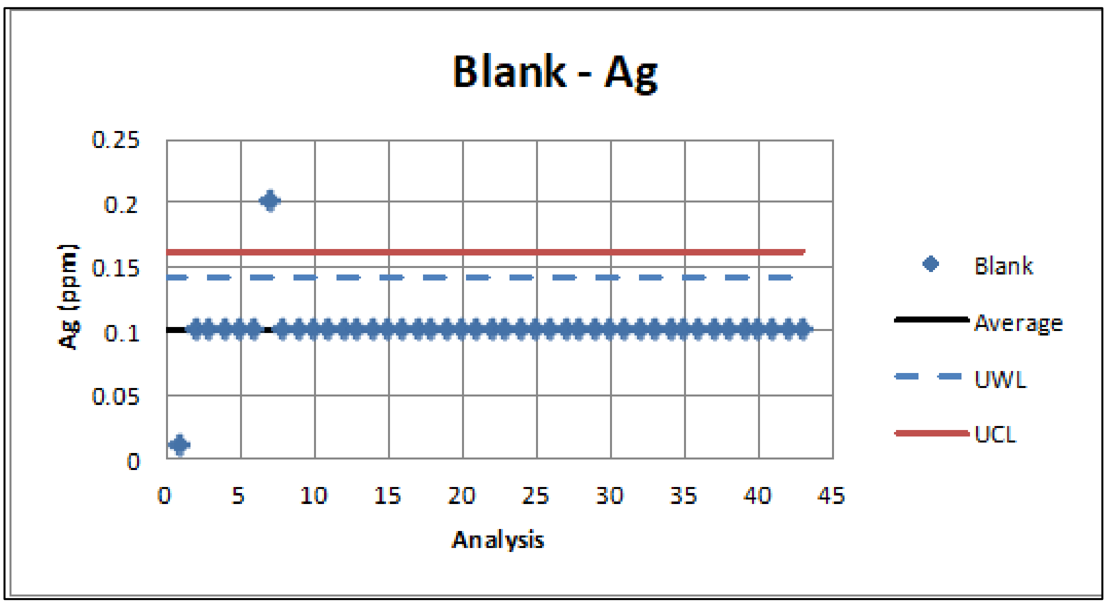
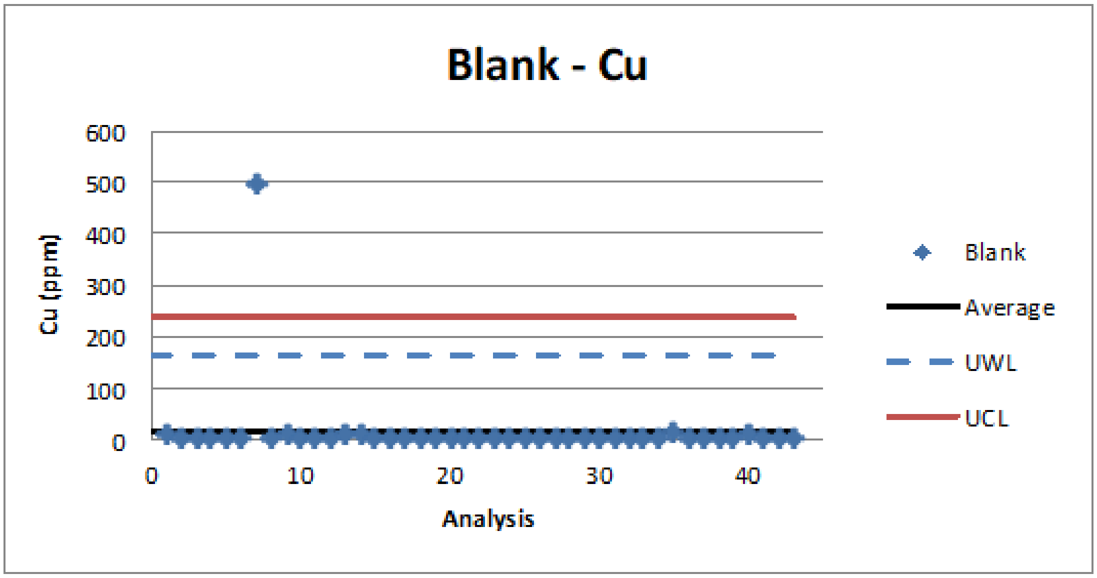


Figure 11.15: Performance of Blanks for Cu



11.2.3.3 <u>Performance of Duplicates</u>

The field duplicate data for Au, Pt, Pd, Ag and Cu were plotted on scatter plots and compared with the laboratory duplicate data (Figure 11.16 to Figure 11.20). Precision for all elements is shown to increase with the reduction in grain size from field to lab, as expected, and precision at laboratory level, as demonstrated by R^2 values, is considered satisfactory by P&E.

Figure 11.16: Field and Laboratory Duplicates for Au

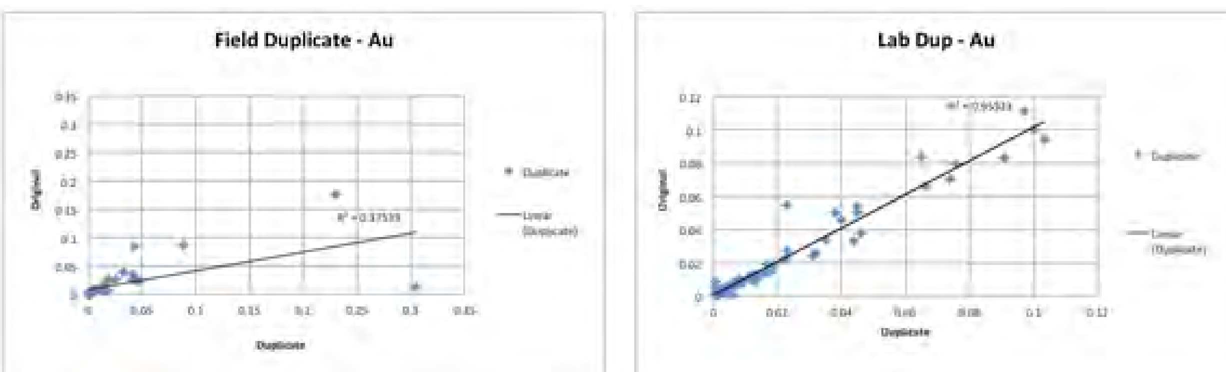


Figure 11.17: Field and Laboratory Duplicates for Pt

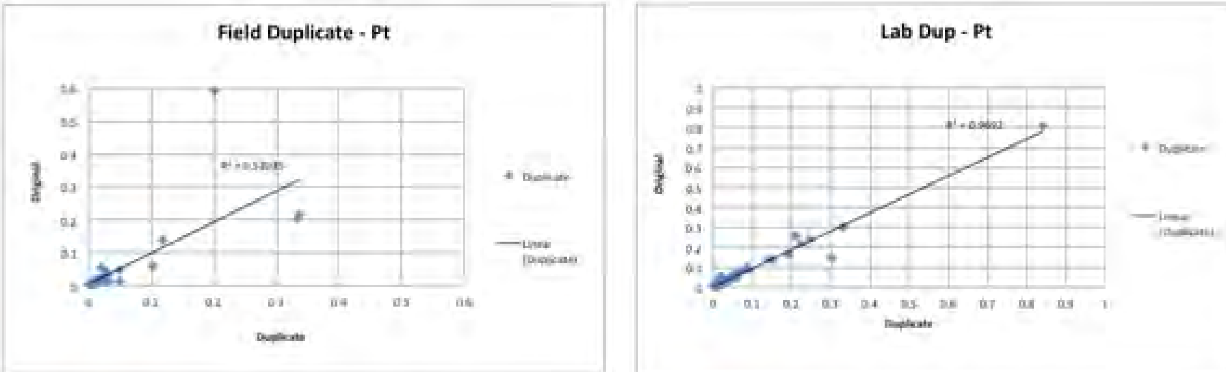


Figure 11.18: Field and Laboratory Duplicates for Pd

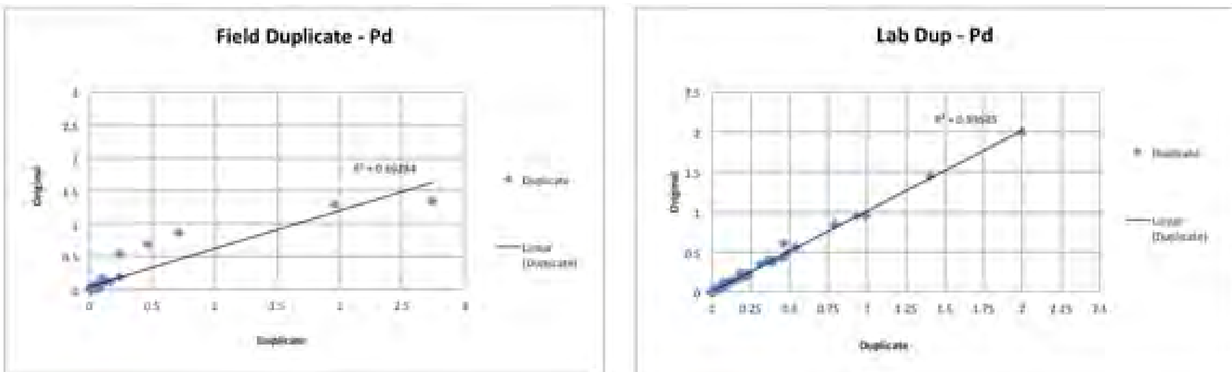


Figure 11.19: Field and Laboratory Duplicates for Ag

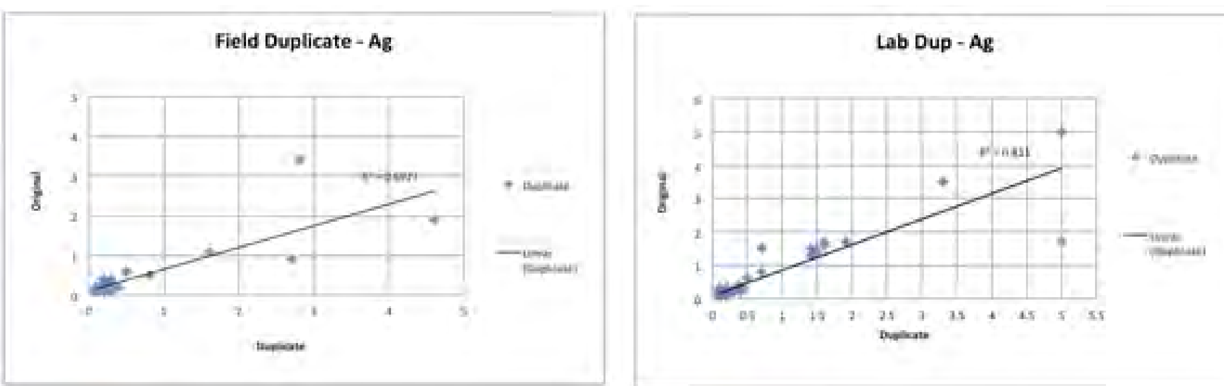
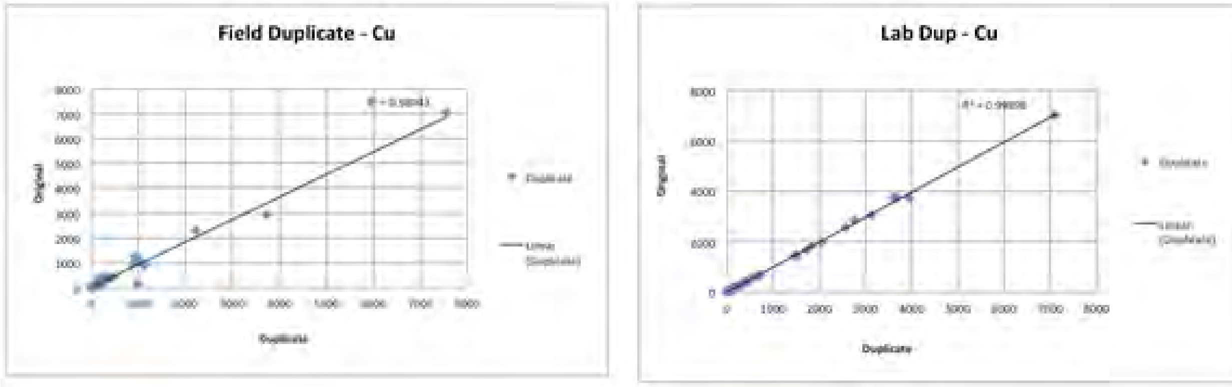


Figure 11.20: Field and Laboratory Duplicates for Cu



11.2.3.4 Laboratory Quality Control

P&E has reviewed the corresponding laboratory QC data for the 2019 and 2020 programs, including standards, blanks and duplicates, and does not consider that the laboratory QC data indicates issues with data accuracy, contamination or precision.

11.2.4 Conclusions

P&E considers the Marathon data to be of good quality and acceptable for use for Mineral Resource estimation. The 2020 data was not included in the current Mineral Resource Estimate since it was acquired after the June 30, 2020 effective date.

11.3 Geordie Quality Assurance/Quality Control

11.3.1 2010 Program

11.3.1.1 Performance of Reference Materials

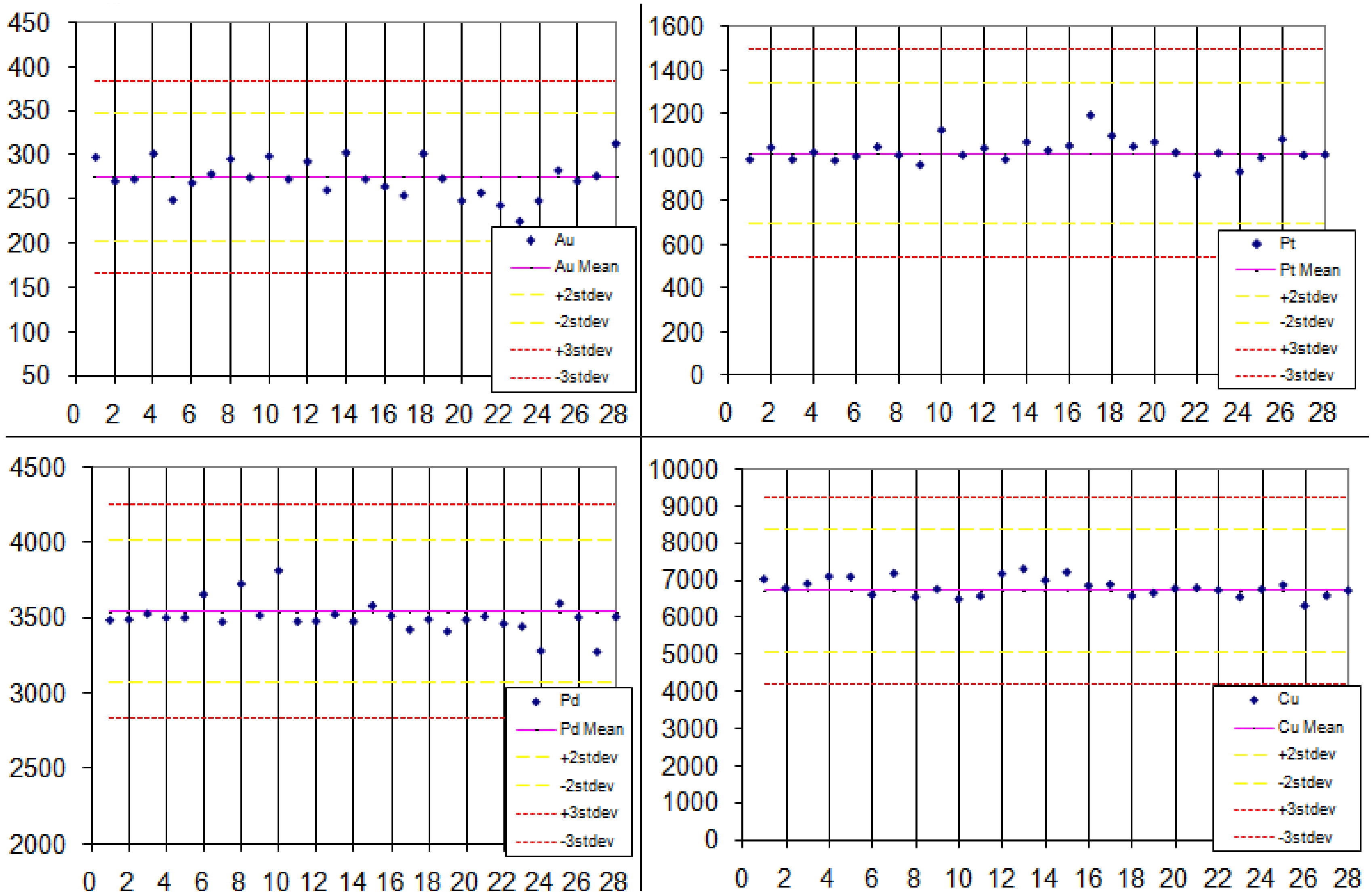
All data generated for QC standards, blanks and duplicates were used in the validation of results. For each QC standard, control charts were produced to monitor the performance of the laboratory. Warning limits were set at +/-2 standard deviations, and control limits were set at +/-3 standard deviations. If two consecutive data points for the QC standards fell outside the warning limits, but within the control limits, 10% of the samples in that batch were to be re-assayed. If the results from the re-assays matched the original assays the data was validated, if the re-assay results did not match the original data the entire batch was rejected, and new re-assays were performed. Any QC standard that fell outside the control limits was automatically re-assayed and all of the initial test results were rejected.

As can be noted in the control charts (Figure 11.21 and Figure 11.22), that none of the Cu, Au or Pd results fell outside of the warning limit and only one of the Pt results fell between the warning limit and the control limit. Consequently, no action was considered necessary.

The results of the MPG1 standard tests are shown in Figure 11.21. All values are in ppb except Cu in ppm. As shown in the figure, no determination fell outside of the 2x detection limit (warning) boundary and there was no sample drift during the period.

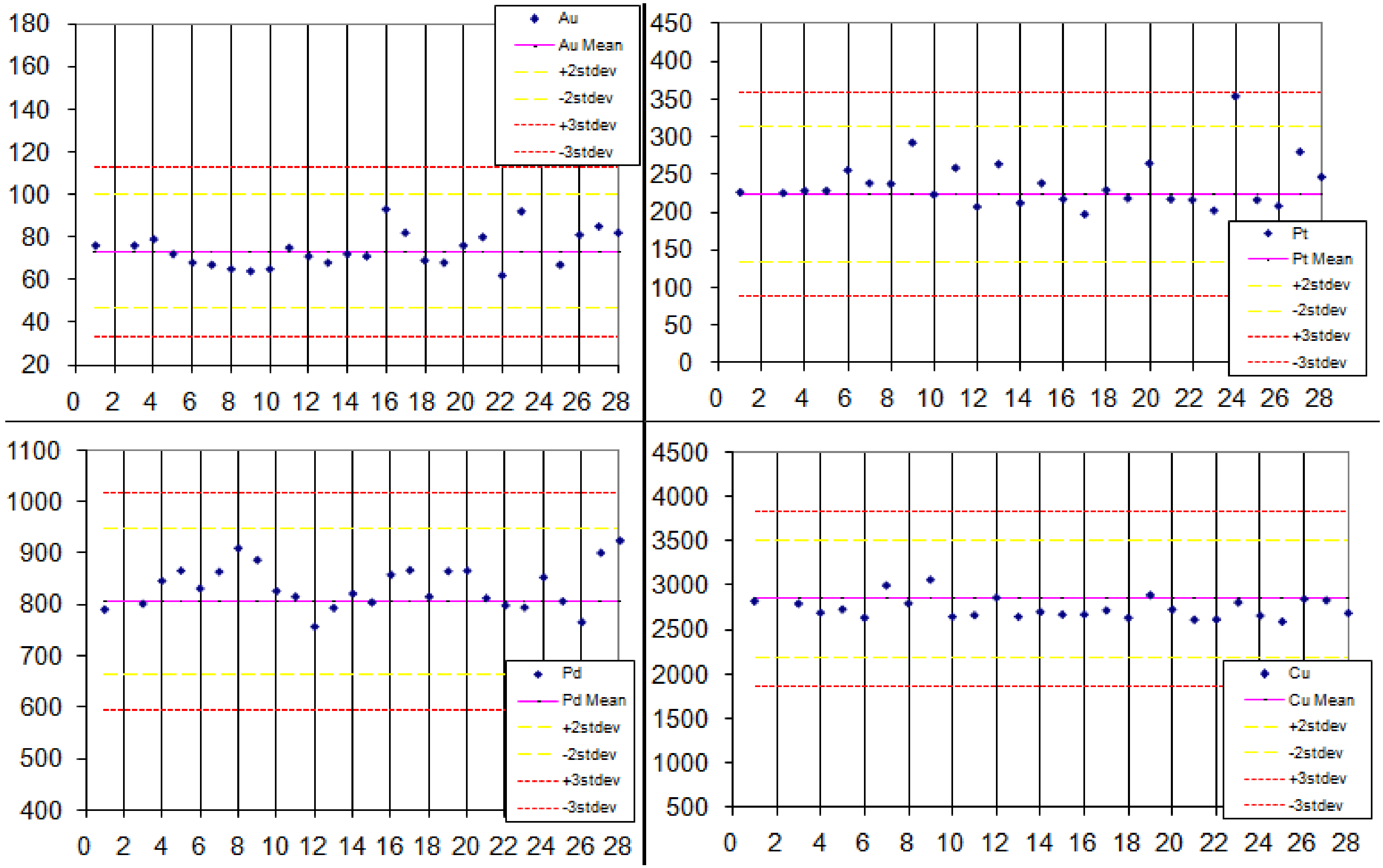
The results of the MPG2 standard tests are shown in Figure 11.22. All values are in ppb except Cu in ppm. As shown in the figure, only one determination fell outside of the 2x detection (warning) limit boundary and there was no sample drift evident during the period observed. No action was taken for the batch where Pt falls outside of the warning limit.

Figure 11.21: Determinations for In House Standard MPG1



Source: *Python (2010).*

Figure 11.22: Determinations for In House Standard MPG2



Source: *Python (2010).*

11.3.1.2 Performance of Blank Material

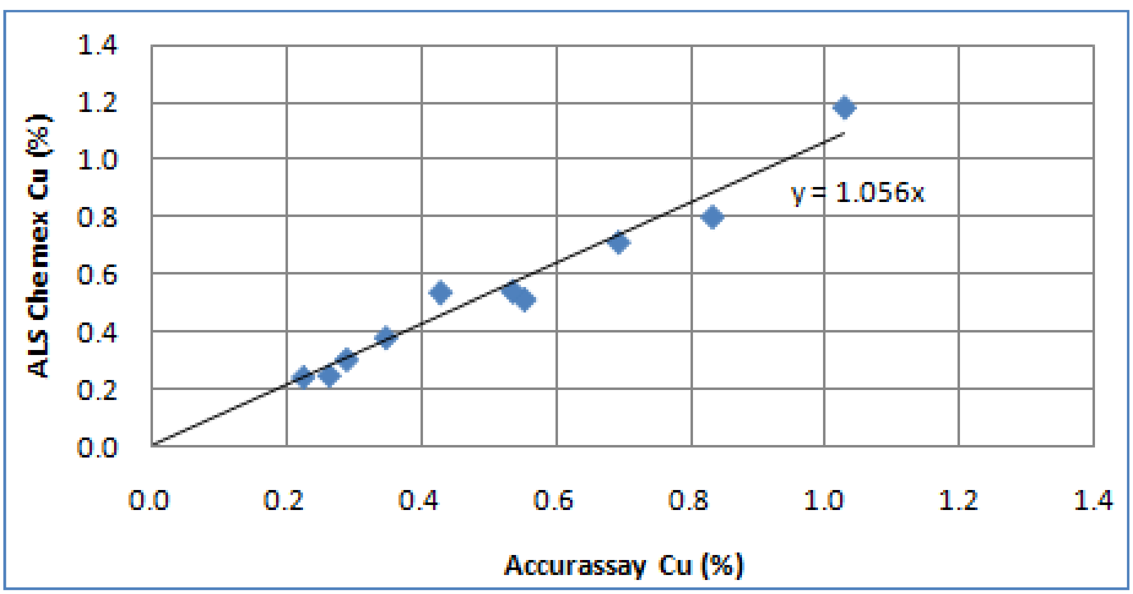
Every sample batch (consisting of 22 or 23 samples) shipped to Accurassay, contained a single blank sample. The blank material comprised 40 g of pulverized nepheline syenite, obtained from "B and L" in Thunder Bay. To verify the quality of the blank material, 10 samples were tested at ALS Chemex to ensure the viability of this material.

The results of the 56 blank sample analyses were considered excellent, with all of the Au, Pt and Pd determinations at or below the detection limits of 5, 15 and 10 ppb, respectively. Three blank Cu determinations returned results of 6, 7 and 46 ppm (greater than three times the detection limit of 1 ppm), however, these elevated results were still considered acceptable levels of contamination and of no material impact. Therefore, no action was necessary for these three batches.

11.3.1.3 Performance of Pulp Duplicates

To further verify the accuracy of Cu determinations carried out by Accurassay, a total of ten pulp samples selected from the two main host rocks (units 3a and 3b), with a varying range of Cu grades, were submitted to ALS Minerals in Thunder Bay for comparison analysis. Results of the duplicate analyses are shown in Figure 11.23 and Table 11.2. Two samples returned 15% to 25% higher values from the ALS Minerals; however, the results are considered acceptable.

Figure 11.23: Comparison Chart of ALS and Accurassay Cu Results



Source: *Python (2010).*

Table 11.2: Duplicate Pulp Analyses from Accurassay and ALS Chemex

Hole_ID	Sample No.	From (m)	To (m)	Zone	Cu % (AA)	Cu % (ALS)	ALS-AA (%)
Heterogeneous Gabbro (unit 3a)							
G10-01	870004	10.00	12.00	MZ	0.55	0.51	-7.4%
G10-02	870059	66.00	68.00	MZ	0.35	0.38	9.2%
G10-03	870090	42.00	44.00	HW	0.29	0.30	4.5%
G10-04	870149	142.00	144.00	MZ	0.43	0.54	25.1%
G10-13	870620	184.00	186.00	MZ	0.69	0.71	2.8%
Heterogeneous Gabbro (unit 3b)							
G10-03	870084	32.00	34.00	MZ	0.54	0.54	1.1%
G10-07	870258	60.00	62.00	HW	0.26	0.25	-6.4%
G10-10	870433	180.00	182.00	MZ	1.03	1.19	15.2%
G10-11	870504	186.00	188.00	MZ	0.22	0.24	7.0%
G10-13	870618	180.00	182.00	MZ	0.83	0.80	-3.8%

Note: *ALS-AA (%) = % difference in values of ALS compared with AA.*

Source: *Python (2010).*

11.3.2 Conclusions

P&E considers the Geordie data to be of good quality and acceptable for use for Mineral Resource estimation.

11.4 Sally Quality Assurance/Quality Control

The QA/QC from the 2013 drill program through 2019 was established by means of an internal quality management system with a rotating sequence of duplicates, blanks and standards that are inserted for every 15th sample.

The blanks were created in-house using granular nepheline syenite sand purchased from Bell and Mackenzie Ltd (Thunder Bay). Baggies of 'blank' material were prepared in a clean environment.

11.4.1 2013 Program

11.4.1.1 Performance of Reference Materials

Two standards (MPG1 and MPG2) were prepared and certified by Accurassay Laboratories in 2008 and used during the 2013 through 2019 programs. The certified results for standards MPG1 and MPG2 are shown in Table 11.3 and Table 11.4.

The standards were prepared from sample rejects collected from drilling the Marathon Property in 2007 and 2008. The preparation and certification procedures used for MPG1 and MPG2 are described in an article by Wesley M. Johnson, in the Geostandards Newsletter, Vol. 15, No. 1, April 1991, p. 23 to 31, entitled “Use of Geochemical Reference Materials in A Quality Control/Quality Assurance Program”.

Table 11.3: Standard MPG1

Element	Average (ppb)	Standard Deviation (ppb)
Pd	3,538	236
Pt	1,019	160
Au	275	36
Cu	6,715	835
Ni	444	33
Co	70	5

Table 11.4: Standard MPG2

Element	Average (ppb)	Standard Deviation (ppb)
Au	70	13
Pt	223	45
Pd	805	71
Cu	2,853	329
Ni	318	28
Co	85	8

The analyses for elements Au, Pt, Pd, Ag and Cu for standards MPG1 and MPG2 are plotted in Figure 11.25 to Figure 11.33.

The mean value, standard deviation and lower and upper working limits (two standard deviations from the average) of both the MPG1 and MPG2 standards are presented in Table 11.5 and Table 11.6.

Table 11.5: MPG1 Control Limits

	Au (ppm)	Pt (ppm)	Pd (ppm)	Ag (ppm)	Cu (ppm)	Ni (ppm)	S (%)
Average	0.261	0.914	3.334	3.320	6982.89	375.495	1.115
Standard Deviation	0.056	0.101	0.203	0.268	339.049	19.2712	0.0593
Lower Working Limit	0.149	0.712	2.928	2.784	6304.792	336.9526	0.9964
Upper Working Limit	0.372	1.116	3.740	3.856	7660.98	414.037	1.233

Note: *Ag = silver, Au = gold, Cu = copper, Ni = nickel, Pd = palladium, Pt = platinum, S = sulphur.*

Table 11.6: MPG2 Control Limits

	Au (ppm)	Pt (ppm)	Pd (ppm)	Ag (ppm)	Cu (ppm)	Ni (ppm)	S (%)
Average	0.0835	0.2503	0.8337	1.2396	2860.879	277.6593	1.1777
Standard Deviation	0.0409	0.0883	0.0992	0.2043	130.0568	13.0896	0.0612
Lower Working Limit	0.0017	0.0737	0.6353	0.831	2600.7653	251.4801	1.0553
Upper Working Limit	0.1653	0.4270	1.0322	1.6482	3120.993	303.8386	1.3002

Note: *Ag = silver, Au = gold, Cu = copper, Ni = nickel, Pd = palladium, Pt = platinum, S = sulphur.*

As can be noted in Figure 11.24, there are some outliers beyond the upper control limit (example point 5229); however, individual outliers were isolated to a specific element and did not fail for all tested elements in the same sample. In addition, inspection of the internal standard data determined by routine ALS Minerals procedure verified the analyses were sound and no further action was taken. There is a strong confidence for the analysis as data fell within the 95% confidence interval as seen in Figure 11.24 to Figure 11.33, and there was no systematic bias either above or below the recommended values, nor was there temporal variation in the data.

Figure 11.24: Performance of MPG1 for Au

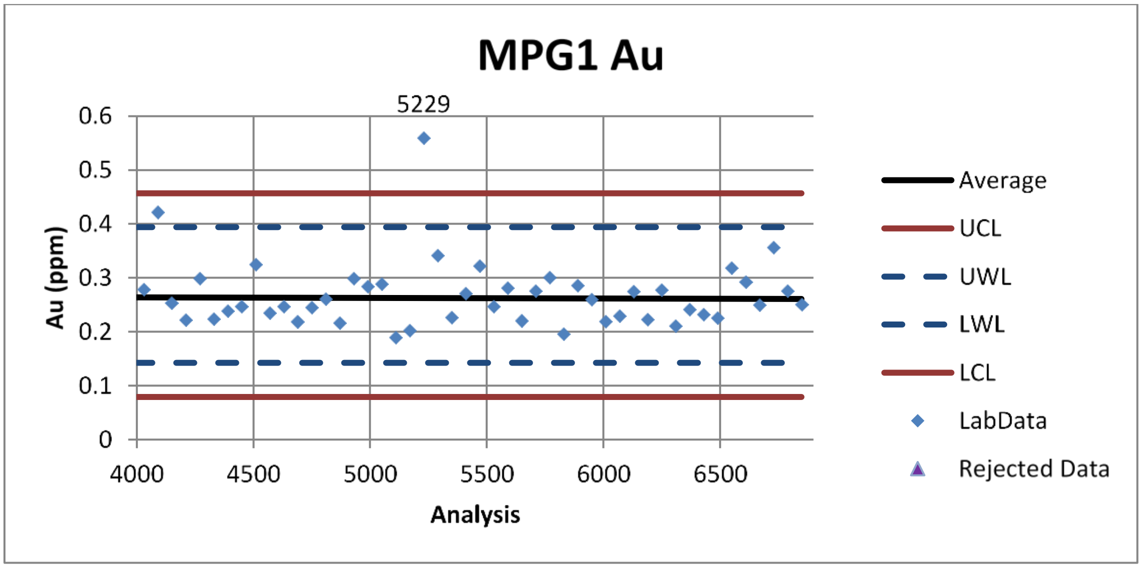


Figure 11.25: Performance of MPG1 for Pt

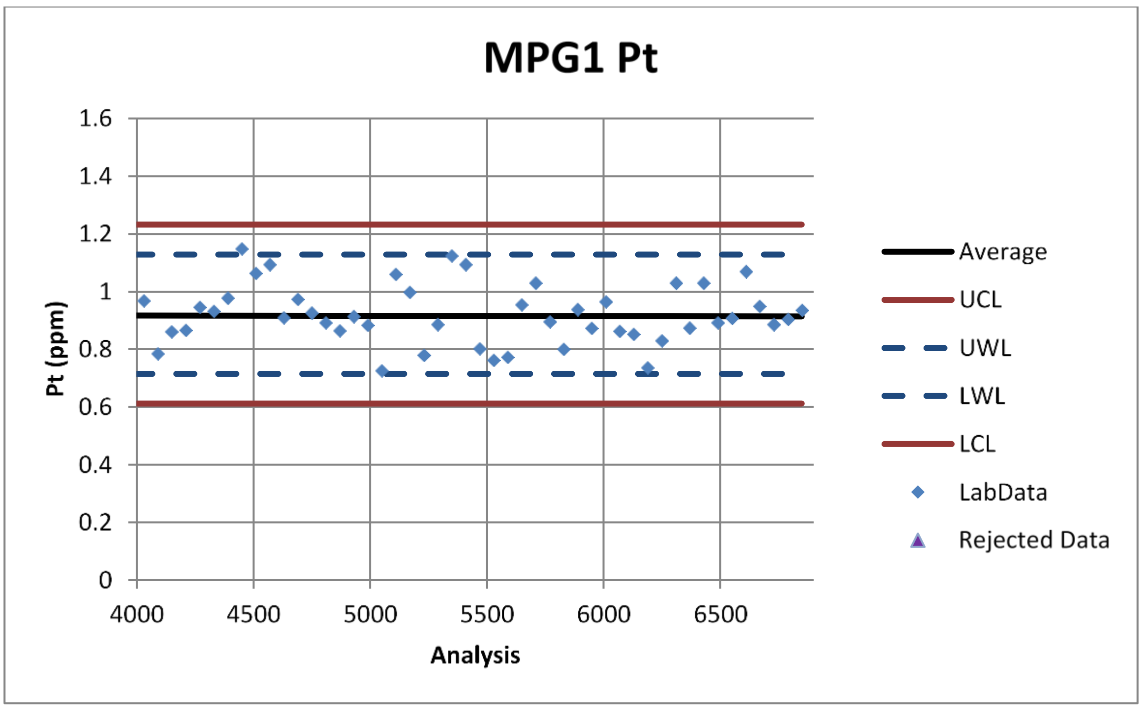


Figure 11.26: Performance of MPG1 for Pd

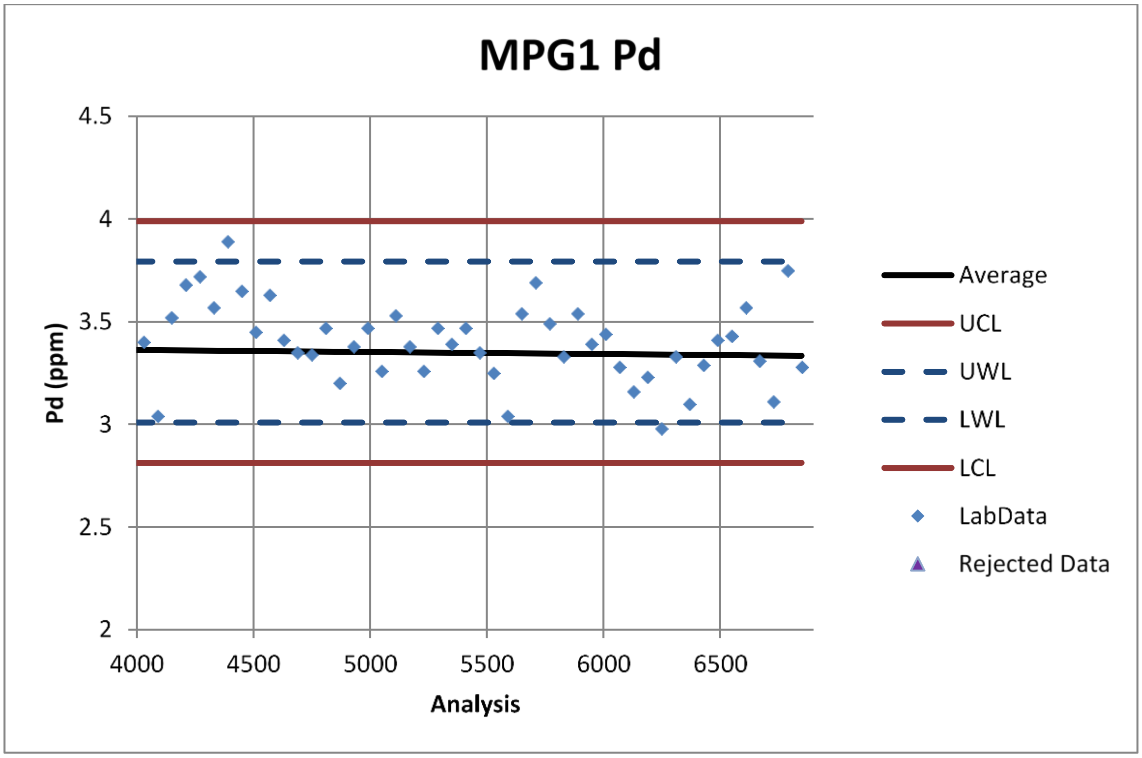


Figure 11.27: Performance of MPG1 for Ag

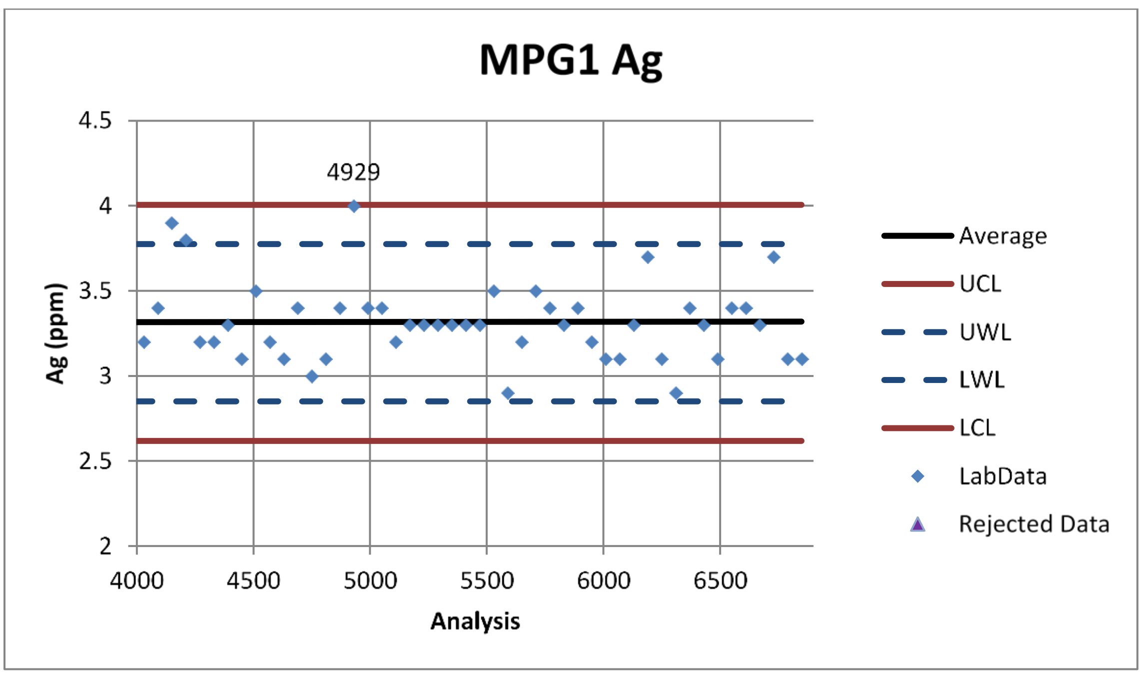


Figure 11.28: Performance of MPG1 for Cu

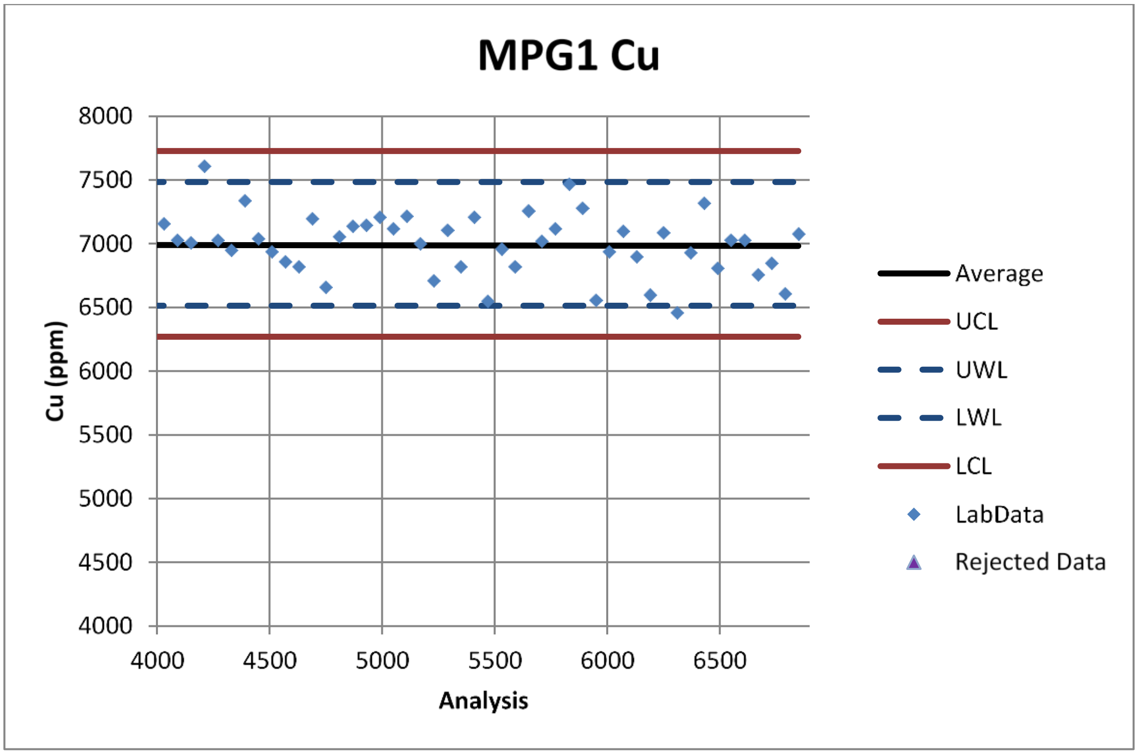


Figure 11.29: Performance of MPG2 for Au

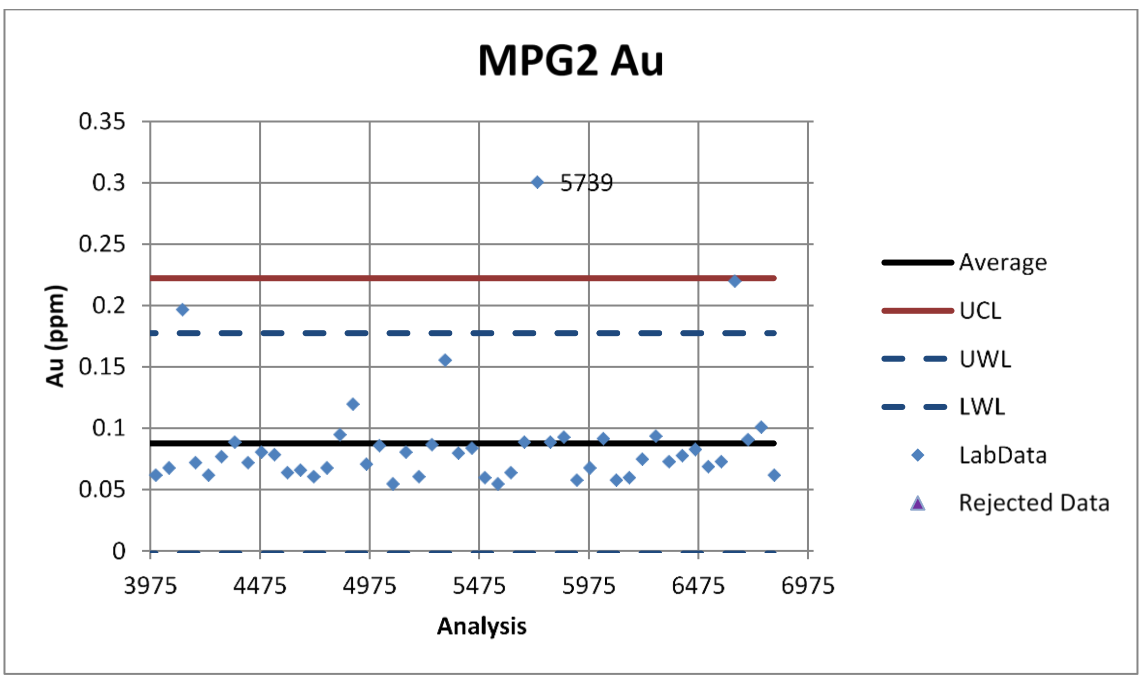


Figure 11.30: Performance of MPG2 for Pt

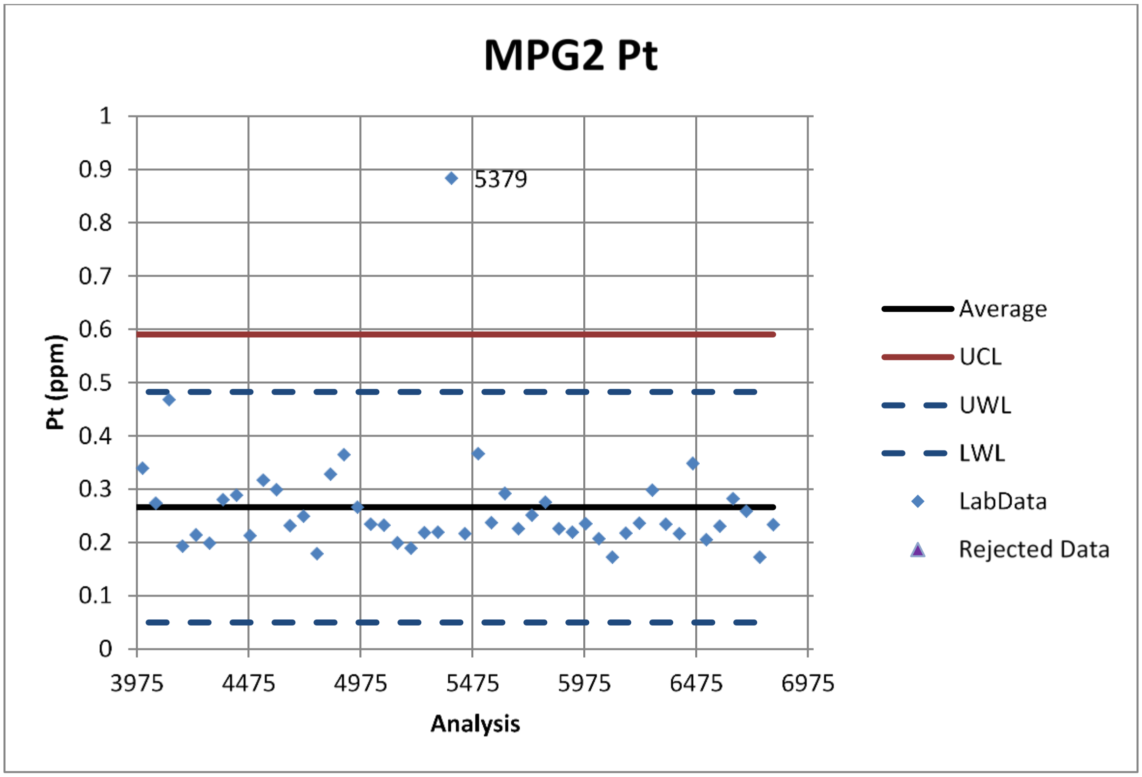


Figure 11.31: Performance of MPG2 for Pd

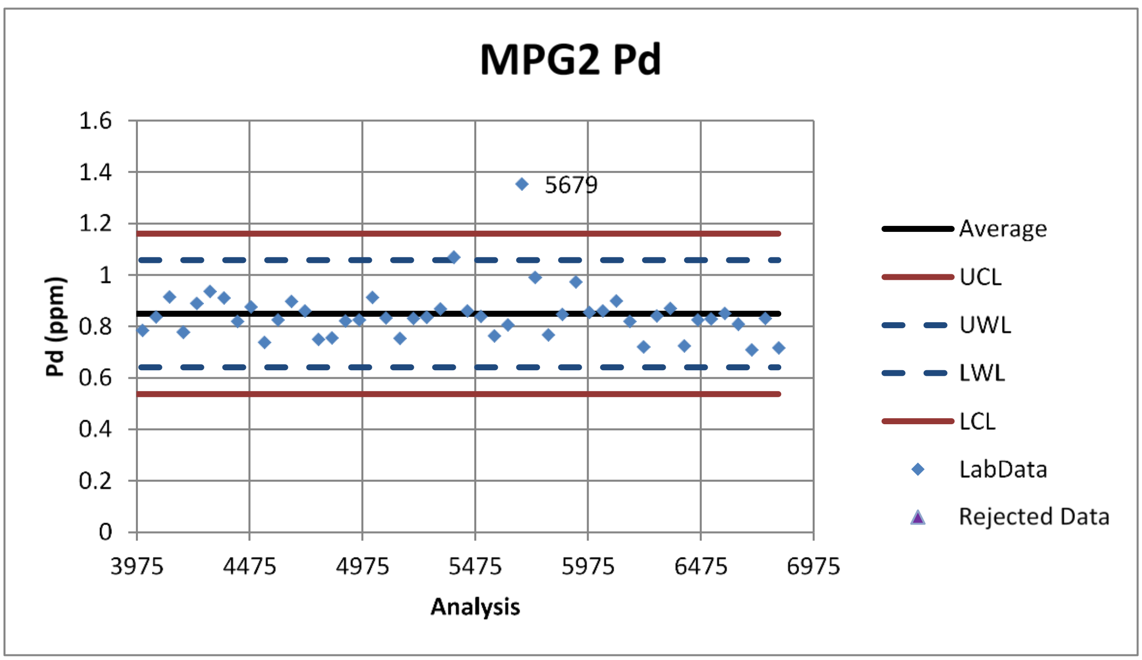


Figure 11.32: Performance of MPG2 for Ag

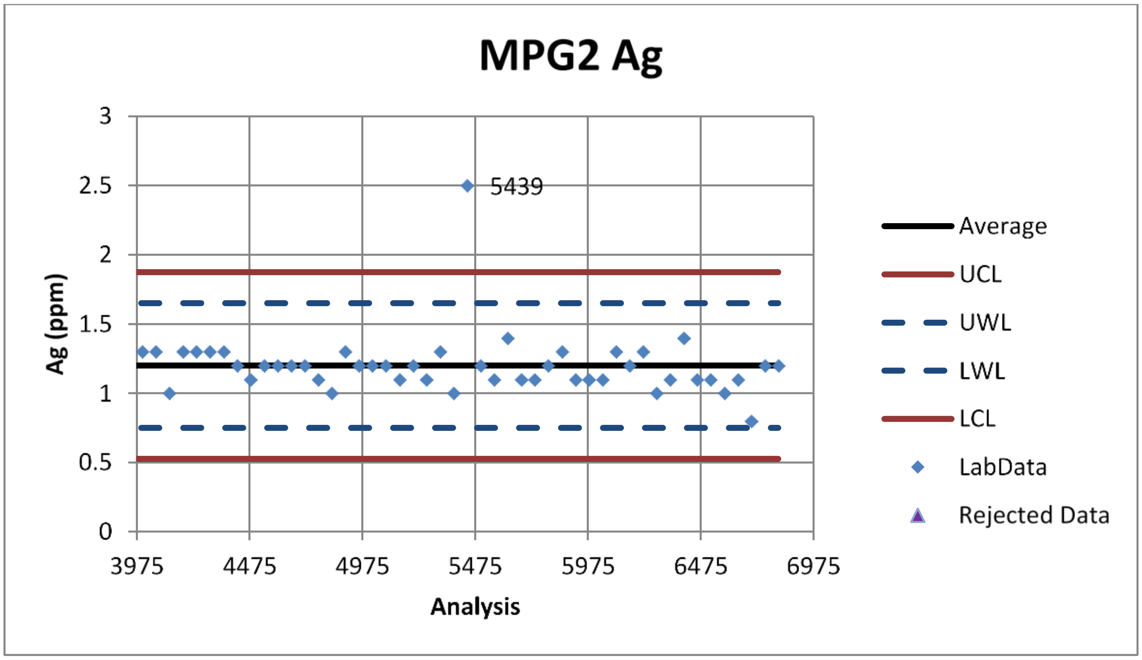
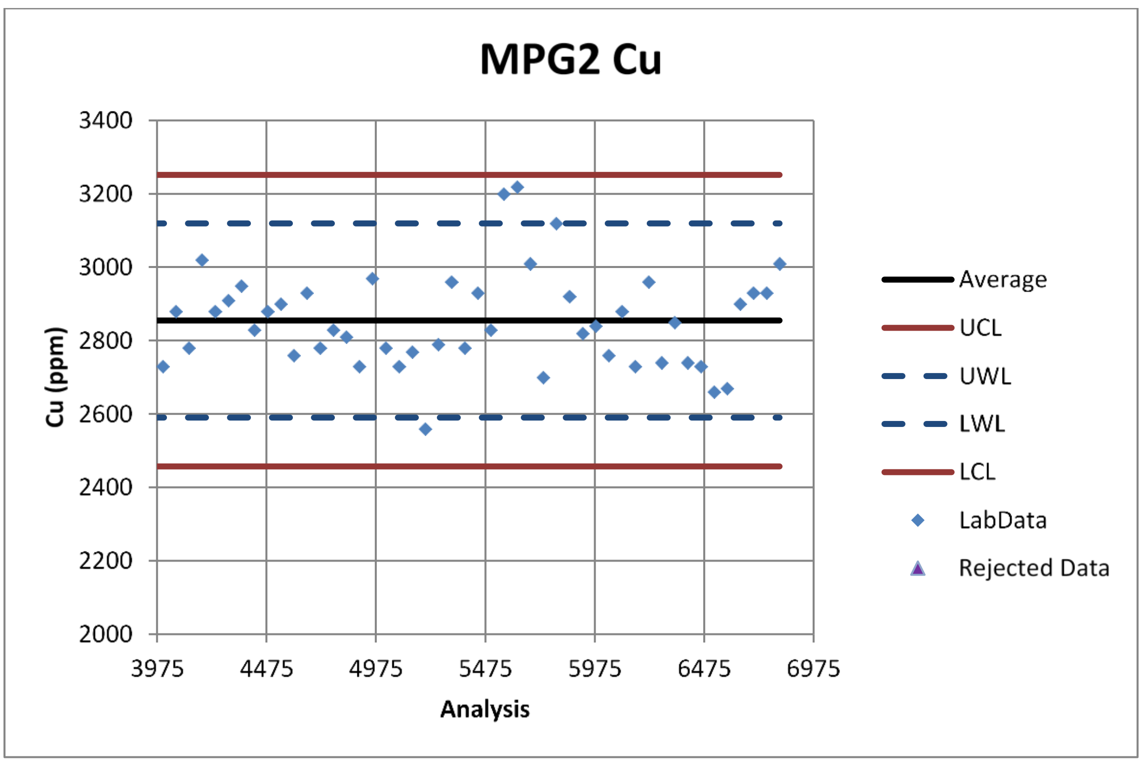


Figure 11.33: Performance of MPG2 for Cu



11.4.1.2 Performance of Blank Material

The blanks were created in-house using granular nepheline syenite sand purchased from Bell and Mackenzie Ltd (Thunder Bay). Baggies of 'blank' material were prepared in a clean environment.

The mean value, standard deviation and upper working limits (two standard deviations from the average) of the blank material are presented in Table 11.7.

The results of the blank sample analyses (Figure 11.34 to Figure 11.38) were considered excellent, with the vast majority of the Au, Pt, Pd, Ag and Cu determinations falling below the respective upper working limit of two times the standard deviation of the mean of each element. The occasional result falling above the upper working limit (as with sample 8621 in Figure 11.35) was not considered to be of material impact to the Mineral Resource Estimate and contamination was not considered to be an issue in the 2013 data.

Table 11.7: Blank Control Limits

	Au (ppm)	Pt (ppm)	Pd (ppm)	Ag (ppm)	Cu (ppm)	Ni (ppm)	S (%)
Average	0.0013	0.0028	0.0011	0.1096	8.0593	2.9765	0.0176
Standard Deviation	0.0019	0.0009	0.0012	0.0327	8.7975	10.5980	0.0414
Upper Working Limit	0.0051	0.0046	0.0034	0.1751	25.6543	24.1726	0.1004

Note: *Ag = silver, Au = gold, Cu = copper, Ni = nickel, Pd = palladium, Pt = platinum, S = sulphur.*

Figure 11.34: Performance of Blanks for Au

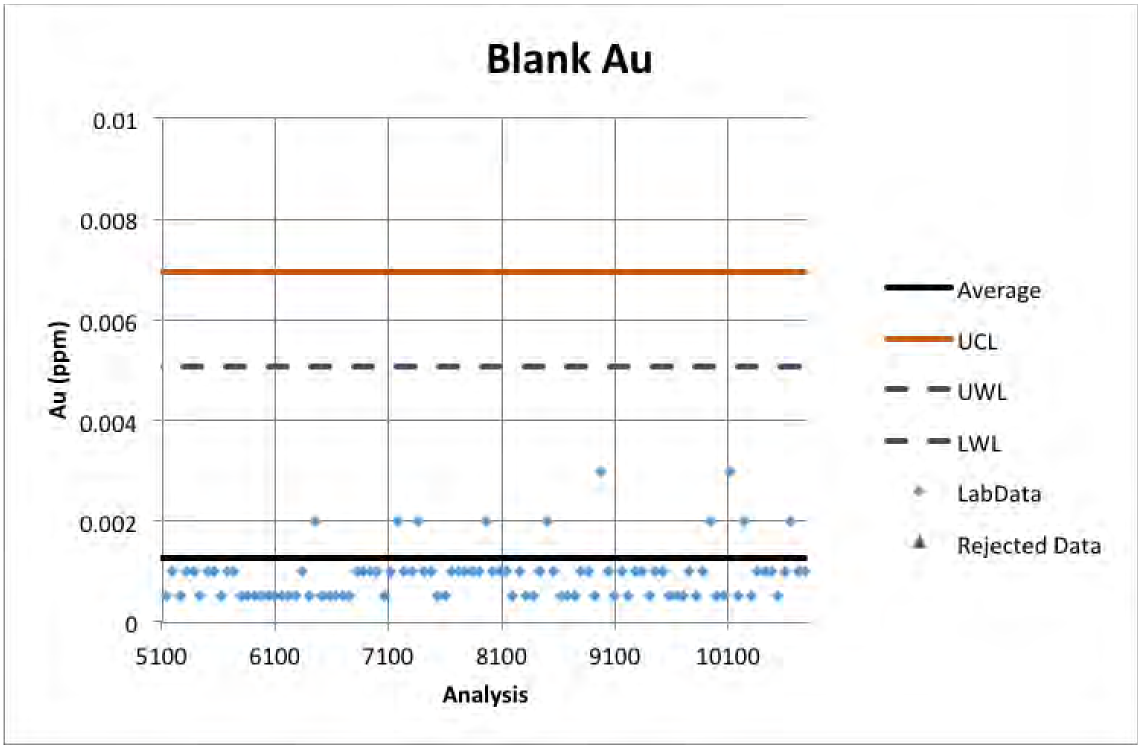


Figure 11.35: Performance of Blanks for Pt

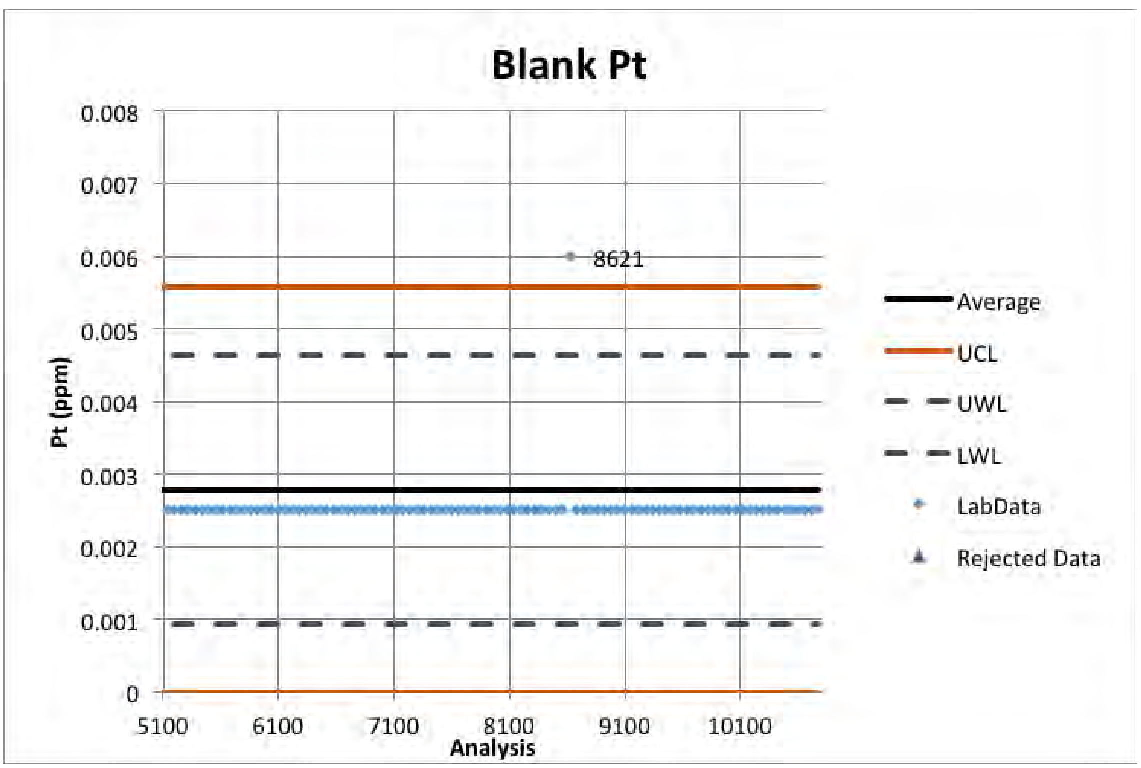


Figure 11.36: Performance of Blanks for Pd

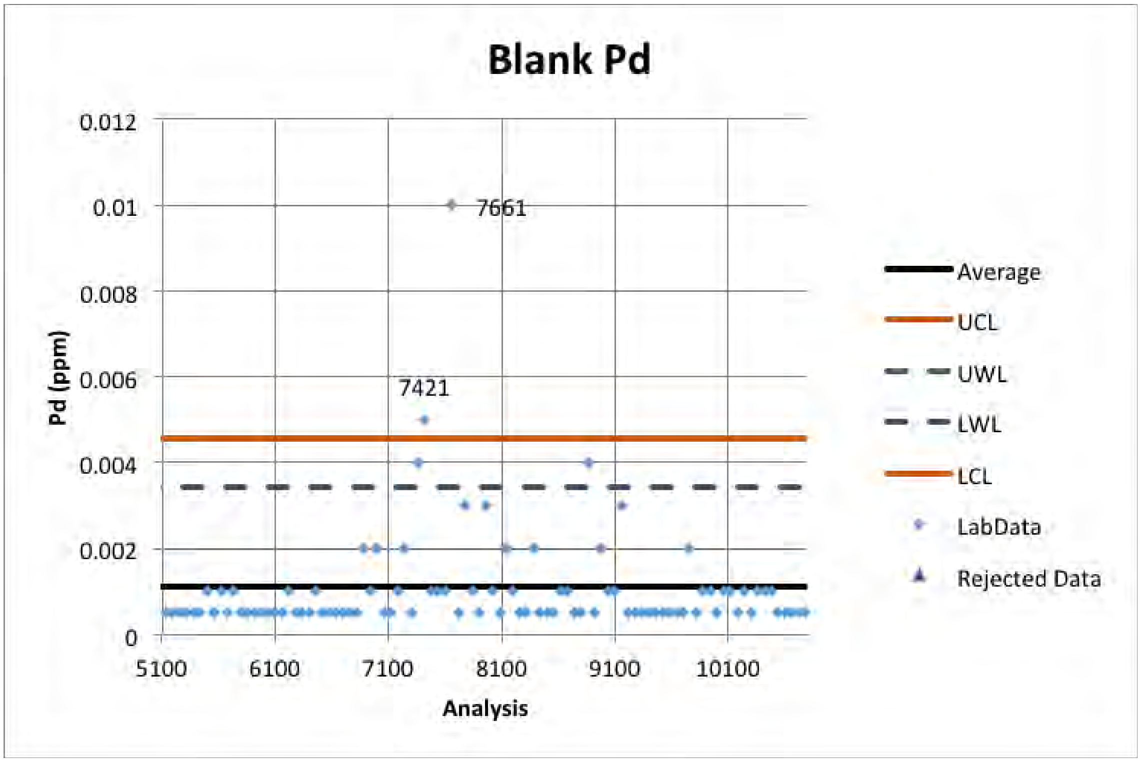


Figure 11.37: Performance of Blanks for Ag

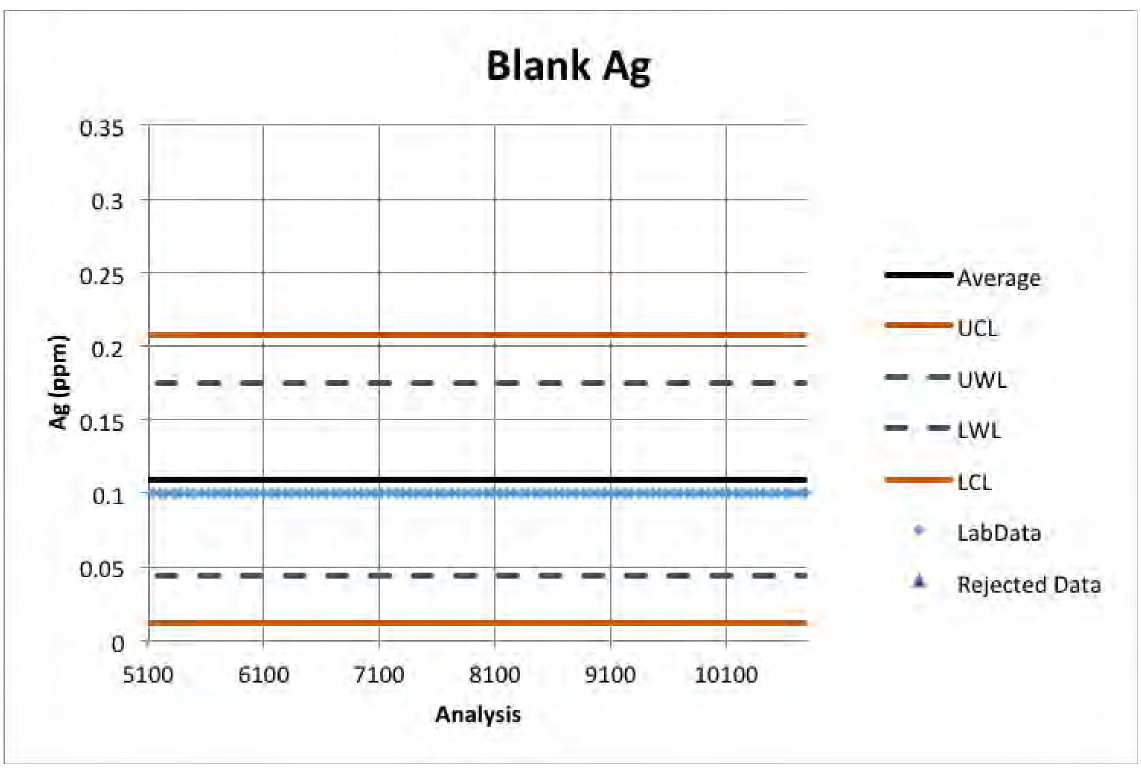
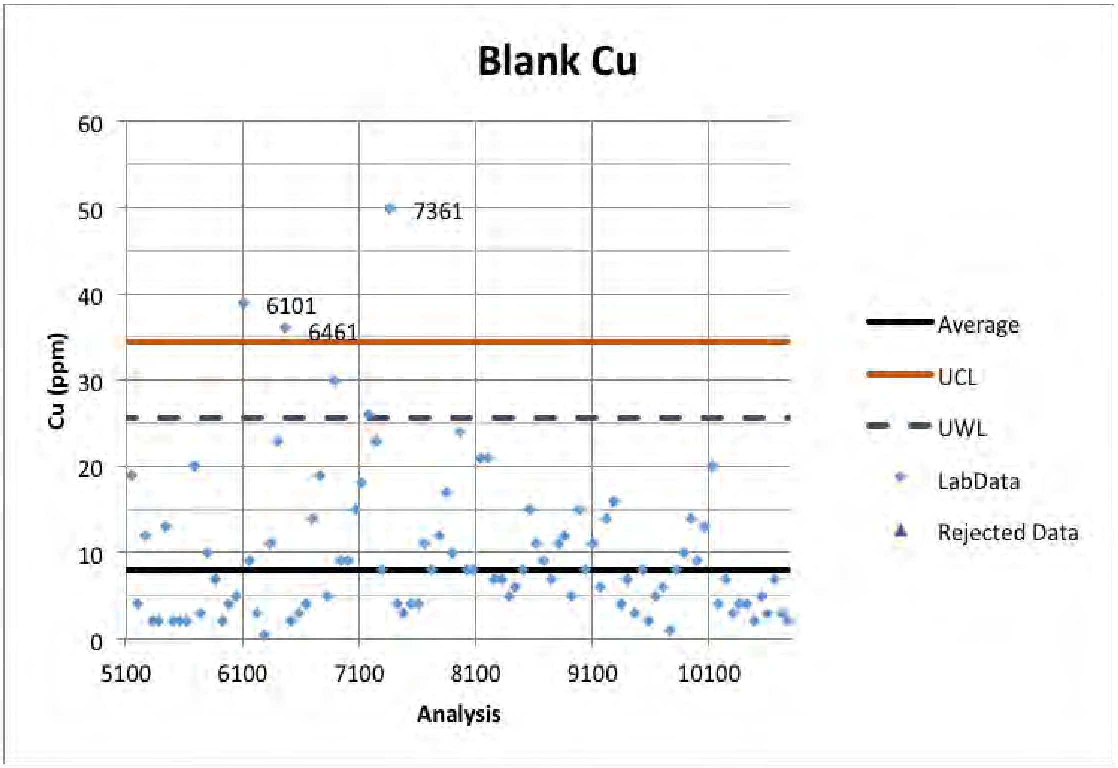


Figure 11.38: Performance of Blanks for Cu



11.4.1.3 Performance of Field Duplicates

The field duplicate data is represented in Table 11.8 and the duplicate sample results are plotted in Figure 11.39 through Figure 11.43 for each element including: Au, Pt, Pd, Ag, Cu, Ni and S. A best-fit line is calculated for each element, as well as the R-squared value. There is a strong confidence in the data, with all R-squared values greater than 89%.

Table 11.8: Field Duplicate Control Limits

	Au (ppm)	Pt (ppm)	Pd (ppm)	Ag (ppm)	Cu (ppm)	Ni (ppm)	S (%)
Average	0.0195	0.0489	0.0854	0.3417	825	124.1472	0.3048
Standard Deviation	0.0391	0.1054	0.1771	0.3329	909.051	164.5228	0.3599
R Squared	0.899	0.8933	0.9508	0.911	0.9551	0.9874	0.944

Note: *Ag = silver, Au = gold, Cu = copper, Ni = nickel, Pd = palladium, Pt = platinum, S = sulphur.*

Figure 11.39: Performance of Field Duplicates for Au

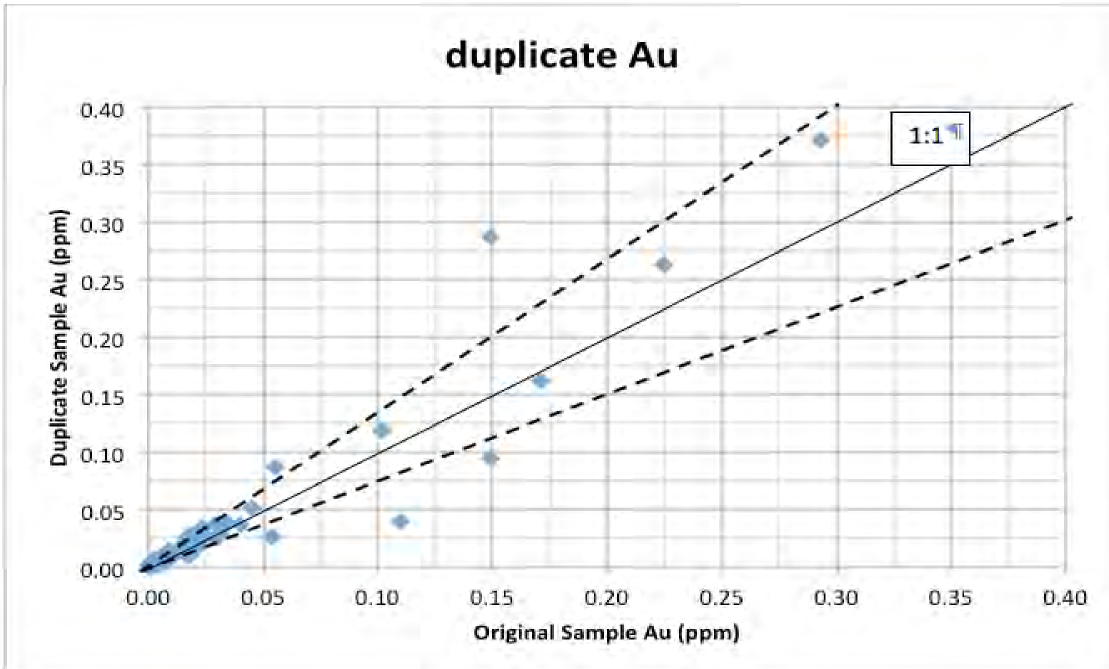


Figure 11.40: Performance of Field Duplicates for Pt

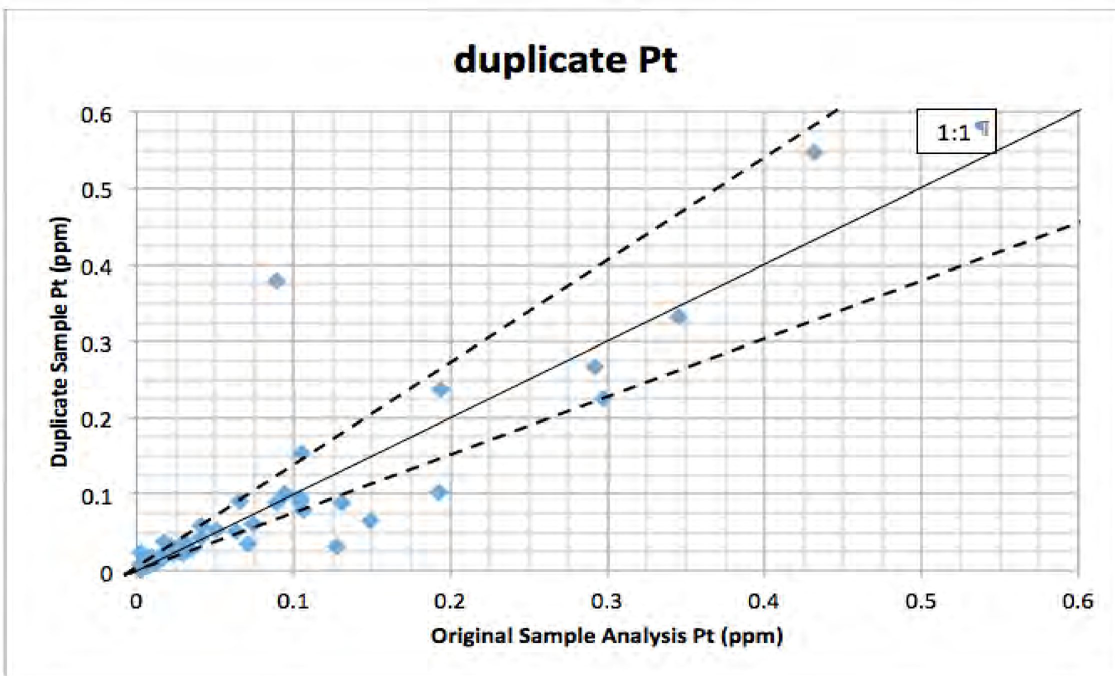


Figure 11.41: Performance of Field Duplicates for Pd

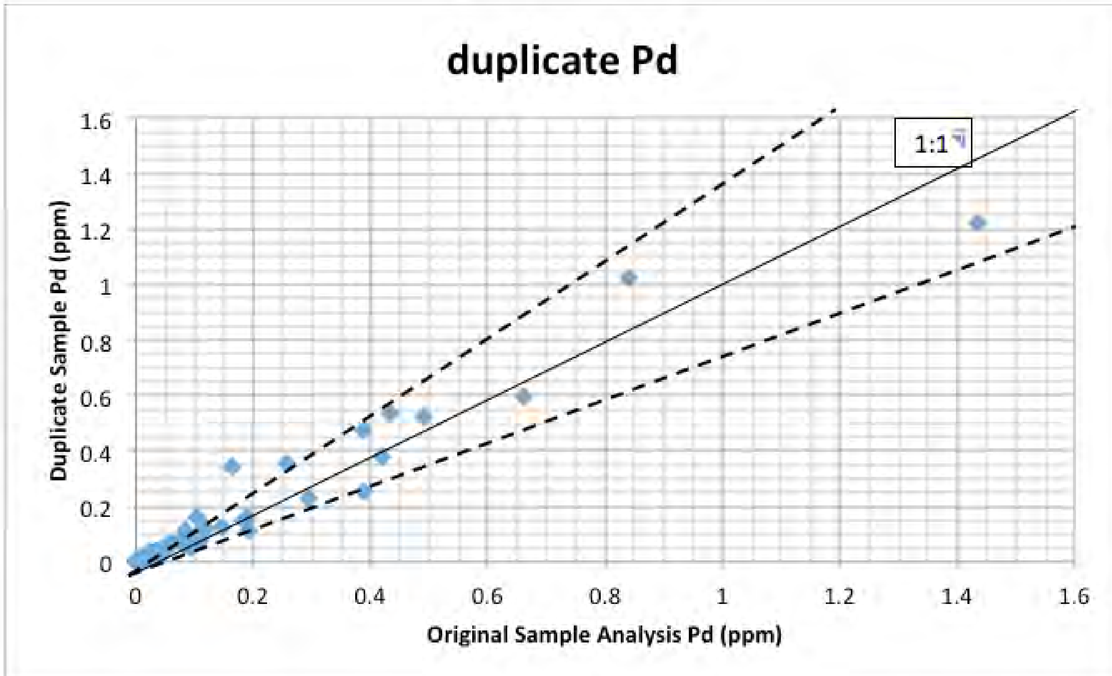


Figure 11.42: Performance of Field Duplicates for Ag

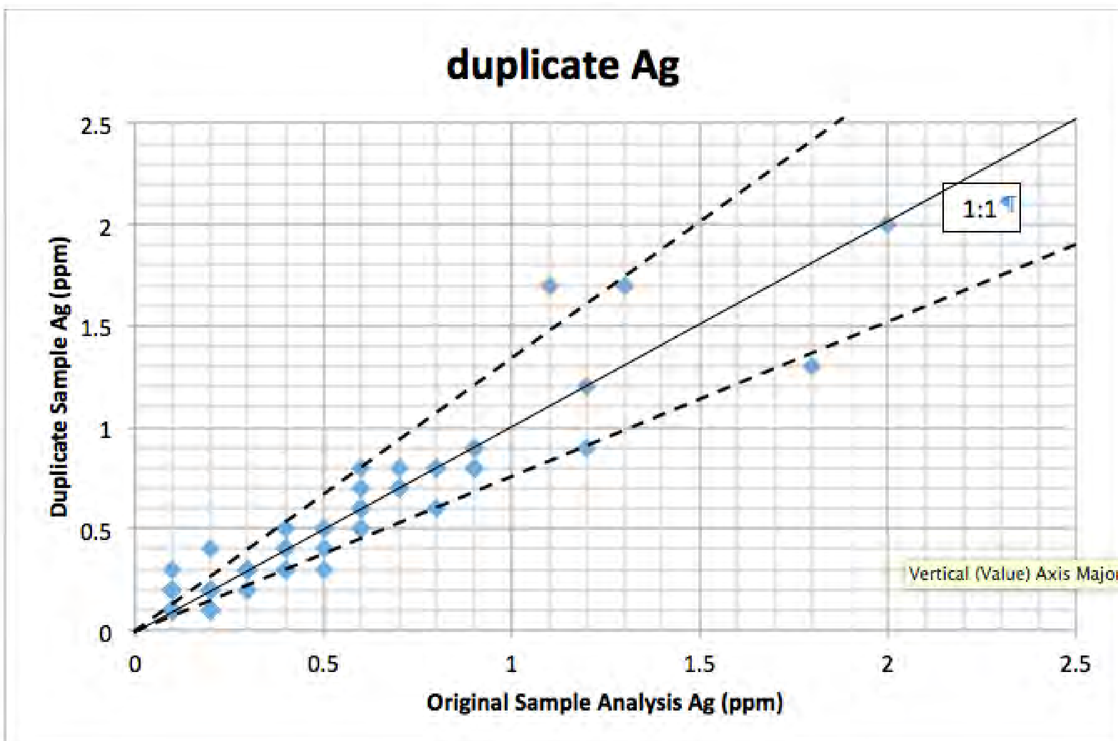
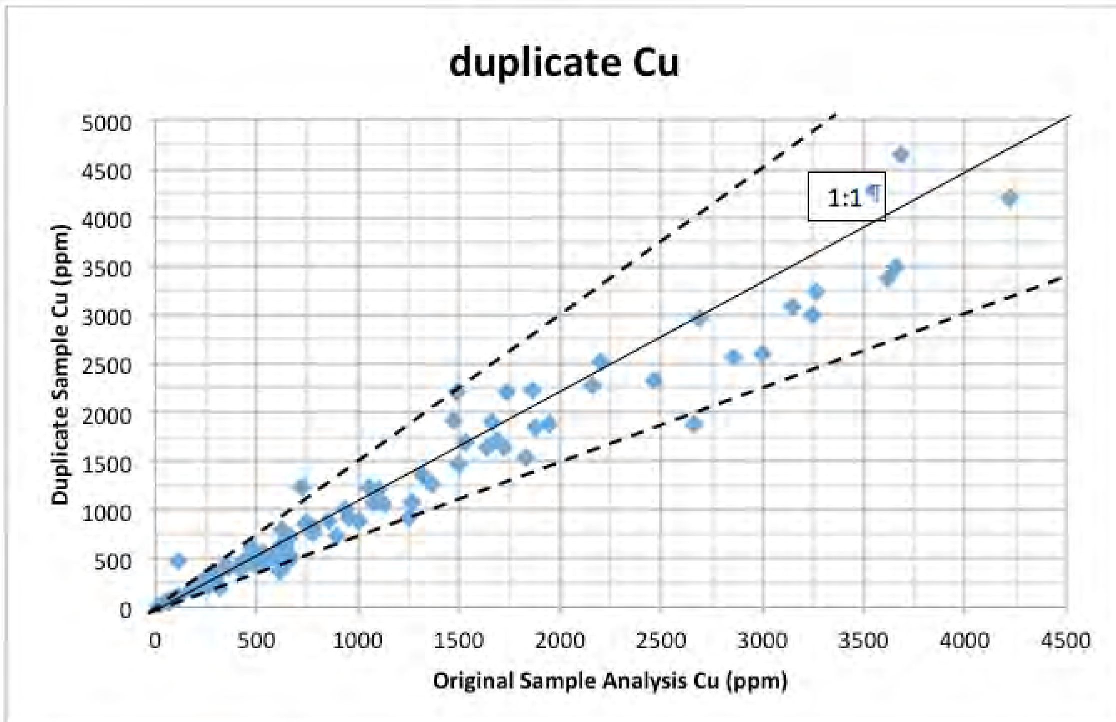


Figure 11.43: Performance of Field Duplicates for Cu



11.4.2 <u>2017 Program</u>

11.4.2.1 <u>Performance of Reference Materials</u>

The analyses for elements Au, Pt, Pd, Ag and Cu for standards MPG1 and MPG2 are plotted in Figure 11.44 to Figure 11.53.

Some outliers beyond the set control limits can be noted; however, the overall performance of both standards, for all elements, was excellent and no bias or temporal variation in the 2017 data was noted.

Figure 11.44: Performance of MPG1 Au

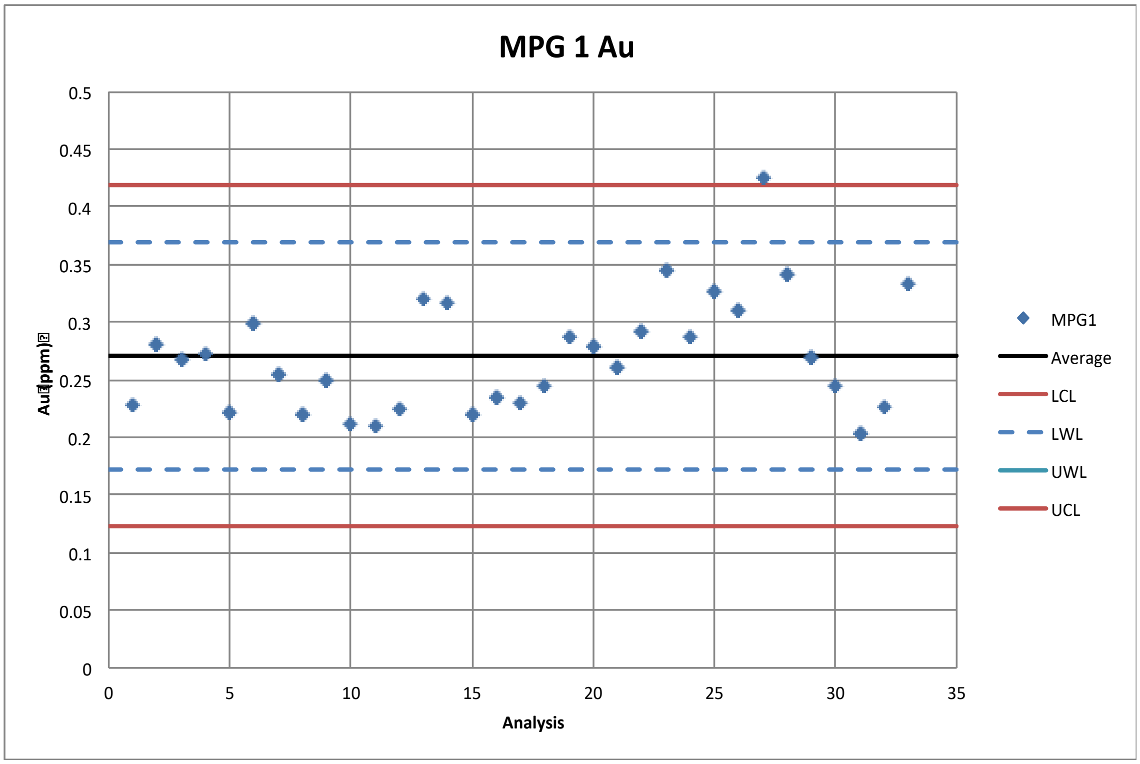


Figure 11.45: Performance of MPG1 for Pt

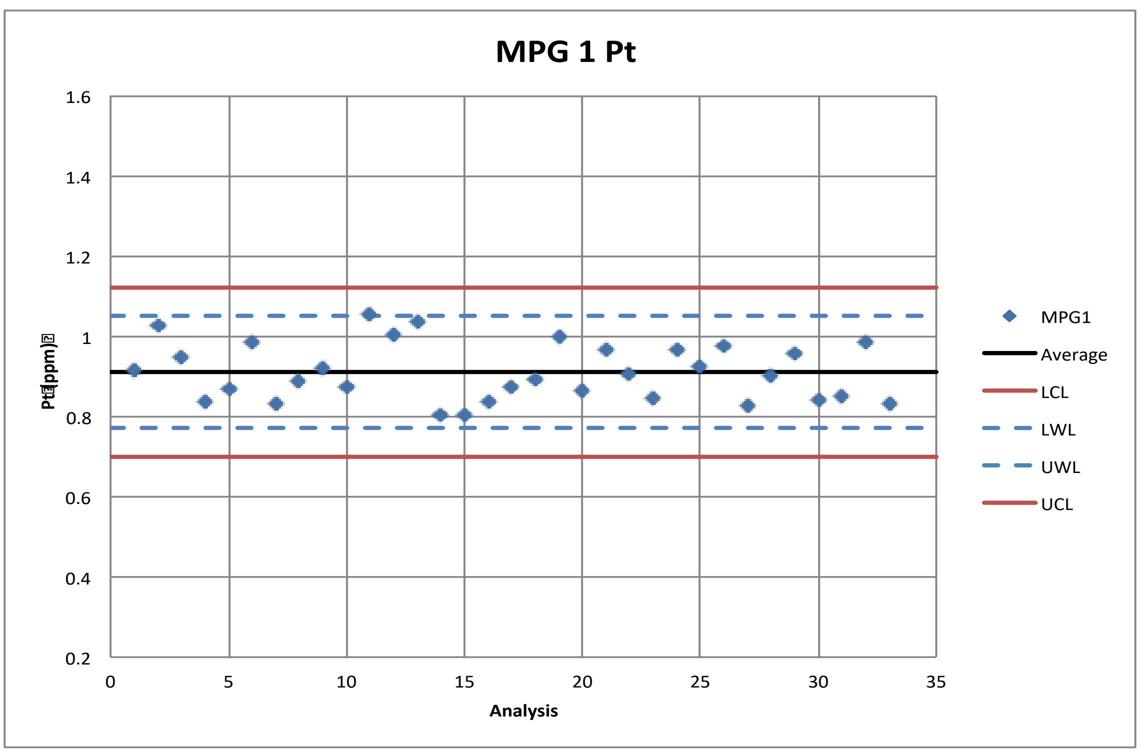


Figure 11.46: Performance of MPG1 for Pd

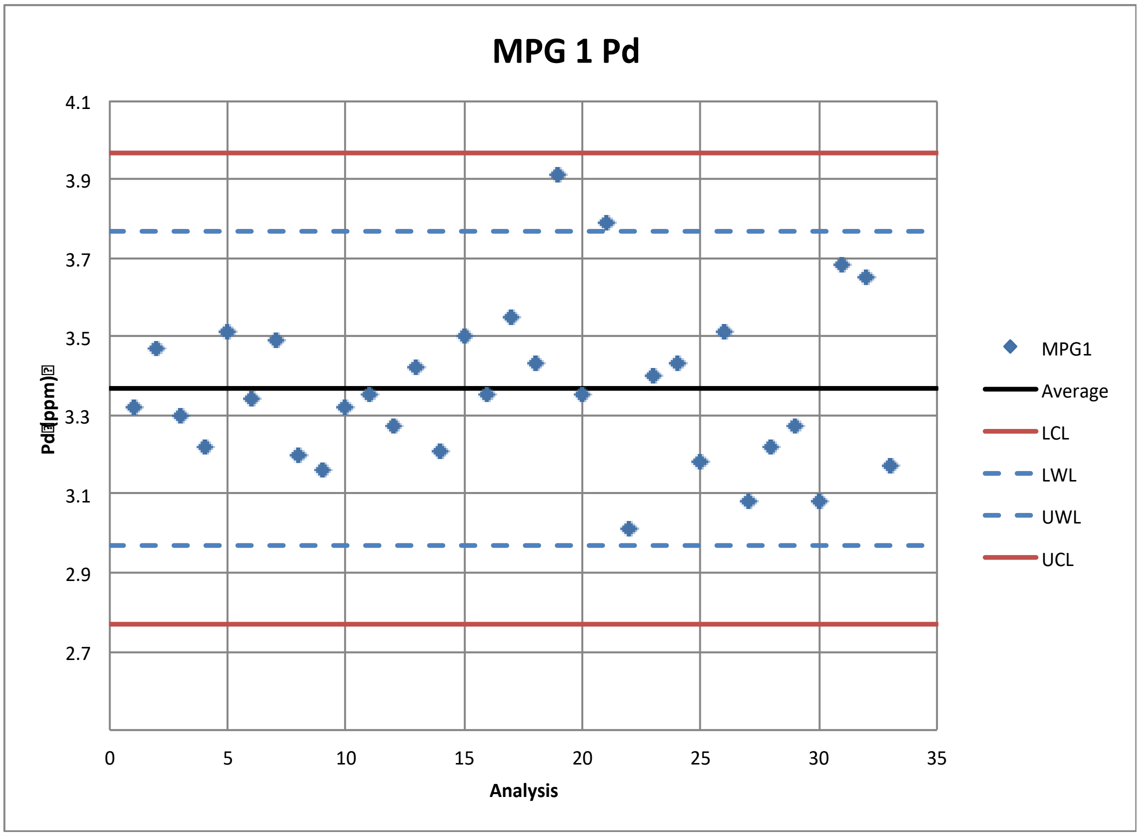


Figure 11.47: Performance of MPG1 for Ag

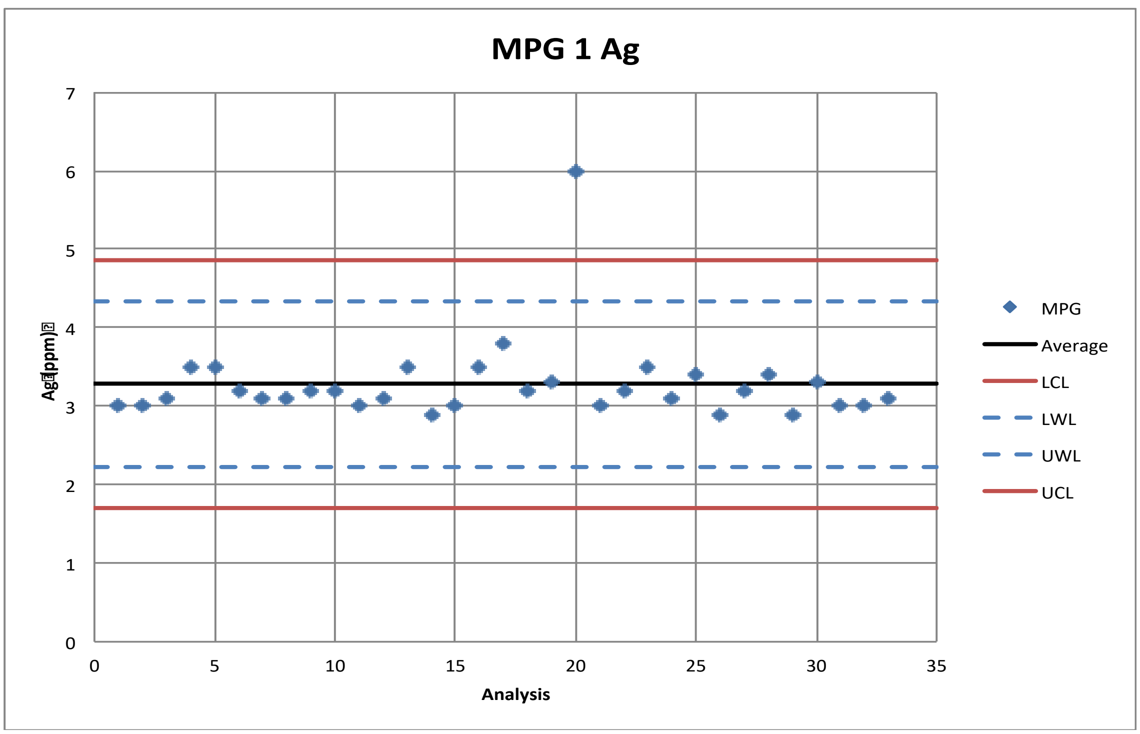


Figure 11.48: Performance of MPG1 for Cu

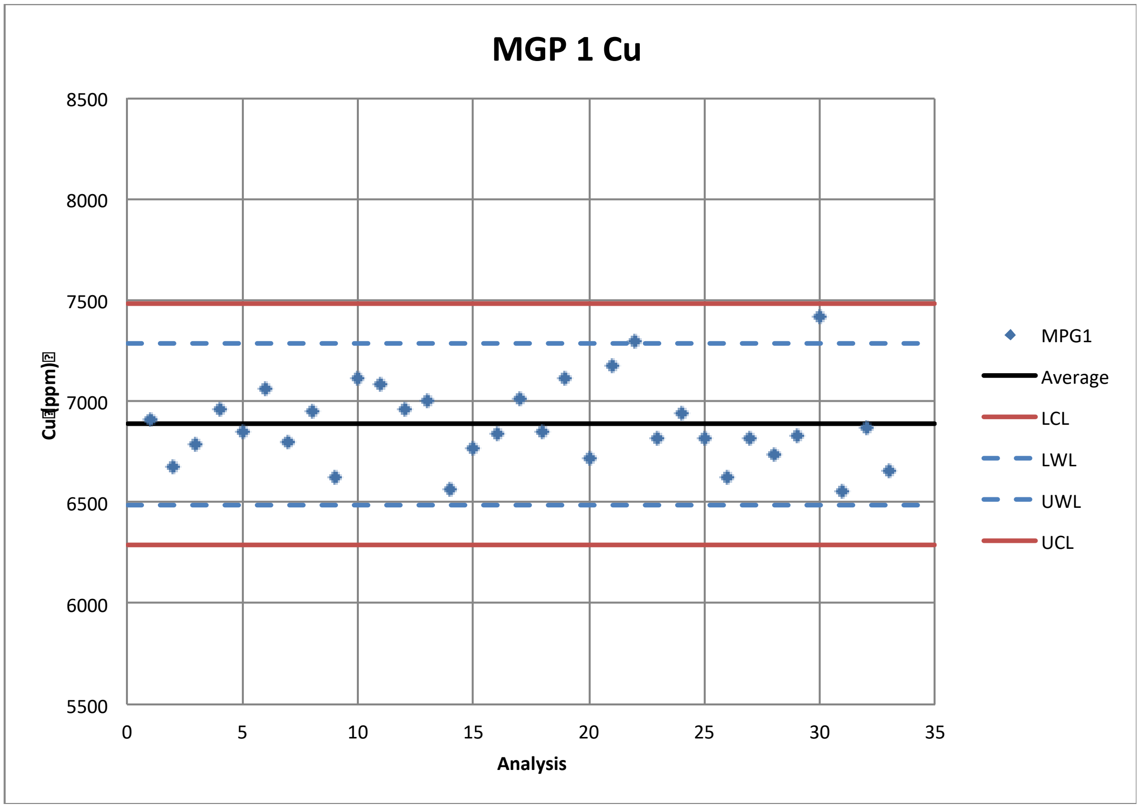


Figure 11.49: Performance of MPG2 for Au

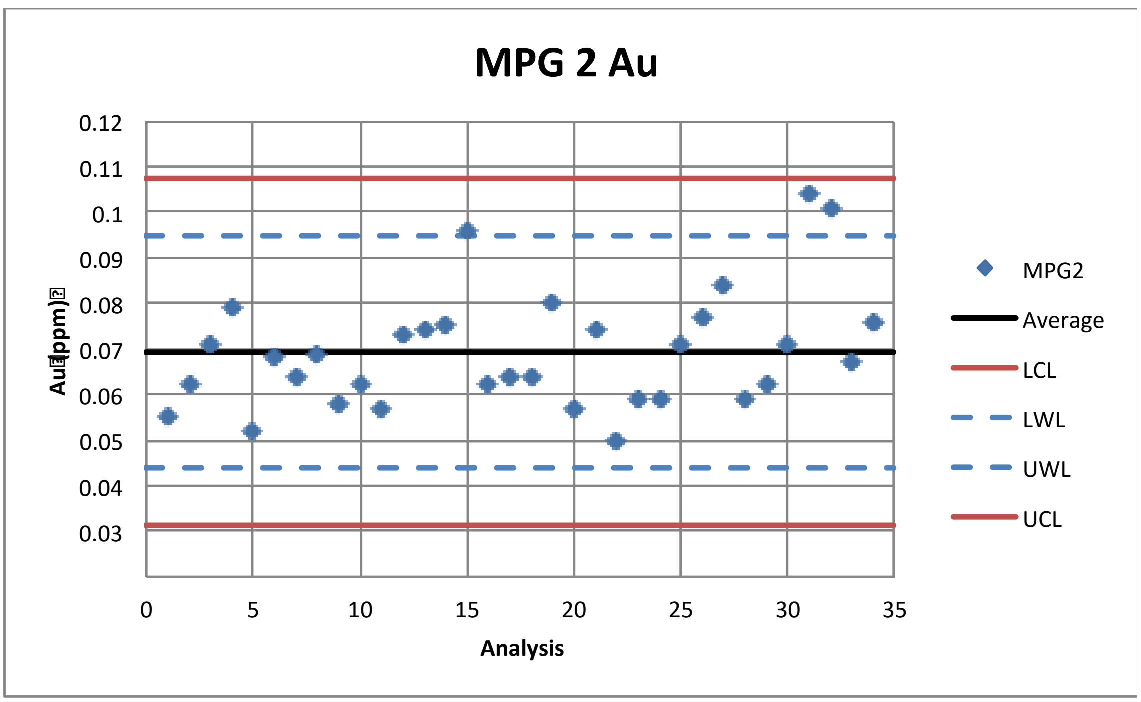


Figure 11.50: Performance of MPG2 for Pt

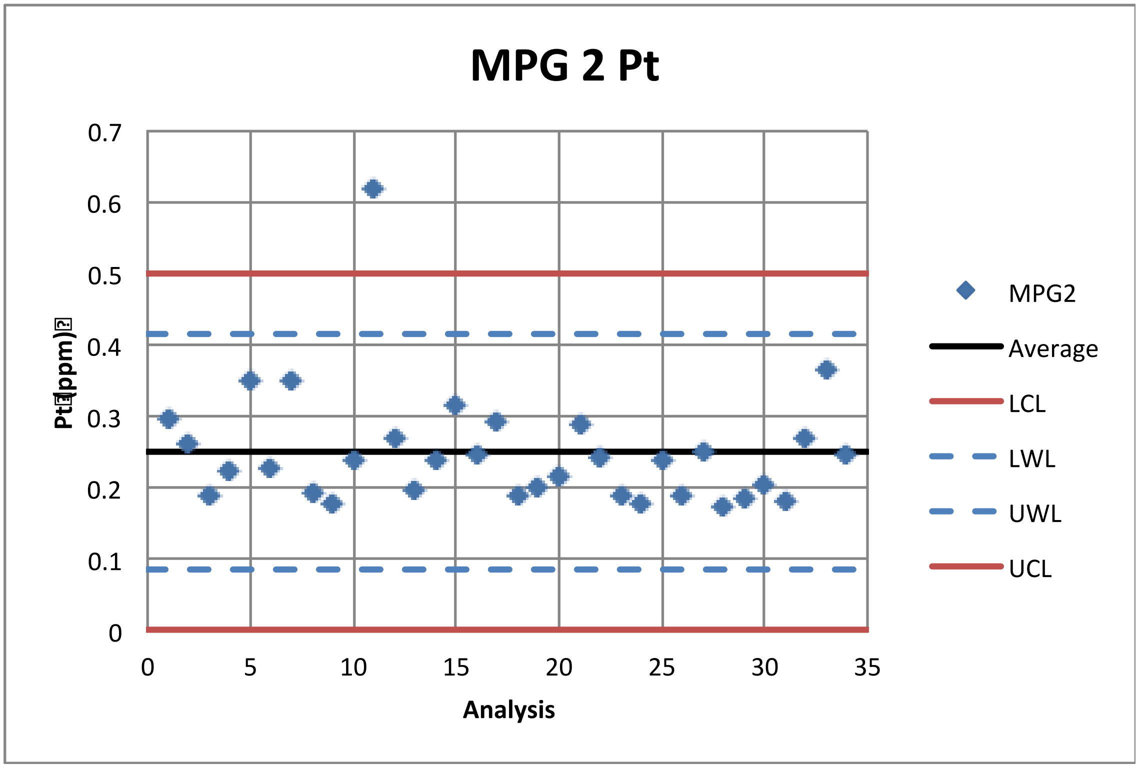


Figure 11.51: Performance of MPG2 for Pd

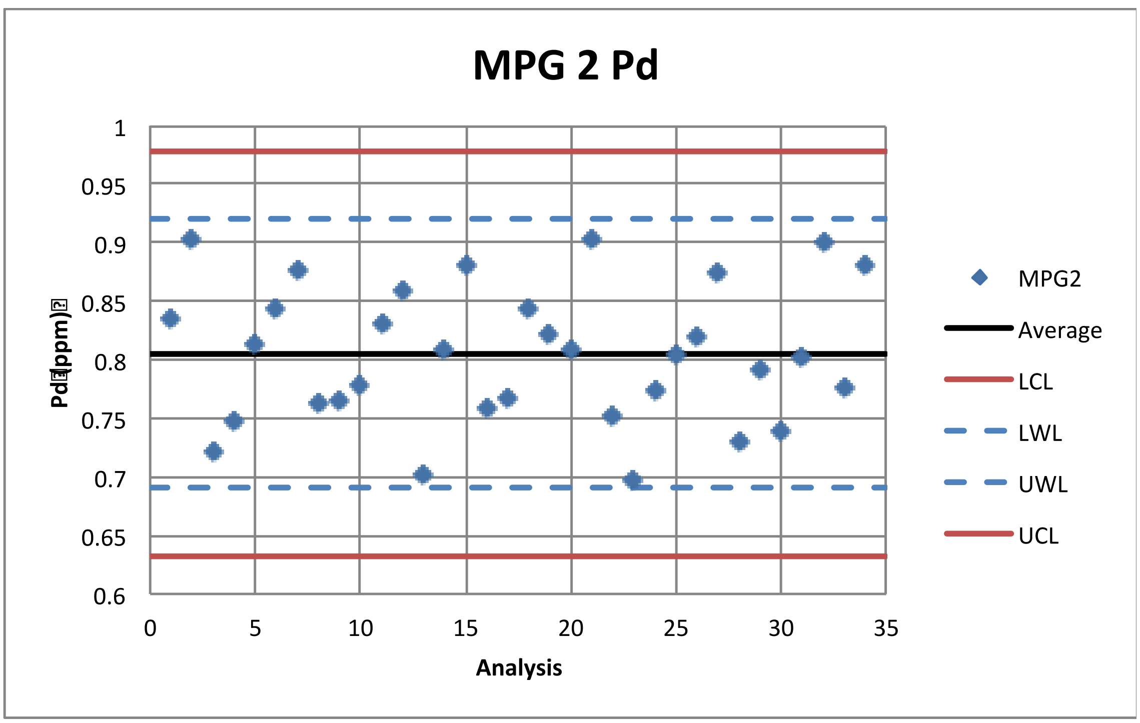


Figure 11.52: Performance of MPG2 for Ag

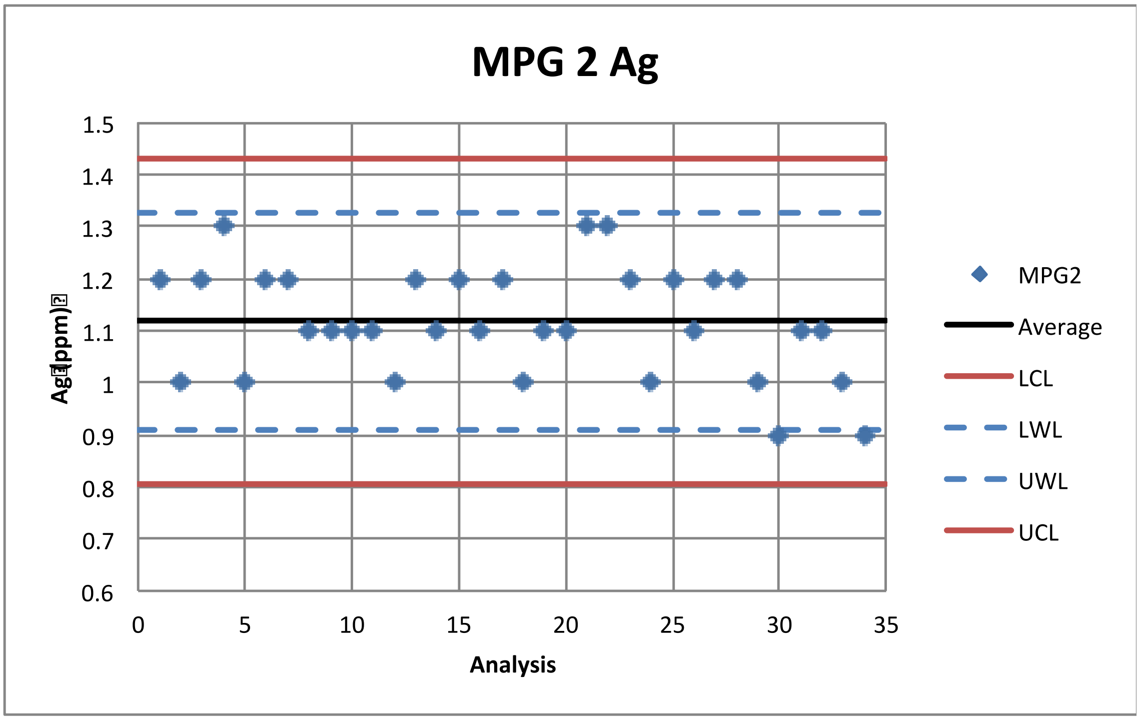
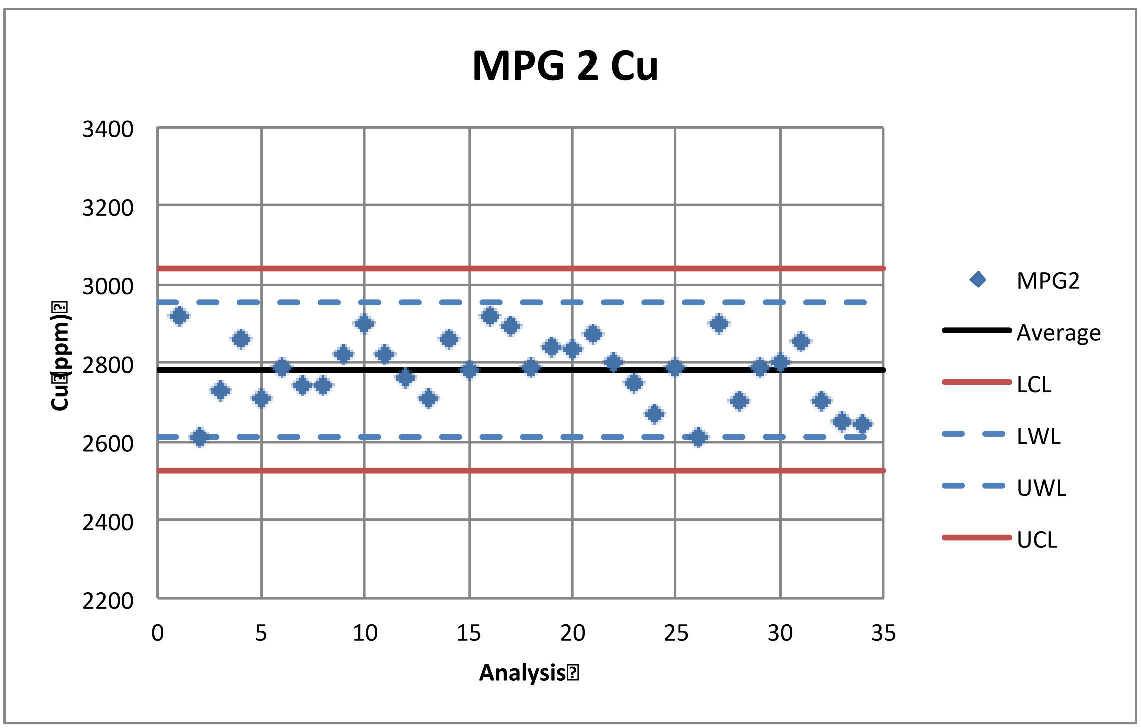


Figure 11.53: Performance of MPG2 for Cu



11.4.2.2 Performance of Blank Material

The results of the blank sample analyses (Figure 11.54 to Figure 11.58) were considered excellent, with the vast majority of the Au, Pt, Pd, Ag and Cu determinations falling below the respective upper working limit of two times the standard deviation of the mean of each element. The occasional result falling above the upper working limit was not considered to be of material impact to the Mineral Resource Estimate and contamination was not considered to be an issue with the 2017 data.

Figure 11.54: Performance of Blanks for Au

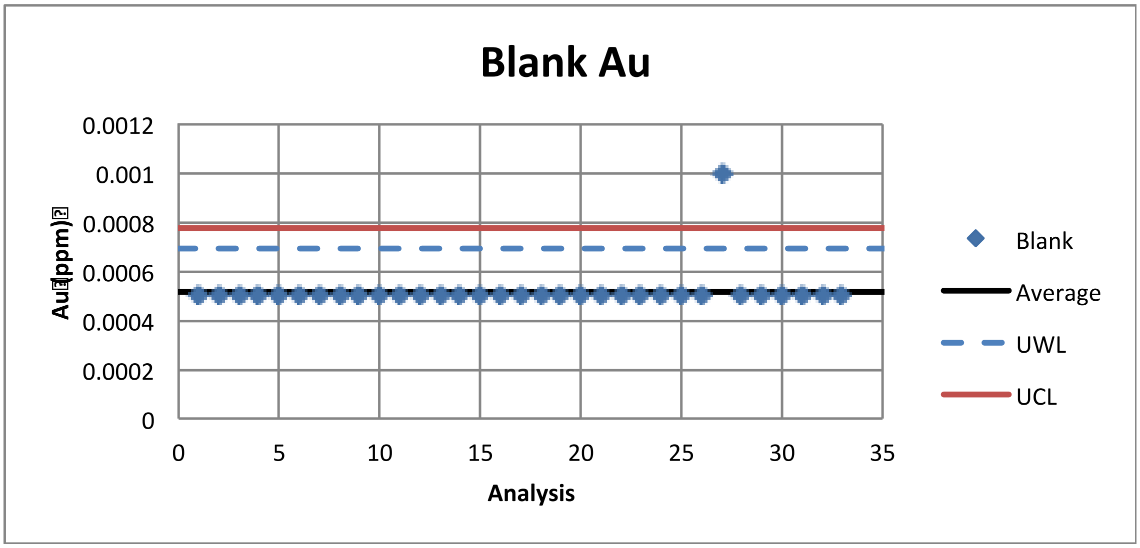


Figure 11.55: Performance of Blanks for Pt

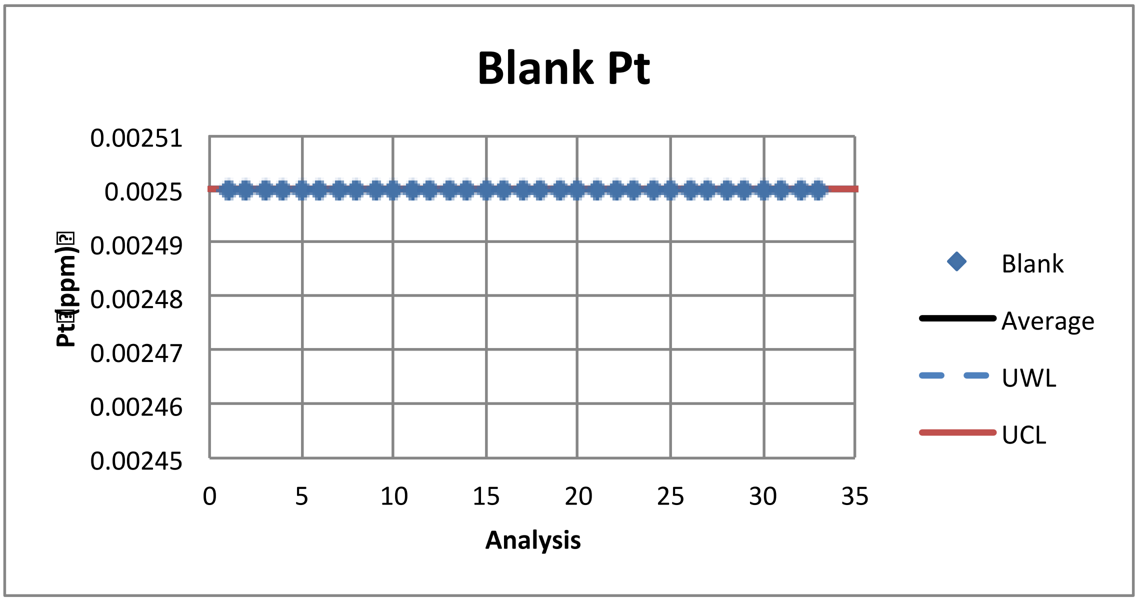


Figure 11.56: Performance of Blanks for Pd

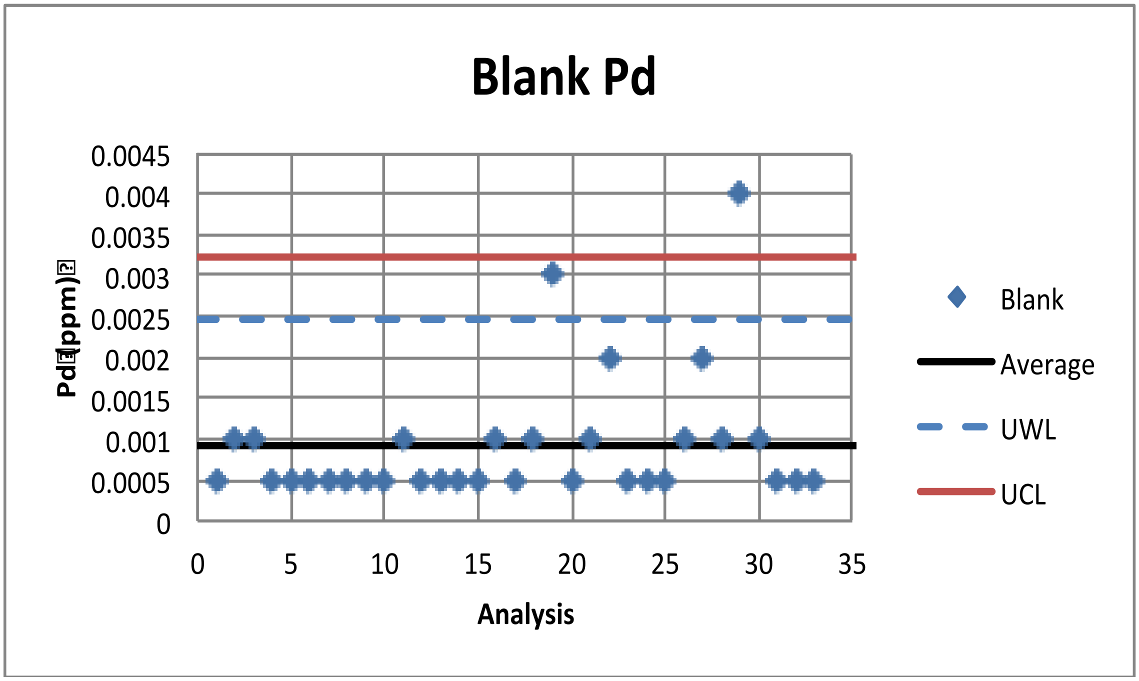


Figure 11.57: Performance of Blanks for Ag

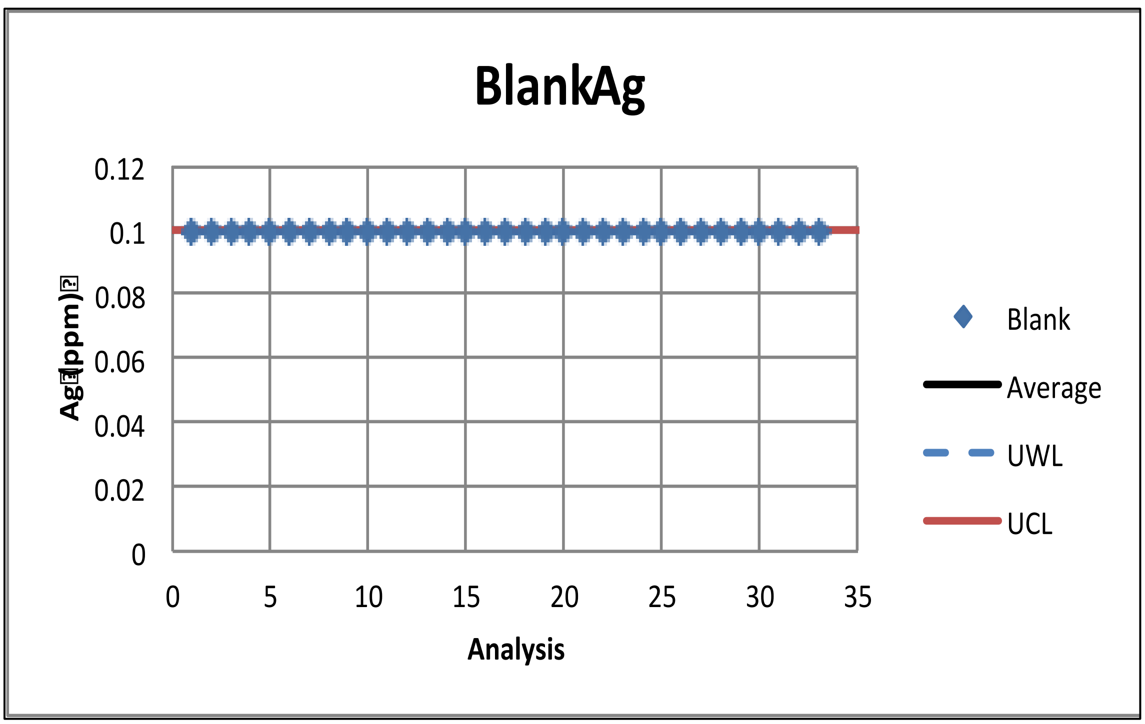
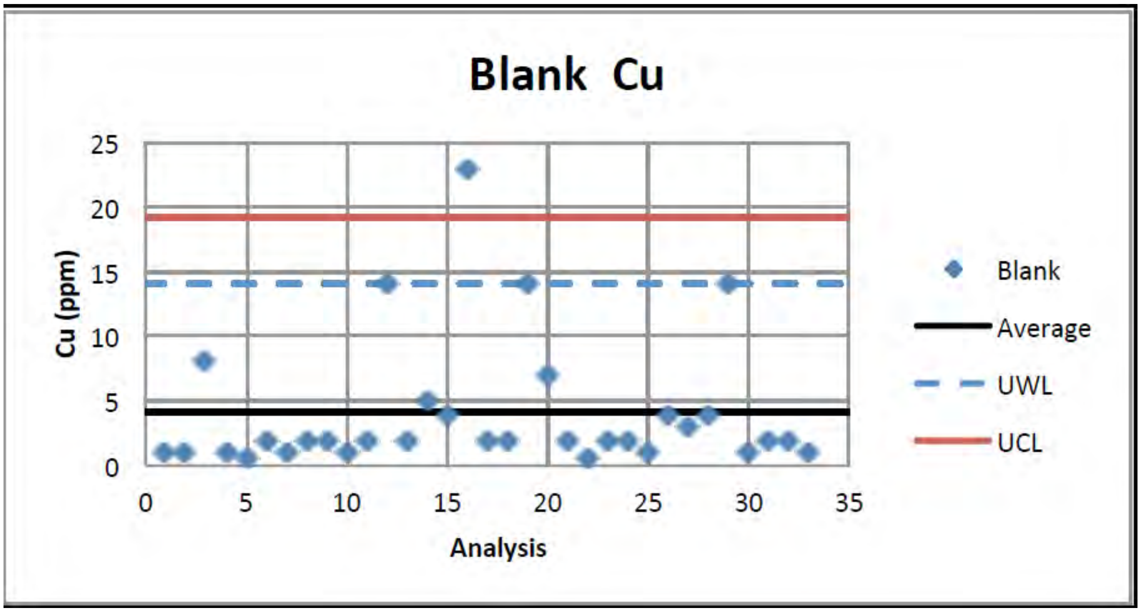


Figure 11.58: Performance of Blanks for Cu



11.4.2.3 Performance of Field Duplicates

The field duplicate data for Au, Pt, Pd, Ag and Cu were plotted on scatter plots and precision for all elements was considered acceptable by P&E.

11.4.3 Gen Mining 2019 Drilling Program

11.4.3.1 Performance of Reference Material

The analyses for elements Au, Pt, Pd, Ag and Cu for standards MPG1 and MPG2 are plotted in Figure 11.59 to Figure 11.68.

Some outliers beyond the set control limits can be noted; however, the overall performance of both standards for all elements was excellent and no bias or temporal variation in the 2019 data was noted.

Figure 11.59: Performance of MPG1 Au

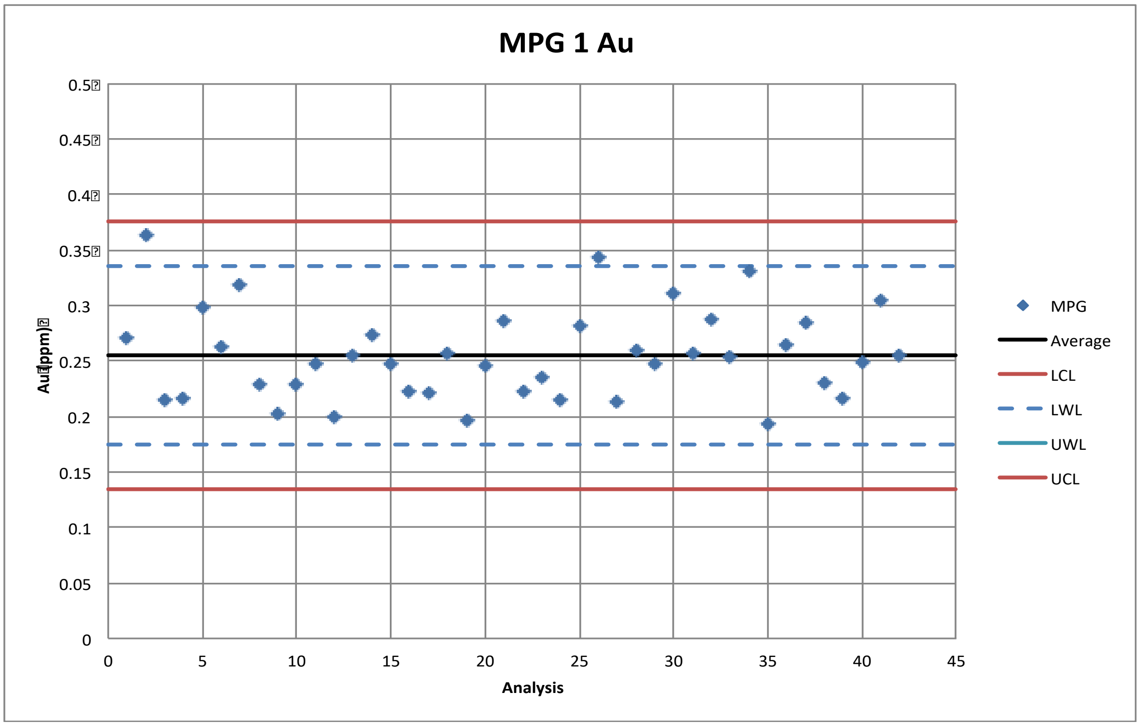


Figure 11.60: Performance of MPG1 for Pt

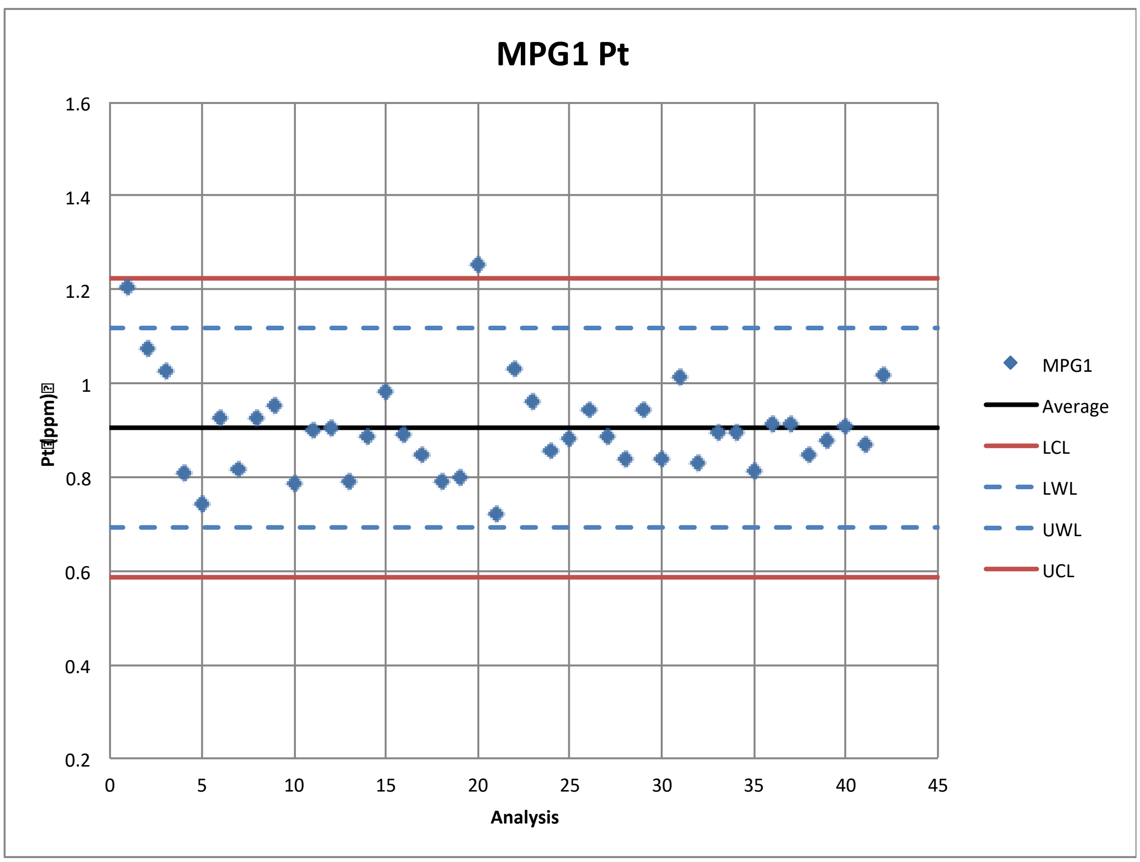


Figure 11.61: Performance of MPG1 for Pd

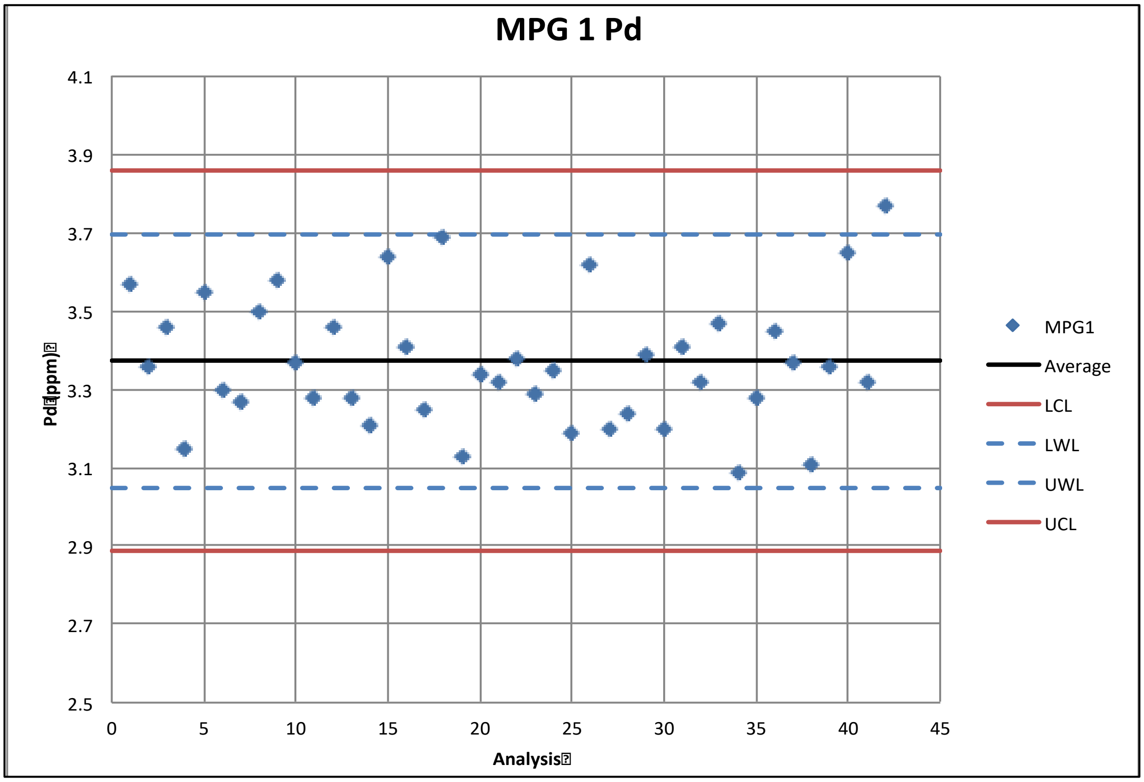


Figure 11.62: Performance of MPG1 for Ag

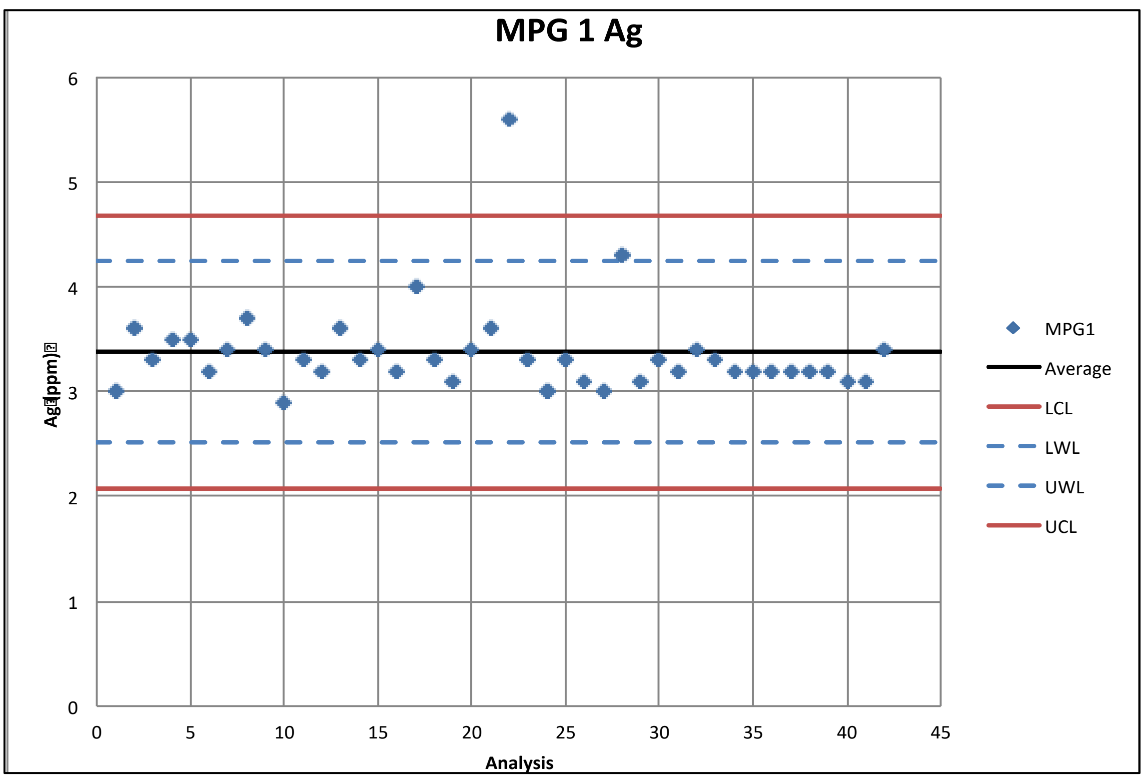


Figure 11.63: Performance of MPG1 for Cu

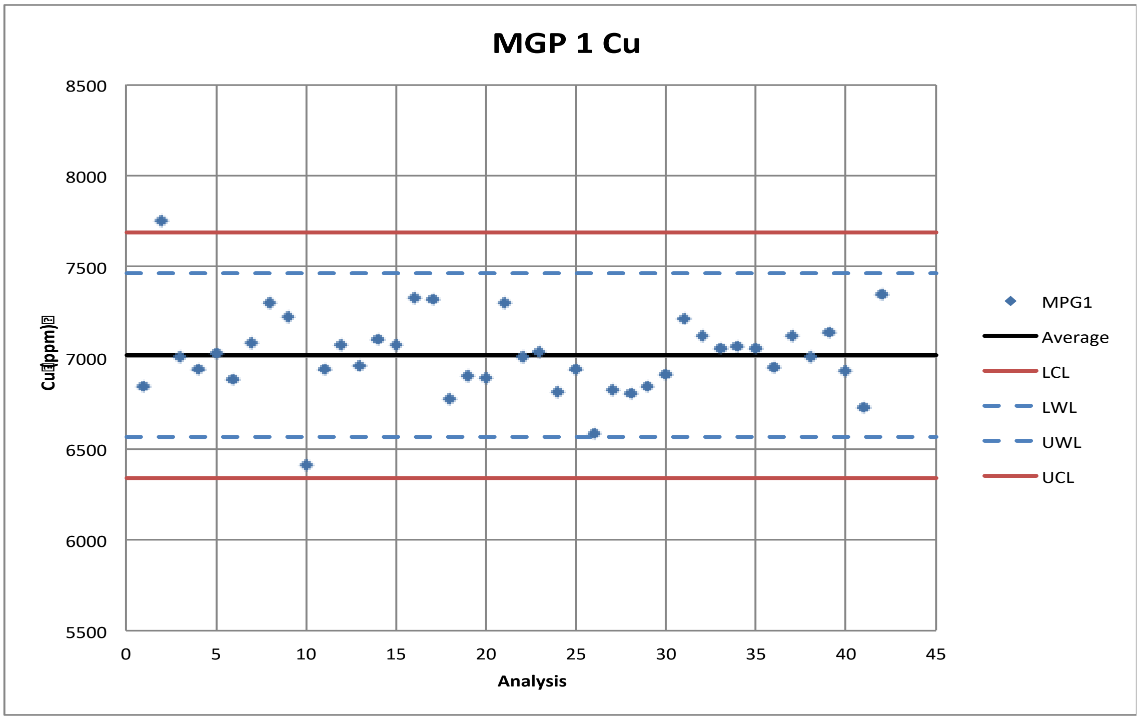


Figure 11.64: Performance of MPG2 for Au

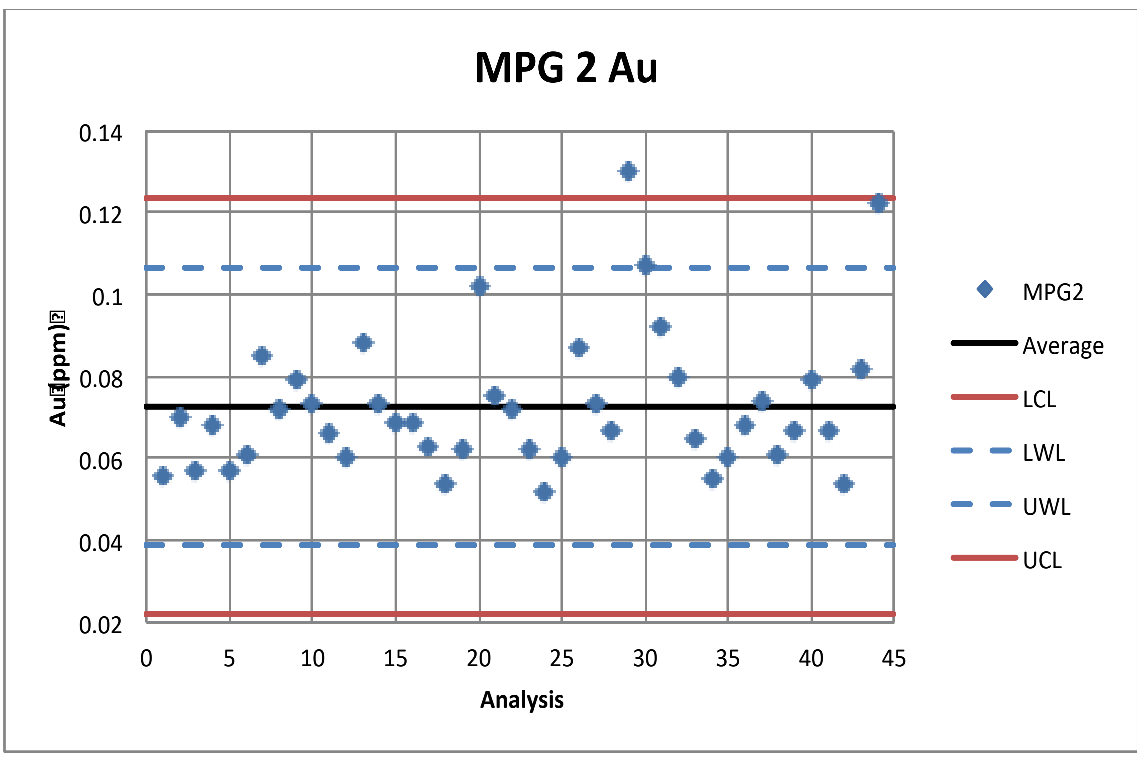


Figure 11.65: Performance of MPG2 for Pt

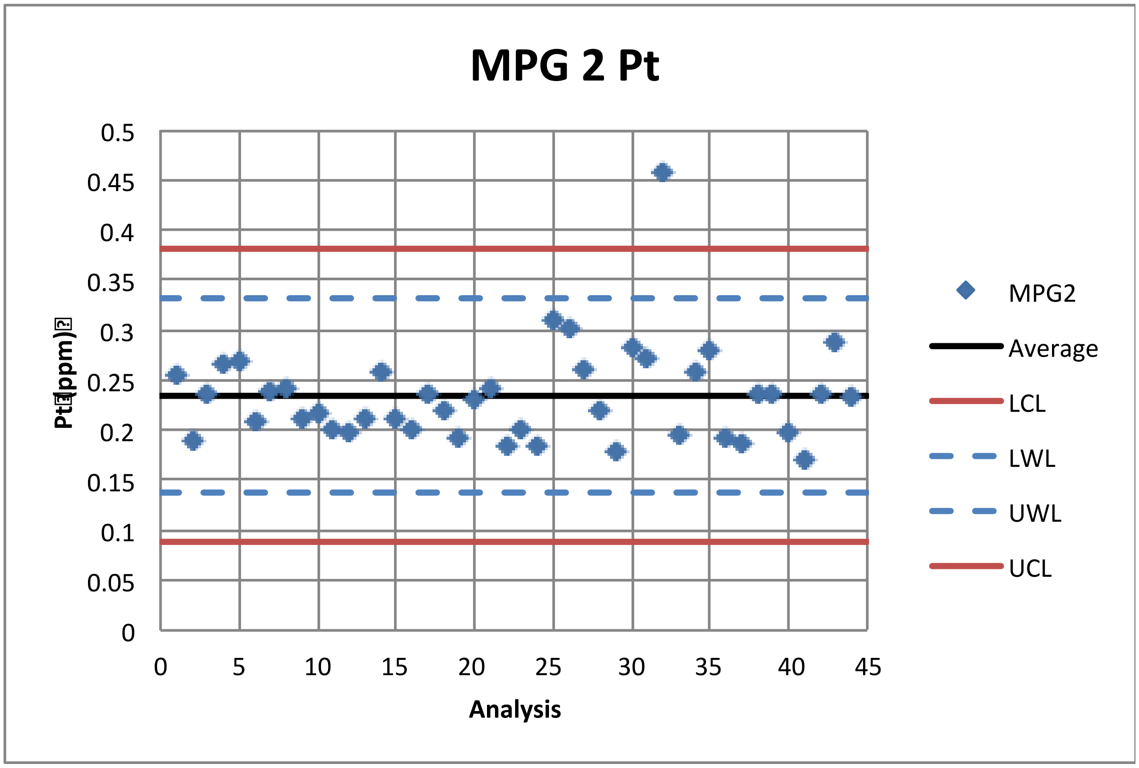


Figure 11.66: Performance of MPG2 for Pd

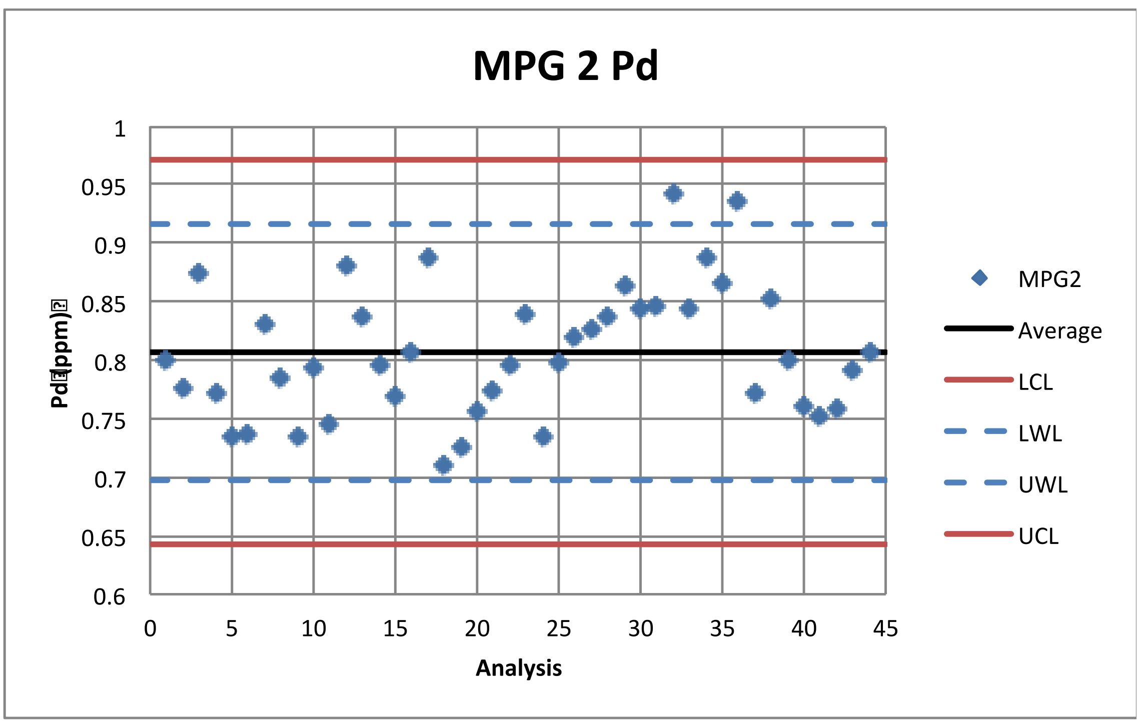


Figure 11.67: Performance of MPG2 for Ag

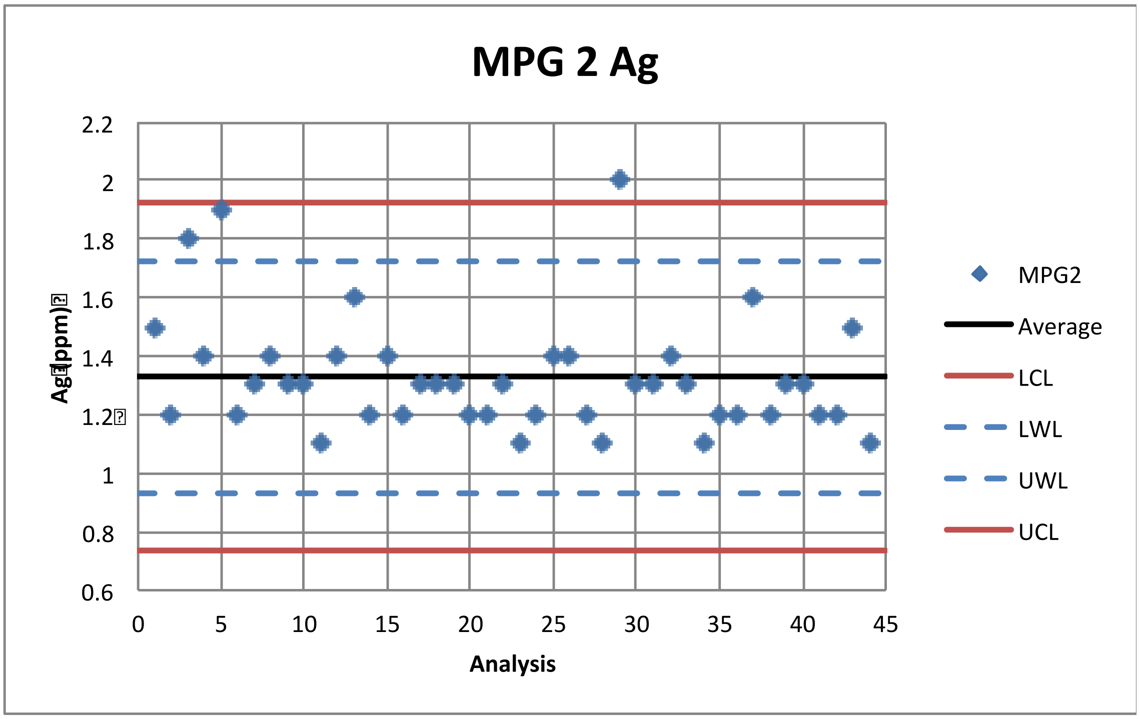
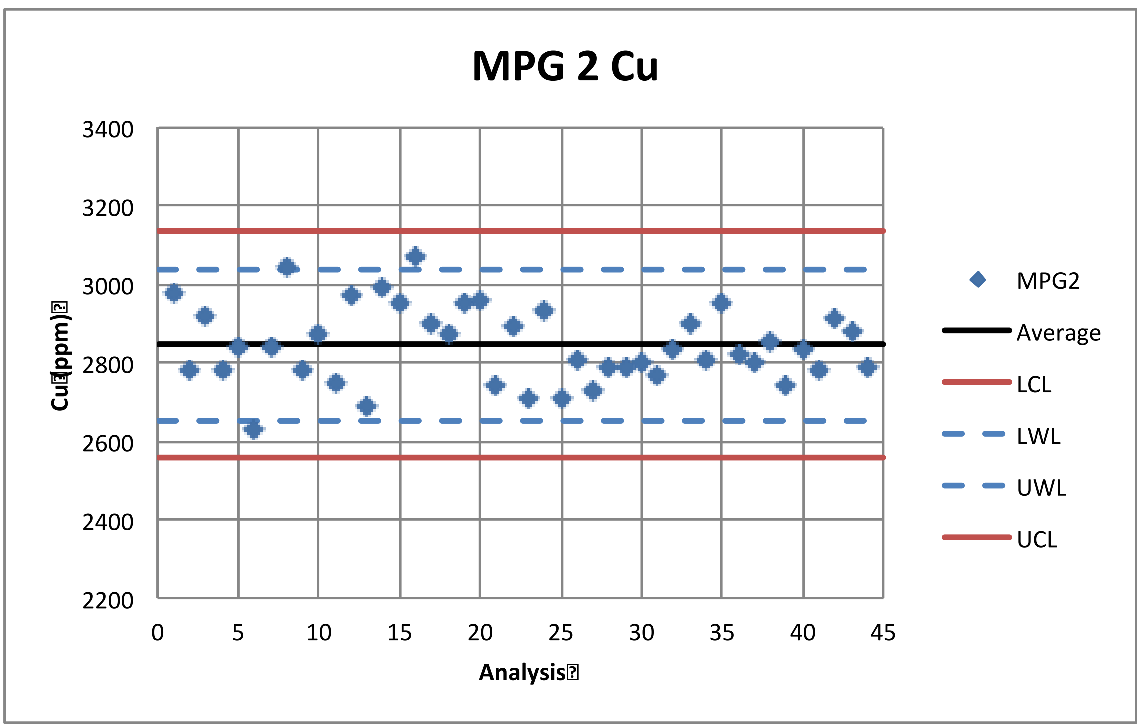


Figure 11.68: Performance of MPG2 for Cu



11.4.3.2 Performance of Blank Material

The results of the blank sample analyses (Figure 11.69 to Figure 11.73) were considered excellent, with the vast majority of the Au, Pt, Pd, Ag and Cu determinations falling below the respective upper working limit of two times the standard deviation of the mean of each element. The occasional result falling above the upper working limit was not considered to be of material impact to the Mineral Resource Estimate and contamination was not considered to be an issue with the 2019 data.

Figure 11.69: Performance of Blanks for Au

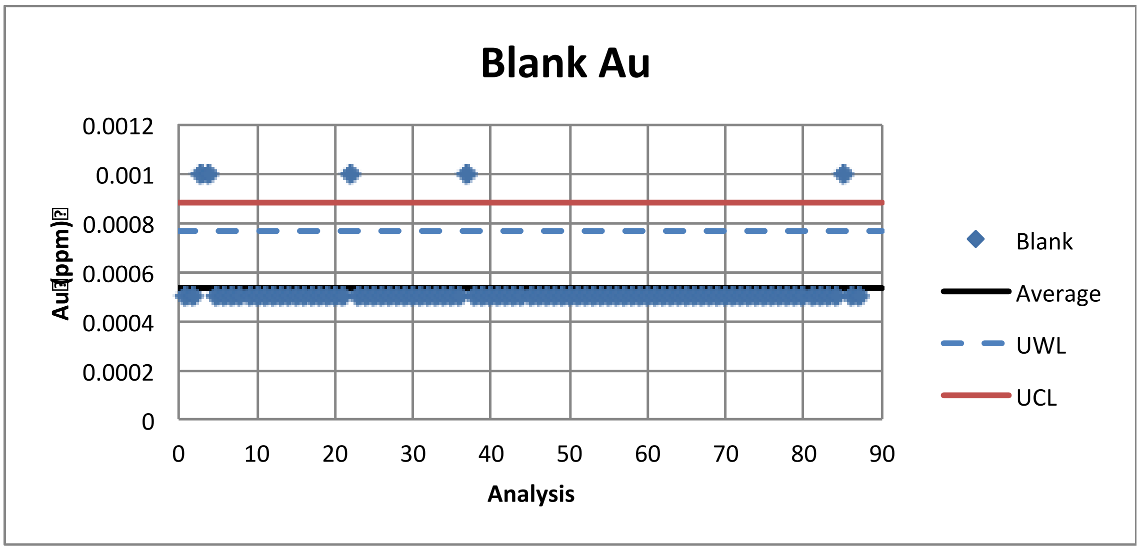


Figure 11.70: Performance of Blanks for Pt

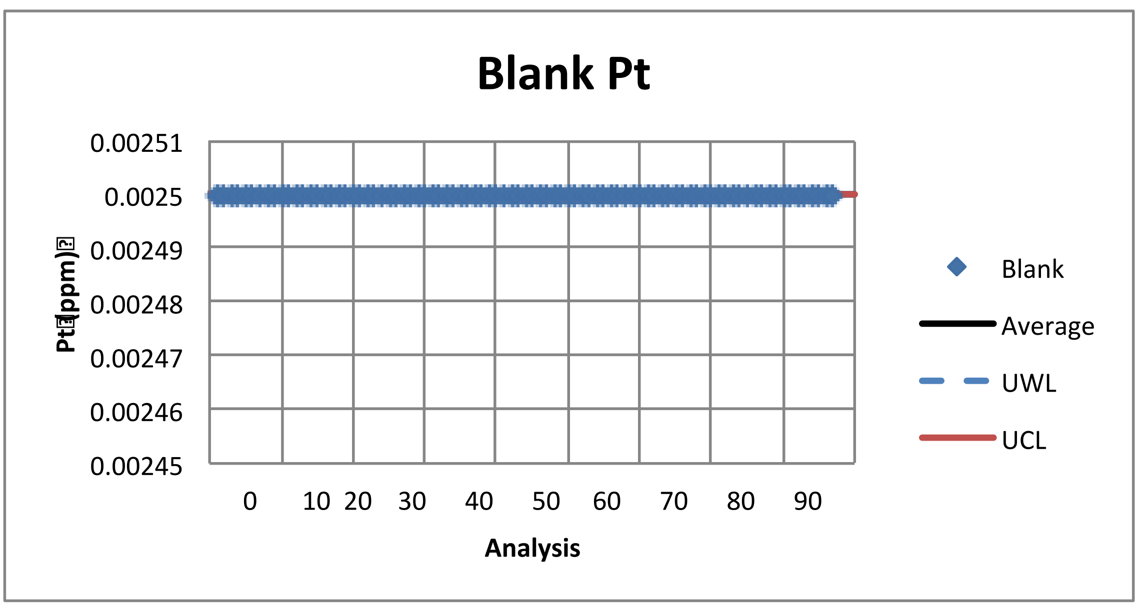


Figure 11.71: Performance of Blanks for Pd

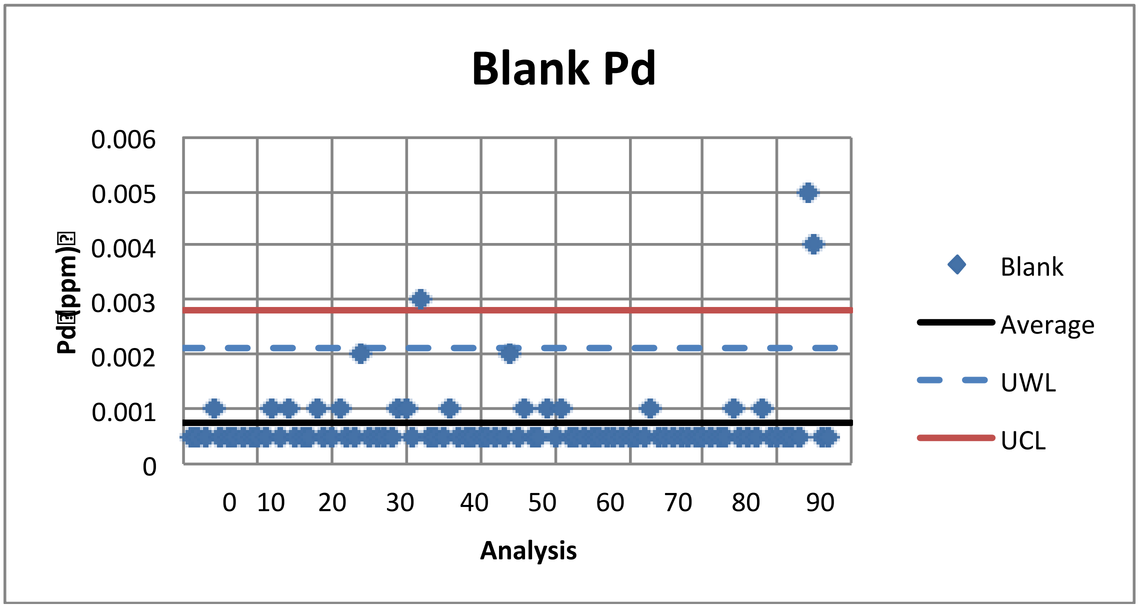


Figure 11.72: Performance of Blanks for Ag

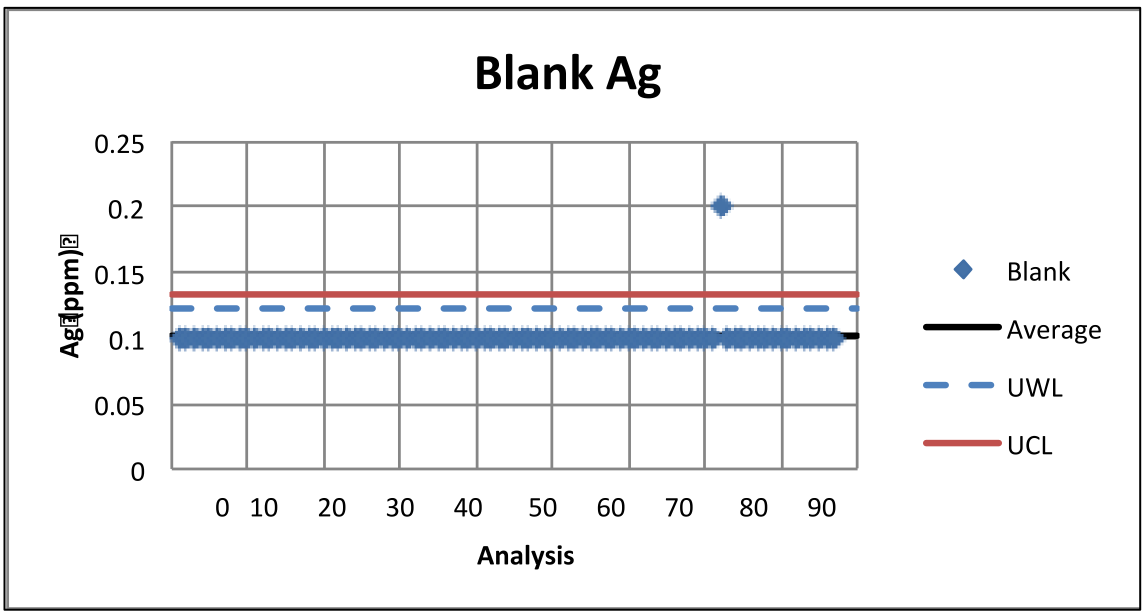
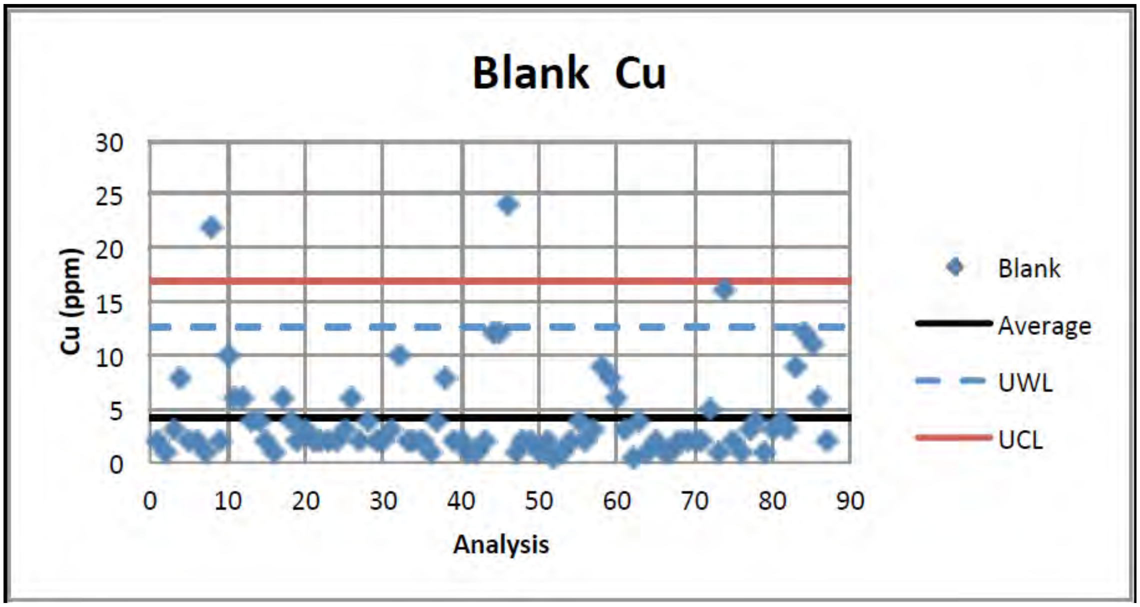


Figure 11.73: Performance of Blanks for Cu



11.4.3.3 Performance of Field Duplicates

The field duplicate data for Au, Pt, Pd, Ag and Cu were plotted on scatter plots and precision for all elements was considered acceptable by P&E.

11.4.4 Conclusions

P&E considers the Sally data to be of good quality and acceptable for use for Mineral Resource estimation.

12. DATA VERIFICATION

12.1 April 2012 Site Visit Independent Sampling

The Property was visited on April 4, 2012 by Mr. David Burga, P.Geo., of P&E, an independent QP as defined by Canadian NI 43-101. Mr. Burga collected 10 samples from nine holes. Samples were collected by ¼ sawing the half core remaining in the core box.

The samples were placed in plastic bags, given a unique sample ID and taken by Mr. Burga to AGAT Labs in Mississauga, ON for analysis.

Copper, silver and nickel were analyzed using four-acid digest with AAS finish. Gold, platinum and palladium were analyzed using lead collection fire assay with ICP-OES finish.

AGAT has developed and implemented at each of its locations a Quality Management System ("QMS") designed to ensure the production of consistently reliable data. The system covers all laboratory activities and takes into consideration the requirements of ISO standards.

AGAT maintains ISO registrations and accreditations. ISO registration and accreditation provide independent verification that a QMS is in operation at the location in question. Most AGAT laboratories are registered or are pending registration to ISO 9001:2000.

Results of the independent site visit samples are presented in Figure 12.1 through Figure 12.4.

Figure 12.1: P&E Site Visit Results for Palladium

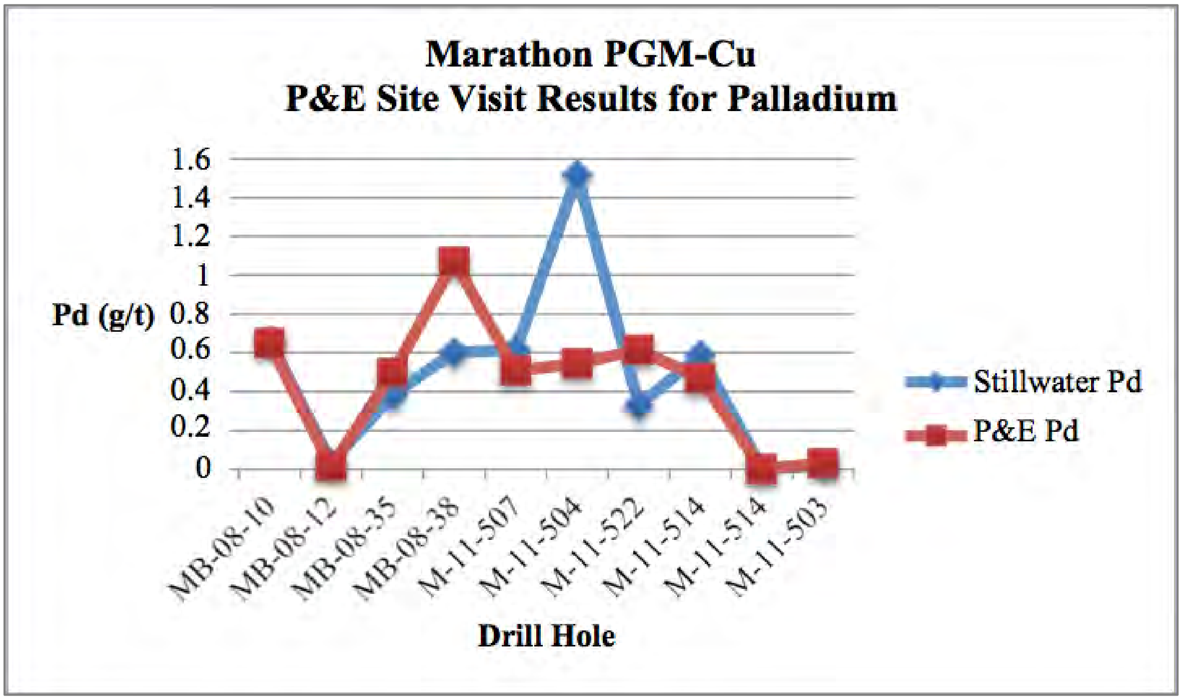


Figure12.2: P&E Site Visit Results for Platinum

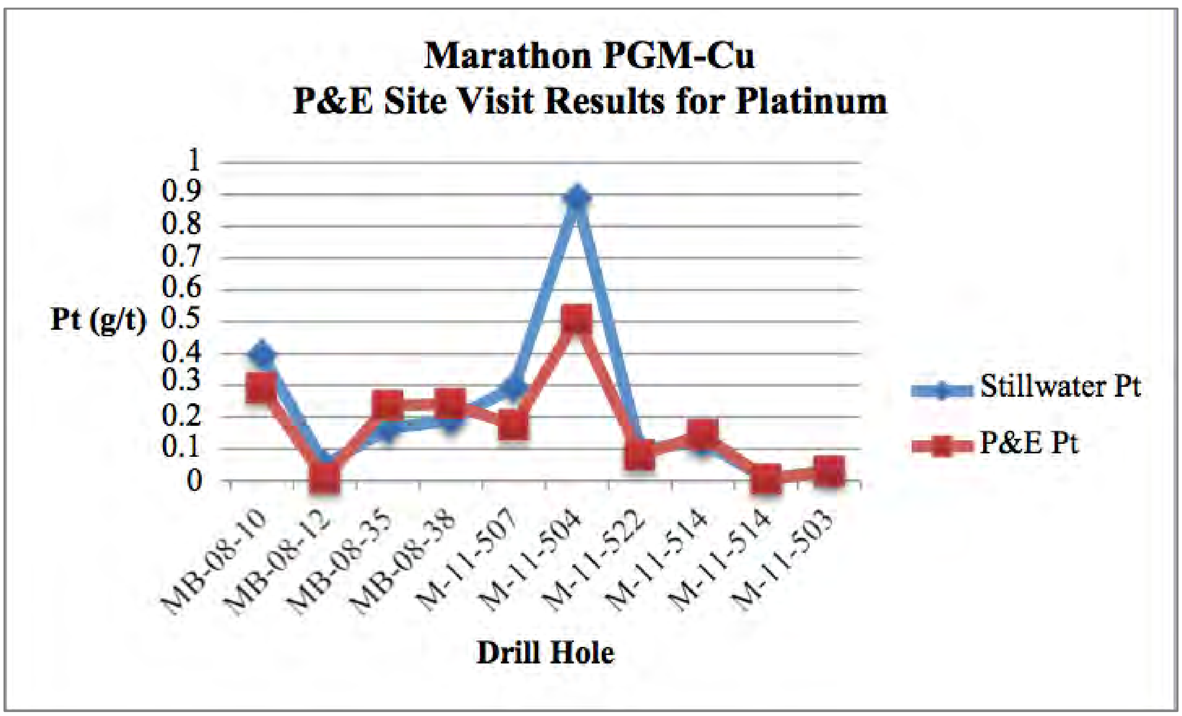


Figure 12.3: P&E Site Visit Results for Copper

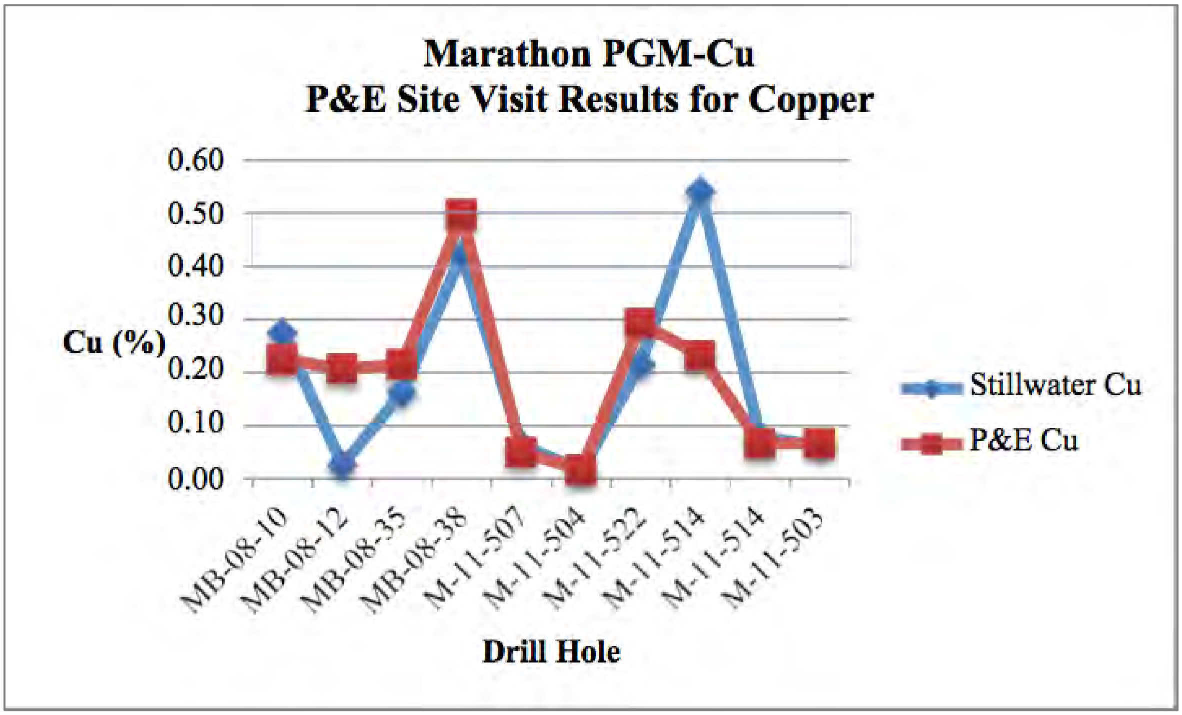
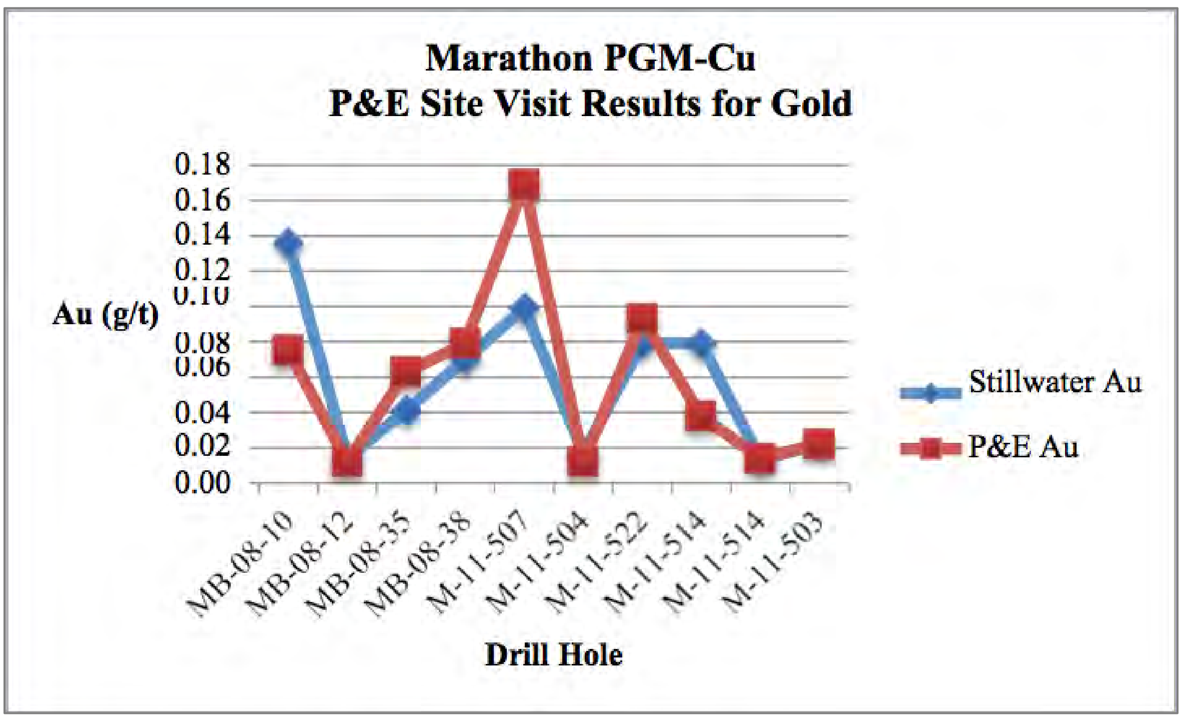


Figure 12.4: P&E Site Visit Results for Gold



12.2 May 2019 Site Visit and Independent Sampling

A site visit to the Property was undertaken by Mr. Bruce Mackie, P.Geo., of Mackie, an independent QP as defined by Canadian NI 43-101, on May 4, 2019. As part of the site visit, confirmation samples from selected drill core intervals were taken by Mr. Mackie and submitted to Activation Laboratories Ltd. in Thunder Bay. This work was aided by Mr. John McBride, P.Geo., a Senior Project Geologist employed at that time by Stillwater Canada.

12.2.1 Data Verification and Drill Core Examination

During the site visit, 12 mineralized drill hole intercepts were inspected by Mr. Mackie (listed in Table 12.1).

Prior to the inspection, the core was located and laid out at the main core storage facility in the Town of Marathon. This work was performed by Mr. John McBride of Stillwater Canada. It should be noted that while the mineralized drill hole intercepts were provided in advance to save time during the site visit, the specific intervals that were to be re-sampled by Mr. Mackie were not provided in advance.

Table 12.1: Drill Hole Intercepts Inspected

Zone	Hole No.	From (m)	To (m)	Interval (m)
Main Zone	M-05-49	20.0	34.0	14.0
Main Zone	M-05-49	80.0	90.0	10.0
Main Zone	M-11-520	176.0	189.0	13.0
Main Zone	M-11-520	211.0	227.0	16.0
BR Zone	M-06-178	3.0	17.0	14.0
Southern Resource Zone	M-17-528	43.0	55.0	12.0
Southern Resource Zone	M-17-529	70.0	80.0	10.0
Sally Zone	SL-17-71	31.0	49.0	18.0
Sally Zone	SL-17-72	264.0	284.0	20.0
Sally Zone	SL-17-72	310.0	320.0	10.0
Geordie	G-00-08	158.01	168.50	10.5
Geordie	G-10-17	216.00	234.00	18.0
Total				**165.5**

Source: *Mackie (2019).*

The 12 intercepts were selected from nine diamond drill holes based largely on the following criteria: availability of core (much of the mineralized core from historic drilling from the Core Area of the Marathon Deposit was taken for metallurgical testwork), intercepts ranging from low-grade (<0.5 g Pd/t), medium-grade (0.5 to 1.0 g Pd/t) and high-grade (>1.0 g Pd/t). In addition, drill core intercepts selected were from five different zones. The Core Area is defined as the area of the Property from which the historic Mineral Resource Estimates were calculated (the Main Zone, BR Zone, and Southern Resource Zone), the Sally Zone, as well as from the Geordie Area. Finally, the selection included drill core from several different drill campaigns carried out between 2005 and 2017 by both Marathon PGM Corp. and Stillwater Canada.

Mr. Mackie's inspection of the mineralized drill hole intercepts comprised the following tasks:

- Drill hole numbers were verified, and initial and final depths of the mineralized intercepts were reviewed.
- Measurement of core sample lengths and verification of sample numbers and tags.
- Validation of the descriptive geology with emphasis on the reported visual estimates of pyrite, chalcopyrite, pyrrhotite, chalcocite and magnetite content reported by Marathon PGM Corp. and Stillwater Canada.
- Validation, using original Accurassay and ALS Chemex assay certificates, of Pd, Pt, Au, and Cu assays reported for the mineralized intercepts in MS Excel™ files: Marathon Assays and Core.xlsx and Geordie Assay Range for Due Diligence.xlsx provided by Stillwater Canada.

Mr. Mackie's visual estimates of pyrite, chalcopyrite, pyrrhotite, chalcocite and magnetite content generally agree with those reported by Marathon PGM Corp. and Stillwater Canada for the 12 mineralized drill hole intercepts reviewed.

Drill logs for the sections reviewed were found to be appropriately detailed and presented a reasonable representation of geology, alteration, mineralization and structure.

No discrepancies in the sample tag numbers within the drill core trays and the intervals quoted in the above-mentioned Excel spreadsheets were noted. Nor were any discrepancies observed in the Pd, Pt, Au, and Cu values quoted from those in the original assay certificates.

Based on the results of the investigation, Mr. Mackie is of the opinion that the mineralized drill hole assay results and corresponding drill hole logs reported by Stillwater Canada and Marathon PGM Corp. (for drill holes M-05-49, M-11-520, M-06-178, M-17-528, M-17-529, SL-17-71, SL-17-72, G-00-08, and G-10-17 that were the subject of the investigation) are verifiable and accurate and portray a reasonable representation of the types of mineralization encountered on the Marathon and Geordie Deposits.

12.2.1.1 Confirmation of Sampling

Twelve samples were taken for due diligence to verify the presence of palladium, platinum, gold, and copper in the drill core. In addition, a sample of both the high- and low-grade standards used by Stillwater Canada in its 2017 drill program were also taken for analyses. The sample intervals were selected by Mr. Mackie without prior knowledge given to Gen Mining. The samples collected consisted of sawn quarter core. All verification samples duplicated the original sample intervals. In all instances the original sample interval was visible in the core box. Each verification sample was indicated with a Bruce Mackie sample identification tag that was placed in the core box. Mr. Mackie collected each sample and placed them in clearly identified plastic bags with a unique sample number tag.

The verification samples remained in the custody of Mr. Mackie until he delivered them in person in a sealed container to Activation Labs, an accredited assay laboratory, in Thunder Bay.

The samples were prepared and analyzed using similar methodologies employed by Stillwater Canada during its 2017 diamond drilling campaign: sample preparation Code RX1, gold, platinum and palladium analyses by fire assay followed by ICP-MS (Code 1C-EXP2) and trace element analyses by partial “aqua regia” digestion with an ICP-MS finish (Code UT-1M). In addition, the Specific Gravity of each of the core samples was determined by Pycnometer (Nitrogen).

Table 12.2 gives the intervals sampled and Table 12.3 summarizes the results of the confirmation sampling.

Table 12.2: Confirmation of Sample Intervals

Zone	Hole Number	From (m)	To (m)	Interval (m)	Lab / Year	Lab Certificate Number
Sally	SL-17-71	41.0	43.0	2.0	ALS/2017	TB17177687
Sally	SL-17-72	276.0	278.0	2.0	ALS/2017	TB17210631
Sally	SL-17-72	314.0	316.0	2.0	ALS/2017	TB17210631
Southern Resource	M-17-529	72.0	74.0	2.0	ALS/2017	TB17233256
Southern Resource	M-17-528	45.0	47.0	2.0	ALS/2017	TB17220588
BZ Zone	M-06-178	7.0	9.0	2.0	Accurassay/2006	200641225
Main Zone	M-11-520	183.0	185.0	2.0	ALS/2011	TB11168362
Main Zone	M-11-520	217.0	219.0	2.0	ALS/2011	TB11168362
Main Zone	M-05-49	22.0	24.0	2.0	Accurassay/2005	200541214
Main Zone	M-05-49	84.0	86.0	2.0	Accurassay/2005	200541214
Geordie	G-00-08	160.1	161.1	1.0	Accurassay/2000	200041175
Geordie	G-10-17	222.00	224.00	2.0	Accurassay/2010	201040690

Table 12.3: Confirmation of Assay Results

Survey By	From (m)	To (m)	Length (m)	Au (g/t)	Pd (g/t)	Pt (g/t)	Cu (ppm)
DDH SL-17-71 Mineralized Intercept Sally Zone							
Stillwater	41.0	43.0	2.0	0.200	0.633	0.245	3,330
Mackie	41.0	43.0	2.0	0.195	0.591	0.246	3,510
DDH SL-17-72 Mineralized Intercept Sally Zone							
Stillwater	276.0	278.0	2.0	0.124	1.310	0.850	529
Mackie	276.0	278.0	2.0	0.065	1.190	0.587	225
Stillwater	314.0	316.0	2.0	0.252	1.085	0.658	1,920
Mackie	314.0	316.0	2.0	0.263	1.790	0.924	2,840
DDH M-17-529 Mineralized Intercept Southern Resource							
Stillwater	72.0	74.0	2.0	0.136	0.815	0.239	3,510
Mackie	72.0	74.0	2.0	0.101	0.750	0.235	3,530
DDH M-17-528 Mineralized Intercept Southern Resource							
Stillwater	45.0	47.0	2.0	0.190	0.274	0.129	2,770
Mackie	45.0	47.0	2.0	0.103	0.113	0.101	2,530
DDH M-06-178 Mineralized Intercept BZ Zone							
Marathon	7.0	9.0	2.0	0.963	2.230	0.727	2,352
Mackie	7.0	9.0	2.0	0.152	1.750	0.583	852
DDH M-11-520 Mineralized Intercept Main Zone Resource							
Stillwater	183.0	185.0	2.0	0.055	0.616	0.139	3,480
Mackie	183.0	185.0	2.0	0.053	0.599	0.120	2,940
DDH M-11-520 Mineralized Intercept Main Zone Resource							
Stillwater	217.0	219.0	2.0	0.160	1.160	0.244	4,680
Mackie	217.0	219.0	2.0	0.092	0.935	0.275	3,860
DDH M-05-49 Mineralized Intercept Main Zone Resource							
Marathon	22.0	24.0	2.0	0.005	0.755	0.530	190
Mackie	22.0	24.0	2.0	0.013	0.461	0.430	190
DDH M-05-049 Mineralized Intercept Main Zone Resource							
Marathon	84.0	86.0	2.0	0.039	0.321	0.106	1,410
Mackie	84.0	86.0	2.0	0.043	0.327	0.071	2,340
DDH G-00-08 Mineralized Intercept Geordie							
Marathon	160.1	161.1	1.0	0.141	2.125	0.107	9,980
Mackie	160.1	161.1	1.0	0.092	1.700	0.092	8,670
DDH G-10-17 Mineralized Intercept Geordie							
Marathon	222.0	224.0	2.0	0.065	0.981	0.065	5,163
Mackie	222.0	224.0	2.0	0.052	0.824	0.051	5,860
MPG-1 High Grade Standard 2017 Drill Program							
Stillwater				0.275	3.538	1.109	6,715
Mackie				0.240	3.550	0.868	7,070
MPG-2 Low Grade Standard 2017 Drill Program							
Stillwater				0.073	0.805	0.223	2,853
Mackie				0.119	1.110	0.245	2,800

Note: *DDH = diamond drill hole.*
Source: *Mackie (2019).*

P&E considers that there is good correlation between the independent verification samples and the original analyses in the Company database.

12.3 Marathon Deposit AssayDatabase Verification

In September 2019, verification of assay data entry was performed on 7,022 assay intervals for Cu, Au, Ag, Pt and Pd. Only a few data entry errors were observed and corrected. The 7,022 verified intervals were checked against assay laboratory certificates from Accurassay Laboratories of Thunder Bay, Ontario, ALS Chemex of Vancouver, B.C., ACME Analytical Laboratories Ltd. of Vancouver, B.C., Bell White Analytical Laboratories of Haileybury, Ontario, and XRAL Laboratories of Don Mills, Ontario. The checked assays represented 51% of the data to be used for the Mineral Resource Estimate and approximately 13% of the entire database.

12.4 Geordie Deposit Database Verification

In January 2020, P&E conducted verification of the Geordie Project drill hole assay database for gold, platinum, palladium, silver and copper, by comparison of the database entries with assay certificates, supplied to P&E by Gen Mining, in pdf files.

Assay data ranging from 1987 through 2010 were verified for the Geordie Project. 69% (3,163 out of 4,558 samples) of the database was checked for gold, platinum, palladium, silver and copper, which included 82% (1,047 out of 1,277 samples) of the constrained drilling assay data.

Only two minor errors for gold and one minor error for palladium were encountered during verification of the Geordie database, which are of no material impact to the Mineral Resource Estimate.

12.5 Geordie Deposit Site Visit and Due Diligence Sampling

Due diligence sampling was not considered necessary on the Geordie Deposit for verification purposes, due to the extensive verification sampling already undertaken over a number of drilling programs.

12.6 Sally Deposit Database Verification

In January 2020, P&E conducted verification of the Sally Deposit drill hole assay database for gold, platinum, palladium, silver and copper, by comparison of the database entries with assay certificates, supplied to P&E by Gen Mining, in Portable Document Format. Assay data ranging from 2007 through 2017 were verified for the Sally Project.

Fifty-seven percent (57%), representing 5,182 out of 9,119 samples, of the database was checked for gold, platinum and palladium, which included 50% (1,275 out of 2,529 samples) of the constrained drilling assay data.

Fifty-three percent (53%), representing 4,874 out of 9,119 samples, of the database was checked for copper, which included 50% (1,275 out of 2,529 samples) of the constrained drilling assay data.

Thirty-seven percent (37%), representing 3,325 out of 9,119 samples, of the database was checked for silver, which included 41% (1,029 out of 2,529 samples) of the constrained drilling assay data.

No errors were encountered during verification of the Sally database.

12.7 Sally Deposit Site Visit and Due Diligence Sampling

Due diligence sampling was not considered necessary for the Sally Deposit verification purposes, due to the extensive verification sampling already undertaken at the Marathon Property over a number of drilling programs.

12.8 Conclusion

Based upon the evaluation of the QA/QC program undertaken by Gen Mining, as well as database verification carried out by P&E, it is P&E's opinion that the data is robust and suitable for use in the current Mineral Resource Estimate.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

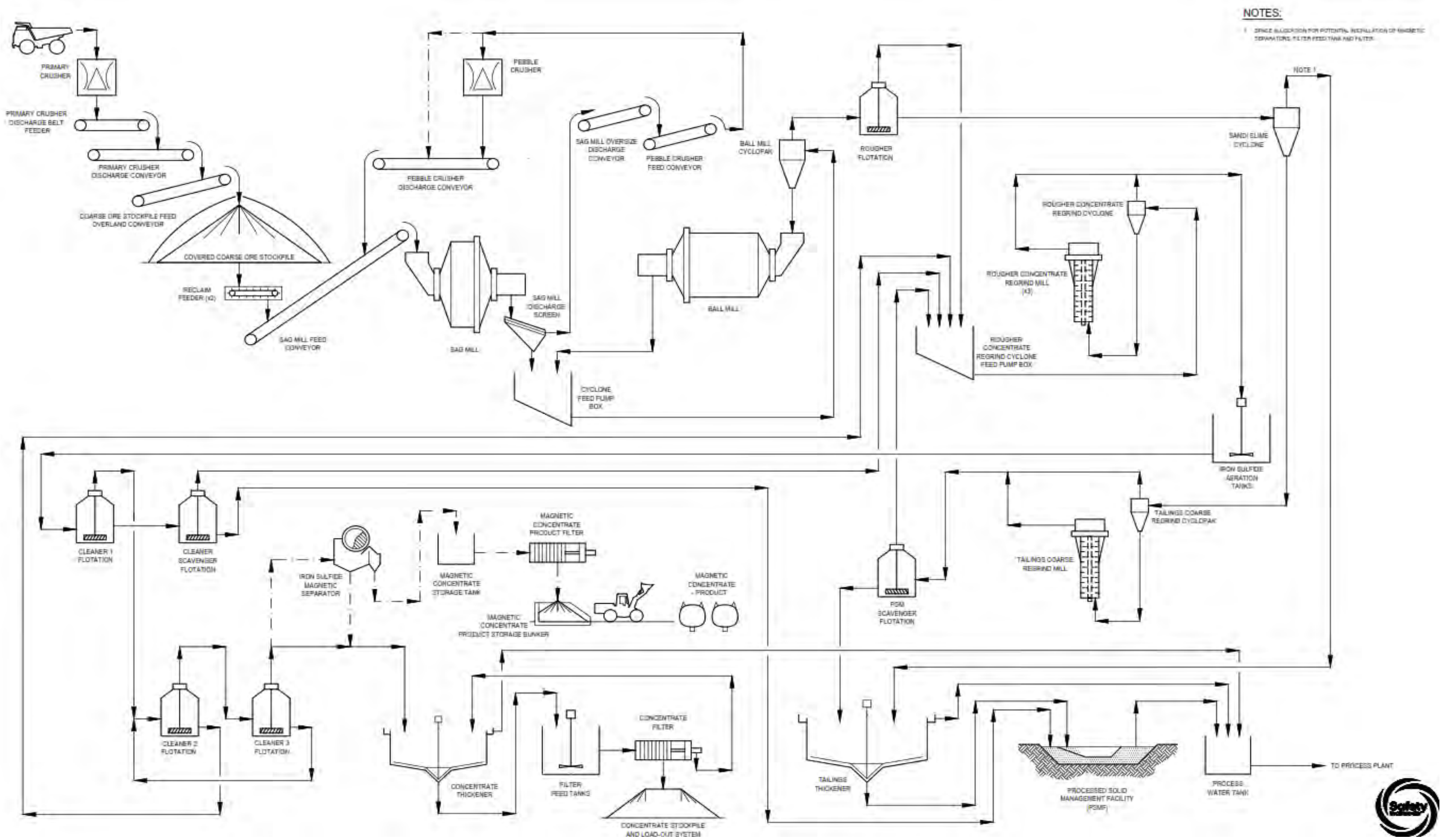
Metallurgical testing associated with the Project was initiated in the 1960's and has been the subject of testing and study over the past sixty years.

Fluctuations in the value of PGM over time have influenced flowsheet development with a previous focus on copper and recently shifting to PGM recovery as a priority. The evaluation of an optimized processing strategy and process flowsheet (Figure 13.1) by Gen Mining during 2020 has improved the ability to manage the influence of pyrrhotite in the cleaner circuit, simplified the process water balance, and yields maximum Pd and Cu recovery.

The optimized process flowsheet involves a primary grind of 80% passing (P_{80}) of 106 µm grind to rougher flotation at natural pH, followed by rougher concentrate regrinding to a P_{80} of 18 µm at pH 11. The first, second and third cleaner flotation stages would be operated in closed circuit with rejection of iron sulphides to first Cleaner tailings. A combined PGM-Cu concentrate provides optionality for magnetic separation of pyrrhotite and pentlandite to yield a higher grade PGM-Cu concentrate and magnetic by-product concentrate. Rougher tailings would be subjected to cycloning to create a coarse and fine (sand-slime) split, with the coarse fraction subjected to regrinding and PGM Scavenger flotation. PGM Scavenger concentrate would report to the rougher concentrate regrind for further size reduction and upgrading. Performance achieved with the optimized process flowsheet compared to previous concepts from 2010 to 2013 are outlined in Subsection 13.10.

Project technical risk, associated with mineral processing, has been considerably reduced through the 2020 testing program. Testwork completed by Gen Mining in 2020 provided an acceptable level of confidence for processing parameters and design criteria. Processing strategies and equipment considered for implementation at the Project is industrially proven with well recognized and capable equipment suppliers available. The requirement for any additional testing is limited and would be related to specific requirements for detailed engineering, or focused optimization efforts. Details are outlined in Subsection 13.12.

Figure 13.1: Optimized Process Flowsheet[1]



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[1] See Section 17 for details of the 2020 Optimized Flowsheet.

13.1 Recent Metallurgical Testwork and Studies

The focus of the metallurgical testwork completed by Gen Mining in 2020 was to optimize the process flowsheet and associated criteria for PGM and copper recovery. Specifics and concepts determined as an outcome includes:

- Mineralization: The metals of interest for the Project include Cu, Pd, Pt, Au, Ag. Less than 40% of PGM present are associated with sulphides; the majority of values are either free or interlocked with silicates. Details with respect to mineralogy are outlined in Subsection 13.2.
- Material Characterization: Mineralized material is medium to hard with a ball mill bond work index (75th percentile) of 16.5 kWh/t and has a moderate abrasiveness with an average abrasion index of 0.3 g. An SMC Axb value (75th percentile) of 38 supports conventional SAG milling. Material characterization details are outlined in Subsection 13.3.
- Flotation Feed Grind Size: An initial grind size of P_{80} of 106 µm was defined based on optimization of Pd and Cu recovery to rougher concentrate over a range in Cu, Pd head grades. Details are outlined in Subsection 13.4.
- Flotation Reagents: An outcome of reagent optimization, PAX, Aero 3501, MIBC and lime were selected as a constant for baseline testing and yielded very acceptable results. Selectivity within the circuit was good. Pyrite and talc rejection was effective with silicate levels typically less than 4.0% Mg without mineral specific depressants. Details are outlined in Subsection 13.5.
- Rougher Flotation Rate Kinetics: A benchscale rougher flotation retention time of 24 minutes and a target mass pull of 15% to rougher concentrate was defined as maximizing Pd and Cu recovery to rougher concentrate. Details are outlined in Subsection 13.6.
- Rougher Concentrate Regrind Size and Specific Energy: A rougher concentrate regrind size P_{80} of 18 µm was selected as the target for subsequent baseline conditions based on optimal concentration ratio and liberation from gangue materials. The specific energy required for the concentrate regrind duty is 11.8 kWh/t. Details are outlined in Subsection 13.7.
- PGM Scavenger Circuit: The incremental benefit of PGM Scavenger flotation considers a nominal 8% Pd recovery loss to rougher tails, where 65% of associated losses, or 5.2% incremental recovery would report to the Rougher tailings coarse fraction. Subsequent regrinding of the coarse fraction to P_{80} of 38 µm followed by PGM Scavenger flotation would yield a conservative 2.5% incremental gain in Pd recovery after upgrading through Cleaner flotation. The specific energy required for the concentrate regrind duty is 12.3 kWh/t as detailed in Subsection 13.15 Details are outlined in Subsection 13.7.2.

- Locked Cycle Testing: Phase 2 locked cycle test samples included: (i) 2012 Bulk Composite 3, (ii) 2020 Main Zone[2] Bulk Composite, (iii) 2020 W Horizon[3] Bulk Composite. Locked cycle flotation test stability was achieved in all cases within the first few iterations. Metal recoveries achieved from respective composites in 2020 locked cycle testing slightly exceeded expectations. Details are summarized in Subsection 13.8.

- Process Flowsheet Development: Previous technical studies by Stillwater Canada during 2010-2013 considered a [Grind-Float]^2 concept with initial Cu flotation at a feed size P_{80} of 212 µm, followed by regrinding of Cu rougher tails to P_{80} 78 µm as feed to a secondary PGM flotation circuit. The split flowsheet was intended as producing a high-grade Cu concentrate and a lower grade PGM-Cu concentrate.

  Results confirm that the optimized flowsheet pursued by Gen Mining in 2020 yields metal recoveries that tend to be higher for both Pd and Cu with similar or improved Pd and Cu grade to a combined PGM-Cu concentrate.

  Results from metallurgical testing confirm an expected range in sulphide sulfur content from 0.01 to 0.10%S^{2-} in the rougher tailings and 0.10 to 10.0% S^{2-} in first Cleaner tailings. The recovery and separation of sulphides within the process flowsheet supports a project design requirement to produce separate low sulphide non-acid generating (NAG) tailings and sulfidic potentially acid generating (PAG) first Cleaner tailings for co-disposal.

  Initially considered as a potentially marketable bi-product, first Cleaner tailings is expected as being low in PGM and Cu content with no significant marketable value. Process flowsheet development details are outlined in Subsection 13.10.

- Geometallurgy: Metallurgical testwork completed by Gen Mining in 2020 included benchscale and locked cycle flotation testwork providing a means to develop a predictive geological-metallurgical model for the optimized process flowsheet. The proposed GeoMet model, relative to results observed from locked cycle testing, is realistic with actual metal recoveries slightly exceeding expectations. Details are outlined in Subsection 13.11.

- PGM-Cu Concentrate Grade: PGM concentrate grades and recoveries achieved in 2020 locked cycle testing varied from 12.6-25.0% Cu and 21-145 g Pd/t with metal recoveries of 92.5-94.7% Cu

[2] The Main Zone refers to the general mineralogy associated with the North pit of the deposit.

[3] The W Horizon refers to the specific mineralogy associated with the higher-grade Pd domains in the South pit.

and 86.9-90.9% Pd from starting head grades of 0.10-0.37% Cu and 0.57-1.23 g Pd/t. Aside from magnesium, which is expected as varying from an acceptable range of 2.0-6.0% Mg, there are no other deleterious elements of concern in the PGM-Cu concentrate. Details are outlined in Section 13.9.

- Thickening and Filtration: In conjunction with Phase 2 benchscale testing, Gen Mining involved SNF[4] and Outotec Canada in the completion of flocculation, dewatering and pressure filtration testing on samples generated from testwork at SGS Lakefield. Details are outlined in Section 13.15.

- Composite Samples: Specifics relating to composite samples associated with the 2020 Phase 1 and Phase 2 metallurgical test programs by Gen Mining at SGS Lakefield, as well as previous (2010-2013) composites prepared by Stillwater Canada are summarized in Section 13.13.

- Direct Flotation Reactor (DFR) Cells and Flotation Circuit Selectivity: In conjunction with Phase 1 and Phase 2 benchscale testing during 2020, Gen Mining conducted a mini-pilot plant to evaluate the applicability of Woodgrove direct flotation reactors (DFRs) relative to conventional flotation cells. Testwork confirmed the applicability of DFR technology which was included in the FS cost estimation for the entire flotation circuit. Details are outlined in Section 13.14.

- Technical Risk and Future Testing: Project technical risk, associated with mineral processing, is considered as minimal. Testwork completed by Gen Mining in 2020 provides an acceptable level of confidence for processing parameters and design criteria. Processing strategies and equipment considered for implementation at the Project is industrially proven with well recognized and capable equipment suppliers available.

- The requirement for additional testing is limited and would be related to any specific requirement for detailed engineering, or focused optimization efforts. Details are outlined in Section 13.12

13.2 Mineralization Mineralogy (as applicable to Process Metallurgy) 5

Deposit mineralization is characterized by less than 40% of PGM in association with sulphides. The majority of values are present on grain boundaries of silicates, as opposed to finely disseminated or solid solution style deportment. Magnesium is associated with pyroxenes as well as a basic magnesium silicate within

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[4] SNF is a private company that provides specialty chemicals and services for mineral processing and metallurgical industries.

[5] SGS 2020 Mineralogy, Gen Mining, Report 18005-01 MI5027, September 16, 2020.

the host rock. Approximately 70% of PGM mineralization present was noted in mineralogical studies as being coarser than 20 µm in size[6].

Palladium mineralization includes arsenides (arsenopalladinite $Pd_{11}Sb_2As_2$, palladoarsenide Pd_2As), bismuthides (sobolevskite PdBi, froodite $PdBi_2$), stannides (paolovite Pd2Sn, atokite Pd/Pt_3Sn), tellurides (kotulskite $PdTe/Bi_2$, naldretteite Pd_2Sb), plumbides (zvyaginstevite Pd_3Pb), and sulphides (laflameitte $Pd_3Pb_2S_2$, coldwellite Pd_3Ag_2S).

Platinum content is typically associated with arsenic or iron as sperrylite ($PtAs_2$), isoferroplatinum (Pt_3Fe) or tetraferroplatinum (PtFe).

Dominant sulphides include chalcopyrite ($CuFeS_2$), cubanite ($CuFe_2S_3$), pyrite (FeS_2), pyrrhotite (FeS) and minor amounts of nickel (pendlandite $(Fe,Ni)_9S_8$, mackinawite [$(Fe,Ni)_{1+x}S$ (where x = 0 to 0.11)] Fe/Ni_9S_8). Gold and silver values are present as solid solutions within sulphides, as an electrum, or in native form.

Copper mineralization is bimodal and present as both coarse and fine grained size sulphides. The strategic focus of studies by Gen Mining in 2020 was to optimize PGM recovery with the same process conditions also yielding favorable performance for the recovery of copper.

13.3 Material Characterization

The Marathon Deposit is situated within a gabbro intrusion (coarse grained crystalline matrix associated with plagioclase, clinopyroxene, olivine, magnetite, apatite with minor amounts of biotite, chlorite, orthopyroxene, amphibole and feldspar). Emplacement of the gabbro involved multiple events resulting in a fine grained to pegmatic, brecciated metabasalt host rock. Material characterization details are listed in Table 13.2.

Based on breakage testwork, mineralized material of interest can be described as follows:

- Moderately high competency with a design (75th percentile) SMC Axb value of 38 and SPI value of 100 minutes lab scale grinding time that supports the application of conventional SAG milling.
- Moderately high hardness with a design (75th percentile) ball mill work index 16.5 kWh/t.

[6] Louis Cabri Mineralogy Report 2014-02, Stillwater Canada, August 20, 2014.

- Moderate abrasiveness with a design (average) abrasion index of 0.3 g.

An SMC Axb factor of 38 indicates reasonable material competency that supports the application of conventional SAG milling.

Previous concepts for the project considered the use of high-pressure grinding rolls ("HPGR") size reduction following two-stage crushing. While HPGR crushing is a technical alternative, it is typically applied for deposits with very hard rock (Axb <25) or at a project site where power costs are much higher than the energy cost for the Project.

The natural pH of mineralized material tested was in the range of 8.0 to 9.0 which implies that the potential for corrosion or corrosion/abrasion will be limited.

Table 13.1: Material Characterization

Parameter	Unit	Plant Feed
Specific Gravity	t/m^3	3.09
SMC Axb	--	38
Bond Crushing Index	kWh/t	18.6
Bond Ball Mill Work Index	kWh/t	16.5
Bond Abrasion Index	g	0.30

13.4 Grind Size Optimization

The determination of optimal grind size for flotation was a component of the 2020 metallurgical test program completed by Gen Mining.

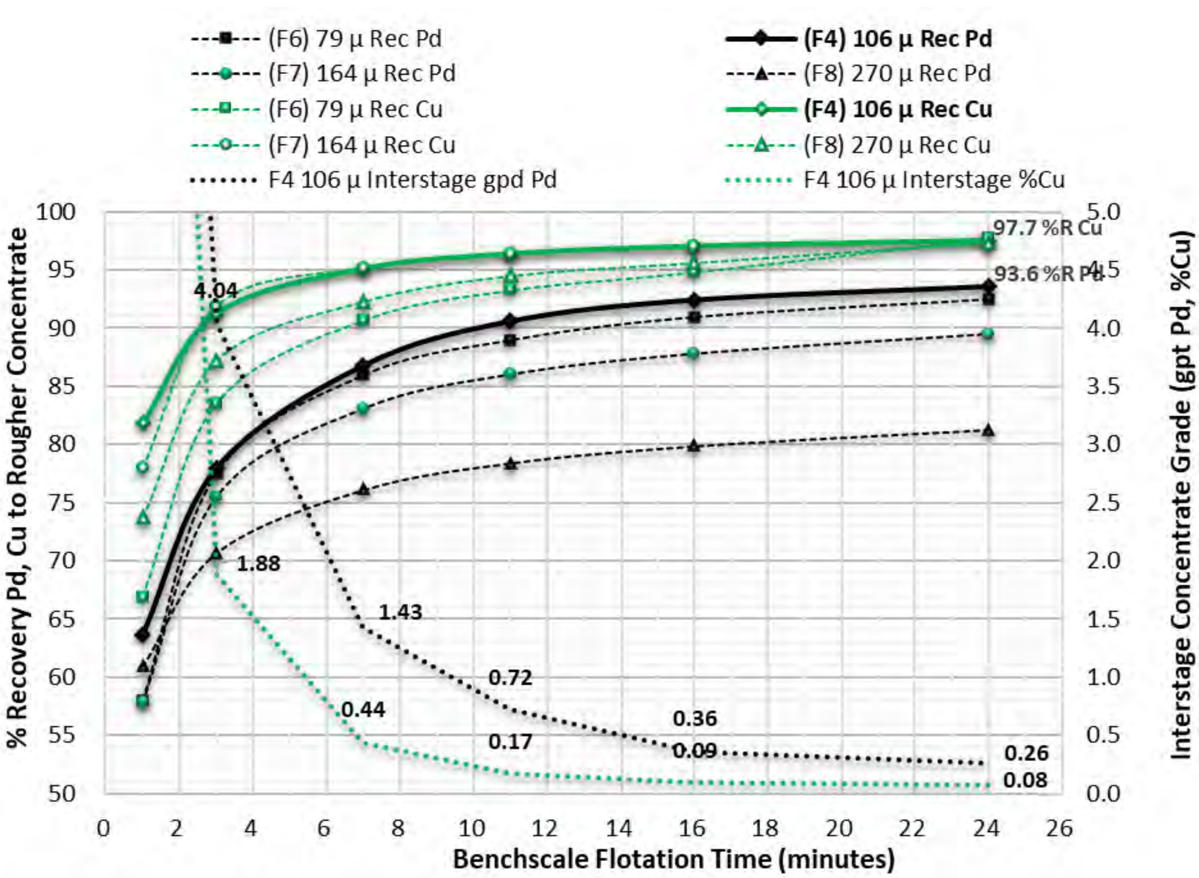
Previous technical studies by Stillwater Canada during 2010-2013 considered a $[\text{Grind-Float}]^2$ concept with initial Cu flotation at a feed size P_{80} of 212 µm, followed by regrinding of Cu rougher tails to a P_{80} of 110 µm as feed to a secondary PGM flotation circuit. The split flowsheet, pursued in the past, was intended to produce a high-grade Cu concentrate and a lower grade PGM-Cu concentrate (Subsection 13.10).

The optimized process flowsheet (Figure 13.1) considered by Gen Mining for the FS involves rougher flotation at natural pH, followed by rougher concentrate regrinding at pH 11. The first, second and third Cleaners would be operated in closed circuit with rejection of iron sulphides to first Cleaner tailings. A combined PGM-Cu concentrate provides optionality for magnetic separation of pyrrhotite and pentlandite to yield a higher grade PGM-Cu concentrate and magnetic bi-product concentrate. Rougher tailings would be subjected to cycloning to create a coarse and fine (sand-slime) split, with the coarse fraction subjected to regrinding and PGM Scavenger flotation. PGM Scavenger concentrate would report to the Rougher concentrate regrind for further size reduction and upgrading.

A product grind of P_{80} of 106 µm (150 mesh) to rougher flotation yielded near optimal extraction of 93.6% Rec Pd and 97.7% Rec Cu (Rec = recovered) to a rougher concentrate at 15% mass pull from a flotation feed grade of 0.36% Cu and 0.53 g/t Pd. No observed benefit was achieved in pursuing finer grind sizes. Flotation feed at grind sizes coarser than 150 µm displayed a degradation in PGM recovery to rougher concentrate.

A grind size of P_{80} 106 µm to flotation was defined as a baseline parameter and target for subsequent testing and process design criteria (Figure 13.2).

Figure 13.2: Flotation Feed Grind Size vs Recovery and Interstage Conc Grade (2012 Composite 3)



13.5 Flotation Reagent Selection

A reevaluation of optimal flotation collectors and frothers for the Project was a component of the 2020 metallurgical testing completed by Gen Mining.

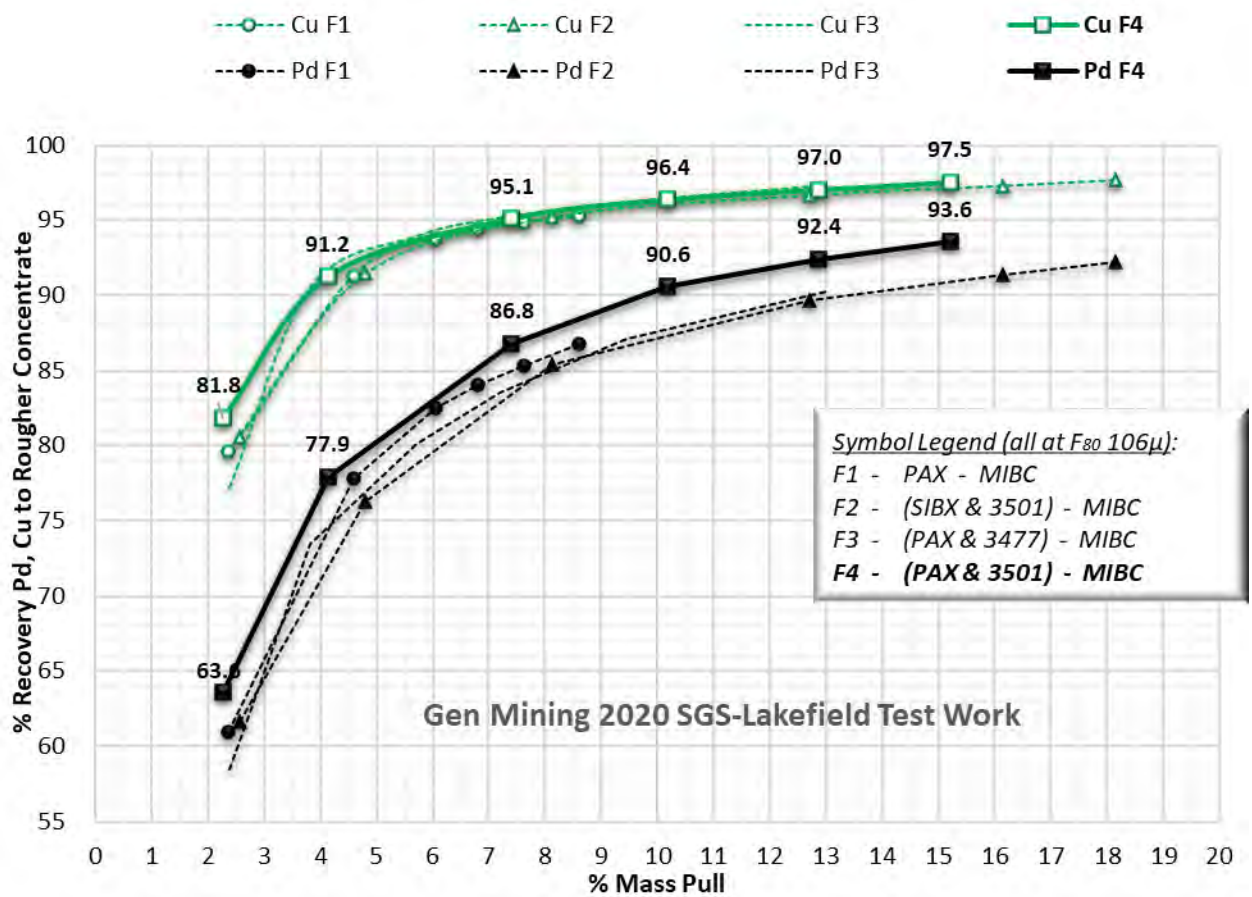
During 2012, in the metallurgical studies on the Project, potassium amyl xanthate (PAX) and isobutyl dithiophosphate (Aero 3477) were applied in the majority of testwork by RDi, ALS, and XPS. A mini-pilot plant completed by XPS during September 2009 considered a blend of 141 g/t Aero 3418A, 27 g/t PAX, and 24 g/t Aero 3477 as an ideal combination with 18 g/t MIBC and 34 g/t W34 as frother addition. Testwork completed with ALS in 2013 followed the same XPS reagent suite and addition rate. Previous testwork by RDi in 2009 considered PAX and MIBC as a viable reagent scheme with Aero 3477 used as a promoter on some materials.

A review of peer palladium producers suggests that PAX, sodium isobutyl xanthate (SIBX) and dodecyl mercaptan (DDM) are often applied as effective PGM promoters and collectors.

The intention of the 2020 testing was to re-evaluate the performance of collectors and frothers on the 2012 Composite 3 which represents a blend of lithological types from across the entire Marathon Deposit.

For each of the discrete interval composites, MZ-1 to MZ-5 and WH-1 to WH-3, as well as 2012 Composite 3, which is indicated in Figure 13.3 collector combinations including PAX, (SIBX + Aero 3501), (PAX + Aero 3477) and (PAX + Aero 3501) yielded similar performance with respect to copper, and markedly different performance for the slower floating PGM mineralization.

Figure 13.3: Flotation Circuit Reagent Selection (2012 Composite 3)



A key benefit associated with Aero 3501, an isoamyl dithiophosphate, is that aside from being an effective PGM-Cu promoter, this collector also has a slight frothing characteristic.

For all samples tested, a rougher collector combination of (PAX + Aero 3501) or (SIBX + Aero 3501) exhibited an increase in metal recovery as a result of increased mass pull, surpassing the performance of PAX or (PAX + Aero 3477). The increased mass pull to rougher concentrate was not a function of frother addition rate, or the manner in which the test was conducted, but from improved froth characteristics present with Aero 3501. PAX is a more aggressive collector than SIBX and in conjunction with Aero 3501 yielded a gain of 8% Pd recovery to rougher concentrate relative to PAX only, and 4% Pd recovery increase relative to (PAX + Aero 3477).

Another intention of reagent selection was to pursue moderately priced products that are readily available from reliable manufacturers.

As an outcome of reagent optimization, 35 g/t PAX, 35 g/t 3501, and 35-50 g/t MIBC were selected for rougher flotation baseline testing.

13.6 Rougher Flotation Performance and Rate Kinetics

Rougher flotation rate kinetic testing was a component of the 2020 metallurgical program completed by Gen Mining. Results of rougher kinetic testing are indicated on Figure 13.4 to Figure 13.6, as well as in Table 13.2. Flotation performance for both Pd and Cu were excellent for all samples tested.

Figure 13.4: Rougher Flotation Rate Kinetics and Interstage Grade

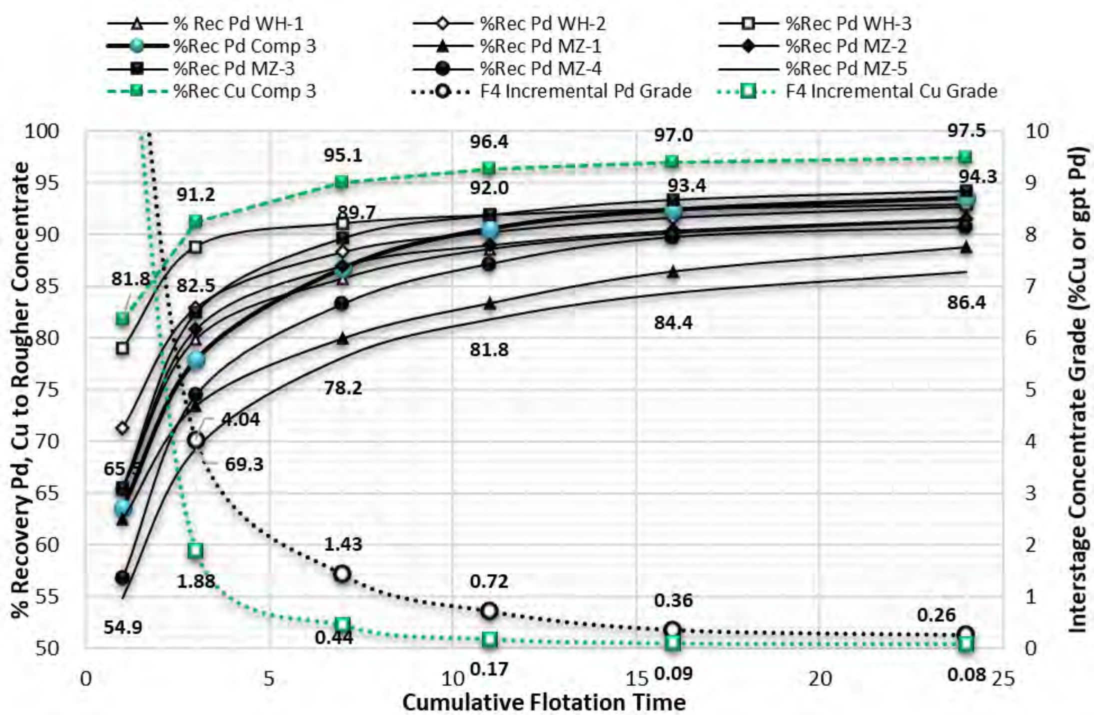


Figure 13.5: North Pit (Main Zone) Composites - Rougher Conc Rate Kinetics & Interstage Grade

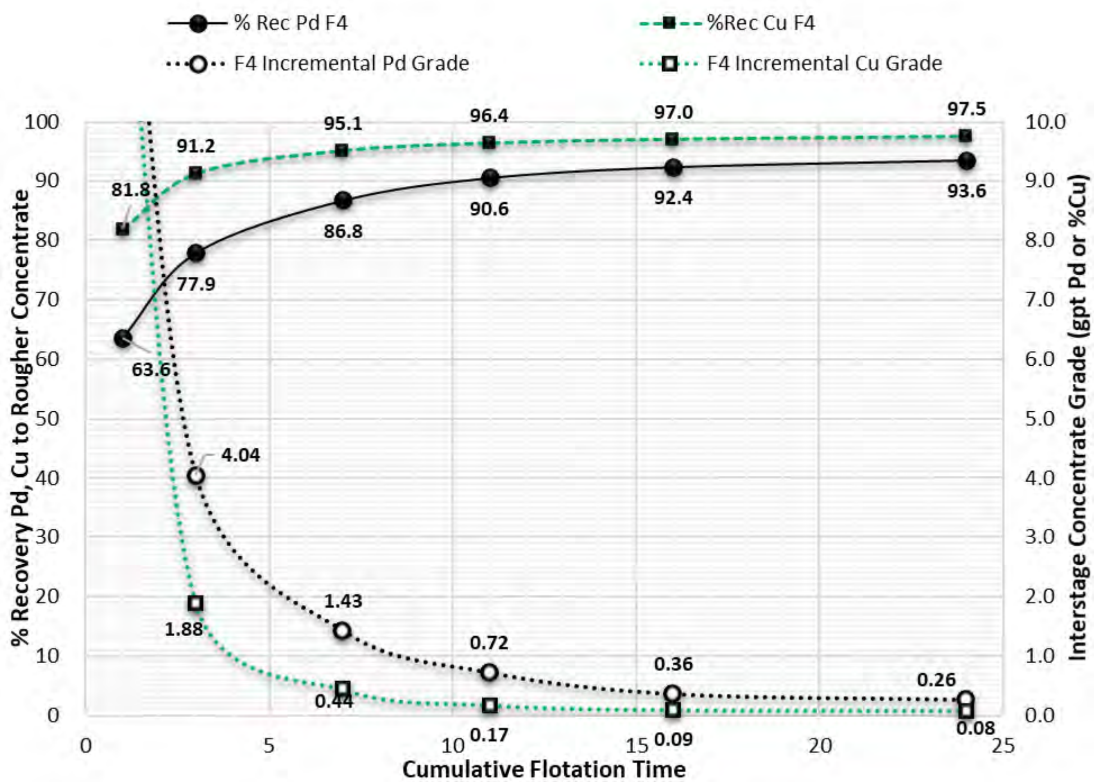
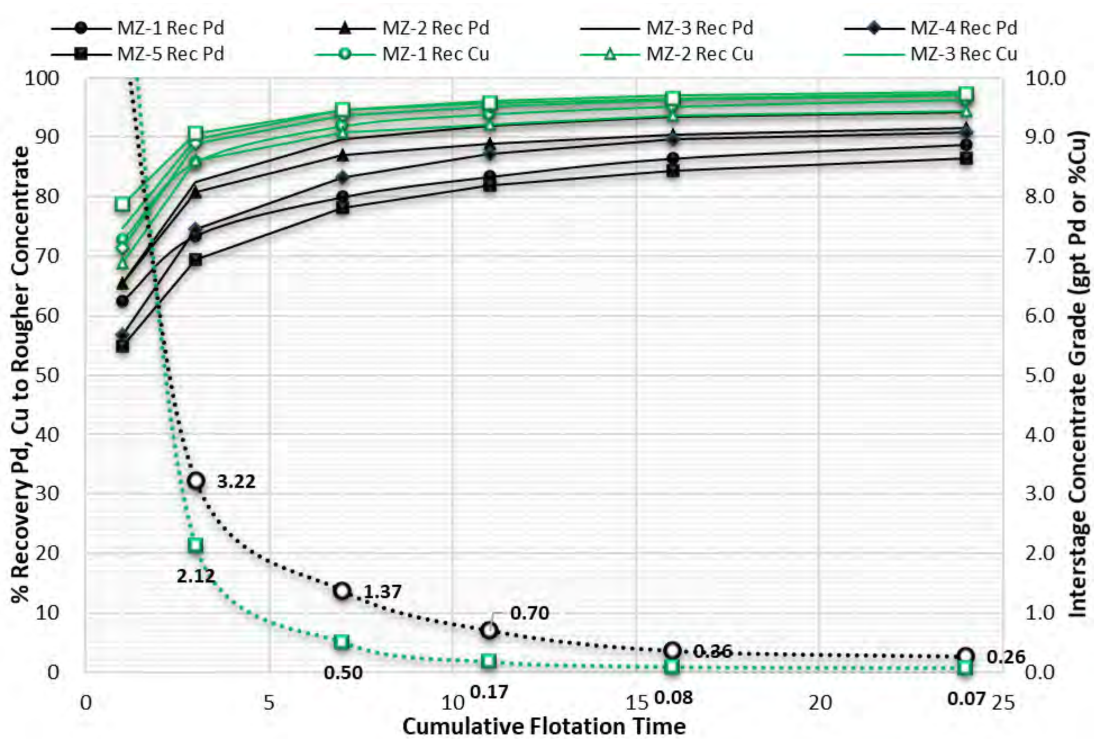


Figure 13.6: South Pit (W Horizon) Composites - Rougher Conc Rate Kinetics & Interstage Grade



Metallurgical testwork completed during 2010-2013 evaluated five separate bulk composites representing the entire cross Section of the Marathon Deposit. The 2012 Composite 3, retested in 2020, is a blend of 890 separate intervals from the Main Zone, South Zone and W Horizon at varying grade. Testwork completed in 2020 confirmed that oxidation effects on the bulk composite were minimal, with the ½ split HQ core stored outdoors since 2012 in a wooden crate. This information bodes well for the future processing of low-grade stockpiled material as part of the LOM.

In contrast to previous testing, discrete interval composite samples selected for the 2020 testing were chosen from the Main Zone and W Horizon with a grade range from 0.05 to 0.47% Cu, 0.38 to 2.62 g Pd/t, and a Pd/Cu ratio from 1.2 to 51.4. The primary difference of newly selected samples for the 2020 bench scale testwork is that discrete interval samples are from specific drill holes over a defined continuous length that would be representative of a mineable bench. Composite sample specifics are detailed in Subsection 13.13.

Specific details and findings associated with rougher flotation rate kinetic testing are as follows:

- Baseline conditions were applied to all rougher flotation kinetic tests involving a flotation feed size of P_{80} 106 µm, natural pH in the order of 8.5, 30% slurry density, and the staged addition of collectors including 35 g/t PAX, 35 g/t 3501, and MIBC as a frother.
- Cu recovery to rougher concentrate varied from 94.4% to 97.5% with a range in feed grade of 0.05 to 0.59% Cu, and a mass pull to rougher concentrate between 10.7 to 16.3%.
- Pd recovery to rougher concentrate varied from 86.4% to 96.3% with a range in feed grade of 0.38 to 2.62 g/t Pd, and a mass pull to rougher concentrate between 10.7 to 16.3%.
- Pt recovery to rougher concentrate varied from 85.2% to 97.8% with a range in feed grade of 0.12 to 0.79 g/t Pt, and a mass pull to rougher concentrate between 10.7 to 16.3%.
- Au recovery to rougher concentrate varied from 72.7% to 86.9% with a range in feed grade of 0.06 to 0.13 g/t Au, and a mass pull to rougher concentrate between 10.7 to 16.3%.
- Within the first seven minutes of benchscale rougher flotation, 96.6% of final Rec Cu and 93.6% of final Pd recovery was achieved, within 16minutes, 99.2% of final Rec Cu and 98.6% of final Rec Pd, with final recovery of respective metals assumed after 24 minutes.
- For baseline conditions applied, Cu flotation rate kinetics were rapid with excellent recoveries. Pd flotation rate kinetics were slower in comparison with incremental recovery gains of 1.5% Rec Pd versus 0.5% Rec Cu with an extended benchscale flotation time from 17 to 24 minutes.

- The scale up factor from benchscale to full scale design is typically in the order of 2.0 for copper sulphide only applications. The Project considers a scale up factor of 2.5 to compensate for the slower PGM flotation rate kinetics, and the relative value of PGM metals.

- Rougher flotation retention time of 24 minutes and a target mass pull of 15% feed weight to rougher concentrate were defined as baseline parameters and targets for subsequent testing and process design criteria.

Table 13.2: Rougher Flotation Kinetic Testing

Sample	Pd/Cu	Flotation Feed				Flotation Tailings				Combined Rougher Concentrate #1 to 6						
	Ratio	Cu (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)	Pd (g/t)	Pt (g/t)	Au (g/t)	%Wght	%Rec Cu	%Rec Pd	%Rec Pt	%Rec Au	%Rec Ni	%Rec Fe
2012 Composite #3 (entire deposit)	1.4	0.37	0.53	0.18	0.08	0.01	0.04	0.02	0.02	15.2	97.5	93.6	90.7	78.0	76.3	32.8
2020 W-Horizon Composite 1	24.5	0.08	2.01	0.71	0.13	0.00	0.20	0.06	0.02	14.0	96.8	91.4	92.8	86.4	31.1	17.5
2020 W-Horizon Composite 2	6.5	0.19	1.23	0.30	0.09	0.01	0.10	0.03	0.02	10.7	96.8	92.7	91.0	80.8	56.9	16.6
2020 W-Horizon Composite 3	51.4	0.05	2.62	0.79	0.14	0.00	0.11	0.02	0.02	11.5	94.8	96.3	97.7	86.9	23.5	12.9
2020 Main Zone Composite 1	2.3	0.31	0.71	0.18	0.07	0.01	0.09	0.03	0.02	11.8	96.2	88.8	85.2	76.2	48.7	16.7
2020 Main Zone Composite 2	1.9	0.59	1.12	0.30	0.13	0.04	0.11	0.03	0.03	14.2	94.4	91.6	91.4	80.8	76.6	24.1
2020 Main Zone Composite 3	1.9	0.46	0.88	0.24	0.11	0.01	0.06	0.02	0.02	16.3	97.6	94.3	93.0	84.3	79.4	27.9
2020 Main Zone Composite 4	1.6	0.47	0.73	0.20	0.08	0.02	0.08	0.02	0.02	15.9	97.1	90.7	91.8	79.3	84.8	35.1
2020 Main Zone Composite 5	1.2	0.31	0.38	0.12	0.06	0.01	0.06	0.02	0.02	13.8	97.2	86.4	85.5	72.6	79.9	27.8

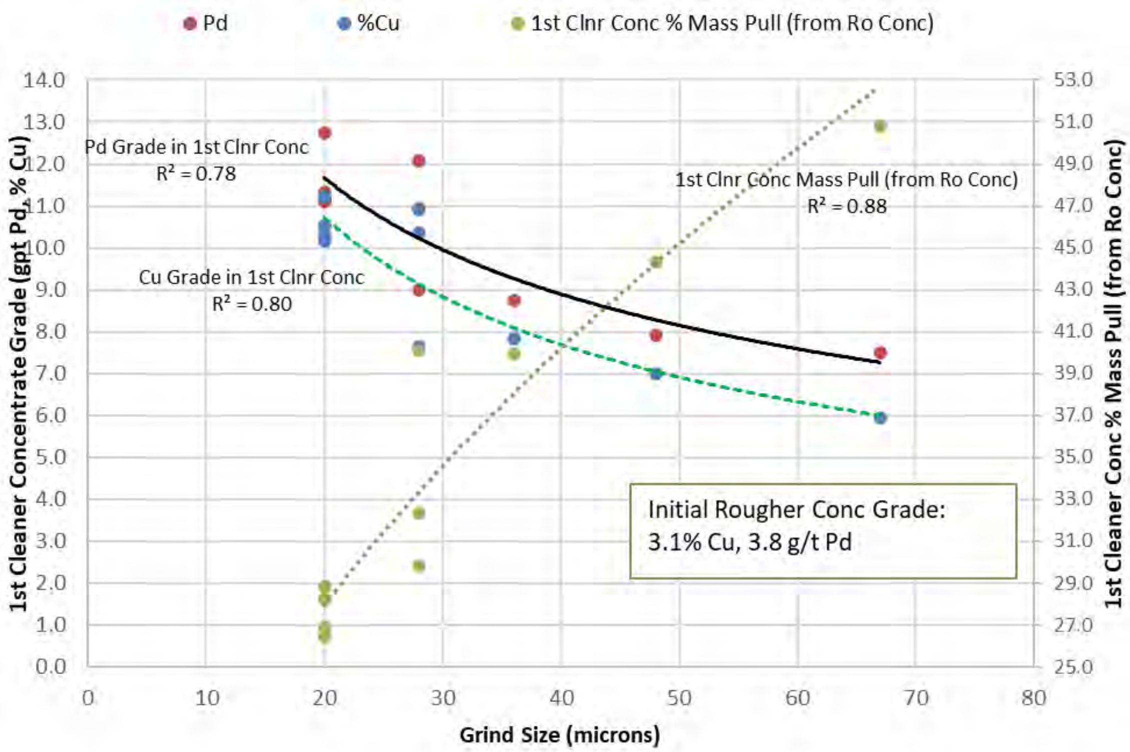
Rate kinetic float tests were completed on 2 kg feed samples and baseline conditions: F80 106 micron grind size, 35 gpt PAX, 35 gpt, 3501, MIBC, natural pH 8.5

Details	COPPER (%)									PALLADIUM (g/t)								
	Comp 3	MZ-1	MZ-2	MZ-3	MZ-4	MZ-5	WH-1	WH-2	WH-3	Comp 3	MZ-1	MZ-2	MZ-3	MZ-4	MZ-5	WH-1	WH-2	WH-3
Flotation Feed	0.37	0.31	0.59	0.46	0.47	0.31	0.08	0.19	0.05	0.53	0.71	1.12	0.88	0.73	0.38	2.01	1.23	2.62
Flotation Tails	0.01	0.01	0.04	0.01	0.02	0.01	0.00	0.01	0.00	0.04	0.09	0.11	0.06	0.08	0.06	0.20	0.10	0.11
Ro Conc Mass Pull %	15.2	11.8	14.2	16.3	15.9	13.8	14.0	10.7	11.5	15.2	11.8	14.2	16.3	15.9	13.8	14.0	10.7	11.5
Ro Conc 1 min %Rec	81.8	72.7	68.9	74.7	71.3	78.8	71.8	70.8	79.7	63.6	62.5	65.4	65.5	56.7	54.9	65.4	71.3	82.4
Ro Conc 1 - 3min %Rec	91.2	85.7	86.1	89.8	89.0	90.7	90.4	86.2	88.9	77.9	73.5	80.9	82.5	74.5	69.3	79.9	83.0	90.7
Ro Conc 1 - 7 min %Rec	95.1	91.8	90.7	94.7	93.6	94.7	94.0	92.9	92.0	86.8	80.0	87.0	89.7	83.3	78.2	85.8	88.3	93.8
Ro Conc 1 - 11 min %Rec	96.4	93.8	92.1	96.2	95.2	95.8	95.5	94.7	93.0	90.6	83.4	89.0	92.0	87.2	81.8	88.6	90.2	94.9
Ro Conc 1 - 16 min %Rec	97.0	95.1	93.6	97.1	96.3	96.5	96.1	95.8	93.9	92.4	86.5	90.4	93.4	89.8	84.4	90.2	91.7	95.6
Ro Conc 1 - 24 min %Rec	97.5	96.2	94.4	97.6	97.1	97.2	96.8	96.8	94.8	93.6	88.8	91.6	94.3	90.7	86.4	91.4	92.7	96.3

13.7 Rougher Concentrate Regrind Size and Specific Energy

Optimization of rougher concentrate regrind size was a component of the 2020 metallurgical program completed by Gen Mining. Results of rougher concentrate regrind testing are indicated on Figure 13.7. Comparative first Cleaner flotation performance at varying rougher concentrate regrind size was completed on a rougher concentrate sample from the 2012 Composite 3.

Figure 13.7: Rougher Concentrate Regrind Size Optimization



Flotation conditions applied in the regrinding of rougher concentrate included the addition of lime at pH 9-10, followed by an adjustment to pH 11 with lime to first Cleaner Feed. Collector addition included PAX (50 to 100 g/t) and Aero 3501 (50 g/t). No MIBC or frother addition was required. Reagent addition rates listed for first Cleaner addition are relative to rougher concentrate tonnage and would be divided by a factor of 6.7 (assumes 15% mass pull to rougher concentrate) for equivalent addition rate per tonne flotation feed.

Irrespective of grind size, the flotation response of Pd and Cu to concentrate was excellent with a range from 94-99% Pd recovery and 94-99% Cu recovery. There was no indication of any detrimental effect on either metal with finer regrind sizes.

Testwork confirmed a decrease in mass pull to first Cleaner concentrate from 51% to 27% with a decrease in rougher concentrate regrind size from P_{80} 68 µm to P_{80} 20 µm. Both Pd and Cu recoveries were relatively constant over the range in regrind size with an increase in grade from 7 to 11.5 g Pd/t and from 6.0 to 10.5% Cu.

A rougher concentrate regrind size P_{80} of 17 to 20 µm was selected as the target for subsequent baseline conditions based on optimal concentration ratio and liberation from gangue materials. Regrind tests to confirm specific energy requirements to achieve the target rougher concentrate regrind size were not conducted. The specific energy value of 11.8 kWh/t was determined from industrial benchmarking. Previously completed 2014 mineralogy studies, referenced in Subsection 13.10, are aligned with findings from testwork that sub-20 micron regrind sizes are preferable for mineral release to achieve optimal PGM-Cu concentrate grade. Magnesium silicate (talc) content in first Cleaner concentrate at fine regrind size was noted as being less than 6% Mg confirming acceptable liberation of values from gangue materials without the use of depressants such as carboxyl methyl cellulose ("CMC") or Depramin.

Aside from rougher concentrate regrind size, first Cleaner performance improved with the introduction of a 30-minute aeration step which was effective in suppressing pyrrhotite in the first Cleaner roughers. While pyrite is effectively depressed with regrinding and lime addition to pH 11, pyrrhotite tends to be more persistent and exhibits natural hydrophobic tendencies. The effect of sulphide aeration, in conjunction with decreased PAX addition rates to the first Cleaners, improved first Cleaner selectivity favoring PGM and Cu flotation and iron sulphide rejection.

The rejection of pyrrhotite to achieve improved PGM-Cu concentrate grade is beneficial, and also influences overall Pd recovery due to an association of Pd within or on the surfaces of pyrrhotite. Pyrrhotite mineralization that is slightly iron deficient, $Fe_{(1-x)}S$, has a crystal structure which can exhibit slightly magnetic properties. Low intensity magnetic separation (LIMS) is included within the process flowsheet and confirmed as capable of capturing magnetically susceptible pyrrhotite and pentlandite from a PGM-Cu concentrate. The optionality to market a higher grade PGM-Cu concentrate relative to a by-product magnetic concentrate lower in copper content, higher in iron and nickel content, with payable Pd, is an alternative, subject to further consideration by Gen Mining.

A rougher concentrate regrind size of P_{80} 18 μm was selected for the design of the rougher concentrate regrind circuit. Regrind tests in which energy requirements to achieve the target grind size were not conducted. The specific energy of 11.8 kWh/t was determined based on benchmarking.

13.7.1 Rougher Tailings Regrind Size and Specific Energy

A rougher tailings regrind size of P_{80} 38 μm was selected for the design of the rougher tailings regrind circuit. Regrind tests in which energy requirements to achieve the target grind size were not conducted. The specific energy of 12.3 kWh/t was calculated using Bond's methodology and an energy efficiency factor to account for lower energy requirement of stirred mills compared to ball mills.

13.7.2 PGM Scavenger Optimization

PGM Scavenger flotation on a reground coarse fraction of Rougher tailings was pursued by Gen Mining during 2020 in conjunction with evaluation of the optimized process flowsheet.

Benchscale testwork in 2020 confirmed that 50-60% of rougher tailings was +53 µm and -120 µm particle size and contained 65-75% of Pd losses associated with rougher tailings (Table 13.3). The coarse fraction, while just slightly higher than nominal rougher tailings grade, represents the majority of Pd losses from rougher flotation due to dissemination or encapsulation of values within gangue. The rougher tailings -53 µm fine fraction contained minimal recoverable value and tended to be unresponsive to flotation.

Regrinding of the rougher tailings coarse fraction considered a comparison of PGM Scavenger flotation performance at regrind sizes of P_{80} 69, 49, 35, and 25 µm (Table 13.4). The feed sample for PGM Scavenger optimization testing involved rougher tailings from 2012 Composite 3. Pd recovery to PGM Scavenger concentrate varied from 70% to 75%, with an increase in mass pull from 7.4% to 10.4% associated with a decrease in regrind size from 69 µm to 35 µm.

The implications of PGM Scavenger flotation are that for a nominal 8% Pd recovery loss to rougher tails, 65% of associated losses or 5.2% incremental recovery would report to the Rougher tailings coarse fraction. Subsequent regrinding of the coarse fraction to P_{80} of 38 µm (400 mesh) would yield 75% capture, or a nominal 3.9% Pd recovery, which would be recycled to the rougher concentrate regrind for additional regrinding and upgrading through first to third Cleaners.

Table 13.3: Rougher Tailings +53 -120 µm fraction Weight and Pd, Cu content

Test	Product	% Weight	Assays, %		Distribution, %	
			Cu (%)	Pd (g/t)	Cu	Pd
2012 Composite 3	Ro Tails +53 -120 µm	53.4	0.02	0.10	54.9	64.8
MZ-1 Composite	Ro Tails +53 -120 µm	56.3	0.01	0.10	57.1	67.4
MZ-2 Composite	Ro Tails +53 -120 µm	64.4	0.01	0.10	61.2	73.3
MZ-3 Composite	Ro Tails +53 -120 µm	62.7	0.01	0.06	67.2	68.7
MZ-4 Composite	Ro Tails +53 -120 µm	59.2	0.01	0.08	60.8	69.9
MZ-5 Composite	Ro Tails +53 -120 µm	62.7	0.01	0.05	50.3	66.4
WH-1 Composite	Ro Tails +53 -120 µm	63.6	0.00	0.21	43.6	76.4
WH-2 Composite	Ro Tails +53 -120 µm	62.7	0.01	0.11	57.2	75.0
WH-3 Composite	Ro Tails +53 -120 µm	59.2	0.00	0.12	41.8	71.5
	Average	**60.5**	**0.01**	**0.10**	**54.9**	**70.4**

Table 13.4: Pd, Cu Recovery from PGM Scavenger Flotation at Variable Grind Size

Test	Product	P80 Grind Size (microns)	Mass Pull %	Assays		Distribution	
				Cu (%)	Pd (g/t)	Cu %	Pd %
Comp 3 Rghr Tails Test F1	PGM Scav 1-4	69	7.4	0.19	1.14	59.7	69.5
Comp 3 Rghr Tails Test F2	PGM Scav 1-4	49	12.2	0.11	0.60	61.5	73.6
Comp 3 Rghr Tails Test F3	PGM Scav 1-4	35	13.4	0.12	0.66	77.2	77.9
Comp 3 Rghr Tails Test F4	PGM Scav 1-4	25	15.9	0.10	0.56	64.7	77.9
Comp 3 Rghr Tails Test F5	PGM Scav 1-4	35	10.4	0.15	0.78	64.1	75.1

An incremental 2.5% Pd recovery is considered as reasonable with the implementation of the PGM Scavenger circuit involving cycloning, regrinding and PGM Scavenger flotation. A 10.4% mass pull to PGM Scavenger concentrate implies an additional 5.5% of feed tonnage would be combined along with rougher concentrate for additional regrinding and upgrading in the cleaner circuit.

13.8 2020 Locked Cycle Flotation Testing

In conjunction with the Phase 1 benchscale testing program in 2020, Gen Mining completed a series of locked cycle flotation tests as part of Phase 2 testwork including cleaner circuit optimization and semi-continuous pilot plant testing.

Samples selected for Phase 2 locked cycle testing included: (i) 2012 Bulk Composite 3, (ii) 2020 Main Zone Bulk Composite, (iii) 2020 W Horizon Bulk Composite. A comparison of bulk composite head grades is listed in Table 13.5. Composite sample specifics are detailed in Subsection 13.13.

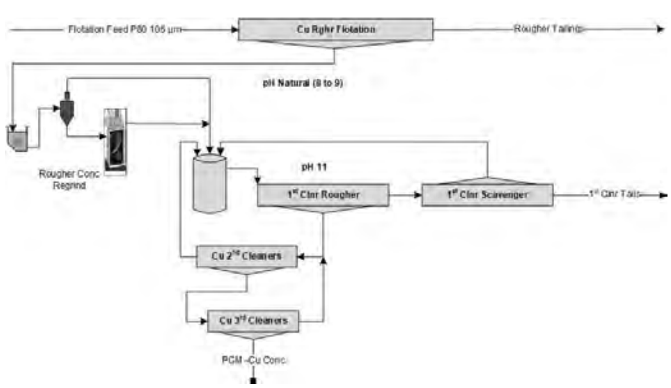
Table 13.5: 2020 SGS Locked Cycle Test Composite Head Grades

Composite	Cu (%)	Fe (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)
2012 Composite 3 Bulk Sample	0.36	10.10	1.67	0.26	0.11	0.50
2020 North Pit (Main Zone) Composite Bulk Sample	0.23	9.65	0.44	0.07	0.15	0.63
2020 South Pit (W Horizon) Composite Bulk Sample	0.09	6.39	0.08	0.58	0.42	0.90

Locked cycle testing considered six iterations of benchscale flotation, simulating grinding, rougher flotation, regrinding, and first to third Cleaners of the optimized flowsheet depicted in Table 13.7. The specific configuration followed for locked cycle flotation testing is outlined in Table 13.6.

Table 13.6: 2020 SGS Locked Cycle Test Details and Process Flowsheet

Locked Cycle Test Details	
Six (6) iterations with 4 kg feed samples	Flotation Feed F80 106 µm grind
Reagents: PAX, Aero 3501, MIBC, Lime	24 minutes rougher flotation
Rougher conc regrind size P80 20 µm	first to third Cleaner pH 11



Metal recoveries achieved for respective composites in 2020 locked cycle testing are summarized in Table 13.7.

Table 13.7: 2020 SGS Locked Cycle Test Results

Composite	Flotation Feed				PGM-Cu Conc				Metal Recovery (%)			
	Cu %	Au g/t	Pt g/t	Pd g/t	Cu %	Au g/t	Pt g/t	Pd g/t	Cu	Au	Pt	Pd
2020 Locked Cycle Test Results with adjustment for intermediate (middling) product streams												
2012 Composite 3	0.37	0.08	0.14	0.57	16.49	2.33	4.07	20.71	94.7	67.7	68.1	86.9
2020 Main Zone Composite	0.24	0.07	0.15	0.63	24.96	6.06	7.84	63.50	94.9	72.6	63.5	90.9
2020 W Horizon Composite	0.10	0.22	0.45	1.23	12.60	25.24	37.97	144.81	92.5	86.9	69.7	90.2
2020 Locked Cycle Test Results - excluding adjustments for intermediate (middling) product streams												
2012 Composite 3	0.37	0.08	0.14	0.57	16.49	2.33	4.07	20.71	93.4	64.6	60.5	76.8
2020 Main Zone Composite	0.24	0.07	0.15	0.63	24.96	6.06	7.84	63.50	87.9	69.6	42.6	84.3
2020 W Horizon Composite	0.10	0.22	0.45	1.23	12.60	25.24	37.97	144.81	89.6	84.4	61.3	84.7

Baseline conditions were applied for all the locked cycle tests with a target flotation feed size P_{80} of 106 µm, natural pH in the roughers at 30% slurry density, collector addition including 35 g/t PAX, 35 g/t Aero 3501 and MIBC to the roughers. Rougher concentrate regrinding to P80 of 17 µm was followed by 30 minutes aeration at pH 11, with Aero 3501 and reduced PAX addition rates applied in the cleaner circuit. PAX while an effective primary collector, is less selective than Aero 3501. Addition rates of PAX to first through third Cleaners were decreased relative to Aero 3501 to promote the recovery of PGM-Cu mineralization while limiting the response of pyrrhotite to sulfide flotation.

13.8.1 2012 Composite 3 Locked Cycle Testing

The 2012 Composite 3 sample responded favorably to the optimized flowsheet and locked cycle flotation with stability achieved after three iterations. The six-iteration locked cycle flotation test achieved 93.4% Rec Cu and 76.8% Rec Pd to a PGM-Cu concentrate with a grade of 16.5% Cu and 20.7 g Pd/t at 2.1% mass pull to final concentrate (Table 13.7). Rougher flotation metal recoveries coincided with previous flotation feed grind size optimization, and rougher kinetic testing with 97.1% Cu recovery and 88.8% Pd recovery to rougher concentrate at 11.4% mass pull.

The PGM-Cu concentrate was noted as being relatively clean with less than 2% Mg without the use of depressants. Rougher concentrate regrinding to P_{80} of 17 µm was confirmed as reasonable.

Benchscale locked cycle testing is recognized as a reasonable simulation of full-scale performance. The estimation of final overall recovery must consider the contribution of intermediate middling products which are not fully accounted for in the metallurgical balance including (i) third Cleaner Tails, (ii) second Cleaner Tails, (iii) first Cleaner Scavenger Concentrate, and (iv) PGM Scavenger Concentrate. Cleaner circuit metal recovery from rougher concentrate for Cu, Pd, Pt varies between 94-97% for Cu and 90-95% for Pd, Pt. Lower capture rates for Pd, Pt are a function of mineral association of Pd, Pt with pyrrhotite and pyrite which is in part rejected from the circuit and accounts for a portion of PGM losses to tailings. Assuming 95% capture of Cu and 90% capture of Pd, Pt, Au from middling streams (i) to (iii) would increase overall Cu recovery by 1.3%, Pd recovery by 3.6%, Pt recovery by 7.6%, and Au recovery by 3.1%. The PGM Scavenger circuit was assumed as contributing an incremental 2.5% Pd recovery which was confirmed as reasonable from PGM Scavenger locked cycle testing.

An estimate of the overall recovery of metals to PGM-Cu concentrate from 2012 Composite 3 locked cycle testing, adjusted for intermediate process streams within the process flowsheet suggests an expected overall 94.7% Rec Cu, 67.7% Rec Au, 68.1% Rec Pt, and 86.9% Rec Pd (Table 13.8).

The recalculated metal content versus assayed head grade highlights variability, particularly for Au (244%), Pt (22%), Pd (125%) due to the nugget effect, as well as for low level sulphide sulfur accuracy (+/-10%). The analysis of results and flotation performance is based on the recalculated head grade.

Table 13.8: 2020 SGS Locked Cycle Test – 2012 Composite 3

2012 Composite 3 Sample: SGS Q4 2020 Flotation Test Program - File 18005-02 - Locked Cycle Test Products (A-F)

Product	Weight		Assays						
	g	%	Cu (%)	Fe (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	Mg (%)
Third Cl Conc Combined	505.2	2.1	16.49	35.32	29.77	2.33	4.07	20.71	1.96
Third Cl Conc Non-Mag	425.5	1.8	18.75	33.11	30.43	2.33	4.42	22.80	1.86
Third Cl Conc Mag Fraction	79.7	0.3	4.80	47.08	26.26	2.35	2.19	9.58	2.52
Third Cl Tail	54.1	0.2	0.37	38.70	19.60	0.20	0.86	1.82	3.72
Second Cl Conc	559.3	2.3	14.93	35.65	28.79	2.12	3.76	18.88	2.13
Second Cl Tail	113.9	0.5	0.21	31.60	14.20	0.14	0.71	1.08	3.69
First Cl Conc	673.2	2.8	12.44	34.96	26.32	1.79	3.24	15.87	2.40
First Cl Scav Conc	185.1	0.8	0.41	37.70	18.60	0.19	0.85	1.75	3.11
First Cl Scav Tails	1,901.7	7.9	0.11	21.63	6.98	0.08	0.33	0.57	3.63
Ro Conc	2,760.0	11.4	3.14	25.96	12.48	0.50	1.07	4.38	3.29
Ro Tails	21,353.6	88.6	0.01	8.33	0.10	0.02	0.02	0.07	3.99
Flotation Feed (Calc)	24,113.6	100.0	0.37	10.34	1.52	0.08	0.14	0.57	3.91
Flotation Feed (Assayed)			0.36	10.10	1.67	0.26	0.11	0.50	3.90
% Variance			-3%	-2%	10%	244%	-22%	-12%	0%
Product	**Weight**		**Distribution**						
	g	**%**	**Cu**	**Fe**	**S**	**Au**	**Pt**	**Pd**	**Mg**
Third Cl Conc Combined	505.2	2.1	93.4	7.2	41.0	64.6	60.5	76.8	1.1
Third Cl Conc Non-Mag	425.5	1.8	89.4	5.6	35.3	54.4	55.4	71.2	0.8
Third Cl Conc Mag Fraction	79.7	0.3	3.9	1.5	5.7	10.2	5.1	5.6	0.2
Third Cl Tail	54.1	0.2	0.2	0.8	2.9	0.6	1.4	0.7	0.2
Second Cl Conc	559.3	2.3	93.6	8.0	43.9	65.2	61.9	77.5	1.3
Second Cl Tail	113.9	0.5	0.3	1.4	4.4	0.9	2.4	0.9	0.4
First Cl Conc	673.2	2.8	93.9	9.4	48.3	66.1	64.3	78.4	1.7
First Cl Scav Conc	185.1	0.8	0.9	2.8	9.4	1.9	4.6	2.4	0.6
First Cl Scav Tails	1,901.7	7.9	2.3	16.5	36.2	8.5	18.5	8.0	7.3
Ro Conc	2,760.0	11.4	97.1	28.7	94.0	76.5	87.4	88.8	9.6
Ro Tails	21,353.6	88.6	2.9	71.3	6.0	23.5	12.6	11.2	90.4
Flotation Feed (Calc)	24,113.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

13.8.2 2020 Main Zone Composite Locked Cycle Testing:

The 2020 Main Zone composite sample responded favorably to the optimized flowsheet and locked cycle flotation with stability achieved after three iterations. The six-iteration locked cycle flotation testwork achieved 87.9% Cu recovery and 84.3% Pd recovery to a PGM-Cu concentrate with a grade of 25.0% Cu and 63.5 g/t Pd at 0.8% mass pull to final concentrate (Table 13.7). Rougher flotation locked cycle recoveries coincided with previous flotation feed grind size optimization, and rougher kinetic testing with 96.2% Cu recovery and 91.3% Pd recovery to rougher concentrate at 8.7% mass pull.

The PGM-Cu concentrate was noted as being relatively clean at 2% Mg without the use of depressants. Rougher concentrate regrinding to P_{80} of 18 µm was confirmed as reasonable.

Benchscale locked cycle testing is recognized as a reasonable simulation of full-scale performance. The estimation of final overall recovery must consider the contribution of intermediate middling products which are not fully accounted for in the metallurgical balance including (i) third Cleaner Tails, (ii) second Cleaner Tails, (iii) first Cleaner Scavenger Concentrate, and (iv) PGM Scavenger Concentrate. Cleaner circuit metal recovery from rougher concentrate for Cu, Pd, Pt varies between 94-97% for Cu and 90-95% for Pd, Pt. Lower capture rates for Pd, Pt are a function of mineral association of Pd, Pt with pyrrhotite and pyrite which is in part rejected from the circuit and accounts for a portion of PGM losses to tailings. Assuming 95% capture of Cu and 90% capture of Pd, Pt, Au from middling streams (i) to (iii) would increase overall Cu recovery by 7.0%, Pd recovery by 4.1%, Pt recovery by 20.9%, and Au recovery by 3.0%. The PGM Scavenger circuit which was not pursued as part of locked cycle testing would be considered as contributing an additional 2.5% Pd recovery.

An estimate of the overall recovery of metals to PGM-Cu concentrate from 2020 Main Zone bulk locked cycle testing, adjusted for intermediate process streams within the process flowsheet suggests an expected overall 94.9% Cu recovery, 72.6% Au recovery, 63.5% Pt recovery, and 90.9% Pd recovery (Table 13.7).

The recalculated metal content versus assayed head grade highlights variability, which for this particular test was within +/-6% with the exception of low-level sulfide sulfur accuracy (+/-17%). The analysis of results and flotation performance is based on the recalculated head grade.

Table 13.9: 2020 SGS Locked Cycle Test – 2020 Main Zone Composite

2020 Main Zone Composite Sample: SGS Q4 2020 Flotation Test Program - File 18005-02 - Locked Cycle Test Products (A-F)

Product	Weight		Assays						
	(g)	(%)	Cu (%)	Fe (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	Mg (%)
Third Cl Conc Combined	33.6	0.8	24.96	26.96	26.57	6.06	7.84	63.50	2.07
Third Cl Tail	12.8	0.3	2.49	15.60	5.19	0.22	1.91	2.84	6.17
Second Cl Conc	46.4	1.2	18.76	23.83	20.67	4.45	6.20	46.76	3.20
Second Cl Tail	36.4	0.9	0.46	13.80	2.25	0.13	1.90	1.68	4.97
First Cl Conc	82.8	2.1	10.72	19.42	12.57	2.55	4.31	26.94	3.98
First Cl Scav Conc	64.9	1.6	0.34	15.00	2.43	0.03	0.76	0.31	5.11
First Cl Scav Tails	201.3	5.0	0.04	12.50	1.03	0.03	0.69	0.30	3.92
Ro Conc	349.0	8.7	2.63	14.61	4.03	0.63	1.56	6.62	4.16
Ro Tails	3,667.9	91.3	0.01	9.87	0.03	0.02	0.02	0.06	4.04
Flotation Feed (Calc)	4,016.9	100.0	0.24	10.28	0.38	0.07	0.15	0.63	4.05
Flotation Feed (Assayed)			0.23	9.65	0.44	0.07	0.15	0.63	
% Variance			-3%	-6%	17%	-4%	-3%	0%	
Product	**Weight**		**Distribution**						
	g	**%**	**Cu**	**Fe**	**S**	**Au**	**Pt**	**Pd**	**Mg**
Third Cl Conc Combined	33.6	0.8	87.9	2.2	58.9	69.6	42.6	84.3	0.4
Third Cl Tail	12.8	0.3	3.3	0.5	4.4	1.0	4.0	1.4	0.5
Second Cl Conc	46.4	1.2	91.2	2.7	63.3	70.6	46.5	85.7	0.9
Second Cl Tail	36.4	0.9	1.8	1.2	5.4	1.6	11.2	2.4	1.1
First Cl Conc	82.8	2.1	93.0	3.9	68.7	72.2	57.7	88.1	2.0
First Cl Scav Conc	64.9	1.6	2.3	2.4	10.4	0.7	8.0	0.8	2.0
First Cl Scav Tails	201.3	5.0	0.9	6.1	13.7	2.1	22.5	2.4	4.9
Ro Conc	349.0	8.7	96.2	12.3	92.7	74.9	88.1	91.3	8.9
Ro Tails	3,667.9	91.3	3.8	87.7	7.3	25.1	11.9	8.7	91.1
Flotation Feed (Calc)	4,016.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

13.8.3 2020 W Horizon Composite Locked Cycle Testing

The 2020 W Horizon composite sample responded favorably to the optimized and locked cycle flotation with stability achieved after three iterations. The six-iteration locked cycle flotation testwork achieved 89.6% Cu recovery and 84.7% Pd recovery to a PGM-Cu concentrate with a grade of 12.6% Cu and 144.8 g/t Pd at 0.7% mass pull to final concentrate (Table 13.10). Rougher flotation locked cycle recoveries coincided with previous flotation feed grind size optimization, and rougher kinetic testing with 96.0% Cu recovery and 91.7% Pd recovery to rougher concentrate at 6.2% mass pull.

The PGM-Cu concentrate was higher in silicate content at 6.3% Mg without the use of depressants. Rougher concentrate regrinding to P_{80} of 18 µm was confirmed as reasonable.

Benchscale locked cycle testing is recognized as a reasonable simulation of full-scale performance. The estimation of final overall recovery must consider the contribution of intermediate middling products which are not fully accounted for in the metallurgical balance including (i) third Cleaner Tails, (ii) second Cleaner Tails, (iii) first Cleaner Scavenger Concentrate, and (iv) PGM Scavenger Concentrate. Cleaner circuit metal recovery from rougher concentrate for Cu, Pd, Pt varies between 94-97% for Cu and 90-95% for Pd, Pt. Lower capture rates for Pd, Pt are a function of mineral association of Pd, Pt with pyrrhotite and pyrite which is in part rejected from the circuit and accounts for a portion of PGM losses to tailings. Assuming 95% capture of Cu and 90% capture of Pd, Pt, Au from middling streams (i) to (ii) would increase overall Cu recovery by 2.9%, Pd recovery by 3.0%, Pt recovery by 8.4%, and Au recovery by 2.5%. The PGM Scavenger circuit which was not pursued as part of locked cycle testing would be considered as contributing an additional 2.5% Pd recovery.

An estimate of the overall recovery of metals to PGM-Cu Conc from 2020 Main Zone bulk locked cycle testing, adjusted for intermediate process streams within the process flowsheet suggests an expected overall 92.5% Rec Cu, 86.9% Rec Au, 69.7% Rec Pt, and 90.2% Rec Pd (Table 13.7).

The recalculated metal content versus assayed head grade highlights variability, particularly for Au (170%), Pt (6%), Pd (27%) due to the nugget effect, as well as for low-level sulphide sulfur accuracy (+/-18%). The analysis of results and flotation performance is based on the recalculated head grade.

Table 13.10: 2020 SGS Locked Cycle Test – W Horizon Composite

2020 W HORIZON COMPOSITE SAMPLE: SGS Q4 2020 Flotation Test Program - File 18005-02 - Locked Cycle Test Products (A-F)

Product	Weight		Assays						
	g	%	Cu (%)	Fe (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	Mg (%)
Third Cl Conc Combined	170.1	0.7	12.60	17.97	11.40	25.24	37.97	144.81	6.28
Third Cl Tail	18.0	0.1	3.94	107.71	3.66	8.02	54.71	53.14	14.73
Second Cl Conc	188.1	0.8	11.77	26.56	10.66	23.59	39.57	136.03	7.09
Second Cl Tail	47.0	0.2	0.20	11.90	0.19	0.41	4.80	2.78	1.55
First Cl Conc	235.1	1.0	9.41	21.26	8.53	18.87	31.67	108.84	5.67
First Cl Scav Conc	90.7	0.4	0.61	12.80	0.56	1.20	6.27	8.10	1.76
First Cl Scav Tails	1,140.6	4.8	0.07	11.41	0.07	0.18	1.71	0.94	5.46
Ro Conc	1,466.4	6.2	1.56	12.29	1.42	3.17	6.41	18.19	5.16
Ro Tails	22,174.0	93.8	0.00	6.35	0.01	0.02	0.05	0.11	4.43
Flotation Feed (Calc)	23,640.4	100.0	0.10	6.72	0.10	0.22	0.45	1.23	4.47
Flotation Feed (Assayed)			0.09	6.39	0.08	0.58	0.42	0.90	
% Variance			-11%	-5%	-18%	170%	-6%	-27%	
Product	**Weight**		**Distribution**						
	g	**%**	**Cu**	**Fe**	**S**	**Au**	**Pt**	**Pd**	**Mg**
Third Cl Conc Combined	170.1	0.7	89.6	1.9	84.1	84.4	61.3	84.7	1.0
Third Cl Tail	18.0	0.1	3.0	1.2	2.9	2.8	9.3	3.3	0.3
Second Cl Conc	188.1	0.8	92.6	3.1	86.9	87.3	70.6	88.0	1.3
Second Cl Tail	47.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First Cl Conc	235.1	1.0	92.6	3.1	86.9	87.3	70.6	88.0	1.3
First Cl Scav Conc	90.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First Cl Scav Tails	1,140.6	4.8	3.4	8.2	3.5	4.0	18.5	3.7	5.9
Ro Conc	1,466.4	6.2	96.0	11.3	90.4	91.3	89.1	91.7	7.2
Ro Tails	22,174.0	93.8	4.0	88.7	9.6	8.7	10.9	8.3	92.8
Flotation Feed (Calc)	23,640.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

13.8.4 PGM Scavenger Locked Cycle Testing

Outlined in Subsection 13.7.2 PGM Scavenger flotation on a reground coarse fraction of rougher tailings was pursued in 2020 by Gen Mining in conjunction with the evaluation of an optimized process flowsheet.

A bulk composite of rougher tailings was subjected to size separation at +53 µm and -120 µm and then reground to a P_{80} of 38 µm for PGM Scavenger locked cycle flotation testing. The reground coarse fraction of rougher tailings responded reasonably well to treatment. he locked cycle flotation test for PGM Scavenger flotation achieved 29.8% Cu recovery and 32.7% Pd recovery to a PGM-Cu concentrate with a grade of 4.1% Cu and 19.2 g/t Pd at 0.2% mass pull (Table 13.11). PGM Scavenger locked cycle flotation recoveries coincided with previous PGM Scavenger grind size optimization, and rougher kinetic testing with 64.1% Cu recovery and 75.1% Pd recovery to PGM scavenger concentrate at 10.4% mass pull.

Benchscale locked cycle testing is recognized as a reasonable simulation of full-scale performance. The estimation of final overall recovery must consider the contribution of intermediate middling products which are not fully accounted for in the metallurgical balance including (i) third CleanerTails and (ii) second CleanerTails. Cleaner circuit metal recovery from rougher concentrate for Cu, Pd, Pt varies between 94-97% for Cu and 90-95% for Pd, Pt. Lower capture rates for Pd, Pt are a function of mineral association of Pd, Pt with pyrrhotite and pyrite which is in part rejected from the circuit and accounts for a portion of PGM losses to tailings. For PGM Scavenger flotation intermediate products, 75% capture of Cu and 80% capture of Pd, Pt, Au from middling streams (i) to (ii) is assumed for an equivalent incremental recovery gain of 9.2% Rec Cu, 10.5% Rec Pd.

An estimate of overall recovery of metals from PGM Scavenger feed to PGM-Cu Conc, adjusted for intermediate process streams within the process flowsheet, suggests an expected overall 49.8% Rec Cu and 45.1% Rec Pd.

PGM Scavenger circuit feed was estimated from 2012 Composite 3 locked cycle testing with an indicated recovery loss to rougher tailings of 3.0% Rec Cu, 24.3% Rec Au, 13.6% Rec Pt and 11.6% Rec Pd (Table 13.7). Assuming 65% of recoverable metal content would be associated with the rougher tailings coarse fraction, the potential maximum incremental recovery with PGM Scavenger flotation would be 1.95% Rec Cu and 7.5% Rec Pd.

The potential incremental recovery achieved with PGM Scavenger flotation, based on test results for the 2012 Composite 3 bulk sample, suggests a gain of 1.5% Rec Cu and 5.2% Rec Pd would be possible and represents the capture of approximately 50% of the values in rougher tailings.

For the purposes of determining overall recovery from benchscale and semi-continuous testwork, the incremental gain in Pd recovery including PGM Scavenger flotation considers a reasonable and conservative 2.5% Pd recovery. Incremental gains in Cu, Pt and Au recovery would also be expected.

Table 13.11: 2020 SGS Locked Cycle Test – PGM Scavenger Circuit

PGM Scavenger Locked Cycle Test: SGS Q4 2020 Flotation Test Program - File 18005-02

Product	Weight		Assays				
	g	%	Cu (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)
Third Cl Conc Combined	7.6	0.2	4.06	12.90	7.16	5.61	19.2
Third Cl Tail	6.3	0.2	1.29	8.42	2.56	2.47	6.6
Second Cl Conc	13.9	0.3	2.93	11.27	5.30	4.36	14.1
Second Cl Tail	21.2	0.5	0.08	2.36	0.09	1.08	0.8
First Cl Conc	35.1	0.8	1.32	6.43	2.35	2.60	6.6
First Cl Scav Tails	397.6	9.9	0.00	1.15	0.03	0.01	0.3
PGM Scav Conc	432.7	10.8	0.10	1.53	0.20	0.20	0.8
PGM Scav Tails	3,713.3	89.6	0.01	0.05	0.02	0.02	0.0
PGM Scav Feed (Calc)	4,146.0	100.0	0.02	0.21	0.04	0.04	0.1
Product	**Weight**		**Distribution**				
	g	**%**	**Cu**	**S**	**Au**	**Pt**	**Pd**
Third Cl Conc Combined	7.6	0.2	40.6	12.3	35.8	28.1	34.6
Third Cl Tail	6.3	0.2	10.1	6.3	10.05	9.7	9.4
Second Cl Conc	13.9	0.3	50.7	18.6	45.85	37.7	44.0
Second Cl Tail	21.2	0.5	2.1	5.9	1.15	14.3	3.7
First Cl Conc	35.1	0.8	52.8	24.5	47	52.0	47.6
First Cl Scav Tails	397.6	9.9	2.4	54.2	8.2	3.2	28.1
PGM Scav Conc	432.7	10.8	55.2	78.7	55.2	55.2	75.8
PGM Scav Tails	3,713.3	89.6	44.8	21.3	44.8	44.8	24.2
PGM Scav Feed (Calc)	4,146.0	100.0	100.0	100.0	100	100.0	100.0

13.9 PGM-Cu Concentrate Quality

PGM-Cu concentrate grade is a variable, influenced by initial head grade, mass pull to rougher concentrate, rougher concentrate regrind size, and cleaner circuit performance which ultimately define mass pull and metal recovery to final concentrate.

Locked cycle flotation test results listed in Table 13.8 to Table 13.10 confirm an ability to achieve a range in Mg content from 2.0% to 6.3% Mg relative to an initial Mg head grade of 3.9-4.5% Mg. Consistent rougher concentrate regrind size, constant cleaner circuit slurry densities, in addition to the improved selectivity possible with DFRs are expected as being sufficient to limit the carry-over of magnesium silicates (talc) into the final PGM-Cu concentrate. An additional option to limit Mg content in final concentrate is the potential to implement carboxyl methyl cellulose ("CMC") in the cleaner circuit. Aside from Mg, there are no other deleterious elements of concern in the PGM-Cu concentrate.

PGM concentrate grades achieved in 2020 Locked Cycle testing are detailed in Table 13.12 with an observed range of 12.6-25.0% Cu and 21-145 g Pd/t. Metal recovery to PGM-Cu concentrate varied from 92.5-94.9% Cu and 86.9-90.9% Pd from a starting head grade of 0.10-0.37% Cu and 0.57-1.23 g/t Pd and a mass pull to final concentrate between 0.7-2.1%.

The operating strategy for the full-scale flotation circuit will utilize real-time on-stream analyzer for Cu analysis from the various product streams to target the design mass pull to rougher concentrate and PGM-Cu concentrate to stabilize and optimize both metal recovery and final concentrate grade.

Table 13.12: Concentrate as Generated in 2020 Metallurgical Testing

Element	Unit	South Pit (W Horizon)	North Pit (Main Zone)	Blended Historical Composite (Composite 3)
Cu	%	18.7	19.7	18.7
Ni	%	0.31	0.49	0.36
Zn	%	0.10	0.17	0.10
Fe	%	20.3	24.7	28.4
As	%	0.01	0.01	0.00
Sb	%	< 0.002	< 0.002	<0.002
Au	g/t	17.6	3.3	2.7
Pt	g/t	43.5	7.6	4.0
Pd	g/t	171	39	19
Ag	g/t	50	68	42
S	%	17	24	26
F	%	0.07	0.07	0.04
Hg	g/t	<0.3	< 0.3	< 0.3
Rh	g/t	2.4	0.58	0.22
Si	%	11.3	7.0	6.2
Mg	%	6.2	2.2	1.9
V	g/t	80	88	1000
Pb	%	0.02	0.02	0.01
Mo	%	< 0.01	< 0.01	0.01
Co	%	0.04	0.08	0.06
Sn	%	< 0.002	< 0.002	<0.002
Cl*	g/t	18	67	58
Bi	%	< 0.002	< 0.002	< 0.002
Cd	%	< 0.002	< 0.002	< 0.002
Al_2O_3	%	1.1	3.7	2.9
CaO	%	0.9	3.2	2.8
Mn	g/t	0.039	355	370
Cr	g/t	40	40	142
Ba	g/t	27	85	75
Se	g/t	174	87	70
Te	g/t	51	13	9
SG		3.57	3.71	3.85

* as HNO_3 soluble.

13.10 Process Flowsheet Development and Comparison to Historical Studies

Metallurgical testing associated with the Project was initiated in the 1960's and has been the subject of intensive study over the past sixty years.

Fluctuations in the value of PGM over time has influenced flowsheet development with a previous focus on copper recently shifting to PGM recovery as a priority. Previous technical studies by Stillwater Canada during 2010-2013 considered a [Grind-Float]^2 concept with initial Cu flotation at a feed size of P_{80} of 212 µm, followed by regrinding of Cu rougher tails to a P_{80} of 78 microns as feed to a secondary PGM flotation circuit. The split flowsheet, pursued in the past, was intended as producing a high-grade Cu concentrate and a lower grade PGM-Cu concentrate.

During 2012, in metallurgical studies on the Project, potassium amyl xanthate (PAX) and isobutyl dithiophosphate (Aero 3477) were applied in the majority of testwork by RDi, ALS, and XPS. A mini-pilot plant completed by XPS during September 2009 considered a blend of 141 g/t Aero 3418A, 27 g/t PAX, and 24 g/t Aero 3477 as an ideal combination with 18 g/t MIBC and 34 g/t W34 as frother addition. Testwork completed with ALS in 2013 typically followed the same XPS reagent suite and addition rate. Previous testwork by RDi in 2009 also considered PAX and MIBC as a viable reagent scheme, with Aero 3477 used as a promoter on some materials.

Table 13.13: (2010-2013) XPS, ALS, RDi Locked Cycle Testwork

LCT & Composite Sample Details	Mass Pull to Conc		Flotation Feed				PGM Cu-Conc Grade				Combined PGM-Cu Conc Recovery			
	% Mass	F/C	Cu (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	Cu (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	%R Cu	%R Au	%R Pt	%R Pd
XPS Q2 2010 LCT - 2012 Comp 1	1.64	61	0.11	0.04	0.13	0.41	15.24	59.30	68.18	83.52	84.51	59.30	68.18	82.01
XPS Q2 2010 LCT - 2012 Comp 2	0.94	107	0.17	0.05	0.11	0.46	14.51	73.15	78.81	84.00	91.15	73.15	78.81	80.28
XPS Q2 2010 LCT - 2012 Comp 3	0.82	122	0.25	0.08	0.29	0.86	18.62	81.54	75.29	79.95	90.69	81.54	75.29	73.30
XPS Q2 2010 LCT - 2012 Comp 4	0.71	140	0.30	0.10	0.23	0.84	19.10	78.33	75.09	82.71	89.29	78.33	75.09	82.71
XPS Q2 2010 LCT - 2012 Comp 5	0.61	165	0.39	0.11	0.25	0.95	21.94	73.46	75.28	84.47	92.91	73.46	75.28	79.95
ALS Q1 2012 LCT - 2012 Comp 1	1.50	67	0.30	0.10	0.19	0.78	19.06	5.70	8.57	42.65	95.30	84.90	67.65	82.01
ALS Q1 2012 LCT - 2012 Comp 2	0.70	143	0.07	0.10	0.24	0.73	9.05	10.70	22.24	83.72	90.47	74.70	64.86	80.28
ALS Q1 2012 LCT - 2012 Comp 3	1.70	59	0.33	0.10	0.10	0.40	17.31	4.23	3.85	16.47	89.15	72.00	65.47	69.98
ALS Q1 2012 LCT - 2012 Comp 4	2.80	36	0.50	0.19	0.50	2.00	16.41	5.51	12.79	59.08	91.91	81.20	71.60	82.71
ALS Q1 2012 LCT - 2012 Comp 5	0.70	143	0.09	0.05	0.05	0.15	11.50	4.98	3.12	17.13	89.41	69.70	43.74	79.95
RDI Q1 2013 LCT - 2012 Comp 1	1.70	59	0.29	0.15	0.25	0.81	15.62	4.25	10.73	37.80	93.70	49.10	73.30	79.10
RDI Q1 2013 LCT - 2012 Comp 2	0.90	111	0.07	0.15	0.35	0.95	7.30	7.69	32.43	92.86	91.60	45.60	70.60	85.40
RDI Q1 2013 LCT - 2012 Comp 3	2.40	42	0.31	0.10	0.13	0.49	12.85	2.45	4.47	15.13	94.10	54.00	80.30	71.10
RDI Q1 2013 LCT - 2012 Comp 4	3.30	30	0.50	0.26	0.48	2.01	14.82	5.98	12.88	55.82	96.70	75.40	87.20	90.00
RDI Q1 2013 LCT - 2012 Comp 5	1.00	100	0.09	0.05	0.08	0.22	16.18	3.67	5.67	15.98	87.00	66.50	67.80	71.70

Flowsheet 2 applied for XPS, ALS, RDI Locked Cycle Testwork

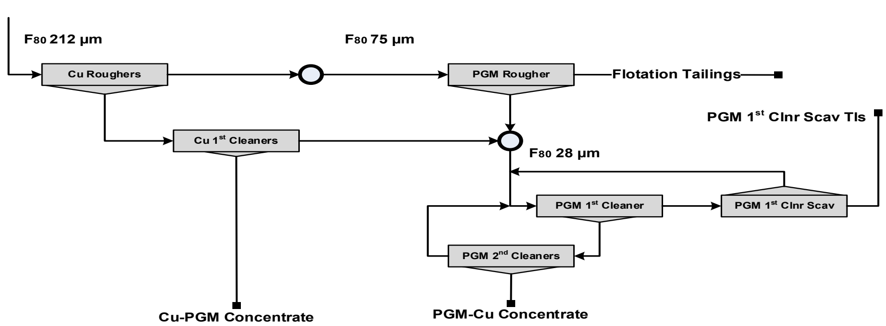
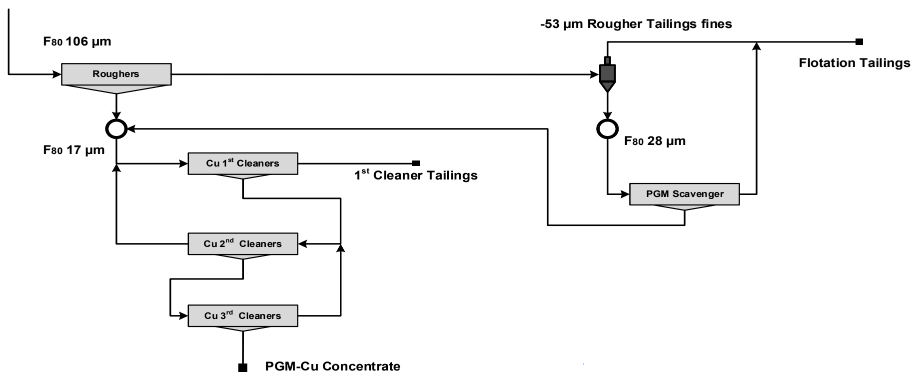


Table 13.14: 2020 SGS Lakefield Locked Cycle Testwork

LCT & Composite Sample Details	Mass Pull to Conc		Flotation Feed				PGM Cu-Conc Grade				Combined PGM-Cu Conc Recovery			
	% Mass	F/C	Cu (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	Cu (%)	Au (g/t)	Pt (g/t)	Pd (g/t)	%R Cu	%R Au	%R Pt	%R Pd
SGS Q3 2020 LCT - 2012 Comp 3	2.10	48	0.37	0.08	0.14	0.57	16.49	2.33	4.07	20.71	94.70	67.70	68.10	86.90
SGS Q3 2020 LCT - 2020 Main Zone	1.10	91	0.24	0.07	0.15	0.63	24.96	6.06	7.84	63.50	94.90	72.60	63.50	90.90
SGS Q3 2020 LCT - 2020 W-Horizon	0.70	143	0.10	0.22	0.45	1.23	12.60	25.24	37.97	144.80	92.50	86.90	69.70	90.20

Generation Mining Alternative Flowsheet applied for 2020 SGS-Lakefield Testwork



A summary of 2010-2013 locked cycle test results from XLS, RDi and ALS relative to 2020 SGS Lakefield metallurgical testwork is detailed in Table 13.13 and Table 13.14. Comparative Pd and Cu recovery to PGM-Cu concentrate over a range in head grade is indicated in Figure 13.9. A similar comparison for a combined PGM-Cu concentrate Pd and Cu relative to initial head grade is detailed in Figure 13.10.

Figure 13.8: Locked Cycle Flotation Test Recovery Comparison

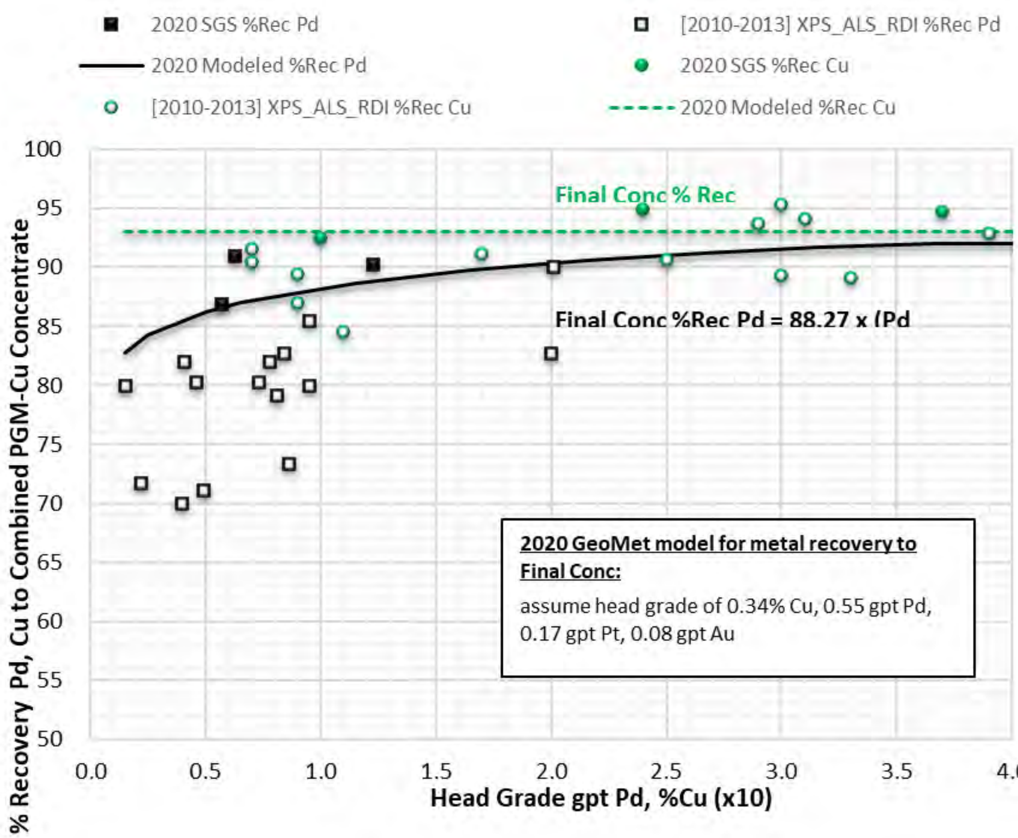
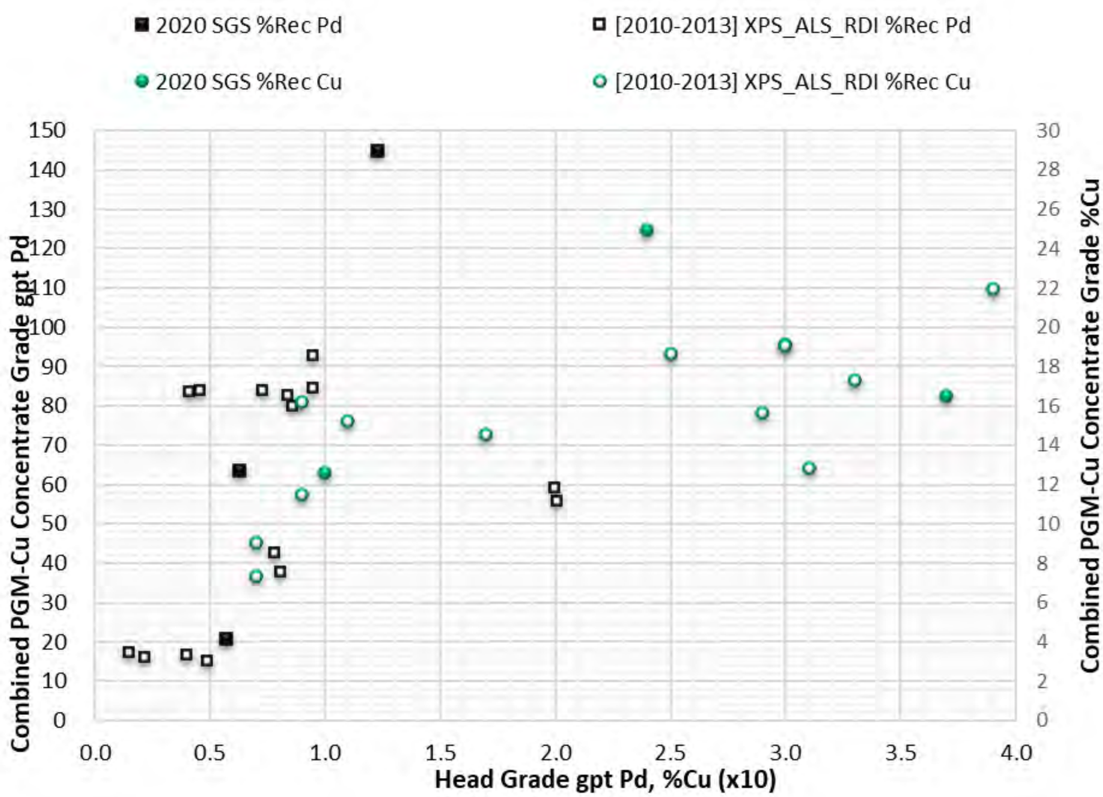


Figure 13.9: Locked Cycle Flotation Test Concentrate Grade Comparison



Results confirm that the optimized flowsheet pursued by Gen Mining in 2020 yields metal recoveries that tend to be higher for both Pd and Cu with similar or improved Pd and Cu grade to a combined PGM-Cu concentrate.

Results from metallurgical testing confirm an expected range in sulphide sulfur content in the rougher tailings from 0.01 to 0.10% S^{2-} and in first Cleaner Tailings from 0.10 to 10.0% S^{2-}. The recovery and separation of sulphides within the process flowsheet supports an intention of project design to produce separate low sulphide NAG tailings and sulfidic PAG first Cleaner Tailings for co-disposal.

Initially considered as a potential marketable by-product, the PGM and Cu content within first Cleaner Tails is expected as being low with no appreciable marketable value.

13.11 Geo-Metallurgical Modeling

Metallurgical testwork completed by Gen Mining during 2020 included benchscale and locked cycle flotation testwork providing a means to develop and validate a predictive geological-metallurgical model for the optimized process flowsheet.

Test samples included remnant 2012 Composite 3, three discrete 2020 interval samples from W Horizon, five 2020 discrete interval samples from the Main zone (North pit), a 2020 bulk sample from the Main Zone (North pit) and a 2020 bulk sample from W Horizon (South pit).

PGM and Cu recovery involves a number of independent, somewhat overlapping influences including:

(i) PGM and Cu head grade.

(ii) PGM and Cu recovery to Rougher Concentrate.

(iii) PGM and Cu recovery to PGM-Cu concentrate considering the potential rejection of values to first Cleaner Tailings due to an association at fine size with pyrite, pyrrhotite or silicates.

(iv) Concentration ratio to either rougher concentrate or PGM-Cu concentrate with a target 10-15% mass pull to rougher concentrate, and 1.0-1.5% mass pull to PGM-Cu concentrate.

(v) PGM Scavenger flotation incremental recovery gains with a nominal 2.5% incremental Rec Pd assumed from PGM Scavengers based on locked cycle testing. The demonstrated range in recovery from PGM Scavengers was 2.0 to 5.5% Rec Pd based on testwork.

Geo-Met modeling considered the recovery of Pd and Cu to rougher concentrate and cleaner concentrate over a range in head grade and material types. Cleaner circuit recovery is in the order of 94-97% for Cu and 90-95% for PGM values. Determination of a predictive curve for metal recovery to a PGM-Cu concentrate was established by first generating a model for recovery to rougher concentrate which was then adjusted by multiplying the equation by demonstrated and expected cleaner circuit recovery.

Specific equations for the GeoMet model and metal recovery to final concentrate are as follows:

% Rec Pd = 88.27 x (Pd head grade$^{0.0338}$) - with a maximum of 92%

% Rec Pt = 1.22 x (%Rec Pd) -21.79

% Rec Au = 1.39 x (%Rec Pd) - 48.37

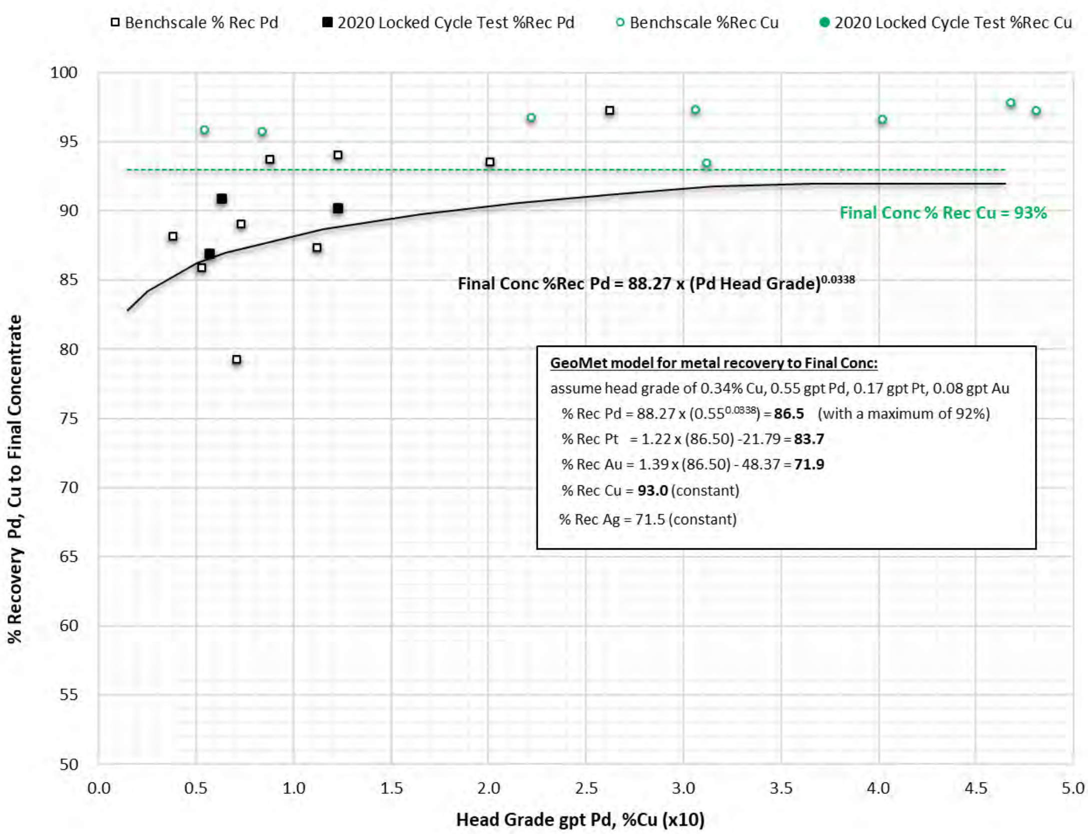
% Rec Cu = 93.0 (constant)

% Rec Ag = 71.5 (constant)

Geo-Met modeling will require continued testing over time to generate additional benchscale metallurgical test data over a wider cross Section of samples. The use of production data, or an analysis of past production trends provides a perspective, although results and confidence levels become somewhat blurred due to the influence of multiple uncontrolled variables. Estimates for silver recovery are based on a comparison of bulk sample Ag head grade relative to final concentrate Ag content. Both gold and silver are associated as a solid solution within copper sulphides with copper mineralization being very responsive to the flotation conditions in testwork and for full scale design.

The proposed GeoMet model, relative to results observed from locked cycle testing, suggests that recovery estimates for LOM modeling are realistic with actual metal recoveries slightly exceeding expectations (Figure 13.10).

Figure 13.10: GeoMet Model for Pd, Cu Recovery to PGM-Cu Conc versus Head Grade



13.12 Technical Risk and Future Testing

Metallurgical testwork completed by Gen Mining during 2020 included a Phase 1 benchscale test program with an evaluation of material hardness and competency, flotation feed grind size, flotation rate kinetics, rougher concentrate regrind size, reagent suite and cleaner circuit performance and optimization. Phase 1 testing involved an optimized flowsheet, relative to previous project studies, which was confirmed as well suited to manage the expected variability in Pd and Cu feed grades, and variable iron sulphide content with a focus on maximizing PGM and Cu recovery.

Follow-up Phase 2 metallurgical testing was completed on three bulk samples including: (i) 2012 Composite 3, (ii) 2020 Main Zone Composite, and (iii) 2020 W Horizon Composite. Testwork included cleaner circuit optimization studies, locked cycle testing, an evaluation DFR performance, flocculant trials for dewatering, thickening and pressure filtration studies, and semi-continuous pilot plant trials for the validation of benchscale and locked cycle testing.

Technical risk associated with mineral processing and the optimized flowsheet is considered as minimal. The overlap and confirmation of metallurgical performance in Phase 1 and Phase 2 testwork provides an acceptable level of confidence in the defined processing parameters and design criteria. Processing technology considered for implementation on the Project is well proven in the mining industry with recognized and capable equipment suppliers available.

The scope of metallurgical testing completed during 2020 and past studies associated with the Project are thorough and address the requirements for completion of a FS, basic engineering, and for advance into detailed engineering. Regrind tests are required to confirm benchmarking specific energy selected for design of both rougher concentrate and tailings regrind circuits.

13.13 Composite Sample Details

Prior to the testwork undertaken in 2020, the most recent significant test program was undertaken by Stillwater Canada during the period 2010-2012. Samples prepared for testwork at that time included composites numbered 1 through 5. Summarized in Table 13.15, respective samples were selected from a bulk composite of discrete intervals of split diamond drill core, representing a cross Section of the Marathon Deposit at varying Cu and Pd grades.

Table 13.15: 2010-2013 Stillwater Composites

Composite #1	Composite #2	Composite #3	Composite #4	Composite #5
Medium Cu / Medium PGM	Low Cu / Medium PGM	High Cu / Medium PGM	High Cu / High PGM	Low Cu / Low PGM
260 Samples	992 Samples	890 Samples	856 Samples	988 Samples
BM Wi 17.7 kwh/t Abrasion Index 0.24	BM Wi 17.8 kwh/t Abrasion Index 0.22	BM Wi 15.9 kwh/t Abrasion Index 0.22	BM Wi 17.3 kwh/t Abrasion Index 0.23	BMWi 16.4 kwh/t Abrasion Index 0.22
0.29% Cu 0.75 gpt Pd 0.18 gpt Pt 0.10 gpt Au	0.08% Cu 0.71 gpt Pd 0.22 gpt Pt 0.07 gpt Au	0.34% Cu 0.55 gpt Pd 0.17 gpt Pt 0.08 gpt Au	0.48% Cu 1.63 gpt Pd 0.40 gpt Pt 0.17 gpt Au	0.09% Cu 0.18 gpt Pd 0.06 gpt Pt 0.04 gpt Au
Avg 0.31 %Cu Max 0.50 %Cu	Avg 0.08 %Cu Max 0.11 %Cu	Avg 0.42 %Cu Max 1.61 %Cu	Avg 0.56 %Cu Max 3.34 % Cu	Avg 0.08 %Cu Max 0.11 %Cu
Avg Pd 0.88 gpt Max Pd 1.52 gpt	Avg Pd 1.14 gpt Max Pd 67.37 gpt	Avg Pd 0.46 gpt Max Pd 0.92 gpt	Avg Pd 2.25 gpt Max Pd 69.98 gpt	Avg Pd 1.14 gpt Max Pd 67.37 gpt
Avg Pt 0.27 gpt Max Pt 1.69 gpt	Avg Pt 0.46 gpt Max Pt 39.10 gpt	Avg Pt 0.14 gpt Max Pt 0.72 gpt	Avg Pt 0.62 gpt Max Pt 21.61 gpt	Avg Pt 0.46 gpt Max Pt 39.10 gpt
Avg Au 0.11 gpt Max Au 0.82 gpt	Avg Au 0.09 gpt Max Au 2.49 gpt	Avg Au 0.08 gpt Max Au 0.83 gpt	Avg Au 0.21 gpt Max Au 3.52 gpt	Avg Au 0.09 gpt Max Au 2.49 gpt
				

Testwork completed on composites 1 to 5 during 2010-2012 applied a different flowsheet and approach to processing. A [Grind-Float]2 concept involving Cu flotation at a feed size of F80 212 μm was followed by regrinding of Cu rougher tails to a P80 110 microns as feed to a secondary PGM flotation circuit. The split flowsheet was intended as producing a high-grade Cu concentrate and a lower grade PGM-Cu concentrate (Subsection 13.10).

Metallurgical testing by Stillwater Canada involved XPS-Sudbury, RDi-Denver, and ALS-Kamloops. The build-up and recirculation of pyrrhotite from Cu first Cleaner Tailings into regrinding and PGM flotation is in hindsight suggested as a significant factor that impacted testwork on occasion. The composite samples selected for testing, although intended as representing blends with Low/Medium and High Cu and Pd, included a high degree of variability in grade between the discrete intervals comprising the respective composites. Composite #2 and #5 intended as being low Cu and medium Pd included a range in interval grades between 0.08-0.11% Cu and 0.5-39.1 g/t Pd. Of the composites prepared, the most realistic composites included Composite #1, #3, #4 with variability in Cu, Pd, Pt, Au grade that were within a single digit multiple of the average composite grade.

A 2.5 t remnant sample of 2012 Composite 3 for the Project, which was stored at site since 2012 in a wooden crate as ½ split HQ drill core, was shipped to SGS Lakefield and was tested extensively during 2020 for comparison to past testwork.

Additional samples selected for benchscale testing during 2020 included a total of eight 150 kg samples including five Main Zone samples identified as MZ-1 through MZ-5 and three W Horizon samples identified as WH-1 through WH-3 summarized in Table 13.16.

Selection of the samples for 2020 benchscale testing sought to provide samples that reliably varied in Pd and Cu grade. Another objective was to pursue contiguous discrete intervals, implying that aside from representing variable metal and mineral content, the composite sample also represented a spatial volume within the deposit that could conceptually be mined and fed to the process plant at some point in the time. This compares to a composite sample comprised of intervals from across the entire wireframe and surface of the Marathon Deposit which, while of interest, would realistically not represent a mix of lithology that might be considered as feed to the process plant.

Additional samples selected for Phase 2 benchscale cleaner circuit optimization and pilot plant testing involved larger 1.5 t bulk samples selected from surface outcrops in the Main Zone and W Horizon. 2020 bulk sample locations and specifics are outlined in Table 13.17.

Table 13.16: 2020 Gen Mining W Horizon and Main Zone Composite Samples (next 7 pages)

2020 Composite W Horizon #1 (High Pd, Low Cu, Low S) DDH M-19-530 Interval Depth (m) 5 to 35										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-530	5	7	V242635	0.02	0.89	0.30	0.01	0.10	0.08	12.65
M-19-530	7	9	V242636	0.02	20.00	5.35	0.16	0.20	0.03	10.70
M-19-530	9	11	V242637	0.02	0.30	0.14	0.01	0.20	0.05	8.71
M-19-530	11	13	V242638	0.21	7.61	2.36	0.46	1.20	0.19	3.80
M-19-530	13	15	V242639	0.26	13.90	2.70	0.73	1.40	0.24	3.31
M-19-530	15	17	V242641	0.03	0.95	0.31	0.07	0.20	0.04	4.33
M-19-530	17	19	V242642	0.01	0.45	0.33	0.02	0.10	0.02	3.48
M-19-530	19	21	V242643	0.01	0.39	0.23	0.03	0.10	0.02	2.86
M-19-530	21	23	V242644	0.01	0.33	0.18	0.02	0.10	0.02	2.84
M-19-530	23	25	V242645	0.04	0.31	0.17	0.12	0.30	0.05	2.81
M-19-530	25	27	V242646	0.14	0.37	0.20	0.22	0.80	0.15	3.09
M-19-530	27	29	V242647	0.07	0.11	0.06	0.03	0.40	0.09	4.10
M-19-530	29	31	V242648	0.18	0.78	0.29	0.11	1.00	0.30	4.19
M-19-530	31	33	V242649	0.19	0.34	0.21	0.10	1.10	0.20	3.82
M-19-530	33	35	V242650	0.22	0.64	0.28	0.26	1.20	0.23	5.32
			Average ->	**0.09**	**3.16**	**0.87**	**0.16**	**0.56**	**0.11**	**5.07**

2020 Composite W Horizon #2 (Median Pd, Low Cu, Low S) DDH M-19-531 Interval Depth (m) 13 to 39										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-531	13	15	V242696	0.07	0.18	0.13	0.02	0.20	0.14	13.10
M-19-531	15	17	V242697	0.04	0.51	0.34	0.01	0.20	0.10	12.00
M-19-531	17	19	V242698	0.11	4.84	0.96	0.26	0.60	0.14	5.98
M-19-531	19	21	V242699	0.05	1.84	0.61	0.09	0.20	0.14	7.35
M-19-531	21	23	V242701	0.01	0.53	0.22	0.07	0.10	0.02	3.72
M-19-531	23	25	V242702	0.02	0.18	0.06	0.01	0.10	0.05	4.48
M-19-531	25	27	V242703	0.04	0.15	0.03	0.01	0.20	0.14	9.17
M-19-531	27	29	V242704	0.04	0.31	0.12	0.05	0.20	0.06	3.73
M-19-531	29	31	V242705	0.24	0.13	0.07	0.10	1.40	0.30	4.32
M-19-531	31	33	V242706	0.06	2.40	0.85	0.14	0.30	0.09	3.15
M-19-531	33	35	V242707	0.01	0.25	0.08	0.01	0.10	0.02	3.61
M-19-531	35	37	V242708	0.01	0.22	0.09	0.03	0.10	0.02	3.47
Hole ID	From	To	Samp ID	% Cu	Pd ppm	Pt ppm	Au ppm	Ag ppm	% S	% Fe
M-19-531	37	39	V242709	0.02	0.16	0.11	0.06	0.10	0.03	5.08
			Average ->	**0.06**	**0.90**	**0.28**	**0.07**	**0.29**	**0.10**	**6.09**

2020 Composite W Horizon #3 (High Pd, Low Cu, Low S) DDH M-19-532 Interval Depth (m) 149 to 175										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-532	145	147	V242849	0.01	1.62	0.16	0.00	0.20	0.01	7.57
M-19-532	147	149	V242851	0.04	20.00	4.39	0.57	0.40	0.04	5.06
M-19-532	149	151	V242852	0.03	0.72	0.04	0.03	0.20	0.02	4.44
M-19-532	151	153	V242853	0.04	0.86	0.46	0.04	0.20	0.02	4.09
M-19-532	153	155	V242854	0.11	4.04	1.20	0.29	1.10	0.08	4.55
M-19-532	155	157	V242855	0.01	0.10	0.01	0.01	0.10	0.01	5.47
M-19-532	157	159	V242856	0.03	0.36	0.17	0.08	0.30	0.03	7.28
M-19-532	159	161	V242857	0.22	5.59	1.11	0.47	1.10	0.17	4.60
M-19-532	161	163	V242858	0.12	2.19	0.66	0.13	0.70	0.13	5.06
M-19-532	163	165	V242859	0.01	0.01	0.01	0.00	0.20	0.02	4.27
M-19-532	165	167	V242860	0.07	0.94	0.24	0.04	0.40	0.13	7.63
M-19-532	167	169	V242861	0.03	0.24	0.18	0.02	0.30	0.04	4.60
M-19-532	169	171	V242862	0.05	0.48	0.09	0.03	0.20	0.05	5.21
			Average ->	**0.06**	**2.86**	**0.67**	**0.13**	**0.42**	**0.06**	**5.37**

2020 Composite Main Zone #1 (Median Pd, Median Cu, Median S) DDH M-19-533 Interval Depth (m) 103 to 131										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-533	103	105	V242962	0.12	1.83	0.08	0.03	0.80	0.22	7.15
M-19-533	105	107	V242963	0.27	0.71	0.15	0.08	1.40	0.46	9.17
M-19-533	107	109	V242964	0.10	0.18	0.04	0.02	1.10	0.20	8.57
M-19-533	109	111	V242965	0.26	0.59	0.14	0.04	1.50	0.54	8.83
M-19-533	111	113	V242966	0.34	0.47	0.10	0.05	1.70	0.74	7.17
M-19-533	113	115	V242967	0.10	0.13	0.04	0.01	0.60	0.30	5.62
M-19-533	115	117	V242968	0.06	0.05	0.04	0.00	0.50	0.25	7.89
M-19-533	117	119	V242969	0.38	0.94	0.21	0.07	2.00	0.82	4.41
M-19-533	119	121	V242971	0.48	1.75	0.35	0.10	2.40	0.92	5.24
M-19-533	121	123	V242972	0.27	0.72	0.15	0.28	1.30	0.58	5.35
M-19-533	123	125	V242973	0.45	1.19	0.29	0.10	2.30	0.91	5.15
Hole ID	From	To	Samp ID	% Cu	Pd ppm	Pt ppm	Au ppm	Ag ppm	% S	% Fe
M-19-533	125	127	V242974	0.40	0.90	0.19	0.10	1.90	0.80	6.27
M-19-533	127	129	V242975	0.45	1.08	0.26	0.12	2.40	0.86	5.29
M-19-533	129	131	V242976	0.73	1.65	0.30	0.11	3.30	1.29	6.11
			Average ->	**0.31**	**0.87**	**0.17**	**0.08**	**1.66**	**0.64**	**6.59**

2020 Composite Main Zone #2 (High Pd, High Cu, High S) DDH M-19-533 Interval Depth (m) 131 to 157										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-533	131	133	V242977	0.70	1.16	0.34	0.19	3.70	1.15	5.36
M-19-533	133	135	V242978	0.42	1.37	0.46	0.09	2.20	0.70	6.79
M-19-533	135	137	V242979	0.63	0.97	0.26	0.10	2.90	1.06	5.90
M-19-533	137	139	V242980	0.63	0.88	0.22	0.09	3.20	1.18	5.69
M-19-533	139	141	V242981	0.54	1.02	0.24	0.09	2.90	1.05	6.55
M-19-533	141	143	V242982	0.58	1.64	0.49	0.18	2.80	1.14	6.07
M-19-533	143	145	V242983	0.39	1.05	0.41	0.09	2.00	0.72	6.15
M-19-533	145	147	V242984	0.88	1.10	0.22	0.16	4.10	1.57	6.37
M-19-533	147	149	V242986	0.66	0.98	0.33	0.09	3.10	1.19	6.83
M-19-533	149	151	V242987	0.97	1.92	0.30	0.16	4.40	1.90	7.66
M-19-533	151	153	V242988	0.42	1.22	0.35	0.10	2.00	0.79	7.20
M-19-533	153	155	V242989	0.49	1.26	0.28	0.10	2.60	0.97	6.69
M-19-533	155	157	V242990	0.34	0.93	0.33	0.13	1.90	0.66	5.43
			Average ->	**0.59**	**1.19**	**0.32**	**0.12**	**2.91**	**1.08**	**6.36**

2020 Composite Main Zone #3 (Median Pd, High Cu, High S) DDH M-19-533 Interval Depth (m) 157 to 181										
Hole ID	From	To	Samp ID	% Cu	Pd ppm	Pt ppm	Au ppm	Ag ppm	% S	% Fe
M-19-533	157	159	V242991	0.12	0.29	0.17	0.04	0.80	0.27	5.17
M-19-533	159	161	V242992	0.54	1.05	0.37	0.16	2.70	1.16	6.00
M-19-533	161	163	V242993	0.77	1.41	0.30	0.13	3.40	1.57	6.21
M-19-533	163	165	V242994	0.50	0.89	0.26	0.13	2.40	1.01	5.73
M-19-533	165	167	V242995	0.42	0.77	0.18	0.08	2.10	0.89	5.42
M-19-533	167	169	V242996	0.59	1.22	0.27	0.09	2.60	1.23	6.12
M-19-533	169	171	V242997	0.68	1.22	0.32	0.11	3.40	1.39	5.97
M-19-533	171	173	V242998	0.53	0.93	0.24	0.09	2.60	1.22	5.83
M-19-533	173	175	V242999	0.59	0.80	0.35	0.08	2.60	1.16	7.33
M-19-533	175	177	V243001	0.61	1.16	0.25	0.11	3.00	1.34	7.90
M-19-533	177	179	V243002	0.37	0.71	0.23	0.06	1.80	1.14	7.14
M-19-533	179	181	V243003	0.39	0.56	0.13	0.11	1.70	1.30	5.57
M-19-533	181	183	V243004	0.05	0.02	0.02	0.01	0.20	0.65	2.81
			Average ->	**0.47**	**0.85**	**0.24**	**0.09**	**2.25**	**1.10**	**5.94**

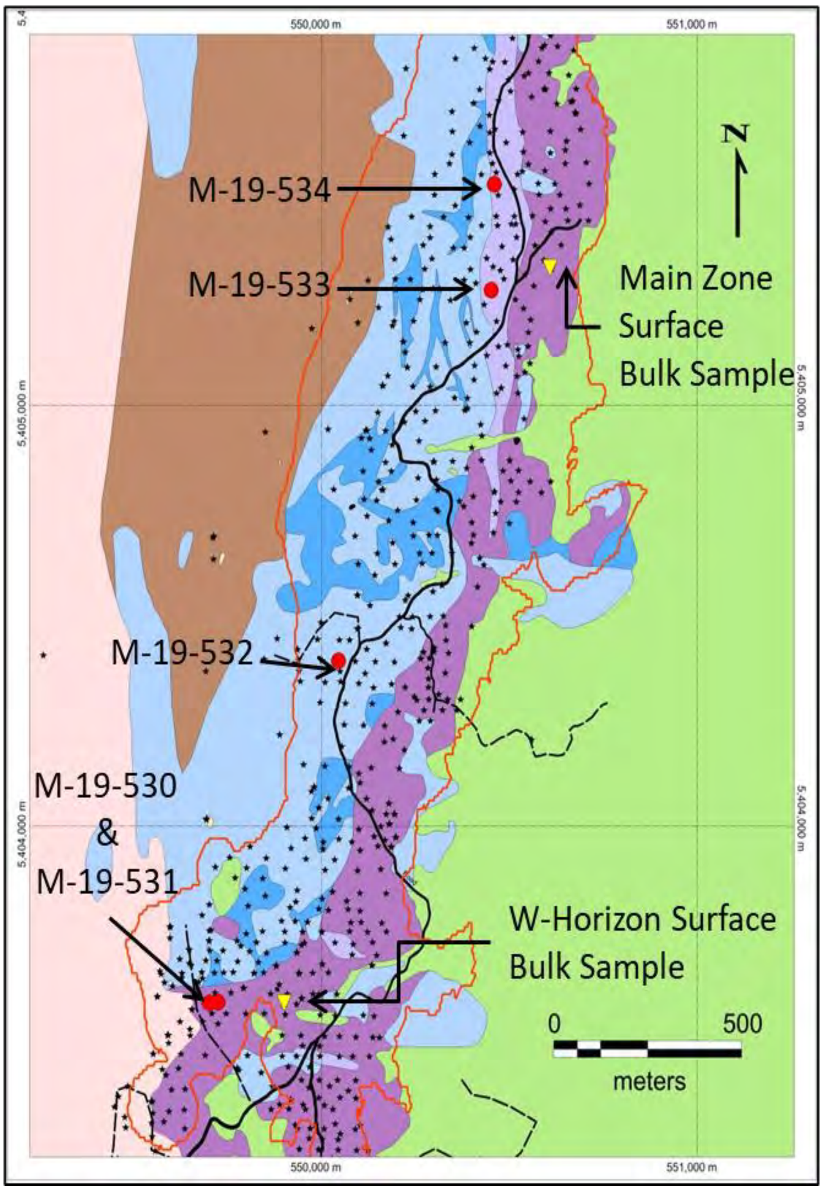
2020 Composite Main Zone #4 (Median Pd, High Cu, High S) DDH M-19-533 Interval Depth (m) 183 to 231										
Hole ID	From	To	Samp ID	% Cu	Pd ppm	Pt ppm	Au ppm	Ag ppm	% S	% Fe
M-19-533	183	185	V243005	0.12	0.21	0.04	0.01	0.40	1.39	4.74
M-19-533	185	187	V243006	0.43	0.64	0.12	0.05	2.30	1.53	6.77
M-19-533	187	189	V243007	0.41	0.43	0.06	0.04	1.90	1.59	6.64
M-19-533	189	191	V243008	0.57	0.76	0.13	0.07	2.80	1.86	7.34
M-19-533	191	193	V243009	0.53	0.73	0.23	0.08	2.60	1.92	7.07
M-19-533	193	195	V243010	0.61	1.07	0.15	0.16	3.00	2.10	7.64
M-19-533	195	197	V243011	0.51	0.65	0.11	0.07	2.00	2.61	7.50
M-19-533	197	199	V243012	0.40	0.60	0.10	0.03	0.90	2.99	6.61
M-19-534	219	221	V243132	0.44	0.96	0.37	0.15	2.40	1.60	7.82
M-19-534	221	223	V243133	0.52	1.43	0.29	0.09	2.50	2.35	8.72
M-19-534	223	225	V243134	0.35	0.56	0.07	0.10	1.90	1.03	6.61
M-19-534	225	227	V243136	0.66	1.02	0.25	0.18	3.70	2.07	9.15
M-19-534	227	229	V243137	0.37	0.73	0.14	0.06	1.20	1.48	8.38
M-19-534	229	231	V243138	0.44	3.02	0.21	0.05	1.60	2.10	8.62
			Average ->	**0.46**	**0.91**	**0.16**	**0.08**	**2.09**	**1.90**	**7.40**

2020 Composite Main Zone #5 (Low Pd, Median Cu, High S) DDH M-19-534 Interval Depth (m) 177 to 207										
Hole ID	**From**	**To**	**Samp ID**	**% Cu**	**Pd ppm**	**Pt ppm**	**Au ppm**	**Ag ppm**	**% S**	**% Fe**
M-19-534	177	179	V243110	0.40	0.57	0.15	0.06	1.40	1.21	6.47
M-19-534	179	181	V243111	0.49	0.38	0.10	0.05	2.10	1.17	4.93
M-19-534	181	183	V243112	0.20	0.27	0.07	0.05	0.70	0.81	5.58
M-19-534	183	185	V243113	0.24	0.22	0.06	0.04	1.20	1.44	6.31
M-19-534	185	187	V243114	0.13	0.12	0.04	0.03	0.50	1.93	6.93
M-19-534	187	189	V243115	0.15	0.15	0.05	0.02	0.70	1.87	7.07
M-19-534	189	191	V243116	0.29	0.25	0.06	0.04	1.40	1.95	6.12
M-19-534	191	193	V243117	0.31	0.44	0.15	0.07	1.30	1.70	6.84
M-19-534	193	195	V243118	0.52	0.72	0.49	0.07	2.30	1.99	6.78
M-19-534	195	197	V243119	0.56	0.89	0.23	0.08	2.40	1.66	8.21
M-19-534	197	199	V243121	0.19	0.37	0.09	0.05	0.80	0.67	6.90
M-19-534	199	201	V243122	0.13	0.41	0.09	0.03	0.60	0.40	6.18
M-19-534	201	203	V243123	0.12	0.30	0.09	0.03	0.70	0.29	5.57
M-19-534	203	205	V243124	0.14	0.56	0.08	0.04	0.90	0.29	5.76
M-19-534	205	207	V243125	0.35	0.67	0.09	0.04	1.50	0.69	6.00
			Average ->	**0.28**	**0.42**	**0.12**	**0.05**	**1.23**	**1.20**	**6.38**

Table 13.17: 2020 Gen Mining W Horizon and Main Zone Bulk Samples

Composite	Cu (%)	Fe (%)	S (%)	Au (g/t)	Pt (g/t)	Pd (g/t)
2012 Composite 3 Bulk Sample	0.36	10.10	1.67	0.26	0.11	0.50
2020 North Pit (Main Zone) Composite Bulk Sample	0.23	9.65	0.44	0.07	0.15	0.63
2020 South Pit (W Horizon) Composite Bulk Sample	0.09	6.39	0.08	0.58	0.42	0.90

Figure 13.11: Location of Composite locations (Figure not to scale)



13.14 DFR (Direct Flotation Reactor) Cells and Flotation Circuit Selectivity

In conjunction with Phase 1 and Phase 2 benchscale testing during 2020, Gen Mining conducted a mini-pilot plant to evaluate the applicability of Woodgrove DFRs relative to conventional flotation cells on both the roughers, and first Cleaner flotation.

The Project mineralogy includes chalcopyrite as the primary copper sulphide mineral, along with variable iron sulphide content including pyrite and pyrrhotite. A nominal 30-40% PGM are associated with recoverable copper with the remainder either free or associated with silicate prior to rougher concentrate regrinding. The relatively slow PGM flotation rate kinetics, compared to the performance of Cu mineralization, requires a relatively aggressive mass pull to concentrate with the potential for froth collapse and cell to cell carry-over with conventional flotation.

The Woodgrove DFR cell provides a distinct operating advantage since relative to conventional flotation cells the technology:

- Yields a mineral rich gas/slurry Phase as opposed to a froth.
- Incorporates wash water in the disengagement zone of each cell to promote silicate rejection.
- Can provide increased concentration ratio (lower mass pull), with maintained metal recovery, which improves the consistency of final PGM-Cu concentrate grade.
- Requires a smaller footprint and lower power cost than conventional technology.
- Minimizes the requirement for transfer pumps between stages since concentrate from respective DFR cells is moved pneumatically.

Testwork confirmed the applicability of DFR technology. The FS cost estimates assume direct flotation reactors throughout the circuit including Rougher, first to third Cleaner, and PGM Scavenger flotation.

13.15 Dewatering and Concentrate Filtration

The Project and optimized process flowsheet (Figure 13.1) involves the dewatering of a PGM-Cu concentrate in a concentrate thickener followed by pressure filtration to yield a 9-11% weight/weight moisture concentrate for transport. Flotation tailings are dewatered in a tailings thickener prior to impoundment in the Process Solids management Facility (PSMF).

Thickener overflow from both applications is expected as being clear and low in total suspended solids for recycle within the operation as process water.

In conjunction with Phase 2 benchscale testing, Gen Mining involved SNF and Outotec Canada in the completion of flocculation, dewatering and pressure filtration testing on samples generated from testwork at SGS Lakefield. The results indicated that concentrate and flotation tailings can be successfully treated with flocculant SNF 920-SH.

Effective concentrate dewatering required an addition of 48 g/t flocculant to achieve acceptable overflow clarity (24 NTU or 29 ppm solids) with 50-55% solids underflow density. Concentrate thickener sizing from dynamic simulation tests was confirmed as 0.15 mt/m^2-h. Concentrate pressure filtration specifics defined a filtration rate of 375 kg/m^2-h yielding a filter cake of 13% moisture. Further optimization of filter cake moisture is possible with the potential to decrease pressure filter chamber depth which increases the size of the associated pressure filter. The FS considers the implementation of a larger pressure filter for layout and cost estimation which will support decreased transportation costs, while achieving target moisture to control dusting and wind losses during transport.

Tailings dewatering required a blend of coagulant and flocculant involving the addition of coagulant, 8 g/t SNF 45-SH, with 40 g/t flocculant to achieve acceptable overflow clarity (100 NTU or 83 ppm solids) with 55-60% underflow density. Tailings thickener sizing from dynamic simulation testing was confirmed as 0.40 mt/m^2-h.

14. MINERAL RESOURCE ESTIMATES

14.1 Introduction

The Mineral Resource Estimate presented herein has been prepared following the guidelines of the Canadian Securities Administrators' NI 43-101 and Form 43-101F1 and in conformity with generally accepted "CIM Estimation of Mineral Resource and Mineral Reserves Best Practices" guidelines. Mineral Resources have been classified in accordance with the "CIM Standards on Mineral Resources and Reserves: Definition and Guidelines" as adopted by CIM Council on May 10, 2014:

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applied to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the Mineral Resource will be converted into Mineral Reserve. Confidence in the estimate of Inferred Mineral Resources is insufficient to allow the meaningful application of technical and economic parameters or to enable an evaluation of economic viability worthy of public disclosure.

P&E is not aware of any known permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource Estimate. All Mineral Resource estimation work reported herein was carried out or reviewed by Yungang Wu, P.Geo., Fred Brown, P.Geo., and Eugene Puritch, P.Eng., FEC, CET, all independent QP as defined by NI 43-101.

Wireframe modeling utilized Seequent Leapfrog Geo™ software. Mineral Resource estimation was carried out using GEOVIA GEMS™ software. Variography was carried out using Snowden Supervisor™. Pit optimization was carried out using NPV Scheduler™ software.

The effective date of the Mineral Resource Estimates for Marathon, Geordie and Sally in this Technical Report is June 30, 2020. Since the Marathon Mineral Resource is the focus of this FS the Geordie and Sally Mineral Resource Estimates will be summarized in Subsection 14.3.

14.2 Marathon Mineral Resource Estimate

14.2.1 Previous Marathon Mineral Resource Estimate

A Mineral Resource Estimate for the Marathon Deposit, prepared by P&E, was released on January 6, 2020 with the results of the PEA (Gen Mining) News Release, January 6, 2020). The Mineral Resource Estimate was reported relative to a NSR cut-off value of $13/t (Table 14.1).

Table 14.1: Marathon Deposit Pit Constrained Mineral Resource Estimate (effective June 30, 2020)

Classification	Tonnes k	Pd g/t	Pt g/t	Cu %	Au g/t	Ag g/t	Pd koz	Pt koz	Cu Mlb	Au koz	Ag koz
Measured	103,337	0.64	0.21	0.20	0.07	1.5	2,123	688	463	239	4,964
Indicated	75,911	0.46	0.15	0.20	0.06	1.8	1,115	376	333	151	4,371
Total M+I	**179,248**	**0.56**	**0.18**	**0.20**	**0.07**	**1.6**	**3,238**	**1,064**	**796**	**390**	**9,335**
Inferred	668	0.37	0.12	0.19	0.05	1.4	8	3	3	1	31

14.2.2 Data Supplied

Sample data was provided in the form of ASCII text files and Excel format files. Gen Mining supplied the database which contained 1,341 unique collar records (Table 14.2). Of these, 164 records fell outside the block model limits or had no reported assay data. Drill hole and surface channel sample records consist of collar, survey, lithology, bulk density and assay data. Assay data fields consist of the drill hole ID, down-hole interval distances, sample number, and g/t Ag, g/t Au, Cu %, g/t Pd, g/t Pt assay grades. All data are in metric units. Collar coordinates were provided in the NAD27 UTM Zone 16 coordinate system. The drilling covers an area of approximately 470 ha (Figure 14.1 – see Appendices)

Table 14.2: Drill Hole Database Summary

	Drill Holes	Channel Samples	Total
Count	882	459	**1,341**
Total Metres	169,850	4,221.10	**174,071.10**
Minimum Length (m)	4.90	0.80	**0.80**
Maximum Length (m)	1,050	52.80	**1,050**
Average Length (m)	192.57	9.20	**129.81**

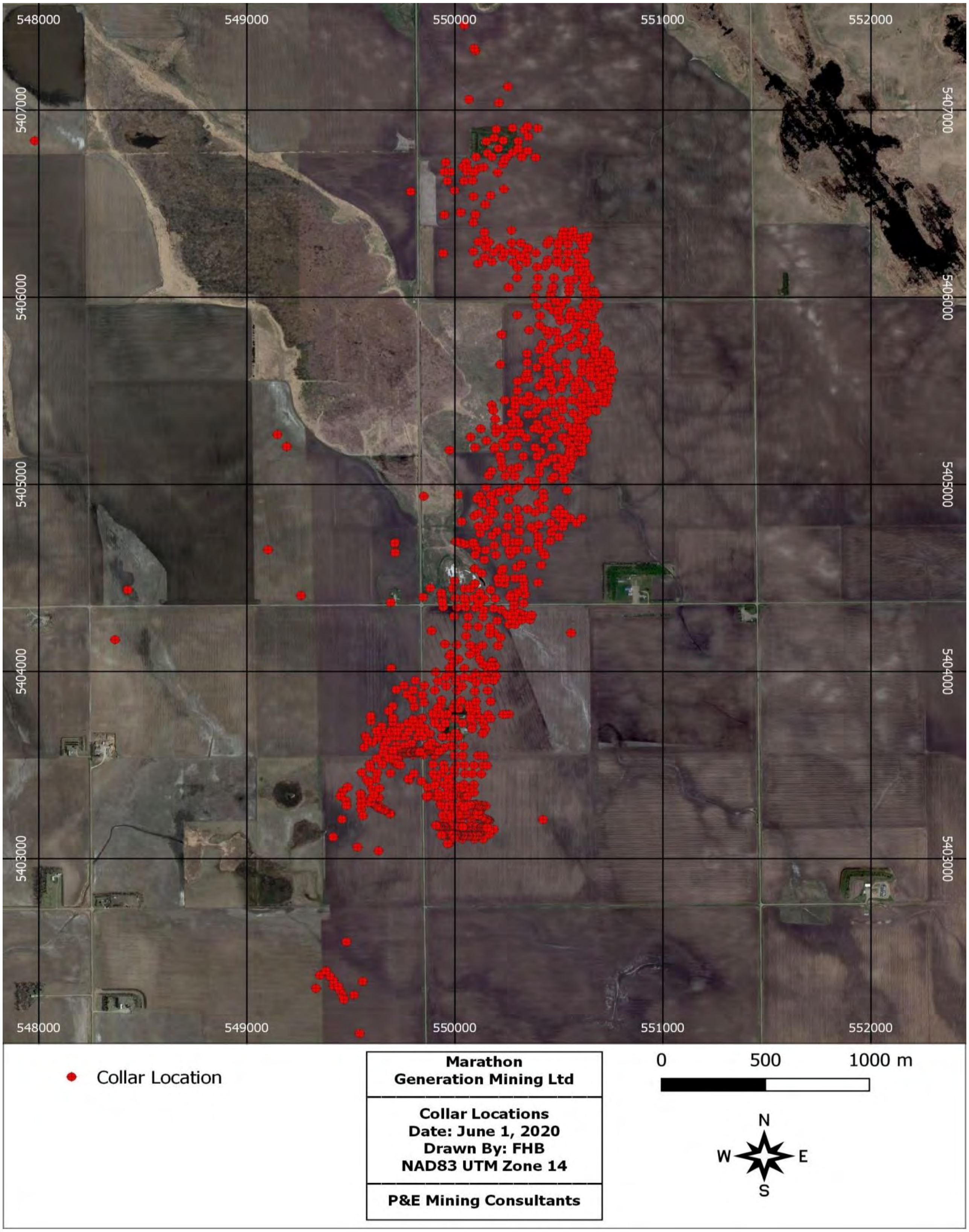
Gen Mining supplied the database which contained a total of 44,084 Ag assays, 54,208 Au assays, 54,741 Cu assays, 54,070 Pd assays, and 54,163 Pt assays. For domain modeling a calculated NSR field was added to the assay table as follows:

$$NSR\ (C\$/t) = (Ag \times 0.48) + (Au \times 42.14) + (Cu \times 73.27) + (Pd \times 50.50) + (Pt \times 25.07) - 2.62$$

Industry standard validation checks were carried out on the databases provided by Gen Mining and minor corrections were made where necessary. P&E typically validates a Mineral Resource database by checking for inconsistencies in naming conventions or analytical units, duplicate entries, interval, length or distance, values less than or equal to zero, blank or zero-value assay results, out-of-sequence intervals, intervals or distances greater than the reported drill hole length, inappropriate collar locations, missing interval and coordinate fields, and down-hole survey information beyond normal expected deviation.

No significant errors were noted with the provided databases. P&E considers that the drill hole database supplied is suitable for Mineral Resource estimation. The drill hole data was imported into a GEMS™ format MS-Access™ database.

Figure 14.1: Drill Hole Plan View



14.2.3 Economic Considerations

Based on knowledge of similar projects, review of available historical data, and consideration of potential mining scenarios for the Marathon Deposit, the economic parameters listed in Table 14.3 were deemed appropriate for the Mineral Resource Estimate. Metal prices are based on the approximate two-year trailing average metal prices as of April 30, 2020. Process recovery factors are based on information from previous Technical Reports on the Property. Mining and processing costs are based on similar projects.

Table 14.3: Economic Parameters

Parameter	Unit	Value
Palladium Metal Price	US$/oz	1,600
Platinum Metal Price	US$/oz	900
Gold Metal Price	US$/oz	1,500
Silver Metal Price	US$/oz	18.00
Copper Metal Price	US$/lb	3.00
US$/C$ Exchange Rate	$	0.75
Pd Process Recovery	%	80.0
Pt Process Recovery	%	74.5
Au Process Recovery	%	73.2
Ag Process Recovery	%	71.5
Cu Process Recovery	%	90.0
Cu Smelter Payable	%	95.5
Ag Smelter Payable	%	90.0
Au Smelter Payable	%	90.0
Pd Smelter Payable	%	92.5
Pt Smelter Payable	%	88.0
Smelting, Refining & Shipping	$/t	2.62
G&A Cost	$/t	2.00
Rock Mining Cost	$/t	2.50
Mineralized Material Mining Cost	$/t	2.70
Overburden Mining Cost	$/t	2.70
Processing Cost	$/t	11.00
NSR Contribution		
Cu %	$/%	73.27
Ag g/t	$/g	0.48
Au g/t	$/g	42.14
Pd g/t	$/g	50.50
Pt g/t	$/g	25.07
Mineral Resource NSR Cut-off	**$/t**	**13.00**

14.2.4 Geology Model

Based on fault interpretations developed by Gen Mining, the Marathon Deposit area was divided into 10 fault blocks (Figure 14.2). Within each fault block, the metabasalt, gabbro, troctolite, melagabbro, dyke and basement lithologies were modeled in Leapfrog based on drill hole lithological logging (Figure 14.3). The resulting lithological units were used for modeling bulk density.

Figure 14.2: Fault Blocks

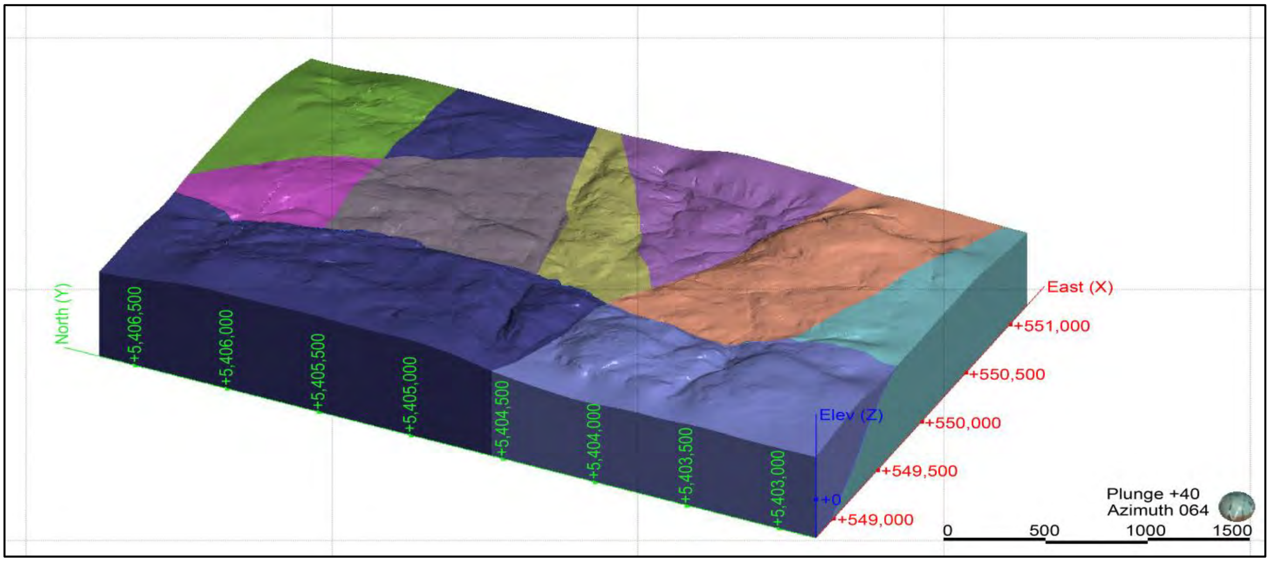
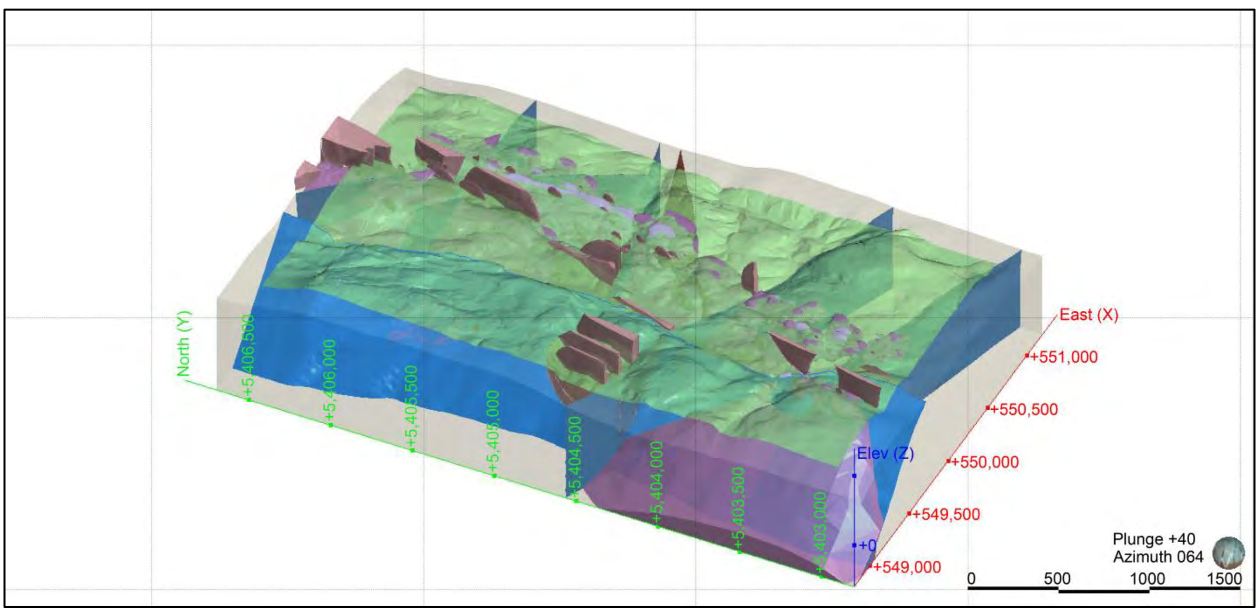


Figure 14.3: Lithology Model



14.2.5 Mineralization Domains

The updated Mineral Resource Estimate in this Technical Report is based on 19 mineralization domains with a total volume on the order of 91 Mm^3 (Figure 14.4). The mineralization domains have been based on zones developed by Dr. David Good, P.Geo., previously Vice President Exploration for Stillwater Canada. Mineralization domains are further broadly grouped into two areas: the northern domains where mineralization is dominated by paleo-topographic controls, and the remaining southern domains. The domains are further split into the identified fault blocks. Of the 19 domains modeled, the North Main (NMAIN_90) and Walford Zone (WZONE_80) include approximately 66% of the total Mineral Resource by volume (Figure 14.4).

The mineralization domains were based on NSR drill hole assay values equal to or greater than $13/t within the identified zones and with observed continuity downhole along strike and down dip. Drill hole intercepts were only used to define the mineralization domains and surface channel sample intervals were excluded from the process. The selected intervals include lower grade intervals or un-sampled intervals, where necessary and were used to maintain continuity between drill holes. Three-dimensional wireframes linking drill hole sections were subsequently constructed using the Leapfrog Radial Basis Vein Function with hanging wall and footwall surfaces snapped directly to the selected drill hole intercepts within each fault block. The domain wireframes were used to back-tag the block model, as well as the assay, bulk density and composite tables with unique rock codes (Table 14.14).

Figure 14.4: Mineralization Domains

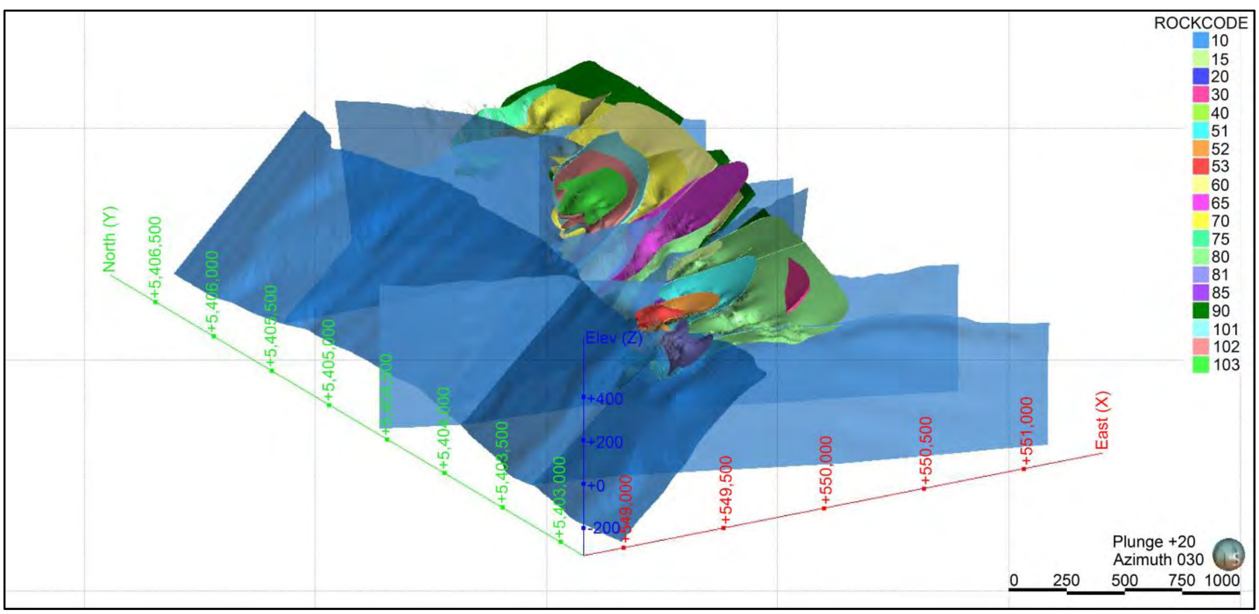


Figure 14.5: North Main & Walford Mineralization Domains

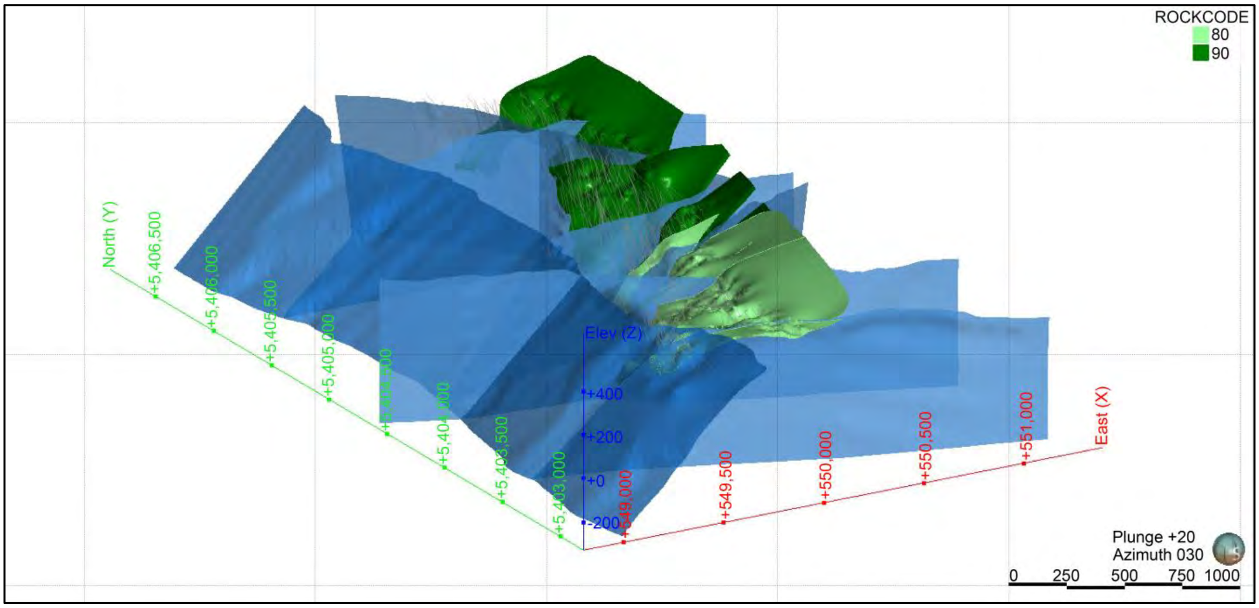


Table 14.4: Domain Rock Codes

Domain	Rock Code	Volume (k m^3)
MAG_101	101	1,767.0
MAG_102	102	603.0
MAG_103	103	231.2
MBRFW_40	40	3,123.2
MBR_30	30	3,965.5
MHW_51	51	1,056.8
MHW_52	52	558.2
MHW_53	53	256.9
NFW_20	20	8,322.0
NHW2_60	60	4,781.1
NHW3_70	70	2,537.0
NHW4_65	65	1,225.7
NHW5_15	15	65.7
NHW6_75	75	871.5
NHW_10	10	534.4
NMAIN_90	90	48,560.2
WHW_85	85	122.4
WZHW_81	81	985.3
WZONE_80	80	11,846.8
Total		**91,413.8**

14.2.6 Exploratory Data Analysis

The mean nearest neighbor collar distance for the Marathon Project drilling is 44. The average length of the drill holes is 192.57 m, with a mode of 201.00 m. A total of 27 drill holes do not report assay results. Summary statistics for the domain coded assay data (drill hole and trench channel samples) are listed in Table 14.5.

Table 14.5: Assay Summary Statistics

Agg/t						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
MAG_101	1.543	1.351	0.875	0.100	9.000	243
MAG_102	1.791	1.206	0.673	0.100	5.220	135
MAG_103	1.852	1.522	0.822	0.450	8.000	53
MBR_30	1.717	1.502	0.875	0.100	19.000	1,113
MBRFW_40	1.627	1.760	1.082	0.100	33.000	632
MHW_51	2.466	1.995	0.809	0.450	24.000	280
MHW_52	2.626	2.330	0.887	0.450	25.000	131
MHW_53	2.089	1.167	0.559	0.500	6.300	55
NFW_20	1.335	1.750	1.311	0.100	44.000	1,667
NHW_10	1.426	0.991	0.695	0.450	6.000	87
NHW2_60	1.553	2.355	1.516	0.100	38.040	986
NHW3_70	1.381	3.290	2.382	0.090	73.000	605
NHW4_65	1.720	1.223	0.711	0.450	9.120	241
NHW5_15	1.305	1.004	0.770	0.200	4.120	32
NHW6_75	2.294	2.540	1.107	0.200	29.300	168
NMAIN_90	1.647	1.477	0.897	0.010	27.000	7,623
WHW_85	1.156	1.155	1.000	0.450	3.470	19
WZHW_81	1.138	1.161	1.021	0.450	12.860	478
WZONE_80	2.217	12.381	5.585	0.100	591.000	3,094

g/t Au						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
MAG_101	0.039	0.043	1.105	0.001	0.340	243
MAG_102	0.075	0.161	2.143	0.001	1.090	135
MAG_103	0.039	0.049	1.274	0.001	0.210	53
MBR_30	0.065	0.116	1.790	0.001	1.580	1,144
MBRFW_40	0.043	0.053	1.223	0.001	0.480	638
MHW_51	0.043	0.082	1.903	0.001	0.840	293
MHW_52	0.040	0.050	1.266	0.002	0.450	133
MHW_53	0.057	0.062	1.096	0.002	0.270	55

g/t Au						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
NFW_20	0.050	0.078	1.550	0.001	1.160	1,909
NHW_10	0.042	0.080	1.878	0.001	0.700	87
NHW2_60	0.041	0.054	1.295	0.001	0.590	1,070
NHW3_70	0.041	0.086	2.132	0.001	1.390	662
NHW4_65	0.055	0.090	1.626	0.001	0.680	249
NHW5_15	0.041	0.070	1.713	0.001	0.370	35
NHW6_75	0.058	0.069	1.181	0.001	0.420	222
NMAIN_90	0.067	0.097	1.452	0.001	2.610	8,287
WHW_85	0.029	0.031	1.075	0.002	0.080	19
WZHW_81	0.055	0.074	1.360	0.001	0.830	480
WZONE_80	0.072	0.198	2.740	0.001	7.220	3,227

Cu%						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
MAG_101	0.069	0.093	1.350	0.001	1.050	243
MAG_102	0.082	0.072	0.874	0.002	0.330	135
MAG_103	0.127	0.139	1.096	0.002	0.730	53
MBR_30	0.101	0.123	1.217	0.001	0.970	1,144
MBRFW_40	0.101	0.100	0.991	0.001	0.900	638
MHW_51	0.056	0.064	1.152	0.001	0.360	293
MHW_52	0.080	0.056	0.695	0.003	0.290	133
MHW_53	0.093	0.089	0.960	0.005	0.320	55
NFW_20	0.235	0.277	1.178	0.001	4.910	1,911
NHW_10	0.100	0.098	0.979	0.001	0.520	88
NHW2_60	0.108	0.135	1.254	0.001	1.430	1,072
NHW3_70	0.082	0.092	1.114	0.001	0.630	662
NHW4_65	0.101	0.125	1.231	0.001	0.970	250
NHW5_15	0.018	0.027	1.462	0.006	0.120	35
NHW6_75	0.188	0.198	1.053	0.004	1.470	222
NMAIN_90	0.235	0.208	0.883	0.001	2.900	8,303
WHW_85	0.064	0.107	1.671	0.002	0.410	19
WZHW_81	0.184	0.189	1.025	0.001	0.980	480
WZONE_80	0.093	0.119	1.277	0.001	1.220	3,227

g/t Pd						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
MAG_101	0.354	0.390	1.103	0.005	1.720	243
MAG_102	0.266	0.404	1.518	0.001	2.770	135
MAG_103	0.103	0.222	2.163	0.001	1.190	53
MBR_30	0.477	1.160	2.430	0.001	18.600	1,144
MBRFW_40	0.221	0.333	1.504	0.001	3.360	638
MHW_51	0.325	1.247	3.831	0.005	15.220	292
MHW_52	0.165	0.229	1.393	0.005	1.590	133
MHW_53	0.242	0.364	1.508	0.005	2.060	55
NFW_20	0.436	0.671	1.539	0.000	14.900	1,906
NHW_10	0.310	0.377	1.218	0.005	2.100	87
NHW2_60	0.321	0.458	1.424	0.001	5.700	1,068
NHW3_70	0.285	0.442	1.551	0.001	3.650	660
NHW4_65	0.230	0.316	1.376	0.001	2.350	249
NHW5_15	0.393	0.557	1.417	0.010	2.680	35
NHW6_75	0.551	0.716	1.299	0.001	4.870	222
NMAIN_90	0.604	0.780	1.291	0.001	15.710	8,268
WHW_85	0.201	0.200	0.994	0.005	0.800	19
WZHW_81	0.439	0.787	1.792	0.005	9.460	478
WZONE_80	0.753	2.794	3.711	0.001	69.970	3,222

g/t Pt						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
MAG_101	0.094	0.087	0.920	0.002	0.540	243
MAG_102	0.092	0.095	1.037	0.001	0.450	135
MAG_103	0.059	0.067	1.122	0.001	0.220	53
MBR_30	0.200	0.426	2.127	0.001	8.720	1,144
MBRFW_40	0.099	0.114	1.162	0.001	1.030	638
MHW_51	0.138	0.437	3.167	0.005	4.930	293
MHW_52	0.073	0.088	1.199	0.007	0.780	133
MHW_53	0.105	0.095	0.902	0.007	0.470	55
NFW_20	0.123	0.164	1.328	0.001	2.210	1,898
NHW_10	0.115	0.106	0.923	0.005	0.490	87
NHW2_60	0.121	0.172	1.416	0.001	2.930	1,065
NHW3_70	0.110	0.137	1.248	0.001	1.420	660
NHW4_65	0.129	0.174	1.350	0.001	1.410	249
NHW5_15	0.231	0.250	1.081	0.010	1.140	35
NHW6_75	0.180	0.238	1.317	0.001	2.340	220
NMAIN_90	0.181	0.264	1.457	0.001	8.200	8,274
WHW_85	0.083	0.052	0.628	0.007	0.170	19
WZHW_81	0.165	0.278	1.686	0.001	2.680	480

g/t Pt						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
WZONE_80	0.294	1.176	3.998	0.001	39.100	3,225

P&E noted a strong overall correlation between Pd and Pt as well as with Au, Pd and Pt. A strong correlation between Cu with Pd and Pt was noted in the northern area (Table 14.6).

Table 14.6: Assay Correlation Table (Pearson Correlation Coefficient)

Total	Ag	Au	Cu	Pd	Pt
Ag	1				
Au	0.07	1			
Cu	0.06	0.31	1		
Pd	0.03	0.55	0.32	1	
Pt	0.03	0.40	0.18	0.83	1
WZONE 80	**Ag**	**Au**	**Cu**	**Pd**	**Pt**
Ag	1				
Au	0.06	1			
Cu	0.04	0.30	1		
Pd	0.01	0.55	0.23	1	
Pt	0.01	0.41	0.14	0.87	1
NMAIN 90	**Ag**	**Au**	**Cu**	**Pd**	**Pt**
Ag	1				
Au	0.20	1			
Cu	0.32	0.45	1		
Pd	0.21	0.59	0.66	1	
Pt	0.19	0.44	0.48	0.65	1

Gen Mining supplied the database which contained 2,130 bulk density measurements with values ranging from 1.075 to 4.307 t/m^3 (Table 14.7). The average bulk density measured is 3.023 t/m^3. Bulk density measurements were back-tagged to the lithology model.

Table 14.7: Bulk Density Summary Statistics (t/m^3)

Lithology	Count	Average	Minimum	Maximum	Std Dev
Basement	166	2.909	2.559	3.440	0.202
Gabbro	612	3.035	2.004	3.410	0.146
Melagabbro	32	3.289	2.870	3.840	0.241
Metabasalt	793	3.049	1.076	4.307	0.226
Troctolite	29	3.052	1.929	3.410	0.258
Other	498	2.986	1.075	3.980	0.313
Total	**2,130**	**3.023**	**1.075**	**4.307**	**0.236**

14.2.7 Compositing

Constrained assay sample lengths range from 0.10 m to 29.8 m with an average sample length of 2.04 m and a sample length mode of 2.00 m. A total of 94% of the assay samples have a length of 2.00 m.

All constrained assay samples were therefore composited to the dominant sample length of 2.00 m. Length-weighted composites were calculated for all metals within the defined mineralization domains. Missing sample intervals in the data were assigned a nominal background grade of 0.001 g/t or 0.001%. The compositing process started at the first point of intersection between the drill hole and the domain intersected and halted upon exit from the domain wireframe. Channel samples that were intersected by the domain wireframes were also included in the compositing process. Residual composites that were less than half of the compositing length were discarded so as to not introduce a short sample bias into the estimation process. The wireframes that represent the interpreted mineralization domains were also used to back-tag a rock code identifier into the composite workspace. The composite data were visually validated against the domain wireframes and then exported for analysis and estimation. A summary of uncapped composite statistics is tabulated in Table 14.8.

Table 14.8: Composite Summary Statistics

Ag g/t						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
NHW_10	0.969	1.073	1.108	0.001	5.990	108
NHW5_15	1.081	0.940	0.869	0.001	3.020	27
NFW_20	1.104	1.689	1.530	0.001	43.990	1,950
MBR_30	1.720	1.564	0.910	0.001	18.990	977
MBRFW_40	1.610	1.885	1.171	0.001	33.000	551
MHW_51	2.062	2.212	1.073	0.001	23.990	269
MHW_52	2.080	2.564	1.232	0.001	24.990	132
MHW_53	2.228	1.195	0.536	0.500	6.290	45
NHW2_60	1.335	2.363	1.770	0.001	38.040	995
NHW4_65	1.459	1.296	0.888	0.001	9.110	247
NHW3_70	1.064	3.075	2.889	0.001	72.970	701
NHW6_75	1.712	2.509	1.465	0.001	29.290	207
WZONE_80	2.104	12.463	5.923	0.001	590.910	3,056
WZHW_81	1.171	1.192	1.019	0.003	12.850	441
WHW_85	1.320	1.285	0.973	0.500	3.460	13
NMAIN_90	1.425	1.476	1.035	0.001	26.990	8,645
MAG_101	1.341	1.404	1.047	0.001	8.990	248
MAG_102	1.558	1.325	0.851	0.001	5.210	120
MAG_103	1.847	1.676	0.907	0.001	7.990	42

Au g/t						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
NHW_10	0.032	0.074	2.292	0.001	0.700	108
NHW5_15	0.049	0.077	1.574	0.001	0.370	27
NFW_20	0.048	0.075	1.571	0.001	1.160	1,950
MBR_30	0.072	0.124	1.714	0.001	1.580	977
MBRFW_40	0.046	0.055	1.199	0.001	0.470	551
MHW_51	0.042	0.085	2.043	0.001	0.840	269
MHW_52	0.036	0.052	1.435	0.001	0.450	132
MHW_53	0.065	0.066	1.016	0.002	0.270	45
NHW2_60	0.041	0.054	1.301	0.001	0.590	995
NHW4_65	0.053	0.088	1.642	0.001	0.680	247
NHW3_70	0.042	0.089	2.125	0.001	1.390	701
NHW6_75	0.055	0.068	1.235	0.001	0.420	207
WZONE_80	0.073	0.197	2.701	0.001	7.220	3,056
WZHW_81	0.053	0.073	1.376	0.001	0.830	441
WHW_85	0.038	0.032	0.841	0.002	0.080	13
NMAIN_90	0.064	0.090	1.406	0.001	2.590	8,645

Au g/t						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
MAG_101	0.037	0.043	1.147	0.001	0.340	248
MAG_102	0.067	0.141	2.107	0.001	1.050	120
MAG_103	0.043	0.053	1.219	0.001	0.210	42

Cu%						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
NHW_10	0.083	0.089	1.070	0.001	0.350	108
NHW5_15	0.021	0.030	1.448	0.001	0.120	27
NFW_20	0.219	0.204	0.933	0.001	3.330	1,950
MBR_30	0.110	0.127	1.161	0.000	0.970	977
MBRFW_40	0.107	0.103	0.967	0.001	0.900	551
MHW_51	0.053	0.068	1.272	0.001	0.360	269
MHW_52	0.071	0.062	0.885	0.001	0.290	132
MHW_53	0.108	0.092	0.847	0.006	0.320	45
NHW2_60	0.112	0.123	1.103	0.001	0.890	995
NHW4_65	0.105	0.127	1.210	0.001	0.970	247
NHW3_70	0.085	0.096	1.128	0.001	0.630	701
NHW6_75	0.166	0.173	1.042	0.001	0.810	207
WZONE_80	0.093	0.115	1.231	0.000	1.180	3,056
WZHW_81	0.190	0.189	0.997	0.006	0.980	441
WHW_85	0.090	0.123	1.366	0.004	0.410	13
NMAIN_90	0.225	0.194	0.860	0.000	2.180	8,645
MAG_101	0.063	0.069	1.091	0.001	0.370	248
MAG_102	0.075	0.067	0.888	0.001	0.270	120
MAG_103	0.123	0.126	1.031	0.001	0.730	42

Pd g/t						
Domain	Mean	Std Dev	CoV	Minimum	Maximum	Count
NHW_10	0.250	0.339	1.358	0.001	1.580	108
NHW5_15	0.474	0.589	1.244	0.001	2.680	27
NFW_20	0.407	0.574	1.411	0.001	14.900	1,950
MBR_30	0.549	1.243	2.265	0.001	18.600	977
MBRFW_40	0.241	0.347	1.438	0.001	3.360	551
MHW_51	0.275	0.926	3.364	0.001	10.470	269
MHW_52	0.156	0.235	1.507	0.001	1.590	132
MHW_53	0.285	0.389	1.363	0.005	2.050	45
NHW2_60	0.348	0.466	1.340	0.001	5.700	995
NHW4_65	0.228	0.305	1.341	0.001	2.010	247
NHW3_70	0.325	0.486	1.494	0.001	3.650	701
NHW6_75	0.519	0.657	1.266	0.001	4.860	207

Pd g/t						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
WZONE_80	0.777	2.812	3.618	0.001	69.970	3,056
WZHW_81	0.436	0.780	1.789	0.005	9.460	441
WHW_85	0.272	0.202	0.741	0.030	0.800	13
NMAIN_90	0.595	0.746	1.254	0.001	15.710	8,645
MAG_101	0.348	0.383	1.099	0.001	1.710	248
MAG_102	0.248	0.360	1.450	0.001	2.510	120
MAG_103	0.094	0.179	1.893	0.001	0.970	42

Pt g/t						
Domain	**Mean**	**Std Dev**	**CoV**	**Minimum**	**Maximum**	**Count**
NHW_10	0.088	0.104	1.183	0.001	0.400	108
NHW5_15	0.283	0.259	0.915	0.001	1.130	27
NFW_20	0.113	0.139	1.227	0.001	1.750	1,950
MBR_30	0.227	0.458	2.018	0.001	8.710	977
MBRFW_40	0.105	0.121	1.145	0.001	1.030	551
MHW_51	0.119	0.350	2.942	0.001	4.200	269
MHW_52	0.066	0.091	1.382	0.001	0.780	132
MHW_53	0.122	0.097	0.792	0.007	0.470	45
NHW2_60	0.129	0.196	1.522	0.001	2.930	995
NHW4_65	0.122	0.170	1.387	0.001	1.410	247
NHW3_70	0.117	0.150	1.284	0.001	1.420	701
NHW6_75	0.169	0.222	1.318	0.001	2.340	207
WZONE_80	0.302	1.199	3.967	0.001	39.090	3,056
WZHW_81	0.163	0.270	1.655	0.007	2.680	441
WHW_85	0.107	0.040	0.371	0.050	0.170	13
NMAIN_90	0.177	0.256	1.451	0.001	8.200	8,645
MAG_101	0.089	0.085	0.954	0.001	0.470	248
MAG_102	0.084	0.087	1.035	0.001	0.410	120
MAG_103	0.063	0.068	1.085	0.001	0.220	42

14.2.8 Treatment of Extreme Values

Grade capping analyses were conducted on the domain-coded and composited grade sample data in order to evaluate the potential influence of extreme values during estimation. Capping thresholds were determined by the decomposition of the domain composite log-probability distributions (see Appendices). Where possible, the observed correlations between elements were also maintained when determining appropriate capping levels. Potential outliers are not markedly clustered in localized high-grade areas and sub-domaining is therefore not warranted. Composites are capped to the defined threshold prior to estimation and capped composites are restricted to a maximum range of influence of 50 m (Table 14.9).

Table 14.9: Capping Thresholds

Ag						
Domain	**Count**	**Threshold**	**Avg Ag g/t Uncapped**	**Number Capped**	**Avg Ag g/t Capped**	**Change**
NHW_10	108	4.00	0.97	1	0.95	-2%
NHW5_15	27	9999.00	1.08	0	1.08	0%
NFW_20	1950	14.00	1.10	2	1.09	-2%
MBR_30	977	10.00	1.72	3	1.70	-1%
MBRFW_40	551	10.00	1.61	1	1.57	-3%
MHW_51	269	10.00	2.06	1	2.01	-3%
MHW_52	132	7.00	2.08	1	1.94	-7%
MHW_53	45	6.00	2.23	1	2.22	0%
NHW2_60	995	7.00	1.33	8	1.22	-9%
NHW4_65	247	9999.00	1.46	0	1.46	0%
NHW3_70	701	6.00	1.06	5	0.93	-12%
NHW6_75	207	7.00	1.71	2	1.60	-7%
WZONE_80	3056	10.00	2.10	26	1.54	-27%
WZHW_81	441	5.00	1.17	4	1.15	-2%
WHW_85	13	9999.00	1.32	0	1.32	0%
NMAIN_90	8645	10.00	1.43	6	1.42	0%
MAG_101	248	6.00	1.34	1	1.33	-1%
MAG_102	120	4.00	1.56	4	1.54	-1%
MAG_103	42	5.00	1.85	2	1.77	-4%

Au						
Domain	**Count**	**Threshold**	**Avg Au g/t Uncapped**	**Number Capped**	**Avg Au g/t Capped**	**Change**
NHW_10	108	0.10	0.03	4	0.02	-23%
NHW5_15	27	0.30	0.05	1	0.05	-5%
NFW_20	1950	0.60	0.05	6	0.05	-2%
MBR_30	977	0.50	0.07	12	0.07	-7%
MBRFW_40	551	9999.00	0.05	0	0.05	0%
MHW_51	269	0.30	0.04	5	0.04	-11%
MHW_52	132	0.10	0.04	5	0.03	-12%
MHW_53	45	0.20	0.06	2	0.06	-3%
NHW2_60	995	0.40	0.04	2	0.04	0%

Au						
Domain	**Count**	**Threshold**	**Avg Au g/t Uncapped**	**Number Capped**	**Avg Au g/t Capped**	**Change**
NHW4_65	247	0.40	0.05	3	0.05	-4%
NHW3_70	701	0.20	0.04	17	0.04	-15%
NHW6_75	207	0.30	0.06	3	0.05	-3%
WZONE_80	3056	2.00	0.07	3	0.07	-3%
WZHW_81	441	0.40	0.05	2	0.05	-3%
WHW_85	13	9999.00	0.04	0	0.04	0%
NMAIN_90	8645	1.00	0.06	6	0.06	-1%
MAG_101	248	0.20	0.04	2	0.04	-2%
MAG_102	120	0.14	0.07	8	0.05	-33%
MAG_103	42	0.09	0.04	6	0.04	-19%

Cu						
Domain	**Count**	**Threshold**	**Avg Cu % Uncapped**	**Number Capped**	**Avg Cu % Capped**	**Change**
NHW_10	108	0.20	0.08	13	0.07	-10%
NHW5_15	27	0.04	0.02	3	0.01	-33%
NFW_20	1950	1.30	0.22	3	0.22	-1%
MBR_30	977	0.80	0.11	3	0.11	0%
MBRFW_40	551	0.50	0.11	5	0.11	-1%
MHW_51	269	0.25	0.05	7	0.05	-4%
MHW_52	132	0.20	0.07	2	0.07	-2%
MHW_53	45	0.30	0.11	1	0.11	0%
NHW2_60	995	0.70	0.11	6	0.11	-1%
NHW4_65	247	0.40	0.11	7	0.10	-6%
NHW3_70	701	0.40	0.09	13	0.08	-2%
NHW6_75	207	0.70	0.17	1	0.17	0%
WZONE_80	3056	1.00	0.09	2	0.09	0%
WZHW_81	441	0.80	0.19	5	0.19	0%
WHW_85	13	9999.00	0.09	0	0.09	0%
NMAIN_90	8645	1.50	0.23	2	0.23	0%
MAG_101	248	0.23	0.06	6	0.06	-2%
MAG_102	120	0.30	0.07	0	0.07	0%
MAG_103	42	0.30	0.12	1	0.11	-8%

Pd						
Domain	Count	Threshold	Avg Pd g/t Uncapped	Number Capped	Avg Pd g/t Capped	Change
NHW_10	108	0.80	0.25	7	0.22	-13%
NHW5_15	27	1.00	0.47	3	0.38	-21%
NFW_20	1950	2.00	0.41	26	0.39	-5%
MBR_30	977	4.00	0.55	13	0.48	-12%
MBRFW_40	551	2.00	0.24	4	0.24	-2%
MHW_51	269	0.80	0.28	8	0.18	-34%
MHW_52	132	0.60	0.16	4	0.14	-12%
MHW_53	45	1.50	0.29	2	0.27	-4%
NHW2_60	995	2.00	0.35	10	0.33	-4%
NHW4_65	247	0.70	0.23	14	0.20	-13%
NHW3_70	701	1.20	0.33	34	0.28	-13%
NHW6_75	207	2.60	0.52	3	0.50	-3%
WZONE_80	3056	16.00	0.78	14	0.70	-10%
WZHW_81	441	4.00	0.44	3	0.42	-4%
WHW_85	13	9999.00	0.27	0	0.27	0%
NMAIN_90	8645	5.00	0.59	21	0.59	-1%
MAG_101	248	1.70	0.35	1	0.35	0%
MAG_102	120	9999.00	0.25	0	0.25	0%
MAG_103	42	0.30	0.09	3	0.07	-26%

Pt						
Domain	Count	Threshold	Avg Pt g/t Uncapped	Number apped	Avg Pt g/t Capped	Change
NHW_10	108	0.26	0.09	9	0.08	-7%
NHW5_15	27	1.00	0.28	1	0.28	-2%
NFW_20	1950	1.10	0.11	7	0.11	-1%
MBR_30	977	2.00	0.23	9	0.21	-8%
MBRFW_40	551	1.00	0.11	1	0.11	0%
MHW_51	269	0.40	0.12	10	0.08	-35%
MHW_52	132	0.30	0.07	2	0.06	-6%
MHW_53	45	0.40	0.12	1	0.12	-1%
NHW2_60	995	0.60	0.13	16	0.12	-8%
NHW4_65	247	0.40	0.12	11	0.11	-13%
NHW3_70	701	0.40	0.12	34	0.11	-9%
NHW6_75	207	0.60	0.17	6	0.16	-7%
WZONE_80	3056	10.00	0.30	5	0.28	-8%
WZHW_81	441	2.00	0.16	2	0.16	-2%
WHW_85	13	10.00	0.11	0	0.11	0%
NMAIN_90	8645	1.80	0.18	12	0.17	-2%

Pt						
Domain	Count	Threshold	Avg Pt g/t Uncapped	Number apped	Avg Pt g/t Capped	Change
MAG_101	248	0.33	0.09	4	0.09	-1%
MAG_102	120	9999.00	0.08	0	0.08	0%
MAG_103	42	0.14	0.06	7	0.05	-13%

14.2.9 Continuity Analysis

Three-dimensional continuity analyses (variography) were conducted on the domain-coded uncapped composite data. The down-hole variogram was viewed at a 2.00 m lag spacing (equivalent to the composite length) to assess the nugget variance contribution. Standardized directional spherical models were used to model the experimental semi-variograms (see Appendices).

Back-transformed experimental semi-variograms were used to define appropriate ranges for Mineral Resource classification (Table 14.10). Based on the results of the variography as well as the observed geological continuity and the existing drill hole pattern, a Measured classification range was defined as 70 m, and an Indicated classification range was defined as 120 m.

Table 14.10: Experimental Semi-Variograms

Walford Zone 80							
Pd				Pt			
	Direction 1	Direction 2	Direction 3		Direction 1	Direction 2	Direction 3
C	-25 > 290	0 > 200	65 > 290		-25 > 290	0 > 200	65 > 290
0.47	0 m	0 m	0 m	0.53	0 m	0 m	0 m
0.38	48 m	60 m	8 m	0.32	34 m	45 m	8 m
0.15	100 m	75 m	70 m	0.16	100 m	75 m	50 m

North Main Zone 90							
Pd				Pt			
	Direction 1	Direction 2	Direction 3		Direction 1	Direction 2	Direction 3
C	-40 > 275	0 > 185	50 > 275		-40 > 275	0 > 185	50 > 275
0.11	0 m	0 m	0 m	0.21	0 m	0 m	0 m
0.55	40 m	26 m	17 m	0.5	38 m	11 m	11 m
0.34	100 m	70 m	60 m	0.29	70 m	30 m	80 m

14.2.10 Block Model

The modeled Marathon mineralization domains extend along a corridor 2,000 m wide and 3,500 m in length. An orthogonal block model was established with the block model limits selected so as to cover the extent of the mineralized structures, the proposed open pit design, and to reflect the general nature of the mineralized domains (Table 14.11). The block model consists of separate variables for estimated grades, rock codes, percent, bulk density and classification attributes. A volume percent block model was used to accurately represent the volume and tonnage contained within the constraining mineralized domains.

Table 14.11: Block Model Setup

	Origin	Block Size (m)	Number of Blocks
Easting (X)	549,000	5.0	400
Northing (Y)	5,403,00	10.0	350
Elevation (max Z)	500	5.0	168
Rotation	None		

14.2.11 Grade Estimation & Classification

Bulk density was modeled using ID2 linear weighting of between one and five bulk density samples with a maximum of one sample per drill hole. Bulk density estimates were constrained by lithological domains that form hard boundaries between the respective bulk density samples.

The Mineral Resource Estimate was constrained by mineralization domains that form hard boundaries between the respective composite samples. Block grades were estimated in a single pass with ID3 interpolation using a minimum of four (4) and a maximum of twelve (12) composites with a maximum of three (3) samples per drill hole (see Appendices). Composited samples were selected within a 200 m x 200 m x 50 m diameter search envelope oriented parallel to the overall orientation of the relevant domain. For each grade element, an uncapped NN was also generated using the same search parameters. An NSR block model was subsequently calculated from the estimated block grades (see Appendices).

Blocks were classified algorithmically based on the local drill hole spacing within each domain. All blocks within 70 m of five (5) or more drill holes were classified as Measured, and blocks within 120 m of four (4) or more drill holes were classified as Indicated. All additional estimated blocks were classified as Inferred (see Appendices). The average number of composite samples per block used for grade estimation was as follows:

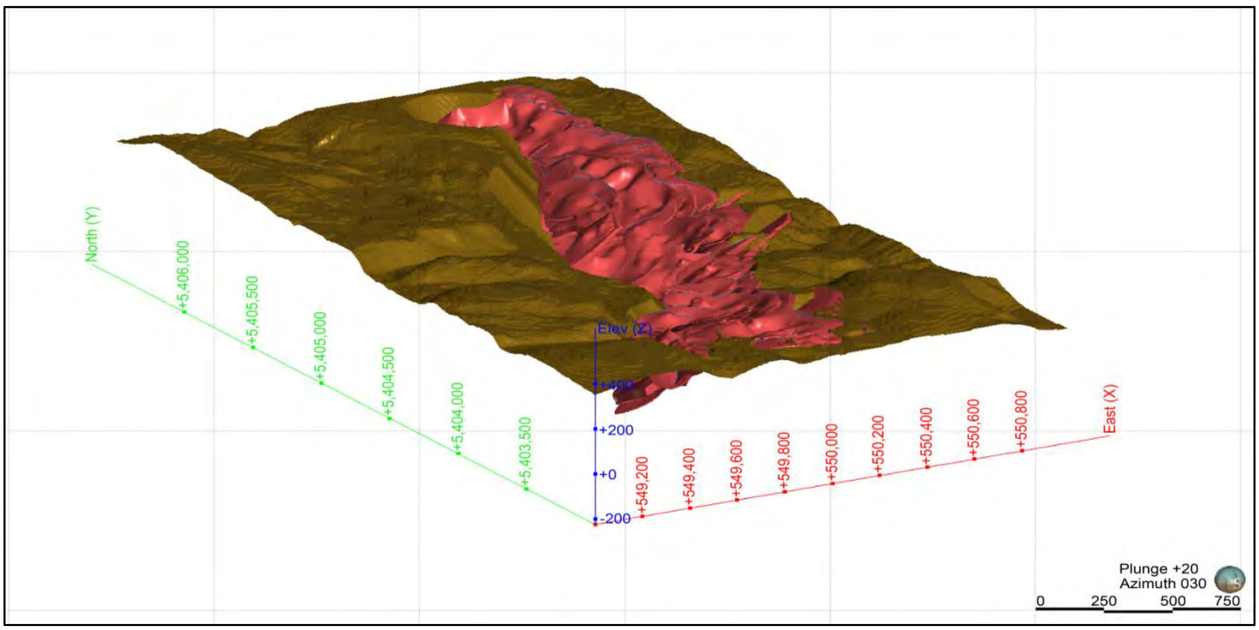
- Measured: 7.2 drill holes within 70 m.
- Indicated: 9.9 drill holes within 120 m.
- Inferred: 11.8 drill holes within 200 m.

Subsequent to the initial classification, blocks were re-classified using a maximum a-posteriori selection pass which corrected isolated classification artifacts and consolidated areas of similar classification into continuous areas.

14.2.12 Mineral Resource Estimate.

Mineral Resources reported herein have been constrained within an optimized pit shell (Figure 14.6 and Appendix I). The results within the constraining pit shell (Table 14.12) are used solely for the purpose of reporting Mineral Resources and include Measured, Indicated and Inferred Mineral Resources. Pit-Constrained Mineral Resources are reported using a NSR cut-off value of $13/t.

Figure 14.6: Isometric View of the Optimized Pit Shell



Highlights of the Pit-Constrained Mineral Resource include:

- Measured and Indicated Mineral Resources of 6.5 M PdEq ozs with an average PdEq grade of 1.00 g/t.
- Inferred Mineral Resource of 184 k PdEq ounces with an average PdEq grade of 0.83 g/t.

P&E considers that the information available for the Marathon Deposit is reliable, demonstrates consistent geological and grade continuity, and satisfies the requirements for a Mineral Resource.

Table 14.12: Pit Constrained Mineral Resource Estimate for the Marathon Deposit(1-5)

Category	Tonnes k	Pd g/t	Pt g/t	Cu %	Au g/t	Ag g/t	Pd koz	Pt koz	Cu Mlb	Au koz	Ag koz
Measured	113,793	0.63	0.21	0.20	0.07	1.49	2,304	762	502	262	5,466
Indicated	89,012	0.45	0.16	0.19	0.06	1.77	1,296	449	373	182	5,078
Meas+Ind	**202,806**	**0.55**	**0.19**	**0.20**	**0.07**	**1.62**	**3,599**	**1,211**	**875**	**444**	**10,544**
Inferred	6,931	0.43	0.14	0.17	0.08	1.55	95	32	26	17	345

Note:

1. *Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, marketing, or other relevant issues.*
2. *Mineral Resources were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions (2014) and Best practices Guidelines (2019) prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.*
3. *The Inferred Mineral Resource in this estimate has a lower level of confidence that that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.*
4. *Contained metal totals may differ due to rounding.*
5. *Mineral Resources are reported within a constraining pit shell at a NSR cut-off value of $13/t.*

The sensitivity of the Mineral Resource to NSR cut-off value was also calculated across a range of potentially economic NSR cut-off values for Measured and Indicated Mineral Resources (Table 14.13).

Table 14.13: Pit Constrained Measures & Indicated Mineral Resource Cut-off Sensitivities

NSR Cut-Off $/t	Tonnes k	Pd g/t	Pt g/t	Cu %	Au g/t	Ag g/t	Pd koz	Pt koz	Cu Mlb	Au koz	Ag koz
20	173,644	0.62	0.20	0.22	0.07	1.66	3,437	1,137	842	409	9,286
19	178,502	0.60	0.20	0.21	0.07	1.66	3,469	1,151	826	416	9,507
18	183,181	0.59	0.20	0.21	0.07	1.65	3,497	1,164	848	422	9,709
17	187,776	0.58	0.20	0.21	0.07	1.64	3,524	1,176	869	427	9,910
16	191,990	0.58	0.19	0.20	0.07	1.63	3,547	1,186	847	432	10,089
15	195,865	0.57	0.19	0.20	0.07	1.63	3,567	1,196	864	437	10,249
14	199,580	0.56	0.19	0.20	0.07	1.62	3,585	1,204	880	441	10,412
13	**202,806**	**0.55**	**0.19**	**0.20**	**0.07**	**1.62**	**3,599**	**1,211**	**875**	**444**	**10,544**
12	205,756	0.55	0.18	0.20	0.07	1.61	3,612	1,217	907	447	10,656
11	208,388	0.54	0.18	0.19	0.07	1.60	3,622	1,222	873	449	10,750
10	210,815	0.54	0.18	0.19	0.07	1.60	3,631	1,226	883	451	10,831

14.2.13 Validation

The block model was validated visually by the inspection of successive section lines in order to confirm that the block models correctly reflect the distribution of high-grade and low-grade values for Ag, Au, Cu, Pd and Pt.

The average estimated block grades were compared to the average NN block estimate at a zero cut-off (Table 14.14, Table 14.15 and Table 14.16).

The results fall within acceptable limits for linear grade estimation.

Table 14.14: Comparison Between Block Estimated Grades and NN Grades

Domain	Ag g/t	Au g/t	Cu%	Pd g/t	Pt g/t
10	1.18	0.03	0.08	0.22	0.09
15	1.37	0.05	0.02	0.39	0.29
20	1.23	0.05	0.21	0.37	0.11
30	1.63	0.07	0.10	0.48	0.22
40	1.32	0.05	0.10	0.24	0.11
51	2.08	0.04	0.06	0.18	0.08
52	1.75	0.04	0.07	0.13	0.07
53	2.23	0.07	0.10	0.30	0.12
60	1.33	0.05	0.11	0.34	0.13
65	1.47	0.05	0.09	0.20	0.11
70	1.12	0.04	0.08	0.25	0.11
75	1.41	0.05	0.14	0.45	0.14
80	1.54	0.07	0.09	0.61	0.25
81	1.20	0.06	0.18	0.37	0.15
85	1.45	0.04	0.08	0.23	0.11
90	1.54	0.06	0.21	0.50	0.16
101	1.14	0.04	0.06	0.34	0.09
102	1.51	0.05	0.10	0.24	0.09
103	1.76	0.03	0.13	0.06	0.05
Total	**1.48**	**0.06**	**0.17**	**0.46**	**0.16**

Table 14.15: Nearest Neighbour Grade

Domain	Ag g/t	Au g/t	Cu%	Pd g/t	Pt g/t
10	1.20	0.05	0.10	0.26	0.10
15	1.39	0.03	0.02	0.39	0.29
20	1.14	0.05	0.20	0.37	0.11
30	1.63	0.07	0.10	0.51	0.23
40	1.32	0.05	0.11	0.28	0.12
51	2.07	0.04	0.06	0.25	0.12
52	1.83	0.04	0.08	0.16	0.09
53	2.34	0.07	0.10	0.28	0.11
60	1.35	0.05	0.11	0.38	0.14
65	1.49	0.05	0.09	0.24	0.14
70	1.19	0.05	0.08	0.28	0.12
75	1.45	0.05	0.14	0.43	0.15
80	1.54	0.07	0.08	0.60	0.25
81	1.15	0.06	0.18	0.37	0.15
85	1.58	0.04	0.09	0.27	0.11
90	1.50	0.06	0.21	0.48	0.15
101	1.18	0.05	0.08	0.39	0.10
102	1.53	0.07	0.10	0.25	0.09
103	1.90	0.05	0.16	0.07	0.11
Total	**1.46**	**0.06**	**0.16**	**0.45**	**0.16**

Table 14.16: Ratio of Estimated Block Grade and NN Grade

Domain	Ag g/t	Au g/t	Cu%	Pd g/t	Pt g/t
10	98%	60%	80%	84%	90%
15	99%	150%	67%	100%	100%
20	108%	102%	105%	100%	104%
30	100%	103%	101%	93%	94%
40	100%	96%	93%	86%	93%
51	101%	90%	94%	75%	66%
52	96%	84%	91%	85%	75%
53	96%	102%	100%	104%	109%
60	98%	96%	96%	88%	89%
65	99%	100%	102%	84%	81%
70	94%	83%	98%	90%	91%
75	97%	100%	103%	103%	94%
80	100%	102%	106%	102%	102%
81	104%	102%	99%	98%	101%
85	92%	86%	90%	85%	103%
90	102%	102%	103%	104%	103%
101	97%	81%	75%	86%	85%
102	98%	73%	95%	96%	99%
103	93%	71%	85%	86%	44%
Total	**101%**	**100%**	**102%**	**100%**	**99%**

An additional validation check was completed by comparing the average grade of the uncapped composites in a block to the associated model block grade estimate (see Appendices). The results fall within acceptable limits for linear grade estimation.

The volume estimated was also checked against the reported volume of the individual mineralized domains (Table 14.17). Estimated volumes are based on partial block volumes.

Table 14.17: Volume Comparison

Domain	Volume Estimated (m^3)	Model Volume (m^3)
NHW_10	534	538
NHW5_15	66	67
NFW_20	8,322	8,403
MBR_30	3,966	4,004
MBRFW_40	3,123	3,134
MHW_51	1,057	1,279
MHW_52	558	599
MHW_53	257	259
NHW2_60	4,781	4,849
NHW4_65	1,226	1,228
NHW3_70	2,537	2,565
NHW6_75	872	890
WZONE_80	16,515	16,909
WZHW_81	985	988
WHW_85	122	123
NMAIN_90	48,560	48,703
MAG_101	1,767	1,773
MAG_102	603	611
MAG_103	231	233
Total	**96,082**	**97,155**

A check for local estimation bias was completed by plotting vertical swath plots of the estimated block grade and the NN grade combining Measured and Indicated blocks. The swath plots demonstrate a reasonable level of smoothing for the block grade estimate, and fall within acceptable limits for linear estimation (see Appendices).

14.3 Geordie and Sally Mineral Resource Estimates

Mineral Resource Estimates were also generated by P&E for the Geordie and Sally Deposits. The methodologies to create the block models were similar to those used for the Marathon Deposit. All drilling and assay data were provided in the form of Excel data files by Gen Mining. The GEOVIA GEMS™ V6.8.2 database for the Geordie Deposit Mineral Resource Estimate, compiled by P&E, consisted of 61 drill holes totaling 9,647 m, of which a total of 57 drill holes intersected the mineralization wireframes used for the Mineral Resource Estimate. For the Sally Deposit, the database consisted of 82 drill holes totaling 16,975 m and 371 surface channels totaling 1,871 m, of which a total of 47 drill holes and 162 channels intersected the mineralization wireframes used for the Mineral Resource Estimate.

The resulting pit constrained Mineral Resource Estimates for the Geordie and Sally Deposits, at an NSR $15/t cut-off, as of the effective date of this Mineral Resourced Estimate, are tabulated in Table 14.18 and Table 14.19, respectively. P&E considers the mineralization of Geordie and Sally to be potentially amenable to open pit economic extraction. Respective Geordie and Sally surface drill plans, 3D domains and constraining pit shells can be seen in Figure 14.7 to Figure 14.12.

Table 14.18: Geordie Pit Constrained Mineral Resource Estimate (1-5)

Classification	Tonnes k	Pd g/t	Pt g/t	Cu %	Au g/t	Ag g/t	Pd koz	Pt koz	Cu Mlb	Au koz	Ag koz
Indicated	17,268	0.56	0.04	0.35	0.05	2.4	312	20	133	25	1,351
Inferred	12,899	0.51	0.03	0.28	0.03	2.4	212	12	80	14	982

Notes:

1. *Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.*
2. *The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.*
3. *The Inferred Mineral Resource in this estimate has a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.*
4. *The Mineral Resources in this report were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions (2014) and Best Practices Guidelines (2019) prepared by the CIM Standing Committee on Reserve Definitions and adopted by the CIM Council.*
5. *The Mineral Resource Estimate was based on metal prices of US$3.00/lb copper, US$1,300/oz gold, US$16/oz silver, US$1,100/oz palladium, and US$900/oz platinum, and an NSR cut-off value of $15/t.*

Table 14.19: Sally Pit Constrained Mineral Resource Estimate (1-5)

Classification	Tonnes k	Pd g/t	Pt g/t	Cu %	Au g/t	Ag g/t	Pd koz	Pt koz	Cu Mlb	Au koz	Ag koz
Indicated	24,801	0.35	0.2	0.17	0.07	0.7	278	160	93	56	567
Inferred	14,019	0.28	0.15	0.19	0.05	0.6	124	70	57	24	280

Notes:

1. *Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability.*
2. *The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.*
3. *The Inferred Mineral Resource in this estimate has a lower level of confidence than that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.*
4. *The Mineral Resources in this report were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions (2014) and Best Practices Guidelines (2019) prepared by the CIM Standing Committee on Reserve Definitions and adopted by the CIM Council.*
5. *The Mineral Resource Estimate was based on metal prices of US$3.00/lb copper, US$1,300/oz gold, US$16/oz silver, US$1,100/oz palladium, and US$900/oz platinum, and an NSR cut-off value of $15/t.*

14.3.1 Grade Estimation & Classification

The Cu, Pd, Pt, Au and Ag grade blocks were interpolated with ID2. Multiple passes were executed for the grade interpolation to progressively capture the sample points in order to avoid over-smoothing and preserve local grade variability. Search ranges were based on the variograms and search directions which were aligned with the strike and dip directions of each domain accordingly. The block size assumed for the models is 5 m L x 5 m W x 6 m H.

Figure 14.7: Geordie Deposit Surface Drill Plan

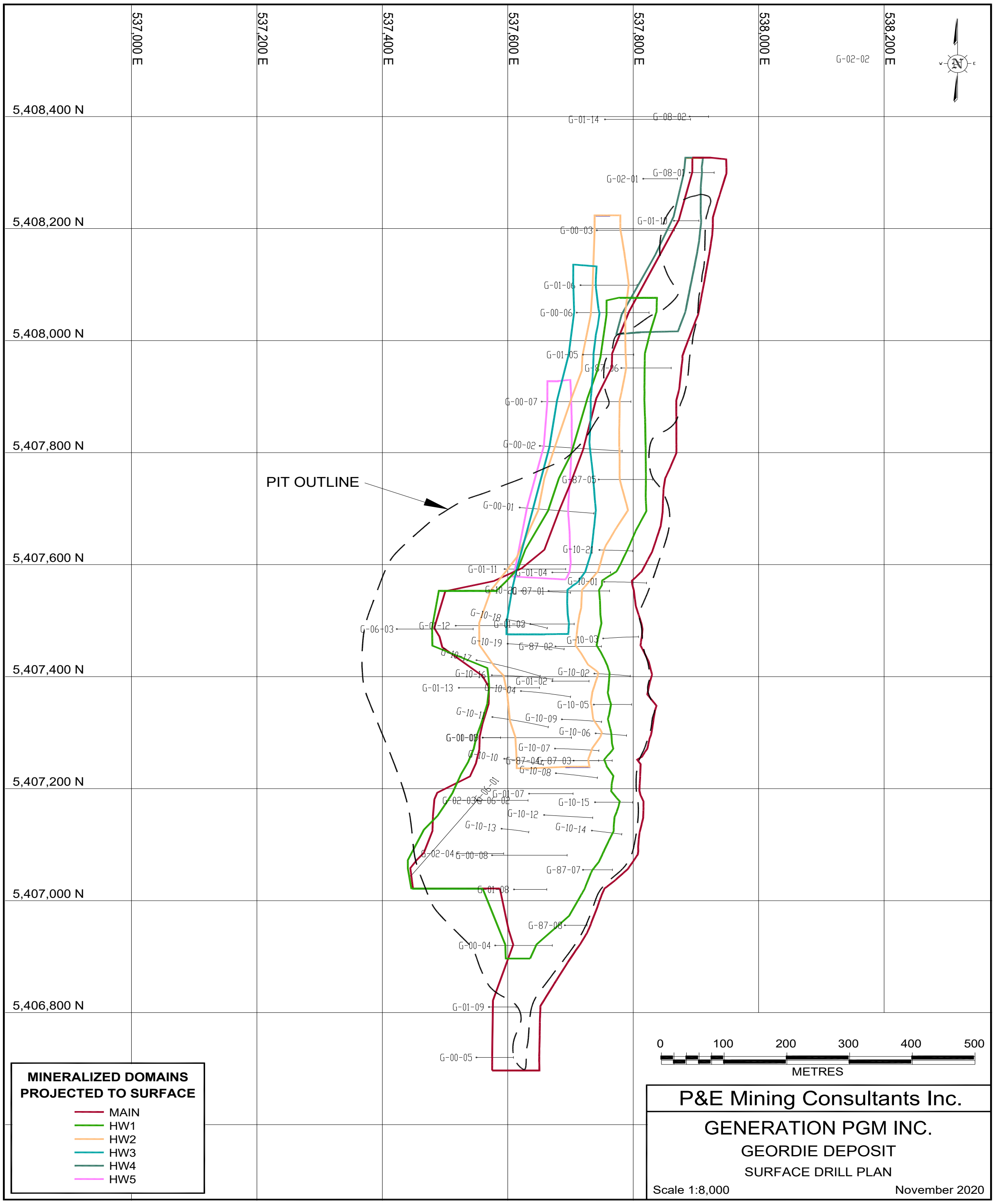


Figure 14.8: Geordie Deposit 3D Domains

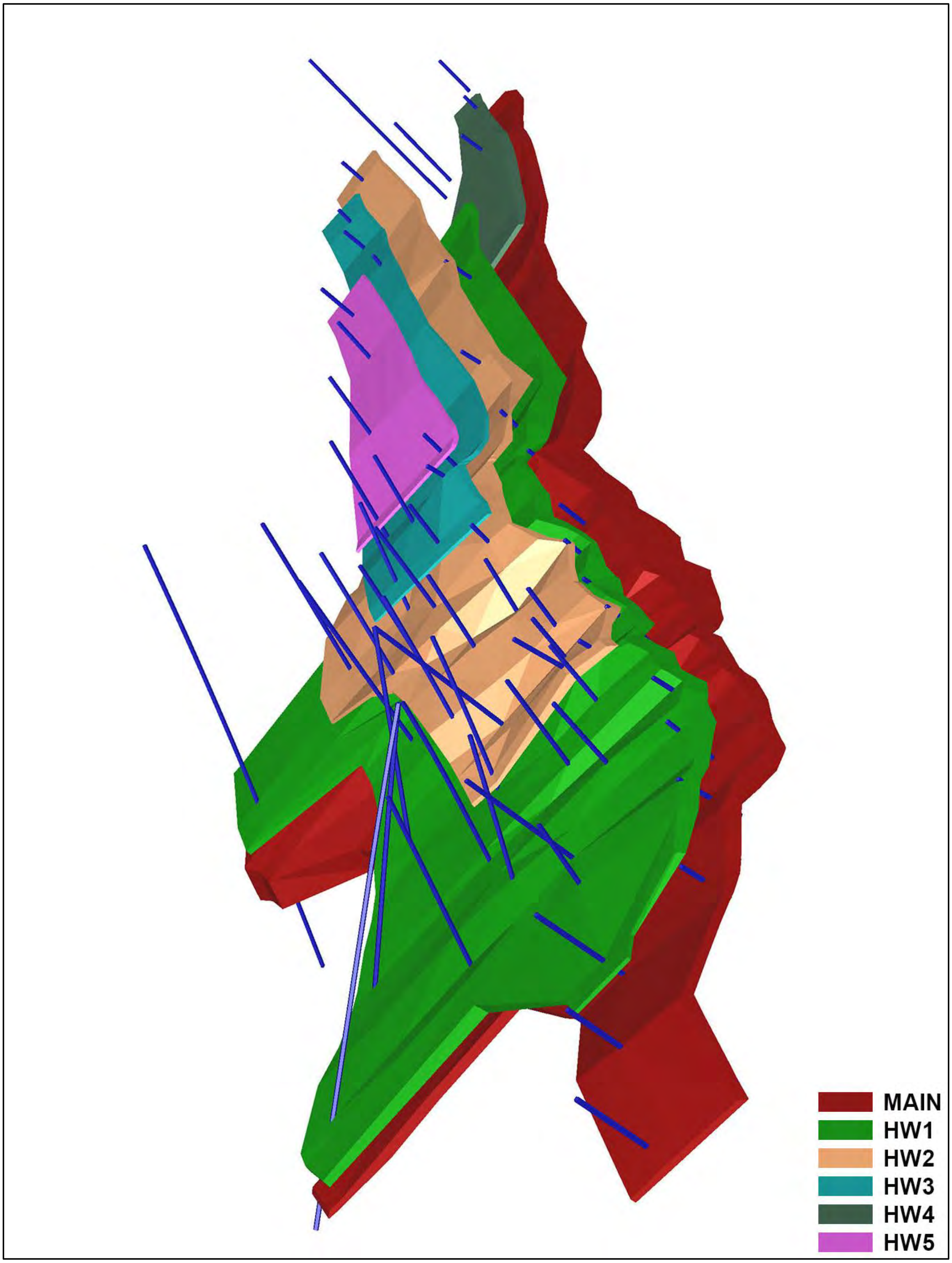


Figure 14.9: Geordie Deposit Constraining Pit Shell

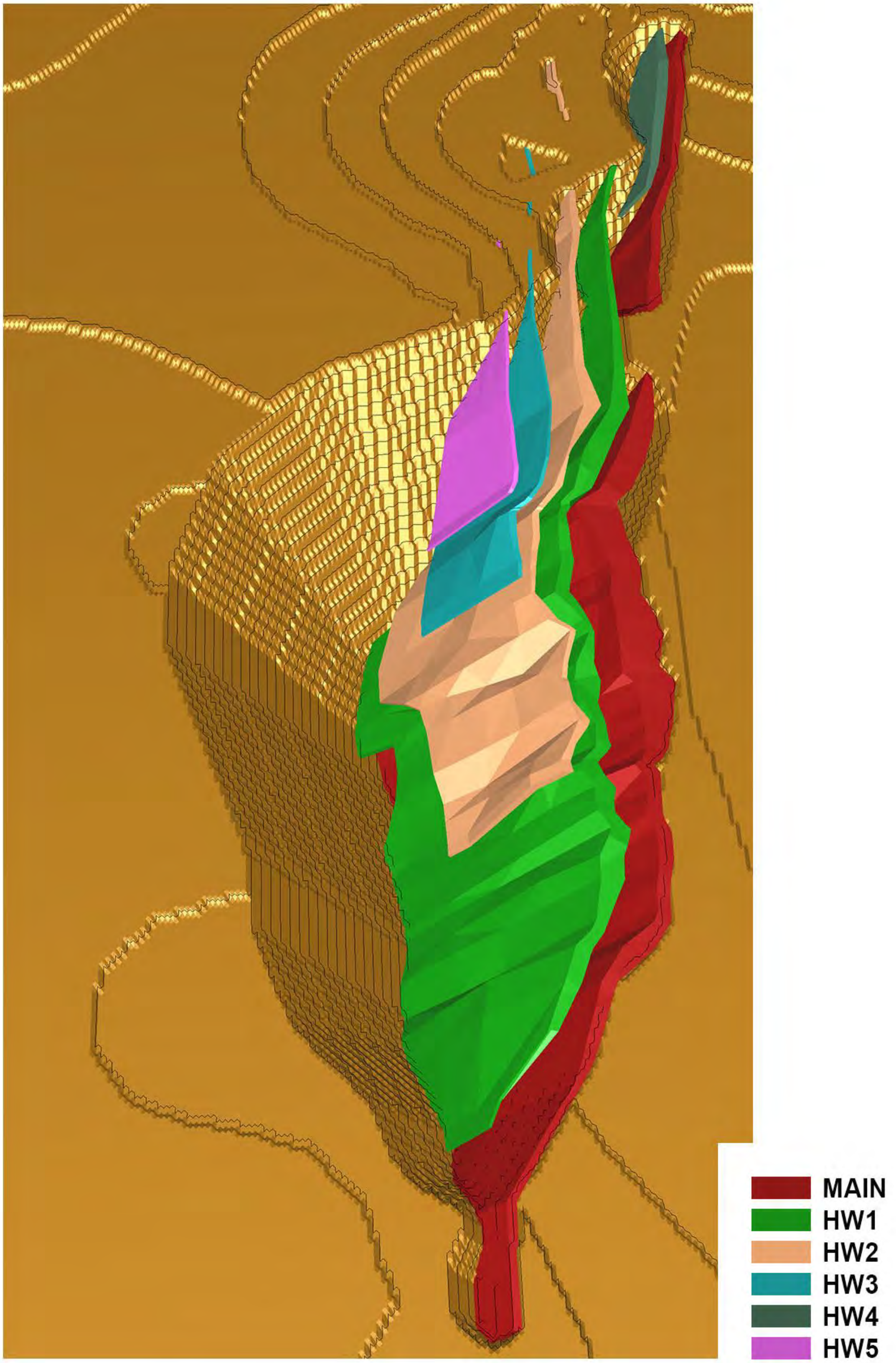


Figure 14.10: Sally Deposit Surface Drill Plant

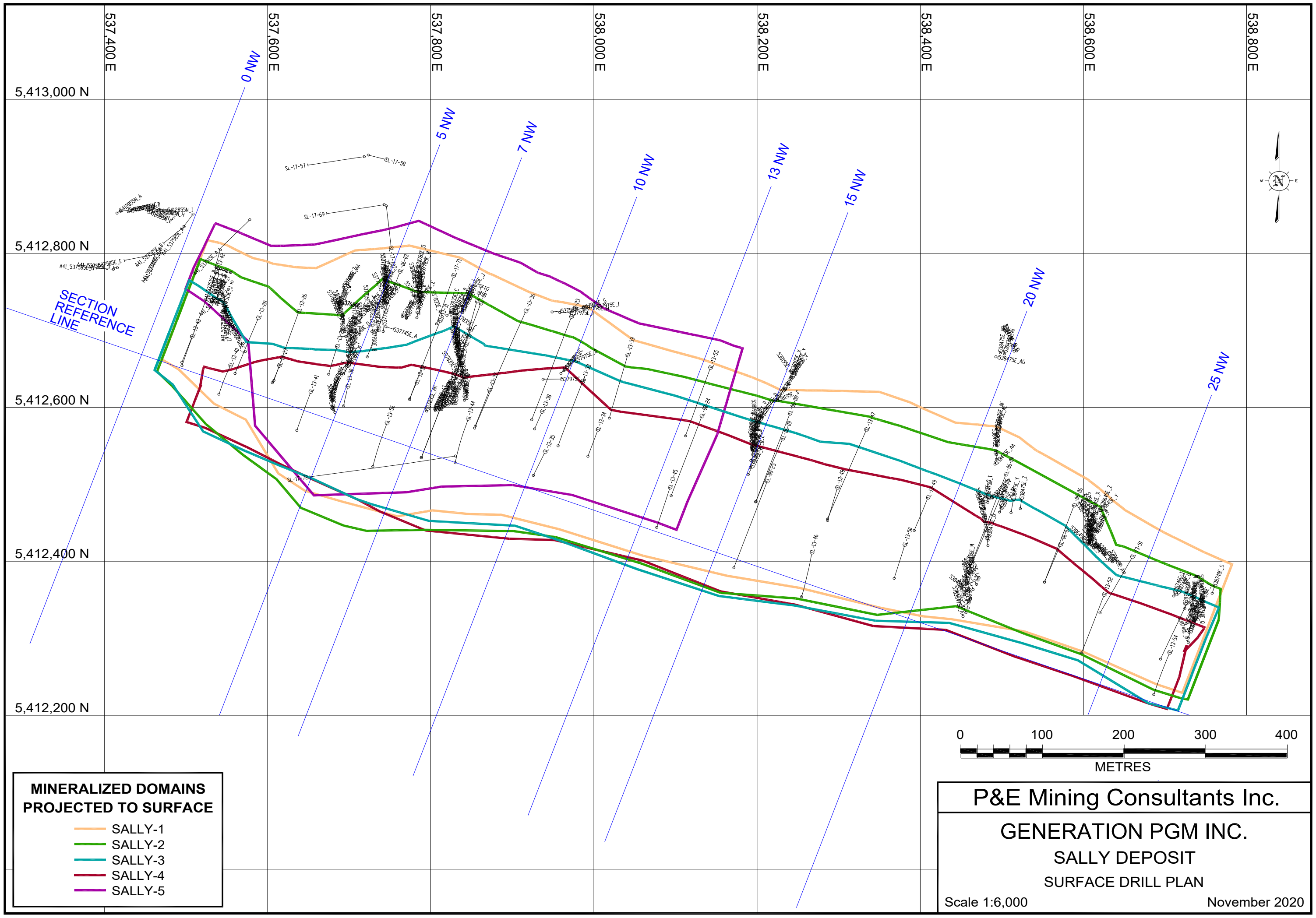


Figure 14.11: SallyDeposit 3D Domains

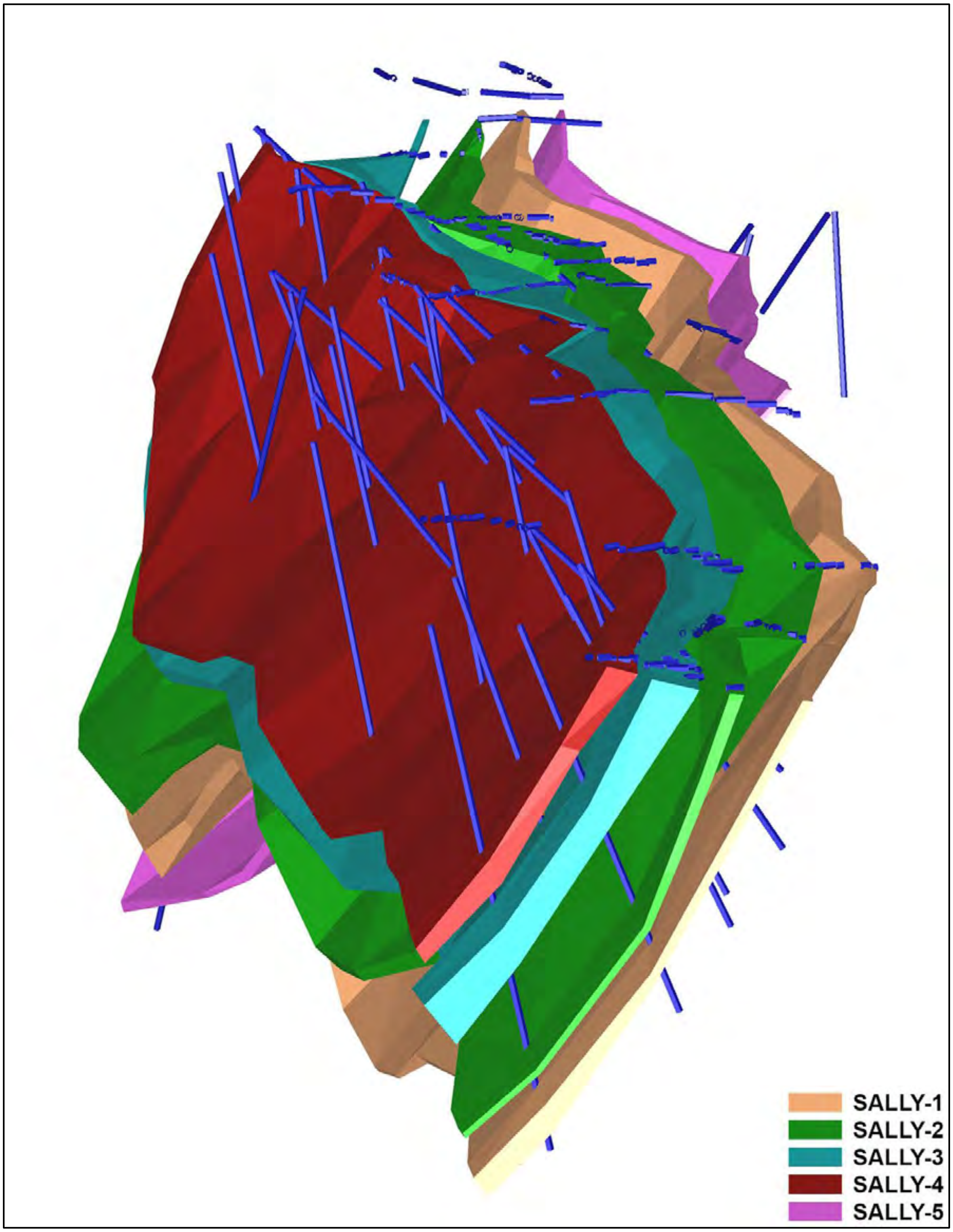
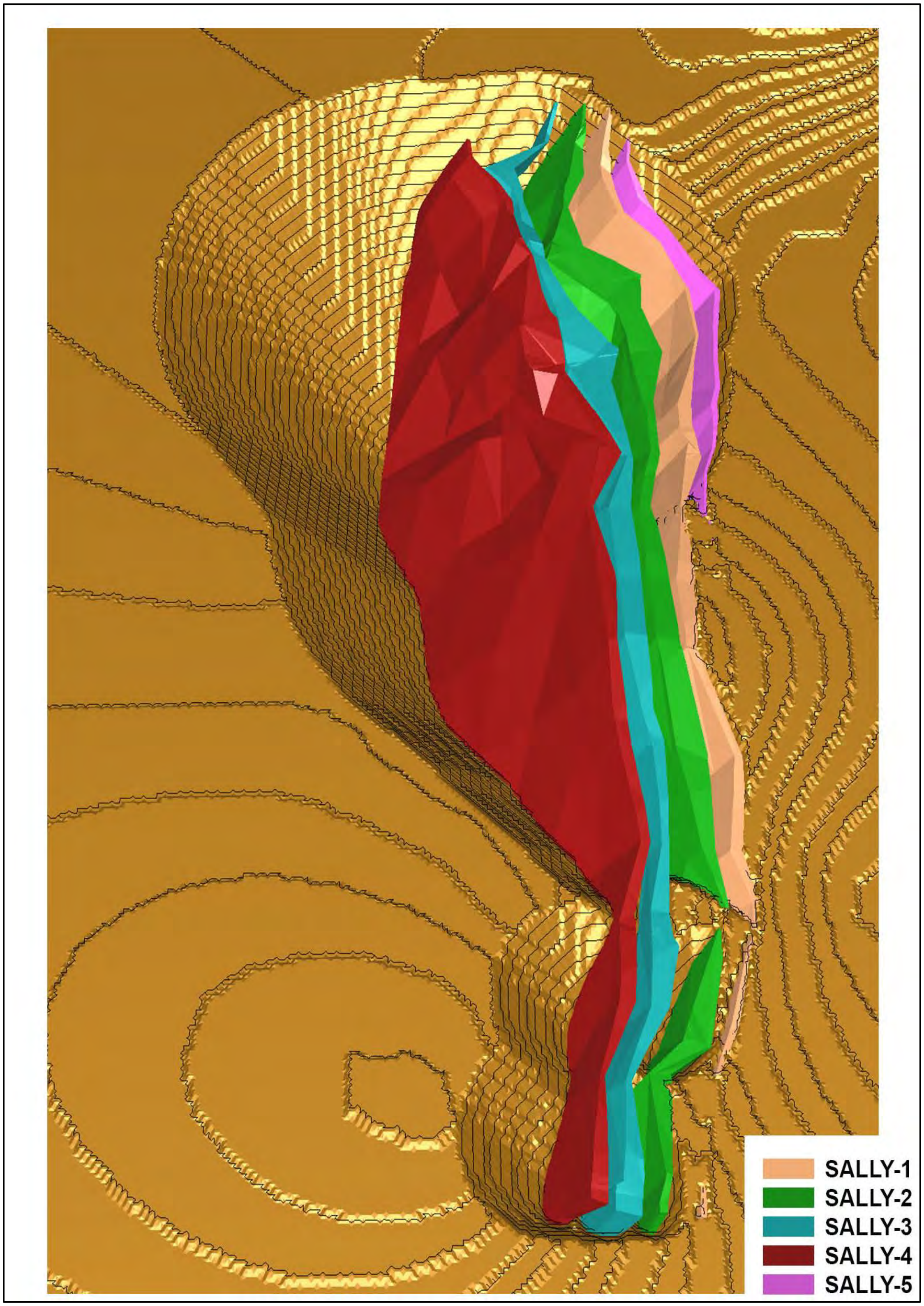


Figure 14.12: Sally Deposit Constraining Pit Shell



14.4 Mineral Resource Estimates for the Property

Table 14.20: Constrained Mineral Resource Estimate for the Marathon, Geordie and Sally Deposits(1-8) (effective date June 30, 2020)

Mineral Resource Classification	Tonnes	Pd		Cu		Au		Pt		Ag	
	k	g/t	koz	%	M lbs	g/t	koz	g/t	koz	g/t	koz
Marathon Deposit											
Measured	113,793	0.63	2,304	0.20	502	0.07	262	0.21	762	1.49	5,466
Indicated	89,012	0.45	1,296	0.19	373	0.06	182	0.16	449	1.77	5,078
Meas & Ind	**202,806**	**0.55**	**3,599**	**0.20**	**875**	**0.07**	**444**	**0.19**	**1,211**	**1.62**	**10,544**
Inferred	6,931	0.43	95	0.17	26	0.08	17	0.14	32	1.55	345
Geordie Deposit											
Indicated	17,268	0.56	312	0.35	133	0.05	25	0.04	20	2.4	1,351
Inferred	12,899	0.51	212	0.28	80	0.03	14	0.03	12	2.4	982
Sally Deposit											
Indicated	24,801	0.35	278	0.17	93	0.07	56	0.2	160	0.7	567
Inferred	14,019	0.28	124	0.19	57	0.05	24	0.15	70	0.6	280
Total Project											
Measured	113,793	0.63	2,304	0.20	502	0.07	262	0.21	762	1.49	5,466
Indicated	131,081	0.45	1,886	0.21	599	0.06	263	0.15	629	1.66	6,996
Meas & Ind	**244,874**	**0.53**	**4,190**	**0.20**	**1,101**	**0.07**	**525**	**0.18**	**1,391**	**1.58**	**12,462**
Inferred	33,849	0.40	431	0.22	163	0.05	55	0.10	114	1.48	1,607

***Notes**:*

1. *Mineral Resources were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions (2014) and Best Practices Guidelines (2019) prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council.*
2. *Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, marketing, or other relevant issues.*
3. *The Inferred Mineral Resource in this estimate has a lower level of confidence that that applied to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of the Inferred Mineral Resource could be upgraded to an Indicated Mineral Resource with continued exploration.*
4. *Mineral Resources are reported within a constraining pit shell at a NSR cut-off value of $13/t.*
5. *NSR (C$/t) = (Ag x 0.48) + (Au x 42.14) + (Cu x 73.27) + (Pd x 50.50) + (Pt x 25.07) – 2.62.*
6. *The Mineral Resource Estimate was based on metal prices of US$3.00/lb copper, US$1,500/oz gold, US$18/oz silver, US$1,600/oz palladium, and US$900/oz platinum.*
7. *Mineral Resources are inclusive of Mineral Reserves.*
8. *Contained metal totals may differ due to rounding.*

15. MINERAL RESERVE ESTIMATE

15.1 Summary

The Mineral Reserve Estimate for the Marathon Project totals 117.7 Mt an average grade of 0.619 g/t Pd for 2.34 Moz, 0.205% Cu for 535 M lbs, 0.067 g Au/t for 255,000 oz, 0.20 g Pt/t for 756,000 oz, and 1.411 g Ag/t for 5.33 Moz (Table 15.1). The Mineral Reserve Estimate was prepared by GMS.

Table 15.1: Marathon Project Open Pit Mineral Reserve Estimates (Effective Date of September 15, 2020)

Mineral Reserves	Tonnage		Pd		Cu		Au		Pt		Ag	
	kt	%	g/t	koz	%	M lbs	g/t	koz	g/t	koz	g/t	koz
Proven	85,091	72%	0.660	1,805	0.202	379	0.070	191	0.212	581	1.359	3,719
Probable	32,610	28%	0.512	537	0.213	153	0.061	64	0.168	176	1.541	1,616
P&P	**117,701**	**100%**	**0.619**	**2,342**	**0.205**	**532**	**0.067**	**255**	**0.200**	**756**	**1.410**	**5,334**

Note:

1. *CIM definitions were followed for Mineral Reserves.*
2. *Mineral Reserves are estimated at a cut-off grade varying from $18.00 to $21.33 NSR/t of ore.*
3. *Mineral Reserves are estimated using the following long-term metal prices: Pd = US$1,500/oz, Pt = US$900/oz, Cu = US$2.75/lb, Au = US$1,300/oz and Ag = US$16/oz, and an exchange rate of US$ / C$ 0.75.*
4. *A minimum mining width of 5 m was used.*
5. *Bulk density of ore is variable and averages 3.07 t/m^3.*
6. *The average strip ratio is 2.8:1.*
7. *The average mining dilution factor is 9%.*
8. *Numbers may not add due to rounding.*

The mine design and Mineral Reserve Estimate have been completed to a level appropriate for feasibility studies. The Mineral Reserve Estimate stated herein is consistent with the CIM definitions and is suitable for public reporting. As such, the Mineral Reserves are based on the Measured and Indicated Mineral Resources and do not include any Inferred Mineral Resources. The Inferred Mineral Resources contained within the mine design are classified as waste.

15.2 Resource Block Model

The resource model was completed by P&E as a percent block model in GEOVIA GEMS™ software. For mine planning purposes, GMS regularized the block model to a standard SMU block size of 5 m x 10 m x 5 m. Given that the overburden thickness is quite thin, a percent block attribute was retained to more accurately estimate the intact rock mass and overburden volumes.

15.3 Pit Optimization

Open pit optimization was conducted in GEOVIA Whittle™ to determine the optimal economic shape of the open pit to guide the pit design process. This task was undertaken using the Whittle software which is based on the Lerchs-Grossmann algorithm. The method works on a block model of the ore body and progressively constructs lists of related blocks that should, or should not, be mined. The method uses the values of the blocks to define a pit outline that has the highest possible total economic value, subject to the required pit slopes defined as structure arcs in the software. This section describes all the parameters used to calculate block values in Whittle™.

For this Mineral Reserve estimate, Measured and Indicated Mineral Resource blocks were considered for optimization purposes and for mineable resource calculations.

15.3.1 Pit Slope Geotechnical Assessment

Knight Piésold Ltd. (KP) produced a feasibility level pit slope design study to support the mine designs. The conclusions of this study have been used as an input to the pit optimization and design process.

The pit area was divided in sector based on the data collected from the oriented core drill holes. In general, the pit area is controlled by bench geometry. The Central West (upper and lower), Central South and South Northwest sectors are controlled by bench scale failures and have different recommended slope geometry.

It has been assessed that the open pit will be developed in relatively consistent rock mass quality. The rock mass is generally of good quality with small zones of reduced rock mass quality associated with large-scale structures (faults, shears, lineaments, etc). The rock mass characteristics for each domain as depicted by KP are:

- Hanging Wall: Average UCS value of 140 MPA and a Mi value of 11. It is classified as good quality rock with a RMR89 design value of 70.
- Ore Zone Gabbro: Average UCS value of 115 MPA and a Mi value of 9. It is classified as good quality rock with a RMR89 design value of 70.
- Footwall: Average UCS value of 180 MPA and a Mi value of 11. It is classified as good quality rock with a RMR89 design value of 65.

KP identified 18 design sectors based on the location and geomechanical domains. Slope analyses were performed on each sector to establish achievable slope configurations.

Based on the stability analyses and precedent practice, KP indicated that the recommended geometries were slightly aggressive but reasonable and appropriate when controlled blasting, proactive geotechnical monitoring and geomechanical analyses will be executed.

According to KP, the rock mass has a moderate to low permeability. The measured values suggest the pre-mining groundwater surface ranges from 4 to 18 m below the ground surface. Groundwater depressurization will not strongly influence overall slope stability. However, the phreatic surface water that develops behind the pit walls should be monitored and depressurized as needed.

A slope monitoring program is recommended for all stages of pit development. It should include geotechnical and tension crack mapping, surface displacement monitoring program using surface prisms.

The slope configuration options are presented in Table 15.2. Double benching will have to be done with pre-split, no sub-grade drilling and well controlled blasting practices are required.

The final pit was designed using a double benching configuration to a final height of 20 m. The pit slope profile is based on recommendations by KP as presented in Table 15.2.

KP did not considered the overburden in the domain definition process and analyses because it is expected to form only a minor part of the proposed pit slopes. It is suggested, in future site investigations, to characterize the overburden along the crest of the proposed pit to evaluate the stability of the upper part of the pit slopes.

Table 15.2: Marathon Final Wall Geotechnical Recommendations

Slope Parameters	
Final Bench Height (m)	20.0
Bench Face Angle (º)	65 to 75
Avg. Design Catch Bench Width (m)	10.4
Inter-ramp Angle (º)	48 to 55
Overall Slope Angle (º)	44 to 55
Geotechnical Benches (m)	-

15.3.2 Mining Dilution and Ore Loss

A mining dilution assessment was made by evaluating the number of contacts for blocks above an economic cut-off grade. The block contacts are then used to estimate a dilution skin around ore blocks to estimate an expected dilution during mining. The dilution skin consists of 1.0 m of material in a north-south direction (across strike) and 1.0 m in an east-west direction (along strike). The dilution is therefore specific to the geometry of the ore body and the number of contacts between ore and waste. The ore body consists of two styles of mineralization. There are massive mineralized envelopes such as for the main zone which incur relatively little dilution and other narrower mineralized envelopes that incur higher mining dilutions with this estimation technique.

For each mineralized block in the resource model, diluted grades and a new density are calculated by taking into account the *in-situ* grades and *in-situ* density of the surrounding blocks.

15.3.3 Pit Optimization Parameters and Cut-Off Grade

Unit reference mining costs are used for a "reference mining block" usually located near the pit crest or surface and are incremented with depth, which corresponds to the additional cycle time and thus hauling cost. The reference mining cost is estimated at $2.45/t with an incremental depth factor of $0.030/t per 10 m bench.

The overall slope angles utilized in Whittle are based on the inter-ramp angles recommended in the KP pit slope study with provisions for ramps and geotechnical berms. The overall slope angle in competent rock is 44 to 55 degrees based on a designed inter-ramp angle of 48 to 55 degrees.

The total ore-based cost is estimated at $13.70/t (US$10.28/t), which includes processing, general and administration costs, sustaining capital and a closure cost provision (Table 15.3).

Table 15.3: Ore Based Cost Assumption

Ore-Based Cost Assumptions	$/t
Processing (including power)	8.30
General & Administration	1.90
Sustaining Capital	3.10
Closure Cost Provision	0.40
Total Ore-Based Cost	**13.70**

For a polymetallic mine such as the Marathon Project, the cut-off grade is best expressed as a NSR value in US$/t for the mineralized material. The marginal cut-off grade corresponds to the ore-based cost. However, an elevated cut-off grade was applied of US$13/t (C$17.33/t) of ore for the main zones consisting of Zones 20, 80 and 90 and a higher cut-off grade of US$18/t (for the remaining mineralized zones which are narrower). These elevated cut-off grades applied to select blocks prior to dilution will provide some operating margin and cover the impact of mining dilution.

Table 15.4: Indicative Smelting Terms & Recovery Assumptions

Marathon Smelting & Refining Terms and Recovery Assumptions					
Metals	**Pd**	**Cu**	**Pt**	**Au**	**Ag**
Treatment Charge (“TC”)	NA	US$62/dmt	NA	NA	NA
Refining Charges (“RC”)	US$20/oz	US$0.062/lb	US$20/oz	US$5/oz	US$0.50/oz
Payable Rates (%)	94	96.5	90	90	90
Minimum Deductions	3 g/t	1.2%	3 g/t	1 g/t	30 g/t
Metallurgical Recovery[1] (%)	80.0	90.0	74.5	73.2	71.5

[1] These recoveries are the assumed recoveries used in the optimizations; these are not the actual metallurgical recoveries of the plant.

A summary of the pit optimization parameters is presented in Table 15.5 for a nominal milling rate of 9.2 Mt per year based on long-term metal price assumptions and an exchange rate of US$/C$ 0.75. A copper concentrate grading 19% will be produced containing Pd, Pt, Au and Ag. This copper concentrate will be sent to a smelter for smelting and refining to produce saleable metals. Indicative terms have been used to calculate the NSR for the concentrate and for the ore itself with the parameters summarized in Table 15.5. A concentrate transportation and logistics cost of $111/t has been assumed.

Table 15.5: Marathon Project Optimization Parameters

Input Parameters					
Exchange Rate			C$/US$	0.75	
Diesel Fuel Price Delivered			$/litre	0.80	
Electricity Cost			$/kWh	0.08	
Royalty Rate			%	0%	
Processing Inputs					
Nominal Milling Rate			Mt/yr	9.2	
Concentrate Grade			% Cu	19.0	
Concentrate Treatment Charge			US$/dmt	62	
Concentrate Transport & Logistics			US$/dmt	111	
Metal	**Copper**	**Palladium**	**Platinum**	**Gold**	**Silver**
Metal Prices (US$)	$2.75/lb	$1,500/oz	$900/oz	$1,300/oz	$16/oz
Refining Charges (US$)	$0.062/lb	$20/oz	$20/oz	$5/oz	$0.50/oz
Payable Rates (%)	96.5	94	90	90	90
Min. Deductions	1.2%	3 g/t	3 g/t	1 g/t	30 g/t
Concentrator Recovery (%)	90	80	74.5	73.2	71.5
Ore-Based Costs					
Processing Cost (incl. power)			$/t milled	8.30	
General and Administration			$/t milled	1.90	
Rehabilitation and Closure			$/t milled	0.40	
Sustaining Capital			$/t milled	3.10	
Total Ore-Based Cost			$/t milled	13.70	
Mining Inputs					
Mining Dilution			%	10%	
Mining Loss			%	3%	
Total Mining Reference Cost			$/t mined	2.45	
Incr. Bench Cost ($ /10 m bench)			$/t mined	0.030	
Overall Slope Angle in Fresh Rock			degrees	50	

15.3.4 Open Pit Optimization Results

The Whittle nested shell results are presented in Table 15.6 using only the Measured and Indicated Mineral Resource. The nested shells are generated by using revenue factors to scale up and down from the base case selling price.

Table 15.6: Measured and Indicated Mineral Resource Whittle Shell Results for Combined Diluted Model

Pit Shell	Best Case Disc. @ 8% ($ M)	Specified Disc. @ 8% ($ M)	Worst Case Disc. @ 8% ($ M)	Total Tonnage (kt)	Ore Tonnage (kt)	Waste Tonnage (kt)	Strip Ratio (W:O)	Pd Grade (g/t)	Cu Grade (%)	Au Grade (g/t)	Pt Grade (g/t)	Ag Grade (g/t)	Total NSR ($/t)
1	340	340	340	16,003	5,737	10,266	1.79	1.26	0.19	0.11	0.42	1.81	82.81
2	375	375	375	18,231	6,885	11,346	1.65	1.17	0.19	0.10	0.39	1.75	77.95
3	413	413	413	21,363	8,101	13,261	1.64	1.12	0.18	0.10	0.37	1.76	74.78
4	536	536	534	34,132	11,806	22,325	1.89	1.03	0.20	0.09	0.33	1.67	70.14
5	570	570	567	37,606	13,052	24,554	1.88	1.00	0.20	0.09	0.32	1.67	68.44
6	630	630	625	46,987	14,887	32,100	2.16	1.00	0.19	0.09	0.33	1.66	68.08
7	655	654	648	50,126	16,001	34,125	2.13	0.98	0.18	0.09	0.32	1.64	66.67
8	710	709	698	58,431	18,854	39,577	2.10	0.93	0.18	0.09	0.31	1.66	63.48
9	882	872	856	86,869	27,311	59,557	2.18	0.84	0.19	0.08	0.27	1.64	58.68
10	929	918	899	96,141	29,870	66,271	2.22	0.82	0.19	0.08	0.27	1.62	57.67
11	965	952	931	102,765	32,349	70,416	2.18	0.80	0.19	0.08	0.26	1.63	56.34
12	1,121	1,097	1,063	142,071	43,353	98,718	2.28	0.74	0.19	0.08	0.24	1.61	53.08
13	1,143	1,117	1,081	148,107	45,340	102,767	2.27	0.73	0.19	0.08	0.24	1.61	52.50
14	1,175	1,145	1,105	157,158	48,120	109,038	2.27	0.72	0.19	0.07	0.23	1.60	51.74
15	1,270	1,229	1,170	196,089	56,275	139,814	2.48	0.70	0.20	0.07	0.22	1.61	50.80
16	1,348	1,294	1,221	228,861	64,487	164,374	2.55	0.67	0.20	0.07	0.22	1.64	49.56
17	1,383	1,322	1,240	244,600	68,944	175,656	2.55	0.66	0.20	0.07	0.21	1.65	48.77
18	1,393	1,329	1,244	249,906	70,385	179,520	2.55	0.65	0.20	0.07	0.21	1.65	48.52
19	1,403	1,335	1,248	255,130	71,938	183,192	2.55	0.65	0.20	0.07	0.21	1.64	48.22
20	1,416	1,343	1,254	264,174	74,013	190,161	2.57	0.64	0.20	0.07	0.21	1.64	47.92
21	1,456	1,372	1,268	295,288	80,903	214,385	2.65	0.63	0.20	0.07	0.20	1.64	47.05
22	1,475	1,383	1,268	312,758	84,612	228,147	2.70	0.62	0.20	0.07	0.20	1.65	46.62
23	1,493	1,392	1,262	330,624	88,701	241,923	2.73	0.61	0.20	0.07	0.20	1.63	46.08
24	1,519	1,402	1,253	368,390	94,692	273,698	2.89	0.61	0.19	0.07	0.20	1.63	45.77
25	1,535	1,408	1,241	393,184	99,340	293,844	2.96	0.60	0.19	0.07	0.20	1.63	45.35
26	1,541	1,406	1,229	403,716	101,675	302,041	2.97	0.60	0.19	0.07	0.20	1.63	45.04
27	1,566	1,401	1,199	462,164	111,104	351,059	3.16	0.59	0.19	0.07	0.19	1.65	44.47
28	1,568	1,399	1,194	468,496	112,526	355,970	3.16	0.58	0.19	0.07	0.19	1.64	44.30
29	1,583	1,376	1,145	532,935	121,558	411,377	3.38	0.58	0.19	0.07	0.19	1.66	43.91
30	1,594	1,362	1,111	581,578	130,486	451,092	3.46	0.57	0.19	0.07	0.19	1.69	43.21
31	1,598	1,347	1,070	605,853	133,796	472,057	3.53	0.57	0.19	0.07	0.19	1.70	43.06
32	1,599	1,344	1,063	612,407	135,103	477,304	3.53	0.56	0.19	0.07	0.19	1.70	42.93
33	1,600	1,335	1,045	627,929	137,923	490,006	3.55	0.56	0.18	0.07	0.19	1.70	42.69
34	1,601	1,331	1,037	632,915	138,702	494,213	3.56	0.56	0.18	0.07	0.19	1.70	42.64
35	1,601	1,324	1,024	644,128	140,554	503,573	3.58	0.56	0.18	0.07	0.19	1.70	42.49
36	1,601	1,321	1,016	648,920	141,406	507,514	3.59	0.56	0.18	0.07	0.19	1.70	42.41
37	1,601	1,319	1,013	651,819	142,008	509,811	3.59	0.55	0.18	0.07	0.19	1.70	42.34
38	1,600	1,312	1,001	662,904	143,944	518,960	3.61	0.55	0.18	0.07	0.19	1.70	42.16
39	1,596	1,271	934	725,030	151,350	573,680	3.79	0.55	0.18	0.07	0.18	1.71	41.87
40	1,595	1,265	922	732,167	152,291	579,876	3.81	0.54	0.18	0.07	0.18	1.71	41.80
41	1,594	1,261	915	737,114	152,932	584,183	3.82	0.54	0.18	0.07	0.18	1.71	41.76
42	1,593	1,255	907	744,130	153,942	590,188	3.83	0.54	0.18	0.07	0.18	1.71	41.68
43	1,593	1,250	899	749,713	154,690	595,023	3.85	0.54	0.18	0.07	0.18	1.71	41.63
44	1,592	1,244	890	756,512	155,445	601,067	3.87	0.54	0.18	0.07	0.18	1.71	41.59
45	1,591	1,242	885	759,933	155,905	604,029	3.87	0.54	0.18	0.07	0.18	1.71	41.55
46	1,591	1,240	882	761,291	156,113	605,178	3.88	0.54	0.18	0.07	0.18	1.71	41.53

The shell selection is presented in Table 15.7. Pit Shell 25 is selected as the optimum final pit shell which corresponds to an NSR of $45.35/t pit shell (Revenue Factor 0.78). This shell has a total tonnage of 393.2 Mt including 99.3 Mt of ore. This is the smallest shell that achieves close to maximum value using a practical phasing approach.

Figure 15.1: Pit by Pit Graph M&I Resource

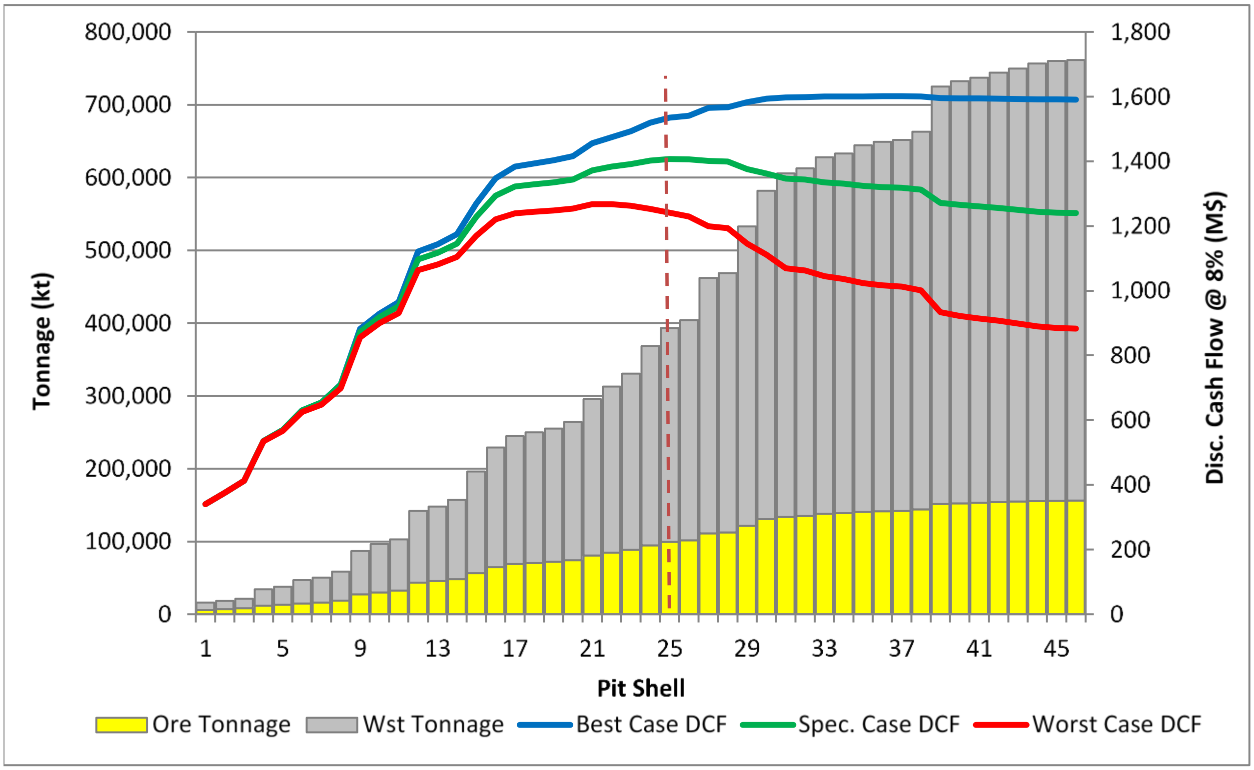


Table 15.7: Measured and Indicated Mineral Resource Pit Shell Selection

Shell Selection	Selection
Shell Number	25.0
Shell RF	0.780
Total Tonnage (kt)	393,184
Waste Tonnage (kt)	293,844
Strip Ratio (W:O)	2.96
Ore Tonnage (kt)	99,340
Cu Grade (%)	0.19
Ag Grade (g/t)	1.63
Au Grade (g/t)	0.07
Pt Grade (g/t)	0.20
Pd Grade (g/t)	0.60
NSR ($/t)	45.35
DCF @ 8 % ($ M)	1,408

15.4 Mine Design

15.4.1 Ramp Design Criteria

The ramps and haul roads are designed for the largest equipment being a 250-ton class haul truck (CAT793) with a canopy width of 8.30 m. For double lane traffic, industry best-practice is to design a travelling surface of at least three times the width of the largest vehicle. Ramp gradients are established at 10%.

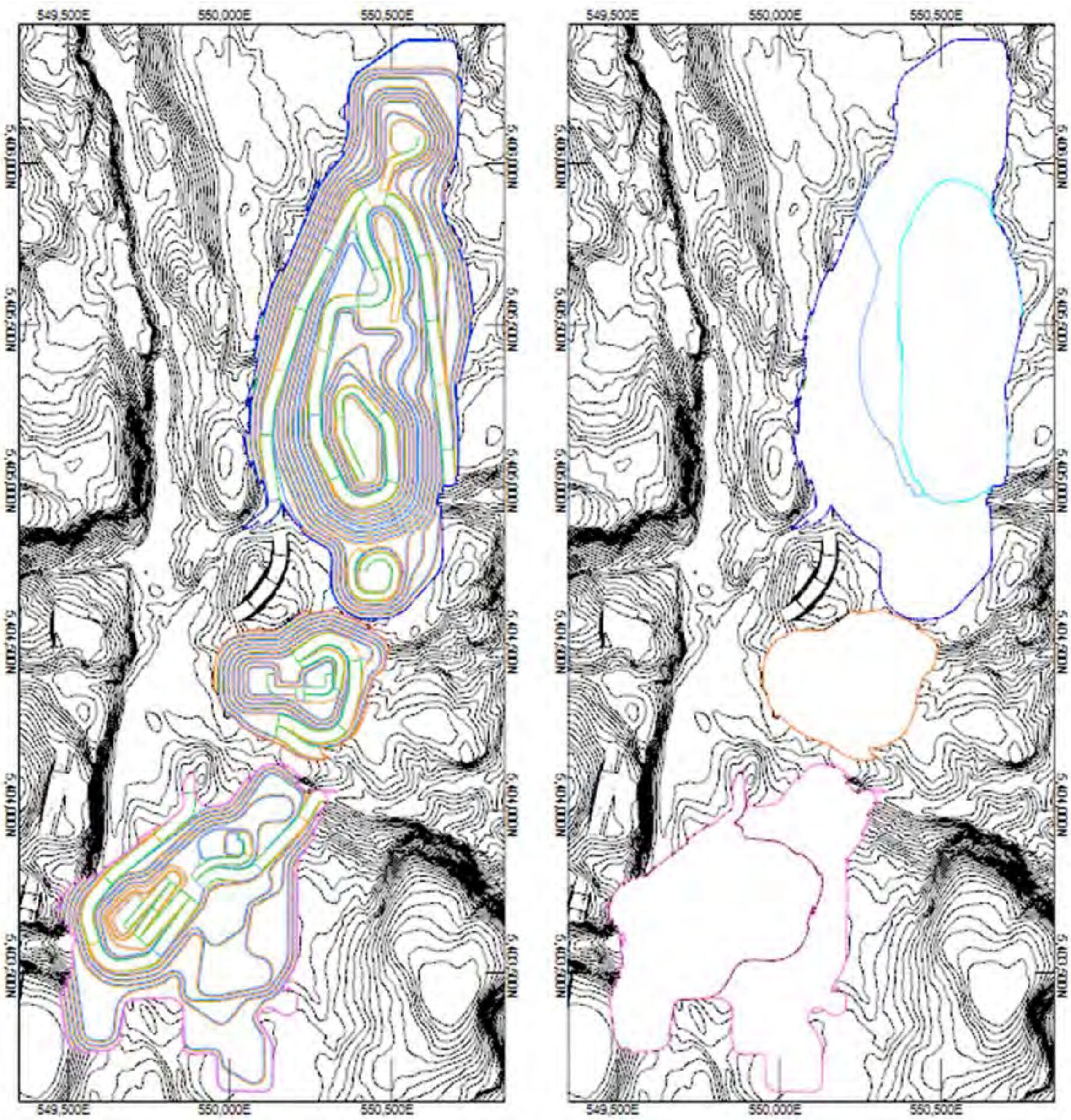
A shoulder barrier or safety berm on the outside edge will be constructed of crushed rock to a height equal to the rolling radius of the largest tire using the ramp. The rolling radius of the truck tire is 1.8 m. These shoulder barriers are required wherever a drop-off greater than 3 m exists and will be designed at 1.1H:1V. A water drainage ditch planned on the highwall will capture run-off from the pit wall surface and assure proper drainage of the running surface. The ditch will be 1.4 m wide. To facilitate drainage of the roadway a 2% cross slope on the ramp is planned.

The double lane ramp width is 35.0 m wide and the single lane ramp is 22 m wide. Single lane ramps are introduced in the pit bottom when the benches start narrowing and when the mining rates will be significantly reduced.

15.4.2 Open Pit Mine Design Results

The Marathon Deposit is mined with three (3) pits as presented in Figure 15.2. The pits are aligned along strike over 3,300 m. The North pit is 1,800 m long and 700 m wide and reaches a depth of 300 m. The Central pit is 450 m long and 500 m wide and reaches a depth of 120 m. Finally, the South pit is 1,100 m long and 800 m wide and reaches a depth of 200 m. The North and South final pit designs have two exits: one to the east and one to the west, providing access to the pushbacks and to shorten haul distances to the crusher and waste dumps. The west ramp system connects with the east ramp system at a plateau at elevation 190 m (north pit) and 200 m (south pit). The ramp system introduces several switchbacks in several instances to reduce the overall slope angle.

Figure 15.2: Final Pit Designs



Mining Services	**Final Pit Design**	**Author: Peter Harquail** **Date: Nov. 2020**

15.5 Mineral Reserve Statement

The Mineral Reserve and stripping estimates are based on the final pit design presented in the previous section.

The Proven and Probable Mineral Reserves are inclusive of mining dilution and ore loss. The total ore tonnage before dilution and ore loss is estimated at 108.1 Mt at an average grade of 1.45 g/t Ag, 0.07 g/t Au, 0.22% Cu, 0.66 g/t Pd and 0.21 g/t Pt. Isolated ore blocks are treated as an ore loss and represent 0.17 Mt or 0.16% in terms of ore tonnage. The dilution envelope around the remaining ore blocks results in a dilution tonnage of 9.4 Mt. The dilution tonnage represents 8.7% of the ore tonnage before dilution and the dilution grade is estimated from the block model and corresponds to the average grade of the dilution skin. Table 15.8 presents a Resource to Reserve reconciliation.

Table 15.8: Resource to Reserve Reconciliation

Resource to Reserve Reconciliation	Tonnage (kt)	Pd Grade (g/t)	Cu Grade (%)	Pt Grade (g/t)	Au Grade (g/t)	Ag Grade (g/t)
Ore before Ore Loss and Dilution	108,290	0.66	0.22	0.21	0.07	1.45
Less: Ore Loss (isolated blocks)	168	0.27	0.09	0.11	0.00	1.42
Ore before Mining Dilution	108,122	0.66	0.22	0.21	0.07	1.45
Add: Mining Dilution	9,411	0.14	0.06	0.06	0.02	0.92
Proven & Probable Mineral Reserve	117,701	0.62	0.21	0.20	0.07	1.41

The Proven Mineral Reserves totals 85.1 Mt at an average grade of 1.36 g/t Ag, 0.07 g/t Au, 0.20% Cu, 0.66 g/t Pd and 0.21 g/t Pt. The Probable Mineral Reserve totals 32.6 Mt at an average grade of 1.54 g/t Ag, 0.06 g Au/t, 0.21% Cu, 0.51 g/t Pd and 0.17 g/t Pt. The total Proven and Probable reserves are 117.7 Mt at an average grade of 1.41 g/t Ag, 0.07 g/t Au, 0.21% Cu, 0.62 g/t Pd and 0.20 g/t Pt. The total tonnage to be mined is estimated at 447.9 Mt for an average strip ratio of 2.81 which includes overburden.

16. MINING METHODS

16.1 Introduction

Mining of the Marathon Project is planned with five (5) phases and three (3) separate pits. The summary of each of the mining phases and pits is summarized in Table 16.1 and depicted in Figure 16.1. The objective of pit phasing is to improve the economics of the Project by feeding the mill with higher grade material during the earlier years and/or delaying waste stripping until later years. Internal phases are designed to have a lower stripping ratio then the subsequent phases. The project is split into the three (3) separate pits: North Pit, Center Pit and South Pit. The North Pit contains three (3) phases. The Center Pit and South Pit only have a single phase.

Over the mine life, the Project will produce 117.7 Mt of ore and 330.2 Mt of waste at an overall stripping ratio of 1 to 2.81 (ore to waste). Some 24.2 Mt of generated waste will be potentially acid generating (PAG) and must be stored separately and with different environmental considerations.

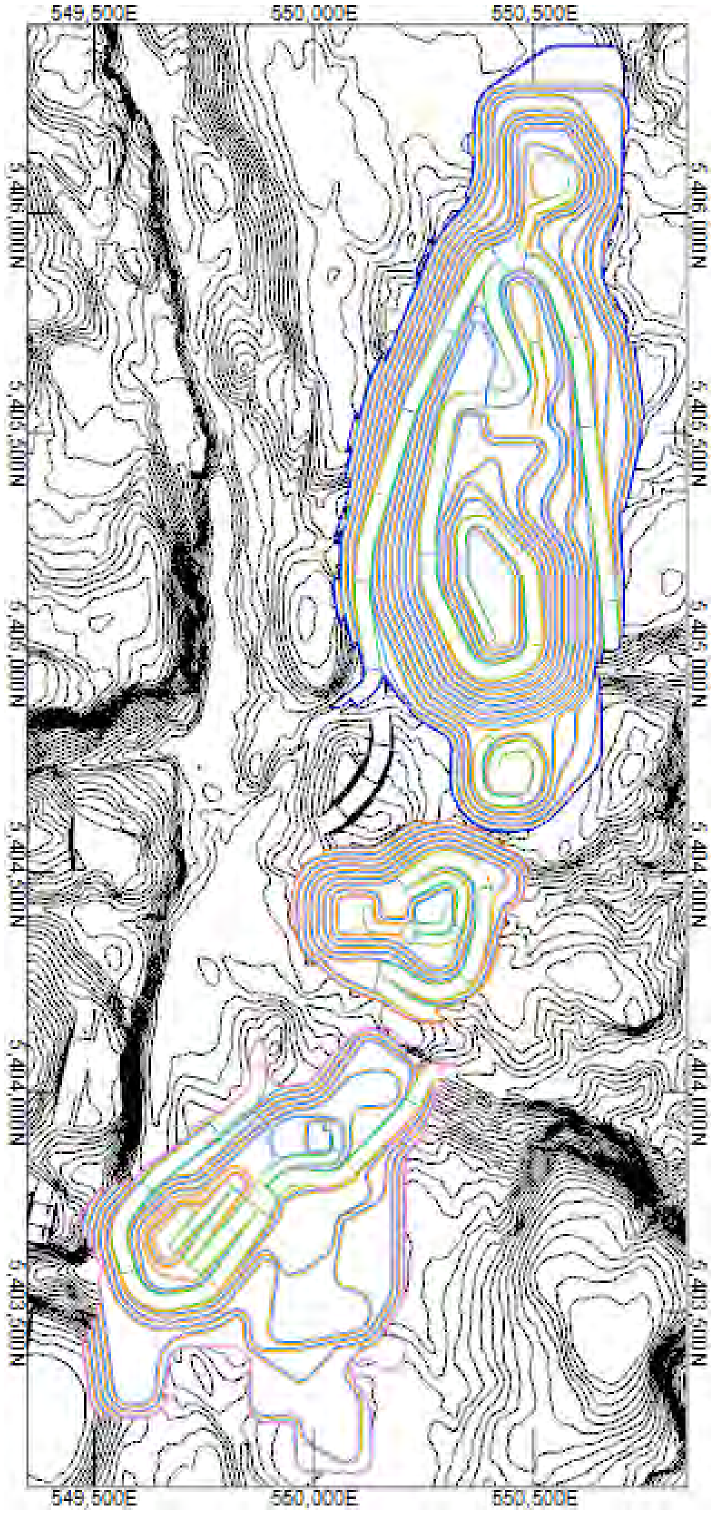
The pit designs are based on the optimized whittle shells described in Section 15 and created with the parameters outlined in Subsection 16.1.1.

Table 16.1: Pit Phase Design Summary

	Units	Total	North Pit				Center Pit	South Pit		
			Phase 1	Phase 2	Phase 3	Total	Total	Phase 1	Phase 2	Total
Total[1]	000 t	**447,877**	83,518	86,638	148,403	**318,559**	**35,916**	51,290	42,112	**93,402**
Waste Rock	000 t	**326,444**	49,428	62,333	116,402	**228,162**	**26,786**	41,096	30,401	**71,497**
NPAG	000 t	**274,467**	36,075	54,240	95,219	**185,534**	**26,153**	34,800	27,980	**62,780**
PAG	000 t	**51,978**	13,353	8,093	21,182	**42,629**	**633**	6,296	2,421	**8,716**
Overburden	000 t	**3,732**	907	398	788	**2,094**	**455**	728	456	**1,183**
Strip Ratio	W:O	**2.81**	1.52	2.62	3.75	**2.61**	**3.14**	4.42	2.74	**3.51**
Ore	000 t	**117,701**	33,183	23,907	31,213	**88,304**	**8,675**	9,467	11,255	**20,722**
Cu Grade	%	**0.21**	0.26	0.222	0.22	**0.23**	**0.118**	0.10	0.09	**0.09**
Ag Grade	g/t	**1.41**	1.04	1.51	1.61	**1.37**	**1.19**	1.69	1.65	**1.67**
Au Grade	g/t	**0.07**	0.07	0.07	0.06	**0.07**	**0.06**	0.08	0.07	**0.08**
Pt Grade	g/t	**0.20**	0.20	0.19	0.16	**0.18**	**0.16**	0.34	0.24	**0.29**
Pd Grade	g/t	**0.62**	0.69	0.64	0.50	**0.61**	**0.50**	0.85	0.59	**0.71**

[1] *Total Material Moved.*

Figure 16.1: End of LOM Pit Layout



Mining Services	Pit Design: End of Mine Life	Author: Peter Harquail Date: Dec. 2020

16.1.1 Open Pit Optimization

All phases use specific Whittle shells to optimize shape and layout to ensure the optimal ore and waste is mined to achieve maximum individual NPV. Table 16.2 depicts the nomenclature of each of the pits and the Whittle shell that guided their design. For more details on the individual pit shells, refer to Section 15.

Table 16.2: Pit Shell Hierarchy

Phasing	Whittle Shell
North Pit Phase 3	Shell #25
→ North Pit Phase 2	Shell #15
→ North Pit Phase 1	Shell #10
South Pit Phase 2	Shell #25
→ South Pit Phase 1	Shell #15
Center Pit Phase 1	Shell #25

Whittle shells are made without ramps, consideration of minimum mining width or ramp access. These details are included subsequently in the pit's designs. Whittle shells are designed with a lower overall slope angle (OSA) to account for these changes. Even with these accommodations, it is typical for the inventory of the pits to fluctuate from the Whittle designs and the actual design. Ranges of fluctuation are typically within -5% to +15%. Table 16.3 depicts the comparison between the inventory calculated by Whittle and the inventory in the designed pits. There is a 13% increase in total tonnage of the pits and a 15% increase in ore tonnage with a significant decline in the stripping ratio. This is primarily due to the application of ramps in areas that contain more ore. In the Whittle designs, it is assumed that the impact of ramping is spread over the entirety of the walls and it is not possible to target ore rich areas to place ramping.

Table 16.3: Shell and Design Comparison

	Shell	Designs
Total Tonnage (kt)	393,184	447,877
Waste Tonnage (kt)	293,844	330,177
Strip Ratio (W:O)	2.96	2.81
Ore Tonnage (kt)	99,340	117,701
Cu Grade (%)	0.19	0.20
Ag Grade (g/t)	1.63	1.41
Au Grade (g/t)	0.07	0.07
Pt Grade (g/t)	0.20	0.20
Pd Grade (g/t)	0.62	0.62

16.1.2 Open Pit Design Criteria

The open pit designs are established with the following design criteria.

16.1.2.1 Geotechnical Parameters

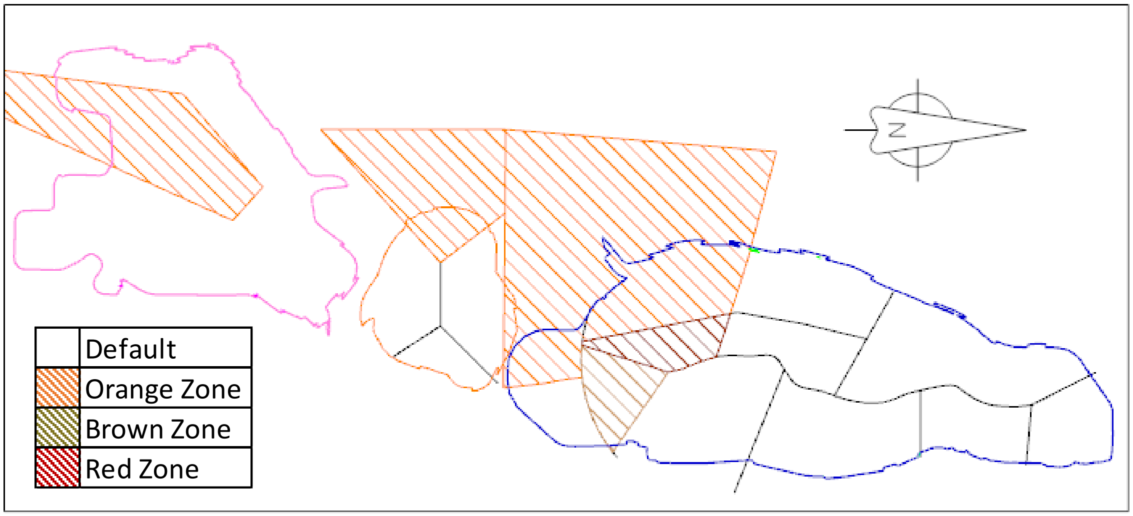
Table 16.4 summarizes the geotechnical parameters used in the design the pit walls. Figure 16.2 outlines the geotechnical zones overlaying the mine designs with parameters summarized in a geotechnical assessment report (Knight Piésold) in Figure 16.3.

Geotechnical berms were not used in the pits. Temporary walls between phases are assumed to have the same parameters as final walls as pre-split is planned for all mining.

Table 16.4: Geotechnical Design Parameters Summary

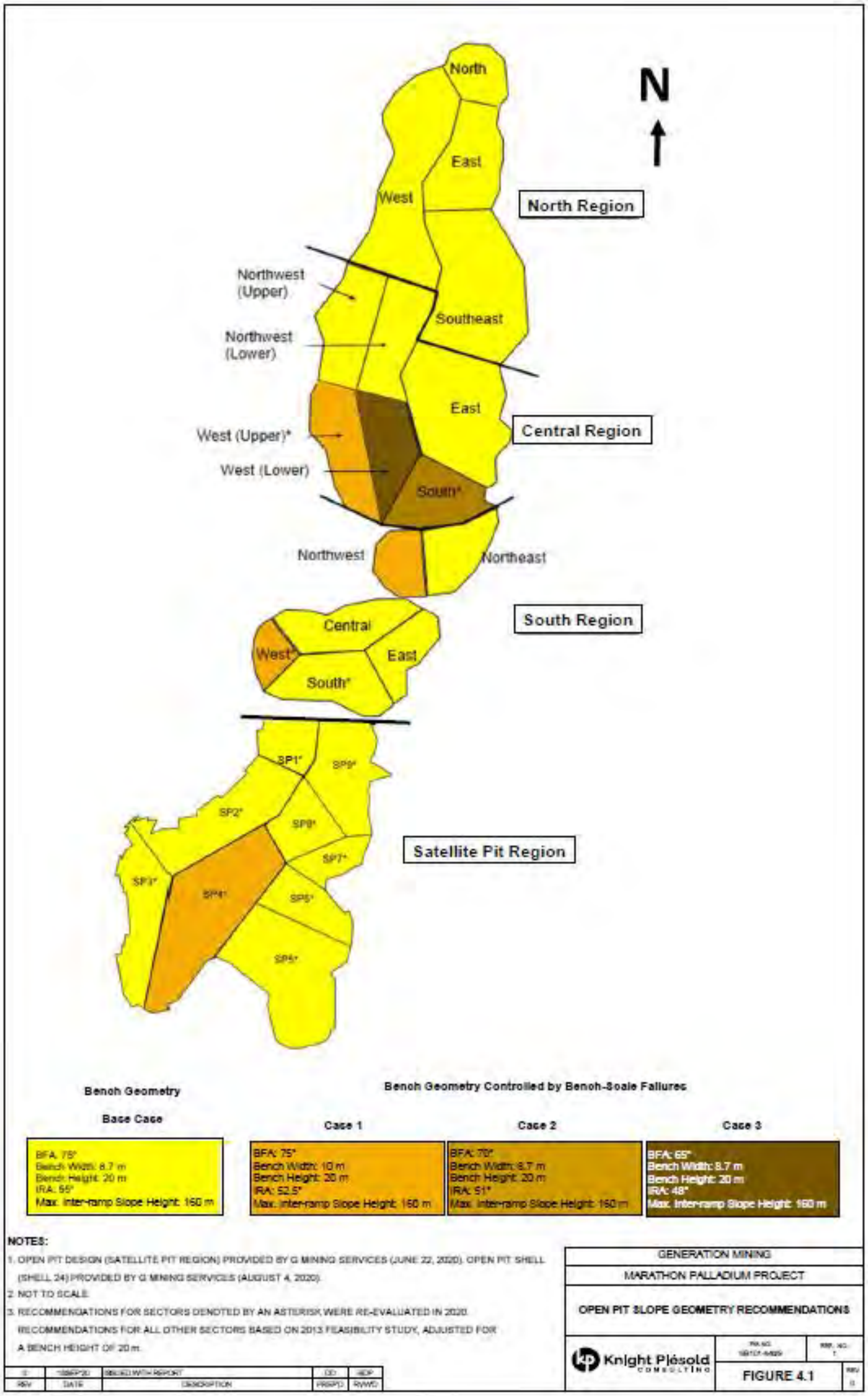
5 m Adjusted Blocks				
Design Sector	**Default**	**Orange Zone**	**Brown Zone**	**Red Zone**
Design Sector	20.0	20.0	20.0	20.0
Final Vertical Bench Height	75.0	75.0	70.0	65.0
Bench Face Angle	8.70	10.00	8.70	8.70
Avg. Catch Berm Width	14.06	15.36	15.98	18.03
Horz	20.00	20.00	20.00	20.00
Vert	54.89	52.48	51.38	47.97
OSA (crest-to-crest)	1.42	1.30	1.25	1.11

Figure 16.2: Application of Geotech Zones



Mining Services	Geotech Zones	Author: Peter Harquail Date: Dec. 2020

Figure 16.3: Knight Piésold Geotechnical Recommendations



16.1.2.2 Ramp and Road Design

Ramp designs are shown in Figure 16.4 and Figure 16.5 for the single lane and double lane ramps, respectively. The ramps are designed specifically for the primary hauler, the CAT 793F. In accordance with SME Standard of 3.5 x and 2.0 x ramp width of the vehicle operating width. The operating width of the CAT 793F is 8.3 m. The ramp includes adequate distance for the vehicles to operate and includes a safety berm on the pit side and a drainage ditch on the wall side. The safety berm is designed to be at least half the height of the tallest tire to be used on site, in this case the tires of the CAT 793F.

Figure 16.4: Single-Lane Ramp Haul Road Profile

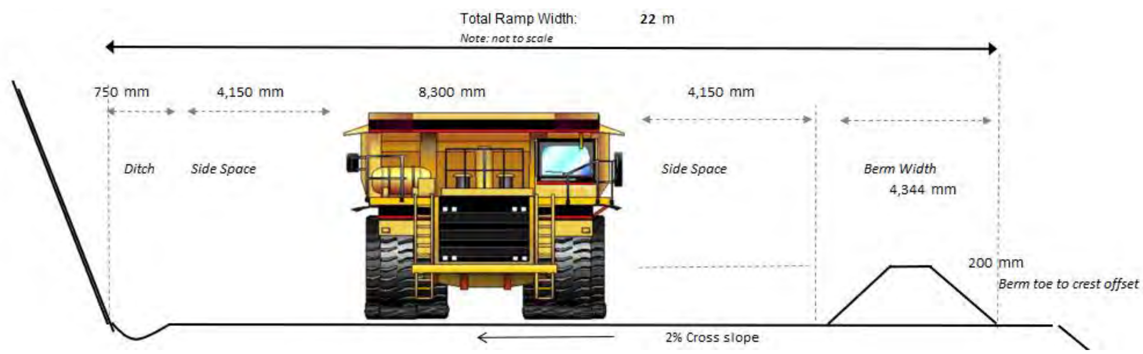
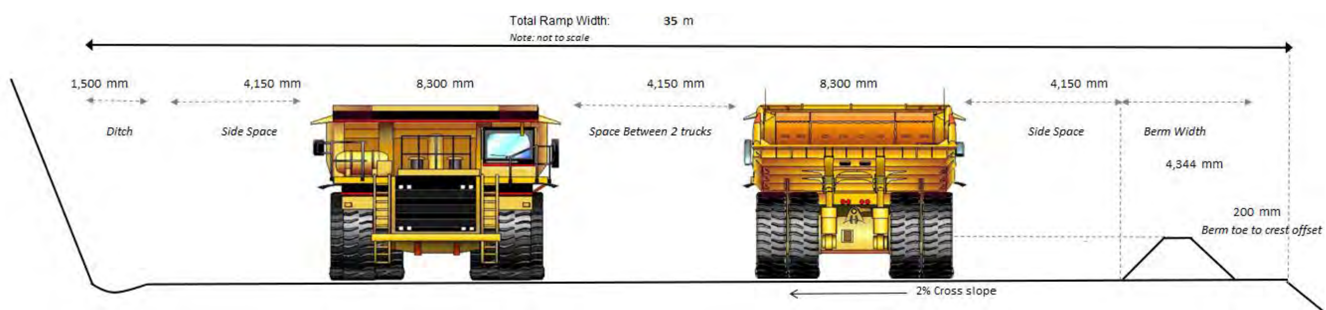


Figure 16.5: Double-Lane Haul Road Profile



16.1.2.3 Mine Design Parameters

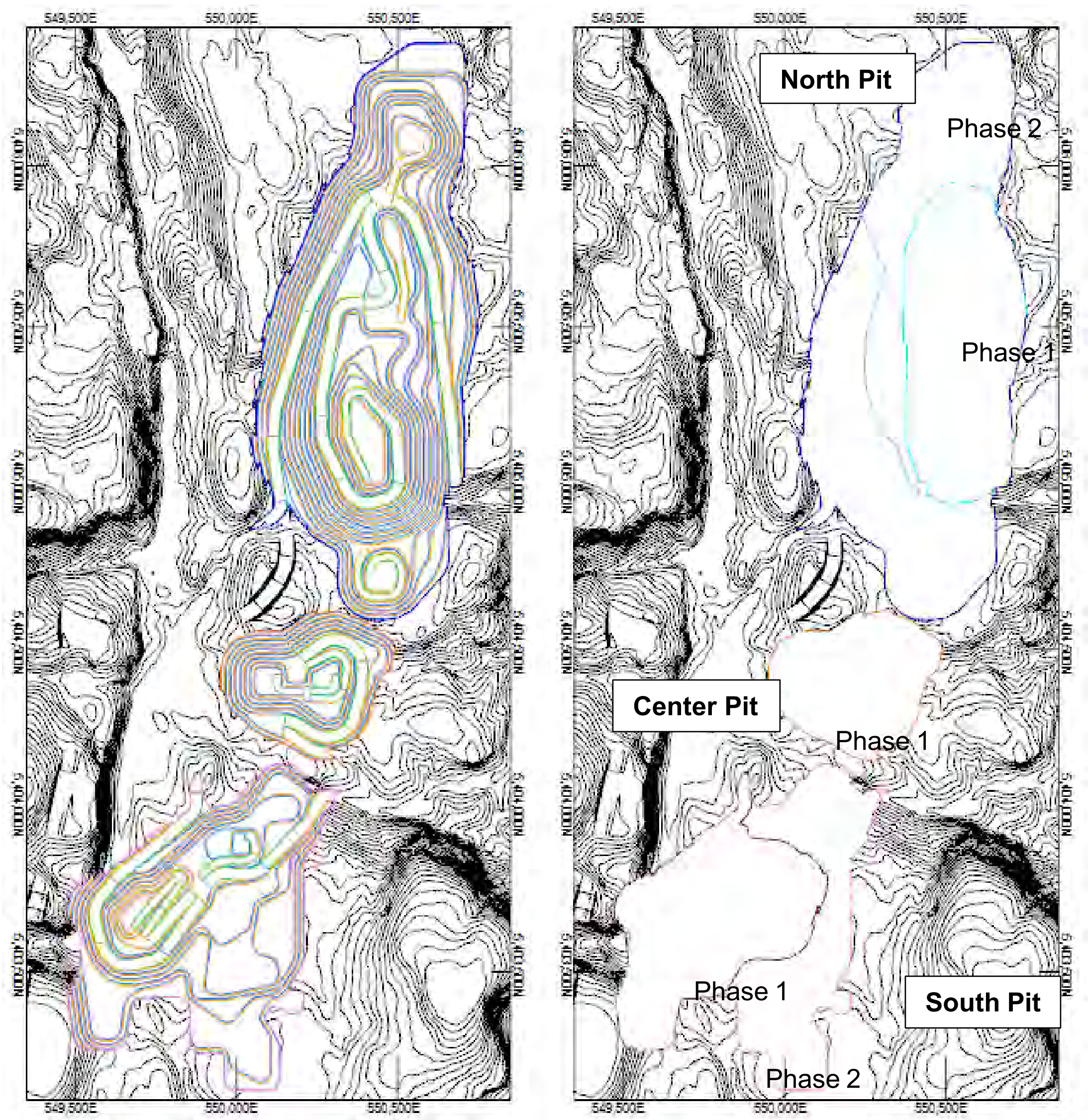
A minimum mining width of 40 m was used when controlling the minimum width that can be safely and optimally mined between phases or at the bottom of a pit. This value is determined by the operating width of the primary shovel, the width required for a double lane road with berm and the area required for the CAT 793F to safely complete a three-point turn.

Single lane ramps were used in the bottom 40 m of the pits to reduce stripping and to capture more ore. Single lane ramps can cause bottle necks in the fleet productivity and this method is only used sparingly at the bottom of the pits. Reductions in productivity stemming from single lane ramping is captured in the mine ramp down in production or compensated by mining in other pits or phases. To attain additional ore at the bottom of the pit, 10 m box cuts are used.

16.1.3 Open Pit Designs

The final designs are depicted in Figure 16.6 along with the phase limits of each of the phases. Ramps for the pits are designed to exit either on the west or east of the pits to better access the primary waste dump and the ore crusher.

Figure 16.6: End of LOM Pit Layout and Phase Limits



Mining Services	Pit Layout: End of Mine Life (Left), Phase Limits (Right)	Author: Peter Harquail Date: Dec. 2020

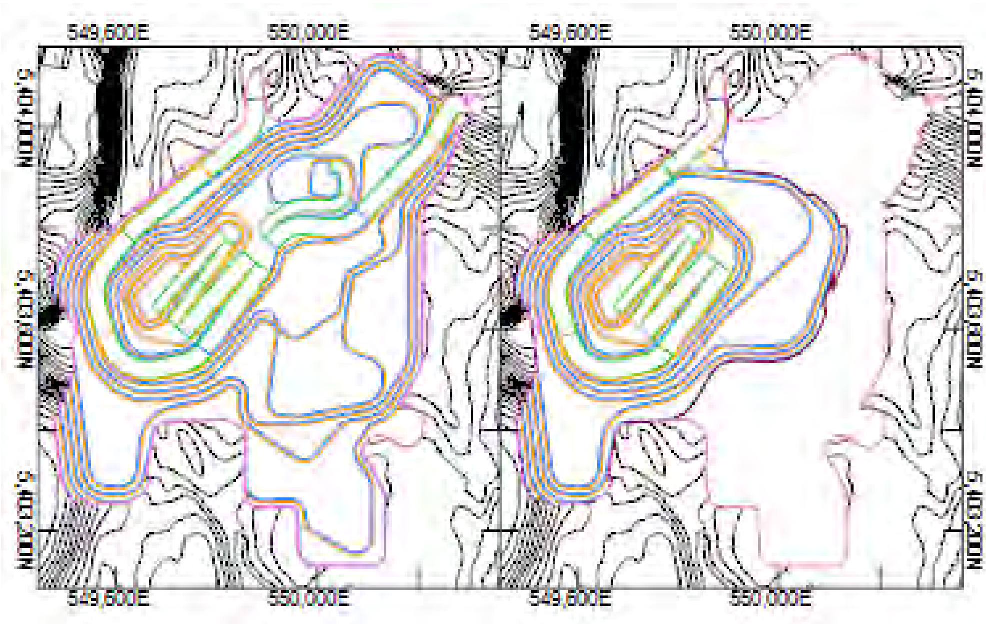
The South Pit consists of two phases. South Pit Phase 1 is deeper and has a higher tonnage then Phase 2. Phase 1 exits to the north side of the pit granting access to the crusher and the eastern dump.

Phase 2 is an extension of Phase 1 and includes an additional ramp exiting to the east for access to the East Waste Dump. Both phase ramps join at 200 m allowing access to the North Exit and the East Exit for the Phase 2 throughout its life.

Phase 1 has a depth of 250 m and is approximately 1.1 km long at its longest and is 500 m wide.

Phase 2 has a depth of 250 m and is approximately 1.0 km long at its longest and is 300 m wide.

Figure 16.7: South Pit Phases 1 & 2

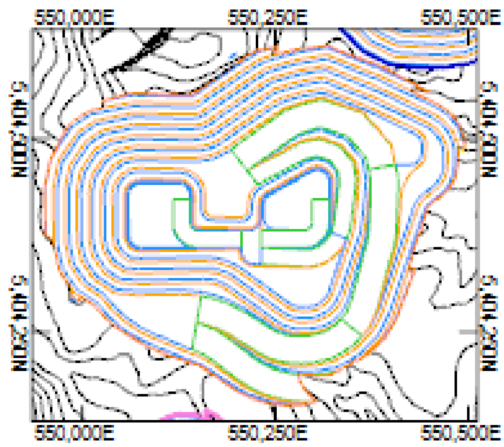


Mining Services	**South Pit: Phase 2 (left), Phase 1 (right)**	**Author: Peter Harquail** **Date: Dec. 2020**

The Center Pit consists of one phase. The ore lays predominately on the east side dipping west. Ramping is planned to take advantage of the ore on the east wall and minimize waste mined on the west wall.

The Center Pit is 170 m deep with a length of 500 m and width of 470 m.

Figure 16.8: Center Pit Phase 1



Mining Services	**Center Pit: Phase 1**	**Author: Peter Harquail** **Date: Dec. 2020**

The North Pit is the largest of the pits and consists of three (3) nested phases. The east wall is shared among all three (3) phases as well as the majority of the east wall ramp.

Phase 1 defines the east wall of the North Pit and has a ramp that will be shared among all the phases. The shared ramp ends as it transitions to a single lane ramp. There is 40 m of single lane ramping at the bottom and no box cut.

Phase 2 maintains the east wall ramp and adds an additional ramp that runs along the west wall. This additional ramp ends once the Phase 1 ramp is surpassed. Then the east wall ramp becomes the primary ramp and allows for deepening of the pit. There is an internal pit to the north with only a depth of 20 m and another internal pit south of the hairpin turn with a depth of 20 m. There is a 10 m box cut at the bottom and 40 vertical meters of single lane ramping.

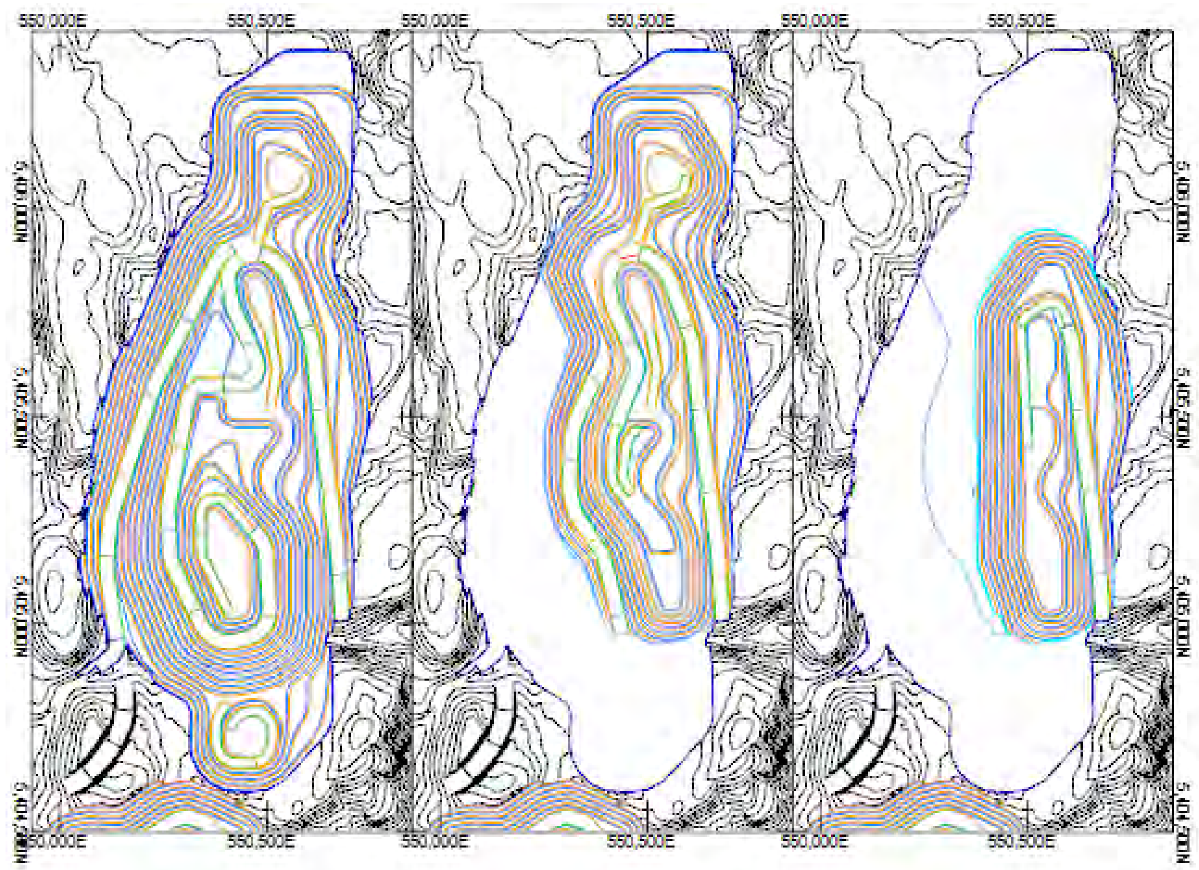
Phase 3 is the final phase and introduces the final west wall ramp. This ramp joins the east ramp wall to merge into the final ramp that will drive to the bottom of the pit. There is a small internal pit on the south wall that is 40 m deep and has an internal ramp. Phase 3 did not require a box cut and contains 40 m of single lane ramping.

North Pit Phase 1 has a depth of 200 m, length of 980 m and a width of 400 m.

North Pit Phase 2 has a depth of 260 m, length of 1.5 km and a width of 500 m.

North Pit Phase 3 has a depth of 360 m, length of 1.8 km and a width of 700 m.

Figure 16.9: North Pit Phases 1,2 & 3



Mining Services	**North Pit: Phase 3 (left), Phase 2 (center), Phase 1 (left)**	**Author: Peter Harquail** **Date: Dec. 2020**

16.1.4 Overburden and Waste Rock Storage

A total of 330 Mt of waste rock is produced over the mine life. The waste is split into three categories of PAG or Type-2 Rock, Non-Potentially Acid Generating ("NPAG" or "Type-1") Rock and Overburden. Each material has different dumping requirements and have unique dumps for storage. Table 16.5 depicts the design parameters of each of the dumps.

Table 16.5: Overburden and Dump Design Parameters

Waste Dump	Avg. Catch Bench Width (m)	Pile Face Angle (deg)	Overall Slope Angle (H:V)	Maximum Elevation (m)	Approximate Height (m)
East Waste Dump (NPAG)	10	28.6	2.3:1	350	200
South In-pit Dump (NPAG+PAG)	10	28.6	2.3:1	300	160
South Dump Extension (NPAG)	10	28.6	2.3:1	390	140
Center In-pit Dump (NPAG+PAG)	10	28.6	2.3:1	310	160
Overburden Pile (OVB)	10	26	2.6:1	410	90

Table 16.6 depicts the various dumps, their inventories and percentage filled. In parenthesis by the name of the dump is the type of material that the dump will accept. Figure 16.10 depicts a site view of the dumps and their nomenclature (Note: showing final dumps with max capacity). Refer to Subsection 16.2.3 - Surface Schedule for dumps at specific periods.

The East Dump (or Mine Rock Storage Area "MRSA") is the largest NPAG dump in the Project. The East Dump contains two access on the west side to both the North Pit and the South / Center Pit. The ramp along the west side joins both entrances and will also act as the primary access route between the three pits on the east side. The explosive magazines are located further east of the East Dump. To access the magazines, the dump must be climbed, traveled across and descend on the opposite side. This method required less road building then alternative scenarios. The East Dump was designed to impact only two sub-watersheds. Diversion and / or containment structures will be constructed in the valley to the east to manage water run-off.

The South pit will be used as an in-pit dump (South Pit In-pit Dump) with both phases being back-filled after completion of the pit. This In-pit dump can be used as a PAG material storage with the material being fully covered with water prior to closure.

The South Dump Extension is not required to be used in the feasibility designs, but allows for additional waste dump capacity for the Project without impacting the overall Project footprint (Figure 16.10 representing the maximum capacity). The South Dump Extension is an extension of the East Dump that extends over the South Pit In-pit Dump. This dump would be usable exclusively for NPAG material. The East ramp of the South Dump Extension will connect with the East Dump ramp to allow access from the North Pit and contain a ramp on the West side to allow access from the stockpile area.

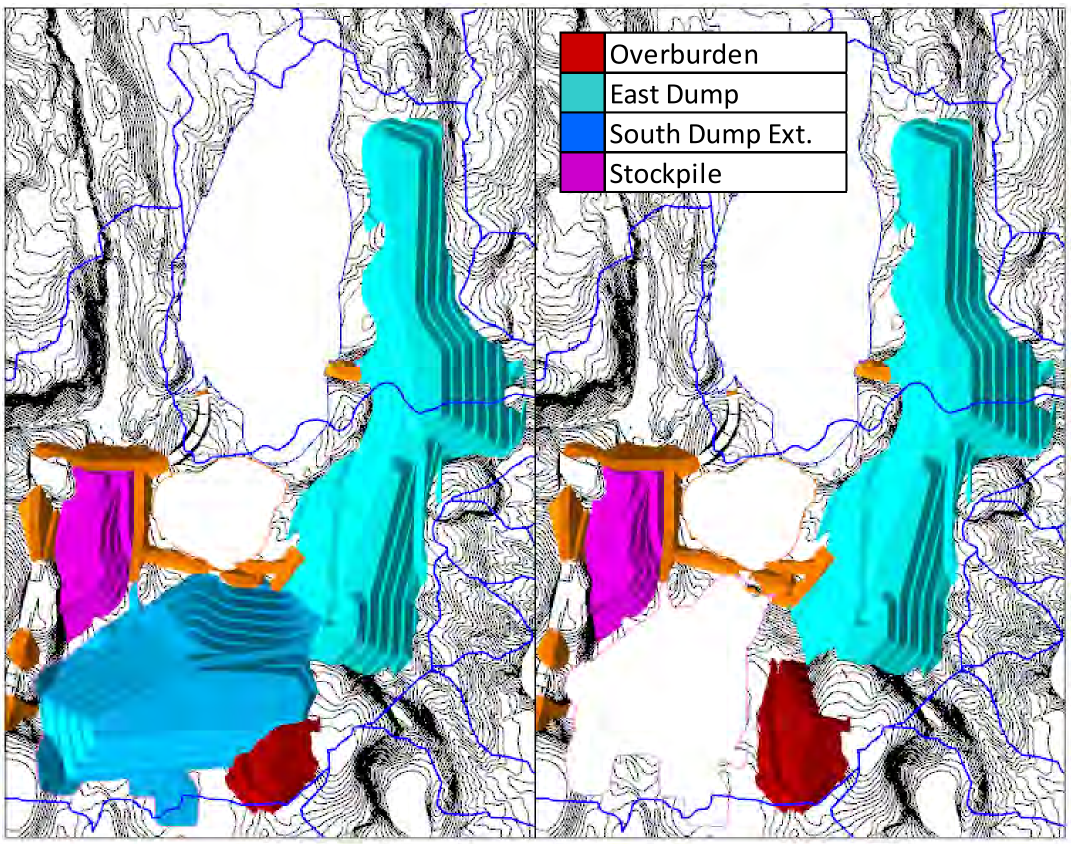
The Center In-pit Dump is similar to the South In-pit Dump in which it can take NPAG and PAG material and with PAG material being covered with water at closure. In the current designs, only PAG material is planned to be dumped at this location.

The Overburden pile is located south of the East Dump (Figure 16.10). The overburden material will be used for progressive reclamation and will be depleted during the final closure of the mine. The material will not be over-dumped by any other material.

Table 16.6: Surface Storage Capacities

Waste Dump	Capacity (Mt)	Capacity (Mm^3)	Surface Area (ha)	% Filled
East Waste Dump (NPAG)	131.3	54.7	104.94	100%
South In-pit Dump (NPAG+PAG)	73.3	30.6	0	100%
South Dump Extension (NPAG)	80.8	33.7	50.6	0%
Center In-pit Dump (NPAG+PAG)	28.5	11.9	0	24%
Overburden Pile (Overburden)	3.7	2.7	17.4	81%
Total	**317.7**	**133.5**	**476.3**	

Figure 16.10: Overburden and Waste Rock Storage Layout



Mining Services

Waste Storage: With South In-pit Dump (left), Without South In-pit Dump *shown for clarity* (right)

Author: Peter Harquail
Date: Dec. 2020

16.1.5 Ore Stockpile

The ore stockpile in Figure 16.10 represents the maximum capacity required for the LOM. The stockpile will be used to store marginally lower grade material and to allow for the preferential plant feed of higher margin ore. The ore stockpile tonnage will fluctuate over the mine life. All ore placed on the stockpile is included in the LOM plan and will be fed and milled over the LOM. Table 16.7 depicts the cut-off grades, in U.S. dollar NSR, of each of the bins used. The majority of the material stockpiled will be low-grade ore with some minor medium- and high-grade ore being stockpiled and depleted during the pre-production period. Different ore groupings will be stored separately within the stockpile to manage in-dump dilution. Table 16.8 depicts the design parameters for the stockpile.

The stockpile pile is accessible from the access road to the South Pit as well as along the crusher ramp. Material to be rehandled will require a loading unit, typically a front-end loader, and haul trucks to bring the material 2.3 km from the stockpile and up to the crusher via the crusher ramp. This route has a cycle time of 12.1 minutes including loading and dumping. Over the LOM, the peak inventory of stockpiled material is 12.4 Mt in Year 7 of mining and a total of 17.4 Mt of ore will be stored and reclaimed from the stockpile.

Table 16.7: Ore Grade Bin Definitions

Grade Bins	Cut-off Grade (NSR US$/t ore milled)
Low-Grade	13.00
Medium-Grade	18.00
High-Grade	30.00

Table 16.8: Stockpile Design Parameters and Capacities

Ore Stockpiles	Catch Bench Width (m)	Overall Slope Angle (H:V)	Maximum Elevation (m)	Approximate Height (m)	Max Capacity (Mt)
Stockpile Max Capacity	10	2.3:1	360	70	14.1

16.1.6 Surface Mine Haul Roads and Access

This section refers only to the haul and access roads accessible by haul trucks and heavy mine equipment.

Haul roads for the CAT 793F are designed with berms on both sides of the road and include a drainage ditch on one side. All surface roads are double lanes. The total width of a surface road is 39 m (Figure 16.11).

Figure 16.11: Double Lane Surface Haul Road Profile

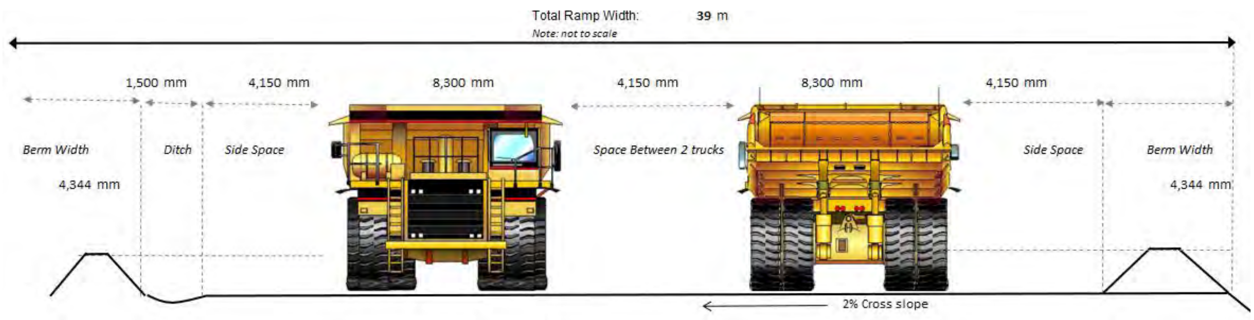


Figure 16.12 depicts all the haulage roads. Table 16.9 presents the three primary road sections and their cut and fill requirements.

The Mine Access Road is the road to the tailings area from the open pits and largely parallels the conveyor gallery. This section also includes the fill and cut required for the conveyor from the crusher pad to the processing plant.

The Crusher Ramp is the largest fill requirement in the Project and consists of a ramp up to the crusher located at a landing near the top of the hill west of the Center Pit. The ramp climbs 44 m at a 10% grade. This road also connects the North and South Pits.

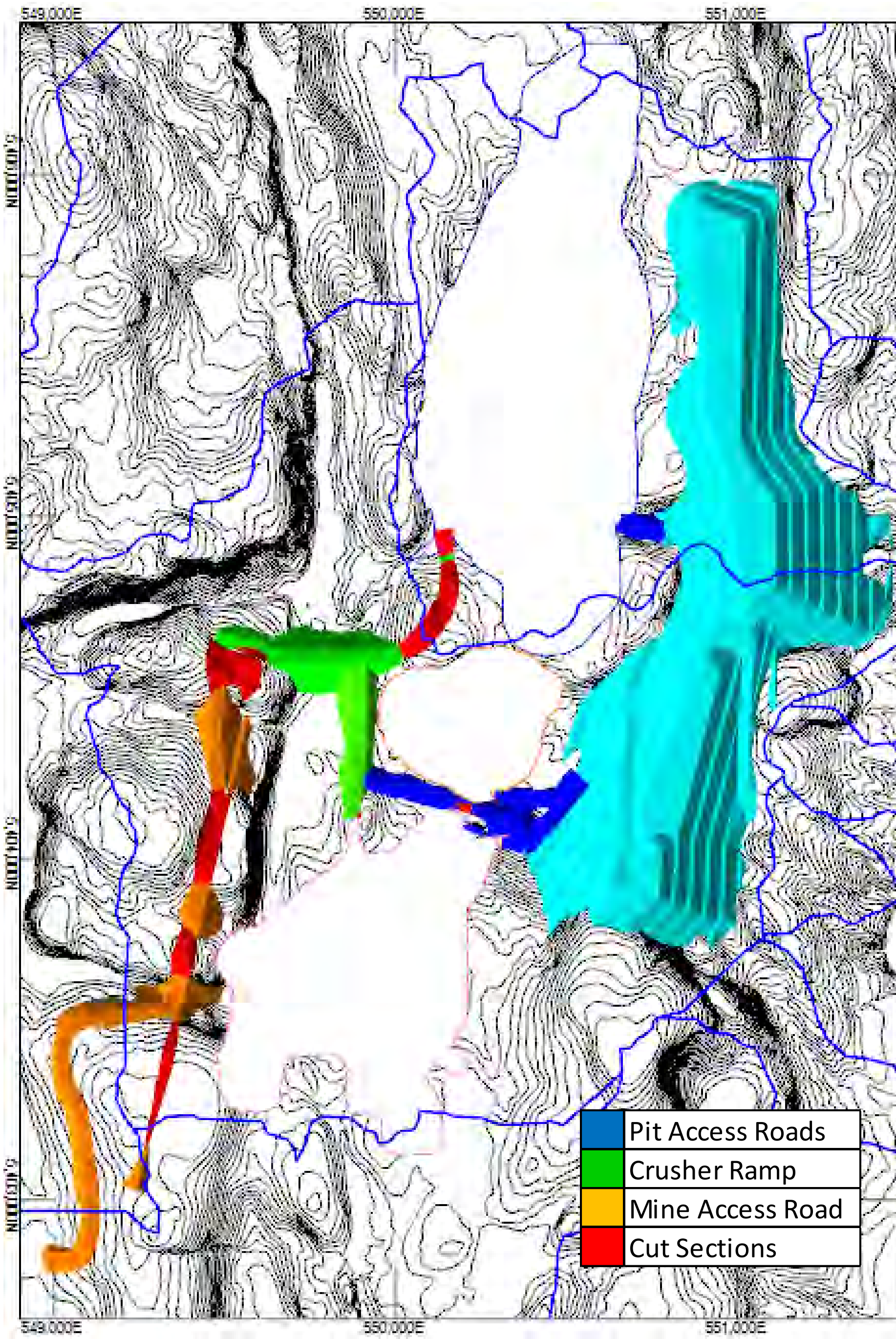
The pit access road allows access from the Center Pit to the crusher ramp road. This road runs between South Pit and Center Pit and will be the primary ore haulage route for material from the Center Pit.

Table 16.9: Ramp Cut and Fill Design Parameters and Requirements

Road	Fill (000'm^3)	Cut (000'm^3)	Net (000'm^3)
Mine Access Road*	919	343	577
Crusher Ramp	1,689	368	1,321
Pit Access Roads	552	1	551

**Includes the cut and fill requirements for the conveyor from the primary crusher to the processing plant.*

Figure 16.12: Site Mine Road Layout



Mining Services	**Road Layout**	**Author: Peter Harquail** **Date: Dec. 2020**

16.2 Mine Production Schedule

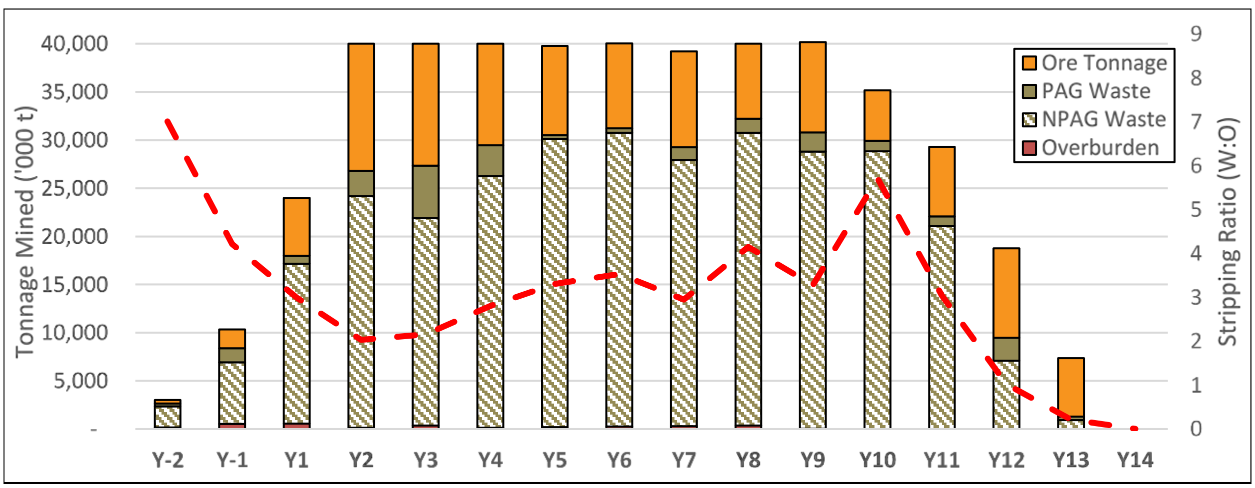
The mining and milling schedules was optimized by Minemax to maximize the Project NPV. The optimization includes mine sequencing and mining rate, stockpile usage and rehandling, and fleet usage. The results from Minemax were then further detailed, and a Deswik schedule was used to further accurately track material movements, stockpile inventory, mill blending, block mining, waste movements and equipment usage/movements.

16.2.1 Mining Schedule

The total mining of the Project takes place over ~15 years of mining, including a ramp up period of 2 years, 8 years of mining at peak capacity, and a 4-year post-peak production ramp down. Peak mining rate is 40 Mt/y (110,000 t/d) at an average stripping ratio of 1:2.8. Figure 16.13 outlines the production schedule by material type and the stripping ratio. Ore feed is consistent through the mine life with no periods of significant stripping required to meet mill requirements. PAG material is mined throughout the mine life and is placed in specific locations, separately from the NPAG material.

A detailed table that includes mined grades and materials can be found in Table 16.10.

Figure 16.13: Mine Production Schedule



Mining is split between large or wide ore domains mining and narrow ore domains. To lower dilution, narrow ore domain material is mined with a dedicated smaller fleet to better control dilution. Figure 16.14 depicts the material mined by the metallurgical groupings. Materials that are large ore domains are depicted with a in orange. Narrow body ore domains are in blue. The majority of mining will be done with the primary large-scale mining fleet in the large ore domains.

Figure 16.14: Material Mined by Domain Groupings

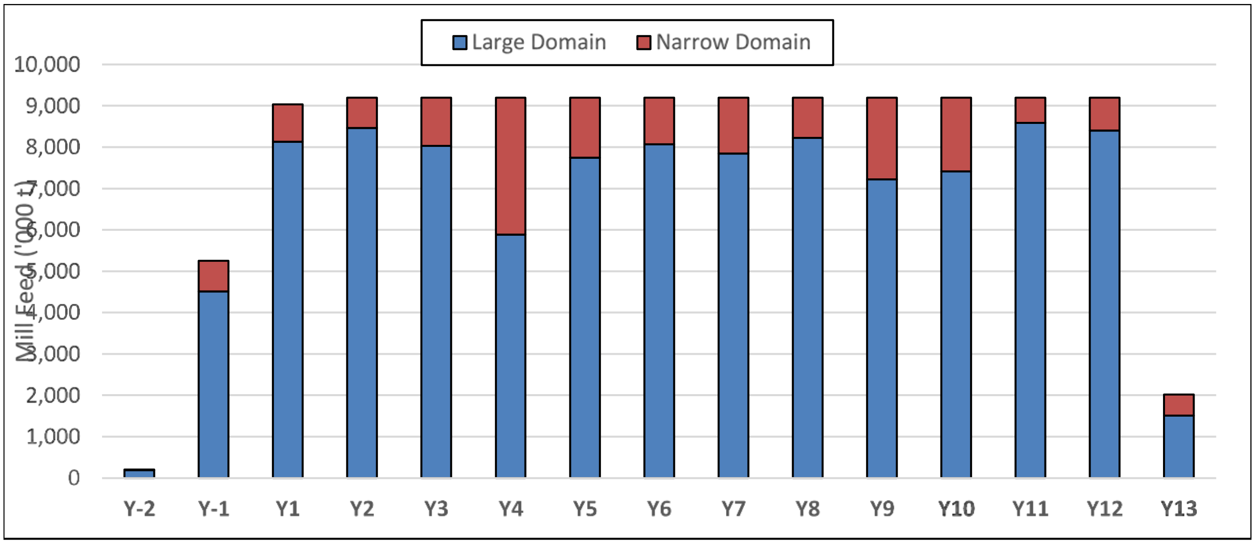


Figure 16.15 depicts the mining in each of the phases in the Project. In each year, there are only three predominantly active phases at once to match the equipment numbers and to reduce the dead heading required for large loading equipment. The North Pit is the largest pit in the Project and its three phases represent the bulk of mining, the Center Pit and South Pit are spread out over the mine life to fill in ore requirements during stripping periods. The South Pit and Center Pit are available for in-pit dumping once completed. The South Pit is mined out by Year 5 and the Center Pit by Year 10.

Figure 16.15: Material Movements from Pit

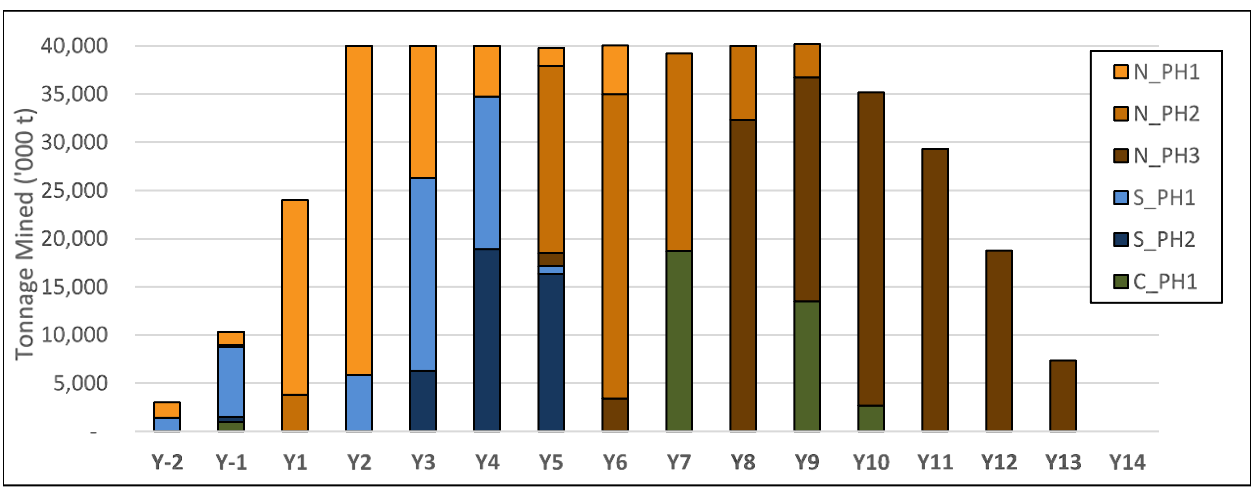


Figure 16.16 shows the movements of materials from the pits and the associated destinations. For All overburden material is placed in the Overburden Dump. Figure 16.16 depicts the totals for each designation from all pits.

Figure 16.16: Total Movements

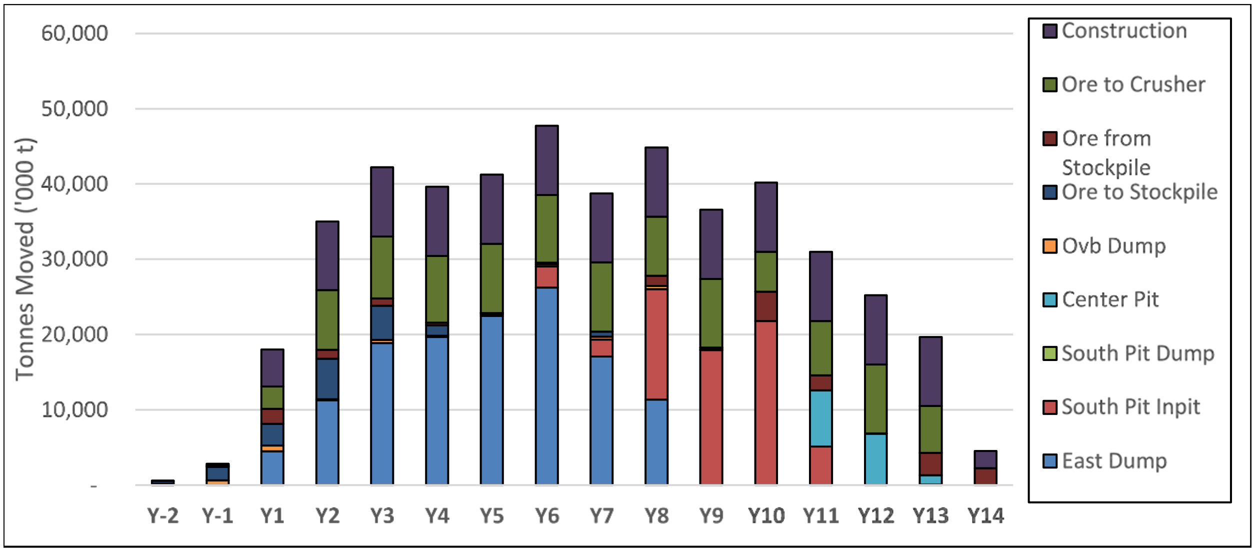


Table 16.10: Detailed Mine Production Schedule

		Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Total
Total Tonnage	Mt	3.0	10.4	24.0	40.0	40.0	40.0	39.8	40.0	39.2	40.0	40.2	35.2	29.3	18.7	7.4	-	**447.2**
Total Waste	Mt	2.6	8.4	18.0	26.8	27.3	29.5	30.5	31.2	29.3	32.2	30.8	29.9	22.1	9.5	1.3	-	**329.5**
Overburden	Mt	0.2	0.5	0.6	0.1	0.3	0.1	0.2	0.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-	**3.02**
NPAG	Mt	2.2	6.4	16.6	24.1	21.6	26.1	29.9	30.5	27.6	30.4	28.8	28.8	21.1	7.1	0.9	-	**302.2**
PAG	Mt	0.3	1.4	0.8	2.6	5.4	3.2	0.4	0.5	1.3	1.5	2.0	1.1	1.0	2.4	0.4	-	**24.28**
Strip Ratio	W:O	7.01	4.22	2.99	2.03	2.16	2.80	3.31	3.53	2.95	4.15	3.28	5.72	3.04	1.02	0.21	-	**2.81**
Ore Tonnage	Mt	0.38	1.98	6.01	13.1	12.6	10.52	9.23	8.83	9.92	7.77	9.39	5.23	7.25	9.27	6.07	-	**117.7**
Cu Grade	%	0.17	0.15	0.23	0.25	0.19	0.14	0.12	0.24	0.19	0.22	0.23	0.19	0.21	0.22	0.26	-	**20.50%**
Ag Grade	g/t	0.59	1.25	0.75	0.81	1.54	1.64	1.41	1.13	1.39	1.81	1.37	1.35	1.49	1.73	1.99	-	**1.41**
Au Grade	g/t	0.06	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.06	0.06	0.07	-	**0.07**
Pt Grade	g/t	0.17	0.21	0.19	0.19	0.23	0.26	0.27	0.22	0.19	0.15	0.15	0.19	0.15	0.17	0.18	-	**0.20**
Pd Grade	g/t	0.60	0.62	0.70	0.73	0.67	0.70	0.72	0.67	0.64	0.50	0.46	0.52	0.52	0.53	0.53	-	**0.62**

16.2.2 Milling Schedule

The mill life for the Project is 13 years. The peak milling capacity is 9.2 Mt per year with a ramp up of 5.3 Mt in the first year of milling before reaching peak milling rate. Mill feed is kept consistent with ore direct from the pits and rehandled ore to cover reduction in ore generation from the pit. Milling is optimized to maximize NPV for the Project and to minimize rehandled. Medium- and high-grade ore are prioritized to maximize revenue. The last year of milling consists entirely of low-grade material that was previously stockpiled. Figure 16.17 outlines the mill feed by source and the resulting NSR of material to the mill.

Figure 16.17: Mill Production

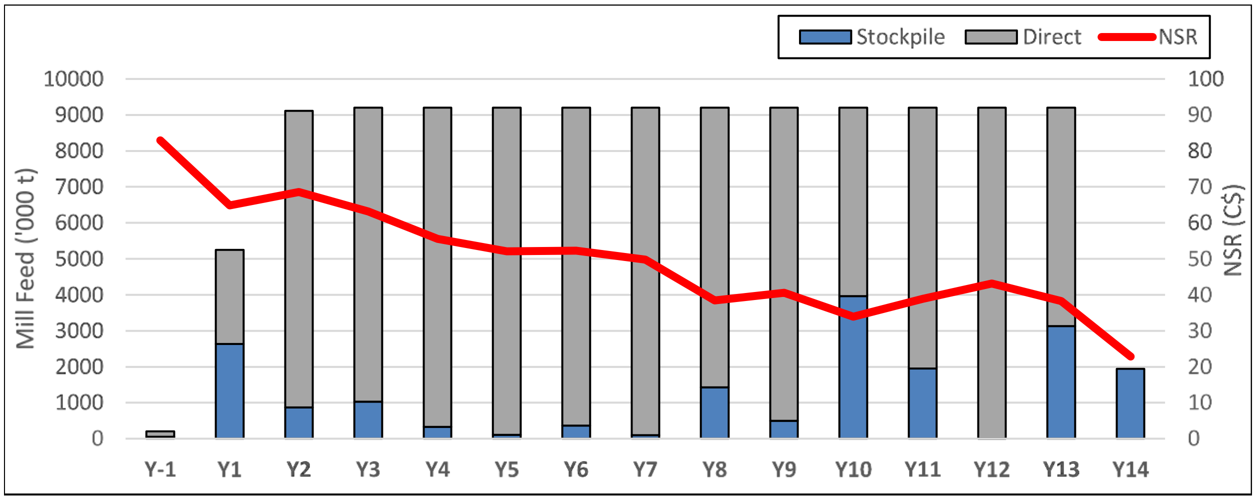


Figure 16.18 depicts the stockpile inventories by period and grade bin. Medium- and high-grade ore is only stockpiled for the first 2 years of mining until it is rehandled to the mill as higher grade ore is prioritized. The peak stockpile capacity is approximately 12 Mt. All material is milled by the end of project life.

Figure 16.18: Stockpile Inventory

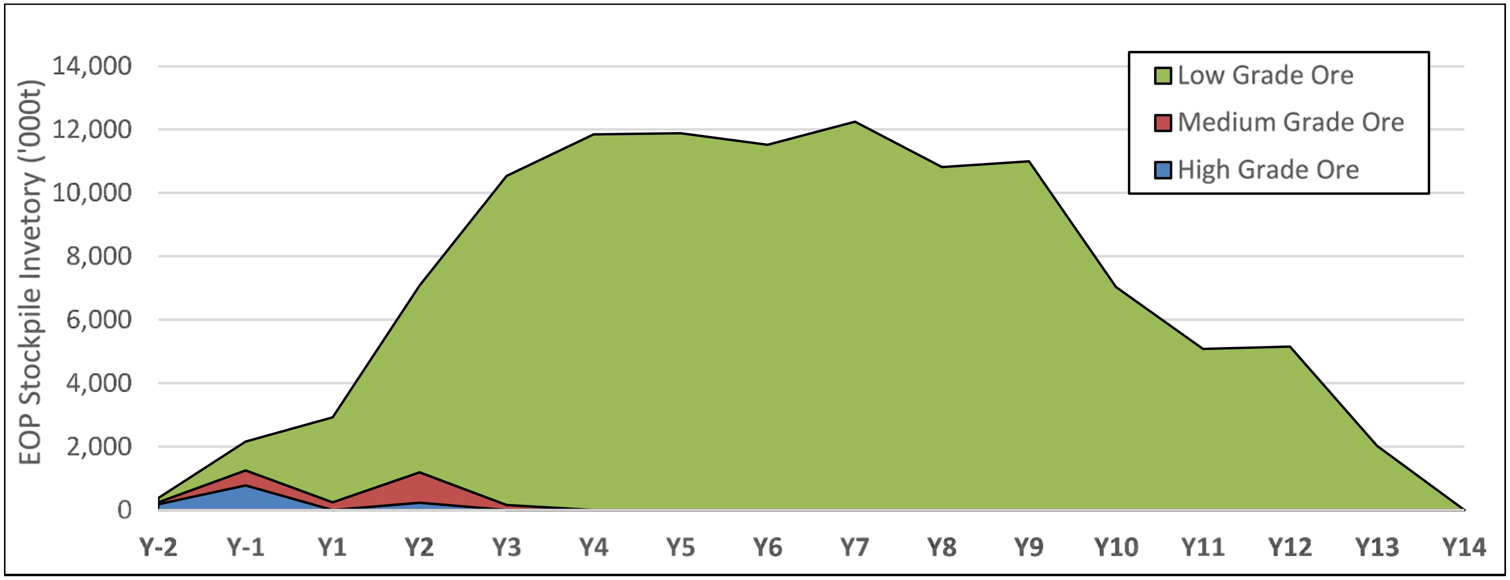


Table 16.11 and Figure 16.9 depicts the metals produced by the mill each year. Over the mine life, a total of 493 M lbs of copper, 3.8 Moz of silver, 185,000 oz of gold, 637,000 oz of platinum and 2.0 Moz of palladium will be produced after recovery.

Figure 16.19: Metals Produced

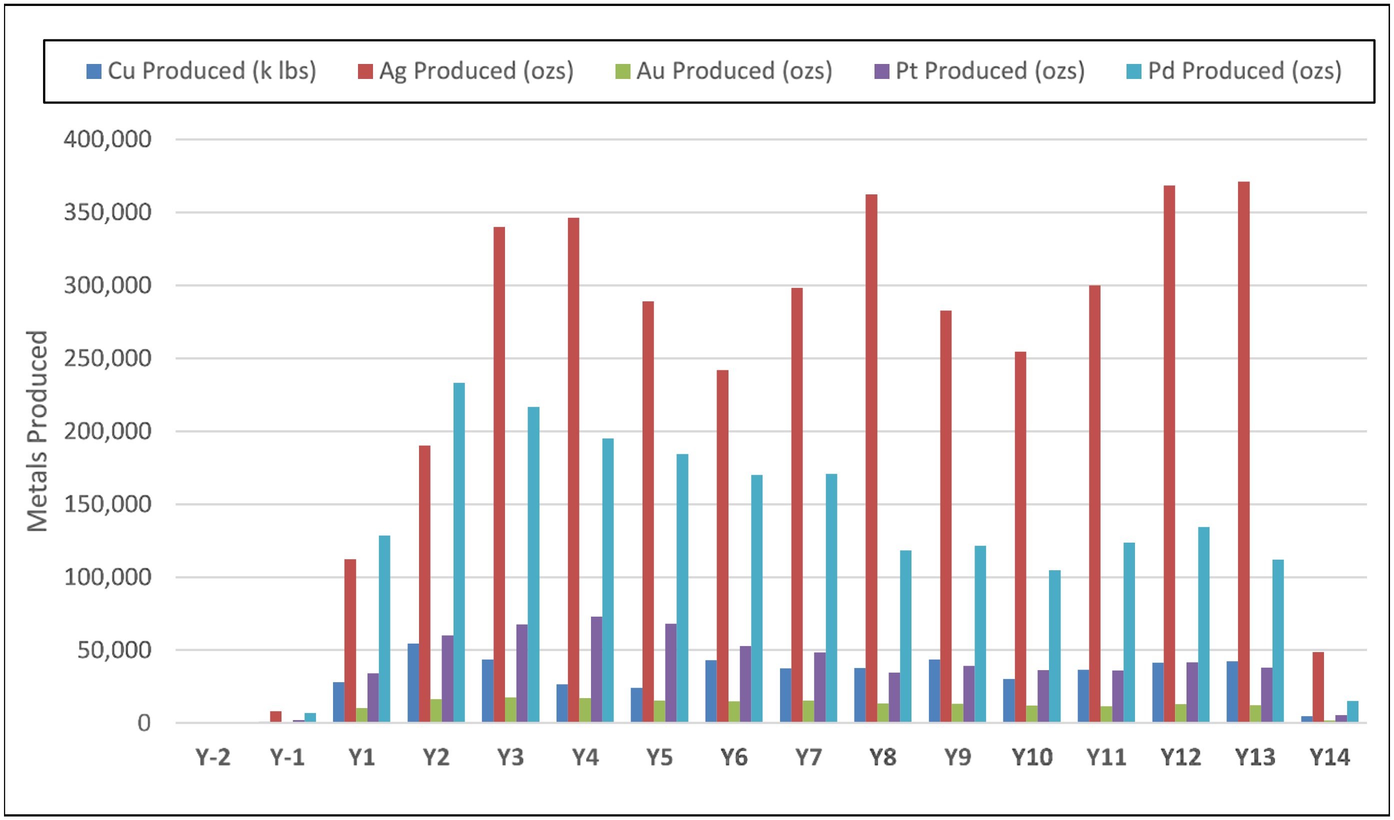


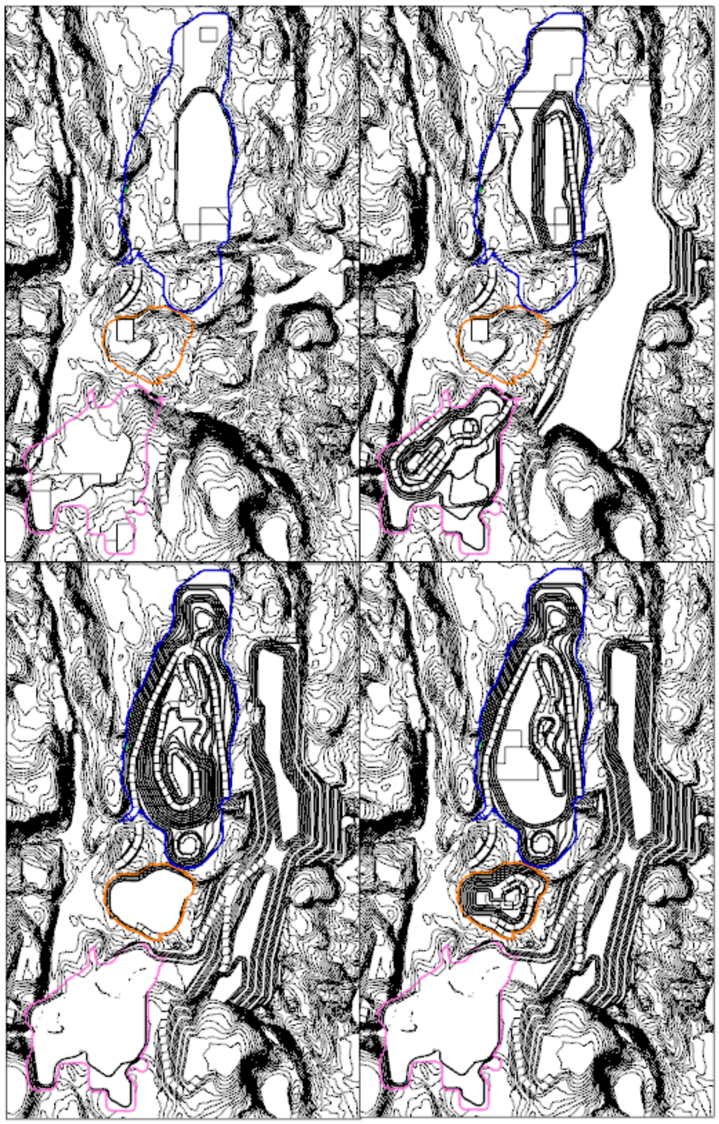
Table 16.11: Detailed Milling Schedule

		Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Total
Ore Milled	Mt	0.20	5.25	9.11	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	9.20	2.02	**118**
Cu Grade	%	0.18	0.26	0.29	0.23	0.14	0.13	0.23	0.20	0.20	0.23	0.16	0.19	0.22	0.22	0.11	**0.20**
Ag Grade	g/t	1.74	0.93	0.92	1.61	1.64	1.37	1.14	1.41	1.71	1.34	1.20	1.42	1.74	1.76	1.05	**1.41**
Au Grade	g/t	0.11	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.06	0.06	0.04	**0.07**
Pt Grade	g/t	0.38	0.24	0.25	0.27	0.29	0.27	0.21	0.19	0.14	0.16	0.15	0.14	0.17	0.15	0.10	**0.20**
Pd Grade	g/t	1.21	0.88	0.92	0.84	0.76	0.72	0.66	0.66	0.46	0.47	0.41	0.48	0.52	0.44	0.27	**0.62**
Cu Rec.	kt	0.3	12.6	24.8	19.8	12.1	10.9	19.5	17.0	17.2	19.8	13.7	16.5	18.7	19.2	2.1	**224**
Ag Rec.	koz	8.1	112	192	340	346	288	241	298	362	282	254	299	368	371	48.7	**3,814**
Au Rec.	koz	0.5	10.3	16.3	17.7	17.1	15.4	15.0	15.4	13.4	13.1	12.0	11.6	13.0	12.2	1.8	**185**
Pt Rec.	koz	2.1	34.1	60.6	67.6	72.8	68.1	52.7	48.5	34.6	39.3	36.2	36.0	41.6	38.0	5.4	**637**
Pd Rec.	koz	6.8	128.4	234.8	216.7	195.2	184.4	170.2	170.7	118.4	121.4	104.8	123.7	134.4	112.1	15.1	**2,036**
Copper Gross Rev	M US$	2	72	141	112	69	62	111	96	98	112	78	94	106	109	12	**1,271**
Silver Gross Rev	M US$	0.1	0.8	1.1	3.8	4.6	3.7	2.3	3.4	4.4	2.9	3.0	3.5	4.4	4.4	0.6	**42.1**
Gold Gross Rev	M US$	0.6	10.6	15.8	18.7	19.6	17.6	15.2	16.3	13.6	12.7	12.5	11.4	12.8	11.6	1.8	**188.9**
Platinum Gross Rev	M US$	1.7	24.9	43.2	51.8	59.0	55.1	38.5	35.9	23.3	26.3	26.3	24.9	28.9	25.4	3.9	**467.2**
Palladium Gross Rev	M US$	9	175	320	295	266	251	232	233	159	161	142	167	181	148	20	**2,763**
NSR	US$/t ore	65	51	54	49	43	41	41	39	30	32	27	30	34	30	18	**37.64**
	C$/ t ore	83	65	69	63	55	52	52	50	38	41	35	38	44	38	23	**48.18**

16.2.3 Surface Schedule

Figure 16.20 depicts the working surfaces of the mine at the specified years. This includes the mined material by period and the dump inventories. Year 14 depicts the end of LOM of the Project and the Project prior to closure. Note the in-pit dumping of the South Pit between Year 5 and 10, and of the Center Pit between Year 10 and 14. These images do not include surface works or construction.

Figure 16.20: EOP Surface (Year 1,5,10,14)



Mining Services	EOP Surface: Clockwise (Year 1,5,10,14)	Author: Peter Harquail Date: Dec. 2020

16.3 Mine Operations and Equipment Selection

16.3.1 Mine Operations Approach

Mining is to be carried out using conventional open pit techniques with hydraulic shovels, wheel loaders and mining trucks in a bulk mining approach with 10 m benches. An owner mining open pit operation is planned with the outsourcing of certain support activities such as explosives manufacturing and blasting activities.

16.3.2 Production Drilling and Blasting

Drill and blast specifications are established to effectively single pass drill and blast a 10 m bench. For this bench height, a 229 mm blast hole size is proposed with a 6 m x 6 m pattern with 1.8 m of sub-drill. These drill parameters combined with a high energy bulk emulsion with a density of 1.2 kg/m^3 result in a powder factor of 0.32 kg/t. Blast holes are initiated with electronic detonators and primed with 450 g boosters. The bulk emulsion product is a gas sensitized pumped emulsion blend specifically designed for use in wet blasting applications.

Several rock types are present in the pit with the average rock hardness has been estimated at about 152 MPa.

The average drill productivity for the production rigs, using down-the-hole drill string, is estimated at 33.6 m/hr instantaneous with an overall penetration rate of 24.2 m/hr. The overall drilling factor represents time lost in the cycle when the rig is not drilling such as move time between holes, moves between patterns, drill bit changes, etc. The overburden can be blasted during winter.

Table 16.12 below summarizes the drill and blast parameters per rock type.

Table 16.12: Drill & Blast Parameters

Drill & Blast Parameters		Ore	Waste	OVB
Drill Pattern				
K_s : Spacing / Burden		1.00	1.17	1.00
K_b : Burden / Diameter		26.25	26.25	52.49
K_j : Subdrill / Burden		0.30	0.30	0.30
K_t : Stemming / Burden		0.67	0.67	0.42
K_h : Height / Burden		1.67	1.67	0.83
Explosive Density	*g/cm³*	1.20	1.20	1.20
Hole Diameter	*in*	9.00	9.00	9.0
Diameter (D)	*m*	0.229	0.229	0.229
Burden (B)	*m*	6.00	6.00	12.00
Spacing (S)	*m*	6.00	7.00	12.00
Subdrill (J)	*m*	1.80	1.80	3.60
Stemming (T)	*m*	4.00	4.00	5.0
Bench Height (H)	*m*	10.0	10.0	10.0
Blasthole Length (L)	*m*	11.8	11.8	13.6
Pattern Yield				
Rock Density	*t/bcm*	3.10	3.05	1.80
BCM / Hole	*bcm/hole*	360	420	1440
Yield per Hole	*t/hole*	1116	1281	2592
Yield per Meter Drilled	*t/m drilled*	95	109	191
Explosive Column (LE)	*m*	7.8	7.8	8.6
Volume of Explosives/ Hole	*m3*	0.32	0.32	0.35
Weight of Explosives/Hole	*kg*	384.2	384.2	423.6
Powder Factor	*kg/t*	0.34	0.30	0.16
Powder Factor	*kg/bcm*	1.07	0.91	0.29
Drill Productivity				
Re-drills	*%*	5.0%	5.0%	5.0%
Pure Penetration Rate	*m/hr*	33.6	33.6	50.0
Overall Drilling Factor (%)	*%*	0.72	0.72	0.80
Overall Penetration Rate	*m/hr*	24.2	24.2	40.0
Drilling Efficiency	*t/hr*	2,288	2,626	7,624
Drilling Efficiency	*holes/hr*	2.05	2.05	2.94

The blast hole rig selected for production drilling will have a hole size range of 152 to 270 mm with a single pass drill depth of 12.2 m with a 40 ft tower configuration. This rig will have both rotary and down-the-hole ("DTH") drilling capability. It is expected that the DTH drilling mode will be most efficient.

Drill automation ("ADS") was not considered in the feasibility designs for the operation. Evaluation of an ADS will be contemplated subsequent to the FS.

Blasting activities will be outsourced to an explosive's provider for supply and delivery of explosives in the hole through a service contract. The mine engineering department will be responsible for designing blast patterns and relaying hole information to the drills via the wireless network.

16.3.3 Grade Control

The ore control program will consist of establishing dig limits for ore and waste in the field to guide loading unit operators. A high precision system combined with a stick and boom geometry system will allow shovels to target small dig blocks and perform selective mining. The system will give operators a real-time view of dig blocks, ore boundaries and other positioning information.

For optimal ore-waste boundaries identification, blasthole sampling will target 100% of all ore material and also capture 100% of the total waste in the pit. Reverse circulation is not deemed required as the orientation of the ore domains make blasthole sampling suitable.

The ore control boundaries will be established by the technical services department based on grade control information obtained the blast hole sampling with post-blast boundaries adjusted for blast movement measurements made using a BMM® system. A blast movement monitoring system has been included in the blasting cost.

The samples collected will be sent to a nearby, off-site laboratory for sample preparation and assaying for the LOM. Samples will be collected on the bench and tagged by grade control samplers on each shift.

16.3.4 Pre-Split

Pre-split drill and blast is planned to maximize stable bench faces and to maximize inter-ramp angles along pit walls as prescribed by the geotechnical pit slope study by Knight Piésold. The pre-split consists of a row of closely-spaced holes along the design excavation limit of interim and final walls. The holes are loaded with a light charge and detonated simultaneously or in groups separated by short delays. Firing the pre-split row creates a crack that forms the excavation limit and helps to prevent wall rock damage by venting explosive gases and reflecting shock waves. As a best-practice, it is recommended that operations restrict production blasts to within 50 m of an unblasted pre-shear line. Once the pre-split is shot, production blasts will be taken to within 10 m of the pre-shear and then a trim shot used to clean the face. Pre-split holes spaced 2 m apart will be 20 m in length and drilled with a smaller diameter of 165 mm (6.5 in.).

As presented in Table 16.13, blasting of the pre-split holes will use a special packaged pre-split explosive internally traced with 5 g/m detonating cord that ensures fast and complete detonation of the decoupled charge. For this specific application, a 410 mm long cartridge will be used, which corresponds to a complete case of 25 kg. This load factor of 1.47 kg/m allows for a targeted charge weight of 0.62 kg/m^2 of face.

The drill selected for this application is more flexible type of rig capable of drilling angled holes for probe drilling and pit wall drain holes. The hole size range of this rig is between 110 mm and 203 mm with a maximum hole depth of 31.5 m.

Table 16.13: Pre-Split Parameters

Design Parameters		Pre-Split Holes
Drill Pattern		
Hole Diameter	*in*	6.5
Diameter (D)	*m*	0.1651
Spacing (S)	*m*	2.0
Stemming (T)	*m*	3
Bench Height (H)	*m*	20
Blasthole Length (L)	*m*	20
Face Area	*m^2*	40
Explosives Charge	*kg*	25
Charge Factor	*kg/m^2 face*	0.62
Cartridge Charge		
Nb Cartridges	*Qty*	41
Cartridge Length	*m*	0.41
Cartridge Loading Factor	*kg/m*	1.47
Decoupled Charge Length	*m*	17.00
Decoupled Charge	*kg*	25
Toe Charge		
Explosive Column (LE)	*m*	0
Volume of Explosives/ Hole	*m^3*	0
Weight of Explosives / Hole	*kg*	0
Blasting		
Packaged Pre-Split Explosive	*kg*	24.99
Surface Delay NONEL	*unit*	0.20
Emulsion Toe Charge	*kg*	0
Booster 400 g	*unit*	0
Detonating Cord	*m*	5
Explosion Product Cost	*$/hole*	191.81
Drill Productivity		
Pure Penetration Rate	*m/hr*	41.2
Overall Drilling Factor (%)	*%*	0.58
Overall Penetration Rate	*m/hr*	23.9
Drilling Efficiency	*holes/hr*	1.2
Metres of Drilling per M Crest	*m/m of crest*	10.00

16.3.5 Loading

The majority of the loading in the pit will be performed by two 29 m^3 face shovels. The shovels will be matched with a fleet of 216 t payload capacity mine trucks. The hydraulic shovels will be complemented by one production front-end wheel loader ("FEL") with 30 m^3 bucket.

Although interchangeable, the hydraulic shovels will primarily be operating in ore and waste. The wheel loader will primarily be taking care of the stockpile rehandling activities while complementing the shovels in waste.

A fleet of two 90 t excavators will take care of the overburden tonnages, along with any narrow-thickness ore zones associated with the W-Horizon in the South Pit.

The loading productivity assumptions for both types of loading tools in ore, waste and overburden are presented in Table 16.14.

The two 29 m^3 face shovels are expected to achieve a productivity of 3,179 t/hr based on a 4-pass match with the mine trucks and an average load time of 2.37 minutes.

The wheel loaders are expected to achieve a productivity of 2,756 t/hr based on a 4-pass match and an average load time of 3.13 minutes in ore and waste.

The 90-t excavator's productivity in overburden will be at 285 t/hr due to lower density of material and the size of the equipment, for an average load time of 5.10 minutes.

Table 16.14: Loading Specifications

		ORE	ORE	WASTE ROCK	WASTE ROCK
Loading Unit		**Diesel Hydraulic Shovel (34 m³) CAT 6060 FSD**	**Wheel Loader (30 m³) Letourneau L1850**	**Diesel Hydraulic Shovel (34 m³) CAT 6060 FSD**	**Wheel Loader (30 m³) Letourneau L1850**
Haulage Unit		**Mining Haul Truck (240 t) CAT 793F**	**Mining Haul Truck (240 t) CAT 793F**	**Mining Haul Truck (240 t) CAT 793F**	**Mining Haul Truck (240t) CAT 793F**
Rated Truck Payload	t	216	216	216	216
Heaped Tray Volume	m^3	152	152	152	152
Bucket Capacity	m^3	29.0	30.0	29.0	30.0
Bucket Fill Factor	%	93%	90%	92%	90%
In-Situ Dry Density	t/bcm	**3.10**	**3.10**	**3.05**	**3.05**
Moisture	%	3%	3%	8%	8%
Swell	%	40%	40%	40%	40%
Wet Loose Density	t/lcm	2.28	2.28	2.35	2.35
Actual Load Per Bucket	t	61.51	61.58	62.77	63.53
Passes (Decimal)	#	3.51	3.50	3.44	3.40
Passes (Whole)	#	3.50	3.50	3.50	3.50
Actual Truck Wet Payload	t	215	216	220	222
Actual Truck Dry Payload	t	209	209	203	206
Actual Heaped Volume	m^3	94	95	93	95
Payload Capacity	%	100%	100%	102%	103%
Heaped Capacity	%	62%	62%	61%	62%
Cycle Time					
Hauler Exchange	min	0.60	0.70	0.60	0.70
First Bucket Dump	min	0.10	0.10	0.10	0.10
Average Cycle Time	min	0.67	0.77	0.67	0.77
Load Time	min	2.37	2.73	2.37	2.73
Cycle Efficiency with Wait Time	%	60%	60%	60%	60%
No. of Trucks Loaded per Hr	#	15.21	13.17	15.21	13.17
Production / Productivity					
Productivity Dry Tonnes / Op. Hr	t/hr	3,179	2,756	3,095	2,712
Effective Hours per Year	hrs/y	5,578	5,317	5,547	5,547
Dry Annual Production Capacity	kt/y	17,735,502	14,653,677	17,166,448	15,041,906
Number of Units	#	2	1	2	1
Tonnes	t/y	35,471,004	14,653,677	34,332,896	15,041,906

16.3.6 Hauling

Haulage will be performed with a 216-t class mine trucks. The truck fleet productivity was estimated in Talpac software. Several haulage profiles were digitized in Deswik with haul routes exported to Talpac to simulate cycle times. Cycle times have been estimated for each period and all possible destinations as there are several waste storage areas.

16.3.6.1 Haulage Site Inputs and Assumptions

The assumptions and input factors for the Talpac simulations in Table 16.15, Table 16.16 and Table 16.17.

Two speed limits were applied in the simulation. For all downhill ramps with an incline greater than 5%, the speed is limited to 30 km/hr Otherwise, the maximum truck speed reaches 50 km/hr in the simulations.

Table 16.15: Site Speed Limits

	Speed (km/hr)
Site Max	50
Down Hill	30

Table 16.16: Site Rolling Resistance Assumptions

	Rolling Resistance (%)
Main Road	2.5
Pit Ramp	3.0
Dump	3.5
Pit Floor	3.5

Table 16.17: Fixed Cycle Time Components

	Time (mins)
Queue Time	1.42
Spot Time	0.6
Loading Time	2.37
Total Loading	**4.39**
Queue Time	0
Spot Time	0.3
Dumping Time	0.2
Total Dump	**0.5**
Total Fixed	**4.89**

16.3.6.2 Haulage Simulation

A multiple waste dumps strategy was used to help level the truck requirements for the Project. During the critical years of the Project, leveling was achieved by sending waste rock to the closest dumps.

Figure 16.21 shows the trucks cycle times by pit, while Figure 16.22 summarizes the haulage hours by source. Typically cycle time increases with the increase of the depth of the pit over the mine life. Cycle time is also dependant on the dumping schedule and the distance each dump is from the pit. The dump schedule was planned so that cycle time tends to plateau at a maximum limit to allow for a consistent fleet over the majority of the mine life. Large variation in cycle time between years within the same phase represents material being diverted to a different destination with a new corresponding cycle time. North Pit Phase 2 sees a large reduction in cycle time in Year 8 as waste material is diverted to the newly available South In-pit Dump significantly reducing the haulage distance and time.

The overburden and narrow-width ore hauling will be done with a fleet of up to four 40 t articulated dump trucks.

Figure 16.21: Truck Cycle Times by Pit

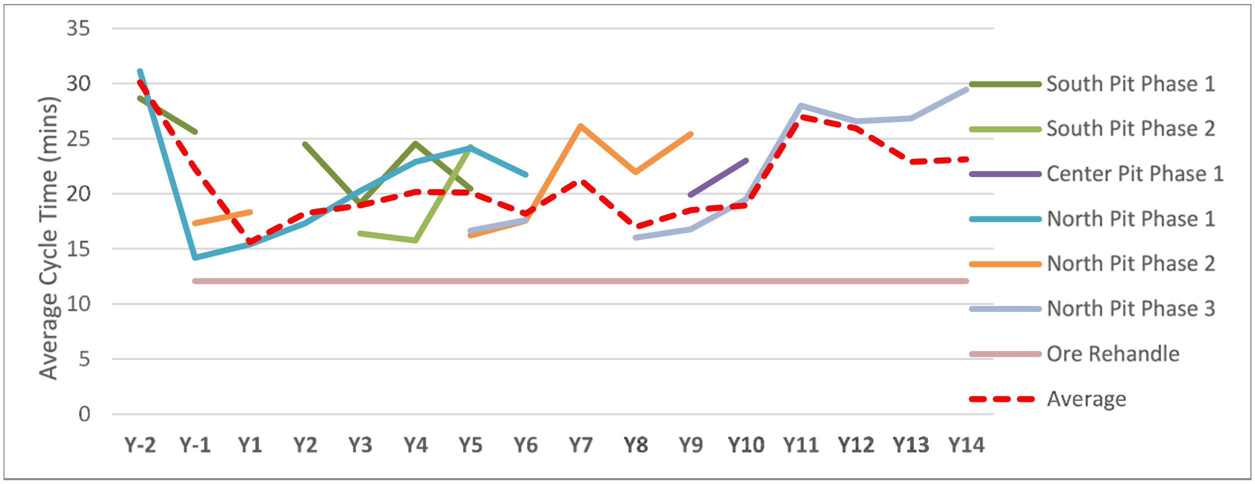
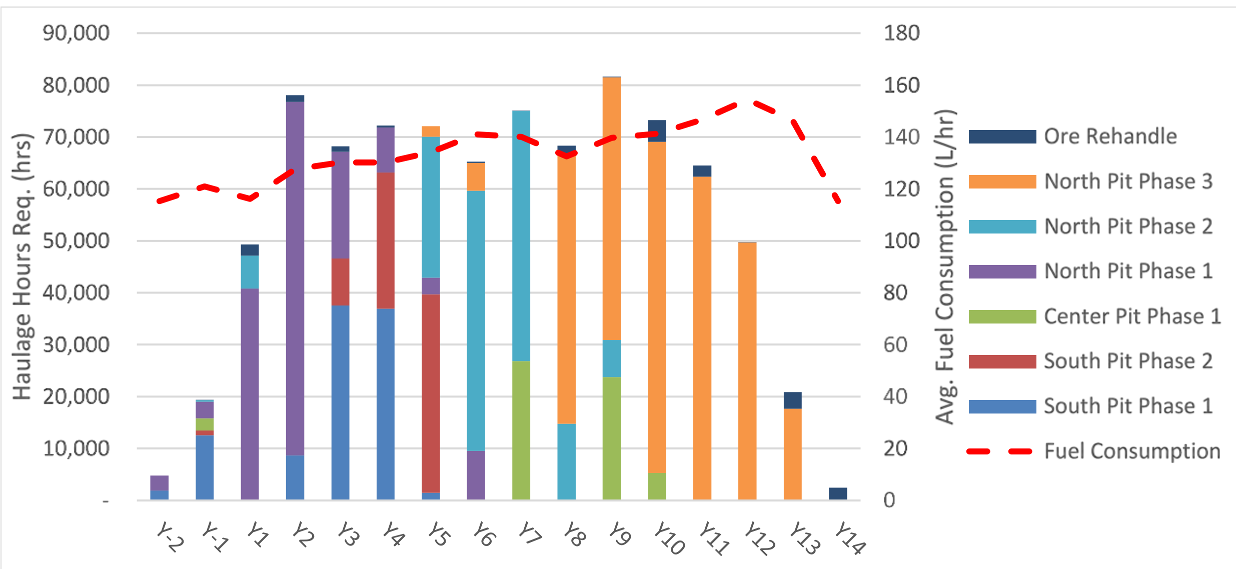


Figure 16.22: Haulage Hours by Source



The total haul hours required by period coupled to the truck mechanical availability were used to determine the number of trucks required throughout the LOM. The truck fleet reaches a maximum of 13 units in Year 2 and remains at this level until Year 11 when truck requirements reduce with a reduced mining rate. Figure 16.23 below summarizes the truck requirements.

Figure 16.23: Truck Requirements

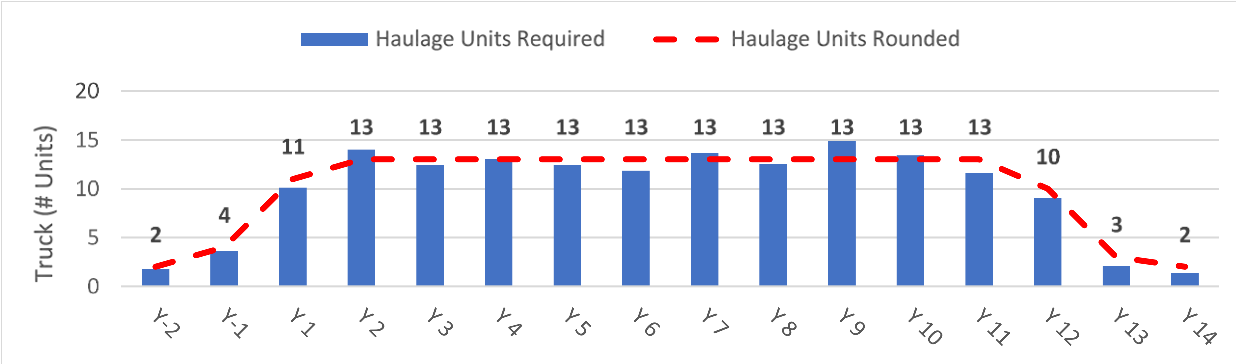
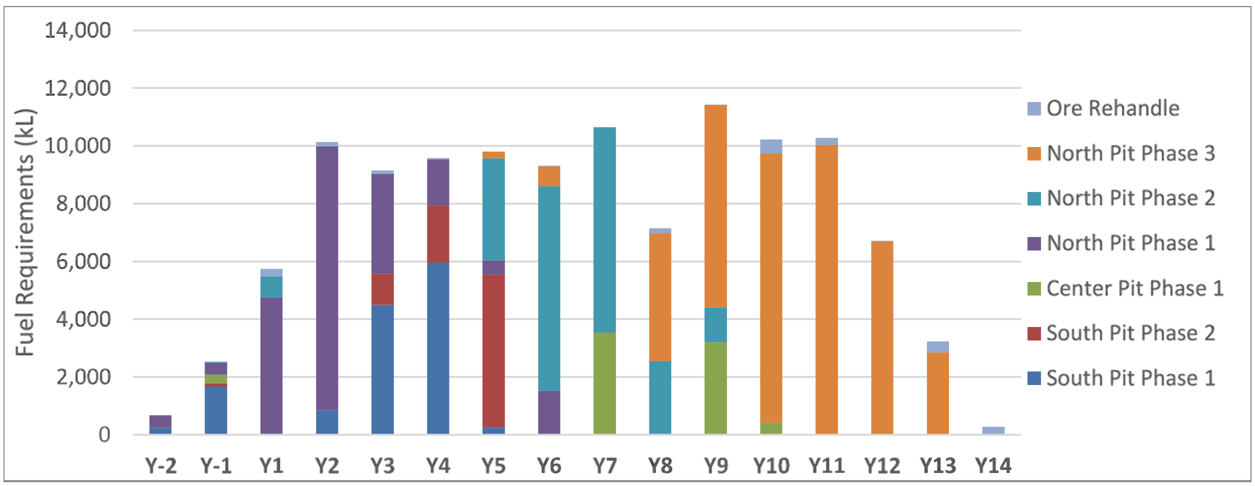


Figure 16.24 depicts the fuel usage by year. Over LOM a total of 118.5 million litres of fuel will be consumed by the haulage fleet.

Figure 16.24: Estimated Fuel Requirements



16.3.6.3 Trolley System

This Project has the potential to benefit from the addition of a trolley system. A trolley system could be implemented in long stretches of consistent uphill climb, typically in sections of the mine that are in place for many years and receive significant traffic. A potential location would be on the west and east ramps of the North Pit as these sections are in production for seven or more years and will see a significant percentage of the mine traffic.

Potential benefits of a trolley system:

- Potential reduction in fuel consumption
  - Vehicles on trolley system use electric only drives, on which is normally the most fuel demanding part of the cycle
- Potential reduction in costs
  - The electric requirements and costs are typically cheaper than fuel alternatives
  - The reduction in fuel burn (when the truck is operating on trolley) will extend engine life
- Potential reduction in cycle time
  - A trolley system can deliver more power to the electric engines significantly increasing the uphill climbing speed
- Potential reduction in haulage units
  - The increased speed on trolley will reduce haulage hours required and potentially lower the number of haulage units required at peak years

Potential drawbacks of implementing a trolley system:

- Increased CAPEX of the trolley system
  - The trolley lines itself, plus the multiple substations and electrical lines, will impose a large upfront CAPEX and additional OPEX cost to maintain
- Increased CAPEX and OPEX in haulage units
  - Haulage units require an additional trolley package to be installed and maintained on all equipment that will use the haulage system
- Potential decrease to stripping ratio
  - Trolley systems typically include ramp widths capable of 3 lanes of traffic. Mines designs will be updated to reflect this. Typically increase in ramp width leads to more waste mined and decrease stripping ratio

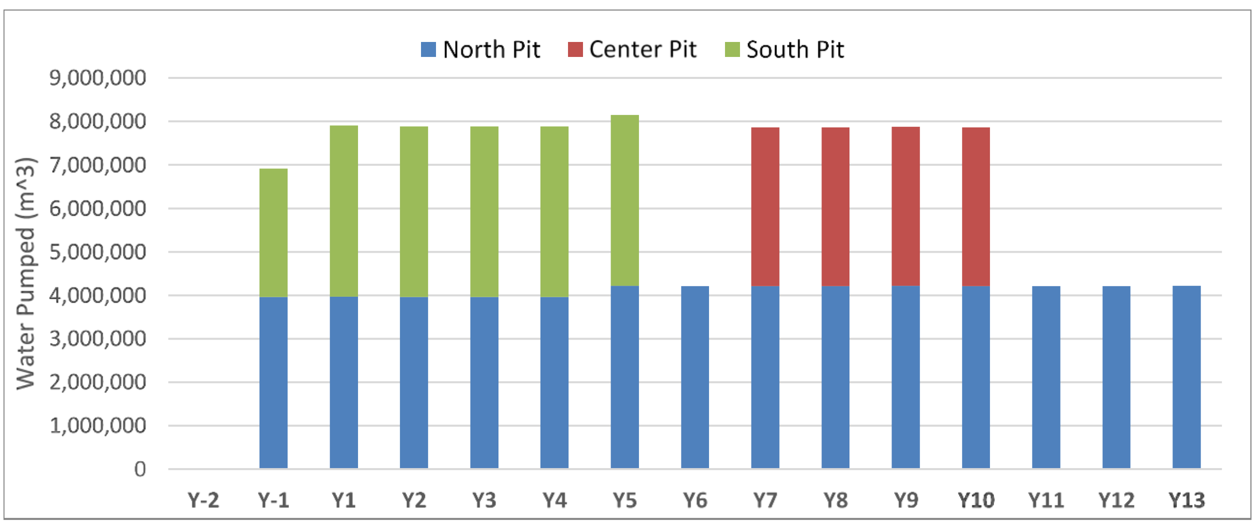
A dedicated study will be carried out to properly assess the implementation over the mine life. This study will include a updates mine designs, updated production schedule, updated waste balance, new haulage simulation and in-depth economic analysis to access the economic feasibility of the system over the entire mine life. This work is intended to be progressed in the detailed engineering phase.

16.3.7 Dewatering

It is assumed that each pit will receive 827 mm/y of rainwater and 400m^3/y of ground water influx. Calculating from the production schedule it is estimated that a total 14.6 Mm^3 of water will be pumped from all the pits over the mine life. To achieve this capacity two 10-inch pumps are required per pit. Due to the staggered mining, pumps can be moved to other pits when the pit is completely mined out. In-pit pumps are placed in sumps equal to the lowest mining level and, using 10-inch pipe segments, the water is pumped to surface settling ponds.

Figure 16.25 depicts the dewatering requirements by pit and period. Once the South Pit and Center Pit are mined out, they are used as in-pit dumps of PAG material. Allowing the water to collect and cover the PAG material to mitigate potential acid generation process and allow for long-term storage of the material. This is reflected in the dewater figure below. Also note, small variation in dewatering requirements by pit as new phases increase the surface area of the mine and increasing the rainwater to be pumped from each of the sumps.

Figure 16.25: Dewatering Totals



16.3.8 Road and Dump Maintenance

Pit operating floors, waste and ore storage areas will be maintained by a fleet of six 630 HP track-type dozers. A 500 HP wheel loader will also be purchased and dedicated to mine roads and the loading areas.

Mine roads will be maintained by two 16 ft blade motor graders. A water/sand truck will be used to spray roads to suppress dust or spread road aggregate during winter months.

16.3.9 Support Equipment

All construction related work, such as berm construction and water ditch cleaning will be done by two 49 t excavators (one of them will be equipped with a hydraulic hammer). The 90 t excavators dedicated to the overburden and narrow-width ore zone will also perform the pit wall scaling activities.

Two pit buses will transport workers to their assigned workplace and a total of 20 pick-ups will be purchased for all the mining departments.

Several other equipment purchases are included to support the mining activities. Also included are one boom truck (28 t crane), one 271 HP wheel loader and a 100 t low-boy trailer and tractor for moving the tracked equipment.

16.3.10 Mine Maintenance

The Project has not included a maintenance and repair contract (“MARC”) for its mobile equipment fleet. The maintenance department and personnel requirement has been structured to fully manage this function, performing maintenance planning and training of employees. However, reliance on dealer and manufacturer support will be key for the initial years of the project, and major component rebuilds will be supported by the OEM’s dealer throughout LOM. An evaluation of a MARC will be considered with the equipment selection process.

Tire monitoring, rotation and / or replacement will be carried out in-house, and a tire handler truck has been planned as part of the maintenance equipment fleet. Some other equipment will also be purchased to facilitate the maintenance activities and support the operation, such as two fuel and lube trucks, a dedicated lube truck, a forklift and some small equipment like tower lights, welding machines or portable air compressors.

A computerized maintenance management system will be used to manage maintenance and repair operations. This system will keep up-to-date status, service history and maintenance needs of each machine while being the source of data for key performance indicators ("KPIs") and cost tracking purposes.

16.3.11 Roster Schedules

A 7 on / 7 off rotating schedule has been planned on a 12-hour shift. Four crews are required to operate on a continuous basis 24 hours per day, 365 days per year.

16.3.12 Equipment Usage Model Assumptions

The typical equipment usage model assumptions are established by equipment groupings as presented in Table 16.18. The annual net operating hours ("NOH") varies approximately between 5,000 and 6,000 hours per year.

Table 16.18: Equipment Usage Model Assumptions

		Shovels	Loaders	Trucks	Drills	Ancillary	Support
Days in Period	*days*	365	365	365	365	365	365
Weather, Schedule Outages	*days*	5.0	5.0	5.0	5.0	5.0	5.0
Shifts per Day	*shift/day*	2.0	2.0	2.0	2.0	2.0	2.0
Hours per Shift	*hrs/shift*	12.0	12.0	12.0	12.0	12.0	12.0
Availability	*%*	82.0	80.0	82.0	80.0	85.0	85.0
Use of Availability	*%*	90.0	90.0	90.0	90.0	85.0	80.0
Utilization	*%*	73.8	72	73.8	72	72.25	68
Effectiveness	*%*	87.0	85.0	87.0	85.0	80.0	80.0
OEE	*%*	64.2	61.2	64.2	61.2	57.8	54.4
Total Hours	*hrs*	8,760	8,760	8,760	8,760	8,760	8,760
Scheduled Hours	*hrs*	8,640	8,640	8,640	8,640	8,640	8,640
Down Hours	*hrs*	1,555	1,728	1,555	1,728	1,296	1,296
Delay Hours	*hrs*	829	933	829	933	1,248	1,175
Standby Hours	*hrs*	708	691	708	691	1,102	1,469
Operating Hours	*hrs*	6,376	6,221	6,376	6,221	6,242	5,875
Ready Hours	*hrs*	5,547	5,288	5,547	5,288	4,994	4,700

16.3.13 Fleet Management

A fleet management system will be implemented to manage the operation, monitor machine health, and track KPIs. The system will be managed by a dispatcher on each crew who will control the system which will send operators onscreen instructions to work at peak efficiency. A dispatch system coordinator will be required to assure proper functioning of system hardware and software with ongoing annual vendor support.

A high-precision GPS for machine guidance is considered for grade control. Similarly, high precision drill navigation systems will be installed on the production drills and auxiliary drills to guide rigs into position and assure holes are drilled to the correct depth and location.

There is no automation or advanced technology are included in the study. Components of advanced technology and control will be considered and progressed in the equipment selection and detailed engineering phase.

16.3.14 Mine Equipment Requirements

The main factors which influenced the selection of the major mine equipment included the annual production requirements and optimization of the fleet size.

An analysis was performed to determine the optimal fleet size, equipment type and preferred suppliers. The requirements of major mining units are presented in Figure 16.26, while Table 16.9 presents the equipment purchase schedule.

Figure 16.26: Equipment Requirements

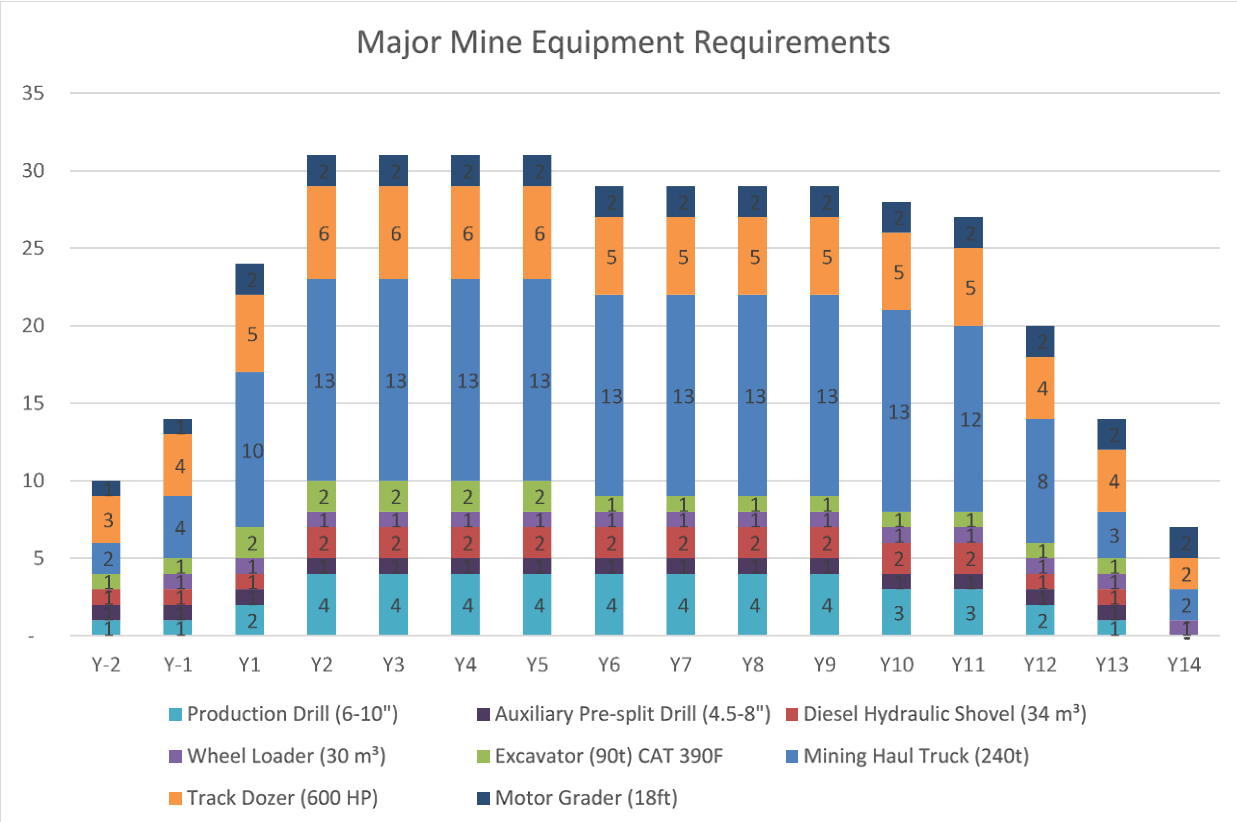


Table 16.19: Equipment Purchase Schedule

Equipment Purchase Schedule	Total	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14
Major Equipment																	
Mining Haul Truck (240 t)	13	4	5	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Diesel Hydraulic Shovel (34 m³)	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Excavator (90 t) CAT 390F	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wheel Loader (30 m³)	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Production Drill (6-10")	4	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Track Dozer (600 HP)	8	3	-	1	-	-	-	-	2	1	1	-	-	-	-	-	-
Motor Grader (18 ft)	4	1	1	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Water/Sand Truck (120 kL tank)	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wheel Dozer (496 HP)	2	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Auxiliary Pre-split Drill (4.5-8")	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**38**	**15**	**8**	**8**	**0**	**0**	**0**	**0**	**4**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Support Equipment																	
Articulated Dump Truck 45 t	6	2	1	-	1	-	-	2	-	-	-	-	-	-	-	-	-
Excavator (49 t)	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydraulic Hammer for Excavator 49 t	3	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-
Skid Steer Loader	2	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Telehandler	2	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Forklift Diesel 4 t	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mechanic Service Truck	4	1	-	1	-	-	-	-	1	1	-	-	-	-	-	-	-
Shovel & Drill Repairs Trailer	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tire Handler Truck	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tire Handler Tooling & Equipment	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel & Lube Truck 10 Wheel	7	1	-	1	-	1	1	-	-	1	1	-	-	1	-	-	-
Lube Truck	3	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Trailer Lowboy	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pick-up Truck	50	10	5	5	-	-	-	10	10	-	-	-	-	10	-	-	-
Pit Bus	6	1	-	1	-	-	-	2	-	-	-	-	2	-	-	-	-
Welding Machine Electric	4	1	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-
Welding Machine Diesel 400A	4	1	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-
Light Plant	30	4	6	-	-	-	4	6	-	-	-	4	6	-	-	-	-
Genset 6 kW	6	3	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
Genset 60 kW	4	1	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Spare Box for Haul Trucks	2	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-
Spare Bucket for Shovels	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Spare Bucket for Excavator	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Spare Bucket for Loaders	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Spare Bucket for Small Excavator	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump 10 in - Diesel	28	2	2	4	4	-	4	-	4	-	4	-	4	-	-	-	-
Water pump 3" - Gasoline	20	4	-	-	4	-	-	4	-	-	4	-	-	4	-	-	-
Diesel Powered Air Heaters	8	2	-	-	-	2	-	-	-	2	-	-	-	2	-	-	-
Total	**213**	**45**	**20**	**16**	**14**	**4**	**12**	**25**	**21**	**5**	**11**	**7**	**14**	**18**	**1**	-	-

16.3.15 Mine Workforce Requirements

Table 16.20 presents the mine workforce requirements over the life of mine. The mine workforce peaks of 247 individuals in Year 4, then decreases to 223 from Year 7 to Year 10 with a reduction occurring when the tonnage decreases starting the Year 11.

Table 16.20: Workforce Requirements

Department	Max	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14
Mine Operations	151	50	83	127	151	151	151	143	135	131	131	131	131	127	103	83	42
Mine Maintenance	73	24	36	65	73	69	73	73	69	69	69	69	69	65	57	49	0
Mine Geology	8	4	8	8	8	8	8	8	8	8	8	8	8	8	8	3	0
Mine Engineering	15	4	12	15	15	15	15	15	15	15	15	15	15	15	15	11	0
Total Mine Workforce	247	**82**	**139**	**215**	**247**	**243**	**247**	**239**	**227**	**223**	**223**	**223**	**223**	**215**	**183**	**146**	**42**

17. RECOVERY METHODS

The Marathon Project FS process design is based on the information and metallurgical test results summarized in Section 13. The process plant will consist of a 25,200 t/d circuit with primary crushing, SAG-ball milling and pebble crushing. Cu-PGM concentrate flotation with regrinding prior to three stages of cleaning is followed by rougher tailings coarse fraction regrinding and PGM scavenger flotation. Rougher tailings regrinding and PGM scavenger flotation is planned to be added in the first year of operation. Concentrate thickening, concentrate filtering, tailings thickening, water management, and a TSF complete the flowsheet.

This section describes the basis for process plant design and selection of major plant equipment for the recovery of copper and palladium, platinum, gold and silver to concentrate.

17.1 Process Design Criteria

The process plant is designed to process material at a rate of 25,200 t/d (9.2 Mt/y) with an average LOM grade of 0.21% copper and 0.63 g/t palladium to produce a Cu-PGM flotation concentrate.

The plant operating schedule and availability is based on two 12-hour shifts per day for 365 d/y. The operating schedule is based on 6,132 hr/y (70%) for the crushing circuit; 8,059 hr/y (92%) for the grinding and flotation circuits; and 7,414 hr/y (85%) for the concentrate filter.

Key design criteria used in the plant design, as well as the resulting sizing parameters of major equipment are listed in Table 17.1.

Table 17.1: Key Process Design Criteria

Description	Units	Value
Plant Capacity	Mt/y	9.2
LOM Average Feed Grade, Cu	%	0.21
LOM Average Feed Grade, Au	g/t	0.07
LOM Average Feed Grade, Ag	g/t	1.42
LOM Average Feed Grade, Pt	g/t	0.20
LOM average feed grade, Pd	g/t	0.63
Operating Schedule and Stockpile		
Crusher Operating Availability	%	70.0
Grinding and Flotation Operating Availability	%	92.0
Overall Concentrator and Filtration Systems	%	84.6
Stockpile Type	-	Covered Conical
Stockpile Repose Angle	°	37
Stockpile Retention Time	hours	18
Ore Properties		
Specific Gravity	-	3.09
SPI Value	min	100
JK Axb (design, based on SPI value)	-	38
Bond Crushing Work Index (CWi)	kWh/t	18.6
Bond Rod Work Index (BRWi) (based on BWi)	kWh/t	16.5
Bond Ball Work Index (BBWi) (75th percentile)	kWh/t	16.5
Bond Abrasion Index (Ai)	g	0.27
Primary Crushing		
Throughput, Nominal	t/h	1,500
Primary Crusher Type	-	Gyratory
Primary Crusher Model	-	Metso Superior^{TM} MK-III 54-75
Primary Crusher Feed Size, F_{80}	mm	425
Primary Crushing Product, P_{80}	mm	274
Grinding and Pebble Crushing		
Throughput, Nominal (dry)	t/hr	1,142

Description	Units	Value
Circuit product size, P_{80}	µm	106
SAG Mill Dimension (diameter x effective grinding length)	Ø x EGL (m)	10.36 x 5.79
SAG Mill Installed Power	MW	15
Pebble Crusher Type	-	Cone
Pebble Crusher Model	-	Metso HP900
Pebble Crusher Feed Size, F_{80}	mm	46
Pebble Crushing Product, P_{80}	Mm	14
Pebble Rate, Nominal	% new feed	24
Ball Mill Dimension (diameter x effective grinding length)	Ø x EGL (m)	7.92 x 11.28
Ball Mill Installed Power	MW	15
Circulating Load, Max for Design	%	400
Cyclone Overflow Solids	% solids (w/w)	35
Rougher Flotation		
Flotation Feed Density, Nominal	% solids (w/w)	35
Flotation Time Lab Testing	min	24
Residence Time Scale-Up Factor	-	2.5
No. of Cells	-	10
Cell Type	-	DFR
Pd Concentrate Grade, Nominal	g/t	3.9
Cu Concentrate Grade, Nominal	%	1.4
Rougher Concentrate Regrind		
Specific Energy	kWh/t	34
Feed Size, F_{80}	µm	75
Product Size, P_{80}	µm	18
No. of Regrind Mills	-	2
Regrind Mill Type	-	HIG Mill
Regrind Mill Installed Power	kW	5,500
Iron Sulfide Aeration		
Aeration Tank Residence Time, Nominal	min	30
Cleaner Flotation		

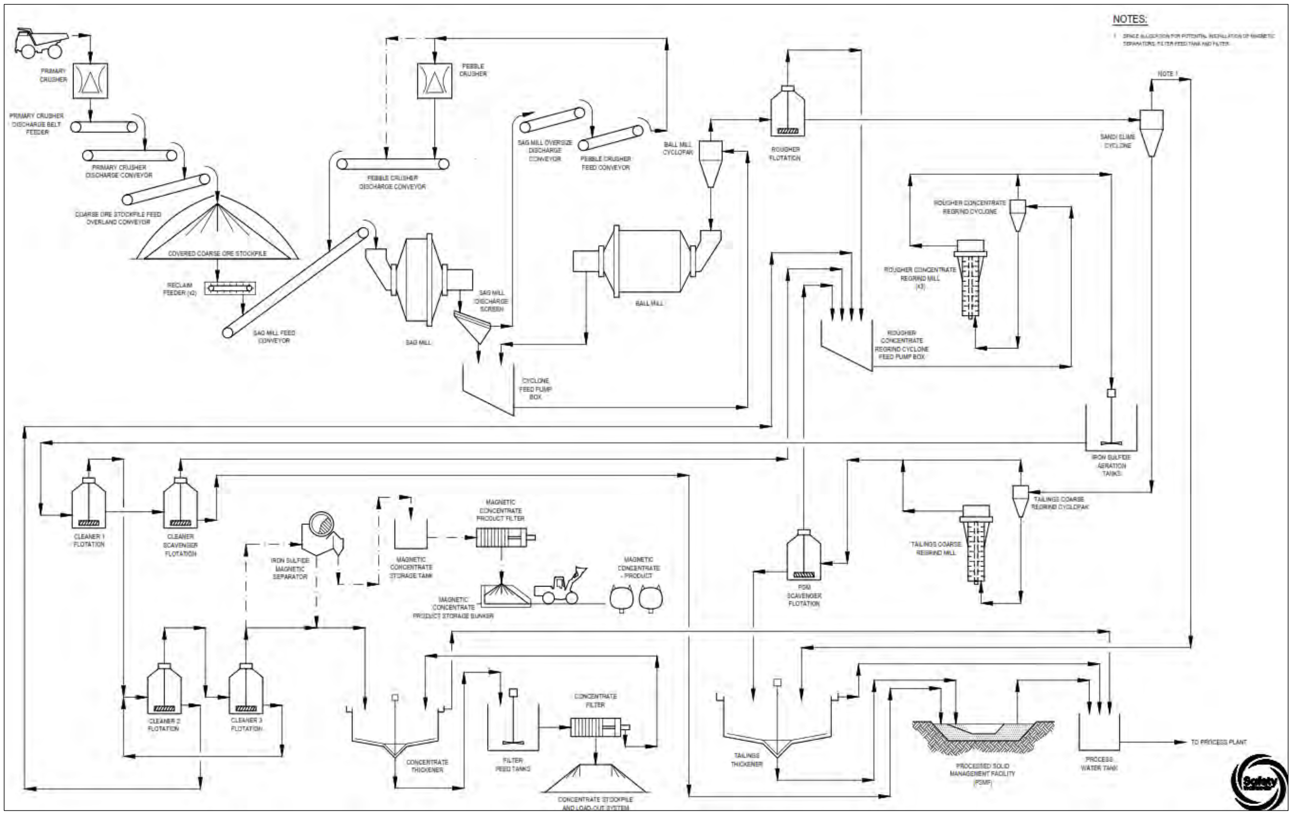
Description	Units	Value
No. of Stages		3
Cell Type	-	DFR
Residence Time Scale-up Factor		2.7
1st Cleaner		
No. of Cells	-	6
1st Cleaner Flotation Time Lab Testing	min	15
Pd Concentrate Grade, Nominal	g/t	5.9
Cu Concentrate Grade, Nominal	%	2.0
Cleaner Scavenger		
No. of Cells	-	4
Cleaner Scavenger Flotation Time Lab Testing	min	9
Pd Concentrate Grade, Nominal	g/t	2.0
Cu Concentrate Grade, Nominal	%	1.0
2nd Cleaner		
No. of Cells	-	6
2nd Cleaner Flotation Time Lab Testing	min	10
Pd Concentrate Grade, Nominal	g/t	19.1
Cu Concentrate Grade, Nominal	%	6.7
3rd Cleaner		
No. of Cells	-	5
3rd Cleaner Flotation Time Lab Testing	min	7
Pd Concentrate Grade, Nominal	g/t	36.6
Cu Concentrate Grade, Nominal	%	13.0
Iron Sulfide Magnetic Separation		
Separator Type	-	Wet Magnetic Separator
Magnetic Strength	Gauss	750
Magnetic Concentrate Feed Tank Residence Time, Nominal	hours	6
Magnetic Concentrate Filtration Rate	kg/m^2/hr	500
Magnetic Concentrate Filter Cake Moisture	%	9
Concentrate Thickening and Filtration		
No. of Thickeners	-	1
Thickener Type	-	High Rate
Unit Area Thickening Rate, Design	m^2/t/d	0.28
Underflow Solids	% solids (w/w)	60

Description	Units	Value
Filter Type	-	Horizontal pressure
Filter Model	-	Outotec Larox PF 60/72
Filtration Rate	$kg/m^2/hr$	500
Filter Cake Moisture	%	13
Coarse Tailings Regrind		
Specific Energy	kWh/t	12.3
Feed Size, F_{80}	µm	130
Product Size, P_{80}	µm	38
No. of Regrind Mills	-	2
Regrind Mill Type	-	HIG Mill
Regrind Mill Installed Power	kW	5,500
PGM Scavenger Flotation		
No. of Cells	-	5
Cell Type	-	DFR
Flotation Time Lab Testing	min	15
Residence Time Scale-up Factor	-	2.5
Pd Concentrate Grade, Nominal	g/t	0.32
Cu Concentrate Grade, Nominal	%	0.05
Tailings Thickening		
No. of Thickeners	-	1
Thickener Type	-	High Rate
Unit Area Thickening Rate, Design	$m^2/t/d$	0.12
Underflow Solids	% solids (w/w)	55

17.2 Process Flowsheet

The simplified overall flowsheet is shown in Figure 17.1.

Figure 17.1: Simplified Overall Process Flowsheet



17.3 Metallurgical Recovery

Determination of a predictive curve for metal recovery to a Cu-PGM concentrate was established with the 2020 Metallurgical testing programs (Refer to Section 13). Estimated metal recovery is defined in the equations for the GeoMet model, including the PGM-Scavenger flotation circuit, as follows:

% Rec Pd = 88.27 x (Pd head grade $^{Exp(0.0338)}$) to a maximum of 92%

% Rec Pt = 1.22 x (% Rec Pd) - 21.79

% Rec Au = 1.39 x (% Rec Pd) - 48.37

% Rec Cu = 93.0 (constant)

% Rec Ag = 71.5 (constant)

17.4 Overall Process Description

The Marathon Project process plant includes the following unit processes and facilities:

- Primary crushing.

- Crushed ore stockpile and reclaim.
- SAG mill with pebble crushing.
- Ball milling in closed circuit with cyclones.
- Flotation comprised of rougher flotation, concentrate regrind and three stages of cleaning.
- Cyclone classification of rougher tailings to reject the fine fraction and submit coarser fractions to additional regrinding and PGM scavenger flotation.
- Optional low intensity magnetic separation of the final concentrate segregating the magnetic portion (pyrrhotite, pentlandite) from the final PGM/Cu concentrate.
- Concentrate thickening and filtration.
- Tailings thickening.
- Reagents storage and distribution (including lime slaking, flotation reagents, water treatment and flocculant).
- Grinding media storage and addition.
- Water services (including fresh water, fire water, cooling water and process water).
- Compressed air and instrument air services. and
- Process plant system and control room.

17.5 Primary Crushing

Run-of-mine ("ROM") ore will be delivered to the primary gyratory crusher dump pocket by 216-t haul trucks or alternatively for short periods by front-end loader ("FEL"). Dual side dumping is included in the design to minimize haul truck waiting time with a dump pocket capacity of approximately 580 t.

ROM ore will be crushed in the gyratory crusher as it passes from the dump pocket to the crusher discharge vault. Crushed ore is withdrawn from the discharge vault by a variable speed apron feeder and subsequently transferred to the primary crusher discharge conveyor. The primary crusher discharge conveyor accelerates material to match the speed for transfer onto the 1.4 km long coarse ore stockpile feed overland conveyor. The coarse ore stockpile feed overland conveyor is equipped with a weightometer to measure crushed ore tonnage.

A hydraulically operated rock breaker mounted on the perimeter of the dump pocket will be used to fracture any oversize ROM that is fed to the primary crusher, or to clear any build up within the pocket.

A metal detector will be located on the primary crusher discharge conveyor to detect tramp metal and protect the overland conveyor. A magnet situated above the discharge conveyor prior to the metal detector will assist in the removal of metallic objects.

The primary crusher area will be monitored and controlled from the crusher or process plant control room.

17.5.1 Coarse Ore Stockpile and Reclaim

Coarse ore from the primary crusher is fed to a single conical, covered stockpile that has a total storage capacity of approximately 75,000 t. The nominal live capacity of the stockpile is 27% of total tonnes (18 hours), depending on material characteristics and moisture. Remaining capacity can be recovered using a bulldozer and/or excavator(s) when required.

Provision for the installation of a primary crushed waste rock take-off transfer point has been considered in the layout of the overland conveyor. This will provide a means to accommodate aggregate crushing requirements for construction and operations during the LOM.

Two belt feeders, each capable of supporting design throughput, will transfer material from the coarse ore stockpile to the SAG mill feed conveyor, which in turn feeds the SAG mill feed chute.

The SAG mill feed conveyor includes a weightometer to control and record feed rate to the SAG mill.

17.6 Grinding and Pebble Crushing

The grinding circuit consists of a single SAG mill, followed by a single ball mill operating in closed circuit with a primary cyclopak. Primary cyclone overflow is the product from grinding with a target 80% passing size of 106 microns as flotation feed. The major equipment in the grinding circuit will include:

- SAG mill of 10.36 m diameter (inside shell) x 5.79 m effective grinding length (“EGL”) with 15 MW twin pinion drives. Motors are controlled via an SER / hyper synchronous variable speed drive.
- Ball mill of 7.92 m diameter (inside shell) x 11.28 m EGL with 15 MW twin pinion drives.

The SAG mill feed conveyor transfers ore (along with pebble crusher discharge) to the SAG mill feed chute where it is combined with mill feed dilution water.

The SAG mill operates in closed circuit with a double deck screen and a pebble crusher. The double deck screen is fitted with spray water to wash slurry from coarse pebbles. The screen undersize flows by gravity to the cyclone feed pump box where it is combined with ball mill discharge. The pebbles reporting as screen oversize are transported by conveyor to a pebble crusher.

Pebble crushing consists of a surge bin, vibrating feeder and cone crusher. The pebble stream can bypass the crusher to the pebble crusher discharge conveyor (or bypass bunker) if required via a diverter gate located ahead of the surge bin. In normal operation, pebbles pass through the diverter gate to the surge bin. Tramp metal and steel grinding media fragments are removed using a self-cleaning belt magnet. A metal detector on the pebble conveyor, after the self-cleaning magnet, automatically activates the diverter gate to divert any remaining tramp metal away from the pebble crusher. A variable speed belt feeder is used to transfer pebbles from the surge bin to the pebble crusher. Pebble crusher discharge is recycled by conveyor and combined with new feed on the SAG mill feed conveyor. A weightometer located on the pebble transfer conveyor is used to monitor and record SAG mill pebble recycle rate.

The ball mill operates in closed circuit with primary cyclone underflow reporting to the ball mill feed chute. Ball mill discharge is combined with SAG mill screen undersize and feeds a cyclone feed pump box with a single variable-speed cyclone feed pump. A spare cyclone feed pump (wet end) is stored on site to allow for quick change-out. Process water for dilution is added to the cyclone feed pump box prior to classification.

Primary cyclone overflow will flow by gravity to the rougher flotation head tank. Cyclone overflow will be sampled and analysed for copper using an on-stream analyser (“OSA”). Specific process streams within the flotation circuit will be sampled each shift, with composites analyzed for Cu and PGM at the assay lab. The OSA will provide copper analysis on a real time basis for flotation circuit operational control.

A ball storage bunker will be installed on the mill floor for SAG mill and ball mill grinding media. Ball charging buckets are filled from the ball hoppers and transferred to the ball addition chutes via the mill area crane.

A liner handler is considered in design to support SAG mill liner replacement activities.

17.7 Rougher Concentrate Flotation and Cleaner Flotation

Primary cyclone overflow reports to the rougher flotation circuit head tank. Direct flotation reactors (DFRs) have been selected for the flotation circuit and summarized as follows:

- Rougher feed tank – 4.2 m diameter x 5.3 m high.
- Rougher bank: ten DFR cells. each cell 4.2 m diameter x 5.7 m high.

- Cleaner 1/Cleaner scavenger feed tank – 3.4 m diameter x 4.7 m high.
- Cleaner 1 bank: six DFR cells. Each cell 3.4 m outside diameter x 5.5 m high.
- Cleaner scavenger bank: four DFR cells. Each cell 3.4 m outside diameter x 5.5 m high.
- Cleaner 2 feed tank – 2.1 m diameter x 4.3 m high.
- Cleaner 2 bank: six DFR cells. Each cell 2.1 m outside diameter x 4.3 m high.
- Cleaner 3 feed tank – 1.1 m diameter x 3.5 m high.
- Cleaner 3 bank: five DFR cells. Each cell 1.1 m outside diameter x 3.5 m high.

The rougher flotation circuit produces a low-grade Cu-PGM concentrate that requires further regrinding to improve mineral liberation and upgrading within the cleaner circuit. Rougher concentrate is combined in the rougher concentrate regrind cyclone feed pump box and pumped to the rougher concentrate regrind cyclones for classification. Rougher concentrate regrind cyclone underflow reports to two parallel rougher concentrate regrind mills. The rougher concentrate regrind cyclone overflow and regrind mill discharge are combined as feed to an iron sulfide aeration tank with a residence time of 30 minutes. The purpose of the iron sulfide aeration tank is to surficially oxidize and suppress pyrrhotite at pH 11 prior to the first cleaner flotation circuit.

First cleaner concentrate is upgraded in two additional cleaning stages. The middlings from the third cleaner reports to the head of the previous stage (second cleaner), and the middlings from the second cleaner reports back to the rougher concentrate regrind cyclone feed pump box.

The final concentrate from the third flotation cleaner can potentially be processed through the iron sulfide magnetic separator to segregate magnetic pyrrhotite if determined to be of financial benefit. The magnetic concentrate product would be pumped to a single pressure filter to produce a filter cake of 13% w/w moisture. The magnetic concentrate filter cake is discharged by gravity to a separate magnetic concentrate storage and into bulk bags for sale as a low Cu, high Fe, PGM bearing bi-product. Initial design concepts for the FS have excluded Cu-PGM concentrate magnetic separation.

First cleaner tailings are fed to first cleaner scavenger flotation with first cleaner scavenger concentrate recycled to the rougher concentrate regrind cyclone feed pump box. The first cleaner scavenger flotation tailings process stream is pumped to designated sub-aerial locations within the TSF to mitigate the potential for oxidation and acid generation from the sulfidic tailings fraction.

Bench scale testing completed during 2020 by Gen Mining applied conventional flotation cell technology. Predicted metal recovery assumes a baseline 12-15% mass pull to rougher concentrate and 0.8 to 1.25%

mass pull to final Cu-PGM concentrate. The evaluation of Woodgrove DFR cells during 2020 Phase 1 & Phase 2 metallurgical test programs supports a 20% decrease in baseline mass pull (an improvement) in the rougher and cleaner circuits, relative to conventional flotation technology, with no change in metal recovery. Process mass balances for the FS applied the higher baseline mass pull for equipment sizing. Concentrate tonnage and grade for transport and TC/RC calculations assume an optimized mass pull to Cu-PGM concentrate from 0.65 to 1.0% relative to feed tonnage, implying a concentration ratio varying from 100 to 150 from feed to final concentrate.

Improvements to concentration ratio accomplished with the use of DFR technology are associated with the ability to inject wash water into the gasified mineral laden slurry which supports the rejection of gangue and middlings, and improved capture of mineralization on a stage-by-stage basis with DFR cells when compared to the performance of conventional flotation cells.

17.7.1 Concentrate Regrind

Rougher concentrate, second cleaner tailings, first cleaner scavenger concentrate, and PGM scavenger concentrate are combined in the concentrate regrind cyclone feed pump box. The combined product is fed to the concentrate regrind cyclopak for classification to a target P80 of 18 µm. Fine particles that do not require further regrinding report to cyclone overflow. The coarse fraction which reports to cyclone underflow is pumped to one of two concentrate regrind mills at a slurry density of 65% solids.

The rougher concentrate regrind circuit will utilise Outotec's HIG mill technology. Regrind mill discharge will be combined with regrind cyclone overflow and report to the iron sulfide aeration tank with a residence time of 30 minutes to suppress pyrrhotite prior to first cleaner flotation.

Ceramic grinding media will be sourced in bulk bags and added to each regrind mill as required.

17.7.2 Tailings Coarse Regrind and PGM Scavenger Flotation

The coarse fraction of the rougher tailings stream is separated from the fine fraction for further processing. Sand/slime cyclone underflow with a target P80 of +53 µm is pumped to two PGM Scavenger regrind mills which operate in open circuit. The reground product flows by gravity to the PGM scavenger flotation with PGM scavenger concentrate returned to the rougher concentrate regrind circuit for additional regrinding and upgrading in the cleaner circuit.

The fine fraction of rougher tailings contained in Sand/Slime cyclone overflow is combined with PGM Scavenger tailings as a low sulfide, non-PAG tailings and directed to the tailings thickener for dewatering prior to transfer and impoundment in the TSF.

17.7.3 Concentrate Thickening and Filtration

The final concentrate thickening and filtration circuit consists of a single high-rate thickener and pressure filter.

The concentrate from the third cleaner stage is pumped to the concentrate thickener via the cleaner concentrate pump. Flocculant is added to the thickener feed stream to enhance settling. The concentrate thickener overflow is used for process water. Concentrate thickener underflow density will be 55-60% w/w solids. The thickener underflow stream is pumped to an agitated filter feed tank by variable speed centrifugal pumps.

The filter feed tank provides 12 hours surge capacity for filter maintenance without affecting mill throughput. The filter feed is pumped to a single pressure filter to produce a filter cake of approximately 10-13% w/w moisture. The concentrate filter cake is discharged by gravity to a concrete storage bunker.

Fresh water is used for the filter cloth washing. Filtrate is returned to the concentrate thickener. High pressure compressed air is supplied from a dedicated bank of air compressors to the pressure filter for dewatering and drying of the filter cake.

17.7.4 Concentrate Storage and Load Out

Concentrate filter cake is discharged by gravity to a concrete storage bunker. The storage bunker provides a storage capacity for up to 7 days at nominal production rates.

Concentrate is loaded by FEL and transferred into a load out chute feeding a cleated belt feeder to a concentrate truck loading conveyor capable of loading a transport truck within 10 minutes. The concentrate transport truck is weighed on a load-out scale at site prior to hauling concentrate to the nearby rail load out facility.

17.7.5 Tailings Thickening

The tailings thickening circuit consists of a single 65 m diameter high-rate thickener to dewater a combined rougher tailings fine fraction and PGM scavenger tailings to 55-60% w/w solids.

Flocculant is added to the thickener feed stream to enhance settling. Thickener overflow gravitates to the process water tank. The thickened underflow is either pumped or flows by gravity to the TSF.

17.8 Tailings Storage Facility

Tailings thickener underflow will report to the TSF by gravity flow when applicable, as well as being pumped by centrifugal pumps as required. First cleaner scavenger tailings will be pumped separately to the TSF to designated sub-water locations to mitigate the potential for oxidation and acid generation from the sulfidic tailings fraction. Barge pumps are located at the TSF will recycle reclaim water to the process water tank.

17.9 Reagents and Consumables

Various reagents will be added to the grinding and flotation circuits to facilitate the recovery of values to concentrate. Process reagents and consumables are received and stored on site as either dry product or bulk liquids. Reagents will be prepared and stored in a dedicated area within an annex to the main process plant and will be delivered by individual metering pumps or centrifugal pumps to the required addition points.

All mixed reagents will be prepared using fresh water from the fresh water tank.

17.9.1 Quicklime

Lime will be trucked to the site as quicklime in 30 t lime transportation trucks. The lime will be transferred to the lime silo using a pneumatic blower from the trucks. From the lime silo, the quicklime will be conveyed by screw into a vendor supplier lime slaker. The slaked lime slurry will be pumped to an agitated storage tank. Distribution of the lime from the storage tank to the addition points will be accomplished using a lime slurry loop. The bulk of the lime slurry will be used in the concentrate regrind circuit prior to first cleaner flotation.

17.9.2 Collector 1 (PAX)

Potassium amyl xanthate (“PAX”) is used as the collector in the rougher flotation circuit and cleaner flotation circuit.

PAX is delivered to site as pellets in 1 m^3 bulk bags where it is stored in a covered building. Bulk bags of PAX are dumped into an agitated mixing tank where it is mixed with fresh water to produce a 15% w/w solution concentration. The solution is then stored in a collector distribution tank and delivered to the rougher and cleaner flotation circuits via dedicated dosing pumps.

PAX, which is classified as spontaneously combustible in solid form and flammable in liquid form, will be isolated in a room with a separate vent fan to the outdoors. This is to disperse vapour produced to limit the impact of the hazardous area.

17.9.3 Collector 2 (Cytec Aero 3501)

Cytec Aero 3501 acts as PGM collector and is added to the rougher and cleaner flotation circuits.

Cytec Aero 3501 is delivered to site as a liquid in 1 t totes. The totes are connected to a manifold for distribution.

Dedicated dosing pumps are used to deliver Cytec Aero 3501 to each dosing point.

17.9.4 Frother (MIBC)

Methyl isobutyl carbinol ("MIBC") is used to provide a stable froth in the flotation circuit.

MIBC is delivered to site as a liquid in 1 t totes. The totes are connected to a manifold for distribution.

Dedicated dosing pumps are used to deliver MIBC from the totes to each dosing point.

MIBC, which is a flammable liquid, will be isolated in a room with a separate vent fan to the outdoors. This is to disperse vapour produced to limit the impact of the hazardous area.

17.9.5 Depressant

Carboxymethyl cellulose ("CMC") is used in the cleaner flotation circuit to improve final concentrate grades by depressing talc.

CMC is delivered to site as dry powder in 1 t bulk bags. The CMC mixing system consists of a storage bin, screw feeder, auto jet wet mixer, mixing tank, distribution tank and dosing pumps.

Dry CMC is dumped to a feed bin into the wetting head via a screw feeder and is mixed in an agitated tank. The diluted CMC is transferred to a storage distribution tank.

Dedicated dosing pumps deliver CMC from the distribution tank to each dosing point.

17.9.6 Flocculant

Two flocculant mixing systems are used to provide flocculant for the concentrate and tailings thickeners. Both flocculant mixing systems consists of a storage bin, screw feeder, auto jet wet mixer, mixing tank, storage tank and dosing pumps.

Flocculant is delivered as dry powder in 25 kg bags or 1 t bulk bags for the concentrate thickener flocculant mixing system and tailings thickener flocculant mixing system, respectively. Electric hosts are used to load bags at the flocculant mixing facility.

Dry powder is transferred to a feed bin and fed into the wetting head via a screw feeder. Flocculant is mixed in an agitated tank and transferred to a storage tank.

Dedicated dosing pumps deliver flocculant from the respective storage tank to the concentrate and tailings thickeners.

17.9.7 Miscellaneous Reagents

Additional miscellaneous reagent (antiscalant) is expected to be used in relatively small quantities in the plant; however, the type of reagent is to be confirmed. Antiscalant is potentially required for upkeep of the process water systems.

17.10 Water Systems and Process Plant Services

17.10.1 Fresh Water

Fresh water make-up will be provided to the Process Plant from vertical turbine pumps located at the Water Management Pond ("WMP") or may be pumped from the Storm Water Management Pond in case of water shortage from the WMP. The fresh water tank serves as a combined fresh water / fire water tank with the lower section dedicated for fire water service and the remainder for general fresh water use.

Fresh water is used to supply the following services:

- Potable water treatment plant (including safety showers).
- Crusher spray water.
- SAG mill and ball mill cooling water.

- Filter cloth wash water.
- Gland seal water.
- Miscellaneous equipment (e.g., On-stream analyzer).
- Reagent mixing (where applicable).
- Make-up water for the process water system.

17.10.2 Process Water

Process water is supplied from tailings thickener overflow, concentrate thickener overflow, Cu-PGM concentrate filtrate, return water from the TSF, and fresh water make-up as required.

Process water is stored in the process water tank. The tailings thickener overflow and concentrate thickener overflow streams report directly to the process water tank for immediate distribution and use. Process water pumps distribute process water to the grinding circuit, rougher flotation, cleaner flotation, PGM scavenger flotation and regrind circuits.

17.10.3 Fire Water

The fresh water tank contains a dedicated firewater reserve with a design capacity of 400 m^3.

17.10.4 Potable Water

Potable water services are described in Subsection 18.4.1.

17.10.5 Gland Seal Water

In-line duplex filters will be used to remove fine particulates for low- and high-pressure pump gland seal water in the process plant.

17.10.6 Cooling Water

Cooling water is used in the SAG mill and ball mill to cool oil lubrication systems. In-line duplex filters will be used to remove fine particulates before distributing cooling water to respective mills.

17.10.7 Air Services

Three air compressors provide high pressure air for process plant and instrumentation air requirements. Plant air needs include work stations throughout the process facility.

17.10.8 On-Stream Analyzers (“OSA”)

Plant instrumentation includes an on-stream analyzer (“OSA”) that will be used to continuously monitor copper as a proxy to palladium in key process streams to assist with optimising concentrate recovery and grade.

A single particle size analyzer will be installed to continuously measure the particle size of the rougher flotation feed (ball mill cyclone overflow).

17.10.9 Closed Circuit Television (“CCTV”) System

A closed-circuit television (“CCTV”) system will be applied to assist control room operators in monitoring the operation of plant and equipment. The CCTV system provides real-time monitoring with archived recording for a nominal period.

18. PROJECT INFRASTRUCTURE

The required infrastructure to support the mining and processing operations include:

- Existing infrastructure
- Area 110 – General Site Preparation
- Area 120 – Mine Infrastructure
- Area 140 – Support Infrastructure
- Area 140 – Permanent Camp
- Area 150 – Laboratory
- Area 160 – Process Plant Infrastructure
- Area 170 – Fuel/Oil Systems Storage
- Area 180 – Transload Facility
- Area 210 – Main Power Generation
- Area 220 – Secondary Power Generation
- Area 260 – Process Plant Electrical Rooms
- Area 270 – MV Distribution O/H Line
- Area 280 – Automation Network
- Area 290 – IT Network & Fire Detection
- Area 310 – Fresh Water / Wells
- Area 320 – Surface Water Management
- Area 330 – Potable / Domestic Water
- Area 340 – Sewage Water
- Area 350 – Fire Water
- Area 360 – Water Treatment Plant
- Area 370 – Tailings Storage Facility (TSF)
- Area 380 –Mine Rock Storage Area (MRSA) Catch Basins
- Area 390 – Site Water Management Pond

18.1 Existing Infrastructure and Location

The Marathon Project, accessed by road from Highway 17, is located 10 km north of the Town of Marathon with a population of approximately 3,200 (2016 census). There is no infrastructure or public services directly on site.

The Marathon region has access to the Canadian railroad network. The railway infrastructure in Marathon is well developed for exporting concentrate to North American ports or smelters in a timely manner.

HydroOne's grid network is well developed in the Marathon Project area. The 115 kV powerline from Marathon to Manitouwadge is approximately 2.5 km from the proposed mill site and less than 2 km to the planned main substation. There is an existing transformer substation 5 km from Marathon providing 115 kV power. Finally, the East-West Tie Transmission Line Project which is currently under construction will tie Thunder Bay to Wawa with a 230 kV transmission line and 230 kV substation adjacent to the Marathon substation. The new powerline is built by Nextbridge Infrastructure LP, a partnership between affiliates of NextEra Energy Canada LP, Enbridge and OMERS Infrastructure. Completion of this project is expected by the end of the first quarter of 2022 (source: Nextbridge Infrastructure website).

The Town of Marathon administers the Marathon Airport located less than 3 km from the Marathon Project site.

18.2 Area 100 Infrastructures

Figure 18.1 shows the Marathon Project general layout up to Camp 19 Road.

Figure 18.1: Marathon Project Infrastructure Map

18.2.1 Area 110 General Site Preparation

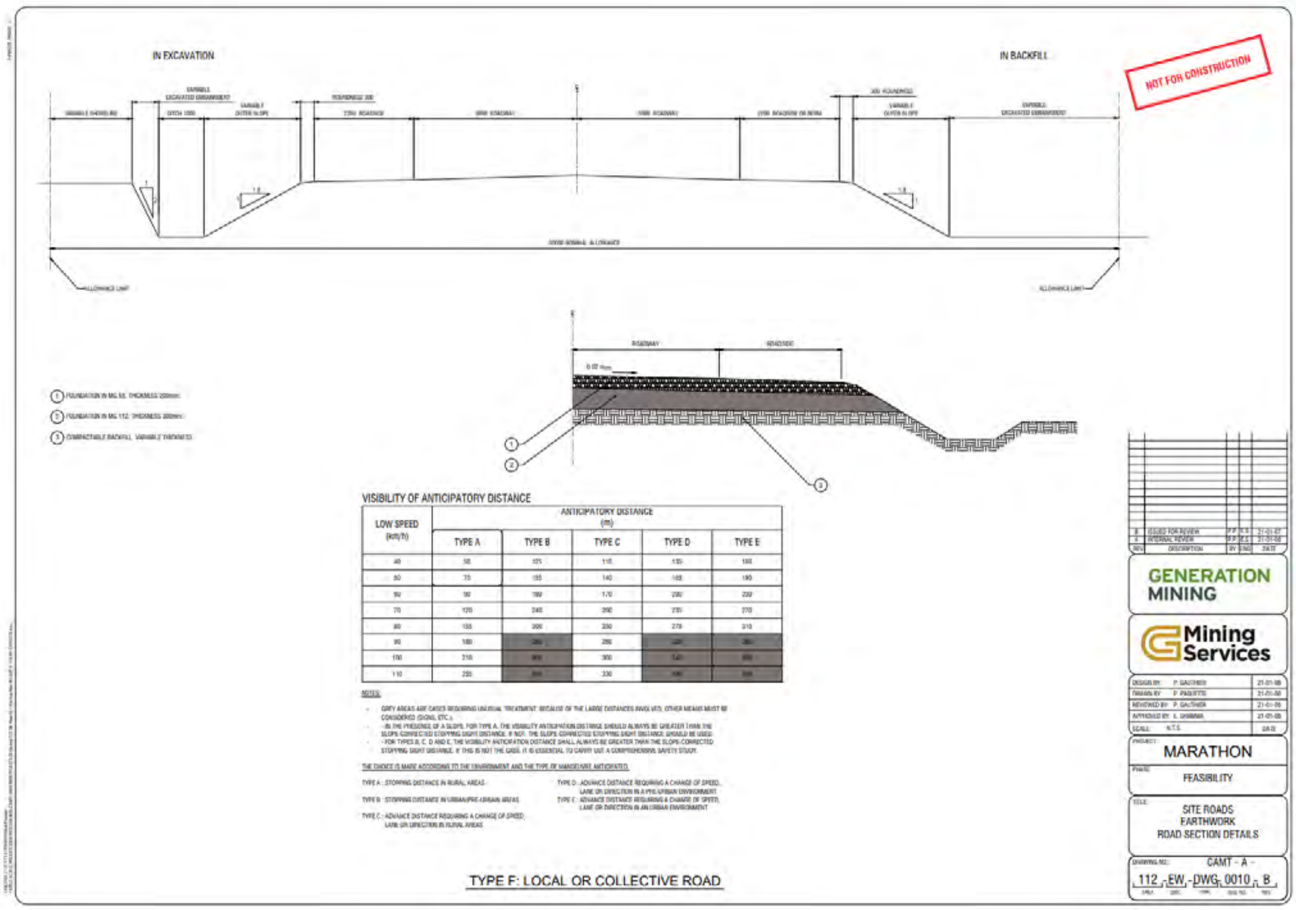
This section presents the clearing of Area 111 for all areas: three pits, process plant, crusher and conveyor, site roads, and the TSF. It includes the costs to properly haul and stockpile to the designated area on site.

Area 112 works are related to site road construction. It includes the removal of overburden, drill and blast excavation (or any other projected method), haul and place whenever possible, process to required sizes to the aggregate plant, and place material back for the road structure (Figure 18.2). It includes all the culverts and drainage. In general, haul roads are 40 m wide while site service roads are 10 m. The list of roads and their widths are as follows:

- Main haul road to crusher and to PSMF: 40 m.
- Secondary haul road, to specific area of the TSF and Water Treatment Plant ("WTP"): 19 m.

- Site roads for the main electrical substation, service roads from the construction pad to the process plant area, and access road to the waste rock dump collection ponds: 10 m.
- Service road along the conveyor from the crusher area to the process plant: 7 m.

Figure 18.2: Road Structure

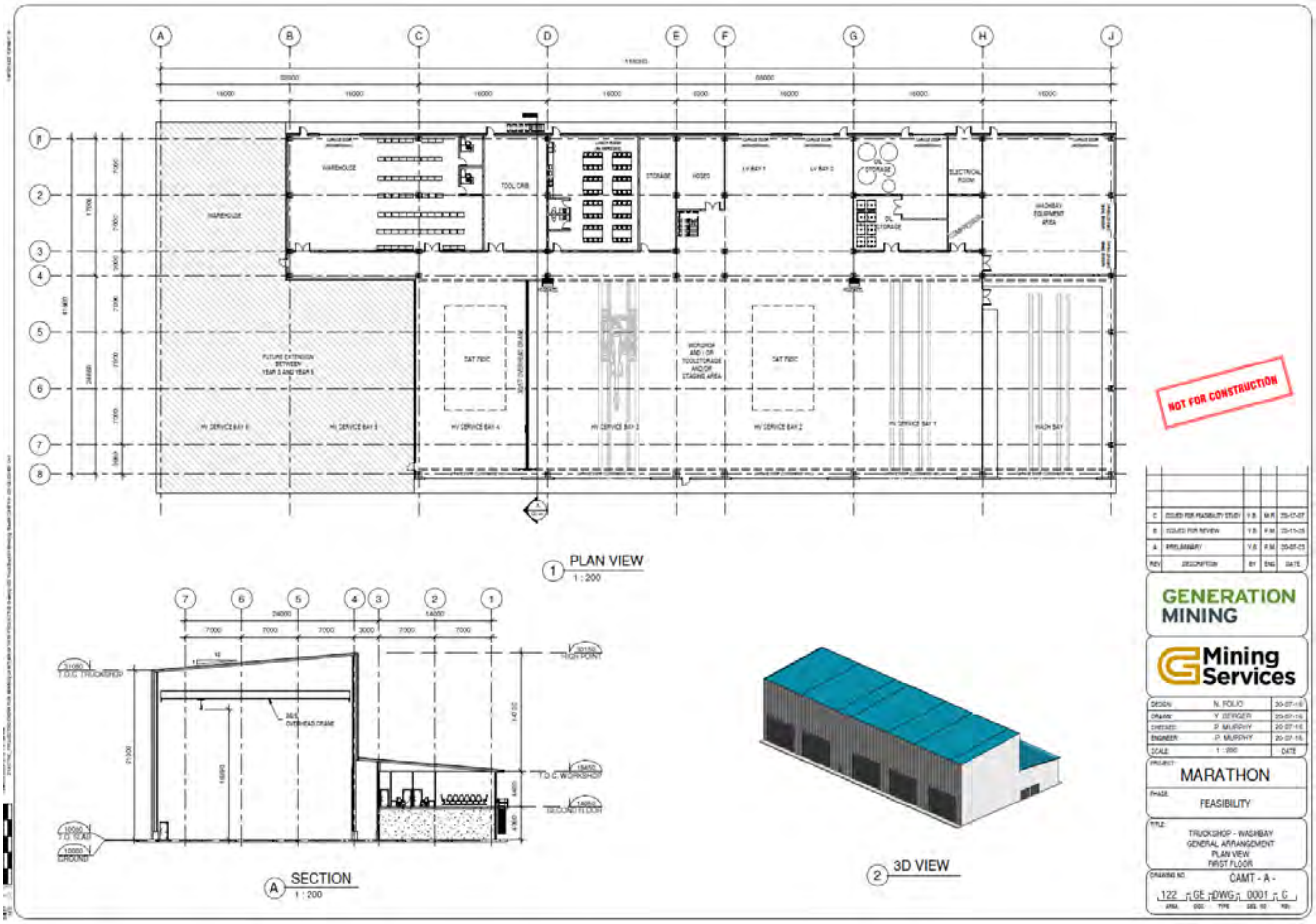


The Main Access Road (Area 113) will be built in Year 1 after commercial production. The road will be 10 m wide. Prior to this construction, the site will be reached via the existing Camp 19 upgraded for construction traffic of up to 10 m in width.

18.2.2 Area 120 Mine Infrastructure

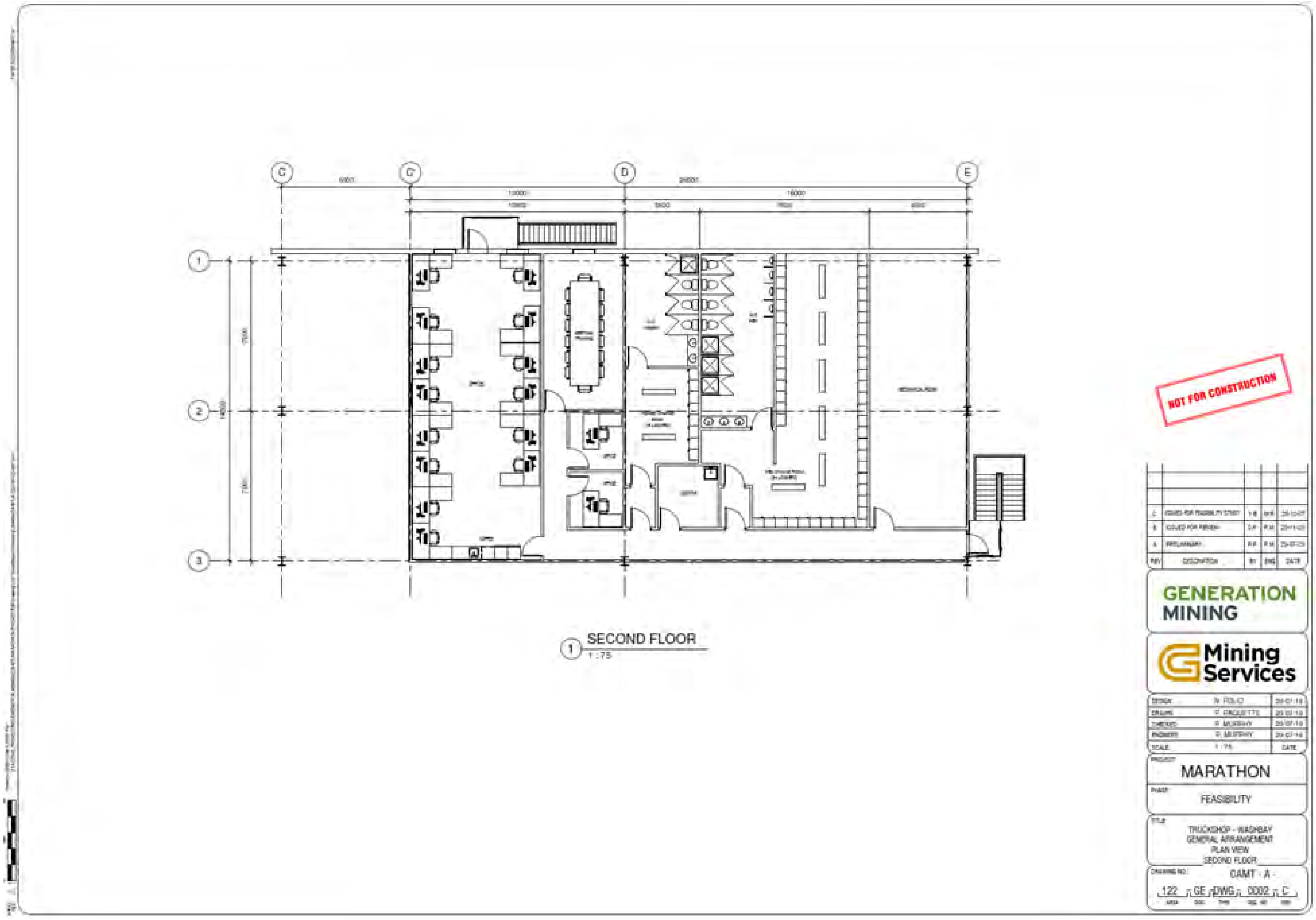
Figure 18.3 illustrates the Mine Service Building (Area 122), ground level, adapted to the open pit mining fleet. The truck shop will have four (4) separate bays each equipped with 12 m (W) x 9 m (H) overdoors. The bays are serviced by a 30/5 t overhead crane. In addition, two light duty bays are planned. A fifth heavy duty bay is planned as a wash bay to clean large equipment, while a smaller wash bay is intended for light duty vehicles. Water used to clean vehicles and equipment in the maintenance shop is considered contact water and will be collected and sent to the WTP.

Figure 18.3: Mine Service Building - Ground Floor



Two additional bays will be built in Year 3 to accommodate the increase in fleet. The width and height of these bays will be the same size as the previous. The truck shop and warehouse are connected. The warehouse dimensions are 24 m x 17 m and is serviced by a 5 m x 6 m garage door. The size of the warehouse will approximately double in Year 3 as well. Over the tool crib, miscellaneous storage rooms and a lunchroom, offices, on the second floor, offices, one meeting room and change rooms including showers are planned. The change room will accommodate over 100 workers. Figure 18.4 illustrates a plan view of the second floor.

Figure 18.4: Mine Service Building - Second Floor



18.2.3 <u>Area 130 Support Infrastructure</u>

18.2.3.1 <u>Area 131 Administration Building</u>

The administration building is located close to the mine service building facility. It is a two-storey building with an infirmary, human resources department, information technology, main lunchroom and kitchenette and additional storage located on the first floor. The second floor is comprised of offices (closed and opened), a total of 38 working stations and two conference rooms.

Figure 18.5, Figure 18.6 and Figure 18.7 present the elevations for the administration building and a plan view of the first and the second floor respectively.

Figure 18.5: Administration Building - Elevation Views

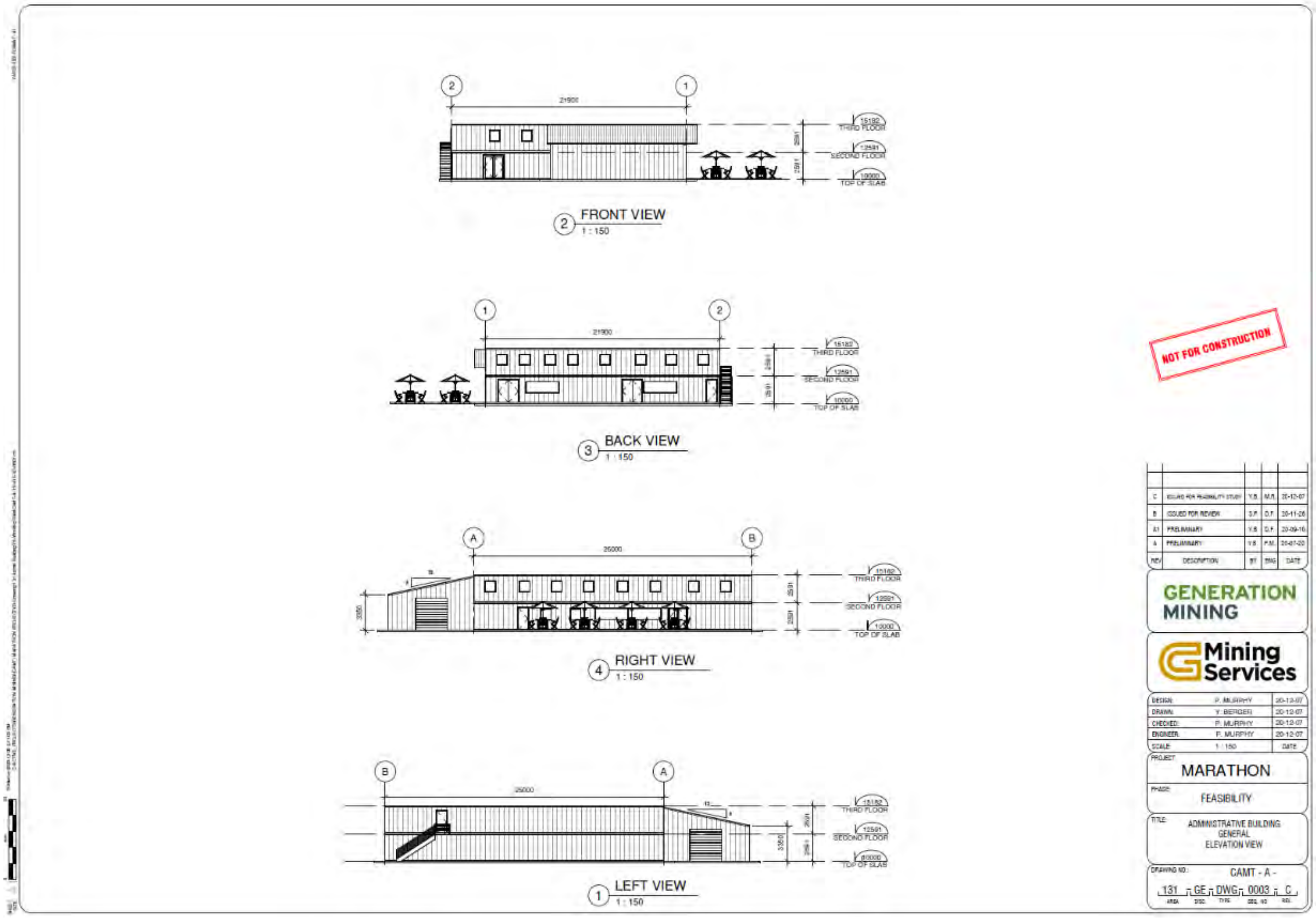


Figure 18.6: Administration Building - First Floor

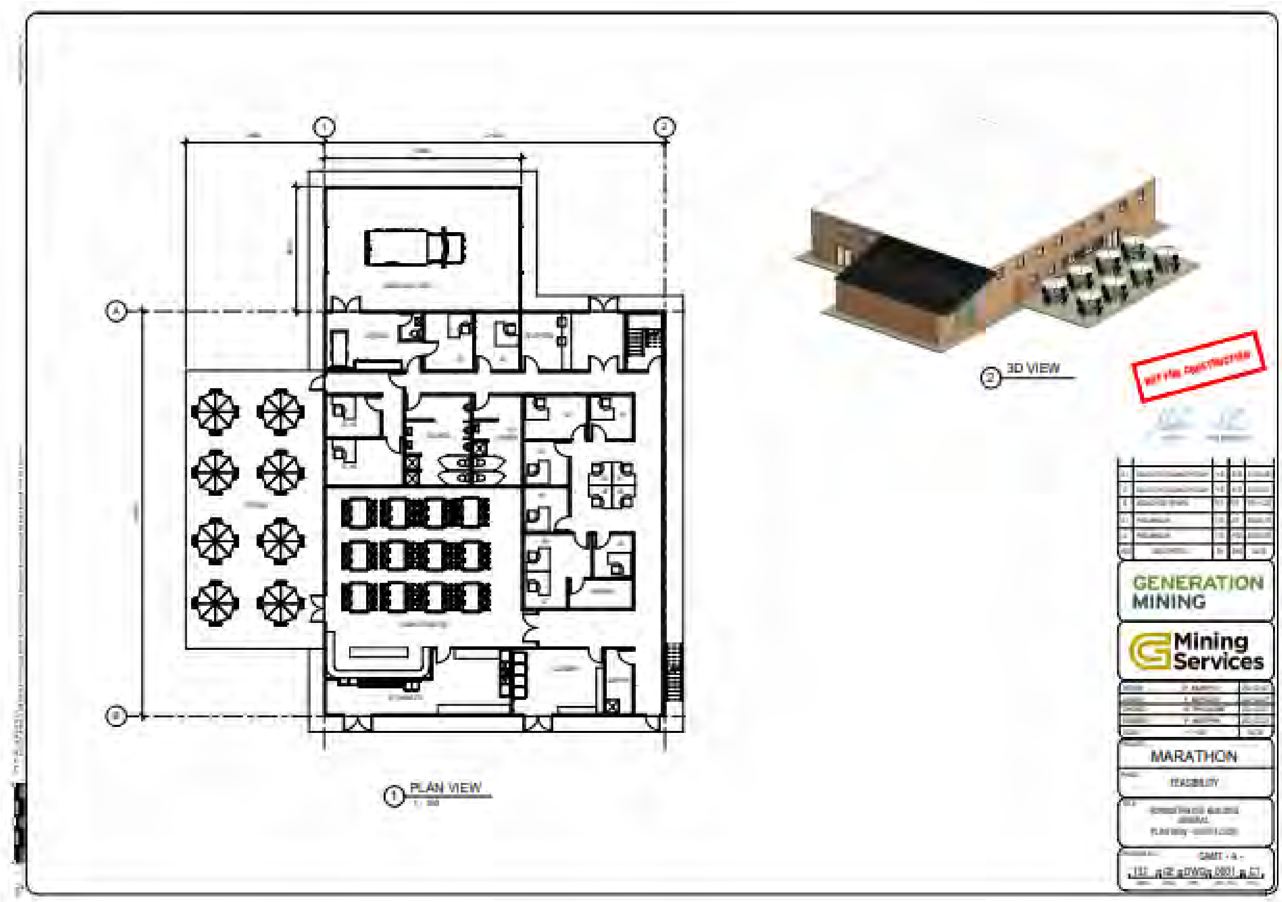
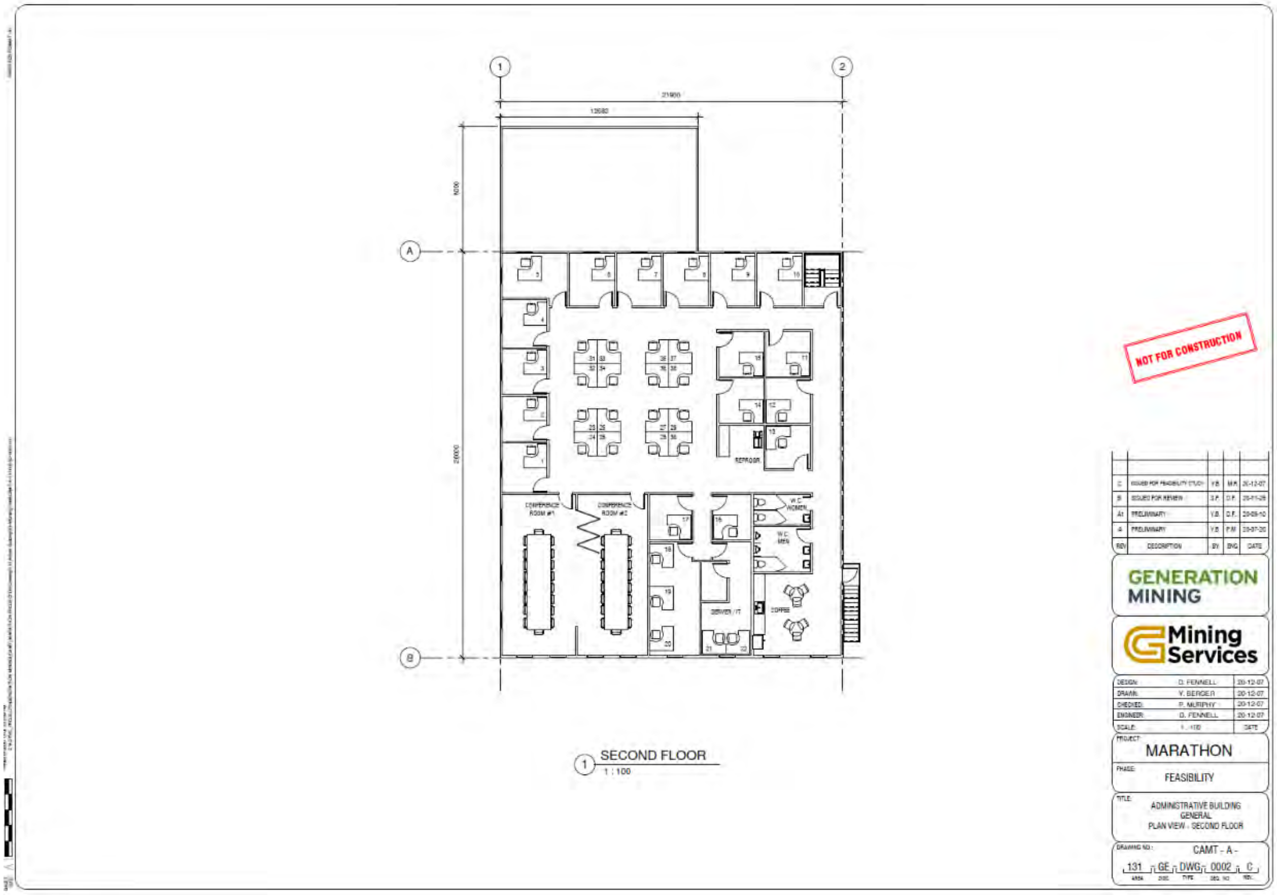


Figure 18.7: Administration Building - Second Floor



18.2.3.2 Area 132 Site Guard Building

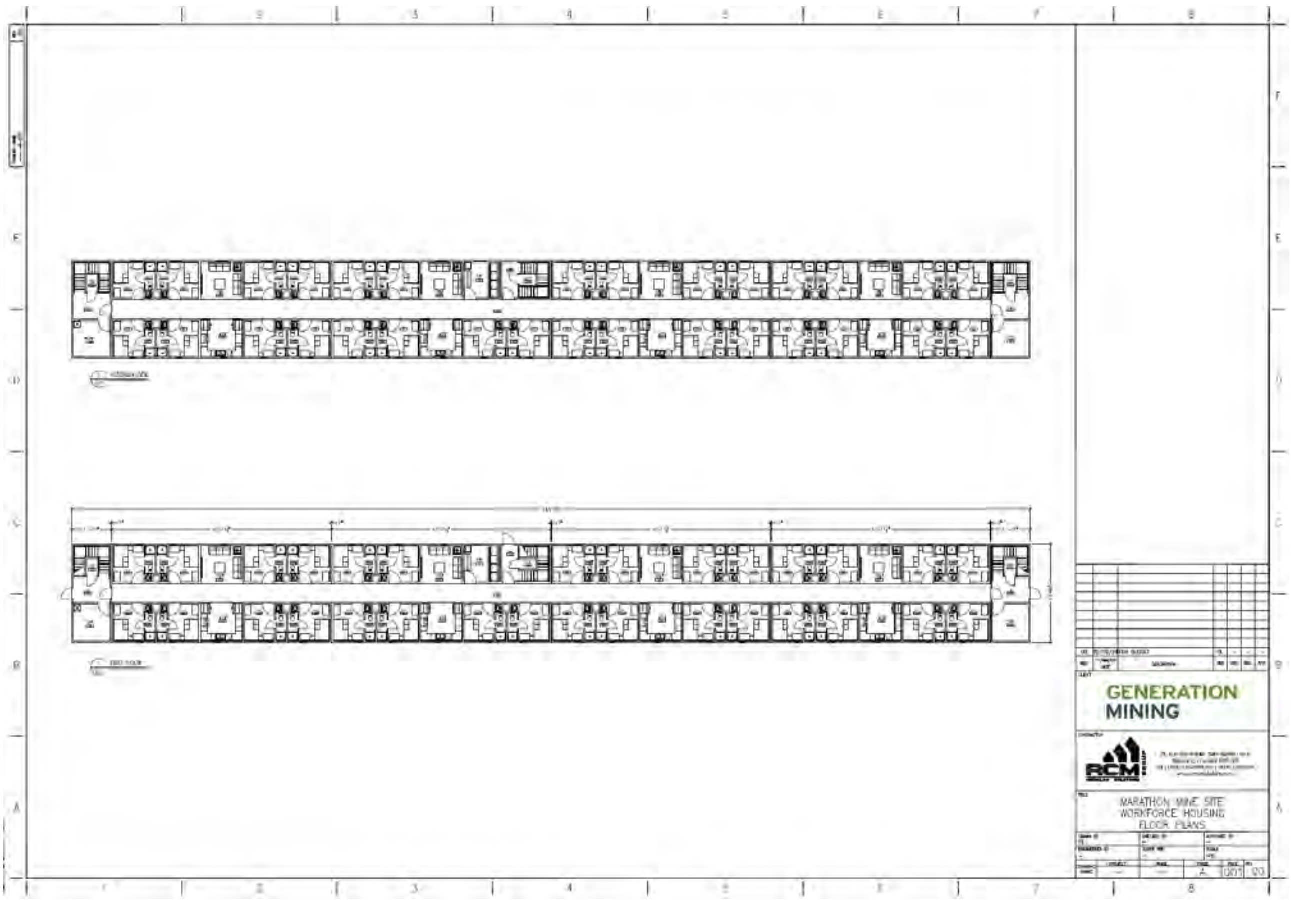
One gate house will be located close to the processing plant. Security checks on vehicles and personnel requesting access to the property will be executed from this building. Induction and safety training and other may occur in this building. Figure 18.8 shows a 3-D view of the Site Guard Building.

Figure 18.8: Site Guard Building - 3D View

18.2.4 Area 140 Permanent Operation Camp

The infrastructure aims to accommodate approximately 15% of the total operation personnel, approximately 60 people from outside the region that require lodging in Marathon. These two-storey accommodations will allow for one bedroom and washroom and a shared kitchen for every 4 apartments. A location was established and agreed with the Town of Marathon. The site is close to existing services. Figure 18.9 shows a plan view of both floors.

Figure 18.9: Permanent Operation Camp



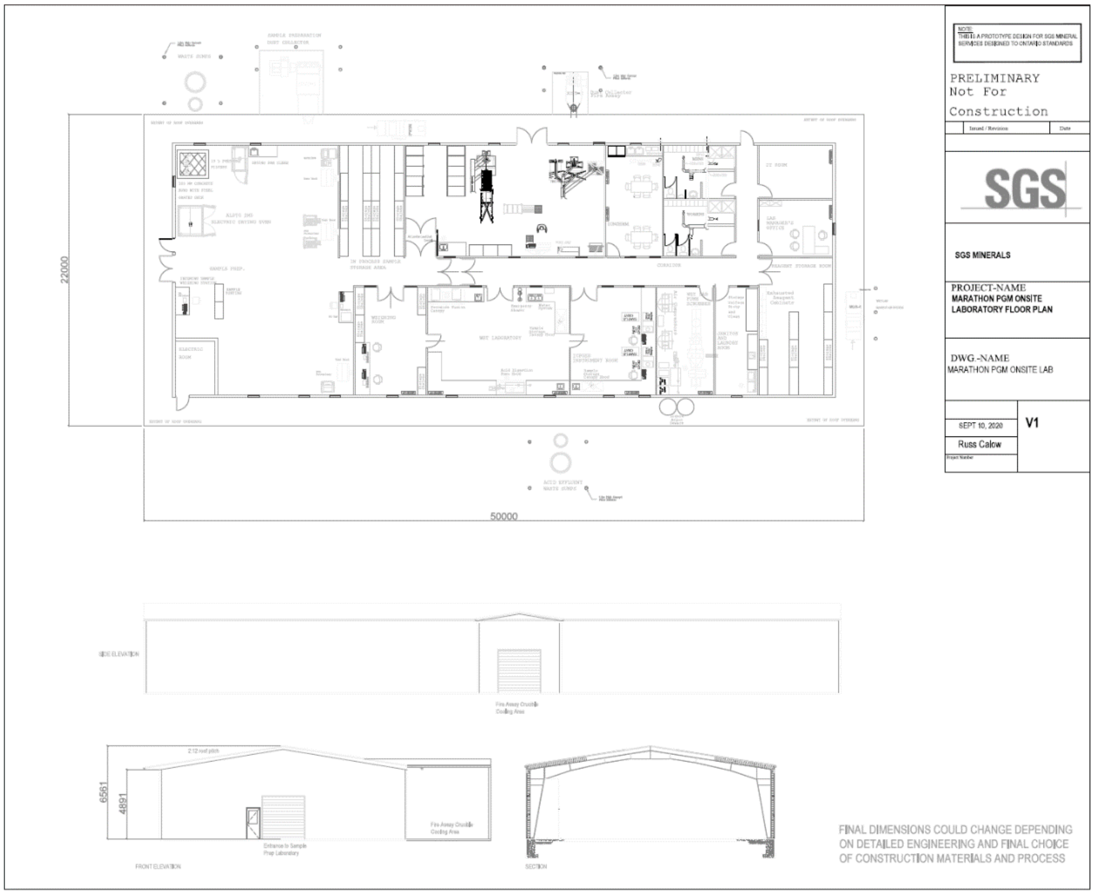
18.2.5 Area 150 Laboratory

The design, drawings, equipment requirements and costs of the laboratory are gathered in a document entitled, "Marathon PGM Mine Laboratory Proposal", dated September 10, 2020. It shows the layout and list of equipment, as well as the planned testing program SGS intends to perform over the LOM.

The laboratory will be located approximately 3 km south of Highway 17 on Peninsula Road. The tie-in costs for services were estimated by GMS.

Figure 18.10 shows a plan view of the Laboratory.

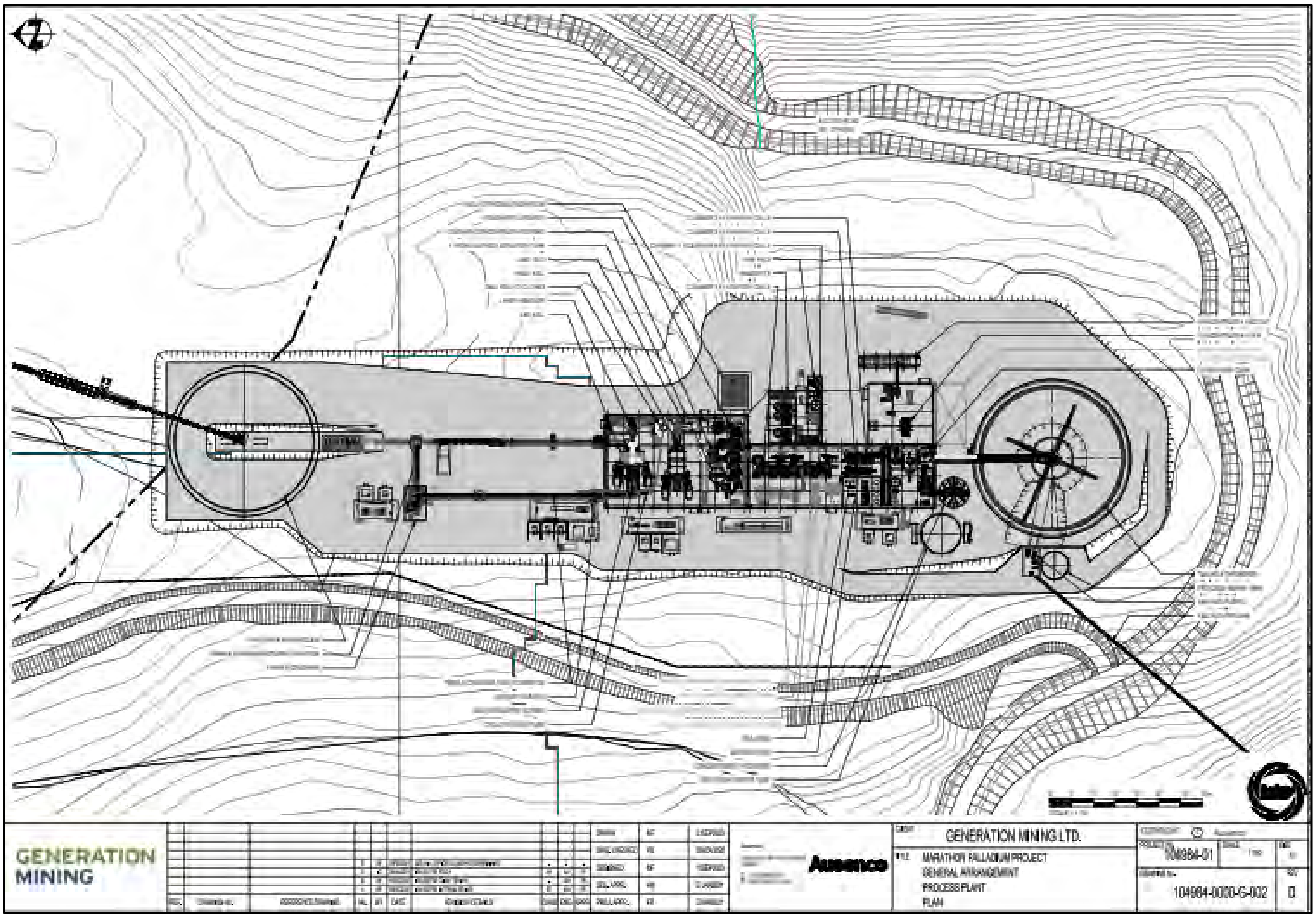
Figure 18.10: Laboratory - Plan View



18.2.6 <u>Area 160 Process Plant Infrastructure</u>

The processing area consists of the main processing building and support infrastructure, as shown in Figure 18.11.

Figure 18.11 Process Plant Site



The process plant consists of the buildings shown in Table 18.1.

Table 18.1: Process Plant Building List

Building Description	Building Construction	Additional Description	L (m)	W (m)	H (m)	Area (m^2)	Volume (m^3)
Grinding Building	Pre-Engineered Building	Metal Cladded	63.0	41.0	32.0	2,583	82,656
Floc Building (Flotation Area)	Pre-Engineered Building	Metal Cladded	84.0	28.0	20.0	2,352	47,040
Stockpile Building	Pre-Engineered Building	Fabric Cladded Dome	72 (diameter)		25	4072	97,716
Pebble Crusher Enclosure Building	Pre-Engineered Building	Metal Cladded	16.0	10.0	16.3	160	2,600
Concentrate Loadout Building	Pre-Engineered Building	Metal Cladded	28.0	30.0	8 / 16	840	840
Reagent Building	Pre-Engineered Building	Metal Cladded	25.0	25.0	15.0	625	9,375
Concentrate Drive Thru	Pre-Engineered Building	Metal Cladded	25.0	6.0	6.0	150	900

The grinding building is serviced by a 30 t overhead crane for the ball mill and a 20 t overhead crane for the SAG mill, both have a 19.3 m span.

The flotation area building is serviced by a 25 t overhead crane with a 27.5 m span, and the pebble crusher enclosure contains a 15 t overhead crane.

18.2.6.1 Area 162 Process Plant Reagents Storage Building

The reagent building consists of a metal cladded pre-engineered building totalling 625 m^2. The building's height is 6 m, and the area is serviced by a 5 t overheard crane that spans 23 m.

18.2.6.2 Area 163 Mill Office

The mill office building consists of five modified shipping containers placed on the east side of the plant near the flotation circuit. These offices are supplied with propane heating and have the following exterior dimensions: 14.6 m (L) x 12.2 m (W) x 2.4 m (H).

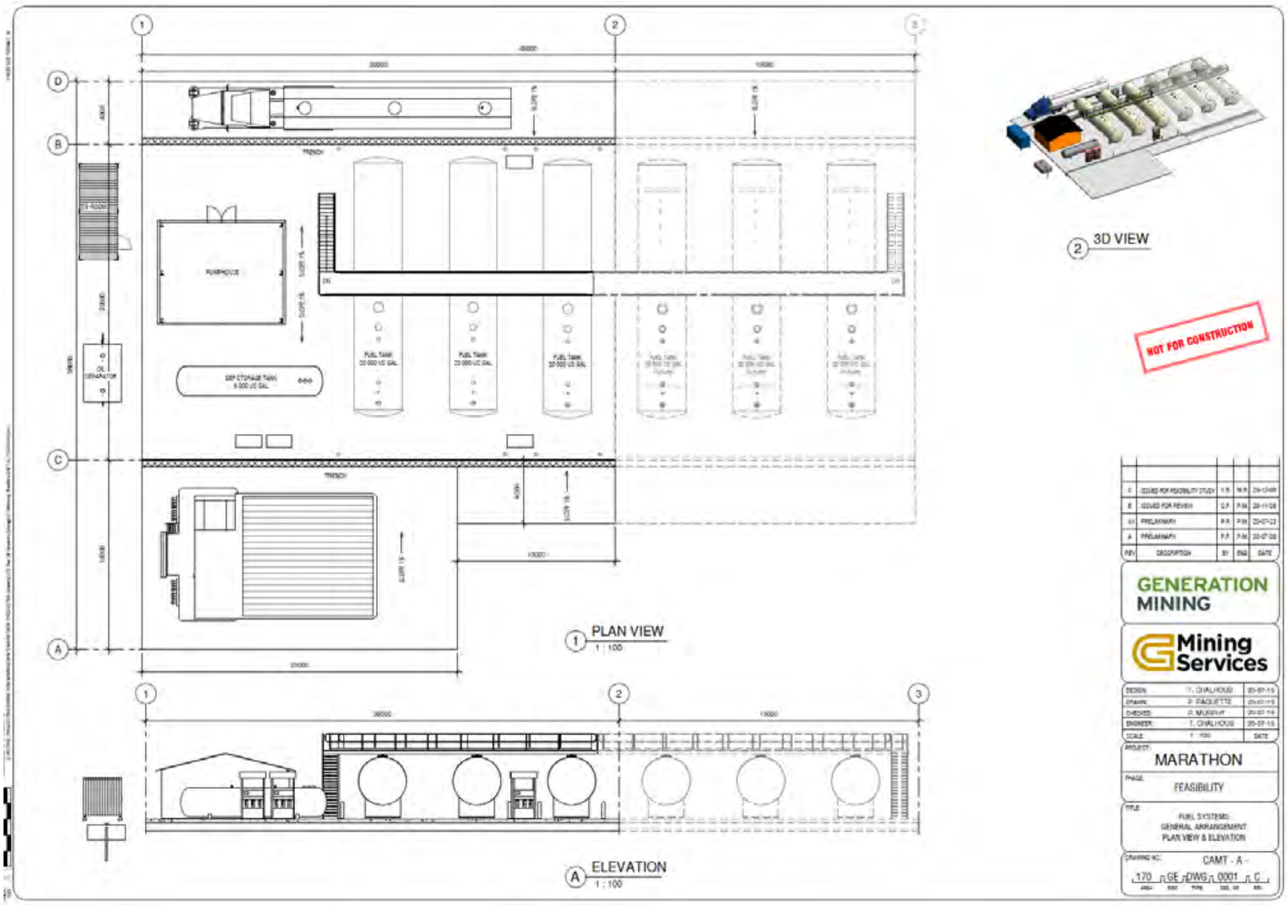
18.2.6.3 Area 164 Lunchroom

Adjacent to the mill office complex is a modified shipping container with exterior dimensions of 14.6 m (L) x 2.4 m (W) x 2.4 m (H) dedicated as a lunchroom for the mill staff.

18.2.7 Area 170 Fuel Storage

A fuel storage, strictly for mining and support mine equipment, will be built (Figure 18.12). The three self-contained tanks for diesel are designed to have a capacity of 20,000 L each. Shelter, pumps, structural steel and concrete pads are designed for smooth delivery operation. The fuel storage is located east of the mine maintenance shop. An expansion is planned in Year 3 to accommodate the fleet equipment increase.

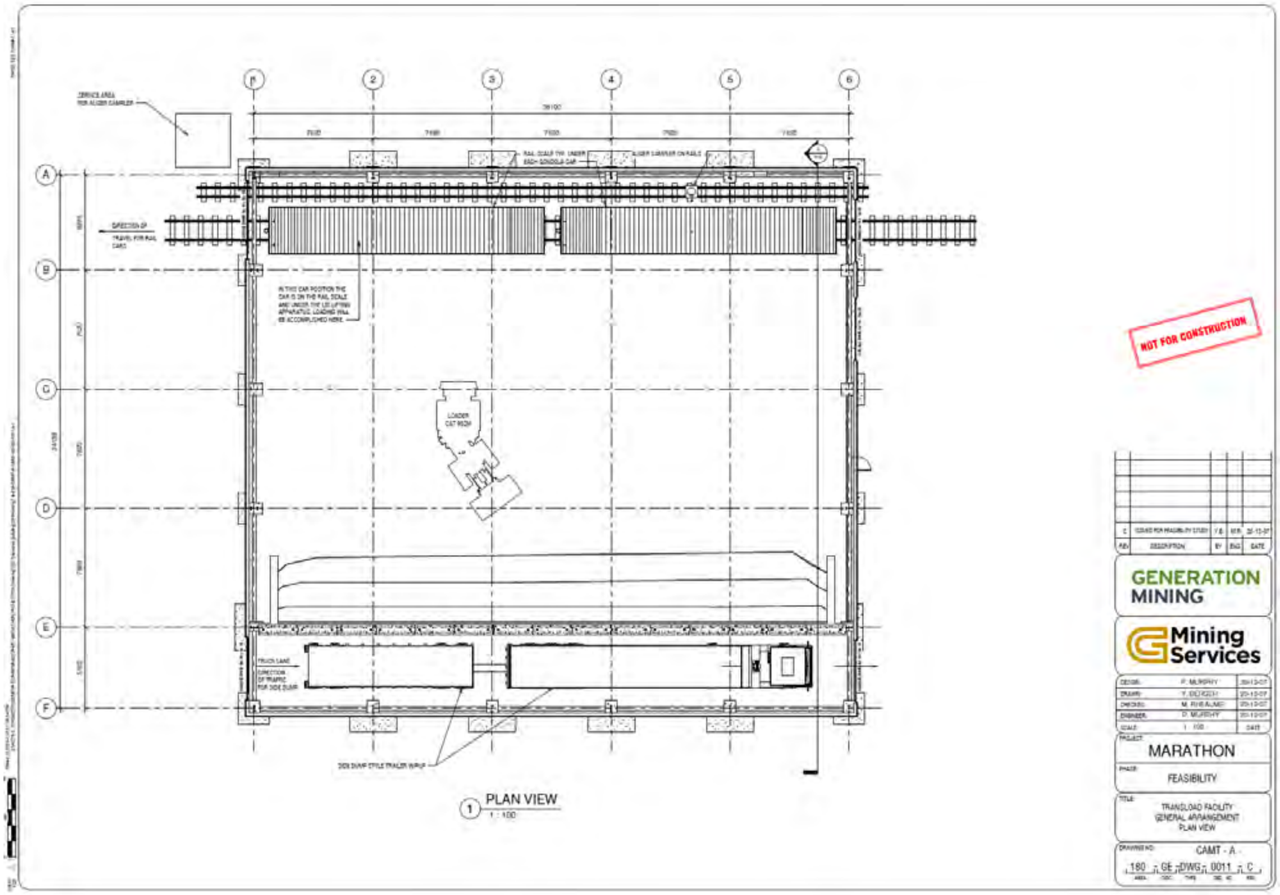
Figure 18.12: Fuel Storage Initial and with Expansion



18.2.8 Area 180 Transload Facility

The transload facility is located at a site in the Town of Marathon, on Canadian Pacific Railway ("CPR") land where there are already some sidings south of Marathon close to Lake Superior (Figure 18.13). The facility is approximately 10 km from the process plant site. The location has been chosen due to the costs and mainly because it provides access to the Canadian railway networks for easy shipment to known smelters. The facility accepts concentrate shipments from site via side-dump haul trucks. Haul trucks enter the building, dump the concentrate, and exit the building. The concentrate is loaded onto rail cars using a front-end loader. The building is fully enclosed to ensure adequate air quality control with sufficient air changes, as per the applicable codes and standards. Entrances and exits will have roll-up style doors to regulate airflow through the building.

Figure 18.13: Transload Facility



The on-highway truck and trailers have a capacity of 36 to 40 t, with a double tub (covered) single trailer pulled by a tractor truck.

Figure 18.14: Example of Dual-trailer Side-dump Trailer with a Max 36-40 t Capacity

Figure 18.15: Example of Hard Cover Side-dump Trailer

18.3 Area 200 Power and Electrical

18.3.1 Area 210 Main Power Generation

Several options were examined to provide power to site. As mentioned previously, HydroOne power distribution in the region is well developed through its power grid network and will be strengthened by the addition of the East-West Tie Transmission Line Project by Nextbridge. To ease the permitting process and reduce the costs, the preferred option is the tie-in on the Marathon Manitouwadge 115 kV line also known as the M2W line.

After several discussions with HydroOne authorities, the M2W line has a short-circuit capacity of 62 MW. The latest information available from the site load list indicates that the Marathon Project would require 60 MW. The Independent Electricity System Operator ("IESO") needs to confirm this availability and approve the tie-in to the Ontario grid. If approved, the tie-in would occur just west of the Marathon Property and a 1.9 km 115 kV transmission line would be built to the site main substation (Area 212).

Figure 18.16, Figure 18.17 and Figure 18.18 show the general layout of the power on site, leg 1 of the main powerline on site and leg 2 of the same powerline respectively.

Figure 18.16: General View Marathon Project Power Generation / Distribution

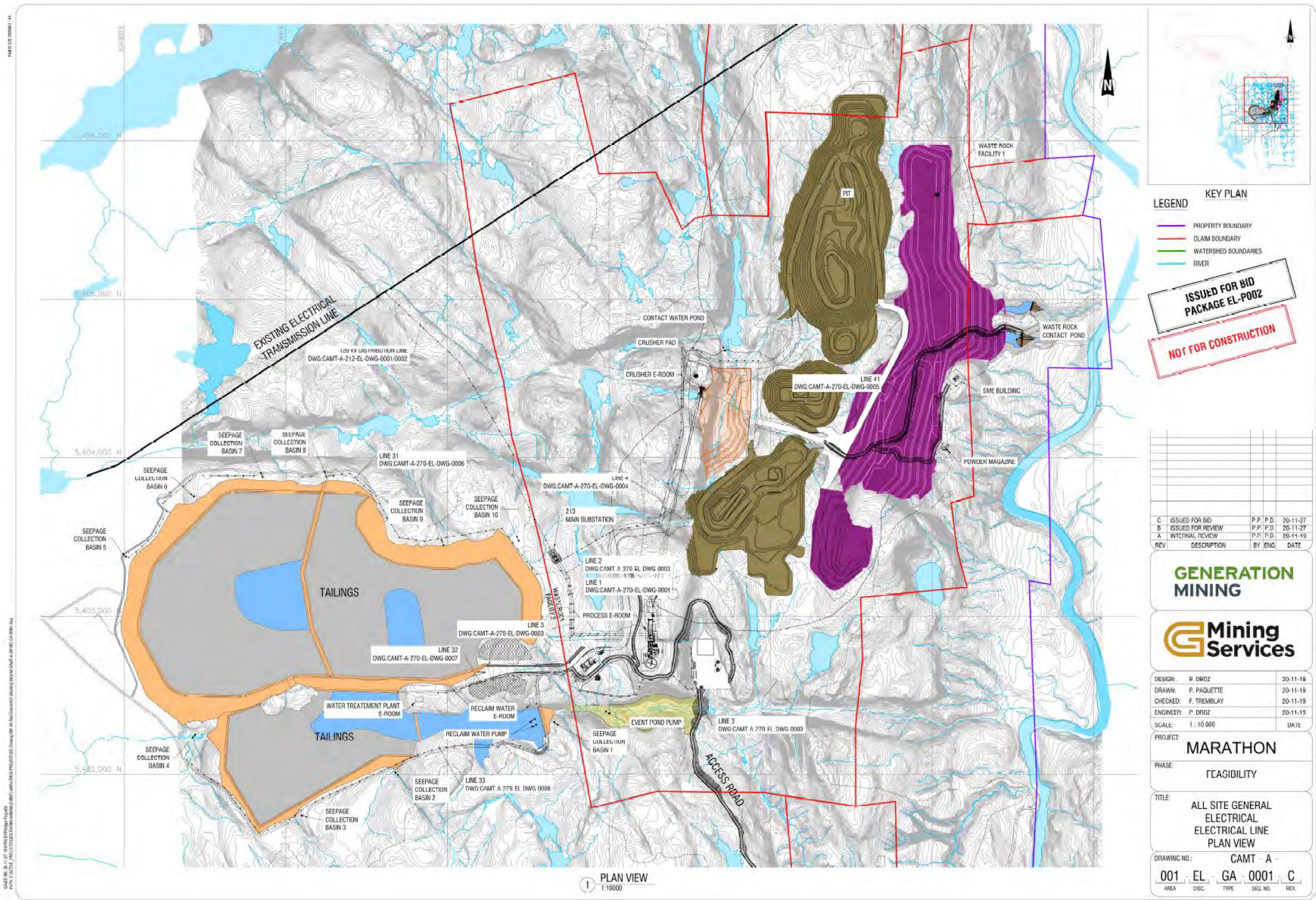


Figure 18.17: Powerline Tie-in First Leg

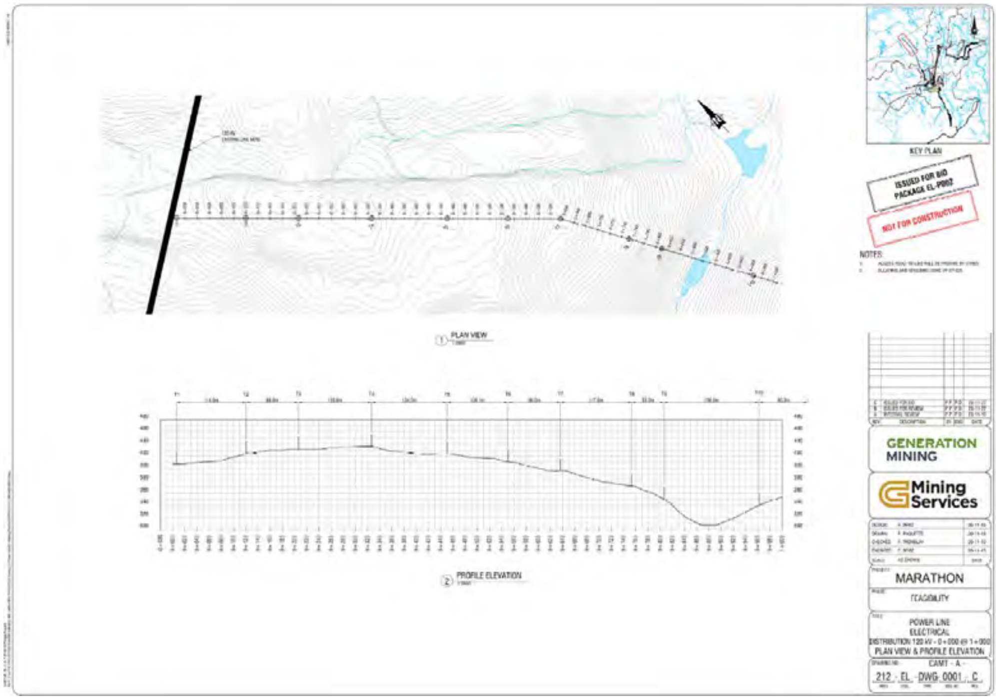
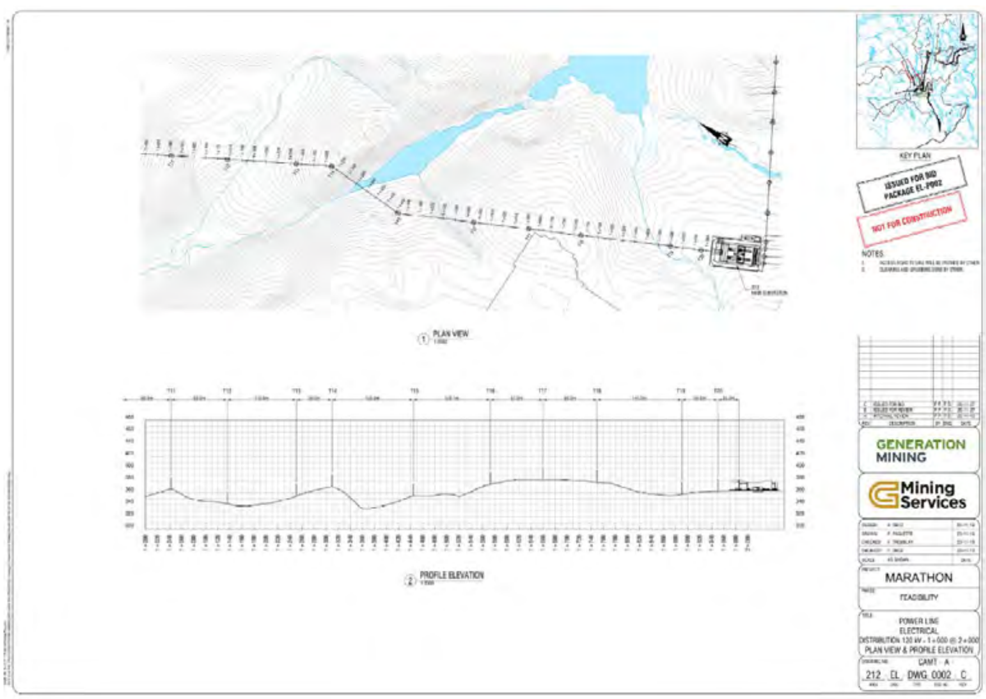


Figure 18.18: Powerline Second Leg



The site main substation (Area 213) allows power to be distributed across the site and provides power to all areas according to the established site wide load list. Two identical transformers, 120 kV to 25 kV at

45/50/75 MVA at the substation provide full redundancy. The substation layout and single line diagrams are shown on Figure 18.19 and Figure 18.20 respectively.

Figure 18.19: Main Substation Layout

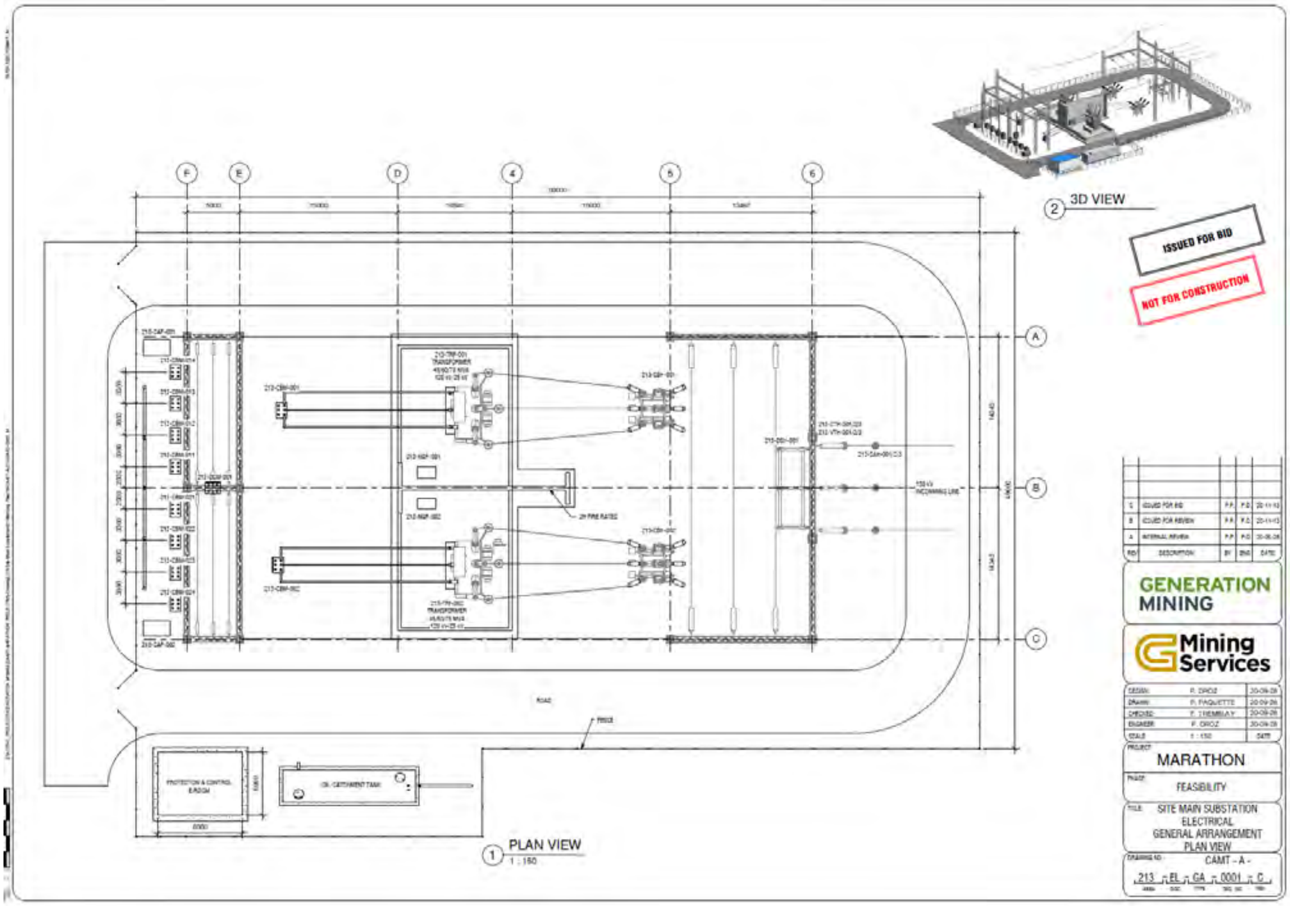
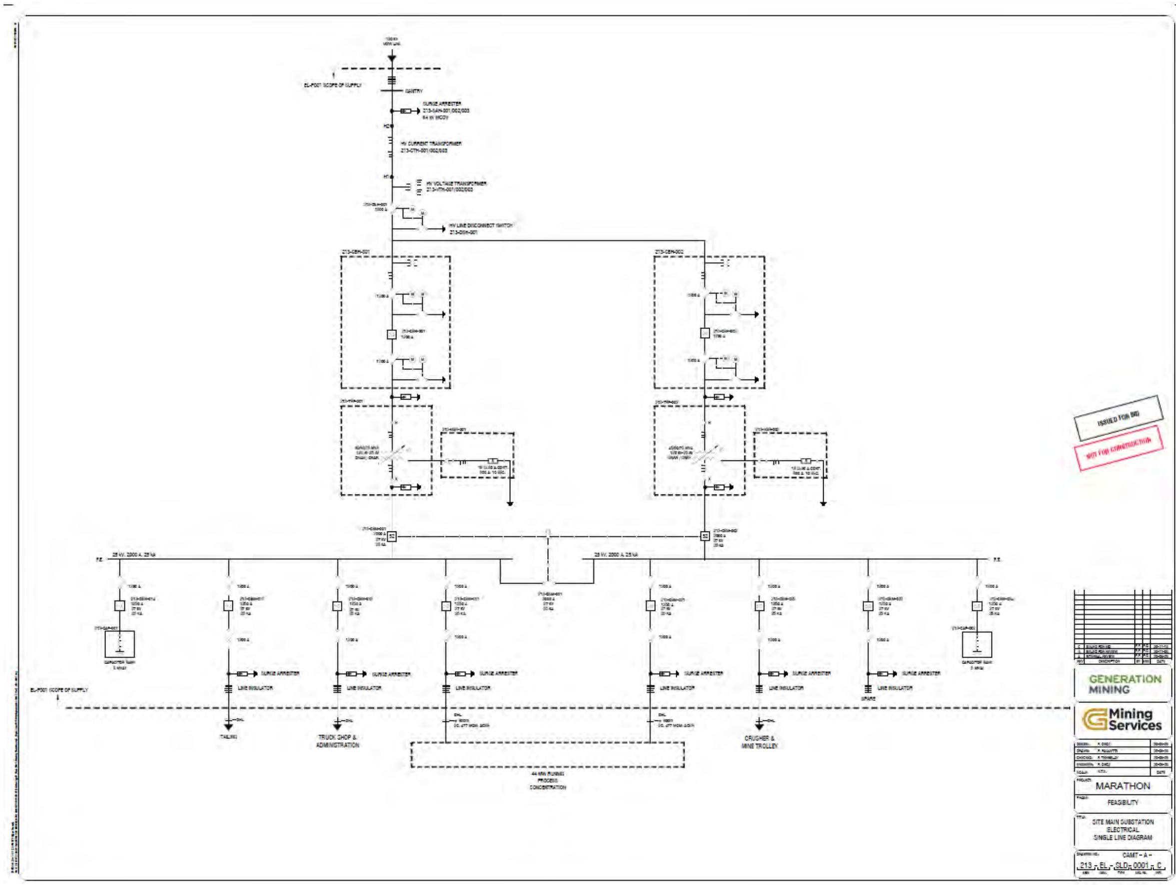


Figure 18.20: Main Substation Single Line Diagram



From the mine main substation, a site distribution network of 25 kV will be built to provide power to all areas.

18.3.2 Area 222 Secondary Power Generation

To support construction of the Project, the plan is to install temporary power that will become secondary / emergency power. An estimated 5 MW emergency would be sufficient to maintain the operation as any power outage would occur over the life of the mine. Hence, three (3) diesel-powered reciprocating generators of 1.8 MW for a total of 5.4 MW will be installed.

For construction purposes, two generators close to the process plant and one at the construction laydown area closer to the aggregate plant and construction offices will be installed.

The distribution overhead powerlines are planned in such a way that they will become permanent and not be removed over time.

18.3.3 Area 270 MV Distribution O/H Line

As shown on Figure 18.16, the medium voltage distribution lines at 25 kV are developed and represent more than 14 km network. At each location, the transformers are designed, either by Ausenco at the process plant, crusher and reclaim systems, or GMS for the site water management, effluent treatment plant, and the aggregate plant area. In addition to the transformers at the process plant, the following E-rooms in Table 18.2 are located near their service areas of the process plant.

Table 18.2: Process Plant Electrical Rooms

Process Plant Electrical Rooms	
Crusher Electrical Room	Pre-fabricated electrical room, with free-issue electrical equipment installed - 7.85 m (L) x 3 m (W) x 3.5 m (H)
Pebble Crushing Electrical Room	Pre-fabricated electrical room, with free-issue electrical equipment installed - 15.25 m (L) x 8.5 m (W) x 3.5 m (H)
Flotation/Grinding Electrical Room	Pre-fabricated electrical room, with free-issue electrical equipment installed - 23.5 m (L) x 8.5 m (W) x 3.5 m (H)
Flotation/Grinding VFD Room	Pre-fabricated electrical room, with free-issue electrical equipment installed – 30 m (L) x 6.5 m (W) x 3.5 m (H)
Mills Electrical Room	Pre-fabricated electrical room, with free-issue electrical equipment installed - 25.5 m (L) x 7.5 m (W) x 3.5 m (H)
Thickening Electrical Room	Pre-fabricated electrical room, with free-issue electrical equipment installed - 16.55 m (L) x 7 m (W) x 3.5 m (H)

18.3.4 Area 280 Automation Network

Areas under the design of GMS will require automation network and devices, representing a cost of $174,359. Major cost of the automation network is covered by Ausenco as part of the process design.

18.3.5 Area 290 IT and Automation

As for the infrastructure automation system, schematics will be developed. However, the costs represent 2.7% of the process mechanical equipment costs. At the process plant, an allowance has been made for a control system interface and instrumentation. Piping and instrumentation diagram (“P&IDs”) have not been developed at this stage of design.

18.4 Water Management

18.4.1 Area 310 Fresh Water

Over the course of the construction, one of the main activities is to build the TSF dams to establish the Water Management Pond (WMP) and Cell 1 storage cell. This infrastructure is required for commissioning and processing as the WMP is the only source of fresh water. There are no plans for wells or other sources at this point. Therefore, the existing ponds have been sized to provide sufficient capacity to satisfy the operation requirements.

Water is pumped to the process plant area with a barge and pipeline system and other infrastructure if required. The WMP will also supply water to the potable water treatment plant.

The Reclaim Water Pipeline from the WMP to the process plant area will be heat-traced and insulated.

18.4.2 Area 200 Surface Water Management

Figure 18.21 shows the site wide water balance that is supporting the infrastructure for water movements on site.

Figure 18.21: Site Wide Water Balance (KP)

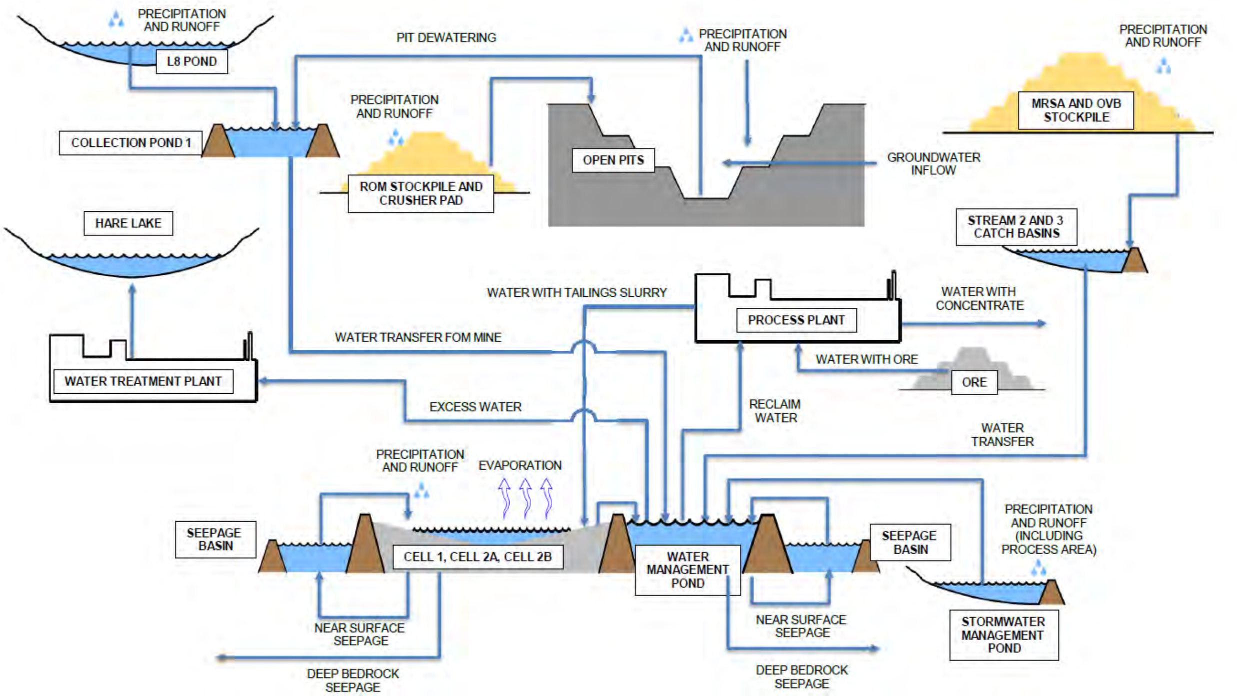
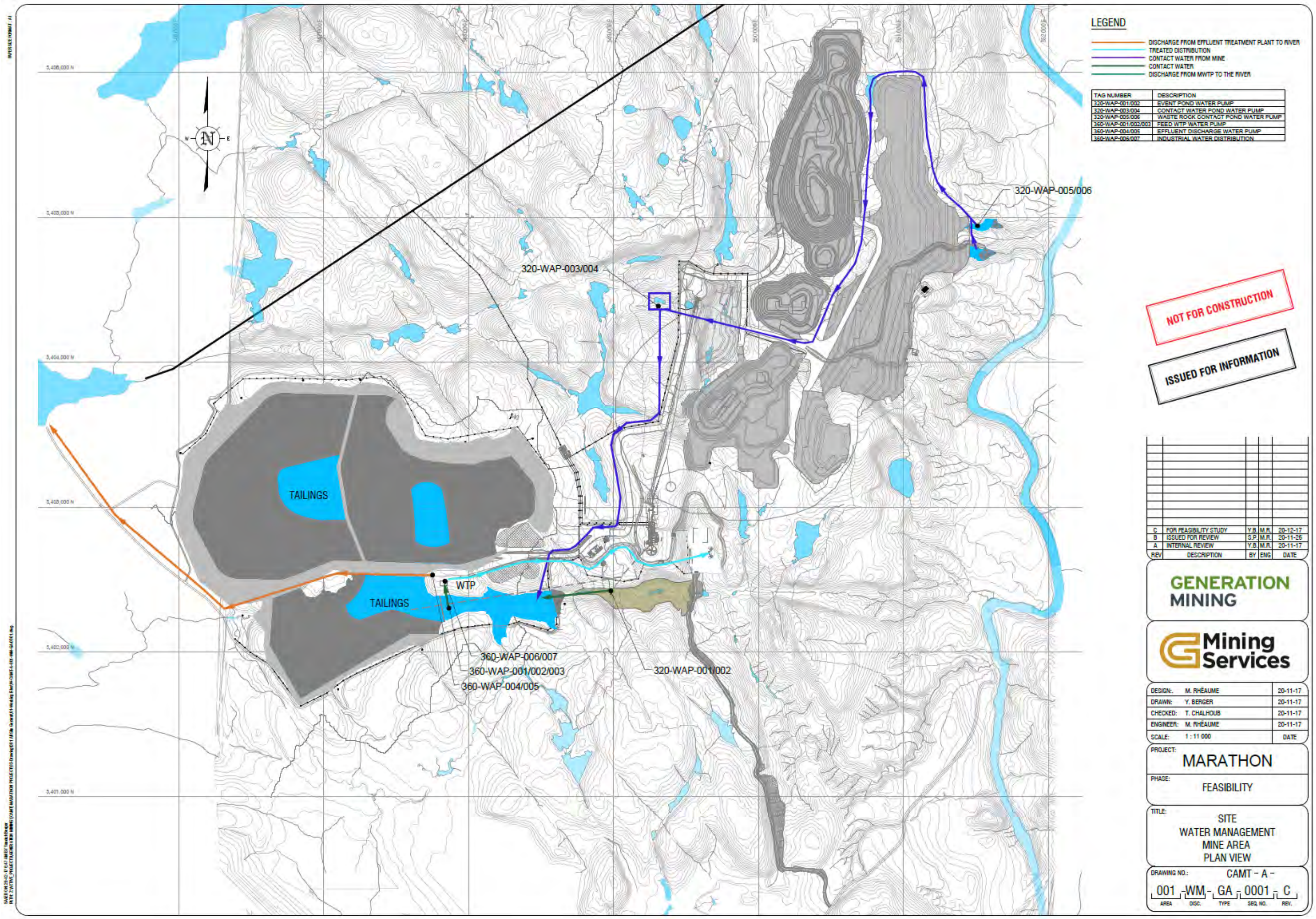


Figure 18.22 shows the pumps and pipelines system for surface water management. Contact surface water from the MRSA Catch Basins, the mine surface, in pit ground water inflows, runoff from the mining activities and all other surface infrastructure drainage (haul road and access road ditches) is collected and transferred to the WMP.

It should be noted that surface drainage at the process plant area and other buildings is collected in the Storm Water Management Pond and transferred to the WMP.

All collected surface water is pumped to the WMP and either reclaimed to the process plant area for reuse in the process plant or treated and discharged to Hare Lake.

Figure 18.22: Surface Pipeline Network



18.4.3 Area 330 Potable Water

The potable water plant is pre-containerized. The capacity of the plant is designed to treat raw water for approximately 4,000 L/hr, dry house, safety shower, offices for operations and the wide site potable supply.

18.4.4 Area 340 Sewage Water

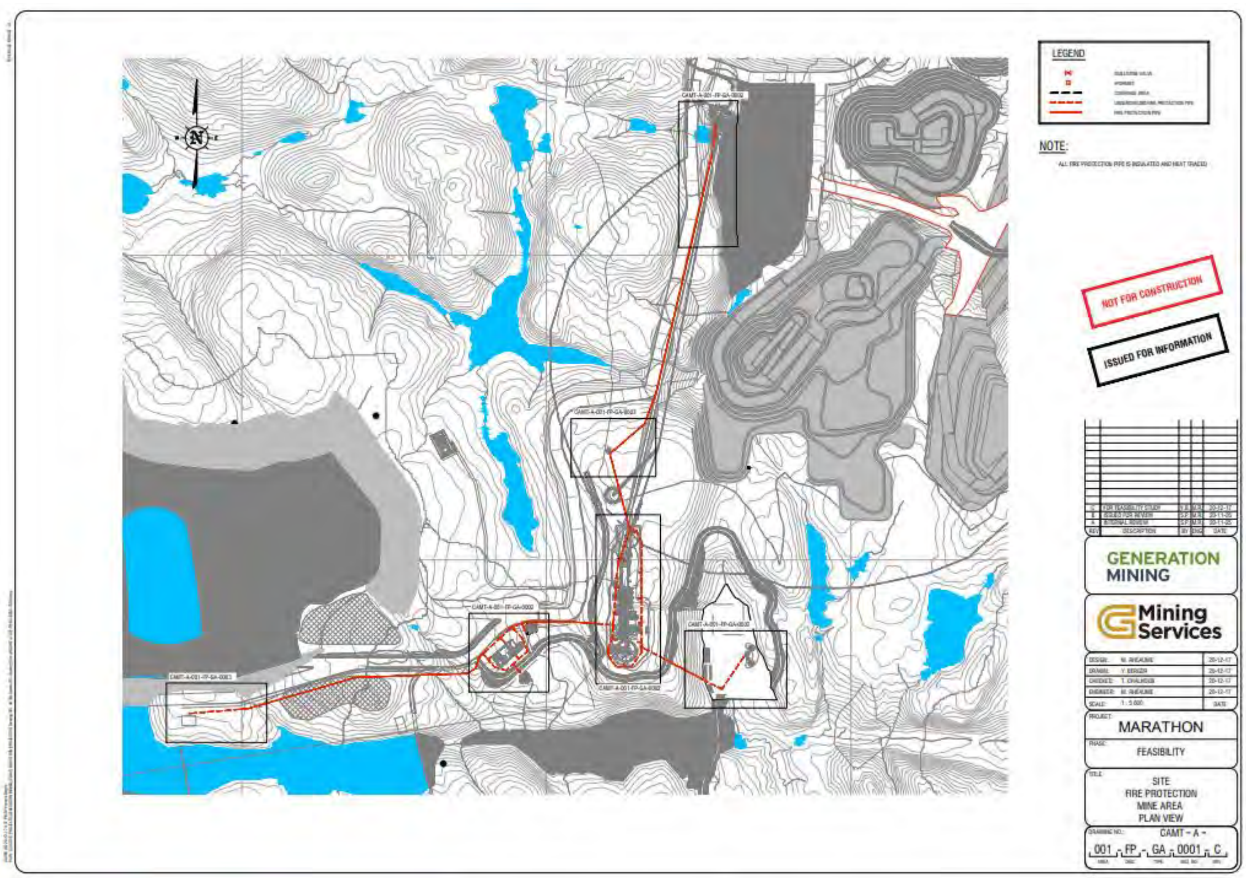
Sewage water is treated through the pre-containerized sewage treatment plant. The treatment unit is designed to remove solids, coliforms and other contaminants in order to meet Ontario's final sewage discharge requirements.

The treated sewage water is then pumped to the WMP.

18.4.5 Area 350 Fire Water

Figure 18.23 shows the fire protection network.

Figure 18.23: Fire Protection Piping Network



It consists of a 2,500 m^3 and 312 m^3/hr flow capacity pumps. Part of the tankage is for fresh water supply at the process plant. The pumping system requires redundancy and jockey pump.

The piping is spread across the site to hydrant, fire cabinet and /or sprinklers. The site infrastructure, crushing area, process plant building and equipment, maintenance shop/warehouse, water treatment plant and gate building are protected by the fire protection piping network.

18.4.6 Area 360 Water Treatment Plant

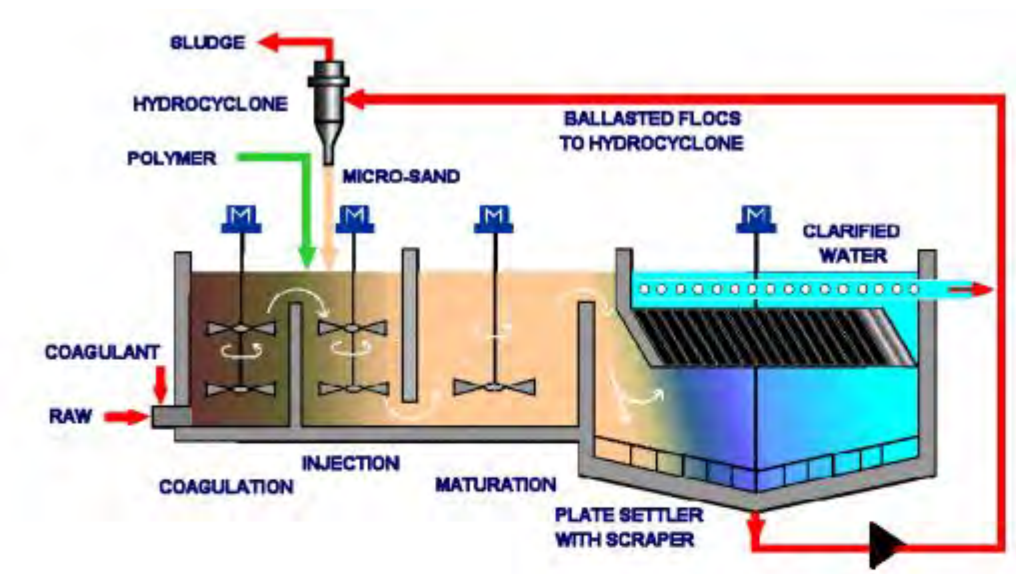
The site will not require to discharge water from site to Hare Lake and as such will not require treatment until the beginning of Year 2. The initial construction plan does not include the construction of a water effluent treatment plant.

The WTP will be built as required in two phases. The first phase will occur in Year 1 after commercial production with an initial capacity of 350 m^3/hr. A second phase, with equal capacity, will be constructed during Year 3 with completion in Year 4.

The design parameters and criteria currently assumed are as outlined and validated in prior studies.

Figure 18.24 presents the flowsheet used for this study.

Figure 18.24: Water Treatment Plant General Arrangement

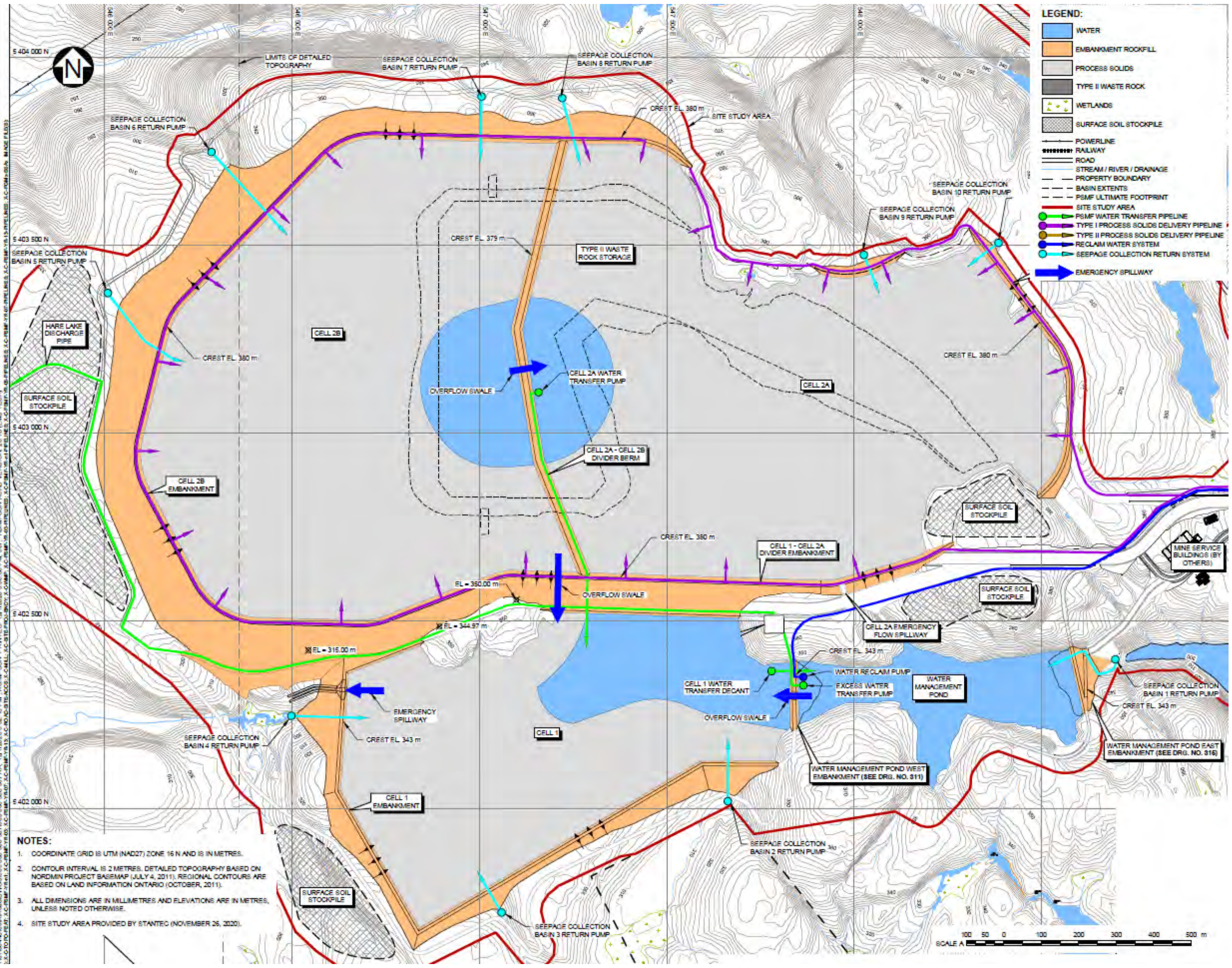


18.4.7 Area 370 TSF

The process plant produces two tailings stream including PGM Scavenger tailings and 1st Cleaner tailings. The PGM Scavenger tailings are NPAG and are referred to as Type 1 material. The 1st Cleaner tailings are PAG and are referred to as Type 2 material. It is anticipated that approximately 85% of tailings will be Type 1 and approximately 15% of the tailings will be Type 2. The Type 1 tailings slurry is thickened to about 55% solids by weight. The Type 2 tailings slurry will be about 22% solids by weight. The Type 1 and Type 2 tailings slurries are conveyed from the process plant to the TSF via separate high-density polyethylene (HDPE) tailings delivery pipelines.

The TSF is located approximately 3 km west of the process plant as shown on Figure 18.25. The TSF will consist of a paddock style impoundment with three storage cells (Cell 1, Cell 2A and Cell 2B). A separate WMP will be constructed at the east side of Cell 1. The TSF perimeter embankments are constructed using the downstream construction method with Type 1 (NPAG) mine rock sourced from the open pit. The TSF has been sized to store approximately 117 Mt of tailings and 31 Mt of Type 2 mine rock. During the last three years of operations, approximately 4 M m^3 of Type 2 tailings is stored in the Central Pit.

Figure 18.25: Process Solids Management Facility



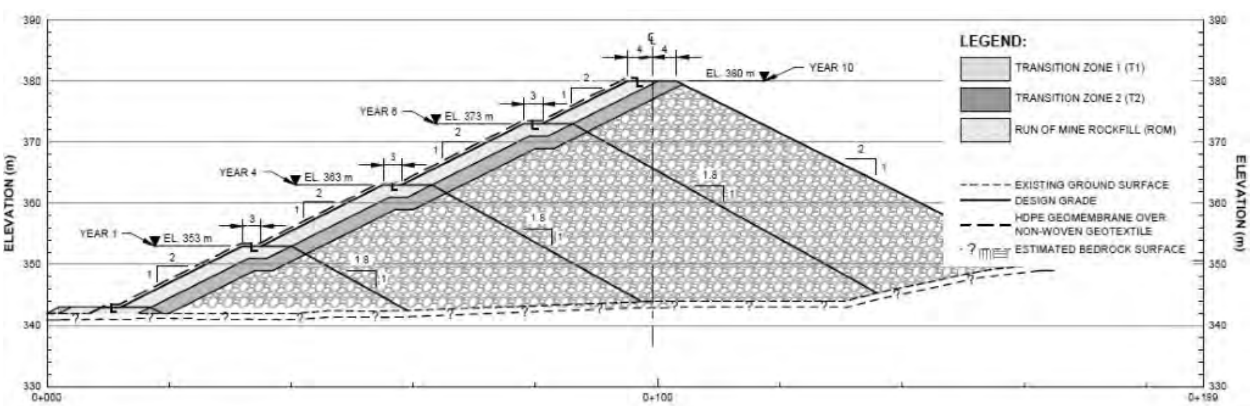
During the first three years of operations, Type 1 tailings are deposited into Cell 1 and Type 2 tailings are deposited towards the center of Cell 2A. Starting in Year 4, Type 1 tailings will be deposited into Cell 2A and Cell 2B, with Type 2 tailings continuing to be deposited towards the center of Cell 2A. After Year 10, Type 2 tailings will be stored in the Central Pit. Type 2 tailings in Cell 2A will be covered with Type 1 tailings during the last 3 years to maintain Type 2 material in a saturated state to prevent the onset of acid generation. Type 2 material be deposited in Cell 2A.

The TSF embankments will be raised in stages to provide sufficient storage capacity for tailings and temporary water management. The final elevation of the dams ranges from 343 masl (Cell 1) to 380 masl (Cell 2A and 2 B). The TSF embankments are constructed with upstream and downstream slopes of approximately 2H:1V and a minimum crest width of 8 m. The TSF arrangement utilizes site topography to reduce the size of the starter embankments. The final embankment heights vary between 52 m and 80 m above the existing ground surface and foundation widths range from approximately 140 m to 330 m. The embankments will include specific rock fill zones with finer material towards the upstream portion of the embankment and coarser material towards the downstream portion of embankment. The embankment zones are filter-graded such that the embankments will not be susceptible to internal erosion or piping. The downstream rockfill zone consists of ROM rockfill and are resistant to downstream erosion.

The dams HDPE liner is keyed into bedrock via a concrete plinth to minimize seepage from the TSF. Foundation preparation includes removal of overburden and unsuitable materials. Along the upstream toe of the embankments, below the concrete plinth, foundation preparation includes the removal of fractured bedrock, placement of slush grout on the prepared bedrock surface and / or injection grouting of deeper permeable bedrock zones to further reduce the potential for seepage from the TSF. Ten Seepage Collection Basins ("SCBs") are constructed at select locations along the downstream toe of the embankments to intercept seepage. Collected seepage will be pumped back to the TSF. Monitoring locations downstream of the TSF will be established to confirm the effectiveness of the SCBs.

A typical cross section for the TSF perimeter embankments is shown in Figure 18.26.

Figure 18.26: Typical Cross Section for TSF Perimeter Embankments

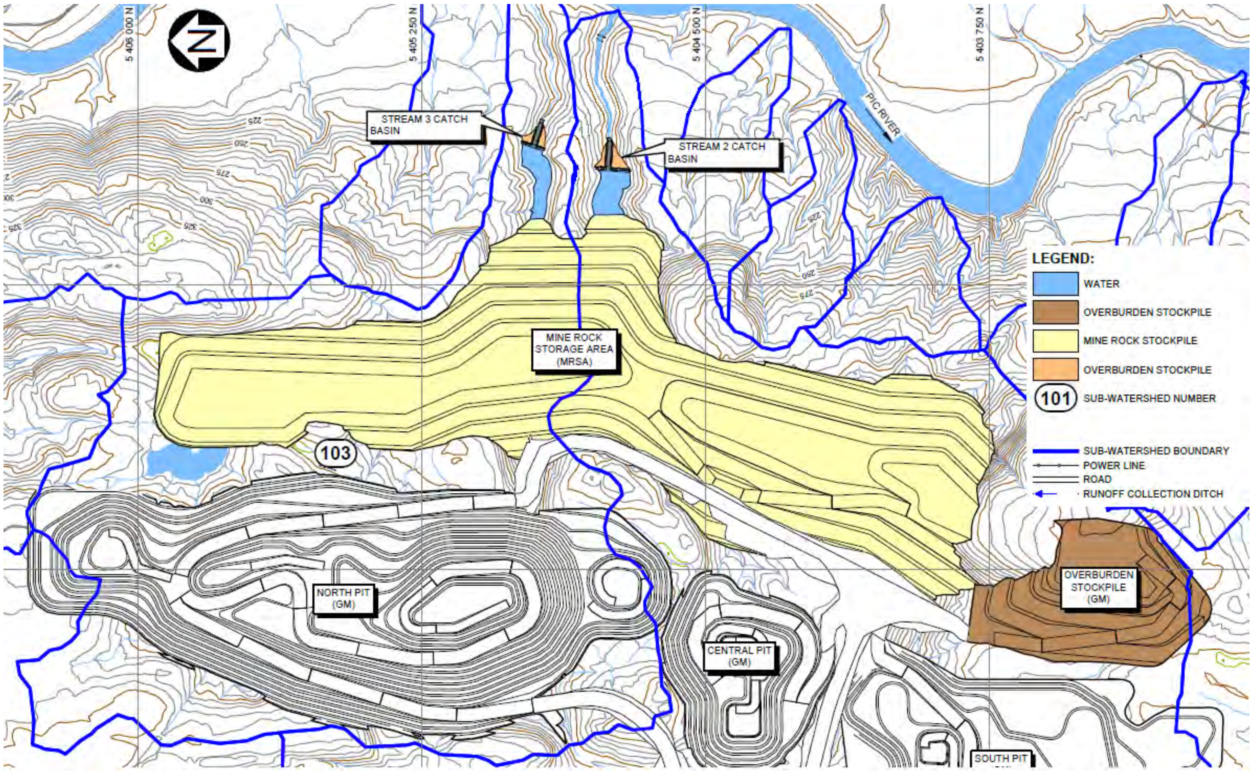


Supernatant water in the TSF will be transferred to the WMP for reclaim to the process plant for reuse in the process. Excess water in the WMP will be treated, as required, and then discharged to Hare Lake.

18.4.8 Area 360 Mine Waste Rock Collection Pond

Runoff water and drainage from the Mine Rock Storage Area (MRSA) are reporting to Sub-watersheds 102 and 103 (Stream 2 and Stream 3) which outlet to the Pic River. Two basins (Stream 2 Catch Basin and Stream 3 Catch Basin) are established to collect contact water from the MRSA as shown on Figure 18.27. The Catch Basin embankments are constructed as clay core rockfill dams that are designed to overtop during extreme rainfall and spring freshet events.

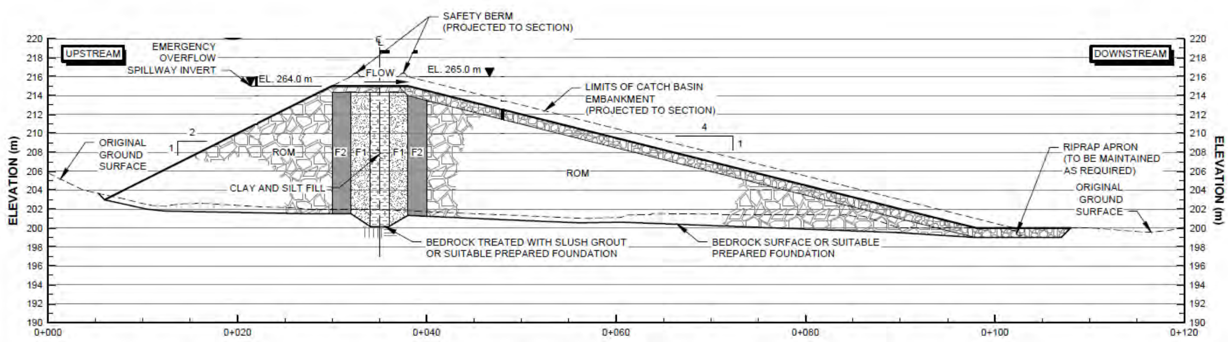
Figure 18.27: MRSA Catch Basin Locations



The Catch Basin embankments are constructed using Type 1 mine rock from the open pits with a low permeability clay core and internal filter zones. The embankment materials will be sourced from the mine development, locally available borrow materials, and select processing were required. Material required for the filter zones, drain and riprap will be produced on site by crushing and screening Type 1 mine rock. Silt and Clay for the low permeability core will be excavated from local borrow areas within the MRSA and Open Pit footprint. The embankment core and shell will be founded on prepared subgrade. Foundation preparation will include the removal of organics and unsuitable materials. The embankment core will be keyed into the foundation to minimize seepage. Foundation preparation below the embankment core may include the removal of fractured bedrock and grouting to minimize seepage. Shear keys may be installed within the foundations to maintain embankment stability.

The embankment consists of a 2H:1V upstream slope and 4H:1V downstream slope with a 6 m wide crest. The maximum embankment height is about 21 m. An overflow spillway will be installed on the crest and downstream slope of the embankments. The spillway is lined with riprap and will outlet to a riprap / boulder apron to dissipate energy. A typical cross section for the MRSA dams is shown in Figure 18.28.

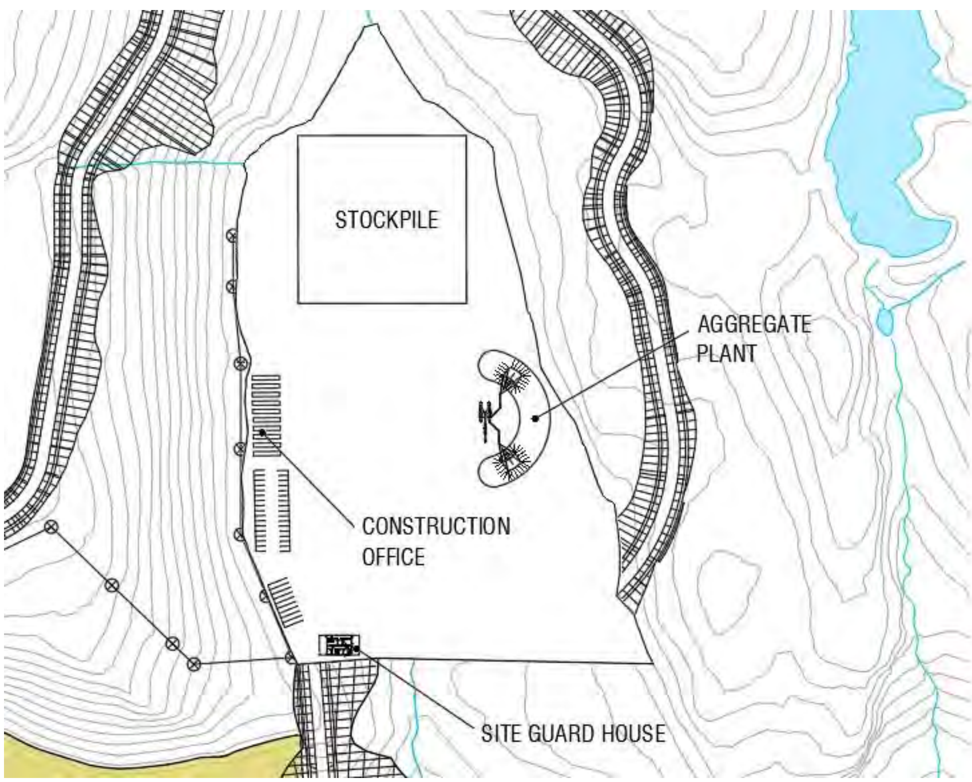
Figure 18.28: Typical Cross Section for MRSA Catch Basin Dams



18.5 Construction Temporary Infrastructure

A platform is built to provide an area for the construction period. Figure 18.29 shows a plan view of the platform. On the platform, there is the gate building, construction offices, the aggregate plant and stockpile and potentially extra rooms for construction laydown and warehouse.

Figure 18.29: Construction Platform and Laydown



18.5.1 Construction Offices

The offices for the Owner and technical teams are located close to the gate building. Ten temporary offices trailers are rented, with portable toilets and water supply and conference rooms. The project team plan for the potable water is to haul water from the Town of Marathon to potable water tanks. Used water is collected in a temporary tank that will be pumped as required for disposal in collaboration with the Town of Marathon.

Diesel generation power unit provides the power. At the end of the construction the unit is relocated closer to the mill area and will be utilized for emergency / secondary power.

Extra spaces are reserved for contractors and external engineering firms.

18.5.2 Construction Camp

The Valard construction camp located in Marathon, shall be available at the beginning of the Marathon Project. Valard is actually used for the construction workers of the East-West Transmission Line Project. Its capacity is 600 persons with canteen, laundry and all the suitable accommodation.

19. MARKET STUDIES AND CONTRACTS

19.1 Metal Price

Metal prices used in the revenue projections considered the two-year and three-year trailing average metal prices along with future consensus pricing. The projected metal prices along with foreign exchange rate assumptions are provided in Table 19.1. There are few sources for long-term projections for PGM metal pricing; however, the estimation based on fundamental supply and demand for the PGM elements is presented in Subsection 19.1.1 The Canadian to U.S. dollar exchange rate assumes consensus estimates.

There are no metals streaming or hedging agreements in place. Spot Price on February 22, 2021: Pd = US$2,395/oz; Cu = US$3.99/lb; Pt = US$1,268/oz; Au = US$1,807/oz; Ag = US$27.45/oz; Pd, Pt, Au and Ag prices sourced LBMA and Cu price sourced on LME Copper.

Table 19.1: Metal Price and Exchange Rate

Element	Unit	3-Year Trailing Average [1]	2-Year Trailing Average[1]	Spot Price[2]	Long-Term Consensus Pricing[3, 4]
Palladium	US$/oz	1,582	1,860	2,395	1,726[3]
Copper	US$/lb	2.82	2.76	3.99	3.20[4]
Gold	US$/oz	1,478	1,582	1,807	1,672[4]
Platinum	US$/oz	874	872	1,268	1,023[4]
Silver	US$/oz	17	18	27.45	21.81[4]
Exchange Rate	US$/C$	n/a	n/a	0.7897	0.75

[1] ***Source**: Comex as of Dec. 31, 2020.*

[2] *Feb 22, 2021 spot prices. Pd, Pt, Au and Ag prices sourced LBMA and Cu price sourced on LME Copper; F/X rate interbank rate as of Feb. 22, 2021.*

[3] *Refer to Table 19.2: Consensus Price for Palladium – Forecasts1 (average of data set).*

[4] ***Source**: Maxit Capital and Haywood Securities dataset from various contributors; Refer to* Table 19.2 *to* Table 19.6 *(average of data set collected in December 2020).*

The Mineral Reserve Estimate (Section 15) uses the following long-term metal prices: Pd = US$1,500/oz, Pt = US$900/oz, Cu = US$2.75/lb, Au = US$1,300/oz and Ag = US$16/oz and an exchange rate of C$1.00 equals US$0.75. The metal price estimates for the Mineral Reserve Estimate are more conservative than the metal price assumptions used in the Economic Analysis. These metal prices in the Mineral Reserve Estimate were applied to limit the pit size and property footprint, and mitigate mineral reserve write-downs due to extreme swings in metal prices.

19.1.1 Consensus Metal Price

Consideration of supply and demand (Refer to Subsection 19.3) for Cu and PGMs and how these elements are required for the 'electrification of the auto industry' is fundamental to the long-term value of the PGMs. The consensus metal prices used for the Project Economic Analysis are generally based at the consensus pricing as outlined in Table 19.2 to Table 19.6.

Table 19.2: Consensus Price for Palladium – Forecasts[1]

Broker Name	2021 (US$/oz)	2022 (US$/oz)	2023 (US$/oz)	Long-Term (US$/oz)
Barclays	1,800	1,800	1,550	1,550
BMO	2,275	1,675	1,325	1,000
Canaccord	2,196	2,196	2,196	2,196
Capital Economics	2,150	1,900	1,900	1,900
Cantor Fitzgerald Canada	1,524	1,500	1,500	1,500
CIBC	2,100	1,760	1,620	1,500
Citigroup	2,800	2,700	n/a	n/a
Commerzbank	2,475	2,575	2,575	2,575
Emirates NBD	2,200	2,100	n/a	n/a
Haywood	n/a	n/a	n/a	1,500
Insesa Sanpaolo	2,225	2,125	2,100	2,075
Investec Bank plc (UK)	2,314	2,314	2,314	2,314
Market Risk Advisory	2,300	2,100	2,250	2,200
National Bank Financial	2,295	1,983	2,025	2,025
Prestige Economics	2,238	2,400	n/a	n/a
Renaissance Capital	2,200	1,879	1,366	1,183
RBC	2,000	1,500	1,400	1,400
SBG Securities (Proprietary) Limited	2,475	2,452	2,057	1,429
Scotiabank	2,320	1,900	1,900	1,800
Societe Generale Cross Asset Research	2,150	1,900	1,600	1,200
High	2,800	2,700	2,575	2,575
Median	**2,225**	**1,983**	**1,900**	**1,550**
Average	**2,212**	**2,040**	**1,855**	**1,726**
Low	1,800	1,500	1,325	1,000

[1] ***Source**: FactSet, Bloomberg and available analyst estimates as provided by Maxit Capital and Haywood Securities (dataset collected in December 2020).*

Table 19.3: Consensus Price for Copper – Forecasts[1]

Ranges	2021 (US$/lb)	2022 (US$/lb)	2023 (US$/lb)	Long-Term (US$/lb)
High	3.45	3.50	3.50	3.50
Median	**3.11**	**3.10**	**3.15**	**3.25**
Average	**3.09**	**3.09**	**3.08**	**3.20**
Low	2.75	2.50	2.50	3.00

*[1] **Source**: FactSet and available analyst estimates as provided by Maxit Capital (dataset collected in December 2020).*

Table 19.4: Consensus Price for Platinum – Forecasts[1]

Range	2021 (US$/oz)	2022 (US$/oz)	2023 (US$/oz)	Long-Term (US$/oz)
High	1,125	1,325	1,250	1,261
Median	**968**	**940**	**1,000**	**1,000**
Average	**979**	**1,007**	**1,018**	**1,023**
Low	872	872	872	872

*[1] **Source**: FactSet, and available analyst estimates as provided by Maxit Capital (dataset collected in December 2020).*

Table 19.5: Consensus Price for Gold – Forecasts[1]

Ranges	2021 (US$/oz)	2022 (US$/oz)	2023 (US$/oz)	Long-Term (US$/oz)
High	2,500	2,300	2,100	2,000
Median	**2,000**	**1,900**	**1,800**	**1,600**
Average	**1,978**	**1,926**	**1,855**	**1,672**
Low	1,600	1,500	1,500	1,400

*[1] **Source**: FactSet, and available analyst estimates as provided by Maxit Capital (dataset collected in December 2020).*

Table 19.6: Consensus Price for Silver – Forecasts[1]

Range	2021 (US$/oz)	2022 (US$/oz)	2023 (US$/oz)	Long-Term (US$/oz)
High	33.30	35.00	30.00	25.43
Median	**26.50**	**24.96**	**24.00**	**22.50**
Average	**26.55**	**25.50**	**24.22**	**21.81**
Low	18.00	16.00	16.00	16.00

*[1] **Source**: FactSet, and available analyst estimates as provided by Maxit Capital (dataset collected in December 2020).*

19.2 Concentrate Quality

Cu-PGM concentrate production is estimated at 92,000 dmt per year over the projected mine-life assuming a nominal 1% mass pull to final concentrate. The concentrate produced will be low in deleterious elements commonly found in copper concentrates (i.e., lead, zinc, arsenic, antimony, mercury, bismuth) and is not expected to draw significant penalties. Fluorine and MgO penalties may occur in some conditions; however, is not expected to be persistent and ore feed-blending is expected to be viable to suit smelter requirements. Cu-PGM concentrate analysis that was generated by the SGS-Lakefield pilot plant and the three-bulk samples during 2020 is detailed in Table 19.7.

Table 19.7: Concentration Grades and Analysis as Produced in 2020 Metallurgical Test Program

Element	Unit	South Pit (W-Horizon)	North Pit (Main Zone)	Blended Historical Composite (Composite 3)
Pd	g/t	171	39	19
Cu	%	18.7	19.7	18.7
Pt	g/t	43.5	7.6	4.0
Au	g/t	17.6	3.3	2.7
Ag	g/t	50	68	42
Rh	g/t	2.4	0.58	0.22
Ni	%	0.31	0.49	0.36
Zn	%	0.10	0.17	0.10
Fe	%	20.3	24.7	28.4
As	%	0.01	0.01	0.00
Sb	%	< 0.002	< 0.002	<0.002
S	%	17	24	26
F	%	0.07	0.07	0.04
Hg	g/t	<0.3	< 0.3	< 0.3
Si	%	11.3	7.0	6.2
Mg	%	6.2	2.2	1.9
V	g/t	80	88	1000
Pb	%	0.02	0.02	0.01
Mo	%	< 0.01	< 0.01	0.01
Co	%	0.04	0.08	0.06
Sn	%	< 0.002	< 0.002	<0.002
Cl*	g/t	18	67	58
Bi	%	< 0.002	< 0.002	< 0.002
Cd	%	< 0.002	< 0.002	< 0.002
Al_2O_3	%	1.1	3.7	2.9
CaO	%	0.9	3.2	2.8
Mn	g/t	0.039	355	370
Cr	g/t	40	40	142
Ba	g/t	27	85	75
Se	g/t	174	87	70
Te	g/t	51	13	9
Specific Gravity		3.57	3.71	3.85

*as HNO_3 soluble.

Table 19.8: Feed Grade for Concentrate produced in Table 19.7

Element	Unit	South Pit (W-Horz.)	North Pit (Main Zone)	Blended Historical Composite (Composite 3)
Pd	g/t	0.90	0.63	0.50
Cu	%	0.09	0.23	0.36
Au	g/t	0.58	0.07	0.26
Ag	g/t	1.1	1.0	1.5
Pt	g/t	0.42	0.15	0.11

The projected levels of PGMs in final concentrates are considerably higher than those found in most copper concentrates, which are typically at trace levels. Copper smelters recover PGMs to copper anodes with subsequent electrorefining yielding bi-product gold, silver, rhodium, platinum, palladium and other metals from refining anode slimes.

Although not all copper smelters will necessarily pay for PGM contained in copper concentrates, the smelters that have been considered in association with this FS have proposed indicative terms for PGMs and an interest in the concentrates.

19.3 Payables Metals in Concentrate

Gen Mining have received indicative terms from selective smelters and refiners. As smelting terms are confidential in nature, the source of smelting terms is specifically excluded. The net payable for a specific metal is calculated as the lesser of (i) the payable rate of the contained metal content in the concentrate and (ii) the contained metal content less a minimum deduction (in g/t for palladium, gold, platinum and silver and a % for copper). Table 19.9 presents the net payable rates.

Table 19.9: Payable Metals in Concentrates

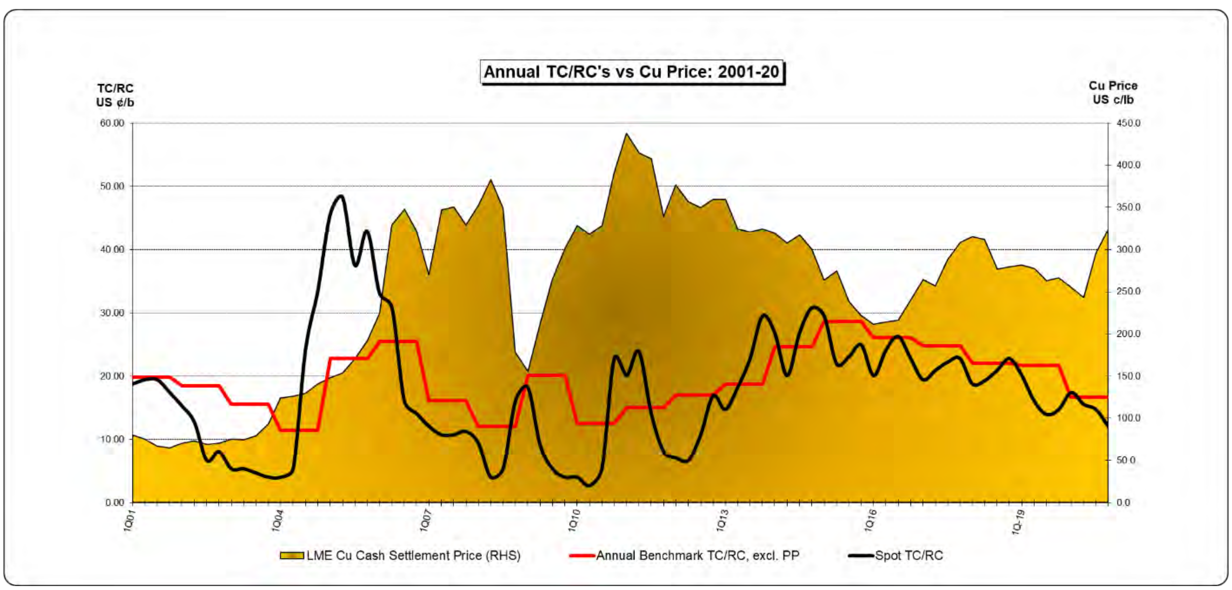
Payable Element	Net Payable Rates (%)
Palladium	94%
Copper	94%
Gold	75%
Platinum	77%
Silver	75%
Rhodium	TBD

19.4 Treatment / Refining Charge Outlook

The treatment charge ("TC") and refining charge ("RC") (referred to as "TC/RCs") are the charges deducted from the payable value of the concentrate to cover the costs for smelting and electro-refining of the concentrate. TC/RCs are typically responsive to supply-demand fundamentals with *floors* and *ceilings* to these charges being governed by mine and smelter economics based on copper metal and by-product prices for the former, and operating costs for the latter. TC/RCs applicable to the concentrates can be based on i) annual negotiations, ii) market benchmarks with caps and floors, or iii) fixed (included with Project financing terms).

Over the past 20 years, "benchmark" TC/RCs[7] have averaged (in dollars of the day) the equivalent of US$73/dmt smelting and US7.3¢/lb Cu refining, with a peak in 2015 of US$107/dmt and US10.7¢/lb and a low in 2004 of US$44/dmt and US4.0¢/lb (Figure 19.1 - combined TC/RC shown in equivalent US¢/lb Cu, basis 28% Cu grade in concentrates). Price participation, representing the amount the smelters share in copper price changes above and/or below specified thresholds was eliminated in annual mine-smelter benchmark contracts in 2007.

Figure 19.1: Treatment and Copper Refining Charges, 2001 to Present



***Source:** Exen Consulting Services (2020).*

[7] TC consider units of $/dry metric tonne of concentrate; RC consider the units of ¢/lb of metal; the remaining of the section may exclude reference to the units in the denominator.

Spot treatment and refining charges ("TC/RCs") on mine to merchant business have ranged from a high in 2006 above US$160/16¢, to lows witnessed in 2004 and 2007-2008 below US$0/0¢ associated with a shortage of concentrate on the market.

Freeport-McMoRan Inc. has agreed to copper TC/RCs for 2021 with four Chinese smelters at US$59.50/t and US5.95¢/lb, thereby setting the 2021 benchmark terms. Although the rates are deemed reflective of a projected concentrate shortage in the metals market, such terms are generally viewed as being at or close to the bottom-end of cyclical ranges. Industry experts are forecasting the early 2020s to continue with below average TC/RCs with an upwards trend in the medium-term as the copper concentrate market rebalances. Forecast treatment and refining charges used for the purposes of the study are as noted in Table 19.10.

Table 19.10: Treatment and Refining Charges

Element	Treatment Charge	Refining Charge
Palladium	-	US$20.00/oz
Copper	US$62/dmt	US$0.062/lb
Gold	-	US$5.00/oz
Platinum	-	US$20.00/oz
Silver	-	US$0.50/oz

***Note**: No penalties expected with the concentrate analysis as defined in the 2020 Metallurgical testing programs; Refer to Section 13 and Table 19.7.*

19.5 Concentrate Transportation and Logistics

Concentrate produced at the Marathon Project will be transported to an off-site smelting facility for further processing. Off-site movement of concentrate will be by truck with subsequent transload at a rail load-out facility along the CP or CN rail line. This transload facility would be located either within the Town of Marathon or at an alternate location. The infrastructure necessary to develop a facility at any location is similar and is described in Section 18. Final agreements with smelters/refiners have not been established; however, transport and logistics costs have been estimated for alternative destinations in Canada and Europe.

The Marathon Project is located approximately 750 km west by road from Glencore's copper smelter in Rouyn-Noranda, Quebec (the Horne Smelter). Deliveries to the Horne Smelter can be made by either truck or rail. For offshore sales to European destinations, Quebec City and Trois Rivieres are approximately 1,550 km by rail from the Project with both ports offering *year-round* service. Also available for year-round shipments from the west coast is Pembina Canada Terminals' (formerly Kinder-Morgan's) Vancouver Wharves facility in North Vancouver, B.C. for any placement with Asian markets. As an alternative to the above, Thunder Bay and the port at Marathon could be used during non-winter months when the St. Lawrence seaway is open. Potential cost savings may be realized if either of these Great Lakes ports can be utilized. The port of Marathon alternative is a deep-water port which was formerly used by Marathon Pulp Inc. Title to this facility will be transitioned to the Town of Marathon. There is presently limited infrastructure in this location so for the purposes of the FS a nearby seasonal port is being considered as a future potential alternative.

19.5.1 Logistics Cost Summary

For the purposes of this Technical Report, transportation and other costs (insurance, representation, losses, freight credits where applicable), are estimated at $137 / wet metric tonne of concentrate (or $149 / dry tonne at the assumed moisture content of 8% for shipment).

19.6 Electrical Power Supply Contract

The Project does not have any agreements in place for electrical power supply. These contracts will be negotiated prior to start of construction. Based on other large consumer industrial (mining) projects in Ontario, an estimated power cost of $80/MWhr has been assumed for the Project economics.

Table 19.11: Power Costs for Northwestern Ontario Mining Projects

Site	Operating Status	Power Cost ($/kWhr)	Additional Comments
Open Pit Site #1	Operating	0.067	Operationally realizing NIER-program benefits $0.056 to $0.053 /kWhr
Open Pit and Underground Operation Site #2	OP - Post Operation UG - Operating	0.08	Including general NEIR benefits
Underground Operation Site #3	Operating	0.12	Based on the Class A consumer, no program benefits included
Open Pit Project Site #4	Pre-Production	0.08	Estimate, Project not in operation
Underground Project Site #5	Operating	0.084	As publicly communicated
Open Pit and current Underground Site #6	OP - Closed UG - Operating	0.07	Operationally was reduced to 0.03-0.05 $/kWh with success of achieving peak reductions
Underground Project Site #7	Operating	0.10	As publicly communicated
Marathon Project Assumption		**0.08**	

19.7 Long-term Metal Supply / Demand Impacting the Project

PGM (including palladium, platinum, and rhodium) are essential metals in the manufacture of automotive catalytic convertors (autocatalysts) to mitigate and decrease air pollution. Up to 87% of palladium, 30% of platinum and most of rhodium demand are autocatalysts, according to Johnson Matthey. In recent years, governments in China and Europe have introduced more stringent vehicle exhaust emission regulations, bringing them in line with those in Canada, United States and Japan. This has resulted in supply shortages for palladium and rhodium. Some analysts expect supply shortages to continue as other countries introduce more stringent controls.

Further into the future, demand for palladium could be reduced if battery-electric cars, which don't use any PGMs, gain a significant market share. Hybrid automobiles, on the other hand, use slightly more palladium than cars powered strictly by gasoline. Fuel cell electric cars use large amounts of platinum.

In automobiles with gasoline-powered internal combustion engines ("ICE"), palladium-rich auto-catalysts convert up to 98% of the noxious gases into harmless by-products as follows:

- Carbon monoxide, which can be fatal to breathe, is converted to carbon dioxide.
- Nitrous oxide, which is 300 times more potent than carbon dioxide as a greenhouse gas, is converted to the benign nitrogen gas.
- Unburned fuel gases, which contain a number of toxic substances, are converted to carbon dioxide and water.

Diesel-powered cars, trucks and generators use a platinum-rich catalytic converter to scrub emissions; however, sales of these vehicles have been declining and platinum supplies remain abundant. Some manufacturers of auto-catalysts have been experimenting with substituting platinum for palladium with some moderate success.

Copper is a key element in the production profile of the Project and is a key element necessary for the expansion of electric and fuel-cell vehicles. The current design of battery-electric automobiles does not require significant amounts of PGM but does require up to four times more copper than ICE or diesel automobiles.

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Regulatory Approvals

20.1.1 Regulatory Framework

The development of a mining project in Ontario requires various approvals from both the Federal and Provincial governments. Project permitting is generally split into two phases, the Environmental Assessment (EA) phase followed by the permitting phase.

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 (JRP) pursuant to the Canada-Ontario Agreement on Environmental Assessment Cooperation (2004).

Following approval of the Federal and Provincial Environmental assessments, various permits, approvals and licenses will be required to construct and operate the Project.

20.1.2 Environmental Assessment

20.1.2.1 Federal

The Project EA was initiated by Stillwater Canada, the original Proponent of the Project, in 2010 under the CEAA and was referred to a JRP on October 7, 2010. On July 6, 2012, the Canadian Environmental Assessment Act was repealed by CEAA, 2012. In accordance with subsection 126 (1) of the new Act, existing projects were to proceed under the process established by CEAA, 2012. This was formalized for the Project through an amended agreement to establish a JRP.

In July 2012, Stillwater Canada prepared and submitted an Environmental Impact Statement (EIS) Report and supporting documents which assessed the potential effects of the Project. Following a review of this information and subsequent responses to information requests, the JRP determined (in 2013) that sufficient information was available to proceed to a public hearing. However, prior to the hearing, the process was put on hold by Stillwater Canda and ultimately postponed in 2014.

In 2019, operatorship of the Project was assumed by Gen Mining via a joint venture agreement with Stillwater Canada. On August 28, 2019, the Impact Assessment Act ("IAA") came into force, replacing CEAA, 2012. The IAA contains transition provisions that apply to projects undergoing an environmental assessment under CEAA, 2012. Specifically, subsection 183 (1) of the IAA allows projects that have already been referred to a review panel to continue under the CEAA,2012 process. The transition policies also contain provisions that give proponents the opportunity to transition to the IAA process (subsection 183 (2)). On September 27, 2019, Gen Mining confirmed with the Impact Assessment Agency of Canada ("IAAC") that the Project would remain under the CEAA, 2012 process.

During 2020, the Project initiated development of an addendum to the 2012 EIS Report previously submitted by Stillwater Canada. The purpose of the addendum is to verify and/or update the assessment of environmental effects provided in the 2012 EIS report as input to the JRP process. The EIS Report Addendum relies on and updates the effects assessment from the 2012 EIS Report and responses to the information requests, additional information requests, and supplemental information requests submitted to the JRP. The addendum is provided in response to relevant 'changes' that have occurred since the 2012 EIS Report was completed where such changes may alter previous conclusions, including:

- Changes to the characterization of existing baseline conditions since the completion of previous baseline studies.
- Changes to applicable criteria, standards, and/or thresholds for determining the significance of potential residual environmental effects.
- Changes to the Project, including refinements to project components and activities implemented by Gen Mining.

It is anticipated that the EIS addendum will be submitted to the JRP in the first quarter of 2021. The submission of the addendum, along with this FS for the Project, is expected to address the information request issued by the JRP on January 21, 2014, thus re-starting the JRP process for the Project.

20.1.2.2 Provincial

As stated in the 2012 EIS Report submitted by Stillwater Canada, an Individual EA is not typically carried out for mining projects in Ontario. The Ontario EA Act provides for the various components of the Project to be assessed by separate EA processes as follows:

- The 115 kV transmission line – Environmental Screening Process under the Electricity Projects Regulation (O. Reg. 116/01).
- Modifications to the existing Trans-Canada Highway (Highway 17) and Camp 19 Road / Peninsula Road intersection – MTO Class EA.

- Disposition of Crown rights of resources for mining activities - MNRF Class EA for Resource Stewardship and Facility Development.

However, the EA Act also includes provisions that allow for a proponent to voluntarily agree to undertake an Individual EA. On March 24, 2011, Stillwater Canada entered into a Voluntary Agreement ("VA") for the assessment of the entire Project under the EA Act via Individual EA. This agreement continues to be valid as it is applied to any successor of Stillwater Canada (i.e., Gen Mining). The VA allows for the entirety of the Project to be subject to the EA Act, which allows for the federal and provincial EAs to be coordinated, thus ensuring no duplication of process.

20.1.2.3 Coordination of Federal and Provincial Environmental Assessment Process

An agreement to establish a JRP was released on August 9, 2011 and amended August 3, 2012. A Draft JRP Terms of Reference ("ToR") for the Project was issued on October 9, 2020, for public comment, as part of the draft amended agreement to re-establish a JRP for the Project. The final ToR were released on January 28, 2021 and outlined the responsibilities of the JR and the JRP Process, replacing the previous ToR issued on August 9, 2011 and amended 2012. At present, the ToR is comprised of the following revisions:

- Establishes a modified process and associated timelines that recognizes that an EIS Addendum will be provided by Gen Mining (including the approval of a 90-day timeline extension by the Minister of Environment and Climate Change ("MENDN").
- Incorporates current practices as it relates to Indigenous consultation and engagement.
- Acknowledges the uncertainty associated with the current COVID-19 pandemic and the potential need for alternative means of consultation and hearing procedures.
- Incorporates legislative changes.
- Includes updated information regarding the Proponent.

The agreement between the MENDM, Canada and the Minister of the Environment, Conservation and Parks, Ontario sets the framework to ensure that the JRP Process satisfies the requirements of CEAA, 2012 and the Ontario EA Act. It directs the JRP to review the EIS and the updated studies and reports and to engage federal and provincial departments and ministries to obtain specialist information and knowledge as it relates to the Project. The agreement further outlines the decision-making process for the federal and provincial Ministers. This agreement harmonizes the federal and provincial EA requirements.

20.1.2.4 Public Registry

The provincial and federal governments maintain an online registry to find information and records related to EAs. The Canadian Impact Assessment Registry file number for the Project is 54755 and the current internet address for related information is:

https://iaac-aeic.gc.ca/050/evaluations/proj/54755

The provincial EA reference number is 11010 and the internet address for related information is:

https://www.ontario.ca/page/marathon-platinum-group-metals-and-copper-mine-project

20.1.3 Permits

A list of potential federal, provincial, and municipal approvals, permits, and/or authorizations required for the Project to move forward beyond the EA phase is provided in Table 20.1, Table 20.2, Table 20.2 and Table 20.3, respectively.

Table 20.1: Potential Federal Approvals, Permits and/or Authorizations for the Project

Approval/ Permit/ Authorization	Rationale
Authorization for Works Affecting Fish Habitat Legislation: *Fisheries Act* Responsible Agency: Department of Fisheries and Oceans	Project development may result in harm to fish and fish habitat for which offsetting measures are required.
Metal and Diamond Mining Effluent Regulations Legislation: *Fisheries Act* – Metal and Diamond Mining Effluent Regulations Responsible Agency: Environment Canada	Watercourses (or portions thereof) that are frequented by fish will be used for long-term storage of process solids and/or mine rock and or discharge from such facilities.
Navigation Protection Program (“NPP”) Approval Legislation: *Canadian Navigable Waters Protection Act* Responsible Agency: Transport Canada	The development of mine-related infrastructure including the open pits, mine rock storage area, process solids management facility and site road network may require approval under the NPP.
Licence for a Factory and Magazine for Explosives Legislation: *The Explosives Act* Responsible Agency: Natural Resources Canada	The proposed development includes facilities to store and supply nitrogen-based explosives that will be used for the purpose of excavating the ore body.

Table 20.2: Potential Provincial Approvals, Permits and/or Authorizations for the Project

Approval/ Permit/ Authorization	Rationale
Closure Plan approval in accordance with Schedule 2 of O. Reg. 240/00 Legislation: *Mining Act* Responsible Agency: Ministry of Energy, Northern Development and Mines	An approved Schedule 2 Closure Plan is required for the project prior to starting construction.
Domestic Processing Exemption Legislation: *Mining Act* Responsible Agency: Ministry of Energy, Northern Development and Mines	An exemption under Section 91 of the Mining Act would be required in the event that ore was processed outside of Canada.
Environmental Compliance Approval ("ECA") Legislation: *Environmental Protection Act* Responsible Agency: Ministry of the Environment, Conservation and Parks	An ECA is required for stationary source emissions, discharges and waste related to the Project, including air emissions, noise emissions, effluent discharges to water, stormwater management and waste disposal/transportation.
Permit to Take Water ("PTTW") Legislation: *Ontario Water Resources Act* Responsible Agency: Ministry of the Environment, Conservation and Parks	A PTTW is required for instances where groundwater or surface water is taken at a rate of 50,000 L/d, or more. As it pertains to the Project a permit to take water will be needed for dewatering of the open pits and possibly for the development of groundwater well(s) for the supply of potable water.
Crown Land Work Permit Legislation: *Public Lands Act* Responsible Agency: Ministry of Natural Resources and Forestry	A work permit is required for Project related construction on Crown Land, including dams, drainage channels, roads, culverts and bridges.
***Lakes and Rivers Improvement Act* Permit** Legislation: *Lakes and Rivers Improvement Act* Responsible Agency: Ministry of Natural Resources and Forestry	A permit will be required for the construction of dams, water crossings, and diversion channels or enclosures.
***Endangered Species Act* Permit** Legislation: *Endangered Species Act* Responsible Agency: Ministry of Environment, Conservation and Parks	A permit may be required if species at risk or its protected habitat may be affected by the development of the Project. The potential effect of the Project on Woodland Caribou habitat has been assessed in this regard.
Aggregate Licence or Permit Legislation: *Aggregate Resources Act* Responsible Agency: Ministry of Natural Resources and Forestry	A licence may be required for the purposes of obtaining aggregate that is needed to develop Project infrastructure from borrow areas around the site study area (SSA) (Project footprint). Gen Mining has a licensed aggregate quarry adjacent to the SSA.
Encroachment Permit Legislation: *Public Transportation and Highway Improvement Act* Responsible Agency: Ministry of Transportation	An encroachment permit would be required for construction of a transmission line over or under a Provincial Highway or within the highway right-of-way. A permit would also be required for any work within the highway right-of-way, including

Approval/ Permit/ Authorization	Rationale
	improvements to the highway itself required for the Project, specifically at the Highway 17 – site access road intersection.
Building and Land Use Permits Legislation: *Public Transportation and Highway Improvement Act* Responsible Agency: Ministry of Transportation	Permits will be required for any development or construction within 45 m of the right-of-way limit of the highway and 395 m of the centre point of the intersection of a side road (such as the site access road) with Highway 17.
Sign Permit Legislation: *Public Transportation and Highway Improvement Act* Responsible Agency: Ministry of Transportation	A permit will be required for any sign erected within 400 m of the limit of the highway.
Licence to Operate a Bulk Storage Plant Legislation: *Technical Standards and Safety Act* Responsible Agency: Technical Standards and Safety Authority	A licence will be required for the purpose of operating a private bulk fuel storage and distribution system in the SSA.
Pre-development review and approval Legislation: *Occupational Health and Safety Act* Responsible Agency: Ontario Ministry of Labour	The Ministry of Labour will subject the proponent to a safety and procedures review prior to the installation of portable crushing, screening or associated washing equipment.

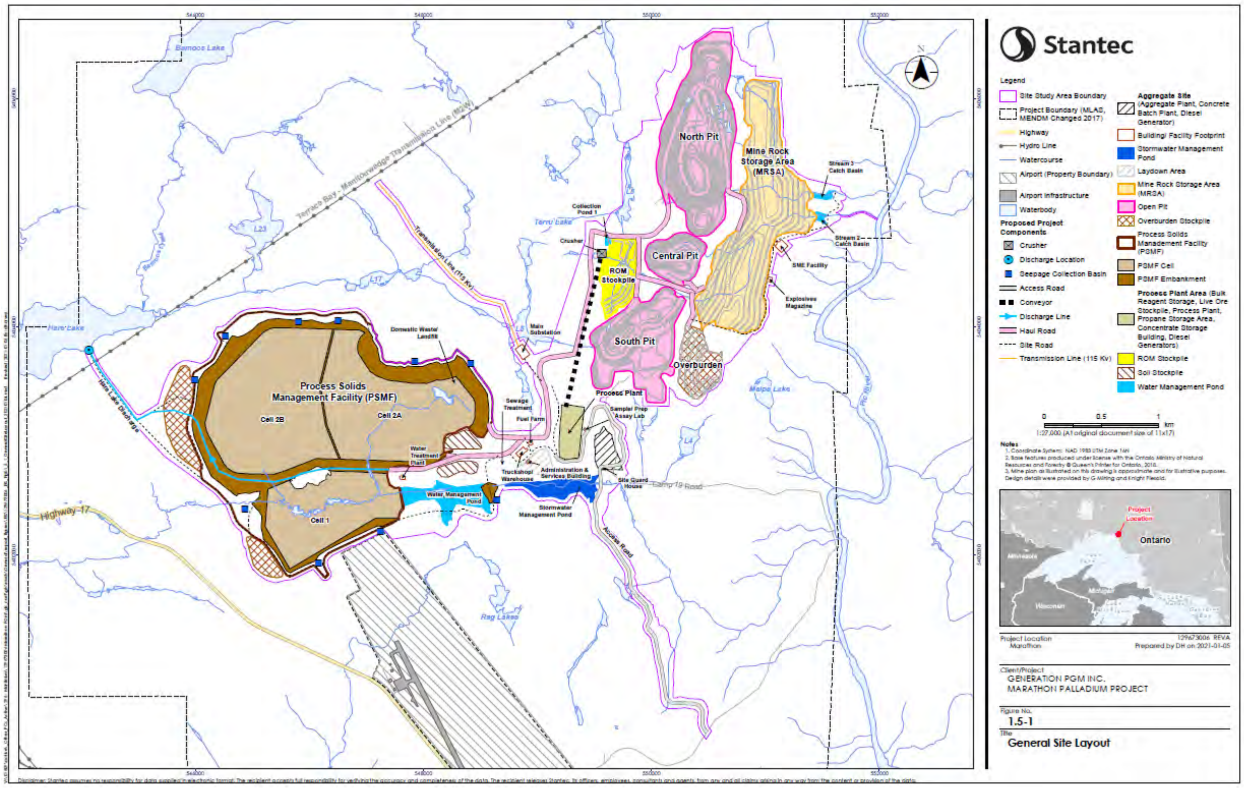
Table 20.3: Potential Municipal Approvals, Permits and/or Authorizations for the Project

Approval/ Permit/ Authorization	Rationale
Zoning By-law Amendment and Site Plan Agreement Legislation: *Planning Act* Responsible Agency: Town of Marathon	The Zoning By-law will need to be amended and a Site Plan agreement will need to be executed to permit mining operations.
Sewage Treatment System Permit Legislation: *Ontario Building Code* Responsible Agency: Thunder Bay District Health Unit/ Town of Marathon	A permit to construct an on-site private septic sewage system <10,000 L/day will be required.
Building Permit Legislation: *Ontario Building Code* Responsible Agency: Town of Marathon	A permit will be required for the construction of any Project buildings.

20.2 Environmental Studies

As part of the development of the 2012 EIS Report extensive environmental studies were conducted to characterize the Project area. The following sections from that report describe the environmental impacts that the Project is expected to have on the area and the mitigation measures proposed to control those impacts. The Project site is shown in Figure 20.1.

Figure 20.1: Project Site



As discussed in Subsection 20.1.2.1, Gen Mining is in the process of completing a EIS Report Addendum intended to verify and/or update the assessment of environmental effects presented in the 2012 EIS Report. As such the Project impacts and mitigation measures discussed in the following sections may change.

20.2.1 Effects Assessment Approach

The effects of the Project described in the 2012 EIS Report were assessed using valued ecosystem components ("VECs"). As identified in the report, a VEC can be defined as:

> *"an environmental element of an ecosystem that is identified as having scientific, ecological, social, cultural, economic, historical, archaeological or aesthetic importance. The value of an ecosystem component may be determined on the basis of cultural ideals or scientific concern."*

VECs are tools that are used to measure the potential effects of a project on the environment. Given the large number of species, habitats and other elements that could potentially occur within the EA study boundaries, it is neither possible, nor particularly useful, to attempt to measure effects on all possible receptors. Rather, the impact assessment focuses on those elements that have been deemed to be of some importance (i.e., the VECs).

VECs defined for the purpose of assessing the potential effects of the Project on the environment were representative of a wide measure of the environmental factors including:

- Atmospheric environment
- Acoustic environment
- Water quality and quantity
- Fish and fish habitat
- Terrain and soils
- Vegetation
- Wildlife
- Species at risk
- Socio-economic
- Indigenous considerations

20.2.2 Potential Effects of the Project

Predicted environmental effects are those effects which would occur in the absence of mitigation. Mitigation is employed to eliminate, or otherwise reduce, predicted environmental effects to acceptable levels. The following sections summarize predicted, or potential, environmental effects and proposed mitigating measures that will be employed to protect VECs.

20.2.2.1 Atmospheric Environment

Project activities may result in occasional short-term exceedances of some air quality guidelines and limits at the Property boundary though air quality meets all criteria at the nearest sensitive receptor locations. Proposed mitigation includes source controls to reduce Project related fugitive emissions. Fugitive dust will be generated mainly from overburden and mine rock stockpiles, open pit mining activities and from operation of heavy and light vehicles on site roads. Fugitive dust emissions will primarily be mitigated by applying water to active mining areas and roads.

Increased light levels from the site could potentially be visible to offset receptors. Proposed mitigation measures include using directional lighting and mounting lights as low as possible.

Greenhouse gas ("GHG") emissions from site activities are predicated to have a negligible contribution to provincial and national CO_2 emissions and the associated phenomenon of climate change. The Project will be designed and operated to minimize GHG emissions to the extent possible. Trolley assist is being considered as a way to reduce the diesel fuel consumption of the haul trucks in the future.

20.2.2.2 Acoustic Environment

Measurable increases to existing noise levels (>5 dB) are predicted at one receptor location along the transportation route to a potential concentrate rail load-out facility near the Town of Marathon; however, noise levels remain below noise limits. Proposed mitigation measures include the use of mufflers on concentrate transport trucks and restricting the transport of concentrate to specific times.

20.2.2.3 Water Quality and Quantity

The mean, peak, and low flows in Stream 6 will decrease substantially during operations as runoff from part of the watershed will be collected in the TSF as it is referred to in the EIS documents. Flows will be restored following closure as runoff from the TSF area is re-established to Stream 6. There will also be a decrease in the mean monthly, peak, and low flows in Streams 2 and 3 due to the management of runoff from the Mine Rock Storage Area (MRSA). Due to the size and assimilative capacity of the Pic River, no effect is expected and thus no mitigation during operation is planned. The Stream 2 and Stream 3 drainages will be restored following closure.

Groundwater is not used as a resource on or immediately near the mine site. Over the long-term, deep bedrock seepage from the TSF and MRSA will report to surface water features, but no effect on surface water is predicted. Groundwater monitoring will assess the accuracy of water quality predictions and identify if any mitigation measures are required.

20.2.2.4 Fish and Fish Habitat

The development of the Project will have an effect on fish habitat. Approximately 10 ha of fish habitat compensation has been proposed for the Project.

The limited recreational Steelhead fishery and Indigenous fishery in Stream 6 may be lost during the construction and operations phase. The effect will be mitigated as part of the Project fish habitat compensation program, which includes potential habitat enhancements in Stream 6 following closure.

Access options to the recreational fishery in Bamoos Lake will be reduced during the Project Life, but public access will still be possible via routes not effected by the Project. In the case of the Indigenous fishery in Bamoos Lake, guided access through the Project site will be provided for Indigenous fishers.

20.2.2.5 Terrain and Soil

There is the potential for surface erosion and slope failure on the overburden and MRSA stockpiles. Proposed mitigation measures include constructing the stockpiles according to appropriate geotechnical criteria, the use of silt fencing to control sediment contained in surface runoff, and stabilizing reclaimed areas with vegetation. The stockpiles will be monitored to confirm they are performing as designed.

20.2.2.6 Vegetation

Approximately 600 ha of forest cover (predominantly white birch and some black spruce) and about 18 ha of non-forest cover (including thicket swamp, shore fen and meadow marsh, and rock barrens) will be removed for site development. Some regionally rare (Algal Pondweed) and provincially rare (Broad-lipped Twayblade, Common Ragweed, Oake's Pondweed, Northern St. Johnswort and Marsh Speedwall) species will be removed during site development. The Project footprint has been optimized to limit the amount of disturbance associated with the development of the site. In addition, selective re-vegetation will be undertaken during operations (progressive reclamation) and at closure to achieve the end land-use plan for the site. To the extent possible, native species will be used for site reclamation and a program will be implemented to control the introduction of non-native plant species.

Water will be applied to active mining areas and roads to limit the effect of dust emissions from the site on the surrounding forest cover.

20.2.2.7 Wildlife

Removal of the forest cover will alter/remove some wildlife habitat for furbearers (marten and fisher). It may also change moose movement behaviour, particularly in the short-term. Grey wolf will follow major prey species such as moose and deer, so if moose leave the Project site in the short-term then grey wolf will likely follow. Grey wolf numbers may increase at closure due to increasing populations of deer and moose related to re-vegetation of the site. Black bear will likely out-migrate from the site during the start of the construction phase but will likely return after a period of human and noise habituation. The Project footprint has been optimized to limit the amount of disturbance associated with the development of the site, and therefore the effect on wildlife. In addition, selective re-vegetation will be undertaken during operations (progressive reclamation) and at closure to achieve the end land-use plan for the site. In the case of black bear, a procedure will be established to minimize human interaction with bears and decrease the potential for habituation at the site during construction and operations.

Removal of forest cover, wetlands, and lake habitat for construction of Project infrastructure, roads and transmission lines will contribute to forest fragmentation and may have negative effects on forest interior bird species (temporary habitat loss for songbirds). Also, there could be a loss of nests and young associated with clearing activities. Planned mitigation measures include re-vegetation of the site and avoiding clearing activities during the nesting season where practical. If clearing during nesting season is required, pre-clearing surveys will be completed and a buffer zone will be established to protect identified nest sites.

Noise and dust emissions may have an effect wildlife. Water will be applied to active mining areas and site roads to limit the effect of dust emissions on wildlife. The Project will be designed to limit noise emissions during operations.

The potential for wildlife interaction will be managed by enforcing speed limits on Project site roads, identifying areas where wildlife frequency cross roads and by monitoring wildlife activity at the site.

20.2.2.8 Species at Risk

There are no recent records of woodland caribou use at the Project site. However, clearing of forest cover and site development will result in the loss of potential connectivity between declining populations of woodland caribou in the Neys and Pukaskwa protected areas. Also, small lichen rich areas on bedrock that could potentially serve as caribou winter/refuge habitat will also be lost. To limit effects on woodland caribou, the Project footprint has been optimized to limit the amount of disturbance at the site. Additionally, as much existing forest as possible has been keep intact along the southern portion of the property to maintain potential linkages between landscapes to the east and west of the property. An overall benefit plan will be developed in conjunction with the Province of Ontario to offset the effects of the Project on woodland caribou.

Nesting habitat for Canada warbler will be lost due to tree clearing. Also, development of the Project will result in the loss of the only known nesting habitat of Rusty Blackbird within the Project footprint. No olive-sided flycatcher or common nighthawk have been observed at the site, but some potential nesting habitat will be lost as part of the development. The Project footprint has been optimized to limit the amount of disturbance associated with the development of the site, and therefore the effect on habitat for bird species at risk.

20.2.2.9 Socio-Economics

It is expected that there will be a population influx into the Town of Marathon and possibly some of the surrounding communities during the construction and operation phases of the Project. An increase in population can generally be viewed as a positive effect given the recent trend of decreasing population and economic activity in the area. To the extent possible, the Project will hire workers from the local area. Workers not currently living in the area will be encouraged to relocate to local communities. Workers not residing in the local area (drive-in / drive-out) will be provided with accommodations (Accommodation Complex). Gen Mining will work closely with the Town of Marathon and surrounding communities to address issues such as increased demands for housing, community services and healthcare services related to workers moving to the area. It is anticipated that funding will be provided to support key community and healthcare services as part of the Project. Prior to closure, local communities will be consulted to determine the best way to address the socio-economic effect of mine closure on the area.

20.3 Tailings Management

The TSF is located approximately 3 km west of the Process Plant as shown on Figure 20.1. An estimated 117 Mt (approx. 78 M m^3) of tailings will be generated over the life of the mine. The TSF is a paddock style impoundment with three storage cells (Cell 1, Cell 2A and Cell 2B). The TSF perimeter embankment will consist of lined rockfill embankments. Cell 2A and 2B are divided by an internal rockfill dyke to optimize tailings management and storage. Cell 1 and Cell 2 have been designed to store approximately 14 M m^3 and 64 M m^3 of tailings, respectively. Approximately 4 Mm^3 of Type 2 tailings will be stored in the Central Pit during the last three years of operation.

The Process Plant will produce two types of tailings, referred to as Type 1 or NPAG (non-potentially acid generating material) and Type 2 (PAG, potentially acid generating material). Type 1 tailings are anticipated to account for approximately 85% of the tailings from the Process Plant and have been determined to be NPAG. Type 2 tailings are estimated to account for up to 15% of the tailings from the Process Plant and have been determined to be PAG. The Type 1 tailings slurry will be thickened to about 55% solids by weight. The Type 2 tailings slurry will be about 22% solids by weight. The Type 1 and Type 2 tailings slurries will be conveyed from the Process Plant to the TSF via separate high density polyethene (HDPE) tailings delivery pipelines.

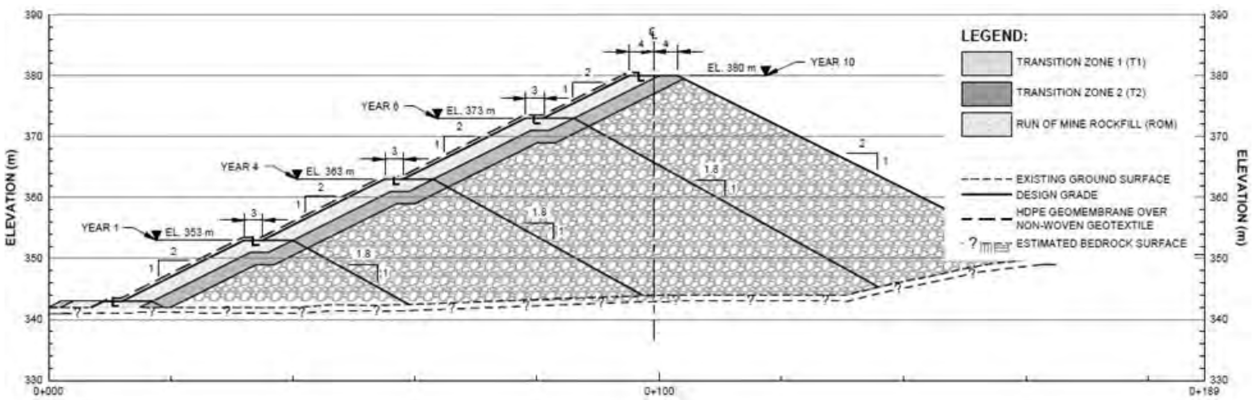
During the first three years of operation, NPAG tailings will be deposited into Cell 1 and PAG tailings will be deposited into the centre of Cell 2A. Starting in year four, NPAG tailings will be deposited into Cell 2A and Cell 2B, with PAG tailings continuing to be deposited into the centre of Cell 2A. After year ten, PAG tailings will be stored in the Central Pit as the tailings management strategy envisages NPAG tailings being used as cover material for PAG tailings and mine rock to prevent the onset of acid generation during both operations and following closure. PAG material will not be included in Cell 1 or Cell 2B.

The TSF rockfill embankments will be developed via the downstream construction method using NPAG mine rock. The dams will be raised in stages to provide sufficient storage capacity for tailings and temporary water management. The final elevation of the dams will range from 343 masl (Cell 1) to 380 masl (Cell 2A and 2B). The TSF embankments will be constructed with upstream and downstream slopes of approximately 2H:1V and a minimum crest width of 8 m. The design utilizes site topography to minimize the size of the starter embankments. The final embankment heights will vary between 52 and 80 m above grade and foundation widths will be between approximately 140 and 330 m. The embankments will include specific rock fill zones with finer material towards the upstream portion of the embankment and coarser material towards the downstream portion of embankment. The embankment zones will be filter graded such that the embankment will not be susceptible to internal erosion or piping. The downstream rockfill zone will consist of Run of Mine (ROM) rockfill and will be resistant to downstream erosion.

The dams will include a HDPE liner keyed into bedrock via a concrete plinth to minimize seepage from the facility. Removal of overburden and higher permeability bedrock, placement of slush grout on the prepared bedrock surface and/or injection grouting of deeper permeable bedrock zones will be completed as required by site conditions to further reduce the potential for seepage from the facility. Seepage collection basins will be constructed along the toe of the dams to intercept seepage and pump it back to the facility. Monitoring stations located downstream of the TSF will be used to verify the effectiveness of the collection basins.

A typical cross section for the TSF dams is shown in Figure 20.2.

Figure 20.2: Typical Cross Section for TSF Dams – Cell 2 Ultimate



The TSF design will include requirements for instrumentation, monitoring, inspection and routine maintenance to ensure the performs as designed. These requirements will be documented in the Operation Maintenance and Surveillance Manual for the facility. A dam breach assessment and analysis of mitigating controls and design parameters will be completed prior to the construction of TSF to evaluate the magnitude of impacts of a hypothetical breach of the facility. The analyses will include an assessment of the dam breach characteristics, including breach outflow volumes and the downstream hydrology during sunny day and flood induced conditions.

The TSF will include capacity to manage storm water runoff inflows under normal operating conditions. The Environmental Design Storm ("EDS") consisting of the 1 in 100 year 24-hour precipitation event and 30-day spring snowmelt (408 mm) will be contained within the TSF without uncontrolled discharge to the environment. Emergency overflow spillways have been included in the TSF arrangement to manage storm events greater than the EDS. The TSF spillways will be sized to route the peak flow resulting from a 24-hour Probable Maximum Precipitation ("PMP") event (328 mm), which has been selected as the Inflow Design Flood "(IDF") for the TSF.

Ten seepage collection basins (SCBs) will be located around the perimeter of the TSF. Near surface seepage and runoff collected in the SCBs will be pumped back to the TSF storage cells. Monitoring wells will be installed to monitor groundwater quality downgradient of the TSF.

Supernatant water in the TSF will be transferred to the Mine Water Pond (WMP) to avoid accumulation of water in the storage cells. The WMP will provide water to the Process Plant. Excess water in the WMP will be treated, as required, and then discharged to Hare Lake.

20.4 Mine Rock Management

An estimated 326 Mt of mine rock will be generated over the LOM. Mining operations will produce two types of mine rock, referred to as Type 1 (NPAG) and Type 2 (PAG). Type 1 mine rock is anticipated to account for approximately 85-90% of the mine rock from the open pits and has been determined to be NPAG. Type 2 mine rock is anticipated to account for approximately 10-15% of the mine rock and has been determined to be PAG.

NPAG mine rock will primarily be stored in the MRSA, but also in the South Pit. The MRSA is located to the east of the open pits. The MRSA will be constructed with an overall slope of approximately 2.2H:1V, with 30 m tall benches with mid slopes at 2H:1V and 10 m wide mid-slope benches. The stockpile slopes will provide long-term stability and allow for concurrent reclamation. Preliminary design criteria incorporated into the MRSA included the codes and standards of *Ontario Mining Act, Regulation 240/00*. Type 1 mine rock will also be used for construction of the TSF, WMP, and SWMP embankments as well as a source of aggregate to build site infrastructure and roads.

During operations, PAG mine rock will either be placed in the TSF during the first 6 years of operations and progressively covered by Type 1 (NPAG) tailings or stored in the South Pit or the Central Pit. Following mine closure, all of the PAG mine rock stored in the TSF will remain below the groundwater table. The PAG mine rock stored in the pits will become submerged as the pits fill with water. In both cases, the storage of PAG mine rock under saturated conditions will effectively prevent the development of acid drainage in the long-term.

Grade control will be undertaken to identify the ore from the mine rock in the open pits. Samples will be taken from blast holes and analyzed at the Assay Lab to determine ore and mine rock boundaries within blasted material prior to mining. Samples of mine rock will also be analyzed for total sulphur content to determine if the rock is NPAG or PAG. Geochemical testwork completed on drill core samples representative of mine rock suggests that rock with less than 0.18% sulphur (by weight) will be NPAG. Conversely, the testwork suggests that mine rock with greater than 0.18% sulphur (by weight) will be PAG. Based on a total sulphur cut-off of 0.18%, it has been estimated that about 37 Mt of PAG mine rock will be produced during the LOM.

An estimated 4 Mt of overburden will be generated over the LOM. The overburden will be stored in the overburden stockpile located to the east of the South Pit. The overburden will be used for the progressive reclamation and final closure of the site.

20.5 Water Management

A detailed site water balance was developed for the Project using the GoldSim software package. The water balance considers all major components of the site, including the TSF, WMP, SWMP, Open Pits and the MRSA, as well as seasonal discharge requirements to Hare Lake.

The TSF will consist of three storage cells (Cell 1, Cell 2A and Cell 2B) and a separate WMP. The storage cells will provide permanent and secure storage for tailings from the Process Plant. Supernatant water (i.e., process water and precipitation) that accumulates in TSF storage cells will be routed to the WMP. The WMP will be established to the east of Cell 1 and will serve as the primary contact water pond for the site as well as the water source for the Process Plant. The pond will be constructed during the site preparation and construction phase and will initially be utilized as a storage pond for construction dewatering.

Runoff from the Process Plant area, Truckshop / Warehouse area, Laydown area and the Aggregate Plant area will be collected in the SWMP. Water collected in the SWMP will be routed to the WMP or directly to the WTP via the water transfer pipelines. The SMWP will also provide tertiary containment for the Process Plant area and associated pipelines (i.e., process solids and reclaim water pipelines) and Fuel Farm, ensuring that Sub-watershed 101 and the Pic River will be protected in the case of an unplanned event.

Surface water runoff and groundwater inflow reporting to the Open Pits will be transferred to Collection Pond 1 ("CP1") located adjacent to the ROM stockpile. Water collected in CP1 will be routed to the WMP via the water transfer pipelines. Water levels in waterbody L-8 located to the northeast of the open pits will also be managed by pumping to CP1. Contact water from CP1 may be used for dust control on the mine haul roads.

Contact water from the MRSA located along the east side of the open pits will be collected in catch basins established in Sub-watershed 102 (Stream 2 Catch Basin) and Sub-watershed 103 (Stream 3 Catch Basin). The catch basins will be constructed prior to initial development of the open pits and the MRSA. Water collected in the catch basins will be collected and pumped to the WMP via the MRSA Catch Basin pipelines. The collection system will be sized to manage the EDS, which is based on a 1 in 25 year rainfall event. In the event that the EDS is exceeded, water will be routed from the MRSA catch basins via the catch basin overflow spillways to the Pic River. The overflow spillways have been sized to convey the 1 in 100-year rainfall event.

Under routine operating conditions contact water from the Project site will be transferred to the WMP. Water from the WMP will be reclaimed to the Process Plant on a continuous basis. The recycling of water from the WMP to the Process Plant has been maximized to limit the potential requirement for fresh water from other sources. Overflow from the WMP can be managed within Cell 1 of the TSF to provide additional operational flexibility, as required. Excess water will be transferred from the WMP to the WTP, treated as required, and discharged to Hare Lake.

Water treatment will be undertaken to ensure applicable receiving water quality criteria are met in Hare Lake. Under average conditions, discharge rates to Hare Lake are anticipated to range between approximately 0.6 M m^3 to 1.9 M m^3 per year depending on the footprint of the site.

A network of surface and groundwater quality monitoring stations will be established prior to the start of construction to verify the effectiveness of the site water management system.

20.6 Reclamation and Mine Closure

The progressive reclamation and closure of the Project will be carried out in accordance with O. Reg. 240/00 and as described in a closure plan that will be approved by MENDM prior to the start of construction. A closure cost of $60 million has been assumed for the Project. This estimate is considered to be preliminary and is subject to change depending on the outcome of the JRP Process and future discussions with MENDM.

Gen Mining will be responsible for providing financial assurance to the Province of Ontario as specified in the approved closure plan. Financial assurance may be provided in phases consistent with the timing of the start of various Project activities if acceptable to MENDM.

Progressive reclamation will be undertaken during operations (as described in the closure plan) to achieve the end land use plan as soon as possible. Active closure is expected to be completed within 5 years following the completion of operations with monitoring of the site continuing for an estimated additional 40 years.

20.7 Community Relations

The Project has an expected production period of about 13 years. It is anticipated that the Project will employ between 450 to 550 workers (on average) during the construction period and 375 permanent workers during operations. It is the intention of Gen Mining to source the workforce, contractors and supplies necessary for the Project from the local area to the extent possible. The Project is expected to have a significant positive economic impact on the area. Gen Mining continues to undertake consultation with the public, government agencies and Indigenous communities regarding the Project with the intent of maximizing the benefit of the Project to the local area.

20.7.1 Indigenous Communities

As determined by the Federal government, the Project will have an effect on the rights of Indigenous communities in the area.

The Project is situated within the geographic territory of the Robinson Superior Treaty area. It is also within lands claimed by Biigtigong Nishnaabeg (BN) as its exclusive Aboriginal Title. In 2003, BN brought legal action (known as the Michano litigation) against Canada and Ontario seeking a declaration of unextinguished exclusive Aboriginal Title to an area north of Lake Superior, claiming they did not enter the Robinson Superior Treaty in 1850 and did not adhere to the Robinson Superior Treaty subsequent to 1850. In 2016, the three parties began exploratory discussions to try to find a resolution outside of the court process. As a result of these discussions, the parties entered into formal negotiations in May 2019 and the Michano litigation was put into abeyance (on hold) in December 2019. Negotiations between BN, Ontario and Canada are ongoing.

As part of the development of the 2012 EIS Report, fourteen Indigenous communities were identified by the CEAA as having a potential interest in the Project based on Treaty rights, asserted traditional territory and proximity to the Project. The 14 communities are summarized in Table 20.4

Table 20.4: Indigenous Communities Having Potential Interest in the Project

Indigenous Community	Proximity to Project Site [1]
Biigtigong Nishnaabeg (BN)	~20 km (south)
Pic Mobert First Nation	~50 km (east)
Pays Plat First Nation	~90 km (west)
Ginoogaming First Nation	~100 (south)
Long Lake No. 58 First Nation	~110 (south)
Michipicoten First Nation	~145 (southeast)
Animbiigoo Zaagi'igan Anishinaabek	~150 km (northwest)
Biinjitiwaabik Zaaging Anishinaabek	~150 km (northwest)
Red Rock Indian Band	~150 km (west)
Bingwi Neyaashi Anishinaabek	~150 km (west)
Fort William First Nation	~225 km (west)
Kiashke Zaaging Anishinaabek	~230 km (northwest)
Whitesand First Nation	~260 km (northwest)
Red Sky Independent Métis Nation	RSIMN has no land base

[1]Distances provided are "as-the-crow-flies".

Of the 14 identified communities, only four expressed an interest in participating in the Project based on traditional and/or current land uses: BN, Pic Mobert First Nation, Pays Plat First Nation and Red Sky Métis Independent Nation. Two additional Métis groups also expressed a direct interest in the Project: Jackfish Métis, known today as Ontario Coalition of Indigenous People ("OCIP") and Superior North Shore Métis Council ("SNSMC"), a charter community of Métis Nation of Ontario ("MNO"). Accordingly, consultation was undertaken regarding the Project with BN, Pic Mobert First Nation, Pays Plat First, Red Sky Métis Independent Nation, OCIP and MNO. A detailed summary of the consultation with the various Indigenous communities was provided in the 2012 EIS Report. The results of the consultation were incorporated into the Project description and mitigation measures were developed as required.

As part of the development of the EIS Report Addendum, Gen Mining has made additional consultation efforts with the six communities (Biigtigong Nishnaabeg, Pic Mobert First Nation, Pays Plat First Nation, RSMIN, OCIP and MNO) that participated in 2012 EA process undertaken by Stillwater. In addition, IAAC Table 20.4 to determine if they now have an interest to participate in the JRP process currently being undertaken by Gen Mining. Gen Mining will update the Project consultation plan as directed by IAAC and continue with consultation efforts throughout the JRP Process. The results of the consultation will be incorporated into the updated Project description and mitigation measures will be developed as required.

Agreements such as memorandums of understanding, consultation protocols and confidentiality agreements were developed by Stillwater Canada with some of the Indigenous groups to help formalize the working relationship between these communities and the Project. Gen Mining has assumed the commitments in these documents. To date, no agreements (Community Benefit Agreements) have been signed with Indigenous groups specific to the construction and operation of the Project. It is the intention of Gen Mining to establish mutually beneficial relationships with the Indigenous communities involved in the Project. It is anticipated that the Project will provide significant economic and development opportunities for Indigenous communities.

20.7.2 Town of Marathon

The Town of Marathon is centrally located on TransCanada Highway (Hwy 17) between Thunder Bay and Sault Ste. Marie on the North Shore of Lake Superior in Northwestern Ontario. The Town is the closest population centre to the Project site, located 10 km south of the site. The current population of Marathon is approximately 3,300. Marathon is surrounded by the Towns of Terrace Bay and Schreiber to the west, the Town of Manitouwadge to the north northwest, the Town of White River to the east, and the First Nations communities of Pic River, Pic Mobert, and Pays Plat.

Historically, the region was supported economically by the forestry and pulp and paper sectors, as well as the mining industry. The significant downturn in forestry and pulp and paper in the last number of years has negatively impacted local and regional communities, including the Town of Marathon, whose pulp mill closed in 2009. Barrick Gold’s Hemlo Gold Camp, which includes two active mines, is the primary natural resource-based employer in the area. The Project plans to continue to work in partnership with the Town of Marathon to develop the Project. It is anticipated that the Project will provide a significant positive economic influence on the Town.

The Project site lies partially within the municipal boundaries of the Town of Marathon, as well as partially within the unorganized townships of Pic, O’Neil and McCoy. The primary zoning designation within the Project site is “rural”. Changes to the Town of Marathon Official Plan and Zoning By-law as it pertains to land-use zoning will be required so as to permit the development of the mine.

It is the intention of Project to work closely with the Town of Marathon to ensure that the economic benefits from the Project are realized and to determine how best to address issues such as increased demand for housing and community and healthcare services.

21. CAPITAL AND OPERATING COSTS

21.1 Summary of Operating and Capital Costs

Table 21.1: High-Level Capital Costs

Capital Costs	Units	
Initial Capital[1]	$M	**665**
LOM Sustaining Capital	$M	**423**
LOM Total Capital	$M	**1,087**
Closure Costs	$M	**66**

***Note**:*

[1] Initial Capital shown after equipment financing. Contingency at approx. 11% of initial Capital.

Table 21.2: Project Area Capital Cost

Capital Costs	Initial ($ M)	Sustaining ($ M)	Total ($ M)
Mining	127.8	184.1	311.9
Process Plant	269.2	38.5	307.7
Infrastructure	107.7	29.3	136.9
Tailings Storage and Water Management	61.2	170.8	232.0
Construction Indirects	113.5		
General and Owner's Cost	14.9		
Preproduction, Startup, Commissioning	(52.9)		
Subtotal (before equipment financing)	**641.4**	**422.6**	**988.5**
Contingency[1]	74.8		
Subtotal (including contingency)	**716.1**		
Less: Equipment Financing Drawdowns	(72.4)		
Add: Equipment Lease Payment & Fees	21.0		
Total Initial Capital (after equipment financing)	**664.7**	**422.6**	**1,087.3**
Closure & Reclamation[2]		65.9	65.9
Total Capital Costs	**664.7**	**488.5**	**1,153.2**

***Note**:*

[1] Contingency included at project sub-category basis and totals approximately 10.4% or the equivalent of 11.7% on the initial capital after equipment financing adjustment.

[2] Closure cost estimate is $55.1M, additional cost included for carrying cost of closure bond.

Sums may not total due to rounding.

Table 21.3: Operating Costs

Operating Costs[1]	Units	
Mining[2]	$/t mined	**2.53**
Processing	$/t milled	**9.08**
General & Administration	$/t milled	**2.48**
Transport & Refining Charges	$/t milled	**2.80**
Royalties	$/t milled	**0.03**
Total Operating Costs	$/t milled	**23.63**
LOM Average Operating Cost	US$/oz Pd Eq	**687**
LOM Average AISC	US$/oz Pd Eq	**809**

***Note**:*

[1] Refer to Non-IFRS Financial Measures.
[2] Mining cost also noted as $9.23/tonne milled.

Table 21.4: Labour Numbers (Operations Phase) per Department

Labour per Department	Number
Mining	269
Processing	119
General & Administration	41
Total	**429**

21.2 Basis of Estimate

21.2.1 Project Execution Strategy

The Marathon Project is planned to be an owner managed project with engineering activities outsourced. The CAPEX estimate is aligned with an "Owner-managed" project delivery model. The Owners' Project team will purchase all equipment and most of the bulk materials directly, and free issue these to the construction contractors. Construction contracts will generally be on a unit rate or time and material basis, with the Owner performing the role of construction manager.

21.2.2 Responsibility Matrix

GMS is responsible for the overall coordination, compilation, documentation and quality control of the CAPEX / OPEX / sustaining estimate as well as the financial model. Estimating responsibilities were assigned at the Work Breakdown Structure ("WBS") level to various contributors. Responsibilities for providing input were as follows:

- GMS, in addition to the estimate task mentioned previously, is responsible for the Mine Design, Open Pit Design Optimization, Mineral Reserves Estimate, Production Sequencing, LOM and Equipment Selection and Haulage Studies. Furthermore, GMS will be responsible for the coordination of the various consultants for infrastructure, including the main powerline.
- Ausenco – Quantities for the process plant and supporting infrastructure (except as noted in the subsequent sections): budgetary quotations for major equipment, in-house historical data for minor equipment; contractor bids for installation contracts including concrete, Steel Mechanical and Piping ("SMP") and Electrical and Instrumentation ("E&I"); budgetary quotations for material supply and fabrication; in-house historical data and benchmark factors for process piping, electrical, instrumentation and controls; indirect costs including field indirect costs, spares, first fills, vendor reps, EPCM, growth and contingency.
- Knight Piésold Ltd. (KP) – Quantities and staging for the TSF (provide and support with GMS construction cost estimate). Water management requirements for the Project were developed by KP based on the site wide water balance which was developed in conjunction with the following consultants.

21.2.3 CAPEX Base Date

The estimate's base date is Q4 2020.

The Project's CAPEX estimate start date is January 1, 2020. Project completion is achieved at the commercial production milestone, which is defined at the end of plant commissioning and is expected nine calendar months after mechanical completion. At that time, revenue and operating costs will revert to operating costs. Any non-operating costs required to complete Project handover and close out will form part of the CAPEX.

21.3 Estimate Methodology

21.3.1 Overview

GMS followed a standard methodology to develop the estimate, as follows:

- Confirm the scope of work.

- Define the estimate base date.
- Define the estimate reporting currency.
- Define the estimate by WBS.
- Collect various data sets, including:
    - Discipline MTOs
    - Pricing from budgetary price bids, budgetary RFP, quotes, databases, and benchmarking
    - Direct labour wages
- Develop the labour rates.
- Determine the productivity factors.
- Determine the installed equipment and material costs.
- Determine the indirect costs.
- Determine foreign exchange content.
- Determine the estimate contingency value through a quantitative risk assessment.
- Complete internal reviews.

Source data that was used in the development of the estimate included:

- Scopes of work.
- Equipment lists.
- Material Take-Off (“MTOs”).
- Design criteria.
- Layouts and general arrangements.
- Process flow diagrams.
- Engineering calculations.
- Geotechnical investigation.
- Project execution plan.
- Equipment pricing and budget quotes.
- Material and labor rates, budgetary pricing.
- Construction installation rates.

- Mine plan.
- Plant ramp-up plan.
- Project schedule.

The direct cost portion of the CAPEX estimate was reviewed for completeness and consistency against the Project description, and indirect costs were added to the direct cost estimates to complete the estimate.

21.3.2 Work Breakdown Structure

The CAPEX estimate has been structured on the WBS and the cost coding structure defined for the Project. The WBS was developed during the FS and has been updated in the detailed engineering phase as required. The first two levels of the WBS are shown in Table 21.5.

Table 21.5: Work Breakdown Structure

WBS L1	WBS L2	WBS L3	Item
		001	All Site General
CAMT	**100**	**100**	**Infrastructure**
	110		General Site Preparation
		111	General Earthwork
		112	Site Roads
		113	Main Access Road
		116	Fencing
	120		Mine Infrastructure
		122	Mine Service Building
		124	Emulsion / Explosive Magazine
	130		Support Infrastructure
		131	Administrative Building
		132	Site Guard House
		135	Laydown
	150		Laboratory
	160		Process Plant Infrastructure
		161	Process Search House
		164	Reagents Storage Building

WBS L1	WBS L2	WBS L3	Item
		165	Mill Office
		168	Lunchroom
		169	Control Room
	170		Fuel/Oil Systems Storage
	180		Transload Facility
	190		Offsite Facilities
		191	Offsite Offices
		192	Offsite Accommodation
	200		**Power & Electrical**
	201		Generals and Single Lines
	210		Main Power Generation
		211	Offsite Substation
		212	Power Line
		213	Site Main Substation
	220		Secondary Power Generation
		221	Process Power Generation
	250		Mine Electrical Room
	260		Process Plant Electrical Rooms
	270		MV Distribution O/H Line
	280		Automation Network
	290		IT Network & Fire Detection
	300		**Water**
	310		Fresh Water / Wells
	320		Surface Water Management
	330		Potable / Sewage Water
	340		Sewage Water
	350		Fire water
	360		Effluent Water Management
	370		Tailings Storage Facility (TSF)
	380		Mine Waste Rock Area Catch Basins
	390		Site Water Management Pond

WBS L1	WBS L2	WBS L3	Item
		392	Storm Water Management Pond
	400		**Surface Operations**
	410		Surface Operations Equipment
		414	Support Equipment
		416	Operations and Maintenance
	480		Aggregate Plant
	500		**Mining (Open Pit and / or U/G)**
	510		Mine Development
	540		Mine Infrastructure
		541	Haul Road
	550		Mine Equipment
		551	Primary Mining Equipment
		553	Support Equipment
		554	Other Equipment
	560		Mine Dewatering
	600		**Process Plant General**
	601		Process Plant
	610		Crushing & Ore Handling
	620		Grinding
	630		Flotation & Regrinding
	640		Final Tails & Reclaim
	650		Reagents
	660		Concentrate Dewatering and Handling
	670		Plant Reagents & Services
	680		Plant Services
	690		Plant Common
	700		**Construction Indirects**
	710		Engineering, CM, PM
	720		Construction Offices, Facilities & Services
	730		Contractor Mob/Demob and Indirects
	740		Construction Camp Facilities & Operation

WBS L1	WBS L2	WBS L3	Item
	750		Freight & Logistics
	800		**General Services - Owner's Costs**
	810		Departments
	820		Logistics / Taxes / Insurance
	830		Operations Accommodations
	900		**Pre-Prod, Start-up, Commissioning**
	910		Mine Preprod / Commissioning
	920		Mining Haul Roads
	940		Spares & First Fill
	950		Process Plant Preprod / Commissioning
		951	Process Plant Management & Training
		952	Process Plant Pre-Prod
		953	Process Plant Commissioning
		954	Vendor Reps
		955	Pre-Prod Revenue
	960		Operational Readiness Support
		961	Spare Parts Capital
		962	Spare Parts Commissioning
		963	Spare Parts Pre-Prod
		964	Spare Parts Mining
		965	First Fill (reagents, grease & oil)
		966	Consumables Pre-Prod
	970		Pre-production Revenue
	980		Sunk Costs
	990		Contingency
		991	General Capex Contingency
		992	Design Growth / Develop Contingency
		993	Schedule Contingency
		994	Mining Eqpt Contingency
		995	Owner's Cost 900 Series Contingency
		997	Escalation on Labour

21.4 Material Take-Off and Estimate Quantities

Material Take Off ("MTOs") were provided in a structured and traceable manner in appropriate formats. The preparation and review of the MTOs followed standard engineering practices.

MTOs are based on net quantities, with applied factors for waste and details. No design growth factor was applied on these quantities. There is a specific provision for design growth in the contingency provision. Before an MTO was issued to estimating, a review of the area being issued was undertaken to ensure all scope is captured.

GMS prepared MTOs for Area 100-Infrastructure. Design Criteria for the FS Level engineering phase were established. In general, GMS produced MTOs based on 2D drawings or CIVIL 3D for infrastructure (WBS 100). MTO quantities were provided net to estimators. Table 21.6 summarizes the MTO basis for these areas:

Table 21.6: MTO Basis for Area 100 Infrastructure

Discipline	Cost Element	MTO Source	Allowance Included in MTO
Mechanical	Equipment Packages	Mechanical Equipment List	None
	Equipment Packages	Mechanical Equipment List	None
	Plate Work Packages	N/A	
	Ducting	N/A	
HVAC	Equipment	Mechanical Equipment List Done Costs estimated by m^2	
	Piping/ Ducting		Included in Equipment
Piping / Plumbing	Small bore (less than DN3")	Manual take-off from GA	
	Large bore RL & CS (greater than DN3")	N/A	
	Large bore CS, SS & HDPE (greater than DN3")	Manual take-off from GA	
	Insulation	Manual take-off from GA	
	Slurry Valves	N/A	
	Manual Valves	Valve List (derived from PID's)	
	Pipe Supports	N/A	
Structural Steel	Pre-Eng Buildings	n/a - Steel, cladding and architectural finishes by pre-eng building supplier	
	Dome	N/A	
	Major Steel (building components)	Overhead cranes included in suppliers' quotes.	
	Misc. Steel (stairs, grating, handrail, ladders)	Included in Pre-Eng Building	
Architectural	Wall & roof cladding (stick built only)	Included in Pre-Eng Building	None
	Overhead doors	Included in Pre-Eng Building	None
	Interiors finishes	Manual take-off from GA	None
	Building finishes (man doors, windows, translucent panels)	Included in Pre-Eng Building	None
Concrete	Building foundations	Manual take-off from 2D drawings	
	Major equipment foundations	Manual take-off from 2D drawings	None
	Slab on grade/ elevated slab	Manual take-off from 2D drawings	None
	Lean concrete	Allowance based on foundation footprint	None
	Equipment plinth	N/A	
	Rock anchors	Allowance based on foundation footprint	Included for pre-eng
	Embedded steel	allowance	None
Earthworks	MSE wall	N/A	None
	Drilling & blasting	Volume for Civil3D (derived from borehole data and surface survey)	Split between deep and shallow excavation assumed
	Soil excavation	Volume for Civil3D (derived from borehole data and surface survey)	None
	Aggregate	Volume for Civil3D (derived from borehole data and surface survey)	None
	Fill	Volume for Civil3D (derived from borehole data and surface survey)	None
	Misc. (geotextile, culverts, etc.)	Manual take-off from site plan (KP)	None
	Buried services	Manual take-off from utility drawing	None
Electrical	Equipment Packages	Electrical Equipment List & Mechanical Equipment List	None
	Lighting transformers & panels	Manual count based 2D layouts Costs from quotations	None
	Lighting	Manual take-off based 2D layouts	None
	Grounding and bonding	Manual take-off based 2D layouts	
	Power & control cables including termination	Manual take-off based 2D layouts	~10% allowance for not modelled
	Cable tray	Manual take-off based 2D layouts	~10% allowance for not modelled
	Heat tracing	Manual take-off based 2D layouts	Allowance
Instrumentation	Equipment Packages	From estimated take-off (P&ID)	None
	Instrument Cables	From estimated take-off (P&ID)	None

Additional information on the MTOs for Area 100 Infrastructure follows:

- Piping - All large bore pipe runs greater than 3" modelled. Small bore pipe MTOs and valve list estimates are based on P&IDs.
- Architectural - All major building dimensions fixed. Manual take-off based on general layout drawings issued after client review, rev C.
- Concrete - Major equipment and stick building foundations designed based on layouts. Pre-engineered buildings and slab-on-grade designed based on preliminary data.
- Civil / Earthworks - All civil design complete with Civil 3D model used for MTO quantities. Earthworks for PSMF based on KP's MTOs.
- Electrical - Preliminary cable tray routing complete, subject to constructability and model reviews. Cable schedule manually compiled based on 2D model.
- HVAC - HVAC design based on general layouts.
- Instrumentation - I/O list, Instrument index developed based on P&IDs.
- Mechanical - All major equipment modelled based on certified basic vendor data. Layout frozen for all areas, except West End.
- Process - PFDs, PDC, Mass balance issued for design. P&IDs under client review. Vendor input into P&IDs is based on historic data.

KP prepared the MTOs for the TSF.

All other earthworks MTOs for minor structures including access roads, haul roads, parking lots, site administration building and the pit fuel station have been developed by GMS from the General Layout.

MTOs for the power distribution lines were prepared by GMS.

The final consolidated MTOs were reviewed by experienced construction personnel and validated against previous project experience. Based on the results of this review, certain additional allowances were included for electrical, instrumentation, piping and HVAC.

21.5 Basis of Estimate (Ausenco)

21.5.1 Capital Cost Introduction (Ausenco)

The objective of the Marathon Project was to develop a capital cost estimate with an accuracy of +/-15% according to Ausenco's Class 3 estimate standards. This estimate includes the cost to complete the design, procurement, construction and commissioning of the Project as it relates to Ausenco's scope of work.

The physical facilities and utilities for Marathon Project as it relates to Ausenco's scope of work include but are not limited to the following areas:

- Crushing & Material Handling:
    - Primary Crushing
    - MSE Reinforced Wall
    - Covered Stockpile
    - Overland Conveyor & Material Handling
- Process Plant:
    - Process Plant Building
    - Plant Drainage
    - Grinding and classification
    - Pebble Crushing
    - Rougher Flotation
    - Regrind
    - Cleaner Flotation
    - Flotation OSA
    - Concentrate Thickening
    - Concentrate Filtration
    - Concentrate Storage & Loadout
    - Tailings Thickening
    - Reagents
    - Process Utilities:
        - Process Plant Building
        - Water Systems
        - Plant & Instrument Air
        - Process Control System

- Tailings Management:
    - Tailings Pipelines & Pumps
    - Storm Water Transfer Pipeline
    - Water Management Pond Pipeline
    - Seepage Pump Pipelines
    - Barge Pipeline & Pumps

21.5.2 Project Execution

The estimate for the process plant and related infrastructure has been based on the traditional EPCM approach where the EPCM contractor will oversee the delivery of the completed project from detailed engineering and procurement to handover of working facility. The EPCM contractor shall engage and coordinate several subcontractors to complete all work within the given scopes.

21.5.3 Work Breakdown Structure

The estimate has been arranged by Major Area, Area, Major Facility, and Facility. Each sub-area has been further broken down into disciplines such as earthworks, concrete etc. Each discipline line item is defined into resources such as labour, materials, equipment, etc., so that each line comprises all the elements required in each task.

The WBS has been developed in sufficient detail to provide the required level of confidence and accuracy and also to provide the basis for further development as the Project moves into execution phase.

21.5.4 Methodology

21.5.4.1 Definition of Costs

The estimate is broken out into direct and indirect costs for the initial capital.

Initial capital is the capital expenditure required to start up a business to a standard where it is ready for initial production.

Sustaining capital is the capital cost associated with the periodic addition of new plant, equipment or services that are required to maintain production and operations at their existing levels.

Direct costs are those costs that pertain to the permanent equipment, materials and labour associated with the physical construction of the process facility, infrastructure, utilities, buildings, etc. Contractor's indirect costs are contained within each discipline's all in rates.

Indirect costs include all costs associated with implementation of the plant and incurred by the owner, engineer or consultants in the design, procurement, construction, and commissioning of the Project.

21.5.4.2 Methodology General

The estimate is developed based on a mix of detailed material take-offs and factored quantities and costs, detailed unit costs supported by contractor bids and budgetary quotations for major equipment supply as outlined in Ausenco's Feasibility Study requirements.

The structure of the estimate is a build-up of the direct & indirect cost of the current quantities; this includes the installation/construction hours, unit labour rates and contractor distributable costs, bulk and miscellaneous material and equipment costs, any subcontractor costs, freight and growth.

The methodology applied and source data used to develop the estimate is as follows:

- Define the scope of work.
- Quantify the work in accordance with standard commodities.
- Organize the estimate structure in accordance with an agreed WBS.
- Calculate "all in" labour rates for construction work.
- Determine the purchase cost of equipment and bulk materials.
- Determine the installation cost for equipment and bulks.
- Establish requirements for freight.
- Determine the costs to carry out detailed engineering design and Project management.
- Determine foreign exchange content and exchange rates.
- Determine growth allowances for each estimate line item.
- Determine the estimate contingency value by probabilistic method.
- Undertake internal peer review, finalize the estimate, estimate basis and obtain sign off by the Project Manager and Qualified Professional.

21.5.4.3 Source Data

- Scope of work.
- Process design criteria.
- General arrangement drawings.
- Drawings and sketches.
- Process flow diagrams.
- Equipment lists.
- Material take-offs.
- Equipment pricing.
- Historical data.
- Project schedule.

21.5.5 Direct Costs

Direct costs are generally quantity based and include all permanent equipment and materials associated with the physical construction of the facility. Typically, these are included in the following list:

- Direct Man-hours.
- Contractors Labour.
- Contractors Distributable.
- Construction Equipment.
- Job Materials (Consumables).
- Permanent Equipment & Bulk Materials.
- Freight & Subcontracts.

21.5.5.1 Direct Man-Hours

Direct site man-hours for Ausenco's scope of work shown in Table 21.7 summarizes the total direct hours to install categorized equipment and bulk material with adjustment made for site productivity. The total labour hours will be used to estimate construction manning.

Table 21.7: Direct Man-Hours by Discipline

Commodity Description	Initial Direct Man-hours
Earthworks	35,754
Concrete	1,718
Architectural	186,382
Structural Steel	24,770
Platework	7,752
Mechanical Equipment	112,865
Piping & Fittings	99,945
Electrical Equipment	14,844
Electrical Bulks	37,580
Instrumentation	16,008
Third Party	0
Total Direct Hours	**537,619**

21.5.5.2 Labour Productivity

Productivity factors are used to capture the productivity loss due to conditions experienced in the Project's region and specifically the Project site. They are used to fill the gap between normal installation or construction periods and the actual time spent. Below is a list of items that can affect lost time or productivity.

- Level of worker skills.
- Labour availability.
- Union meetings.
- Toolbox meetings.
- Normal weather pattern for the site.
- On-site travel time & Logistics.
- Job complexity.
- Interference with other crews.
- Working hours (roster).
- Limited and difficult access to area.

- Brownfield work.
- Site general conditions.

The estimate has been developed primarily from contractor supplied unit-man hours with a productivity factor of 1.0. After a detailed review of contractor supplied unit-man hours, Ausenco adjusted certain hours by a productivity factor based on in-house norms to ensure total manhours carried in the estimate are within the typical range based on project size.

21.5.5.3 Contractor Labour Rates

The craft-based wages have been developed by contractors for the following package:

- Detailed Civil & Concrete.
- Structural Steel.
- Architectural.
- Mechanical Bulks (Platework).
- Mechanical Equipment.
- Piping.
- Electrical & Instrumentation.

The rates are fully burdened rates and include the following elements.

- Base Wages.
- Overtime premium.
- Fringes, industry funds.
- Workers Compensation.
- Government Fees.
- Union Dues.
- Safety.

21.5.5.4 Contractor Distributable Costs

Contractor distributable or indirect costs are related to the contractor's direct costs but cannot easily be allocated to any particular part of them. For the purpose of this estimate these costs have been added to the base labour for concrete, structural, mechanical, piping, electrical, architectural and instrumentation based on contractor submissions, whilst earthworks tasks have been based on subcontract rates.

Distributable costs are typically inclusive of but not limited to:

- Salaries, salary burden, allowances and benefits for the contractor's indirect labour, supervisory and management staff.
- Mobilization and demobilization.
- Site offices and utilities.
- Construction equipment.
- Staff recruitment and travel expenses.
- Workshop equipment and supplies.
- Small tools and consumables.
- Site office overheads, such as consumables.
- Allowance for business risk.
- Head office costs/contribution.
- Financing and insurances charges.
- Profit.

21.5.5.5 Earthworks & Site Preparation

Quantities - Ausenco

The Ausenco scope covers the following site development and bulk earthworks:

- Primary Crushing.
- Crushed Ore Stockpile and Reclaim.
- Plant Common (Process Plant Pad).

- Pipe bedding for tailings, storm water, water management pond, and barge pipelines.
- Ditches & Trenching for process plant.
- Extra Haulage.
- Hydroseeding.

It is assumed that items such as engineered fill will be sourced from borrow pits and stockpiles on site. MTOs have been taken from an Autodesk Civil 3D model of the plant layout and general arrangements.

Pricing - Ausenco

Sub-contract rates are used in the estimate for bulk earthworks as they relate to the Ausenco scope of work. Prices carried in the estimate are based on historical rates from Ausenco's database.

Quantities & Pricing - GMS

Engineered quantities were developed by Ausenco and provided to GMS for pricing and inclusion into the consolidated estimate as it relates to GMS's scope of work.

Assumptions/Qualifications

- Bulk earthworks quantities have been engineered and developed by Ausenco. Earthworks quantities as they relate to Ausenco's scope of work have been priced and included in the Ausenco estimate. All remaining engineered quantities developed by Ausenco have been provided to GMS for pricing and inclusion in their overall consolidated estimate as the work will be performed by GMS. Such quantities include but are not limited to clear and grubbing, topsoil stripping, bulk excavation, bulk backfill, hauling, import backfill, etc.
- Waste rock to be used as fill for ROM pad except as the immediate backfill behind the MSE wall.
- It is assumed that items such as engineered fill will be sourced from a borrow pit nearby the site (within 2 km).

21.5.5.6 Concrete Supply & Installation

Scope

The scope of the concrete works allows for all concrete work in the crushing and process plant and relevant facilities as detailed in the WBS.

Quantities

All concrete quantities were estimated by material take-offs from the general arrangement drawings and benchmarked against Ausenco's historical data for similar projects. MTOs for major structures including foundations, footings, walls, pedestals, slab on grade and elevated concrete, detailed excavation, detailed backfill have been developed based on these calculations.

A quantity allowance for cold weather pours (75% of total structural concrete) was considered, extra over rates for hot water and winter heat were applied to these quantities.

Material take offs have been prepared by engineering and are based on calculations derived from general arrangement drawings, 3D models from past projects and sketches.

Pricing

Budget pricing was sourced from the market for supply, installation and delivery of batched concrete including supply/operation of the batch plant. Rates are inclusive of formwork, reinforcement steel detailed excavation and backfill and were quoted by four local contractors by means of a schedule of rates. The returned price schedules include for the direct and indirect costs to supply and install the agreed concrete scope. The returned rates were compared and evaluated by Ausenco for completeness.

21.5.5.7 Structural Steel

Scope

The scope of the structural steel works allows for all new steel work in the crushing and process plant and relevant facilities as detailed in the WBS.

Quantities

All structural steel quantities were estimated by material take-offs from the general arrangement drawings and benchmarked against Ausenco's historical data for similar projects. Structural steel take-offs include light, medium, heavy and extra heavy structural steel designations and miscellaneous steel including, grating and handrail and stair treads.

The following does not include the steel for the industrial type buildings which is included in the packaged supply and installation costs for the buildings in the Architectural Section.

Pricing

A request for pricing was issued for the installation of structural steel as part of the Structural, Mechanical and Piping ("SMP") installation package. The SMP package was quoted by four local contractors by means of a schedule of rates. The returned price schedules include for the direct and indirect costs to install the agreed structural steel scope. The returned rates were compared and evaluated by Ausenco for completeness.

Quotations for structural steel supply and fabrication were not requested during the FS as Ausenco had previously sourced pricing for a recently completed EPC project in Ontario. The historical quotes include pricing for steel products graded as light, medium, and heavy structural steel designations, and miscellaneous steel including railings, stairs, grating and handrail. The SMP contractor will be free issued the steel for assembly on site.

21.5.5.8 Architectural

Scope

The scope for the site buildings includes the design and construction of all site industrial and administrative buildings.

Quantities

A building list has been developed from general arrangement drawings and historical data of similar facilities. Concrete and internal support steel for equipment inside the buildings have been accounted for in the engineer's material take-offs.

Pricing

The pricing for the supply and installation of the building packages are from current quotations and historical data from recent relevant projects. Overhead cranes are not included in the building costs as they have been accounted for in the mechanical equipment list.

21.5.5.9 Mechanical Equipment

Scope

The scope of the mechanical equipment works allows for all new equipment in the crushing and process plant and relevant facilities as detailed in the WBS.

Quantities

A detailed mechanical equipment list has been developed and was generally sized by process and mechanical engineering, with a principle of selecting proven designs used on similar projects to ensure equipment selection was robust. The mechanical equipment was specified utilizing project specific equipment datasheets highlighting agreed process performance criteria and were accompanied by typical engineering specifications.

The quantities for mechanical equipment are based on the following:

- FS PFDs.
- FS equipment list.
- Equipment datasheets.
- General arrangement plans.

Pricing

Mechanical equipment has been included in the capital cost estimate in accordance with the latest revision of the equipment list.

Pricing for major process mechanical equipment items were based on budget quotations. Other minor equipment costs are from historical data from recent projects and studies or estimated by engineering.

21.5.5.10 Platework

Scope

The scope of the platework steel works allows for all new platework in the crushing and process plant and relevant facilities as detailed in the WBS.

Quantities

All platework quantities were estimated by material take-offs from the general arrangement drawings and benchmarked against Ausenco's historical data for similar projects. Platework take-offs include chute work, launders, hoppers, bins and major field erected tanks and silos, this list makes up part of the mechanical equipment list. Platework and liners were quantified in short tons or square feet by engineering. Tanks were designed as panel-style bolted and welded construction. Mechanical bulks quantities were prepared by engineering based on design calculations, previous similar designs, forced quantity factors, some minor structures were developed from drawings and sketches.

Pricing

A request for pricing was issued for installation of platework components as part of the SMP installation package. The SMP package was quoted by four local contractors by means of a schedule of rates. The returned price schedules include for the direct and indirect costs to install the agreed platework scope. The returned rates were compared and evaluated by Ausenco for completeness.

Quotations for platework supply and fabrication were not requested during the FS as Ausenco had previously sourced pricing for a recently completed EPC project in Ontario. The historical quotes including pricing for platework steel such as chute work, launders, hoppers, bins and major field erected tanks and silos.

The SMP contractor will be free issued the platework for assembly on site.

21.5.5.11 Process Plant Piping

The process plant piping has been factored off the total installed mechanical by WBS Level 2 to ensure appropriate costs have been carried in each major WBS area. The factor allows for pipe, fittings, supports, valves, paint, special pipe items and flanges. The piping bulks will be free issued to the SMP contractor for installation.

21.5.5.12 Fire Protection & Detection Piping

Fire protection and detection piping has been included by GMS to provide the supply and installation of fire protection / detection equipment, pipes, fittings, supports, valves, special pipe items, and flanges.

21.5.5.13 Water Supply & Distribution

Potable water, fresh water, raw water pipeline, wells and septic water supply and distribution piping has been included by GMS to provide the supply and installation of pipe and fittings, civil works and mechanical equipment.

21.5.5.14 Pipelines

Scope

Ausenco's scope includes the installation of the tailings distribution lines, storm water transfer pump line, water management pond line, seepage pump lines, and barge/pump lines as detailed in the WBS.

Quantities

All pipeline lengths were provided by KP based on their preliminary design, lengths were split between initial and sustaining capital. Ausenco reviewed the lengths and assessed the flow rates provided by KP in order to determine the pipe quantities, sizes and specifications which were combined into a material take-off for pricing and inclusion into the estimate.

Pricing

A request for pricing was issued for installation of pipelines as part of the SMP installation package. The SMP package was quoted by four local contractors by means of a schedule of rates. The returned price schedules include for the direct and indirect costs to install the agreed pipeline scope. The returned rates were compared and evaluated by Ausenco for completeness. New pipelines were added after contractor rates were received, due to differences in pipe size and specification, said pipelines were priced with Ausenco's historical installation hours.

Quotations for pipeline supply and fabrication were not requested during the FS as Ausenco had previously sourced pricing for a recently completed EPC project in Ontario. These historical quotes were applied to the various pipeline sizes.

The SMP contractor will be free issued the pipelines for assembly on site.

21.5.5.15 Electrical Equipment

Scope

The scope of the electrical equipment works allows for all new equipment in the crushing and process plant and relevant facilities as detailed in the WBS.

Quantities

The electrical equipment scope represents the Electrical Equipment List which aligns with the current mechanical equipment list and load list.

Pricing

Pricing for major electrical equipment items has been developed from a combination of budget quotations and Ausenco's historical data.

Overhead powerlines to support the site are not part of Ausenco's scope of work. Powerlines will be priced and included in the consolidated estimate by GMS.

21.5.5.16 Electrical Bulks

An Electrical Cable Schedule was developed for the Project covering the major power and control cables between electrical equipment (transformers and switchgears / MCCs) and between MCCs and motors. Based on the layout and e-room placement, MTOs for high voltage cables have been developed via manual take-offs for major lines and an average length per area was established for medium voltage cables.

Cable trays have been developed via manual take-offs for 6" to 36" trays along with allowances for cable tray covers. It is understood that not all cables would travel the full length of the longest tray run but any over supply is deemed to cover costs for risers, bends, covers, fittings and fixtures.

The process plant electrical bulks have been factored off the total installed mechanical by WBS Level 2 to ensure appropriate costs have been carried in each major WBS area. The factored electrical bulks have been cross checked against a supplier priced cable schedule as a secondary check. The benchmarked factor includes all cable, tray, terminations, small lighting, receptacles, etc.

21.5.5.17 Instrumentation and Control

The process plant instrumentation has been factored off the total installed mechanical by WBS Level 2 to ensure appropriate costs have been carried in each major WBS area. In addition, the PCS system for the process plant has been priced separately.

21.5.5.18 Mobile Equipment

A mobile equipment fleet list to be purchased for operations has been developed by Ausenco and provided to GMS for incorporation into the consolidated estimate.

21.5.5.19 Fuel

Fuel for construction contractors has been included within the contractor’s distributable costs which form part of the all-in labour rates.

21.5.5.20 Freight Costs

Freight costs are deemed to include inland transportation, export packing, all forwarder costs, ocean freight and air freight where required, insurance, receiving port custom agent fees, local inland freight to the Project site for all bulk materials and process plant equipment.

The estimate freight costs have been determined by applying a percentage to the applicable items direct supply cost and then including this cost as a separate value on each line items build-up. Vendor supplied freight costs have been included for major equipment where available.

Vendor packages, earthworks, concrete and third-party costs and any other subcontract and design and construct items are deemed to be inclusive of any required freight to site.

21.5.5.21 Import Duties

Import duties have been excluded from the estimate.

21.5.6 Indirect Capital Costs

21.5.6.1 Project Preliminaries (Field Indirects)

Project preliminaries are items or services which are not directly attributable to the construction of specific physical facilities of plant or associated infrastructure but are required to be provided as support during the construction period.

These costs may include:

- Temporary construction facilities - site offices, induction centre, first aid facilities, admin, portable toilets, temporary fencing, temporary roads and parking.
- Temporary utilities – power supply, temporary grounding and generators, construction lighting, and water supply.
- Construction support – site clean-up and waste disposal, material handling, maintenance of buildings and roads, testing and training, service labour, site transport, site surveys, QA/QC, and security.
- Construction equipment, tools and supplies purchased by the owner or EPCM contractor – heavy equipment and cranes, large tools, consumables, scaffolding and purchased utilities.
- Material transportation & storage incurred by the owner or EPCM contractor – All types of freight, agents, staging and marshalling.
- Site office – Local services and expenses, communications and office furniture.

Project preliminaries do not form part of Ausenco's scope of work or cost estimate. Costs have been developed by GMS and will be carried in the consolidated CAPEX for the full Project site.

21.5.6.2 Camp and Catering

An onsite camp complete with catering and cleaning has been included in the consolidated estimate developed by GMS. No costs for camp, catering or cleaning have been included in Ausenco's estimate for the process plant scope of work, simply total manhours for the process plant have been provided to GMS for calculating the camp requirements.

21.5.6.3 Spares Parts

21.5.6.3.1 Operational Spares

Mechanical and electrical spares for operations purposes have been factored based on Ausenco's historical benchmarks for major equipment for the initial 1 year of operations. These costs have been moved from initial capital to sustaining capital as directed by the Owner as they are deemed not required for construction.

21.5.6.3.2 Capital (Insurance) Spares

Major mechanical and electrical spares for capital/insurance purposes have been factored based on Ausenco's historical benchmarks for major equipment. These costs have been moved from initial capital to sustaining capital as directed by the Owner as they are deemed not required for construction.

21.5.6.3.3 Commissioning Spares

Major mechanical and electrical spares for commissioning have been factored based on Ausenco's historical benchmarks.

21.5.6.4 First Fills

First fills include the costs for the initial construction first fills for installed equipment and process first fills, these consist of chemicals, fuels and lubricants etc.

An allowance for construction first fills has been calculated as a factor of mechanical and electrical equipment costs. Costs have been confirmed by Ausenco's process engineering metrics / factors.

In addition, an allowance for commissioning first fills has been calculated as a factor of mechanical and electrical equipment costs. These costs have been moved from initial capital to sustaining capital as directed by the Owner as they are deemed not required for construction.

21.5.6.5 Vendors

Costs for vendor representatives for commissioning have been identified from the returned budget quotes as a cost per day or an allowance made by engineering. Costs have been separated in the estimate as construction and commissioning vendor reps.

21.5.6.6 Pre-commissioning, Commissioning

Commissioning assistance from mechanical completion to hand over was developed with the Ausenco's EPCM costs. Costs include all small tools, consumables, travel to site, contractor indirects.

In addition, a modification squad has been carried to assist the commissioning team to minor modifications or provide labour assistance for commissioning. Costs include all small tools, consumables, travel to site, contractor indirects.

21.5.6.7 EPCM

EPCM services costs cover such items as engineering and procurement services (head office based), construction management services (site based), Project office facilities, IT, staff transfer expenses, secondary consultants, field inspection and expediting, corporate overhead and fees.

The engineering, procurement support, and field support services estimate have been developed from a deliverables list and by the identification of resources over a defined schedule. A detailed assessment of consultants and project general expenses are also included in the EPCM costs.

21.5.7 Owner's Costs

Owner's costs do not form part of Ausenco's scope of work. Owners costs will be carried in the consolidated CAPEX developed by GMS.

21.5.8 Estimate Provisions

21.5.8.1 Estimate Contingency

Estimate contingency is included to address anticipated variances between the specific items contained in the estimate and the final actual project cost.

Contingency is defined as a monetary allowance that is included, over and above the base cost, to ensure the success of the Project from a cost perspective by providing for the various uncertainties. The level of contingency will vary depending on the nature of the contract and the Client's requirements. Due to uncertainties at the time the capital estimate was developed (either in terms of the level of engineering definition, the basis of the estimate, the schedule development, etc.) it is essential that the estimate includes a provision to cover the risk from these uncertainties.

The amount of risk is assessed with due consideration of the preliminary level of design work, the manner in which pricing was derived and the preliminary nature of the plan for project implementation.

The estimate contingency will not allow for the following:

- Abnormal weather conditions.
- Changes to market conditions affecting the cost of labour or materials.
- Changes of scope within the general production and operating parameters.
- Effects of industrial disputes.

21.5.8.2 Management Reserve Analysis

No management reserve has been allowed for in this estimate as it lies outside the scope of this estimate.

21.5.9 Escalation

No escalation has been proportioned to any part of the estimate; this will be handled by Paramount in the financial modelling.

21.5.10 Risk

A detailed risk assessment with all stakeholders to review all areas of scope has not been completed at this time; this review will be required during the next level of study. A risk assessment outlines the major project risks and the steps that would be required in order to mitigate said risks.

21.5.11 Exclusions

The following items will not be considered in the Ausenco Class 3 FS estimate:

- Operating costs.
- Senior finance charges.
- Residual value of temporary equipment and facilities.
- Cost to client of any downtime.
- Cost to client of any isolation and de-isolation of plant and equipment.

- Environmental approvals.
- This study or any further project studies.
- Force majeure issues (incl. Covid-19).
- Future scope changes.
- Special incentives (schedule, safety or others).
- Allowance for loss of productivity and/or disruption due to religious, union, social and/or cultural activities.
- Financial analysis.
- Management reserve (project contingency).
- Owner's escalation costs.
- Owner's foreign exchange exposure.
- Meal allowances, part of GMS consolidated estimate.
- On-site camp accommodation, part of GMS consolidated estimate.

21.5.12 Qualifications

The following qualifications are made:

- All design is to Ausenco standard specification.
- Based on existing geotechnical data, the following assumptions are made for feasibility study: Allowable soil bearing capacity = 350 kPa and Frost depth = 3.5 m.
- Gen Mining / GMS to supply all rock fill required for detailed earthworks in Ausenco scope.
- Gen Mining / GMS to supply all concrete aggregates/sand required for concrete in Ausenco scope.
- Reagents storage design was based on preliminary supplier selection. The final reagents design will be confirmed after final supplier selection.
- All process assumptions are detailed in the Process Design Criteria.
- Ontario Fire Code requirements are assumed to be sufficient for Gen Mining insurance.
- Ore properties (flowability, angle of repose, drawdown angle etc.) have been assumed based on previous projects with similar type ore. Equipment sizing, layout and performance is based on these estimates. Confirmation testing is required.

- Modifications to design as a result of changes to the assumed ore properties will be subject to a Change Order. Performance guarantees are provided based on available information and are subject to change as a result of confirmation testing.
- Routing for off-plot piping has been assumed based on preliminary topography and understanding of the terrain. Exact routing of off-plot piping is to be confirmed. Off plot piping to be installed at grade on road routing.
- HVAC equipment for building where specified is assumed to be propane fired.
- A provision has been made for a single ethernet data point for each desk in the office buildings.
- All in-plant carbon steel piping will be unpainted unless required by statutory codes. Pipe labels will be provided for GenMining to adhere to pipes.
- Pipe supports shall be connected directly to slab on grade.
- All valves are assumed to be manual with the exception of critical process valves and valves required for the safe operation of the facility.
- Fire suppression ring main will be provided around the process plant only and form part of GMS's scope of work.
- All delivery tankers shall be equipped with self-contained offloading equipment (pumps, blowers, etc.).
- Diesel supply shall be P50 Diesel or equivalent.
- Ample local labour is assumed to be able to be sourced during the construction period.
- Required fill quantities are readily available on site.
- Construction Camp is available for the EPCM team and all contractors for the duration of construction.
- Medical and fire equipment will be provided by the Owner.
- All temporary facilities, temporary utilities, equipment and services identified will be made available for the required construction period. All costs for field indirects to support construction will be developed and included in the consolidated estimate by GMS.
- Except for the PGM-scavenger circuit, there is no additional cost allowance for sustaining capital costs included for the process plant.
- Mill office and lunchroom has been included in the Ausenco estimate to support the operations staff.
- Administration building has not been included in the Ausenco estimate, costs for the building have been included in the GMS consolidated estimate to support the operations staff.

21.6 Capital Expenditures

The CAPEX capture the costs were estimated by Ausenco for the process plant and other related area, KP estimated the TSF quantities and GMS defined the costs. GMS is responsible for all other areas such as mining, infrastructure, G & A indirect costs and contingency.

The capital cost estimate is a detailed, bottoms-up, built-up effort by major facility and discipline. Each discipline executed a detailed cost build up by cost type, labor, material, equipment, consumables, construction materials and services costs.

This capital cost is estimated at $665M net of mining equipment financing or $ 689.6M excluding pre-production and contingency. This estimate has an accuracy within a range of -15% / +15%. A summary of the capital expenditures is presented in Table 21.8.

Labor and equipment costs for the Project were built up in a separate analysis to be included in each individual estimate. MTOs were also performed to generate the baseline quantities for the Project. Each discipline estimate cost, in complete cost type details and quantities and consistent with the Project's WBS, was then accumulated in a master estimate summary.

Most of the critical materials and components will be sourced in North America and more specifically in the USA.

The estimate was developed by major group areas, which are then further subdivided in distinct areas, disciplines and activities and are included in each estimate line item per GMS's standard WBS.

The approach allows for an efficient conversion of the estimate data, which is identical in WBS format to a control budget for project execution.

According to standards established at the outset of the Project, pricing of equipment, material and labor were estimated according to the following guidelines:

- Equipment proposals received specifically for the Project.
- Equipment prices derived from recent project or from databases.
- Material prices based on quotations received from suppliers.
- Labor rates based on quotations received from contractors, labor suppliers and wage surveys in the Province of Ontario and Quebec in Canada.

Table 21.8: Capital Expenditures Summary

Capital Expenditures	$ (000)
100 - Infrastructure	71,664
200 - Power and Electrical	25,002
300 - Water	61,173
400 - Mobile Equipment	10,991
500 - Mine	127,810
600 - Process Plant	269,222
700 - Construction Indirect Costs	113,544
800 - General Services with IBA Payments	14,898
900 - Pre-production, Start-up, Commissioning	(52,956)
990 - Contingency	74,791
Subtotal	**716,139**
Equipment lease drawdowns and payments	(51,438)
Total	**664,701**

Locally available material was used when possible for estimation purposes and prices were sourced from regional suppliers.

No escalation was built into the capital cost estimates. The estimates are as of Q3-2020.

The estimates include earthworks, construction material, equipment, and labor. Earthworks will be performed by regional contractors when possible.

21.6.1 Infrastructure

A capital expenditures summary for infrastructure is presented in Table 21.9.

Table 21.9: Infrastructure Capital Expenditures

Area 100 Infrastructure	$ (000)
110 – General Site Preparation	**27,220**
111 – General Earthwork	9,299
112 – Site Roads	14,906
113 – Main Access Road	3,015
120 - Workshops / Storage	**24,966**
122 – Mine Service Building	20,231
124 – Emulsion/Explosive Magazine	4,735
130 - Support Infrastructure	**5,125**
131- Administrative Building	4,365
132 – Site Guard House	0,760
140 – Permanent Camp	**4,505**
150 - Laboratory	**2,000**
170 - Fuel Systems	**In OPEX**
180 – Transload Facility	**7,848**
Total	**71,664**

21.6.2 Power Supply and Communications

A summary of the capital expenditures for electrical and communications is presented in Table 21.10 This includes all equipment and installations for power supply and distribution. The power line and main site substation costs are negotiated with the power rates with the utility company and therefore are not shown in this table. The electrical infrastructures are detailed in Section 18 of this Technical Report.

Table 21.10: Power Supply and Communications Capital Expenditures

Area 200 Power & Electrical	$ (000)
210 – Main Power Generation	**11,424**
211 – Offsite Substation	
212 – Power Line	0,638
213 Site Main Substation	10,786
220 – Secondary Power Generation	**4,399**
270 - MV Distribution O/H Line	**6,392**
280 – Automation Network	**0,174**
290 - IT Network & Fire Detection	**2,613**
Total	**25,002**

21.6.3 Water Management

Details and description of water management infrastructure including the TSF and others and installation and systems are provided in Section 18. The TSF is built in several phases in which Phase 1 costs are included in the initial CAPEX. All other phases are planned for construction and delivery as per Table 21.19 and therefore are included in sustaining expenditures. Capital costs include earthworks, concrete, structure steel, mechanical, electrical and instrumentation equipment and labor.

The surface water management system is constructed to gather all contact water generated on site. It includes ditches, pumping station and pipelines.

KP prepared the MTOs for the TSF, which have been based on Civil 3D Models, neat line estimates from feasibility level drawings, and geotechnical borehole and test pit information. Quantities have been based on the feasibility level embankment raising schedule which has based on the projected mine production. TSF embankment raise schedule is summarized in Table 21.11 below.

Table 21.11: TSF Embankment Raise Schedule (KP)

Year		Embankment Crest Elevation			
Operating	Cashflow Model	WMP (m)	Cell 1 (m)	Cell 2A (m)	Cell 2B (m)
-2	2022	**343**			
-1	2023	343	**320**	**326**	
1	2024	343	**332**	326	
2	2025	343	**343**	**343**	
3	2026	343	343	343	**336**
4	2027	343	343	**353**	**343**
5	2028	343	343	353	**353**
6	2029	343	343	**363**	353
7	2030	343	343	363	**363**
8	2031	343	343	**373**	363
9	2032	343	343	373	**373**
10	2033	343	343	**380**	373
11	2034	343	343	380	373
12	2035	343	343	380	**380**
13	2036	343	343	380	380
14	2036	343	343	380	380

***Notes**:*

1. *Embankment elevations based on end of year.*
2. ***Bold** values indicate stage completion during the year, grey indicates no change from previous year.*

As mentioned, GMS established the unit costs to produce the capital costs, initial and sustaining, mainly based on the mining schedule.

A capital expenditures summary for water is presented in Table 21.12.

Table 21.12: Water Management Capital Expenditures

Area 300 Water Management	$ (000)
310 – Fresh Water / Wells	0,823
320 – Surface Water Management	12,232
330 – Potable / Domestic Water	1,970
340 - Sewage Water	2,319
350 - Fire Water	7,047
360 – Effluent Water Management	1,806
370 – Tailings Storage Facility	33,895
380 – Mine Rock Storage Facility / Catch Basin	1,081
Total	**61,173**

21.6.4 Surface Operations

A summary for the capital expenditures for surface operations equipment is presented in Table 21.13.

The Surface Operations CAPEX consist mainly of the capital expenditure for the acquisition of the mobile equipment (truck and side-dump trailer) required to transport the concentrate from the mill to the transload facility, along with a wheel loader at the transload facility for the re-handling of the concentrate into the railcars. It also includes another wheel loader at the process plant site to load the concentrate transport trucks, along with the required mobile equipment to support the operation and maintenance of the process plant.

A budgetary price Request for Proposal ("RFP") process was completed for the surface operation equipment fleet. The equipment pricing includes, when applicable, tires, transport to the Project site, assembly and commissioning.

The aggregate plant has been added to crush mine waste in order to build various infrastructure such as the haul and site roads and the TSF dams.

Table 21.13: Surface Operations Equipment Capital Expenditures

Area 400 Surface Operations	$ (000)
414 – Concentrate Handling Equipment	1,246
415 – Process Plant Mobile Equipment	1,622
480 – Aggregate Plant	8,123
Total	**10,991**

21.6.5 Mining

The mining CAPEX consists of the capital expenditure for the development of the mining infrastructure (roads), the acquisition of the mine mobile equipment, and the mine dewatering equipment required to fully operate as of the first day of operations.

A budgetary price RFP process was completed for the mine mobile equipment fleet. The equipment pricing includes tires, fire suppression, transport to the Project site, assembly and commissioning.

The capital costs estimate are presented in Table 21.14.

Table 21.14: Mining Equipment Capital Expenditures

Area 500 Mining	$ (000)
540 – Mine Infrastructure (541 – Haul Roads)	**4,110**
550 – Mine Equipment	**122,994**
511 – Primary Mining Equipment	109,566
553 – Support Equipment	6,037
554 – Other Equipment	3,796
555 – Fleet Management System Infrastructure	3,595
560 – Mine Dewatering	**706**
Total	**127,810**

21.6.6 Process Plant and Related Infrastructures

Ausenco developed equipment specifications, layouts and Basis of Estimate as shown in Sections 17, 18 and 21.4 of this Report. The capital costs estimate for the processing areas are presented in Table 21.15.

Table 21.15: Processing Capital Expenditures

Processing Capital Costs	$ (000)
610 - Crushing	**42,985**
611 – Primary Crusher	26,830
612 – Crushed Ore Stockpile& Reclaim	16,155
620 - Grinding	**86,987**
630 – Flotation & Regrind	**88,883**
640 – Concentrate Thickening	**2,649**
650 – Concentrate Filtration, Storage, Loadout	**6,233**
660 – Tailings Thickening	**6,267**
670 – Reagents	**14,234**
680 – Plant Services	**5,605**
690 – Plant Common	**15,379**
Total	**269,222**

21.6.7 Construction Indirect Costs

Construction indirect costs include all the engineering activities as well as site construction management. A full suite of temporary facilities is also included as well as tools, operating and maintenance costs for construction equipment.

Construction Indirect Costs are presented in Table 21.16.

Table 21.16: Construction Indirect Capitals

Construction Indirects	$ (000)
710 - Engineering, CM, PM	71,676
720 - Construction Facilities & Services	15,215
730 – Contractor Mob/Demob and Indirect Costs	2,000
740 – Construction Camp Facilities & Operation	23,925
720 – Freight & Logistics	728
Total	**113,544**

21.6.8 General Services

Initial general services are defined as costs of the in-coming operations management that provides services over the construction and commissioning period. It allows operations personnel to increase their involvement in the mine's project activities and reduces the period of operation readiness critical for project success. It gathers the salaries and other personnel related costs for management, supply chain, human resources, environmental and sustainability, security, accounting, information technology and, in some cases, corporate activities.

In addition to the above, the insurance costs and taxes are included.

Cost estimates are presented in Table 21.17.

Table 21.17: General Services Expenditures

General Services	$ (000)
810 - Departments	11,121
820 - Logistics / Taxes / Insurance	1,723
830 – Other	2,054
Total	**14,898**

21.6.9 Pre-production and Commissioning Expenditures

The pre-production costs are those of the process plant as mining pre-production costs as defined in the operations costs with ramp-up and the general services required to support these activities.

The process plant pre-production includes initial fills as well as salaries, reagents and fuel during the commissioning and ramp-up periods to commercial production. Staffing and training of mill personnel is planned progressively during the construction and commissioning periods.

Pre-production and commissioning expenditures are presented in Table 21.18.

Table 21.18: Pre-production and Commissioning Expenditures

Area	$ (000)
910 – Mining Pre-prod / Commissioning	86,622
950 - Process Plant Pre-prod / Commissioning	25,787
960 – First Fill, Spares & Consumables	6,435
970 – Mine Pre-Production Revenue	(171,800)
990 – Contingency (10.4%)	74,791
Subtotal	**21,835**
Equipment Lease Drawdowns and Payments	(51,438)
Total	**(29,603)**

21.6.10 Sustaining Capital

Sustaining capital for the mine includes additional equipment purchases for a total of $156.8 M. Major equipment repairs are capitalized and represent $165.8 M over the LOM.

Sustaining capital is presented in Table 21.19.

Table 21.19: Sustaining Capital Costs

Areas	Total	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13
Surface Operation Sustaining Capital														
Equipment Purchases	**3.8**	0.0	1.3	0.8	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.8	0.0	0.4
Major Components	**1.7**	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.6	0.3	0.0
Mine Sustaining Capital														
Equipment Purchases	84.7	52.6	1.1	1.6	2.5	6.9	8.3	5.2	2.9	1.3	1.3	0.9	0.2	0.01
Major Components	99.4	1.7	6.3	10.5	12.3	9.4	7.1	8.1	11.7	10.7	6.7	8.3	5.7	0.9
Maintenance Shop and Warehouse Expansion	3,7		1,861	1,861										
Process Infrastructure														
PGM Scavenger Cells	38,5	38.484												
TSF														
Dam Construction	165,0	6,800	20,273	16,072	12,101	15,448	5,159	20,850	8,723	24,560	11,650	000,000	23,358	000,000
Other Infrastructure														
Effluent Water Treatment Plant	4,7			4,716										
Surface Water Management (Pumping Seepage Ponds)	1,1			0,553		0,553								
Power Electrical (Seepage Ponds)	3,6			1,777		1,777								
Fuel Storage	0,9		0,456	0,456										
Operations Laydown	4,3		2,126	2,126										
General Earthworks (Clearing)	8,3	8,257												
Main Access Road	7,3	4,882	2,441											
Site Roads	1,3	0,625			0,625									
Total Sustaining Capital Costs	**422.6**	125.9	32.8	31.6	31.0	30.0	26.8	29.3	29.6	31.4	15.0	18.5	19.9	0.9

21.7 Closure Costs

The closure costs are estimated at $55.1 M including engineering costs, annual inspections and 5 years monitoring of the TSF and mine rock storage area and 10% contingency. The estimate is based on an updated cost estimate based on the True Grit Consulting Ltd report and concepts, dated July 11, 2012, issued to Stillwater Canada for the Marathon Project.

Closure costs would cover the following activities:

- TSF reclamation, including revegetation and stream bank restoration.
- Main, Site and hauling roads reclamation including culverts removal, stream bank restoration and revegetation.
- Open Pit reclamation which includes implementation of boulder fencing, site sighing and security and revegetation.
- Post closure monitoring.
- Buildings removal down to concrete slabs and foundations dismantled, regrading to match surroundings and surfaces covered with overburden salvaged and seeding.
- Soils testing and disposal if required

The closure cost estimate is presented in Table 21.20 with these costs incurred over a five-year period starting 3 years prior operations expected to closure and 2 years after. A Surity Bond and the carrying costs (at 2% annual payment) is included in the economic analysis.

Table 21.20: Closure Costs

Closure Costs Estimate	$ (000)
Roads	0,864
TSF	5,100
Open Pit and MRSA	19,944
Buildings, Powerline Corridor, Parking Lot and Aggregate Pit	8,470
Testing/Disposal of hydrocarbon contaminated soil	1,062
Monitoring Program	9,500
Subtotal	**44,940**
Mob / Demob & Engineering Costs	5,122
Contingency (10%)	5,006
Total	**55,068**

21.8 Operating Costs

Operating expenditures (OPEX) are summarized in Table 21.21. The operating costs include mining, processing, General and Administration ("G&A") and financing costs. The costs for concentrate transportation to smelters and smelting and refining charges are not considered site operating costs and are therefore excluded from the OPEX estimate.

The transportation costs and smelter conversion charges (TC/RC) are deducted from gross smelter revenues to estimate the NSR. These costs are detailed in Section 19 on Market Studies and Contracts.

A summary of the total operating costs including mining, milling, power, G&A and concentrate transportation as well as total cost per tonne milled is presented in Table 21.21.

Table 21.21: Total Operating Costs Summary

Total OPEX		Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mining	$ M	**1,069**	39	98	94	94	94	90	92	89	94	88	82	67	40	6
Processing	$ M	**1,051**	30	78	84	84	84	84	84	84	84	84	84	84	84	15
General & Admin.	$ M	**287**	8	15	26	28	29	26	22	23	21	24	25	25	13	3
TC/RC	$ M	**178**	7	19	18	15	14	15	14	13	13	11	12	13	13	2
Con. Transportation	$ M	**146**	6	14	14	12	12	12	12	12	10	10	10	10	10	2
Royalties	$ M	**4**	1	0	0	0	2	1	0	0	0	0	0	0	0	0
Total Operating Costs	$ M	**2,736**	**89**	**224**	**237**	**233**	**235**	**229**	**224**	**221**	**222**	**218**	**214**	**200**	**161**	**28**
Unit Cost	$ / t	**23.63**	**25.36**	**24.56**	**25.75**	**25.33**	**25.57**	**24.84**	**24.36**	**24.02**	**24.15**	**23.71**	**23.30**	**21.79**	**17.48**	**14.44**

21.8.1 Mining Costs

Table 21.22 presents the breakdown of mining costs, by department, while Table 21.23 presents the major cost drivers for the mine department.

The mine operating costs are estimated from first principles for all mine activities. Equipment hours required to meet production needs of the LOM plan are based on productivity factors or equipment simulations. Each piece of equipment has an hourly operating cost which includes operating and maintenance labour, fuel and lube, maintenance parts, tires (if required) and ground engaging tools (if required). A budgetary RFP process has been completed for the mine equipment and associated operating costs, fuel, tires, explosives and accessories, etc.

The average mining cost during operations is estimated at $2.55/t mined including re-handling costs. The mining costs are lower than average during the early years and increase with increased haulage distances and pit deepening, in the later years. This operating cost estimate excludes capital repairs which treated as sustaining capital. The equivalent unit of capital repairs is $0.24/t mined.

Mining staffing was based on operating equipment numbers. Maintenance staffing was included to support the operating fleet. No MARC was considered. Technical staff was included in the estimates. Explosives loading and blasting labour was included as contract services (in operating costs) with no additional labour count.

Haulage is the major mining cost activity representing 30.8% of total costs followed by blasting (17.3%), loading (11%) and dump maintenance (6.3%). Loading and haulage for stockpile re-handling is also captured as a separate activity cost.

Salaries is the dominant cost, by element, representing 30.36% of total costs, followed by fuel (20.87%), maintenance parts (14.43%) and bulk explosives (8.13%).

Table 21.22: Mining Cost Summary

Mining Costs		Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Tonnage Mined	Mt	**421.8**	**12.0**	**40.0**	**40.0**	**40.0**	**39.8**	**40.0**	**39.2**	**40.0**	**40.2**	**35.2**	**29.3**	**18.7**	**7.4**	**0.0**
Mine Operations	$ M	33.4	1.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.1	0.0
Mine Maintenance Admin.	$ M	60.3	2.7	5.4	5.4	5.4	5.4	4.9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	0.0
Mine Geology	$ M	25.7	1.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	0.9	0.0
Mine Engineering	$ M	31.1	1.2	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.9	0.3
Grade Control	$ M	14.9	0.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Drilling	$ M	50.8	1.8	5.5	5.5	5.5	4.4	4.4	4.3	4.4	4.4	3.9	3.5	2.1	1.2	0.0
Blasting	$ M	176.2	6.9	17.8	16.0	16.0	15.9	16.0	15.4	15.2	15.5	14.1	12.6	8.9	5.9	0.0
Pre-Split Drilling and Blasting	$ M	21.2	0.6	1.6	1.8	2.2	2.0	1.7	2.1	1.7	2.2	1.6	1.5	1.3	1.0	0.0
Loading	$ M	116.1	3.6	11.2	11.4	10.9	11.1	10.6	10.5	10.5	10.5	9.3	8.2	5.6	2.7	0.0
Hauling	$ M	328.8	10.6	30.6	28.3	29.6	30.4	28.3	30.9	27.7	32.2	27.8	26.6	21.4	3.8	0.7
Dump Maintenance	$ M	63.7	2.1	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	4.0	4.0	0.8
Road Maintenance	$ M	68.2	2.7	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	1.6
Dewatering	$ M	10.7	0.5	1.0	1.0	1.0	1.0	0.6	1.0	1.0	1.0	1.0	0.6	0.6	0.6	0.0
Support Equipment	$ M	57.8	2.1	4.7	4.7	4.7	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.6	3.5	1.0
Total InSitu Mining Cost	$ M	**1,058.9**	**37.8**	**97.1**	**93.2**	**94.4**	**94.0**	**90.4**	**92.2**	**88.5**	**93.8**	**85.8**	**81.1**	**66.7**	**38.4**	**5.5**
Rehandling	$ M	9.8	0.9	0.7	0.5	0.1	0.0	0.0	0.0	0.9	0.1	2.7	1.1	0.4	1.8	0.6
Total Mining Cost	$ M	**1,068.7**	**38.7**	**97.7**	**93.7**	**94.5**	**94.0**	**90.4**	**92.2**	**89.4**	**93.9**	**88.5**	**82.2**	**67.1**	**40.2**	**6.1**
Unit Cost per tonne Mined	$/t	**2.53**	**3.22**	**2.44**	**2.34**	**2.36**	**2.36**	**2.26**	**2.35**	**2.24**	**2.34**	**2.52**	**2.81**	**3.58**	**5.45**	

Table 21.23: Top Three Mining Costs ($ M)

Top Mining Costs	Total	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14
Salaries	319.0	26.0	27.8	27.8	27.3	26.5	26.1	26.0	25.8	25.6	25.6	24.3	20.0	10.1	319.0
Diesel/Fuel	225.7	16.5	19.9	19.6	19.8	19.7	20.0	20.0	20.4	20.7	18.9	16.0	10.1	4.1	225.7
Maintenance Parts	155.3	12.1	14.0	13.8	13.8	13.6	13.5	13.6	13.8	13.7	12.5	10.4	6.9	3.4	155.3
Bulk Explosives	93.0	0.4	9.4	9.6	9.6	9.5	9.4	9.4	9.5	8.9	7.6	5.7	3.2	0.9	93.0
Subtotal Top Three	793.2	55.1	71.2	70.7	70.5	69.2	69.1	69.0	69.6	69.0	64.6	56.5	40.2	18.5	793.2
Percentage of Total	73.85%	62.29%	74.85%	74.92%	74.56%	74.80%	75.23%	75.28%	75.14%	75.10%	75.44%	75.40%	74.27%	70.08%	73.85%

21.8.2 Processing Costs

The LOM process operating cost is estimated $1,126 M over the 14-year LOM (2-years pre-commercial production followed by 13-year operating life). A breakdown of this value and its unit costs is presented in Table 21.24.

Table 21.24: Processing Costs

Processing Costs ($/t processed)	Scavenger Circuit	
	Included	Excluded
Labour		
Administration	0.05	0.05
Processing Operations Labour	0.56	0.56
Processing Maintenance Labour	0.64	0.52
Processing Metallurgy	0.08	0.08
Mill Assay Lab (by SGS)	0.22	0.22
Subtotal	**1.55**	**1.43**
Power		
Crushing	0.04	0.04
Pebble Crushing/Stockpile	0.10	0.10
Grinding Mill Area	0.25	0.25
SAG Mill	0.68	0.68
Ball Mill	0.90	0.90
Flotation/Regrinding	0.20	0.15
Concentrate Regrind Mills	0.59	0.59
Tailings Regrind Mills	0.52	0.00
Thickening/Process Water/Reagents/Services	0.14	0.14
Subtotal	**3.42**	**2.84**
Reagents & Consumables		
Crushing	0.02	0.02
Pebble Crushing/Stockpile	0.02	0.02
Grinding Mill Area	2.63	2.24
Flotation/Regrinding	0.50	0.34
Thickening/Process Water/Reagents/Services	0.18	0.18
Subtotal	**3.35**	**2.79**
Plant General Maintenance		
Crushing	0.07	0.07
Grinding	0.20	0.20
Flotation & Regrind	0.22	0.22
Concentrate Thickening	0.00	0.00
Concentrate Filtration, Storage, Loadout	0.01	0.01
Tailings Thickening	0.01	0.01
Reagents	0.02	0.02
Plant Services	0.01	0.01
Installed Electric Equip.	0.05	0.05
PGM Scavenger Circuit	0.09	0.00
Laboratory maintenance cost (by SGS)	0.12	0.12
Subtotal	**0.80**	**0.71**
Miscellaneous Cost		
Process Plant Mobile Equipment Maintenance	0.06	0.06
Total	**9.18**	**7.84**

21.8.2.1 Labour

Plant staffing was estimated on a zero-based headcount for operating positions with additional benchmarking against similar projects. The labour costs incorporate requirements for plant operation, such as management, metallurgy, operations, maintenance, site services, assay laboratory, and contractor allowance. The total operational labour averages 118 (27 staff and 91 operational) employees. Assay laboratory services are planned to be contracted.

Individual personnel were divided into their respective positions and classified as either staff or hourly employee. The rooster can vary depending in the position from 5 days in, 2 off or 7 days in, 2 off. Salaries were determined using published labour market data. The rates were estimated as overall rates, including all burden costs.

21.8.2.2 Plant General Maintenance

General maintenance costs were 8.8% of the total operating cost at $ 0.80/t of plant feed. Annual maintenance consumable costs were calculated based on a total installed mechanical capital cost by area using a weighted average factor from 2-5%. The factor was applied to mechanical equipment, platework, and piping.

21.8.2.3 Power

The processing power draw was based on the average power utilization of each motor on the electrical load list for the process plant and services. Power will be supplied by the Ontario Power Generation grid to service the facilities at the site. The total process plant power cost is $3.42/t of plant feed, approximately 37.1% of the total process operating cost.

21.8.2.4 Reagents and Operating Consumables

Individual reagent consumption rates were estimated based on the metallurgical test work results, Ausenco's in-house database and experience, industry practice, and peer-reviewed literature. Each reagent cost was obtained either through vendor quotations or benchmarking for similar projects performed by Ausenco.

Other consumables (e.g., liners for the primary crusher, SAG mill, ball mill, and ball media for the mills) were estimated using:

- Metallurgical testing results (abrasion index).
- Ausenco's in-house calculation methods, including simulations.
- Forecast nominal power consumption.

Grinding mills liner wear and grinding media consumptions were selected at the lower end of the range of values, based on abrasion characteristics. Wear rates were adjusted to align with operating results from Canadian operations with similar wear characteristics.

Reagents and consumables represent approximately 36.5% of the total process operating cost at $3.35/t of plant feed.

21.8.2.5 Process Plant Mobile Equipment Maintenance

Vehicle costs were based on a scheduled number of light vehicles and mobile equipment, including fuel, maintenance, spares and tires, and annual registration and insurance fees.

Table 21.25: Processing Operating Costs

Processing OPEX		Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Tonnage Processed	Mt	**115.77**	**3.52**	**9.11**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**9.20**	**1.94**
Labour Costs	$ M	**178.51**	6.58	13.73	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30	14.30	0.89
Plant Maintenance	$ M	**92.60**	3.29	7.01	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	7.44	0.47
Power	$ M	**390.17**	9.99	28.48	31.37	31.37	31.37	31.37	31.37	31.37	31.37	31.37	31.37	31.37	31.37	6.61
Reagents & Cons.	$ M	**383.37**	9.84	28.01	30.82	30.82	30.82	30.82	30.82	30.82	30.82	30.82	30.82	30.82	30.82	6.50
Miscellaneous	$ M	**6.81**	0.21	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.11
Total Process Costs	$ M	**1,051.47**	**29.91**	**77.77**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**84.47**	**14.58**
Unit Cost	$/t	**9.08**	**8.49**	**8.54**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**9.18**	**7.52**

21.8.3 General and Administration

General administration and support services include general management, accounting and finance, IT, environmental and social management, human resources, supply chain, camp, surface support, health and safety, security and operating cost of the various supply chain equipment. In most cases, these services represent fixed costs for the site as a whole. The general administration costs exclude certain costs such as transport of concentrates and environmental rehabilitation costs.

General and Administration staff was estimated on a per position basis with consideration to required positions to support the operations. There was no consideration for head-office support or supervision staff costs associated with any of the Joint Venture head office employees.

A summary of G&A costs is presented in Table 21.26.

Table 21.26: General and Administration Operating Costs

G&A OPEX		Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14
General Mgmt. & Other	$ M	**122.59**	1.47	1.90	13.25	14.65	16.14	12.85	8.43	9.69	7.38	10.38	11.85	12.81	1.57	0.22
Accounting & Finance	$ M	**9.76**	0.39	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.57	0.14
Supply Chain	$ M	**19.92**	0.80	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.51	1.29	0.32
Information Technology	$ M	**11.12**	0.44	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.78	0.78	0.19
Human Resources	$ M	**18.24**	0.82	1.63	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.11	0.96	0.24
Health & Safety	$ M	**8.38**	0.24	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.57	0.14
Surface Support	$ M	**23.16**	0.92	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.60	0.40
Environment	$ M	**27.44**	0.95	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	0.54
Security	$ M	**12.11**	0.48	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.24
Taxes & Insurance	$ M	**34.65**	1.36	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	0.68
Total G&A Costs	$ M	**287.37**	**7.87**	**15.15**	**26.37**	**27.78**	**29.26**	**25.98**	**21.56**	**22.81**	**20.51**	**23.51**	**24.97**	**25.34**	**13.15**	**3.11**
Unit Cost	$/t	**2.48**	**2.24**	**1.66**	**2.87**	**3.02**	**3.18**	**2.82**	**2.34**	**2.48**	**2.23**	**2.56**	**2.71**	**2.75**	**1.43**	**1.61**

22. ECONOMIC ANALYSIS

This section presents the economic analysis of the Marathon Project. The elements of the economic model principally consist of metal production and revenues, royalty agreements, operating costs, capital costs, sustaining capital, salvage value, closure and reclamation costs, taxation and net Project cash flow.

The economic analysis is carried out in real terms (i.e., without inflation factors) in Q1 2021 Canadian dollars without any project financing but inclusive of equipment financing and costs for closure bonding. The economic results are calculated as of the beginning of Q2 Year -3, which corresponds to the start of the pre-production CAPEX phase (over 13 quarters), including engineering and procurement, with all prior costs treated as sunk costs but considered for the purposes of taxation calculations. The economic results such as the NPV and IRR are calculated on an annual basis.

22.1 Assumptions

The key assumptions influencing the economics of the Project include:

- Metal prices and smelter terms in US$.
- Canadian dollar to United States dollar exchange rate (“US$/C$”)
- Diesel price in C$/L.

22.1.1 Metal Prices and Smelter Terms

The metal prices and smelter terms selected for the economic evaluation are summarized in Table 22.1. Additional information on marketing is presented in Section 19. Smelter treatment charges are US$62/dmt of concentrate.

Table 22.1: Metal Prices and Smelter Terms

Metal	Copper	Palladium	Platinum	Gold	Silver
Metal Price	US$3.20/lb	US$1,725/oz	US$1,000/oz	US$1,400/oz	US$20/oz
Refining Charges	US$0.062/lb	US$20/oz	US$20/oz	US$5.00/oz	US$0.50/oz
Payable Rate (%)	96.5%	94%	90%	90%	90%
Minimum Deduction	1.2%	3g/t	3 g/t	1 g/t	30 g/t

22.1.2 Exchange Rate

The base case Canadian dollar exchange rate for economic evaluation is C$/US$ 1.28. Most operating costs are estimated in Canadian dollars with the US dollar denominated metal revenue converted to Canadian dollars.

22.1.3 Fuel

The reference diesel fuel price used for estimating operating costs is $ 0.77/L, which is an estimated delivered price to site for coloured diesel destined for off-road vehicles. It is exclusive of provincial road taxes and sales taxes which are reimbursable but includes the federal excise tax. The reference price is benchmarked from Toronto, Ontario rack price for ultra-low sulfur diesel no. 1. The price assumption does not include a carbon tax cost assumption.

22.2 Metal Production and Revenues

The process plant commissioning and ramp-up schedule is presented in Table 22.2. The process plant commissioning period is scheduled over nine months. At this point, commercial production is achieved with the plant processing of 60.9% of nameplate throughput for 30 days, which meets the commercial production definition of at least 60% of nameplate throughput over 30 days. Ramp-up continues for an additional seven months to reach 100% of nameplate (9.2 Mt/y). Plant commissioning starts in the last quarter of Year -1 and continues for the first half of Year 1. Commercial production occurs at the beginning of Q3 of Year 1.

Payable metal over the Project life includes 467 M lbs of copper, 2,823 k oz of silver, 151 k oz of gold, 537 k oz of platinum and 1,905 k oz of palladium as presented in Table 22.3. With the base case metal price assumptions this results in estimated gross revenue of $7,146 M. Palladium represents 58.8% of gross revenue followed by copper (26.7%), platinum (9.6%), gold (3.8%) and then silver (1.0%). Of this total gross revenue over the Project life $182 M is generated during pre-production and is credited against pre-production costs. Gross revenue during commercial production is therefore $6,964 M.

The annual process plant schedule and metal production is summarized in Table 22.4. The palladium average head grade is 0.61 g/t during operations but is above average for the first 7 years (0.76 g/t). Additional details on the production schedule are presented in Section 16.

Table 22.2: Process Plant Commissioning and Ramp-up

Process Plant Commissioning and Ramp-up	Month	Plant Tonnage (kt)	% Nameplate
Plant Commissioning Month 1	Oct (Y -1)	31.195	4.1%
Plant Commissioning Month 2	Nov (Y -1)	49.912	6.5%
Plant Commissioning Month 3	Dec (Y -1)	120.184	15.7%
Plant Commissioning Month 4	Jan (Y 1)	133.538	17.4%
Plant Commissioning Month 5	Feb (Y 1)	216.725	28.3%
Plant Commissioning Month 6	Mar (Y 1)	234.785	30.6%
Plant Commissioning Month 7	Apr (Y 1)	326.708	42.6%
Plant Commissioning Month 8	May (Y 1)	350.044	45.7%
Plant Commissioning Month 9	Jun (Y 1)	466.667	60.9%
Commercial Production Month 1	Jul (Y 1)	466.667	60.9%
Commercial Production Month 2	Aug (Y 1)	566.667	73.9%
Commercial Production Month 3	Sep (Y 1)	566.667	73.9%
Commercial Production Month 4	Oct (Y 1)	586.667	76.5%
Commercial Production Month 5	Nov (Y 1)	660.000	86.1%
Commercial Production Month 6	Dec (Y 1)	675.000	88.0%
Commercial Production Month 7	Jan (Y 2)	675.000	88.0%
Commercial Production Month 8	Feb (Y 2)	766.667	100.0%
Commercial Production Month 9	Mar (Y 2)	766.667	100.0%

***Note**: Represents 100% of full nameplate capacity at 9.2 Mt/y.*

Table 22.3: Life-of-Mine Metal Production & Revenue Summary

Metal Production		Pre-Prod.	Operations	Total
Tonnage Processed	kt	1,930	115,771	117,701
Concentrate Production	k dmt	20	988	1,009
Head Grades				
Cu	%	0.27	0.20	0.20
Ag	g/t	1.19	1.41	1.40
Au	g/t	0.10	0.07	0.07
Pt	g/t	0.29	0.20	0.20
Pd	g/t	1.06	0.61	0.62
Contained Metal				
Cu	M lbs	12	519	531
Ag	koz	74	5,236	5,309
Au	koz	6	249	255
Pt	koz	18	737	756
Pd	koz	66	2,277	2,343
Recovered Metal				
Cu	M lbs	11	483	493
Ag	koz	53	3,743	3,796
Au	koz	4	179	183
Pt	koz	15	619	634
Pd	koz	56	1,972	2,028
Average Recoveries				
Cu	%	92.00%	92.91%	92.89%
Ag	%	71.50%	71.50%	71.50%
Au	%	69.72%	71.96%	71.91%
Pt	%	81.87%	83.94%	83.89%
Pd	%	84.96%	86.64%	86.59%
Payable Metals				
Cu	M lbs	10	456	467
Ag	koz	33	2,790	2,823
Au	koz	4	147	151
Pt	koz	13	524	537
Pd	koz	53	1,852	1,905
Average Payability				
Cu	%	94.98%	94.58%	94.59%
Ag	%	62.61%	74.53%	74.37%
Au	%	85.16%	82.23%	82.30%
Pt	%	86.76%	84.60%	84.65%
Pd	%	94.00%	93.89%	93.90%
Gross Revenue				
Cu	$ M	42	1,870	1,911
Ag	$ M	1	71	72
Au	$ M	7	264	270
Pt	$ M	16	670	687
Pd	$ M	116	4,089	4,205
Total	**$ M**	**182**	**6,964**	**7,146**

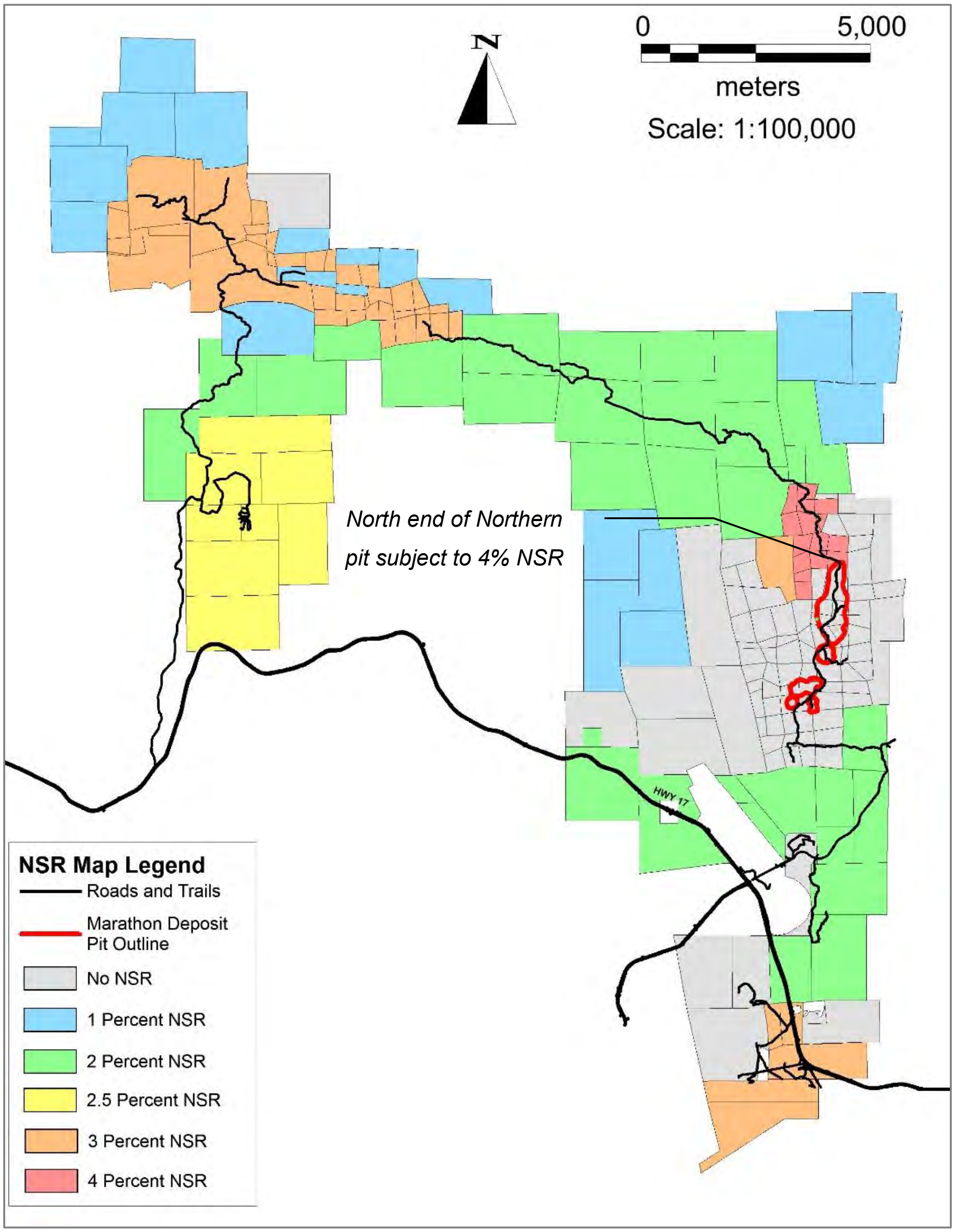
Table 22.4: Annual Metal Production – Operations Period

Physicals Summary (Ops)		Total	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Operating Years	years	12.7				0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.2
Tonnage Milled	Kt	115,771	-	-	-	3,522	9,110	9,200	9,200	9,200	9,200	9,200	9,200	9,200	9,200	9,200	9,200	9,200	1,940
Cu Con. Production	k dmt	988				37	96	97	78	78	78	78	78	71	71	71	71	71	15
Head Grades																			
Cu	%	0.20	-	-	-	0.25	0.29	0.23	0.14	0.13	0.23	0.20	0.20	0.23	0.16	0.19	0.22	0.22	0.11
Ag	g/t	1.41	-	-	-	0.83	0.92	1.60	1.65	1.35	1.09	1.40	1.71	1.34	1.20	1.42	1.74	1.75	1.04
Au	g/t	0.07	-	-	-	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.06	0.06	0.04
Pt	g/t	0.20	-	-	-	0.22	0.25	0.27	0.29	0.27	0.21	0.19	0.14	0.16	0.15	0.14	0.17	0.15	0.10
Pd	g/t	0.61	-	-	-	0.79	0.92	0.84	0.76	0.72	0.67	0.66	0.46	0.47	0.41	0.48	0.52	0.44	0.27
Contained Metal																			
Cu	M lbs	519	-	-	-	19	59	47	29	26	46	40	41	47	32	39	44	46	5
Ag	koz	5,236	-	-	-	94	268	473	488	398	322	415	507	396	356	419	516	518	65
Au	koz	249	-	-	-	9	23	24	24	21	21	21	18	18	17	16	18	17	2
Pt	koz	737	-	-	-	25	72	80	86	81	62	57	41	47	43	43	50	45	6
Pd	koz	2,277	-	-	-	90	270	248	224	213	198	194	136	140	121	142	155	129	17
Recovered Metal																			
Cu	M lbs	483	-	-	-	18	54	44	27	24	43	37	38	43	30	36	41	42	5
Ag	koz	3,743	-	-	-	67	192	338	349	285	231	296	362	283	254	300	369	371	46
Au	koz	179	-	-	-	6	16	18	17	16	15	15	13	13	12	11	13	12	2
Pt	koz	619	-	-	-	20	60	68	73	68	53	48	34	39	36	36	41	37	5
Pd	koz	1,972	-	-	-	75	234	218	196	186	172	169	117	120	103	123	134	111	14
Average Recoveries																			
Cu	%	92.9%	-	-	-	92.0%	92.6%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
Ag	%	71.5%	-	-	-	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%
Au	%	72.0%	-	-	-	68.6%	72.0%	73.6%	73.2%	73.0%	72.7%	72.6%	71.2%	71.3%	70.7%	71.3%	71.7%	70.9%	69.0%
Pt	%	83.9%	-	-	-	80.9%	84.0%	85.3%	84.9%	84.7%	84.4%	84.4%	83.1%	83.2%	82.7%	83.3%	83.6%	82.9%	81.2%
Pd	%	86.6%	-	-	-	84.2%	86.6%	87.8%	87.4%	87.3%	87.1%	87.0%	86.0%	86.1%	85.6%	86.1%	86.4%	85.8%	84.4%
Payable Metals																			
Cu	M lbs	456	-	-	-	17	52	41	25	22	41	35	36	41	28	35	39	41	4
Ag	koz	2,790	-	-	-	31	99	245	274	210	156	221	287	215	186	231	301	302	32
Au	koz	147	-	-	-	5	13	15	15	13	13	13	11	11	9	9	11	10	1
Pt	koz	524	-	-	-	16	51	59	66	61	45	41	27	32	29	29	35	31	4
Pd	koz	1,852	-	-	-	71	220	205	184	175	162	159	110	113	96	115	126	104	13
Average Payabilities																			
Cu	%	94.6%	-	-	-	94.4%	95.3%	94.1%	92.3%	91.5%	95.2%	94.4%	94.6%	95.7%	93.8%	94.9%	95.5%	95.6%	91.3%
Ag	%	74.5%	-	-	-	46.6%	51.6%	72.3%	78.5%	73.6%	67.5%	74.7%	79.3%	75.9%	73.2%	77.2%	81.5%	81.6%	69.0%
Au	%	82.2%	-	-	-	79.6%	80.9%	82.6%	85.6%	83.9%	83.6%	83.6%	81.0%	82.3%	80.5%	80.0%	82.3%	80.9%	70.5%
Pt	%	84.6%	-	-	-	82.1%	84.6%	86.2%	89.8%	89.0%	85.8%	84.4%	78.1%	82.5%	80.8%	80.8%	83.5%	81.7%	71.0%
Pd	%	93.9%	-	-	-	93.7%	94.0%	94.0%	94.0%	94.0%	94.0%	94.0%	93.6%	94.0%	93.4%	94.0%	94.0%	93.8%	89.8%
Gross Revenue																			
Cu	$ M	1,870	-	-	-	68	212	169	101	91	167	143	146	170	116	142	161	166	17
Ag	$ M	71	-	-	-	1	3	6	7	5	4	6	7	5	5	6	8	8	1
Au	$ M	264	-	-	-	8	24	27	27	23	23	23	19	19	17	16	19	17	2
Pt	$ M	670	-	-	-	21	65	75	84	78	58	52	34	41	37	37	44	39	5
Pd	$ M	4,089	-	-	-	156	486	452	407	386	358	350	242	250	213	254	277	229	28
Total	$ M	6,964	-	-	-	254	789	729	626	584	610	574	449	486	387	455	509	459	52

22.3 Royalties

Mining lease 109766 covering the Marathon Project at the north end of the North Pit (Figure 22.1) is subject to a 4% NSR royalty, pink block in Figure 22.1, payable to Teck Resources (2%) and Benton Resources (2%). The ore tonnage mined from these claims is estimated at 2.57 Mt with an estimated NSR value of $177 M resulting in royalty payments of $7.1 M of which $3.2 M is associated with pre-production ore.

Figure 22.1: Claims Subject to Royalties



22.4 Operating Cost Summary

Operating costs include mining, processing, G&A (including estimated payments to Indigenous communities), concentrate treatment charges, refining charges, concentrate transportation charges and royalties. The operating cost summary is presented in Table 22.5.

Detailed operating cost budgets have been estimated from first principles based on detailed wage scales, consumable prices, fuel prices and productivities. Additional details on operating costs are presented in Section 21.

Table 22.5: Operating Cost Summary

Category	Total Costs ($ M)	Unit Cost ($/t milled)
Mining	1,069	9.23
Processing	1,051	9.08
G&A	287	2.48
Concentrate Transport Costs	146	1.26
Treatment & Refining Charges	178	1.54
Royalties	4	0.03
Total Operating Cost	**2,736**	**23.63**
Closure & Reclamation	66	0.57
Sustaining Capital	424	3.66
All-in Sustaining Cost (AISC)	**3,226**	**27.86**

The average operating cost for the LOM is $23.63/t of ore processed. The AISC, which includes closure, reclamation and sustaining capital costs, averages $27.86/t of ore processed over the mine life.

22.5 Capital Cost Summary

The capital expenditures include initial capital (CAPEX) as well as sustaining capital to be spent after commencement of commercial operations.

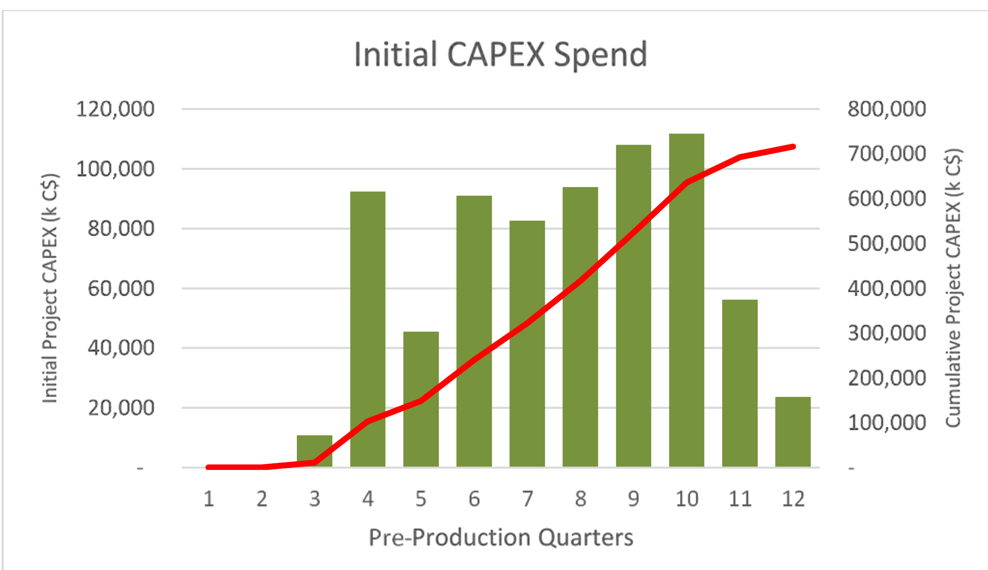
22.5.1 Initial Capital

The CAPEX for Project construction, including processing, mine equipment purchases, pre-production activities (costs and revenues), infrastructures and other direct and indirect costs is estimated to be $716.1 M or $664.7 M net of equipment financing drawdowns less payments ($51.4 M) made during pre-production. The total initial Project capital includes a contingency of $72.4 M which is 11.7% of the total CAPEX before contingency as presented in Table 22.6. The quarterly CAPEX spend is presented in Figure 22.2.

Table 22.6: Initial Capital Cost Summary

Area	Total Costs ($ M)
Infrastructure	71.7
Power & Electrical	25.0
Water & Tailings Management	61.2
Surface Operations	11.0
Mining	127.8
Process Plant	269.2
Construction Indirects	113.5
General Services - Owner's Cost	14.9
Preproduction, Startup, Commissioning	-53.0
Total (before Equip. Financing & Contingency)	**641.3**
Contingency	74.8
Total (before Equip. Financing)	**716.1**
Less: Equipment Financing Drawdowns	-72.4
Add: Equipment Lease Payments & Fees	21.0
Total (after Equipment Financing)	**664.7**

Figure 22.2: Initial CAPEX Expenditures by Quarter



22.5.2 Sustaining Capital Expenditures

Sustaining capital is required during operations principally for additional equipment purchases, mine equipment capital repairs, mine civil works, TSF expansion and process plant scavenger circuit addition. The sustaining capital is estimated at $422.6 M (Table 22.7).

Table 22.7: Sustaining Capital Summary

Sustaining Capital Costs	$ M
Mine Equipment Capital Repairs	99.4
Mine Equipment Purchases	84.7
General Earthwork	8.3
Main Access Road	7.3
Site Roads	1.3
Truck Shop (future extension)	3.7
Laydown	4.3
Fuel Systems Storage (future extension)	0.9
Power & Electrical	3.6
Surface Water Management	1.1
Effluent Water Management	4.7
Tailing Storage Facility	165.0
PGM-Scavenger Circuit	38.5
Total	**422.6**

22.5.3 Salvage Value

No salvage value is estimated as part of the FS. Some salvage value could be expected for some mining equipment purchased during operations that will not have been utilized to its useful life. A residual value is probable for some of the major process plant equipment such as grinding mills, crushers and tank agitators.

22.6 Working Capital

Working capital is required to finance supplies in inventory. Given the accessibility of the site, the working capital requirements are considered low compared to remote operations. Working capital includes 30 days of receivables from concentrate sales. During pre-production the working capital to finance is estimated at $44.7M.

22.7 Reclamation and Closure Costs

The closure costs are estimated at $55.1 M including engineering costs, annual inspections and 5 years monitoring of the TSF and mine rock storage area and 10% contingency. They are updated based on the True Grit Consulting Ltd report, dated July 11, 2012, issued to Stillwater Canada for the Marathon Project.

Closure costs would cover the following activities:

- TSF reclamation, including revegetation and stream bank restoration.
- Main site access road and hauling roads reclamation including culverts removal, stream bank restoration and revegetation.
- Open pit reclamation which includes implementation of boulder fencing, site signing and security and revegetation.
- Post closure monitoring.
- Buildings removal down to concrete slabs and foundations dismantled, regrading to match surroundings and surfaces covered with overburden salvaged and seeding.
- Soils testing and disposal if required.

The closure cost estimate is presented in Table 22.8 with these costs incurred over a five-year period starting 3 years prior operations expected to closure and 2 years after. In addition to the closure costs are surety bonding costs to cover environmental closure liabilities. Over the life of the Project these bonding costs represent $10.8M.

Table 22.8: Reclamation and Closure Cost

Reclamation and Closure	$ 000
Roads	864
TSF	5,100
Open Pit and MSRA	19,944
Buildings, Powerlines Corridor, Parking lot and Aggregate Pit	8,470
Testing / Disposal of hydrocarbon contaminated soils	1,062
Monitoring Program	9,500
Sub-Total	**44,940**
Mob. / Demob & Engineering Costs	5,122
Contingency (10%)	5,006
Total Reclamation & Closure	**55,068**

22.8 Project Financing

The economic model excludes any Project debt but includes equipment financing with the remaining financed through equity for the purposes of the Technical Report. The uses and sources of funds is summarized in Table 22.9. The funding requirement during pre-production is $780.3 M of which $707.9 M is equity.

Table 22.9: Pre-Production Funding Summary

Funding Summary	$ M
Uses of Funds	
Construction Costs (incl. pre-prod revenues & IBA payments)	714.6
Equipment Lease Payments & Fees	21.0
Working Capital Adjustments	44.7
Total	**780.3**
Sources of Funds	
Equity	707.9
Equipment Financing	72.4
Total	**780.3**

22.9 Taxation

Joint ventures ("JV") and partnerships are not legal tax paying entities under the Canadian *Income Tax Act* as the income or loss is calculated at the partnership level and allocated to the partners. Gen Mining and Sibanye-Stillwater will bear the responsibility for paying tax on profits generated by the joint venture. The after-tax results are based on the assumption that the JV is a taxable Canadian entity and tax is calculated based on the tax rules in Ontario. The calculations reflect only the benefit of any historical tax positions held by Gen Mining. The Ontario mining tax, federal income tax and provincial income tax during the LOM totals $943.7M.

22.9.1 Ontario Mining Tax

Ontario mining tax is levied at a rate of 10% on taxable profit in excess of $0.5M derived from a mining operation in Ontario. There are specific guidelines for the calculation of profit and depreciation for the purpose of the Ontario mining tax. A mining tax exemption on up to $10M of profit during a 3-year period is available to each new non-remote mine, of which Marathon does not qualify. The total Ontario mining taxes are $245M over the Project life.

22.9.2 Income Taxes

The federal and provincial income taxes have both been estimated from an identical taxable income which is arrived at by deducting the Ontario mining tax and various tax depreciation allowances. The federal income tax rate is 15% while the Ontario income tax rate is 10%. The total federal income tax is estimated at $419M and the provincial income tax at $279M.

22.10 Economic Results

The main economic metrics used to evaluate the Project consist of net undiscounted after-tax cash flow, net discounted after-tax cash flow or NPV, IRR and payback period. The base case discount rate used to evaluate the present value of the Project is 6%. Sensitivities have been presented at various discount rates ranging from 0 to 10% (Table 22.12).

A summary of the Project economic results is presented in Table 22.10 and the annual Project cash flows are presented in Table 22.11. The total after-tax cash flow over the Project life is $2,061M and after-tax NPV 6% is $1,068M. The after-tax Project cash flow results in a 2.3-year payback period from the commencement of commercial operations with an after-tax IRR of 29.7%.

Table 22.10: Project Economic Results Summary

Project Economics - Base Case Results					
Production Summary (LOM)					
Tonnage Mined (Mt)	447.16				
Ore Processed (Mt)	117.70				
Strip Ratio (W:O)	2.80				
Cu Concentrate (k dmt)	1,009				
Metal	**Cu**	**Ag**	**Au**	**Pt**	**Pd**
Head Grade (% or g/t)	0.20	1.40	0.07	0.20	0.62
Cont. Metal (M lbs / koz)	531	5,309	255	756	2,343
Rec. Metal (M lbs / koz)	493	3,796	183	634	2,028
Pay. Metal (M lbs / koz)	467	2,823	151	537	1,905
Cash Flow Summary ($ M)					
Gross Revenue	6,964				
Mining Costs (incl. rehandle)	-1,069				
Processing Costs	-1,051				
Concentrate Transportation	-146				
Treatment & Refining charges	-178				
G&A Costs (incl. IBA payments)	-287				
Royalty Costs	-4				
Total Operating Costs	-2,736				
Operating Cash Flow	4,228				
Initial CAPEX	-716				
Sustaining CAPEX	-423				
Total CAPEX	-1,139				
Salvage Value	0				
Closure Costs (incl. surety bonding)	-65.9				
Interest and Financing Expenses	-19				
Taxes (mining, prov. & fed.)	-944				
Before-Tax Results					
Before-Tax Undiscounted Cash Flow ($ M)	3,004				
NPV 6% Before-Tax ($ M)	1,636				
Project Before-Tax Payback Period	1.9				
Project Before-Tax IRR	38.6%				
After-Tax Results					
After-Tax Undiscounted Cash Flow ($ M)	2,061				
NPV 6% After-Tax ($ M)	1,068				
Project After-Tax Payback Period	2.3				
Project After-Tax IRR	29.7%				

Table 22.11: Project Cash Flow Summary

Cash Flow Summary ($ M)	Total	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gross Revenue	**6,964**	-	-	-	254	789	729	626	584	610	574	449	486	387	455	509	459	52	-
Mining	**(1,069)**	-	-	-	(39)	(98)	(94)	(94)	(94)	(90)	(92)	(89)	(94)	(88)	(82)	(67)	(40)	(6)	-
Processing	**(1,051)**	-	-	-	(30)	(78)	(84)	(84)	(84)	(84)	(84)	(84)	(84)	(84)	(84)	(84)	(84)	(15)	-
General & Administration (incl. IBA)	**(287)**	-	-	-	(7)	(15)	(15)	(26)	(28)	(29)	(26)	(22)	(23)	(21)	(24)	(24)	(24)	(4)	-
Treatment & Refining Charges	**(178)**	-	-	-	(7)	(19)	(18)	(15)	(14)	(15)	(14)	(13)	(13)	(11)	(12)	(13)	(13)	(2)	-
Concentrate Transport & Insurance	**(146)**		-	-	(6)	(14)	(14)	(12)	(12)	(12)	(12)	(12)	(10)	(10)	(10)	(10)	(10)	(2)	-
Royalties	**(4)**	-	-	-	(1)	-	-	-	(2)	(1)	(0)	-	-	-	-	-	-	-	-
Total Operating Costs	**(2,736)**	-	-	-	(88)	(224)	(226)	(232)	(234)	(232)	(229)	(220)	(224)	(215)	(213)	(200)	(172)	(29)	-
EBITDA	**4,228**	-	-	-	166	566	504	394	350	378	345	229	261	172	242	310	287	24	-
Initial Capital (excl. Contingency)	**(635)**	(0)	(215)	(363)	(62)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Contingency	**(75)**	-	(25)	(33)	(17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sustaining Capital	**(424)**	-	-	(1)	(80)	(68)	(28)	(32)	(33)	(22)	(35)	(22)	(41)	(19)	(8)	(33)	(2)	-	-
Salvage Value	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change in Working Capital	**(0)**	-	(3)	(15)	(29)	(50)	26	8	3	(2)	3	10	(3)	8	(6)	(5)	3	52	-
Closure Costs	**(66)**	-	(0)	(0)	(0)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(55)	-	-
Equip. Financing Drawdowns	**100**	-	43	25	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equip. Financing Payments (Capital + Int)	**(119)**	(1)	(5)	(9)	(14)	(19)	(19)	(22)	(14)	(12)	(4)	-	-	-	-	-	-	-	-
Pre-Tax Cash Flow	**3,004**	(1)	(205)	(395)	(4)	428	481	348	306	340	308	217	216	159	227	270	233	76	-
Taxes (Mining, Prov., Fed.)	**(944)**	-	-	-	(1)	(102)	(118)	(91)	(83)	(95)	(87)	(54)	(67)	(39)	(59)	(77)	(70)	(1)	-
After-Tax Cash Flow	**2,061**	(1)	(205)	(395)	(6)	326	364	257	223	245	221	162	150	120	167	193	163	75	-

Notes:

1. *Non-IFRS Financial Measure.*
2. *Pre-production metal revenue treated as credit against pre-production costs in construction capital.*
3. *Numbers may not add due to rounding.*

22.11 Sensitivity Analysis

A sensitivity analysis was performed for ±10% and ±15% variations for metal price, exchange rate, OPEX and CAPEX. Each parameter was calculated independent of any correlations that may exist between variables such as for gold price and exchange rate, which tend to be negatively correlated.

The Project is most sensitive to metal prices and exchange rate followed by operating costs and initial capital costs. The exchange rate sensitivity is identical to metal prices as exchange rate only impacts revenues since all costs are C$ denominated.

The results of the sensitivity analysis on the NPV 6% and IRR is presented in Table 22.12 and in Figure 22.3 and Figure 22.4 respectively.

Table 22.12: Project After-Tax Sensitivities

After-Tax Results	OPEX Sensitivity				
	-20%	-15%	0%	15%	20%
NPV 6% ($ M)	1,270	1,220	**1,068**	916	866
Payback (yrs)	2.1	2.1	**2.3**	2.4	2.5
IRR (%)	33.0%	32.2%	**29.7%**	27.1%	26.2%

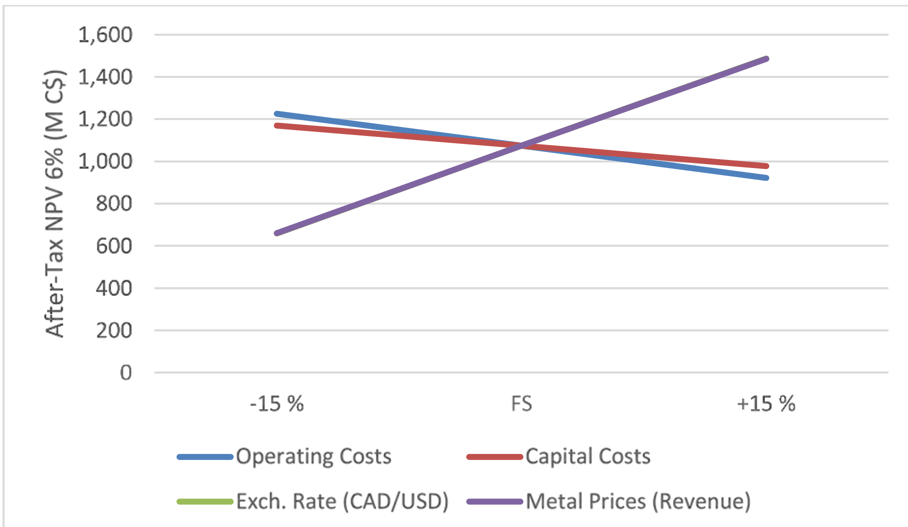
After-Tax Results	CAPEX Sensitivity				
	-20%	-15%	0%	15%	20%
NPV 6% ($ M)	1,195	1,163	**1,068**	972	940
Payback (yrs)	1.9	2.0	**2.3**	2.6	2.7
IRR (%)	37.7%	35.4%	**29.7%**	25.3%	24.1%

Discount Rate Sensitivity	After-Tax NPV ($M)
0%	2,060
5%	1,191
6%	**1,068**
8%	859
10%	689

Palladium Price US$/oz	1,000	1,250	1,500	1,725	1,850	2,000	2,500
NPV 6% ($ M)	356	601	847	**1,068**	1,190	1,337	1,831
Payback (yrs)	4.3	3.2	2.6	**2.3**	2.1	2.0	1.6
IRR (%)	14.8%	20.2%	25.3%	**29.7%**	32.1%	34.8%	43.7%

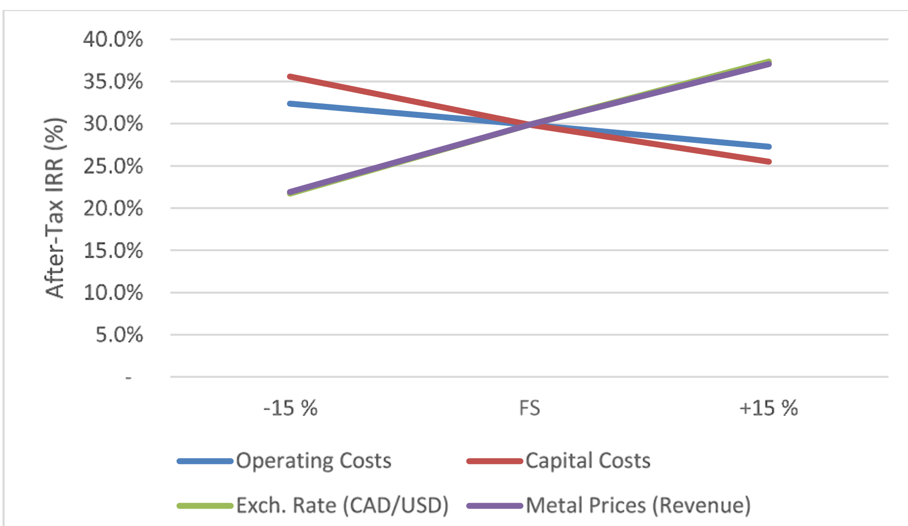
Copper Price US$/lb	2.00	2.50	3.00	3.20	3.50	4.00	4.50
NPV6% ($ M)	792	907	1,022	**1,068**	1,137	1,251	1,365
Payback (years)	2.7	2.5	2.3	**2.3**	2.2	2.1	2.0
IRR %	24.7%	26.8%	28.9%	**29.7%**	30.9%	32.9%	34.8%

Figure 22.3: After-Tax NPV 6% Sensitivity



***Note**: Exchange Rate and Metal Price Sensitivity are very similar with overlapping lines.*

Figure 22.4: After-Tax IRR Sensitivity



***Note**: Exchange Rate and Metal Price Sensitivity are very similar with overlapping lines.*

23. ADJACENT PROPERTIES

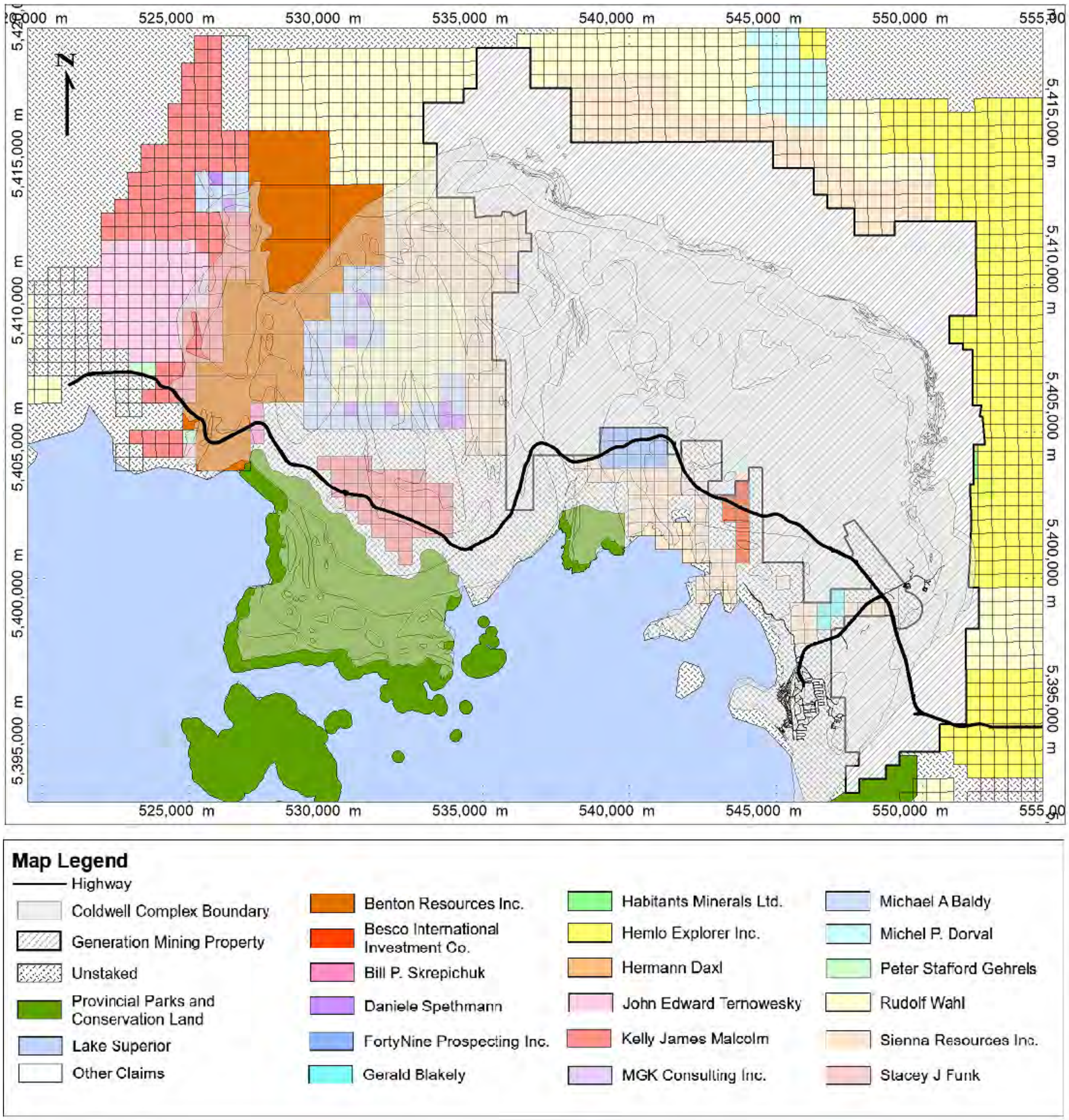
23.1 Introduction

There are 18 land holders adjacent to Gen Mining's land holding or covering a portion of the Coldwell Complex ("CC") (Figure 23.1). The land holders include exploration companies but are predominantly individual prospectors. There are no adjacent properties that have any significant information relating to the Project. Gen Mining maintains a significant land position in the CC, and most of the areas historical mineral deposits are located within the boundaries of the Company's property boundary.

There is a historical showing on the southwest boundary of the CC, called the Middleton Occurrence that is separately staked by Benton Resources Inc. and Kelly-James Malcolm. The Middleton Occurrence is located approximately 0.5 km south of the mouth of Dead Horse Creek and is accessed by trail from Highway 17 east of Dead Horse Creek. The property was explored from 1988 to present with the initial discovery of copper mineralization in the form of malachite precipitate coating fractures, joints, and foliation surfaces. Initial grab samples from 1989 - 1991 by prospects and Resident Geologist staff returned assays results with varied from nil to 0.064 oz/t Au, nil to 4.34 oz/t Ag, 0.055 to 13.925% Cu and 0.008 to 0.019% Zn (Mckay and Pettigrew, 1997).

The land north of Gen Mining's property, as well as the western portion of the CC has recently been staked by various companies focused around PGM exploration. These projects are not related to the Eastern Gabbro which host the Marathon and Sally Deposits, but rather the Western Gabbro or Archean footwall adjacent to the Complex. To the east, Hemlo Explorers Inc. has staked within the footwall margin of the CC covering the Pic Project exploring for Archean gold, which is unrelated to the CC and associated PGM-Cu mineralization.

Figure 23.1: Claims Adjacent to Gen Mining's Marathon Property



Source: *Gen Mining (2021).*

23.2 Regional Properties (but Not Adjacent Properties)

Cu-Ni-PGM exploration in northern Ontario has been focused in five regions as follows: Marathon to Manitouwadge area; Nipigon region; Shebandowan district; Norton-McFaulds Lake Group or Ring of Fire region; and the East Bull Lake District or River Valley area (Figure 23.2).

These five regions have drawn interest from multiple exploration and mining companies because of the high potential for further Cu- Ni-PGM discovery and development.

Figure 23.2: Location Map of other PGM (Cu, Ni) Exploration Projects in Northern Ontario

23.2.1 <u>Lac Des Iles Deposit</u>

The Lac des Iles Mine is an operating palladium mine north of the City of Thunder Bay. Although the Lac des Iles Deposit, owned and operated currently by Impala Platinum Holdings, is geographically related to and has some similarities with the Marathon Deposit, there are many dissimilarities, including age of formation (2.69 Ga for Lac des Isles compared with 1.1 Ga for the Marathon Deposit). The Lac Des Iles Deposit is not associated with the Superior Mid Continental Rift and significantly predates the Marathon Deposit. Other dissimilarities include dominant mineralization textures, and overall style of mineralization and metal ratios.

The Marathon Deposit contains mineralization textures that are considered typical of contact style mineralization, while textures of the Lac des Iles Deposit display some fundamental differences to that type of deposit. The Marathon Deposit is very fresh and coarse grained when compared with Lac des Iles. The Lac des Iles Deposit is metamorphosed and hydrothermally altered, which translates to a significant difference in metallurgy. Despite the lower palladium grade in the Marathon Deposit, recoveries are similar to Lac des Iles due to the differences in alteration and texture.

The Lac des Iles Deposit is not localized near the contact between the host intrusion and the country rocks and evidence of the assimilation of the host rocks is entirely lacking. Instead, the mineralization at Lac des Iles has many features in common with layered intrusion-hosted deposits, in which pulses of primitive magma introduced the PGM. However, unlike the quiescent magma chambers of most layered deposits, the magmas at Lac des Iles were intruded energetically, forming breccias and magma mingling textures.

The mineralization at Lac des Iles has less Pt with respect to Pd, compared to the Marathon Deposit and most other PGM deposits. With Pd:Pt ratios of 10:1, Lac des Iles stands in marked contrast to other deposits in the general vicinity (e.g., Marathon) where Pd:Pt ratios average approximately 4:1.

Impala also has a joint venture with Transition Metals at their Sunday Lake Project which has more similarities to the Marathon Deposit than Lac Des Iles. It is located 25 km north of the city of Thunder Bay and 60 km south east of the Lac Des Iles Mine. It is associated with the Superior Mid Continental Rift and the intrusive host has a reversely magnetized signature similar to the host gabbros at the Marathon Deposit.

Similarities include mafic to ultramafic intrusions into an Archean basement, utilizing local pre-existing structure that is reflected on surface as alinements, Croch Lake Fault. Mineralization is focused along the basal contact in trough embayment and in hanging wall gabbroic breccias. Mineralization in both deposits is commonly disseminated and blebby sulphides of chalcopyrite, pentlandite and pyrrhotite. However, the Pd:Pt ratio is much lower at Sunday Lake than at Marathon.

23.2.2 Thunder Bay North Property

The Thunder Bay North property currently owned and operated by Clean Air Metals Inc. is located approximately 50 km north-northeast of Thunder Bay and covers an area of approximately 700 km^2. Benton Resources completed the purchase of the Thunder Bay North Project from Panoramic Resources Inc in 2019 over a 3-year period for payment of $9 M. Benton Resources will also acquire from Rio Tinto Exploration North, a 100% of the Escape Lake and Escape North property upon completing of a 3-year, $6 M option agreement. Clean Air Metals (formally Regency Gold Corp.) acquired the project from Benton Resources which includes 100% ownership of the Thunder Bay North property as well as acquiring 100% of the Escape Lake Property up completion of previous Benton-Rio terms.

The Thunder Bay North Project is a series of at least five mafic to ultramafic pipes intruding into the Archean basement. Most of the mineralization is associated with two of these intrusions which is the focus of current exploration.

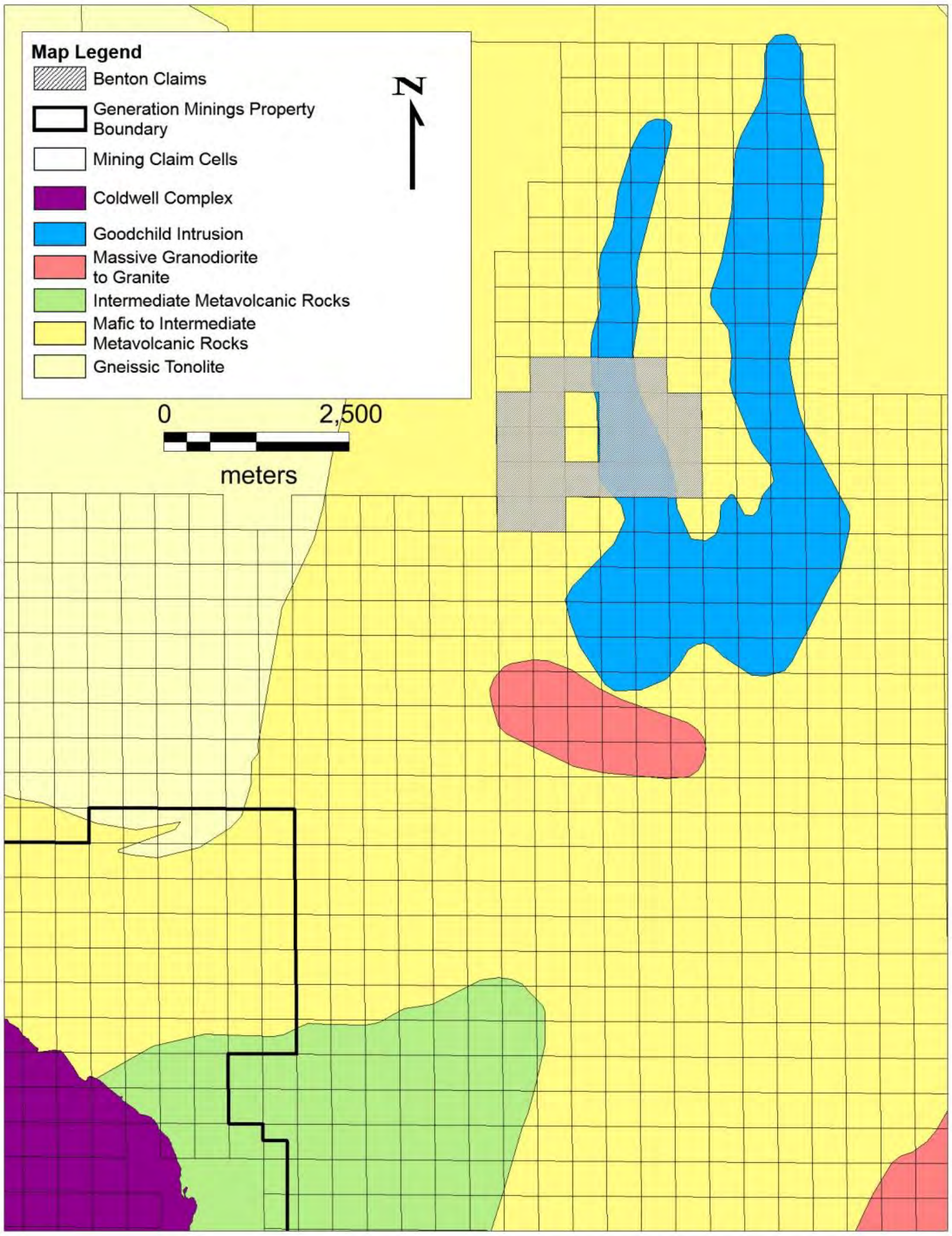
23.2.3 Goodchild Property

The Goodchild property is located 20 km northeast of the Town of Marathon and is accessible by helicopter. The property consists of approximately 22 contiguous mining claim cells held by Benton Resources Inc. The Benton claims cover the historic Beggs Currie and Phantom showings. The rest of the Goodchild Ultramafic Intrusion is staked by various prospectors and Hemlo Explorers Inc.

The Goodchild property is located within the Heron Bay Archean Greenstone Belt. It is underlain by an assemblage of supracrustal rocks, predominantly mafic metavolcanics rocks (basalts) with minor interflow sedimentary rocks including graphitic slate, argillites and iron formation. The supracrustal rocks have been metamorphosed to lower amphibolite facies and trend northeast. The sequence has been intruded by the Goodchild Ultramafic complex which is centered north of Goodchild Lake (Figure 23.3).

The Goodchild Ultramafic complex has a general north-south trend and is comprised of two limbs. The complex is identified as a magnetic high on airborne surveys and measures 8 km long by 4 km wide. The major rock units are serpentinized peridotite, dunite and minor spinifex textured komatiite. Minor units of pyroxenite and gabbro have also been observed.

Figure 23.3: Map of the Goodchild Ultramafic Complex



Source: *Gen Mining (2021)*

23.2.4 Beggs-Currie and Phantom Occurrences

Two main showings referred to as Beggs-Currie and Phantom occur within the boundary of the Benton Resources Inc. claims (Figure 23.2). These occurrences have a long history of exploration.

The Beggs-Currie Showing consists of a sulphide breccia zone along the contact between the mafic volcanic rocks and ultramafic intrusive rocks. It has been described as “composed of 50% ultramafic rock and 50% massive pyrrhotite + chalcopyrite". Grab samples from this zone have returned values up to 12.6% Ni, 0.295% Co and PGE up to 1.8 g/t.

The Phantom showing is a quartz vein hosted pyrrhotite + chalcopyrite zone associated with shear zones. This style of mineralization has been observed in the footwall mafic volcanics at the Beggs-Currie Showing. Grab samples at the Phantom Showing have returned values of up to 1.27% Ni and 0.2% Cu. The Beggs-Currie showing has a higher Ni tenor relative to the Phantom Showing.

23.2.5 Other Occurrences in the Nipigon Region

Other known early-stage exploration Cu-Ni-PGM properties within the Nipigon Region are listed in Table 23.1.

Table 23.1: Early-Stage Cu-Ni-PGM Prospects in the Nipigon Region

Property	Location	Company	Rock Type	Mineralization	Sample Grades
Eva Kitto	153 km NE of Thunder Bay	Transition Metals Corp.	Ultramafic Intrusion		0.28% Ni, 0.13% Cu and 0.56 g/t Pt+Pd over 1.22 m
Seagull	60 km NE of Thunder Bay	White Metals Resources Inc.	Gabbro- Pyroxenite	Disseminated Chalcopyrite	3.6 g/t Pt+Pd, 0.34% Cu and 0.21% Ni over 2.1 m
Weese- Luella	25 km north of Armstrong	Various Stakers	Anorthosite, Gabbro-Peridotite		3.2% Cu, 1.3% Ni over 10 m
Awkward Lake	50 km south of Armstrong	Various Stakers	Gabbro	Disseminated to massive chalcopyrite, pentlandite and pyrrhotite	Drilling – 0.21% Cu, 0.33% Ni over 4.5 m grab sample in massive sulphide, 4.53% Ni
Saturday Night	25 km N of Thunder Bay	Transition Metals Corp.	Mafic to Ultramafic Intrusion	Disseminated to blebby chalcopyrite, and pyrrhotite	1.07 g/t TPGM over 6.25 m
Maude Lake	10 km N of Schreiber	Transition Metals Corp.,	Gabbro-Diorite Intrusion	Semi-massive, net like veins to fine grained disseminated to blebby	Historic surface sample of 6.23% Ni, 0.15% Cu, 0.12% Co and 0.43 g/t TPGM
Hele	75 km NE of Thunder Bay	Benton Resources	Mafic-Ultramafic Intrusion		No significant mineralization

Note: *TPGM = total PGM (platinum group metals).*

23.2.6 Other PGM Properties

River Valley owned by New Age Metals Inc., located 100 km north east of the City of Sudbury. The deposit is hosted in the River Valley Intrusion (“RVI”) a shallow dipping and layered body, approximately 900 m thick. The dominant rock types of the RVI are brecciated and massive leuco-gabbronorite and leucogabbro with gabbro and anorthosite. It is the largest and eastern most intrusion of the Paleoproterozoic age East Bull Lake Intrusive Suite.

East Bull Lake is owned by Grid Metals Corp. and is located 80 km to the east of the City of Sudbury. The East Bull Intrusion is over 20 km long and is made up of two magmatic centres. Palladium mineralization is spatially associated by structure controls and hosed in mafic-ultramafic rocks.

Eagles Nest is owned by Norton Resources Ltd, and is located in the Ring of Fire Region 400 km north of Thunder Bay. The deposit is hosted in an ultramafic sill complex with a strike length over 16 km and 1.5 km thick. The deposit is a sub-vertical plunging peridotite body believed to be a feeder conduit or keel to the overlying ultramafic sill. Mineralization consists of massive to net-textured and disseminated sulphides, of pyrrhotite, pentlandite and chalcopyrite.

24. OTHER RELEVANT DATA AND INFORMATION

24.1 Project Implementation

The FS has been completed with the inclusion of the execution strategy that will incorporate an “Owner Managed” style and aspects of an engineering, procurement, construction management (EPCM) style construction project. This will result in a mixed management team with both the Company and Consultants employees throughout the construction phase. Gen Mining mandated GMS to integrate the FS in order to leverage its experience in implementing similar execution strategies.

The Project team will manage and execute the project engineering, procure project items, execute project construction, provide project control, staff for start-up and operation, and commission mine and process areas. Certain operation departments will be integrated in the project team early in the process to allow their parallel development and will focus on the Project readiness.

Due to the site’s location and proximity to qualified contracting operations, most of the on-site labor services in the construction phase will be provided by third party contractors. Third-party hiring shifts a portion of the risks to the contractors in exchange for the party’s markups.

As part of the early works, the first construction phase will involve clearing and grubbing, upgrading Camp 19 road, temporary installations for the mining equipment like fuel bays, shelters for maintenance, and temporary power access. Reputable third-party consultants and engineers will be hired to complete the detailed design engineering and QA/QC work to reduce the risks to Gen Mining critical and specialized components such as the powerline engineering and easements process, long lead items for the process plant, TSF, water treatment, and environmental issues. Specifications established by these firms will be approved by the team in charge of each task.

The overall result of this style of management will be the placement of experienced and skilled personnel in their respectable positions, which will result in overseeing a qualified workforce and taking advantage of the developed industries near the site.

24.2 Project Development Organization

The Project implementation team is made up of a construction-engineering group, led by a temporary organization, and an operations group. The operations group consists of a mining group, mill group and general services group, which all are created in advance to support execution activities or to begin pre-production planning activities. The engineering, construction and operations group report to the Project

Director and work together with the objective of reducing capital costs through planning of equipment use, staff and employees, project commissioning, and project start-up.

The Project will be executed using an “Owner-managed” project delivery model. All aspects of engineering, procurement and construction for the Project will be managed directly by the Owner. Detailed engineering and a portion of the procurement will be outsourced. The Project construction period is 23 months and the total pre-production period is estimated at 42 months which includes detailed engineering, procurement, construction and commissioning activities up to commercial production being declared. Construction labour estimates a total of 2,255,400 labour hours; this represents an estimated average number of 356 and a peak of 870 contractors and employees on the Project.

The operating organization consists of three departments: Mine - including mine operations, geology, engineering and maintenance; Process Plant - process operations, process technical and analytical and fixed plant maintenance; and General and Administrative - including human resources, environment, health and safety, site services, warehouse and logistics and accounting. Operating labour estimate includes a total steady-state labour count of 429 employees.

The Mine Group includes the Operations, Maintenance, Engineering and Geology departments. The Mine Group will start receiving its equipment to start the mining activities by Q3 2022 and will progressively build its initial fleet.

The Plant Group personnel initially reviews and contributes to the mill detailed engineering and procurement activities performed by the process engineer. The group will subsequently expand to monitor the mill construction activities, particularly piping and mechanical installation, electrical installation, instrumentation and process control. It will also be involved in recruiting and training the mill workforce and prepare the inventory of parts and supplies ahead of production. Finally, the mill department will participate in the mill commissioning activities and take responsibility for the process plant with the start of ore commissioning.

The General Services Group is established early in the Project development phase, and initially provides services to the Mine Group and the Engineering and Construction Group. It is logical to progressively organize and activate the General Services Group as part of the Project and therefore avoid duplication and dislocation when moving into the production phase. These services include general administration, finance and accounting, supply chain, human resources and training, security, social and environmental management, transportation, camp management, health and safety, surface support and IT as well as communications. Some external contributors / contractors will also provide support, such as freight forwarders. The General Services Group will recruit heavily in the local labor pool and will be an important service provider to the mine and construction activities.

The Engineering and Construction Group has the overall responsibility of the engineering and management, equipment and construction material procurement and construction of the processing facilities, accommodations for personnel, administration and mine offices, mine workshop and warehouse, and temporary construction power.

All capital equipment and construction material will be tendered by the Engineering and Construction with the technical assistance of the Process Plant Engineer. Purchase orders will be issued by the Marathon Project team for or on behalf of Gen Mining, owner of the Project. Specifications are established by the various engineering firms retained for the Project and accepted by the Owner's representatives.

Certain specialized construction mandates and services will also be tendered, such as grinding mill installation supervision. These activities will be controlled through contracts. These contracts will be based on the documents approved by Gen Mining, with addenda specific to the Marathon Project.

In parallel to the construction phase, the Marathon General Manager will progress and develop the Operational Readiness Plan ("ORP"). The ORP will develop all of the critical operating systems and operating procedures to allow for efficient start-up, ramp-up into Commercial Production.

Once the Project has been commissioned, the Project Director will turn the Project completely over to the Gen Mining / Marathon General Manager of operations who will assume responsibility of the Mine, Mill and General Services Group. The Construction Group will be phased out as the remaining construction activities are completed. The Project Director will remain on the Project assisting the Operations team until Commercial Production is achieved.

The structure used in the Project implementation team and structure is considered optimal in its ability to reduce capital costs and achieve on time operating objectives.

The ultimate project authority lies with Gen Mining. The Project director shares responsibility for all steps in the process required to reach commercial production.

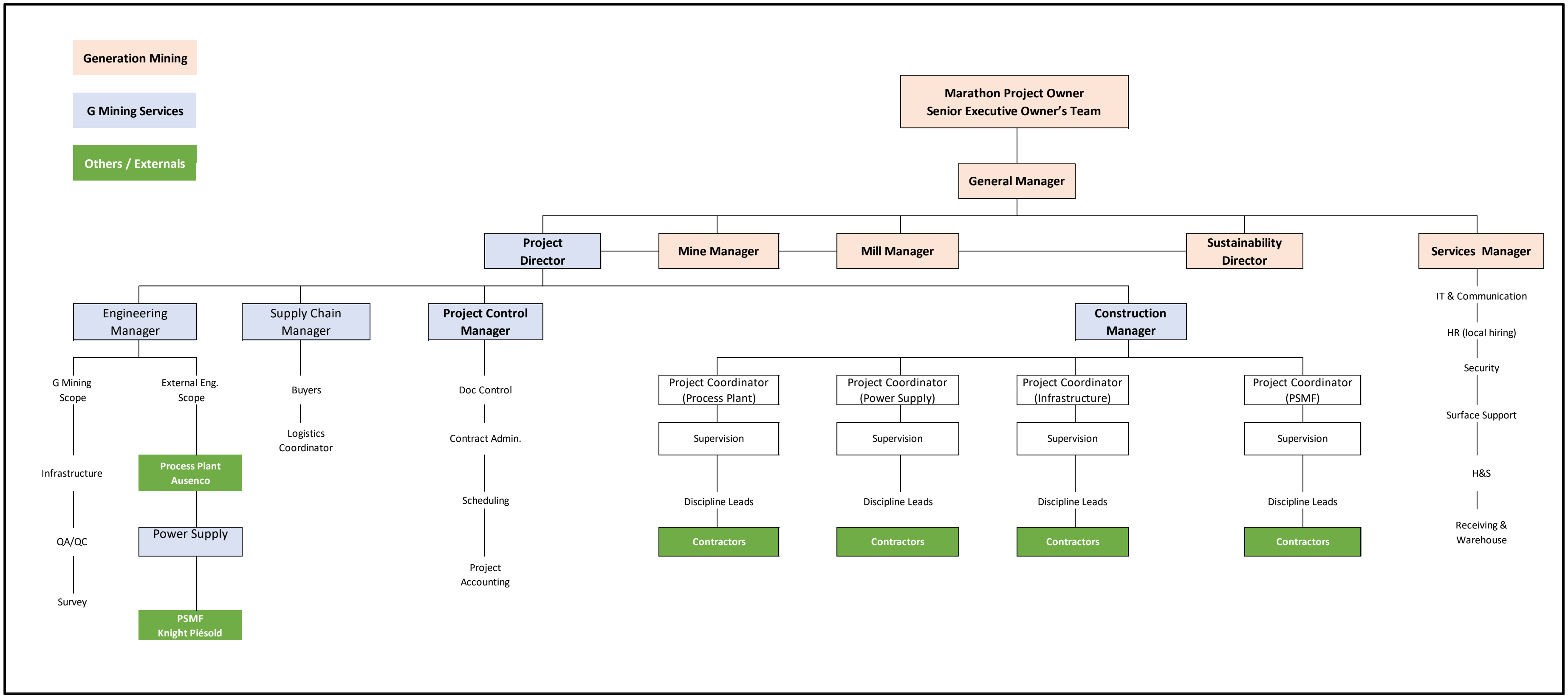
The engineering and construction group is involved in the development of the detailed engineering, procurement, and construction of all items in relation to on-site and off-site infrastructure including; buildings, site preparation, roads, buildings and TSF construction.

Engineering and Construction Group together with Gen Mining will be responsible for the engineering, easements negotiations and agreements, construction and commissioning of the powerline tie-in from the

HydroOne Marathon / Manitouwadge powerline and the Marathon site main substation. The Engineering and Construction Group will support and coordinate HydroOne Planning Group.

In general, the mixed team for engineering and construction can be broken down into five categories: GMS employees on site, GMS employees in Brossard, GMS staff employed by Marathon Project on site, contractors and consultants, and Gen Mining employees. Principal organizational relationships are outlined in the Figure 24.1.

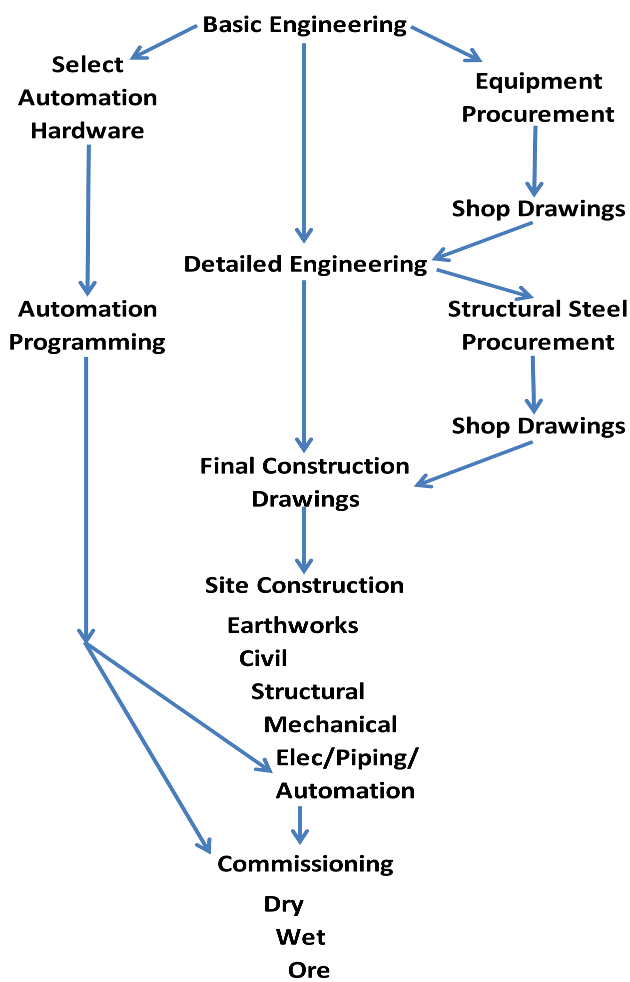
Figure 24.1: Project Team Organization for Engineering and Construction Phases



24.3 Project Engineering

The plan is to use a fast-track engineering process to achieve the planned completion date. This process is shown in Figure 24.2. Some project activities will occur in parallel to reduce the overall timeline. Detailed engineering will be prioritized to fit the staged schedule leading with the early works prior to the delivery of major equipment. In general, the order of construction will follow the order of earthworks, civil, structural, mechanical, and electrical/piping/automation, respectively. Drawings will be completed as far in advance as possible, with others being delivered as-needed.

Figure 24.2: Engineering Process



Some areas of engineering will be subcontracted to specialized firms. The actual plan is to subcontract these engineering areas as follows:

- Tailings Storage Facility by Knight Piésold.
- Process plant by Ausenco.

All other infrastructure engineering will be performed by GMS in Brossard.

Basic engineering is finalized with the completion of principal trade-offs, plant site alternatives, TSF options, and process specifications. The process flowsheets have been finalized and much of the design criteria and equipment specifications are complete. However, detailed engineering will need to commence earlier. This phase is called “Early Works”.

24.4 Early Works

This FS has identified activities to be developed as early as possible to meet the Marathon Project schedule.

The mining group needs to be mobilized to initiate ore extraction as soon as possible. This activity is on the Project’s critical path. Therefore, mining engineering will confirm the mine design and define mining and support to mining equipment. Contracts will have to be tendered for this equipment. The engineering and the construction mine ramps and the beginning of the pit stripping and related infrastructure such as hauling roads, construction of the TSF cell 1 dams and process plant platform need to be in place as the extraction shall begin.

Some detailed engineering activities for the process plant need to begin to establish the parameters and datasheets for all the long-term delivery process equipment such as the grinding mills. The detailed engineering of the process plant building needs to start earlier since the present schedule requires the completion of this building shell by Q2 of 2023.

Engineering and coordination of the main power line with HydroOne will also be part of the early works. A schedule will be established to meet the Project requirements.

Some of these contracts will be awarded following Gen Mining’s approval of partial or full funds for the Project.

24.5 Detailed Engineering/Procurement

The Marathon site has been mapped using LIDAR. The general arrangement uses the topographic information from the LIDAR in the form of UTM coordinates to locate infrastructure.

Multiple soil geotechnical studies will be conducted in the basic engineering on the Marathon site. The previous studies analyzed the soil underneath the TSF. More will be required to confirm the soils mechanical capacity and quality at the location of the infrastructure as per the FS. Consistent values for permeability, soil type, strata thickness, density, and bearing capacity have been found throughout the site. The soil analyses were performed by KP. These studies provide the required information for detailed engineering for foundations.

Rock geotechnical studies have been conducted for metallurgical work as well as pillar design. The metallurgical analysis was performed by SGS to determine the physical properties of the rock.

24.6 Capital Procurement and Logistics

The Engineering and Construction Group will purchase all equipment and import materials required for construction which permits direct control over the procurement budget and schedule. The team follows a standard bidding and evaluation process considering the total delivered cost including freight to site to obtain the lowest total cost or best value (considering operating cost and life cycle considerations). The team coordinates logistics and assists suppliers in complying with project freight and transportation procedures. Freight forwarding is managed dynamically to minimize the freight transit times and maximize consolidation of shipments.

Low-cost country sourcing (“LCCS”) will be considered for low-risk construction material and equipment, where practical, to improve the Project capital expenditures.

In order to minimize the duration of project construction, engineering and construction are performed on an owner managed, fast-track basis. The fast-track strategy compresses the Project schedule by running design and construction phases in close sequence.

The construction team will consist of experienced construction project managers and superintendents working with a skilled team of discipline engineers and construction supervisors. In some instances, the team will have the benefit of having participated in the detailed engineering phase of the Project. The Project is managed with a focus on safety, cost, schedule and quality to support the overall project goals.

Materials and equipment are purchased by the Gen Mining and issued to construction teams in a timely manner. The Owner’s Project team manages risks and opportunities related to material supply, construction labor organization and prioritization of tasks. This provides full flexibility to organize work in such a way that the best available labor resources are allocated to the most urgent or complex construction tasks. Underperforming staff or contractors can be reassigned to less critical work or terminated.

QA/QC of earthworks and concrete is performed by a suitably accredited third-party engineering firm, and all QA/QC documentation is posted to the M-Files data management system for archival and review purposes.

Structural steel is procured from qualified suppliers, most likely from sources in North America, and shipped directly to site. Structural steel is procured as material and erect.

Mechanical / electrical and automation equipment is supervised by the Owner's construction discipline teams. Specialized contractors will be retained for all installation by discipline. Some critical equipment may require specialized supervision such as the grinding mills or other complex or high value equipment. Vendors' representatives are expected for QA/QC on the assembly and installation of critical machinery, and for commissioning assistance or warranty inspections for critical and high value machinery.

All automation equipment is pre-programmed in the GMS's Brossard project office instrumentation laboratory by the automation staff and pre-tested. Once installed, automation equipment requires only routine de-bugging and last-minute modifications which greatly reduces commissioning delays. In general, there is no need to perform any automation programming during startup and commissioning since it has all been completed in the lab months prior to startup.

Preferred piping materials are high-density polyethylene (HDPE) except when corrosiveness, operating pressures or other specific design requirements preclude its use. Generally, HDPE pipes for mineral processing plants have the best abrasion resistance and life cycle cost benefits compared to steel or other materials. There will also be substantial use of rubber lined carbon steel pipes where HDPE cannot be used. The majority of pipe connections will be made using Victaulic connections – which facilitates site fabrication, reduces on site labor requirements, and greatly simplifies maintenance once in production. Equipment will generally be procured with Victaulic flanges for commonality. Piping is fabricated and installed using local hires managed by the construction piping staff.

24.7 Project Controls

The Project will be managed and controlled with the assistance of an earned-value project control methodology. The following software tools are used to support the project execution:

- M-Files is a data management service that provides the sharing of all relevant project data and information, such as drawings and specifications, with all project stakeholders – the Owner and Owner's Project development team, engineers, consultants, suppliers, auditors, insurers, and construction contractors. M-Files is also used to manage all documentation related to procurement – bid documents, proposals, technical documentation and manuals. Access to M-Files services is managed with a flexible system of access controls and protocols, such that each Project stakeholder can only access or upload data pertaining to their scope of project involvement.

- The Project scheduling software is Microsoft Project. It will integrate the Enterprise Resources Planning ("ERP") chosen by Gen Mining, in order to perform standard budget variance and earned value progress reports. GMS will implement an ERP to fulfill Project requirements in the event Gen Mining chooses to delay after commercial production.

24.8 Quality and Design Standards

The Marathon Project's components detailed engineering will be designed based on the relevant Ontario / Canadian design codes and standards using qualified and proven manufacturers.

The process plant and Project infrastructure will be designed with a minimum year design life.

Health and safety standards will comply with all relevant OSHA and MIOSHA regulations and also conform to Gen Mining's requirements.

Process solids and water management dams and dykes will be designed with conservative design factors.

24.9 Quality Management

QA/QC of all construction activities is performed by a suitably accredited third-party engineering firm under the direct supervision of the Resident Engineer of the Project. All QA/QC documentation is posted to the M-Files data management system for archival and review purposes.

QA/QC of welding for critical structures (e.g., fuel tanks) will also be performed by a suitably accredited inspection firm. All QA/QC documentation is posted to the M-Files data management system for archival and review purposes.

The process equipment will be subject to vendor verifications and factory acceptance testing programs included in the Project procurement plan with consideration to an overall process equipment risk analysis.

24.10 Commissioning

As Project areas are mechanically completed, commissioning activities begin immediately. There are three basic stages of commissioning checks – dry, wet and ore commissioning. Dry commissioning checks verify the correct installation of equipment, and the proper connections to all interfaces – electrical, instrumentation, and piping. Wet commissioning verifies the integrity of tankages and piping connections as well as proper equipment functionality. Ore commissioning is a final verification of the process in stages, beginning with ore receipt followed by grinding.

Commissioning checklists are continually updated and uploaded to M-Files by the site commissioning team as commissioning progresses. Commissioning of high value or complex process equipment is supported by vendor representatives who will also provide specialized operations and maintenance training to the operations staff.

The automation team is on-site as process equipment installation begins, with the entire plant automation system having been pre-assembled and bench tested, (which significantly reduces the commissioning time). As equipment is installed, input / output interfaces are verified, controls are tested, and automation drawings are updated to as-built-drawings.

Equipment technical documentation and checklists are available on M-Files for the entire plant at the end of commissioning, so the operation team has all necessary information to ensure a smooth transition from construction to operations.

24.11 Project Schedule

The construction and pre-production development schedule leading to commercial production is 26 months, consisting of two months for initial mobilization of key personnel and equipment and 21 months of on-site construction activities from the start of mining. The Project Level 1 schedule is summarized in Figure 24.3.

Figure 24.3: Project Level 1 Schedule (Page 1 of 4)

Generation Mining -Marathon Feasibility Study - Master Schedule

Area	Start	Finish
Marathon	Tue 20-04-07	Fri 24-06-28
Major Milestones	Tue 20-08-11	Mon 24-06-24
Feasibility Study Milestones	Tue 20-08-11	Wed 21-03-31
Kick Off Meeting	Thu 20-08-27	Thu 20-08-27
Feasibility Study Complete	Wed 21-03-31	Wed 21-03-31
Detail Engineering Complete	Tue 20-08-11	Tue 20-08-11
Project Milestones	Thu 20-10-29	Mon 24-06-24
Permitting	Thu 20-10-29	Thu 23-08-31
Project Financing	Thu 21-07-01	Thu 21-07-01
Early Works Starts	Wed 22-04-06	Wed 22-04-06
Construction Starts	Fri 22-07-01	Fri 22-07-01
Process Plant Building Construction Starts	Tue 22-09-27	Tue 22-09-27
Process Solids Management Facility (TMF) Phase 1 Completed	Mon 22-12-12	Mon 22-12-12
Permanent Power	Thu 23-08-24	Thu 23-08-24
Process Plant Commissioned	Mon 24-06-24	Mon 24-06-24
Commercial Production	Mon 24-06-24	Mon 24-06-24
Permitting, IBA, Negociations & Agreements	Tue 20-04-07	Thu 23-08-31
Restart EA/Baseline/Govt	Tue 20-04-07	Mon 21-01-04
General	Tue 20-04-07	Mon 20-06-01
Baseline Studies/Update Reports & EIS	Tue 20-06-02	Mon 21-01-04
Government Relations prior to JRP Restart	Tue 20-04-21	Thu 20-11-19
Community Relations- Consultation/Engagement	Wed 20-07-08	Thu 20-10-29
Consultations	Wed 20-07-08	Fri 20-09-18
Open Houses Round One	Wed 20-10-21	Thu 20-10-29
Negotiations/Agreements	Tue 20-08-11	Tue 21-01-19
Federal Approvals	Mon 21-01-04	Thu 23-08-31
Provincial Permits and Approvals	Tue 21-10-12	Mon 22-06-06
Municipal Approvals and Permits	Tue 20-08-11	Mon 22-02-21
IBA / Indigenous Affairs	Thu 20-10-29	Thu 20-10-29

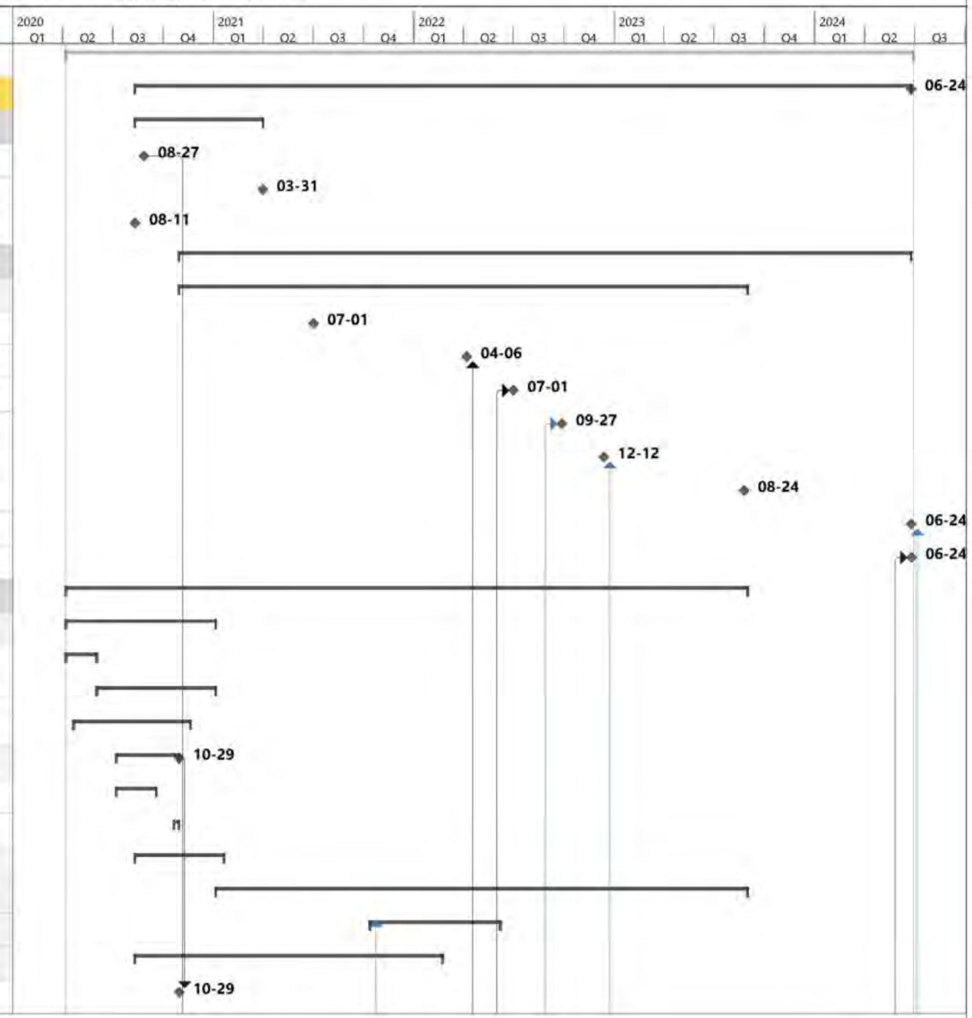


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Figure 24.3: Project Level 1 Schedule (Page 2 of 4)

Generation Mining -Marathon Feasibility Study - Master Schedule

Area	Start	Finish
Electrical Permitting and Negotiations	Thu 20-11-05	Wed 21-12-29
NI-43-101 Feasibility Study Phase	Thu 20-08-27	Wed 21-03-31
Project Execution	Tue 20-08-11	Mon 23-12-25
Basic & Detailed Engineering	Thu 21-04-01	Fri 22-09-16
Basic Engineering	**Mon 21-05-03**	**Fri 21-07-23**
Process Plant Basic Engineering	Mon 21-05-03	Fri 21-07-23
Detailed Engineering	Thu 21-04-01	Fri 22-09-16
Detailed Engineering For Permits	Thu 21-04-01	Tue 21-10-12
OP and Site Geotechnical engineering	Wed 21-09-01	Thu 21-12-30
Civil / Geotechnical Drilling (10 holes x 30m)	Thu 21-06-03	Tue 21-08-31
Process Solids Management Facility and Site water mgt	Mon 21-09-20	Fri 22-09-16
Process Plant Detailed Engineering	Mon 21-07-26	Wed 22-06-29
Mine Engineering (GenM)	Thu 21-06-03	Wed 22-06-29
Mine Engineering (Automation and Technology)	Thu 21-12-02	Wed 22-06-29
Power line engineering	Thu 21-04-01	Wed 22-06-29
Powerline Balance study with IESO and HydroOne	Thu 22-01-06	Wed 22-06-29
Other infrastructure engineering	Thu 21-04-01	Fri 22-09-16
Infrastructure engineering	Mon 21-09-20	Fri 22-09-16
Main Substation Engineering	Thu 21-04-01	Wed 21-07-21
Transload Facility discussions & tariffs negotiations	Tue 21-12-21	Wed 22-05-18
Project Management Document Control	Thu 21-04-01	Wed 22-06-29
Final Construction Budget estimate and project execution	Wed 22-03-23	Fri 22-09-16
Procurement	Mon 21-05-03	Mon 23-10-09
Long Lead Items - Time from PO to Site	Mon 21-05-03	Mon 23-10-09
Mining Equipment	Mon 21-05-03	Wed 22-05-04
Grinding Mills	Thu 22-10-06	Mon 23-10-09
Regrind Mills	Thu 22-10-06	Mon 23-10-09
Power Line Equipment	Thu 22-06-30	Wed 22-10-19
Electrical Switchgears	Fri 21-07-02	Thu 22-11-03

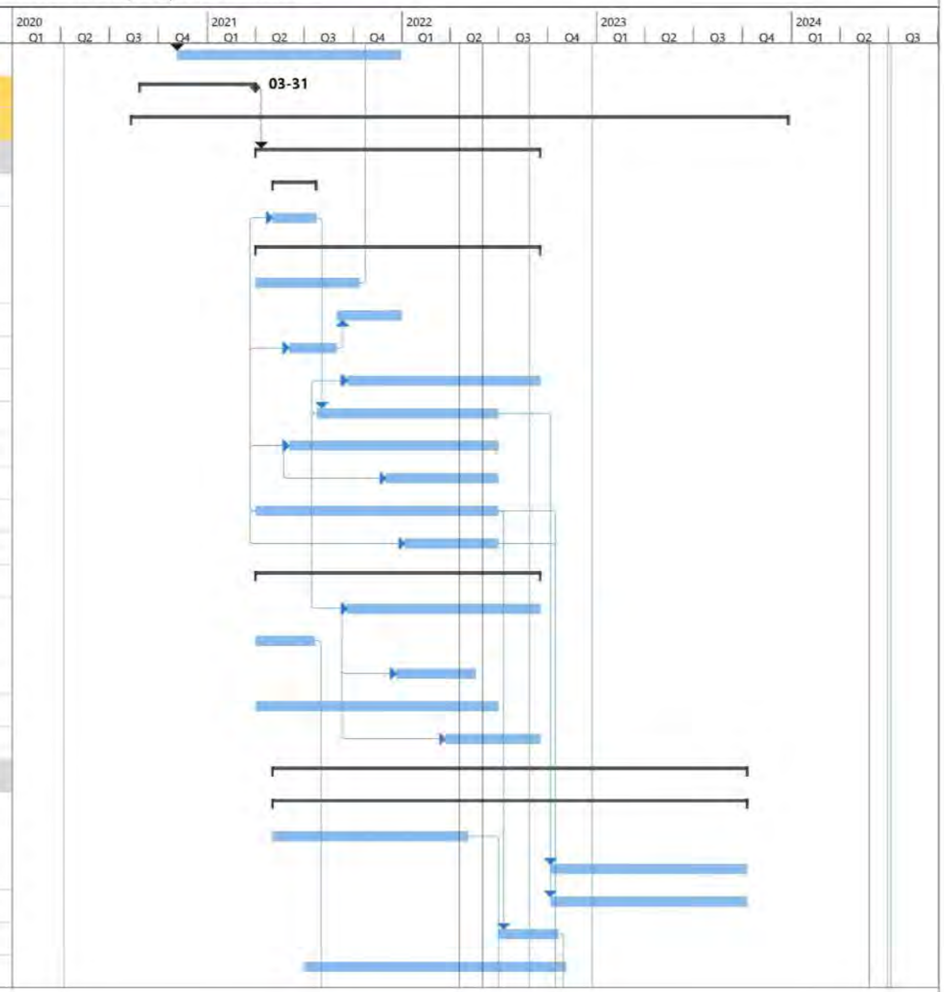

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Figure 24.3: Project Level 1 Schedule (Page 3 of 4)

Generation Mining -Marathon Feasibility Study - Master Schedule

Area	Start	Finish
Concentrate Filter	Fri 21-07-02	Thu 22-11-03
Substation	Fri 21-07-02	Thu 22-11-03
Operational Readiness	Mon 21-02-01	Mon 23-12-25
Construction Support	Tue 20-08-11	Mon 21-12-06
Construction Phase	Wed 22-04-06	Fri 24-06-28
Construction Milestones	Wed 22-04-06	Fri 24-06-28
Early Works Start	Wed 22-04-06	Wed 22-04-06
Early Works Finish	Wed 22-10-05	Wed 22-10-05
Full Construction Finish	Fri 24-06-28	Fri 24-06-28
Timber Harvest	Thu 22-04-07	Wed 22-07-13
Temporary Access Road	Thu 22-04-07	Wed 22-05-04
Site Tree Clearing/Timber Harvest	Thu 22-05-05	Wed 22-07-13
Early Works	Thu 22-07-14	Wed 22-10-19
PSMF and MRSA Dams	Thu 22-07-14	Wed 22-10-19
Temporary Power	Thu 22-07-14	Wed 22-10-05
Fuel Storage	Thu 22-07-14	Wed 22-09-21
Full Construction	Fri 22-07-01	Fri 24-06-28
100 - Infrastructure	Tue 22-07-26	Mon 23-01-23
110 - General Site Preparation	Tue 22-07-26	Mon 23-01-23
120 - Mine Infrastructure	Thu 22-09-01	Fri 22-12-30
130 - Support Infrastructure	Thu 22-09-01	Fri 22-12-30
140 - Permanent Camp	Tue 22-07-26	Tue 22-11-01
150 - Laboratory	Tue 22-07-26	Tue 22-11-01
170 - Fuel/Oil Systems Storage	Tue 22-07-26	Mon 22-10-17
180 - Transload Facility	Tue 22-07-26	Tue 22-11-01
200 - Power & Electrical	Thu 22-07-14	Mon 23-10-02
210 - Main Power Generation	Fri 22-08-12	Thu 23-08-24
212 - Transmission Line	Thu 22-10-20	Wed 22-12-07
213 - Substation	Fri 22-08-12	Thu 23-08-24

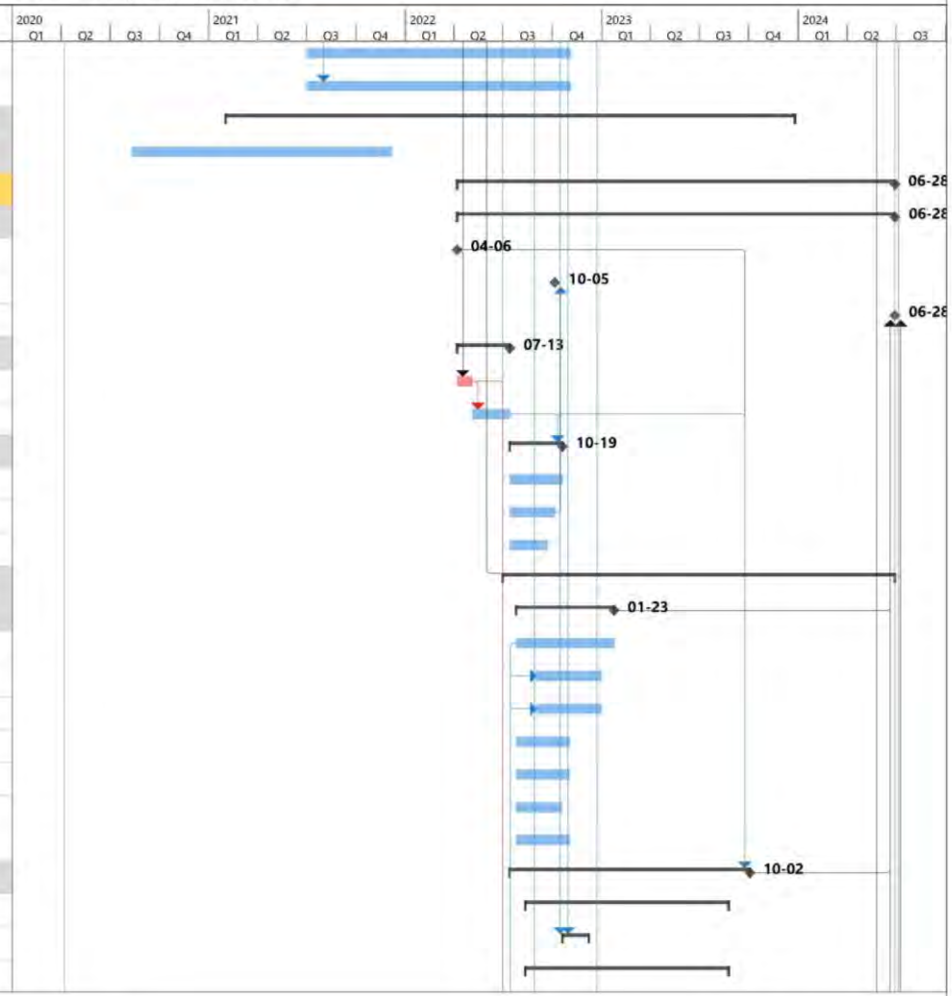

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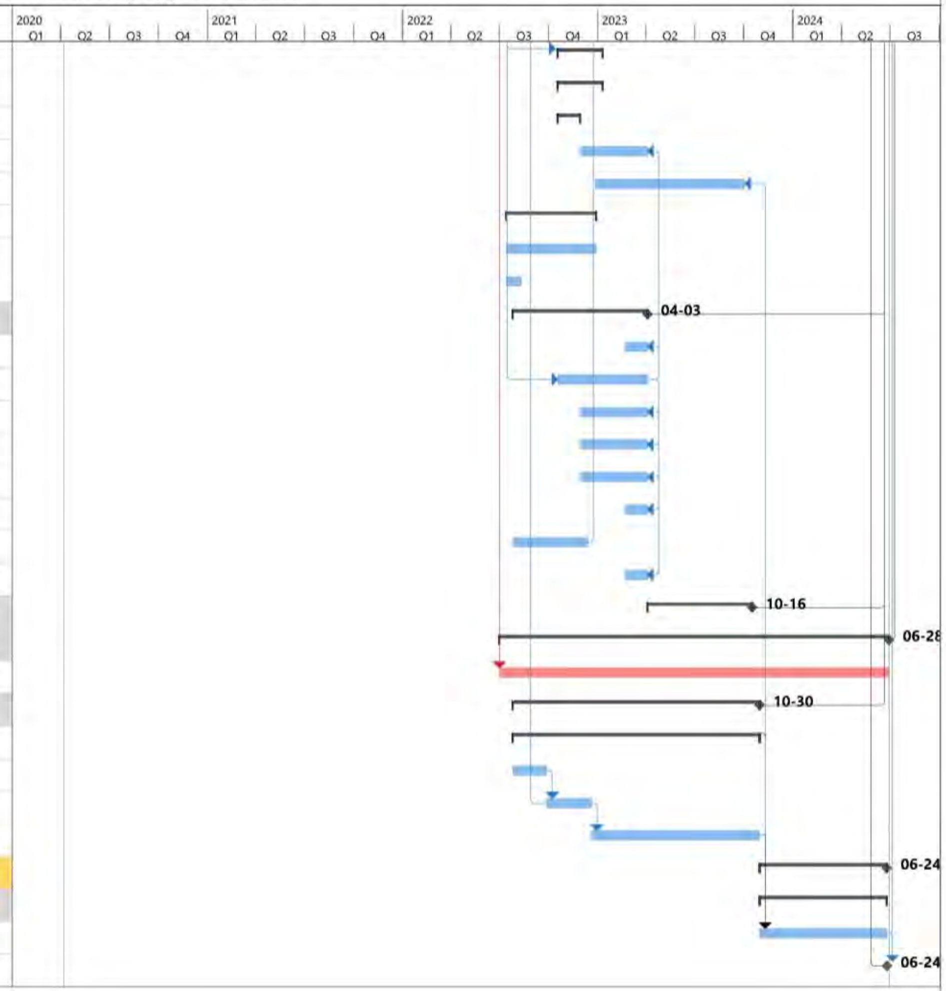
Figure 24.3: Project Level 1 Schedule (Page 4 of 4)

Generation Mining -Marathon Feasibility Study - Master Schedule

Area	Start	Finish
220 - Secondary Power Generation	Tue 22-10-18	Mon 23-01-09
221 - Secondary Power Line	Tue 22-10-18	Mon 23-01-09
222 - Onsite Generator	Tue 22-10-18	Mon 22-11-28
230 - Water Management Electrical Room	Tue 22-11-29	Mon 23-04-03
260 - Process Plant Electrical Rooms (Ausenco's Scope)	Tue 22-12-27	Mon 23-10-02
270 - MV Distribution O/H Line	Thu 22-07-14	Wed 22-12-28
Construction	Thu 22-07-14	Wed 22-12-28
Energization tests and Commissioning	Thu 22-07-14	Wed 22-08-10
300 - Water Management	Tue 22-07-26	Mon 23-04-03
310 - Fresh Water / Wells	Tue 23-02-21	Mon 23-04-03
320 - Surface Water Management	Tue 22-10-18	Mon 23-04-03
330 - Potable / Domestic Water	Tue 22-11-29	Mon 23-04-03
340 - Sewage Water	Tue 22-11-29	Mon 23-04-03
350 - Fire water	Tue 22-11-29	Mon 23-04-03
360 - Effluent Water Management	Tue 23-02-21	Mon 23-04-03
370 - Process Solids Management Facility (TMF)	Tue 22-07-26	Mon 22-12-12
380 - Mine Waste Rock Water Pond	Tue 23-02-21	Mon 23-04-03
400 - Surface Operations	Tue 23-04-04	Mon 23-10-16
500 - Mining	Fri 22-07-01	Fri 24-06-28
Pre-Production Mining	Fri 22-07-01	Fri 24-06-28
600 - Process Plant	Tue 22-07-26	Mon 23-10-30
Process Plant Construction	Tue 22-07-26	Mon 23-10-30
Earthworks for Infrastructure	Tue 22-07-26	Mon 22-09-26
Process Plant Building Construction	Tue 22-09-27	Mon 22-12-19
Process Plant Mechanical	Tue 22-12-20	Mon 23-10-30
Commissioning Phase	Tue 23-10-31	Mon 24-06-24
Commissioning	Tue 23-10-31	Mon 24-06-24
Process Plant Commissioning	Tue 23-10-31	Mon 24-06-24
Commercial Production	Mon 24-06-24	Mon 24-06-24



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25. INTERPRETATION AND CONCLUSIONS

The completion of this Technical Report has confirmed the technical and economic viability of the Marathon Project, based on an open pit mining operation with a production rate of 40 Mtpy and an SABC / flotation plant operating at 9.2 Mtpy.

The main conclusions by area are detailed below:

25.1 Geology and Mineral Resources

- Understanding of the Project geology, structure and mineralization, together with the deposit type, and origin of the mineralization is sufficiently well established to support Mineral Resource and Mineral Reserve estimation.
- Mineral Resources using a NSR cut-off value of C$13/t within a constraining pit shell is appropriate for reporting Mineral Resources for the Project.
- The Mineral Resource model is suitable and fit for purpose for the FS.
- Definitions for Mineral Resource categories used in this report are consistent with the CIM definitions (2014), Best Practices (2019) and adopted by Canadian NI 43-101.

25.2 Mining and Mineral Reserves

- The mine design and Mineral Reserve Estimate have been completed to a level appropriate for a FS.
- Mineral Reserves are estimated at a cut-off grade varying from C$17.33 to C$24.00 NSR/t of ore resulting in a total of Proven and Probable tonnage of 117.7 Mt of ore.
- The methodology and adjustments for ore loss and dilution are appropriate for the FS and is interpreted to be appropriate for the equipment and operating conditions, with the estimates appropriate for achieving operational reconciliation in-line with Mineral Reserve Estimates.

  The Mineral Reserve Estimate stated herein is consistent with CIM definitions. The Mineral Reserves are based on Measured and Indicated Mineral Resources and do not include any Inferred Mineral Resources.

25.3 Metallurgical Testing and Mineral Processing

- The optimized flowsheet and the Project process design criteria is determined by operational considerations and the 2020 metallurgical test programs and historical data (where appropriate and applicable).
- The processing options for the Project were selected based on the results of this testwork and material properties previously established with the design being appropriate for efficient operation.
- The Ausenco subject matter experts and industry benchmarks along with Owner and vendor recommendations or requirements and on standard industry practices have been applied.
- The process plant flowsheet includes a conventional comminution circuit consisting of a SAG mill, pebble crusher followed by a ball mill (SABC).
- The flotation portion of the process plant includes rougher flotation, concentrate regrind and three stages of cleaning.
- After the initial construction phase, the PGM-Scavenger circuit will be installed and including cyclone classification of rougher tailings to reject the fine fraction and submit coarser fractions to additional regrinding and PGM-Scavenger flotation. The PGM-Scavenger circuit will add incremental recovery improvement to achieve the recoveries established in the 2020 metallurgical testing programs. The timing and operating costs of the timing associated circuit performance is appropriately represented in the production and cost modeling.
- The flotation circuit design incorporates Woodgrove DFRs which provide decreased power consumption, improved operational performance and optimal recovery and mass pull to the concentrate and are considered suitable for the processing circuit.
- The process plant is designed to operate at a throughput of 25,200 tpd.
- Metallurgical recovery curves were established for each element in the 2020 metallurgical test program and are representative of the expected geo-met recoveries.

25.4 Infrastructure

- The infrastructure considered in the Technical Report is appropriate to support the operation.
- The power connection to the existing M2W line is suitable for the site power requirements; should additional power be required (for example, the Trolley Assist for the electrification of the haul-truck fleet) additional power connection will be required.

- The consideration of the location and placement of roads, infrastructure, crusher and processing plant with respect to the sub-watersheds is appropriate and is suitably protective of the environment.

25.5 Tailing Storage Facility and Water Management

- The foundation conditions and TSF design make the construction designs and construction methodology appropriate for the Project.
- The water management structures have been designed for the modeled conditions and anticipated variability in the weather patterns with appropriate environment and operational risks considered.

25.6 Market Studies and Concentrate Marketing

- The Cu-PGM concentrate that will be produced by the operation is marketable and low in deleterious elements and is not expected to incur any significant penalties.
- The Cu-PGM concentrate is likely marketable to a Cu smelter and would not likely be marketable to a PGM smelter / refiner.
- The supply and demand conditions of the payable metals are adequately reflected (based on the current and future market conditions) with the consideration of consensus long-term metal price for the key elements.

25.7 Environmental Studies, Permitting and Social or Community Impact

- The FS designs can be included in the Environmental Impact Study Addendum and Environment Assessment documentation.

25.8 Project Execution

- The FS has been completed with the inclusion of the execution strategy that will incorporate an “Owner Managed” style and aspects of an engineering, procurement, construction management (EPCM) style construction project.
- The concept of using a mixed management team including Gen Mining and consultant-employees throughout the construction phase is appropriate for the construction and project management for the Project.

25.9 Risks and Opportunities

Table 25.1 outlines the significant risks and uncertainties that could reasonably be expected to affect the reliability of confidence in the projected economic outcome for the FS.

Table 25.1: Risks

Risk Category	Description	Potential Impact[1]
Mineral Resource Estimate	There is some uncertainty to the reliability of the Mineral Resource Estimate due to the irregular nature of the hanging wall and footwall mineralized contacts.	▪ Reduction in Mineral Resources available for conversion to Mineral Reserves
Environment Assessment and Permitting	There is uncertainty associated with the timing and expected approval conditions for the Project.	▪ A delay to the schedule for project construction. ▪ Additional operating constraints or additional costs.
COVID-19	The duration and impact of the COVID-19 pandemic is uncertain.	▪ Reduced efficiency of the construction workforce or delayed construction schedule.
Construction Costs	Construction costs are based on the FS designs; final designs and construction methodology may change	▪ Increased construction costs.
Operating Costs	Operating efficiency, operating time and productivity are assumed based on similar benchmark operations; any reduction in operating efficiency will increase operating costs.	▪ Increased operating costs.
Labour and Skilled Resources	There is a national and international shortage of skilled and technical expertise in mining.	▪ Increased labour costs. ▪ Increase in remote employees with an increase in camp requirements.
Metal Prices and Exchange Rates	For each payable element and the exchange rate, the economic assumptions are sensitive (both positively and negatively impacted) by metal prices and changes in C$/US$ exchange rates.	▪ Variability in economic results with changing metal prices. ▪ Strengthening of the C$ as compared to the US$ will negatively impact economic results.

Note:

[1] *This is not intended to outline all potential impacts, simply the impacts that could reasonably be expected to occur in the even the risk item results in an impact.*

Table 25.2 outlines the significant opportunities that could reasonably be expected to have a positive impact on improving the Project economics in the future.

Table 25.2: Opportunities

Opportunity	Description	Potential Impact[1]
Mineral Resource Estimate	Unrealized local variability due grade interpolation smoothing may lead to opportunities to extract somewhat more metal from fewer tonnes	▪ Higher value per tonne of ore.
Smelter Terms	The terms included in the Technical Report are based on indicative terms from smelters; that is, final terms have not been negotiated. With the Cu-concentrate that is clean of significant deleterious elements, and high in PGM-elements, it is expected that improved terms (over the indicative terms included) will be realized.	▪ Improved value realized due to increased payable metals in the marketed concentrate.
Rh included in the Concentrate	Negotiations with smelters will include a request for payable Rh in the concentrate. (Note: While many smelters, do not recover Rh, the smelters do have the possibility to on-sell the products that they do not recover).	▪ Improved value realized due to increased payable metals in the marketed concentrate.
Plant Throughput	The Process Design Criteria (PDC) meets the requirements on average for the plant capacity of 9.2 Mtpy. It is anticipated that there is approximately 5-10% increased throughput per hour possible with little capital.	▪ Increased production rate would imply increased value and cash flow.
Exploration Success on the Property	With the conversion of the Property resources to reserves, would be expected to increase material feed to the plant and increase either mine life beyond the 13 years or allow for increased throughput over the same operating life.	▪ Increased production rate would imply increased value and cash flow. ▪ Increased mine life would extend employment opportunities and increase operating cash flow.
Trolley Assist ("TA") to the mining fleet	The concept of TA was evaluated with equipment suppliers / dealers but was not included in the Base Case operating design. TA would conceptually increase up-ramp truck speed and allow for additional tonnage (with a reduced cycle time) or reduce capital requirements.	▪ Improved operating efficiency and lower mine operating costs ▪ Reduction in the generation of GHG from operations (reduced diesel consumption).
Automation of the mining fleet	With the truck fleet being relatively small, autonomous haulage is not expected to be viable; however, the automation of drills and dozers would improve operating efficiency or reduce operating.	▪ Reduced operating costs on a $/t basis.

Note*:*

[1] This is not intended to outline all potential benefits but those that could reasonably be expected to occur or possibly realized.

25.10 Conclusions

The completion of this Technical Report has confirmed the technical and economic viability of the Marathon Project, based on an open pit mining operation with a production rate of 40 Mtpy and an SABC / flotation plant operating at 9.2 Mtpy.

26. RECOMMENDATIONS

The Marathon Project has been thoroughly reviewed by the Company, taking into account technical studies and economic evaluations completed previously by other Parties on the property. Following the completion of this document the Authors and the QPs) recommend progressing work required to allow for funding and subsequently to construct the operation as defined in the document. The following are the recommendations and initiatives as generally outlined by the QPs:

26.1 Production Decision

With the demonstrated and positive economic analysis:

- Progress to the next phase of project development and advance the property towards construction and production.

26.2 Environmental Assessment and Permitting

- Complete the EA process under the Joint Review Panel.
- Progress the critical path permitting activities to provide adequate time frames for submission, review and approval with a commitment to environmental obligations and an intention to develop a definitive schedule for construction.

26.3 Basic Engineering and Detailed Engineering Design

- Complete basic engineering for the process plant and associated site infrastructure design.
- Progress the Project through detailed engineering including formal bidding and equipment selection, final facility construction details, construction scheduling, and regional construction logistics.

26.4 Mine Methods

- Proceed to vendor selection for mobile equipment.
- Determine if a mining fleet Maintenance and Repair Contract (MARC) is viable for the initial years of operation.

- Further evaluation for implementation of advanced operating technology including trolley assist for the "*electrification"* of the haulage fleet, autonomous haulage fleet (rough-cut evaluation), autonomous or teleremote operation of drilling fleet; autonomous dozer operation.
- Evaluate fleet management system and advanced analytics for operational management.
- Complete additional geotechnical studies including characterization of the overburden along the crest of the proposed pit to evaluate the long-term stability of the pit rim.
- Pursue further optimizations of open-pit stage sequencing to maximize financial returns of the asset.

26.5 Mineral Reserves

- Evaluate local areas in the mineral reserve that are within the first 3 years of production to determine if advanced grade control is possible prior to operational start-up; this grade control drilling would provide additional resolution for tonnes and grade thereby increasing the confidence in metal production in the pay-back period.

26.6 Infrastructure

- Progress the IESO study for the power line and connection requirements.
- Progress efforts to secure a long-term power contract for the operation.
- Advance designs for infrastructure facilities that are to be constructed on and off-site.
- Progress concepts for the joint venture or alternative arrangements for the design, construction and operation of an assay lab with an accreted provider.

26.7 Tailings Storage Facility

- Complete a breach risk assessment for the TSF.
- Complete test pitting and geotechnical site investigations for the TSF in specific locations that have not been completed as part of prior site investigations.
- Progress the TSF design to "*for construction"* details.
- Further optimization of water management system design will be considered with a potential opportunity to reclaim and recycle TSF pond water directly to the Process Facility.
- Based on the outcome and conclusions of the EIS Addendum, design the appropriate water treatment plant for discharge.

- Consider implementing an Independent Tailing Review Panel for the oversight during the TSF life-cycle.

26.8 Concentrate Marketing

- Progress negotiations to establish finalized terms for concentrate sales with refiners and / or commodity traders.

26.9 Indigenous Affairs

- Progress Community / Impact and Benefits agreements with the impacted and eligible Indigenous communities.
- Develop a procurement and contracting strategy that includes and promotes benefits to the impacted and eligible Indigenous communities.

26.10 Process Plant

- Complete the geotechnical evaluation for the plant location to optimize the cut-fill requirements and structural foundation designs for facilities.
- During the detailed engineering phase, consider wear parts, key consumables and operating and capital spares for risk management, operability and cost.
- Continued optimization of Process Plant and equipment layout to minimize footprint, improve operability, and further decrease associated capital cost.

26.11 Metallurgical Test Work

- Additional information generated in the 2020 Metallurgical testwork should be further evaluated related to regrind tests to confirm specific energy selected and cost estimates for the rougher concentrate and PGM-Scavenger circuits.

26.12 Project Execution

- Advance the Project through Basic and Detailed Engineering, including construction planning and scheduling.

- Pursue bids as part of Detailed Engineering from Construction Contractors to improve the integrity of constructed cost and optimization of the project construction schedule.
- Progress to have detailed engineering approximately 55% complete prior to commencement of key construction projects.
- Operational Readiness Planning is to progress in parallel with Project execution; this will require the staffing of necessary Company-employees early in the Project execution phase.
- Support the involvement as appropriate of local Contractors, businesses, and community in project advance and development.
- Include specific considerations to businesses associated with the Indigenous communities that have demonstrated impact from the Project.
- Define and advance socio-economic aspects associated with the Project including lodging for construction manpower and long-term workforce.
- Define and develop training programs for local hires as appropriate to infill suitable positions at the site.

26.13 Reducing the Carbon Impact

- Allow for the likely inclusion of Carbon Cure technology (or similar process / technology) into project construction to permanently sequester liquid CO_2 .
- Apply established and developing technologies for the reduction of global carbon emissions where possible.
- Continue to support the research of carbon sequestering in mafic and ultra-mafic tailings.

26.14 Exploration

- Explore in the area immediately west of the main deposit with the goal of discovering an underground prospect that could be exploited to add high-grade material to the LOM production profile.
- Explore and further define the known resources of Geordie and Sally to determine if additional material could supplement the LOM plan production profile.
- Explore on the Project claim blocks to define the potential for additional mineralized resources that could supplement the present LOM production profile.

26.15 Environmental Approvals

- Ensure and allow for the prompt commencement of construction, progress the "critical path" permits in parallel to the EA process.

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28. CERTIFICATES OF QUALIFIED PERSONS

CERTIFICATE OF QUALIFIED PERSON

EUGENE J. PURITCH, P. ENG., FEC, CET

I, Eugene J. Puritch, P. Eng., FEC, CET, residing at 44 Turtlecreek Blvd., Brampton, Ontario, L6W 3X7, do hereby certify that:

1. I am an independent mining consultant and President of P&E Mining Consultants Inc.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I am a graduate of The Haileybury School of Mines, with a Technologist Diploma in Mining, as well as obtaining an additional year of undergraduate education in Mine Engineering at Queen's University. In addition, I have also met the Professional Engineers of Ontario Academic Requirement Committee's Examination requirement for Bachelor's Degree in Engineering Equivalency. I am a mining consultant currently licensed by the: Professional Engineers and Geoscientists New Brunswick (License No. 4778); Professional Engineers, Geoscientists Newfoundland and Labrador (License No. 5998); Association of Professional Engineers and Geoscientists Saskatchewan (License No. 16216); Ontario Association of Certified Engineering Technicians and Technologists (License No. 45252); Professional Engineers of Ontario (License No. 100014010); Association of Professional Engineers and Geoscientists of British Columbia (License No. 42912); and Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (No. L3877). I am also a member of the National Canadian Institute of Mining and Metallurgy.

   I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

   I have practiced my profession continuously since 1978. My summarized career experience is as follows:

Mining Technologist - H.B.M.& S. and Inco Ltd.,	1978-1980
Open Pit Mine Engineer – Cassiar Asbestos/Brinco Ltd.,	1981-1983
Pit Engineer/Drill & Blast Supervisor – Detour Lake Mine,	1984-1986
Self-Employed Mining Consultant – Timmins Area,	1987-1988
Mine Designer/Resource Estimator – Dynatec/CMD/Bharti,	1989-1995
Self-Employed Mining Consultant/Resource-Reserve Estimator,	1995-2004
President – P&E Mining Consultants Inc,	2004-Present

4. I have visited the Property that is the subject of this Technical Report numerous times between 2005 and 2010.
5. I am responsible for authoring Sections 4, 5, 6, 9, 10 and 23 and co-authoring Sections 1, 14, 25, 26 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Reports titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020, "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019 and "Updated Technical Report and Preliminary Economic Assessment on the Marathon PGM-Cu Property Marathon Area, Thunder Bay Mining District, Northwestern Ontario, Canada", with an effective date of April 5, 2007.
8. I have read NI 43-101 and Form 43-101F1. This Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3, 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[Eugene J. Puritch]

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Eugene J. Puritch, P.Eng., FEC, CET

CERTIFICATE OF QUALIFIED PERSON

JARITA BARRY, P.GEO.

I, Jarita Barry, P.Geo., residing at 4 Creek View Close, Mount Clear, Victoria, Australia, 3350, do hereby certify that:

1. I am an independent geological consultant contracted by P&E Mining Consultants Inc.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I am a graduate of RMIT University of Melbourne, Victoria, Australia, with a B.Sc. in Applied Geology. I have worked as a geologist for a total of 14 years since obtaining my B.Sc. degree. I am a geological consultant currently licensed by Engineers and Geoscientists British Columbia (License No. 40875), Professional Engineers and Geoscientists Newfoundland & Labrador (License No. 08399) and Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (License No. L3874). I am also a member of the Australasian Institute of Mining and Metallurgy of Australia (Member No. 305397);

   I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

   My relevant experience for the purpose of the Technical Report is:

Geologist, Foran Mining Corp.	2004
Geologist, Aurelian Resources Inc.	2004
Geologist, Linear Gold Corp.	2005-2006
Geologist, Búscore Consulting	2006-2007
Consulting Geologist (AusIMM)	2008-2014
Consulting Geologist, P.Geo. (APEGBC/AusIMM)	2014-Present

4. I have not visited the Property that is the subject of this Technical Report.
5. I am responsible for authoring Section 11, and co-authoring Section 12 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101. I am independent of the Vendor and the Property.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Reports titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020 and "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019.
8. I have read NI 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3, 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[Jarita Barry]

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Jarita Barry, P.Geo.

CERTIFICATE OF QUALIFIED PERSON

FRED H. BROWN, P.GEO.

I, Fred H. Brown, of PO Box 332, Lynden, WA, USA, do hereby certify that:

1. I am an independent geological consultant and have worked as a geologist continuously since my graduation from university in 1987.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I graduated with a Bachelor of Science degree in Geology from New Mexico State University in 1987. I obtained a Graduate Diploma in Engineering (Mining) in 1997 from the University of the Witwatersrand and a Master of Science in Engineering (Civil) from the University of the Witwatersrand in 2005. I am registered with the South African Council for Natural Scientific Professions as a Professional Geological Scientist (registration number 400008/04), the Association of Professional Engineers and Geoscientists of British Columbia as a Professional Geoscientist (171602) and the Society for Mining, Metallurgy and Exploration as a Registered Member (#4152172).

   I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

   My relevant experience for the purpose of the Technical Report is:

Underground Mine Geologist, Freegold Mine, AAC	1987-1995
Mineral Resource Manager, Vaal Reefs Mine, Anglogold	1995-1997
Resident Geologist, Venetia Mine, De Beers	1997-2000
Chief Geologist, De Beers Consolidated Mines	2000-2004
Consulting Geologist	2004-2008
P&E Mining Consultants Inc. – Sr. Associate Geologist	2008-Present

4. I have not visited the Property that is the subject of this Technical Report.
5. I am responsible for co-authoring Section 14 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Repots titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020 and "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019.
8. I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3, 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[Fred Brown]

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Fred H. Brown, P.Geo.

CERTIFICATE OF QUALIFIED PERSON

DAVID BURGA, P.GEO.

I, David Burga, P. Geo., residing at 3884 Freeman Terrace, Mississauga, Ontario, do hereby certify that:

1. I am an independent geological consultant contracted by P & E Mining Consultants Inc.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I am a graduate of the University of Toronto with a Bachelor of Science degree in Geological Sciences (1997). I have worked as a geologist for over 20 years since obtaining my B.Sc. degree. I am a geological consultant currently licensed by the Association of Professional Geoscientists of Ontario (License No 1836).

   I have read the definition of "Qualified Person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI 43-101.

   My relevant experience for the purpose of the Technical Report is:

Exploration Geologist, Cameco Gold	1997-1998
Field Geophysicist, Quantec Geoscience	1998-1999
Geological Consultant, Andeburg Consulting Ltd.	1999-2003
Geologist, Aeon Egmond Ltd.	2003-2005
Project Manager, Jacques Whitford	2005-2008
Exploration Manager – Chile, Red Metal Resources	2008-2009
Consulting Geologist	2009-Present

4. I have visited the Property that is the subject of this Technical Report on April 4, 2012.
5. I am responsible for co-authoring Section 12 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Reports titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020 and "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019.
8. I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3. 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[David Burga]

____

David Burga, P.Geo.

CERTIFICATE OF QUALIFIED PERSON

BRUCE W. MACKIE, M.SC., P. GEO.

I, Bruce W. Mackie, P. Geo., residing at 339 Parkridge Crescent, Oakville, Ontario, L6M 1A8 do hereby certify that:

1. I am an independent geological consultant contracted by Generation Mining Limited.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I graduated with an Honours Bachelor of Science degree in Geology and Chemistry from the Carleton University in 1975 and with a Master of Science degree in Geology from University of Manitoba in 1978. I have worked as a geologist for a total of 40 years since obtaining my M.Sc. degree. I am a member of the Canadian Institute of Mining and Metallurgy and a P. Geo., Registered in the Province of Ontario (APGO No. 0585).

   I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
4. I have visited Marathon Deposit on behalf of Generation Mining Limited on May 4, 2019.
5. I am responsible for co-authoring Section 12 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Reports titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020 and "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019.
8. I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3, 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[Bruce W Mackie]

____
Bruce W. Mackie M.Sc., P. Geo.

CERTIFICATE OF QUALIFIED PERSON

PAUL PITMAN, P.GEO.

I, Paul W. Pitman, B.Sc., P.Geo., residing in Brampton, Ontario, do hereby certify that:

1. I am an independent consulting geologist since 1983, President of PWP Consulting and an independent consultant to P&E Mining Consultants Inc.
2. This certificate applies to the Technical Report titled "Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", (The "Technical Report") with an effective date of March 3, 2021.
3. I am an honours graduate of Carleton University, 1969 in geology and have been practicing continuously as a professional since graduation. I have been the principal of a geological consulting practice for a period of 35 years. I am a P.Geo., registered in the Province of Ontario (APGO # 0575). I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of education, affiliation with a profession association and past geological experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

   I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that, by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
4. I have not visited the Property that is the subject of this Technical Report.
5. I am responsible for authoring Sections 7 and 8 of this Technical Report.
6. I am independent of the Issuer applying the test in Section 1.5 of NI 43-101.
7. I have had prior involvement with the Project that is the subject of this Technical Report. I was a "Qualified Person" for Technical Reports titled "(Amended) Technical Report, Updated Mineral Resource Estimate and Preliminary Economic Assessment of The Marathon Deposit, Thunder Bay Mining District, Northwestern Ontario, Canada" with an effective date of January 6, 2020 and "Technical Report, Updated Mineral Resource Estimate of the Marathon Deposit, Thunder Bay Mining District Northwestern Ontario, Canada", with an effective date of September 9, 2019.
8. I have read NI 43-101 and Form 43-101F1 and this Technical Report has been prepared in compliance therewith.
9. As of the effective date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Effective Date: March 3, 2021
Signed Date: March 23, 2021

{SIGNED AND SEALED}
[Paul W. Pitman]

____

Paul W. Pitman, B.Sc. (P.Geo.)

CERTIFICATE OF QUALIFIED PERSON

To Accompany the Report entitled:

"Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada",
prepared for Generation Mining Limited effective as of March 03, 2021 (the "Technical Report").

I, **Antoine Champagne**, P.Eng., do hereby certify that:

1) I am Open Pit Engineering Director for G Mining Services Inc. ("GMS") with an office at D-200, 7900 Taschereau Blvd, Brossard, Québec, J4X 1C2;
2) I have graduated from Laval University, Canada with a B.Sc. in Mechanical Engineering in 2005;
3) I am a Professional Engineer registered with the Ordre des ingénieurs du Québec, licence no. 137814;
4) I have been involved in mining operations and engineering for over 10 years, including pit optimization, surface mine design, mineral reserve estimations and mine scheduling. This has included work at the Essakane Project, the Merian Project and work on other pre-feasibility and feasibility studies. I have had no prior involvement with the property which is the subject of this Report;
5) I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a qualified person for the purposes of NI 43-101;
6) I have participated in the preparation of sections: 15, 16 and 26;
7) I have never visited the Project;
8) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections and sub-sections of the Technical Report listed in item 6 above contain all scientific and technical information that is required to be disclosed to make these sections and sub-sections of the Technical Report not misleading;
9) I have read NI 43-101 and believe that the sections and sub-sections of the Technical Report listed in item 6 above have been prepared in accordance with NI 43-101;
10) I have read and understand NI 43-101 and I am considered independent of the issuer as defined in section 1.5 of NI 43-101 Rules and Policies.

Dated this 23rd day of March 2021,

/signed and sealed/

Antoine Champagne, P.Eng.,
Open Pit Engineering Director
G Mining Services Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the Report entitled:

"Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", prepared for Generation Mining Limited effective as of March 03, 2021 (the "Technical Report").

I, **Craig Hall**, P. Eng., do hereby certify that:

11) I am currently employed as Managing Principal with Knight Piésold Ltd. in an office located at 1650 Main Street West, North Bay, ON P1B 8G5, Canada;
12) I graduated from the University of Waterloo, Ontario, Canada with a Bachelor of Applied Science in 2003 in Geological Engineering;
13) I am a Professional Engineer registered with Professional Engineers Ontario, (Licence: 100075047);
14) I have practiced my profession continuously in the mining industry since my graduation from university. I have been involved in mining operations, engineering and financial evaluations for 17 years, including tailings, mine waste, water management facilities and other mining related surface infrastructure.
15) I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a qualified person for the purposes of NI 43-101;
16) I have participated in the preparation of Sections 18, 20, 21;
17) I have visited the site property that is the subject of this report in April 2011 and March 2012;
18) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections and sub-sections of the Technical Report listed in item 6 above contain all scientific and technical information that is required to be disclosed to make these sections and sub-sections of the Technical Report not misleading;
19) I have read NI 43-101 and believe that the sections and sub-sections of the Technical Report listed in item 6 above have been prepared in accordance with NI 43-101;
20) I have read and understand NI 43-101 and I am considered independent of the issuer as defined in section 1.5 of NI 43-101 Rules and Policies.

Dated this 23rd day of March 2021,

/signed and sealed/

Craig N. Hall, P.Eng.,
Managing Principal
Knight Piésold Ltd.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the Report entitled:

"Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", prepared for Generation Mining Limited effective as of March 03, 2021 (the "Technical Report").

I, **Louis-Pierre Gignac**, P.Eng., do hereby certify that:

21) I am Co-President and Senior Mining Engineer for G Mining Services Inc. ("GMS") with an office at 200, 7900 Taschereau Blvd, Brossard, Québec, J4X 1C2;

22) I have graduated from McGill University, Canada with a B.Sc. in Mining Engineering in 1999, and from École Polytechnique de Montréal, Canada with a M.Sc. A. in Industrial Engineering in 2002;

23) I am a Professional Engineer registered with the Ordre des ingénieurs du Québec, licence no. 132995. I am a member of the Canadian Institute of Mining, Metallurgy and Petroleum and I am a Chartered Financial Analyst® Charter holder;

24) I have practiced my profession continuously in the mining industry since my graduation from university. I have been involved in mining operations, engineering and financial evaluations for over 15 years, including pit optimization, surface mine design, mineral reserve estimations and mine scheduling. This has included work at Rosebel Gold Mines NV, the Essakane Project, the Merian Project and work on other pre-feasibility and feasibility studies. I have had no prior involvement with the property which is the subject of this Report;

25) I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a qualified person for the purposes of NI 43-101;

26) I have participated in the preparation of sections: 1, 2, 3, 19 22, 25 and, 26;

27) I visited the Project in August 2020;

28) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections and sub-sections of the Technical Report listed in item 6 above contain all scientific and technical information that is required to be disclosed to make these sections and sub-sections of the Technical Report not misleading;

29) I have read NI 43-101 and believe that the sections and sub-sections of the Technical Report listed in item 6 above have been prepared in accordance with NI 43-101;

30) I have read and understand NI 43-101 and I am considered independent of the issuer as defined in section 1.5 of NI 43-101 Rules and Policies.

Dated this 23rd day of March 2021,

/signed and sealed/

Louis-Pierre Gignac, P.Eng.,
Co-President
G Mining Services Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the Report entitled:

"Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", prepared for Generation Mining Limited effective as of March 03, 2021 (the "Technical Report").

I, **Paul Murphy**, P.Eng., do hereby certify that:

31) I am Project Director for G Mining Services Inc. ("GMS") with an office at 200, 7900 Taschereau Blvd, Brossard, Québec, J4X 1C2;
32) I am a graduate of Université Laval with a B.Sc. (Civil Engineering) in 1986;
33) I am a Professional Engineer registered with the "Ordre des Ingénieurs du Québec" (OIQ-Licence: 43320);
34) I have practiced my profession continuously since 1988 and have been involved in project and team management, construction coordination and engineering with projects located in North and South America and North-West Africa;
35) I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a qualified person for the purposes of NI 43-101;
36) I have participated in the preparation of sections: 18, 20, 21, 24 and, 26;
37) I visited the Project in August 2020;
38) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections and sub-sections of the Technical Report listed in item 6 above contain all scientific and technical information that is required to be disclosed to make these sections and sub-sections of the Technical Report not misleading;
39) I have read NI 43-101 and believe that the sections and sub-sections of the Technical Report listed in item 6 above have been prepared in accordance with NI 43-101;
40) I have read and understand NI 43-101 and I am considered independent of the issuer as defined in section 1.5 of NI 43-101 Rules and Policies.

Dated this 23rd day of March 2021,

/signed and sealed/

Paul Murphy, P.Eng.,
Project Director
G Mining Services Inc.

CERTIFICATE OF QUALIFIED PERSON

To Accompany the Report entitled:

"Feasibility Study – Marathon Palladium and Copper Project, Northwestern Ontario, Canada", prepared for Generation Mining Limited effective as of March 03, 2021 (the "Technical Report").

I, **Tommaso Roberto Raponi**, P. Eng., do hereby certify that:

41) I am a Principal Metallurgist at Ausenco Engineering Canada Inc., 11 King St West, Suite 1550, Toronto, ON, M5H 4C7;
42) I hold a Bachelor's degree in Geological Engineering from University of Toronto, Toronto, Ontario, Canada obtained in 1984;
43) I am a Professional Engineer registered with the Professional Engineers Ontario (No. 90225970), Engineers and Geoscientists British Columbia (No. 23536) and NWT and Nunavut Association of Professional Engineers and Geoscientists (No. L4508);
44) I have worked for more than 36 years in the mining industry in various positions continuously since my graduation from university. I have worked as an independent consultant since 2016;
45) I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be a qualified person for the purposes of NI 43-101;
46) I have participated in the preparation of sections: 13, 17, 21, and 26;
47) I visited the Project in August 2020;
48) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections and sub-sections of the Technical Report listed in item 6 above contain all scientific and technical information that is required to be disclosed to make these sections and sub-sections of the Technical Report not misleading;
49) I have read NI 43-101 and believe that the sections and sub-sections of the Technical Report listed in item 6 above have been prepared in accordance with NI 43-101;
50) I have read and understand NI 43-101 and I am considered independent of the issuer as defined in section 1.5 of NI 43-101 Rules and Policies.

Dated this 23rd day of March 2021,

/signed and sealed/

Tommaso Roberto Raponi, P.Eng.,
Principal Metallurgist
Ausenco Engineering Canada Inc.

MARATHON PALLADIUM & COPPER PROJECT

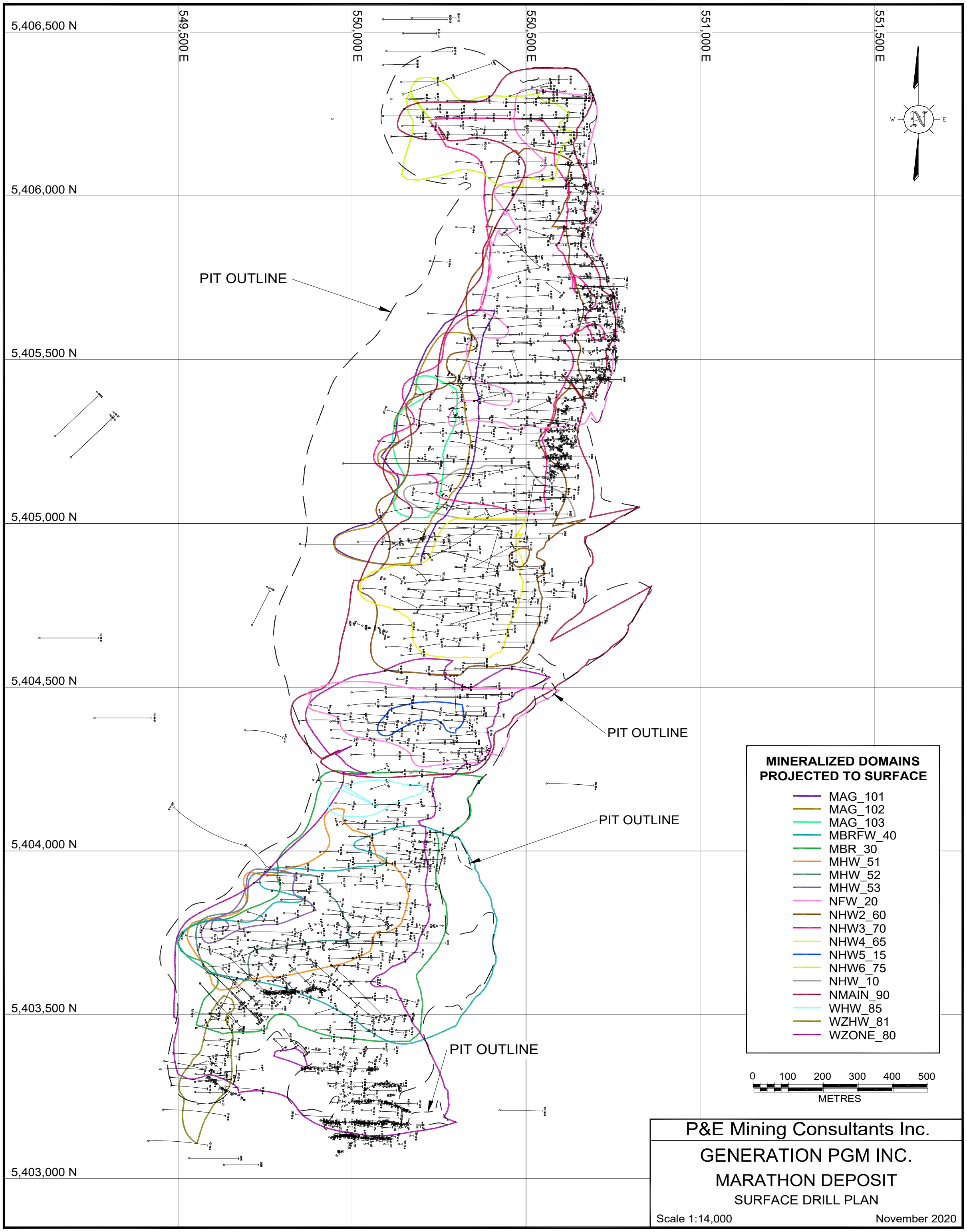
FEASIBILITY STUDY

APPENDICES

MARATHON DEPOSIT APPENDICES

Marathon Deposit

Surface Drill Hole Plan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551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SURFACE
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
SURFACE DRILL PLAN
Scale 1:14,000
November 2020

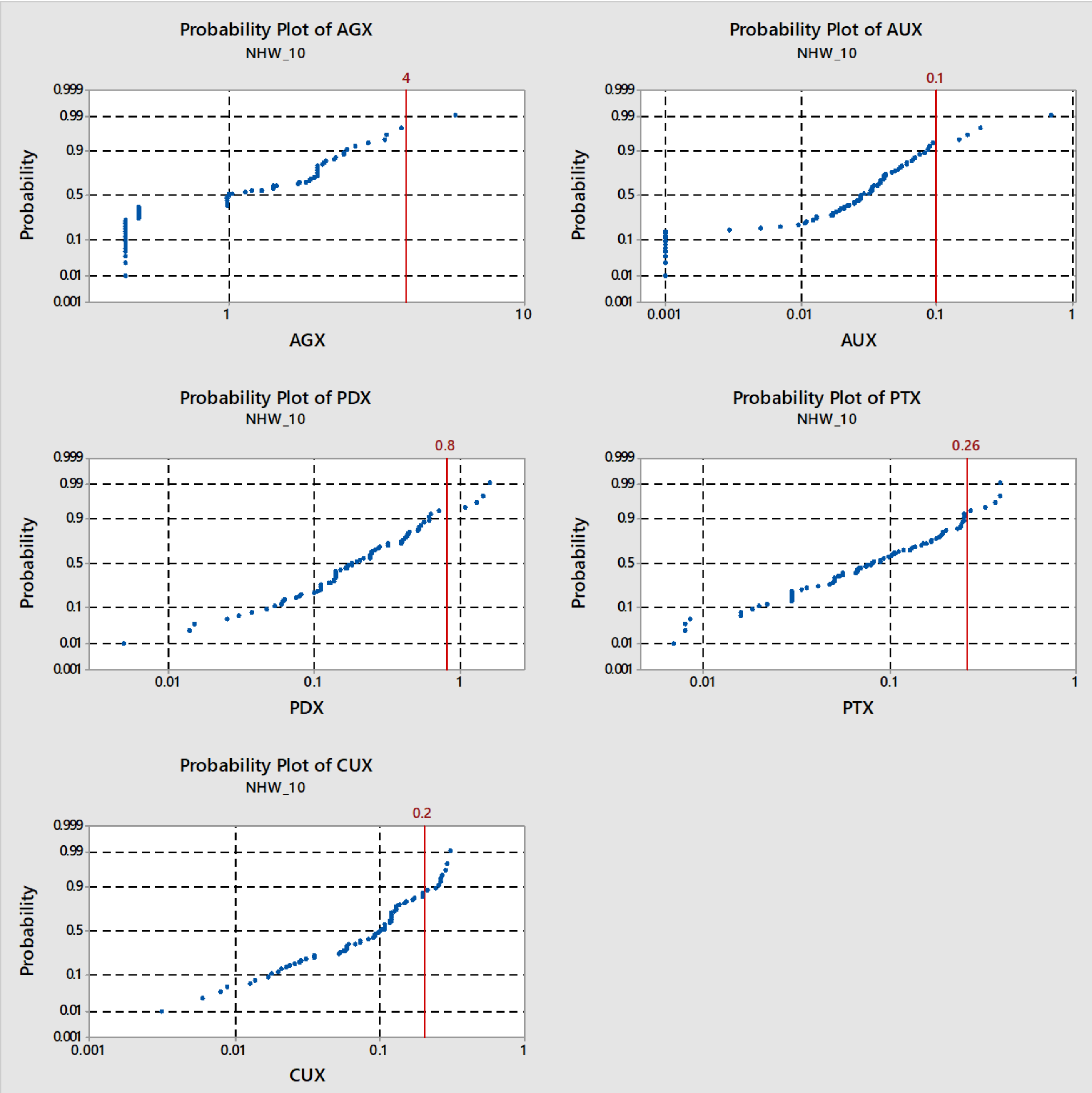
Marathon Deposit

3-D Domains


GENERATION PGM INC.
MARATHON DEPOSIT - 3D DOMAINS
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80

Marathon Deposit

Log Probability Plots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AGX
Probability Plot of AUX
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0.1
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AUX
Probability Plot of PDX
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PDX
Probability Plot of PTX
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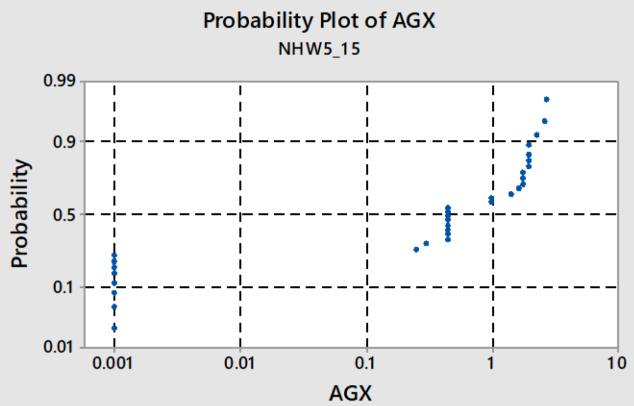
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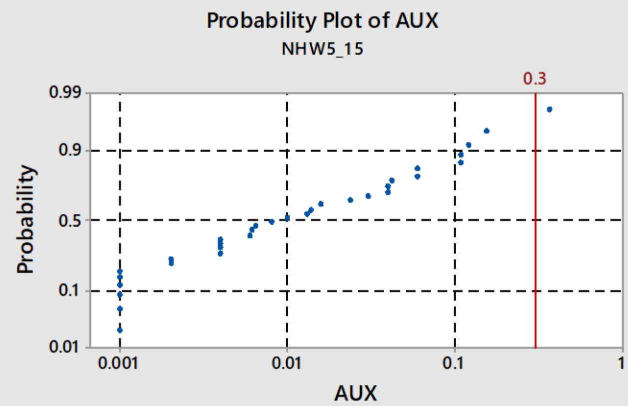
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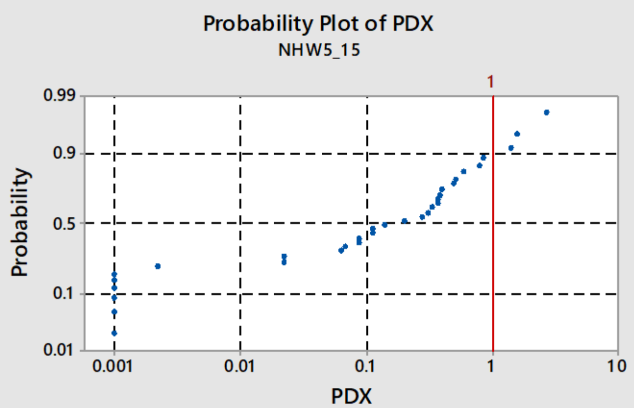
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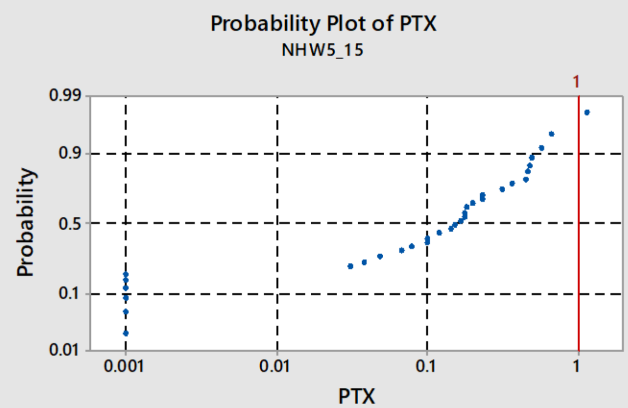
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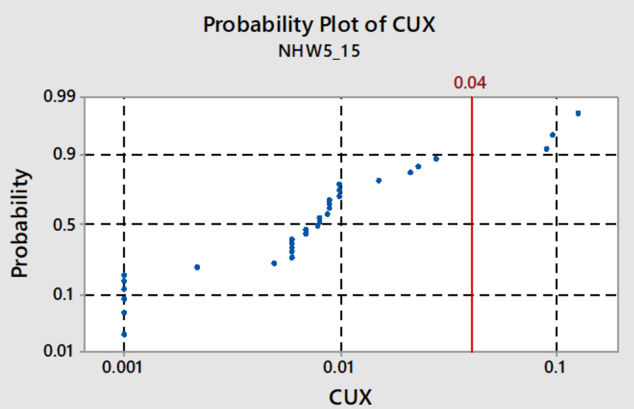
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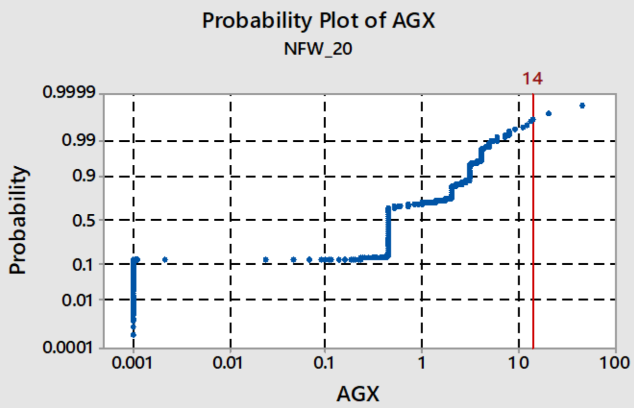
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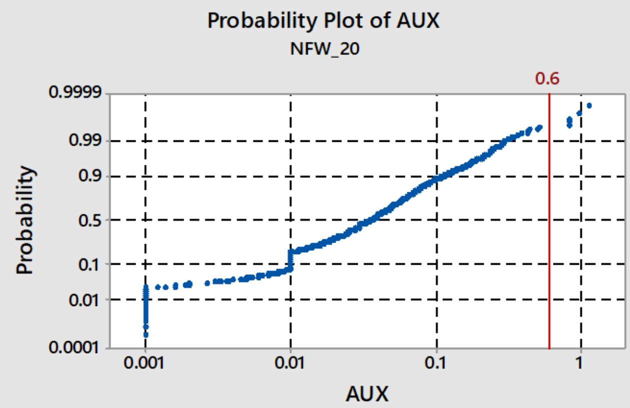
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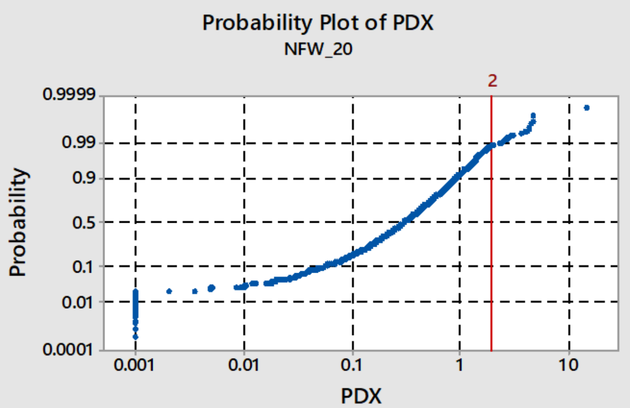
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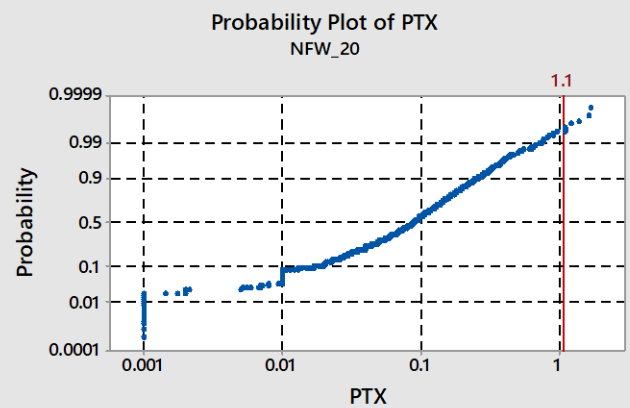
PDX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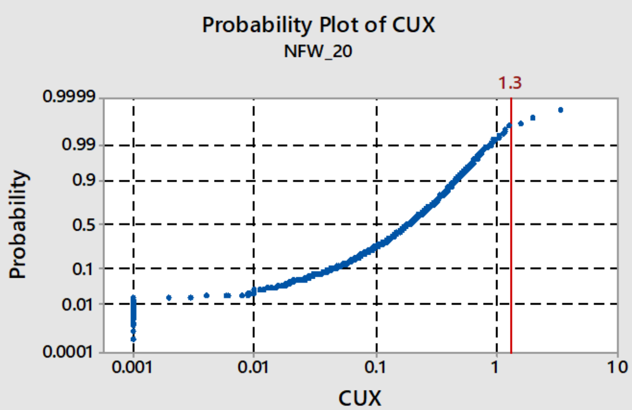
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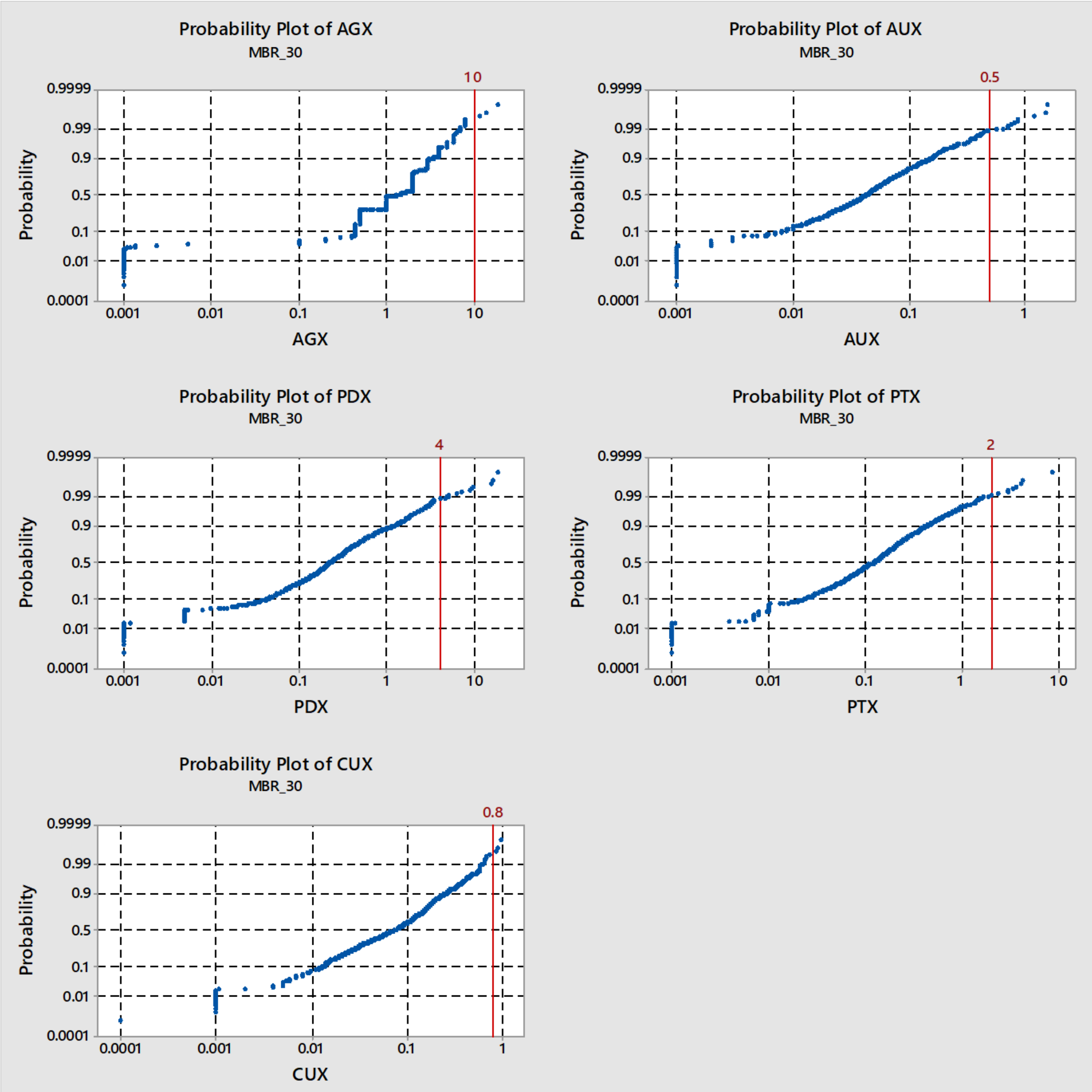
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AGX
Probability Plot of AUX
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Probability
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0.01
0.1
1
AUX
Probability Plot of PDX
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PTX
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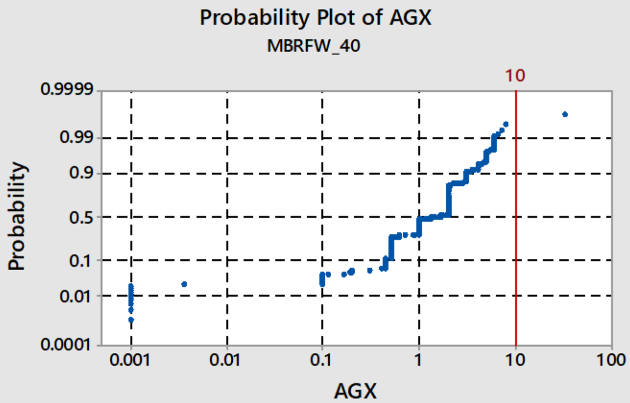
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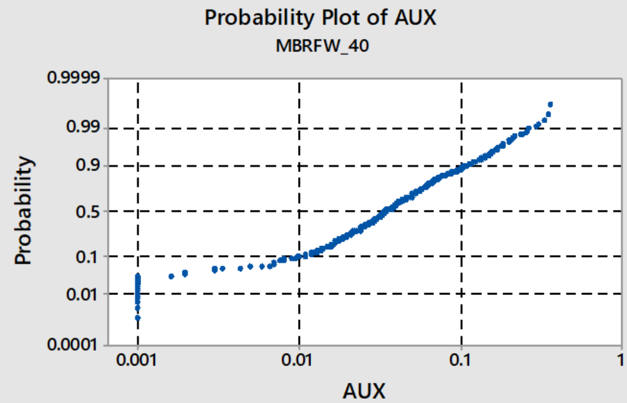
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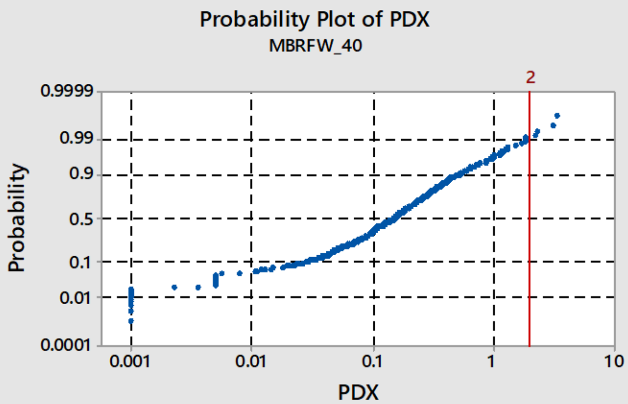
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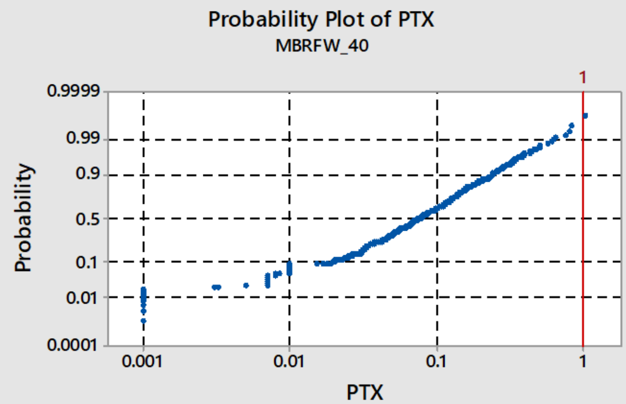
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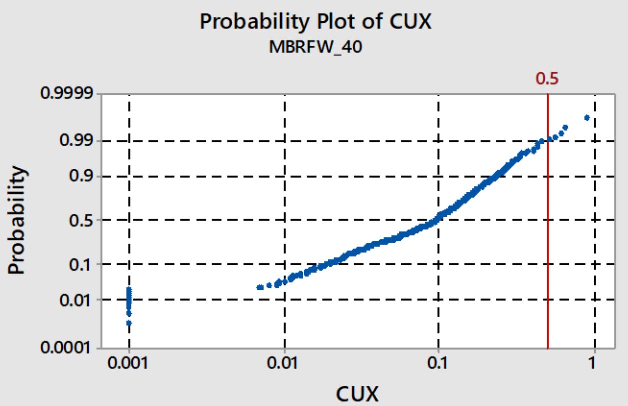
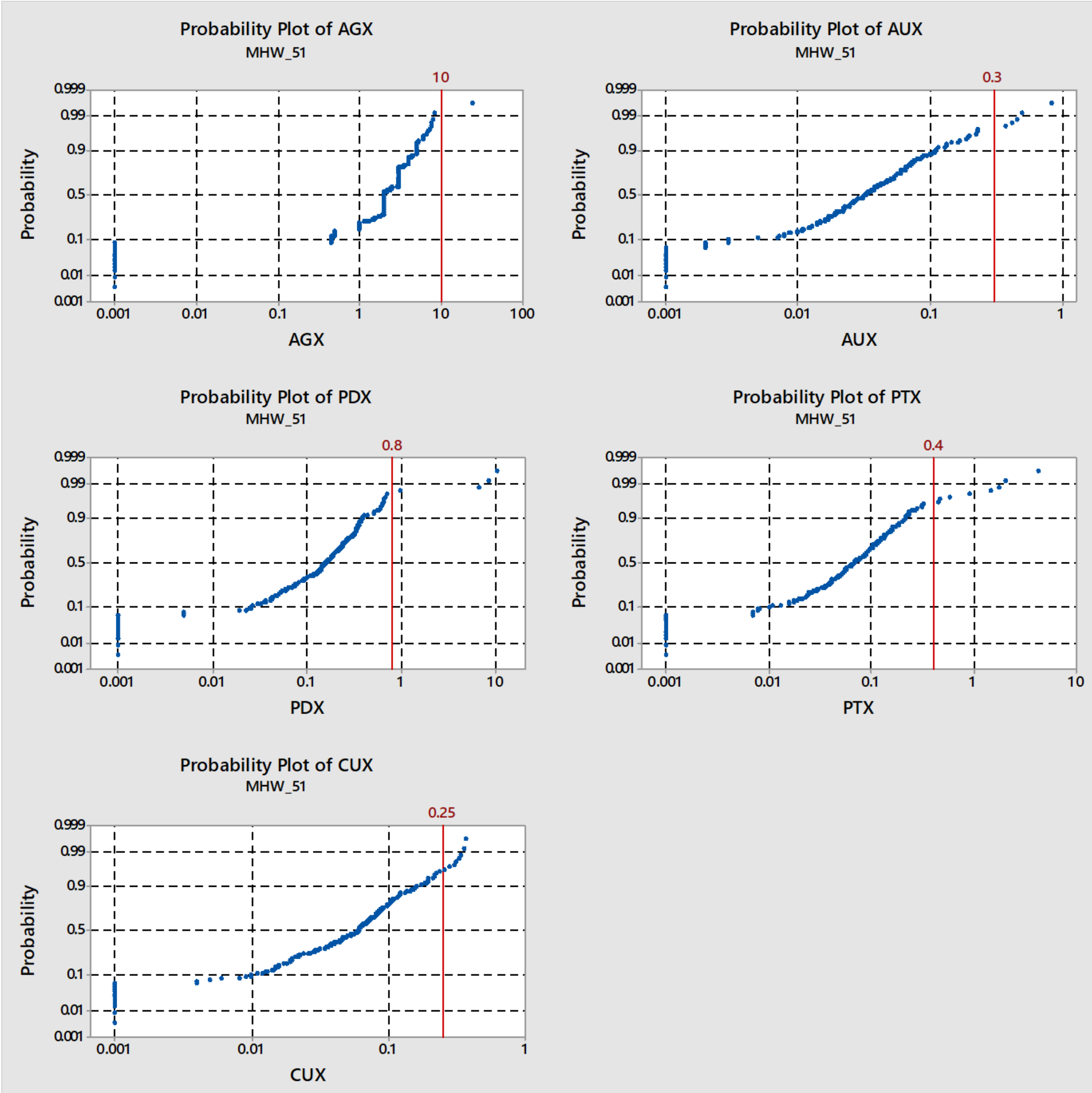
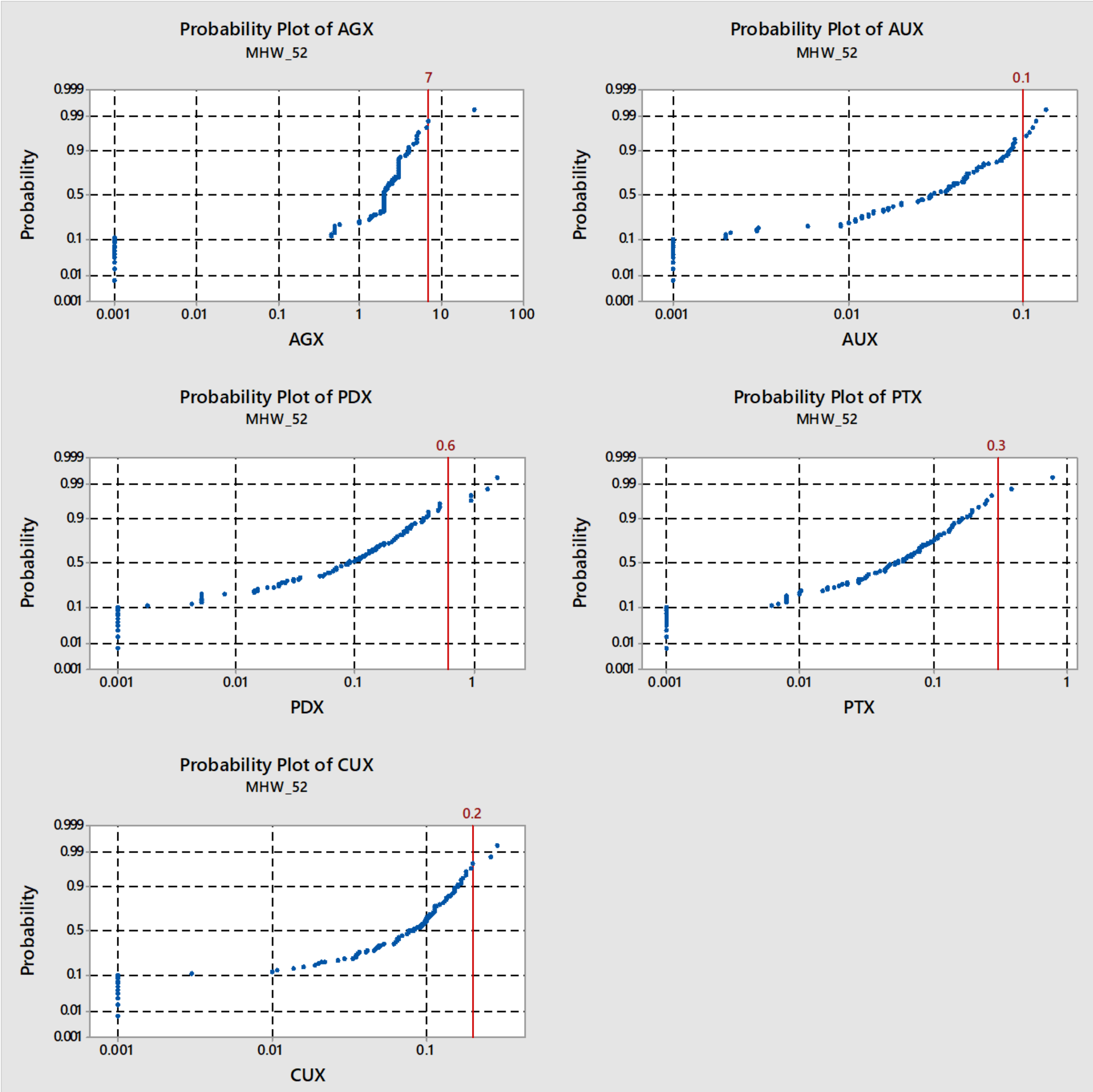
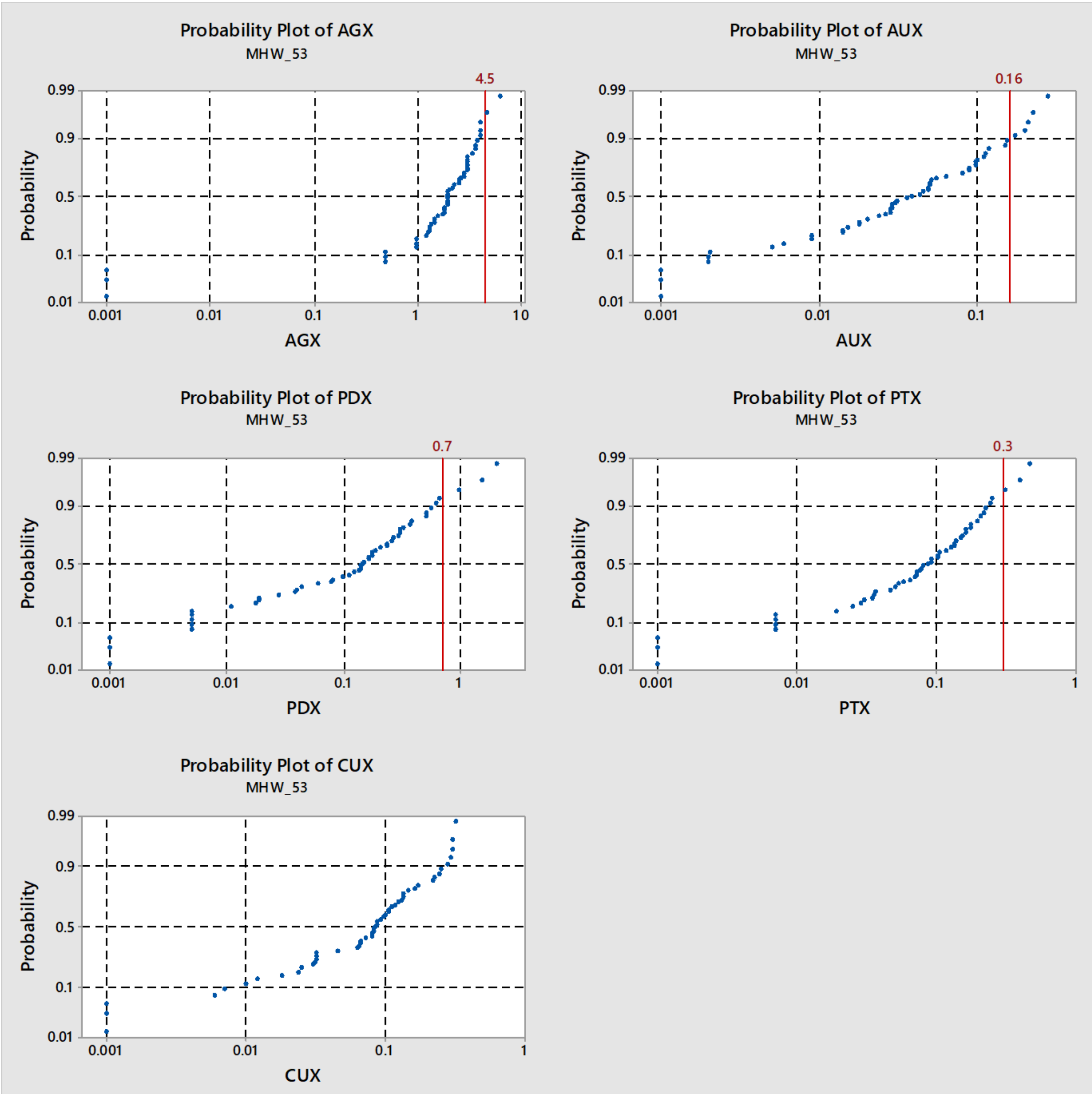
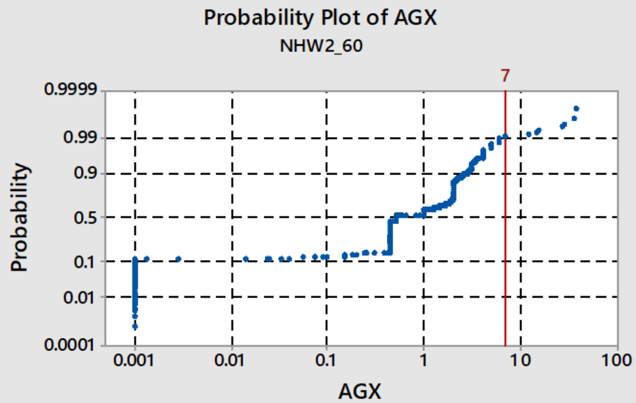
1
PTX

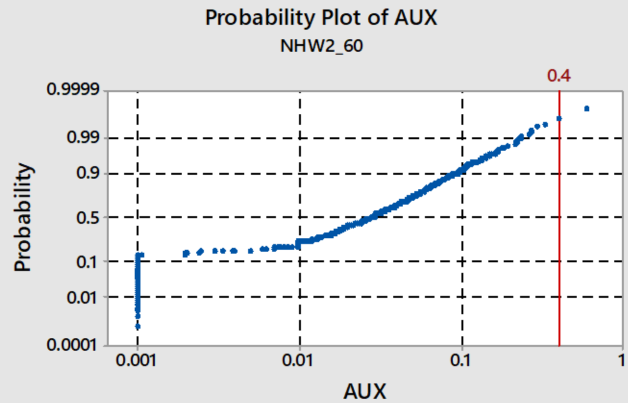

Probability Plot of CUX
MBRFW_40
0.5
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
CUX

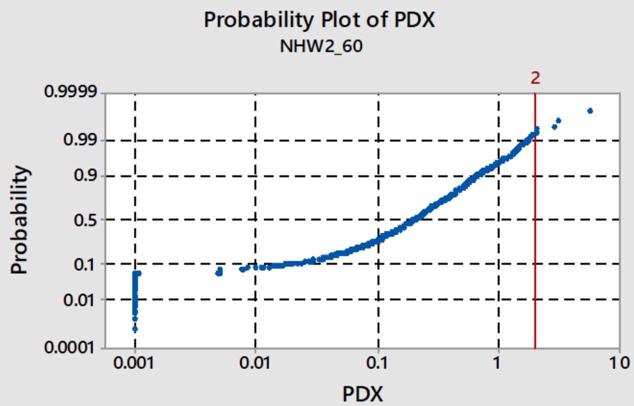

Probability Plot of AGX
MHW_51
10
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
10
100
AGX
Probability Plot of AUX
MHW_51
0.3
Probability
0.001
0.01
0.1
1
AUX
Probability Plot of PDX
MHW_51
0.8
Probability
0.001
0.01
0.1
1
10
PDX
Probability Plot of PTX
MHW_51
0.4
Probability
0.001
0.01
0.1
1
10
PTX
Probability Plot of CUX
MHW_51
0.25
Probability
0.001
0.01
0.1
1
CUX

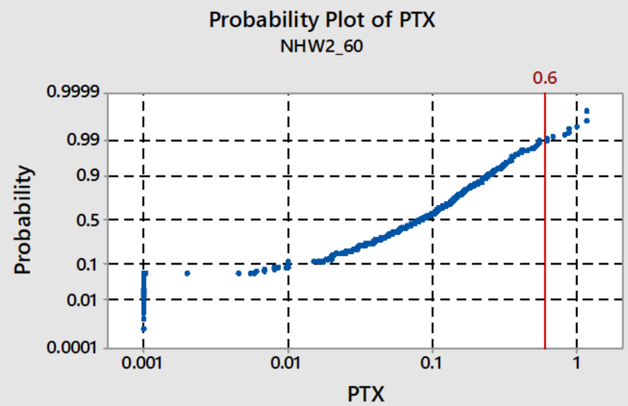

Probability Plot of AGX
MHW_52
7
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
10
100
AGX
Probability Plot of AUX
MHW_52
0.1
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
AUX
Probability Plot of PDX
MHW_52
0.6
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PDX
Probability Plot of PTX
MHW_52
0.3
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PTX
Probability Plot of CUX
MHW_52
0.2
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
CUX

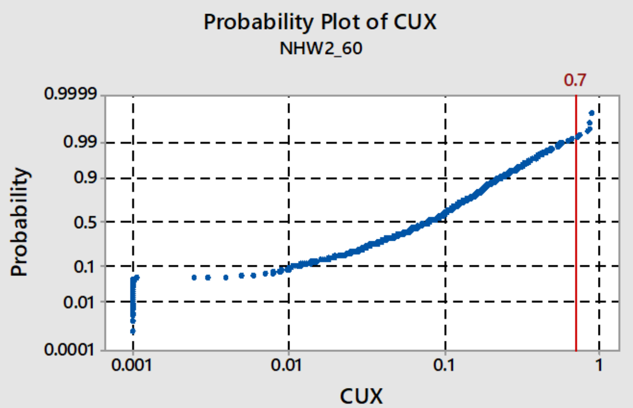

Probability Plot of AGX
MHW_53
4.5
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
10
AGX
Probability Plot of AUX
MHW_53
0.16
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
AUX
Probability Plot of PDX
MHW_53
0.7
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
PDX
Probability Plot of PTX
MHW_53
0.3
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
PTX
Probability Plot of CUX
MHW_53
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
CUX

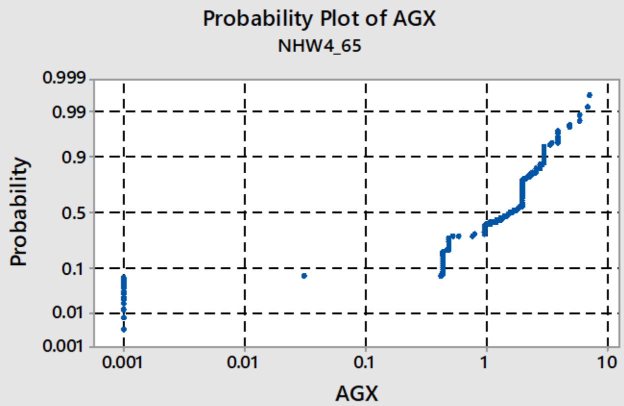

Probability Plot of AGX
NHW2_60
7
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
10
100
AGX

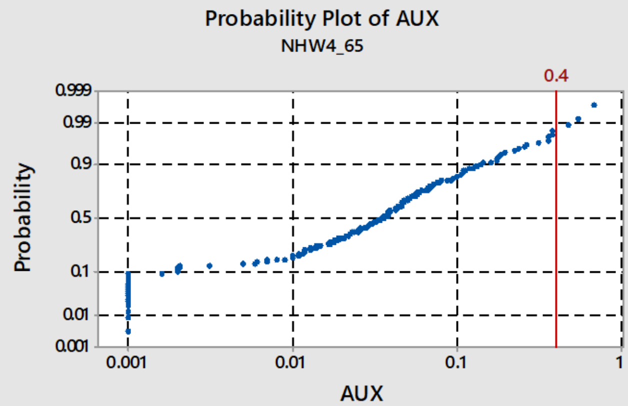

Probability Plot of AUX
NHW2_60
0.4
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
AUX

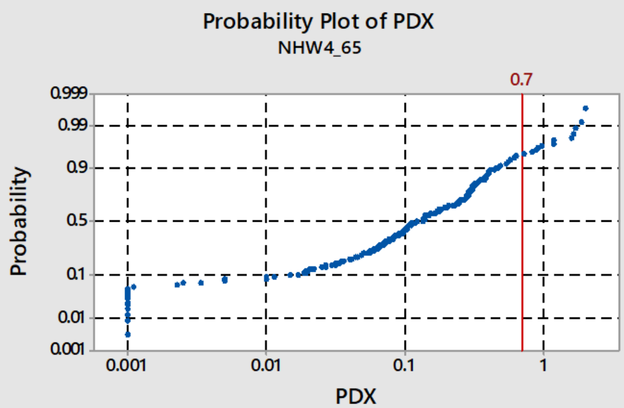

Probability Plot of PDX
NHW2_60
2
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
10
PDX

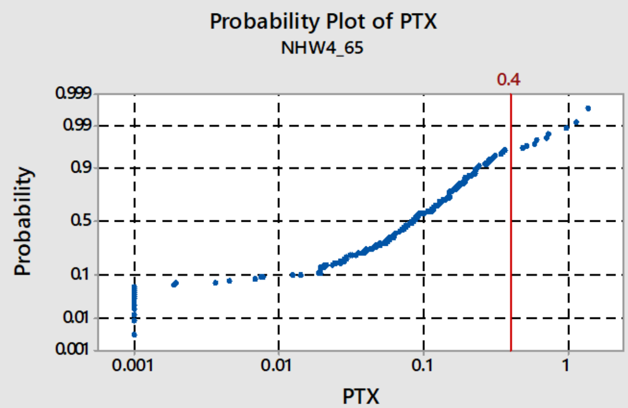

Probability Plot of PTX
NHW2_60
0.6
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
PTX

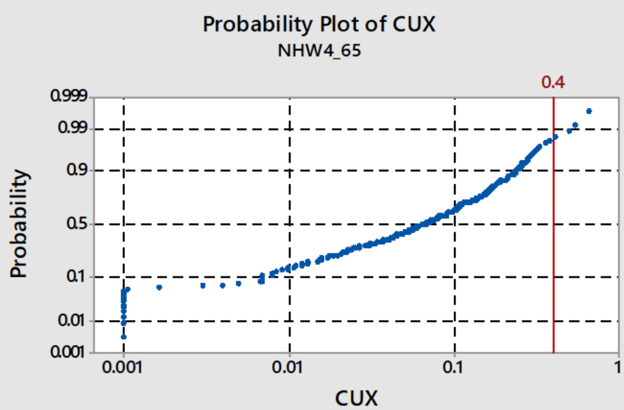

Probability Plot of CUX
NHW2_60
0.7
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
CUX

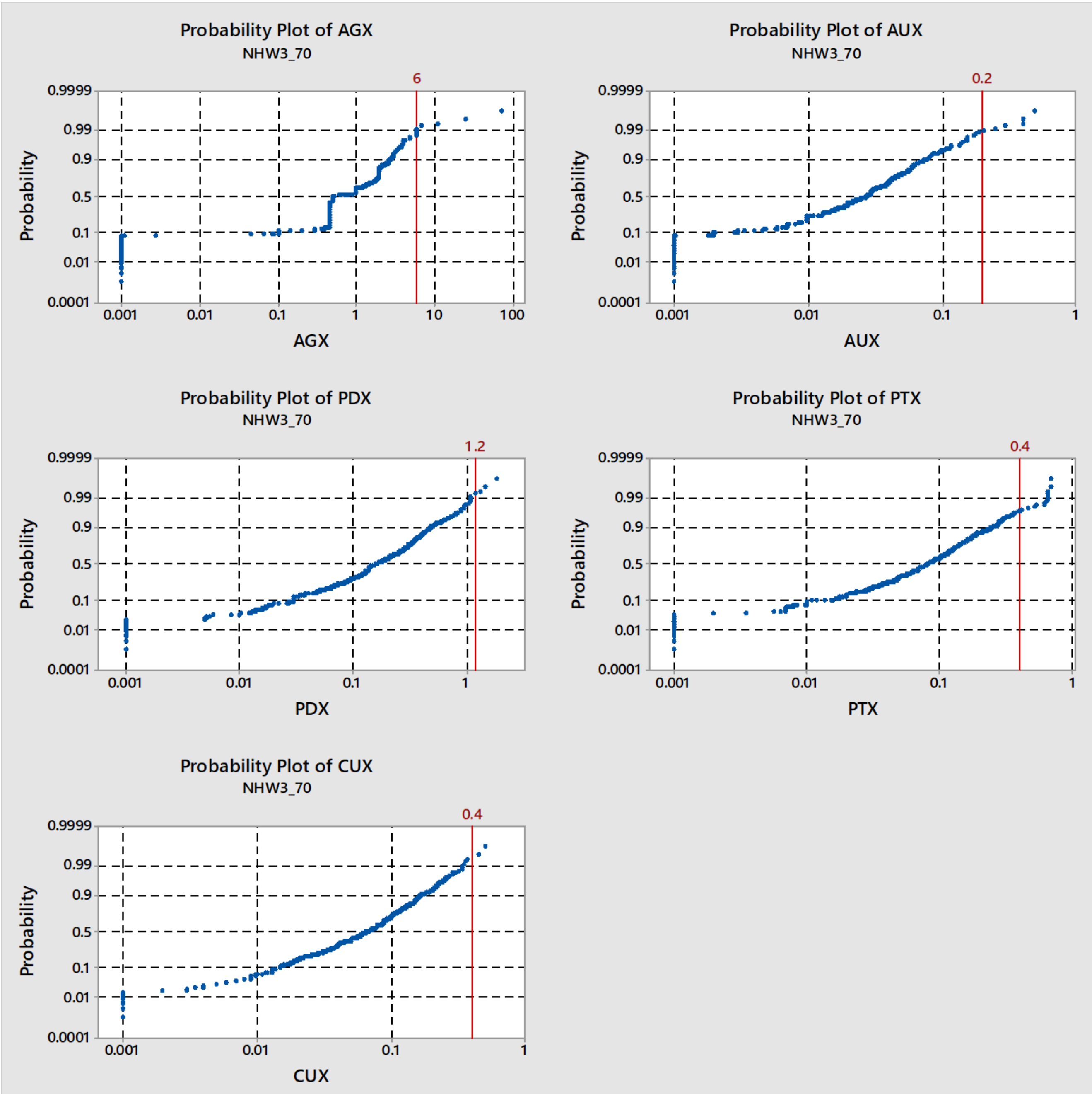

Probability Plot of AGX
NHW4_65
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
10
AGX

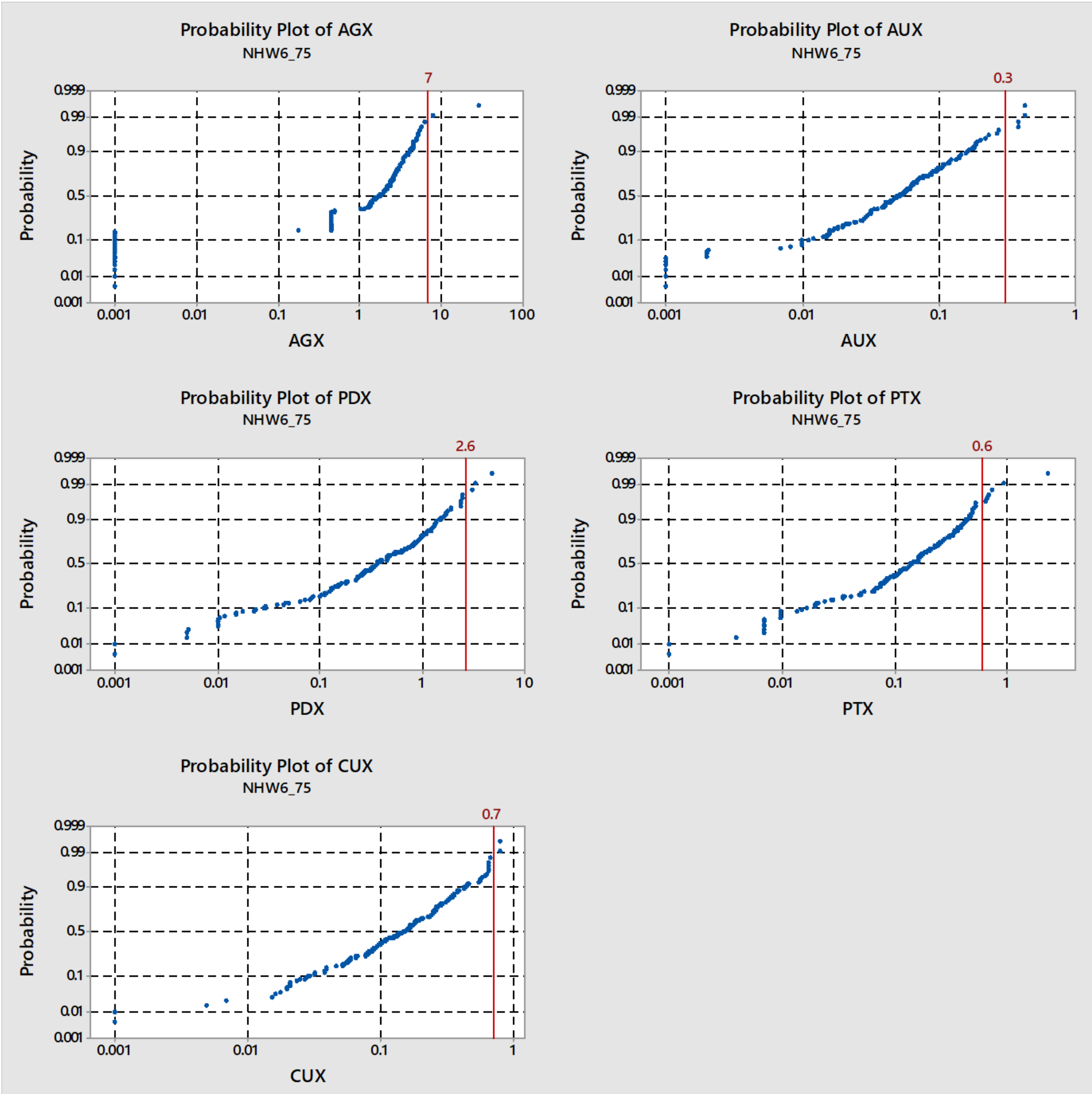

Probability Plot of AUX
NHW4_65
0.4
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
AUX

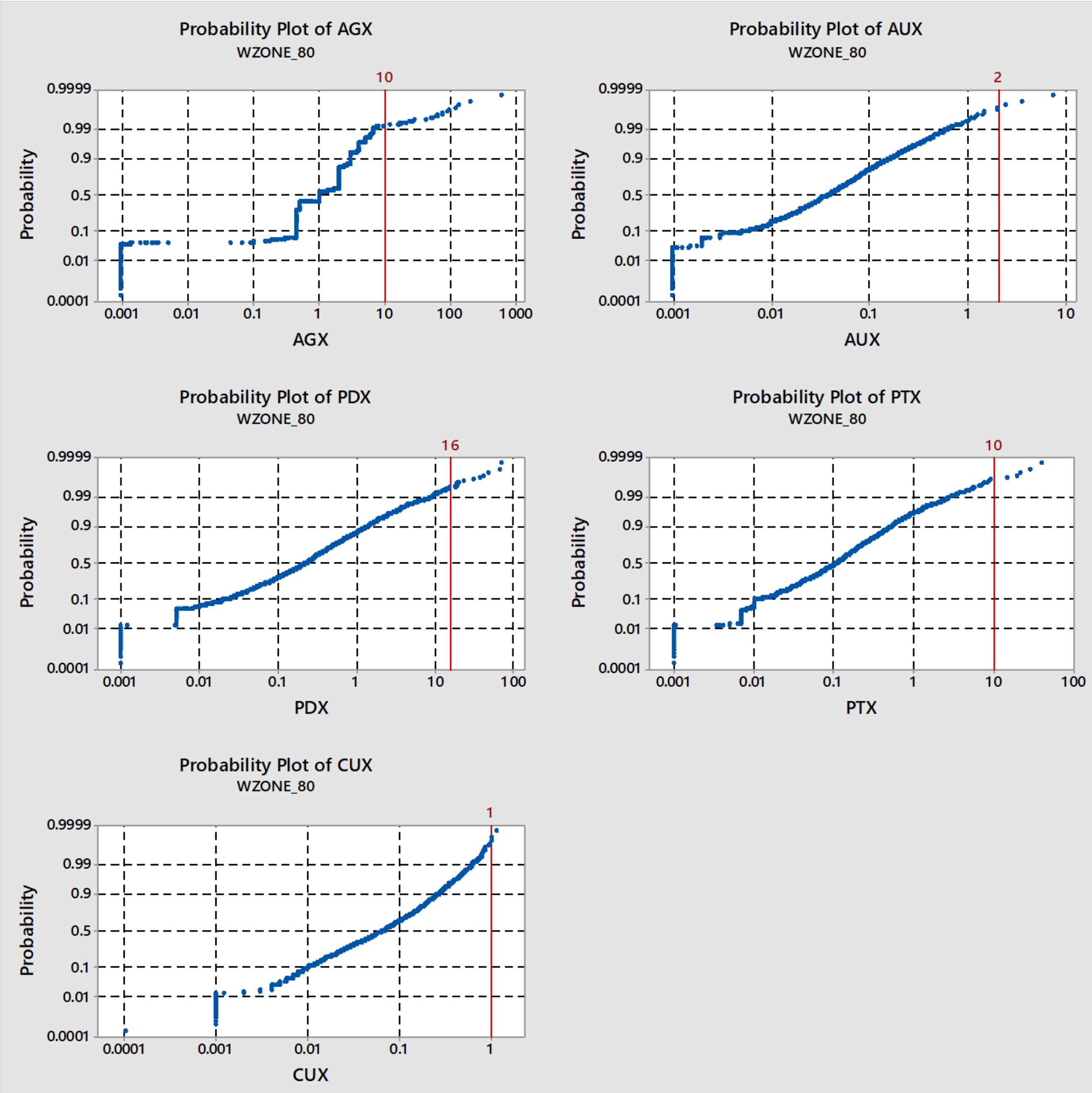

Probability Plot of PDX
NHW4_65
0.7
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PDX

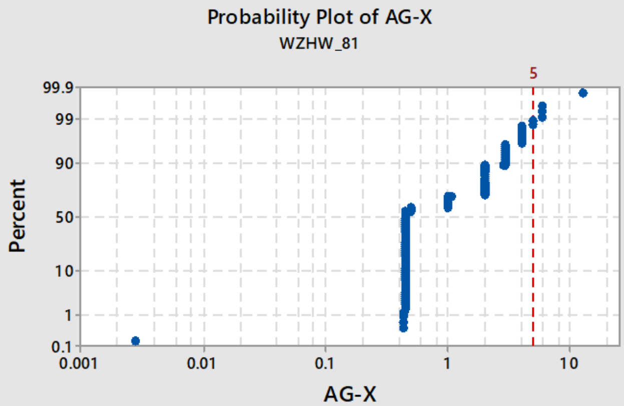

Probability Plot of PTX
NHW4_65
0.4
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PTX

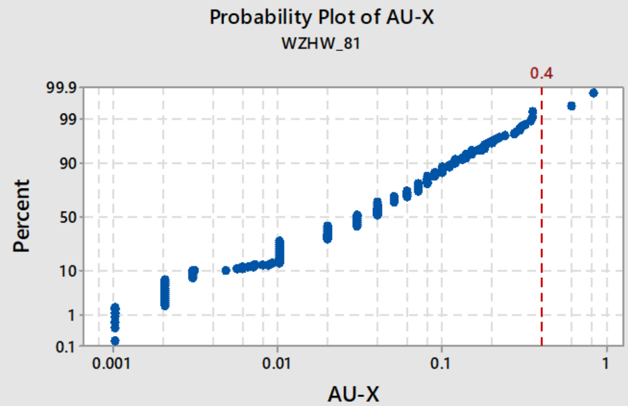

Probability Plot of CUX
NHW4_65
0.4
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
CUX

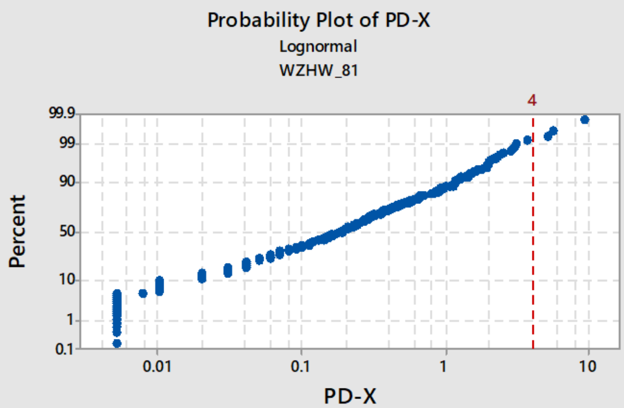

Probability Plot of AGX
NHW3_70
6
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
10
100
AGX
Probability Plot of AUX
NHW3_70
0.2
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
AUX
Probability Plot of PDX
NHW3_70
1.2
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
PDX
Probability Plot of PTX
NHW3_70
0.4
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
PTX
Probability Plot of CUX
NHW3_70
0.4
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
CUX

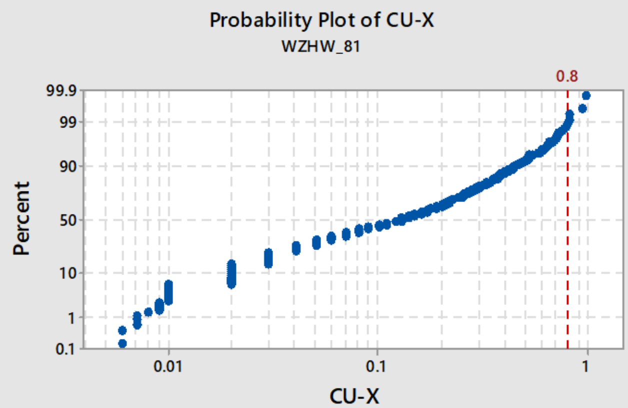

Probability Plot of AGX
NHW6_75
7
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001 0.01 0.1 1 10 100
AGX
Probability Plot of AUX
NHW6_75
0.3
Probability
0.001 0.01 0.1 1
AUX
Probability Plot of PDX
NHW6_75
2.6
Probability
0.001 0.01 0.1 1 10
PDX
Probability Plot of PTX
NHW6_75
0.6
Probability
0.001 0.01 0.1 1
PTX
Probability Plot of CUX
NHW6_75
0.7
Probability
0.001 0.01 0.1 1
CUX

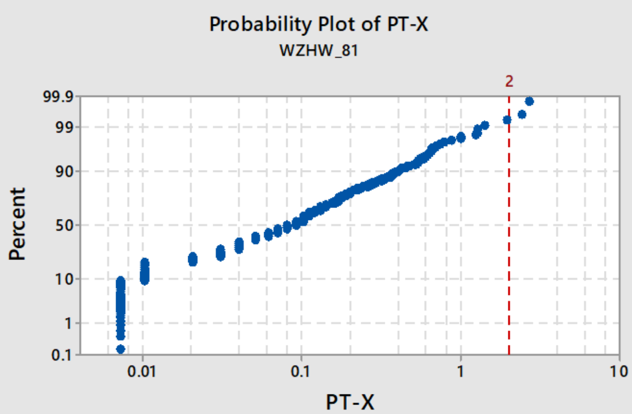

Probability Plot of AGX
WZONE_80
10
Probability
0.9999
0.99
0.9
0.5
0.1
0.01
0.0001
0.001
0.01
0.1
1
10
100
1000
AGX
Probability Plot of AUX
WZONE_80
2
Probability
0.001
0.01
0.1
1
10
AUX
Probability Plot of PDX
WZONE_80
16
Probability
0.001
0.01
0.1
1
10
100
PDX
Probability Plot of PTX
WZONE_80
10
Probability
0.001
0.01
0.1
1
10
100
PTX
Probability Plot of CUX
WZONE_80
1
Probability
0.0001
0.001
0.01
0.1
1
CUX

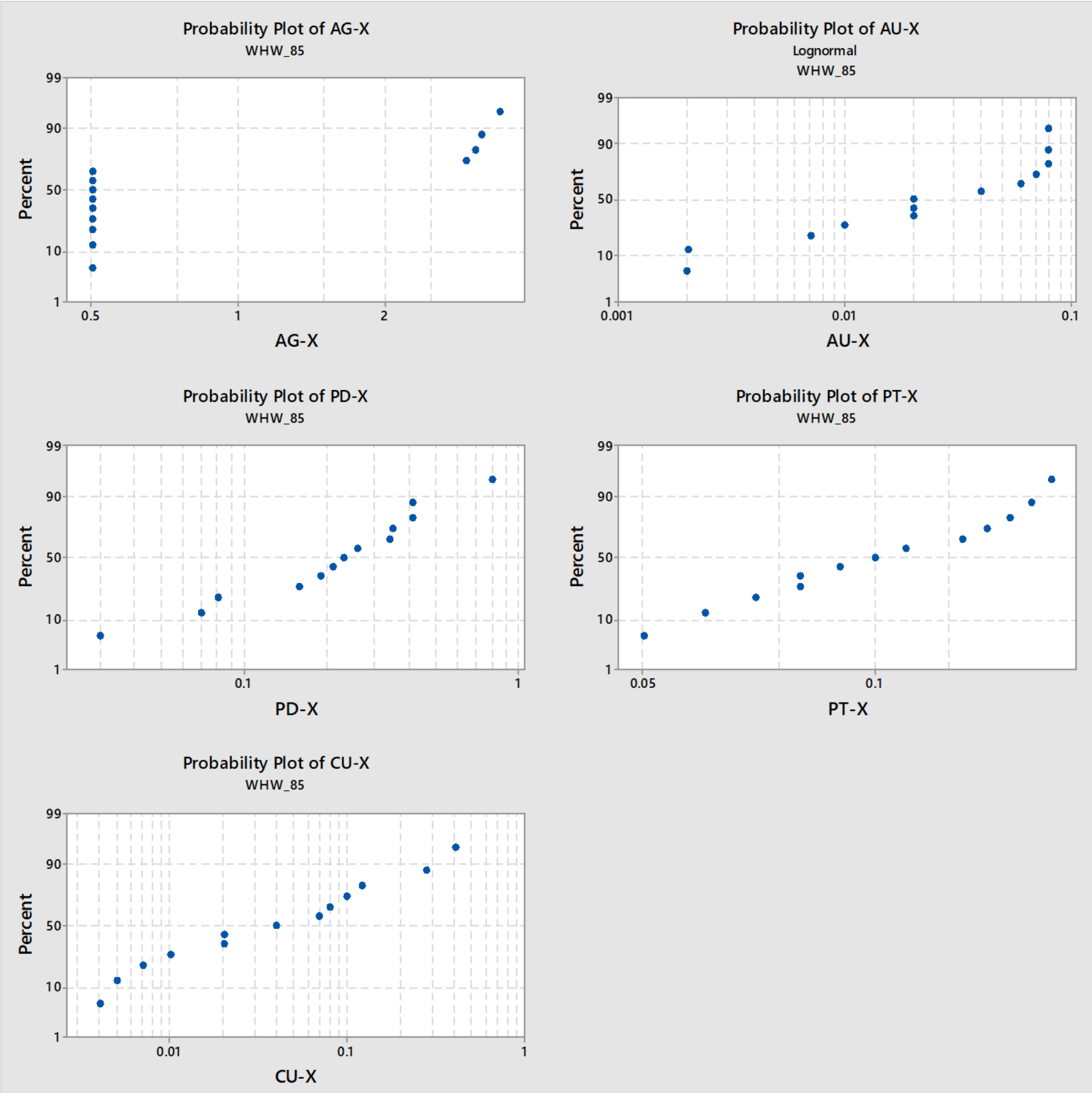

Probability Plot of AG-X
WZHW_81
5
99.9
99
90
50
10
1
0.1
Percent
0.001
0.01
0.1
1
10
AG-X

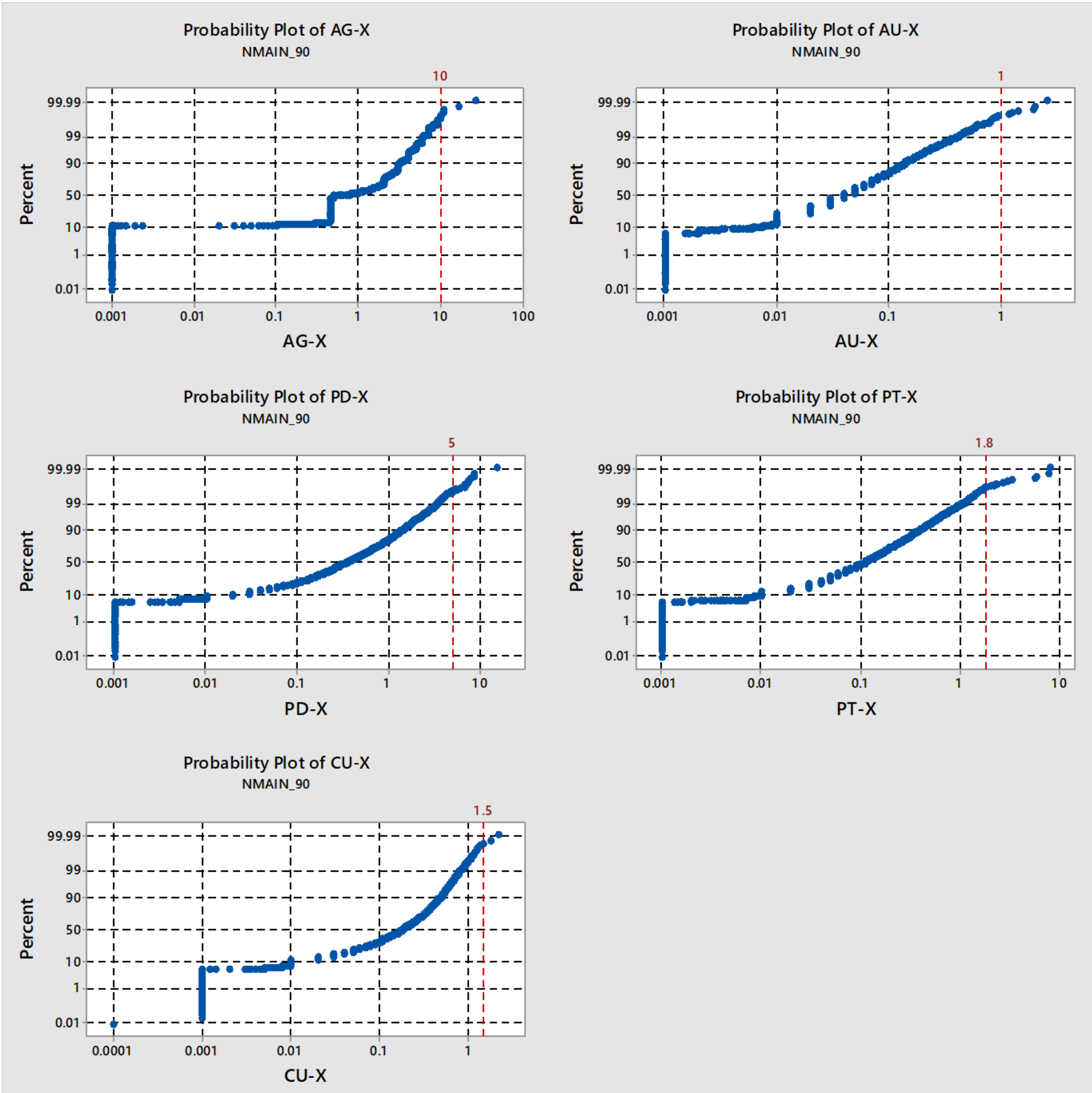

Probability Plot of AU-X
WZHW_81
0.4
99.9
99
90
50
10
1
0.1
Percent
0.001
0.01
0.1
1
AU-X

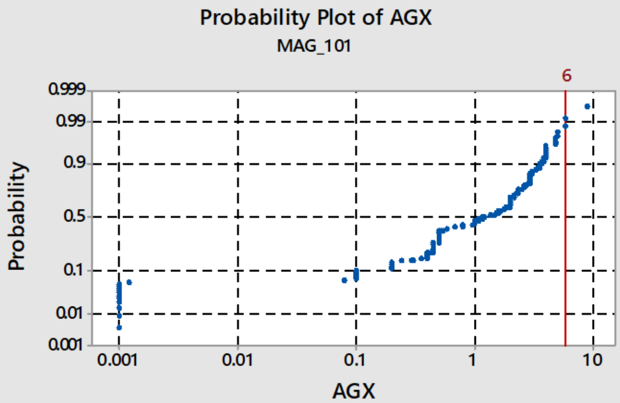

Probability Plot of PD-X
Lognormal
WZHW_81
4
99.9
99
90
50
10
1
0.1
Percent
0.01
0.1
1
10
PD-X

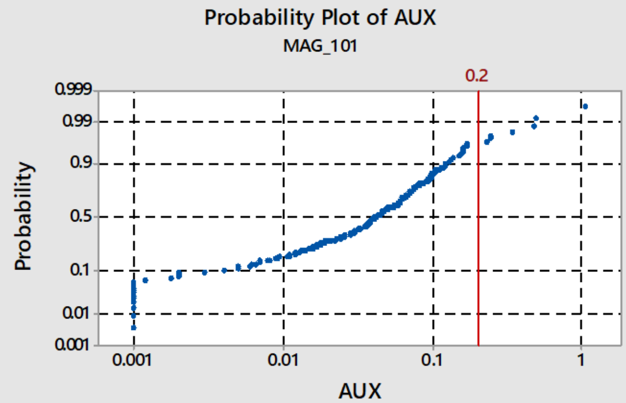

Probability Plot of CU-X
WZHW_81
0.8
99.9
99
90
50
10
1
0.1
Percent
0.01
0.1
1
CU-X

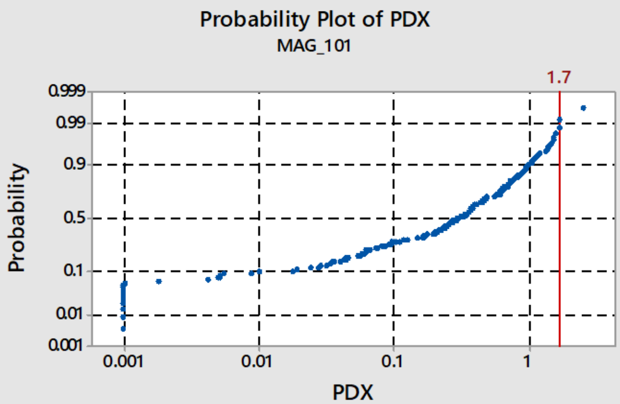

Probability Plot of PT-X
WZHW_81
2
99.9
99
90
50
10
1
0.1
Percent
0.01
0.1
1
10
PT-X

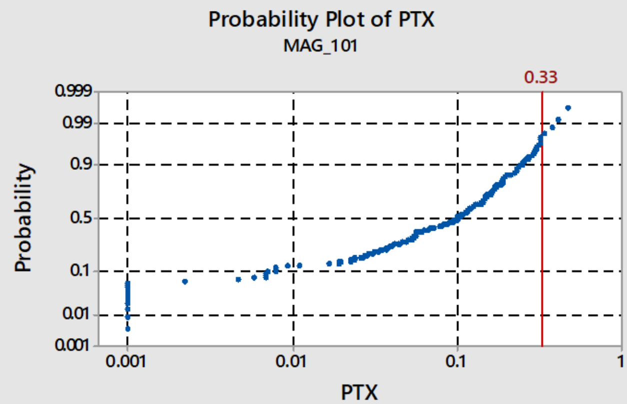

Probability Plot of AG-X
WHW_85
Percent
AG-X
Probability Plot of AU-X
Lognormal
WHW_85
Percent
AU-X
Probability Plot of PD-X
WHW_85
Percent
PD-X
Probability Plot of PT-X
WHW_85
Percent
PT-X
Probability Plot of CU-X
WHW_85
Percent
CU-X

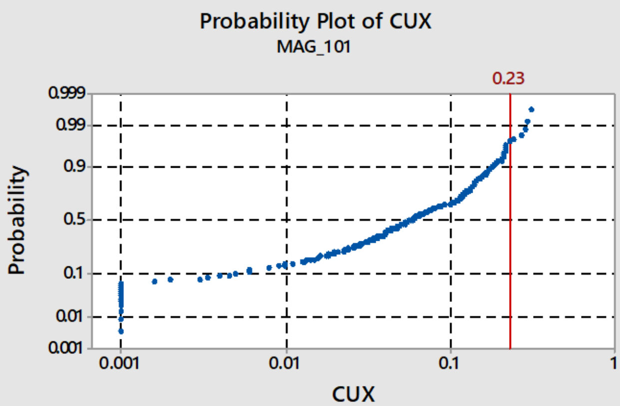

Probability Plot of AG-X
NMAIN_90
10
Percent
99.99
99
90
50
10
1
0.01
0.001
0.01
0.1
1
10
100
AG-X
Probability Plot of AU-X
NMAIN_90
1
Percent
0.001
0.01
0.1
1
AU-X
Probability Plot of PD-X
NMAIN_90
5
0.001
0.01
0.1
1
10
PD-X
Probability Plot of PT-X
NMAIN_90
1.8
0.001
0.01
0.1
1
10
PT-X
Probability Plot of CU-X
NMAIN_90
1.5
0.0001
0.001
0.01
0.1
1
CU-X

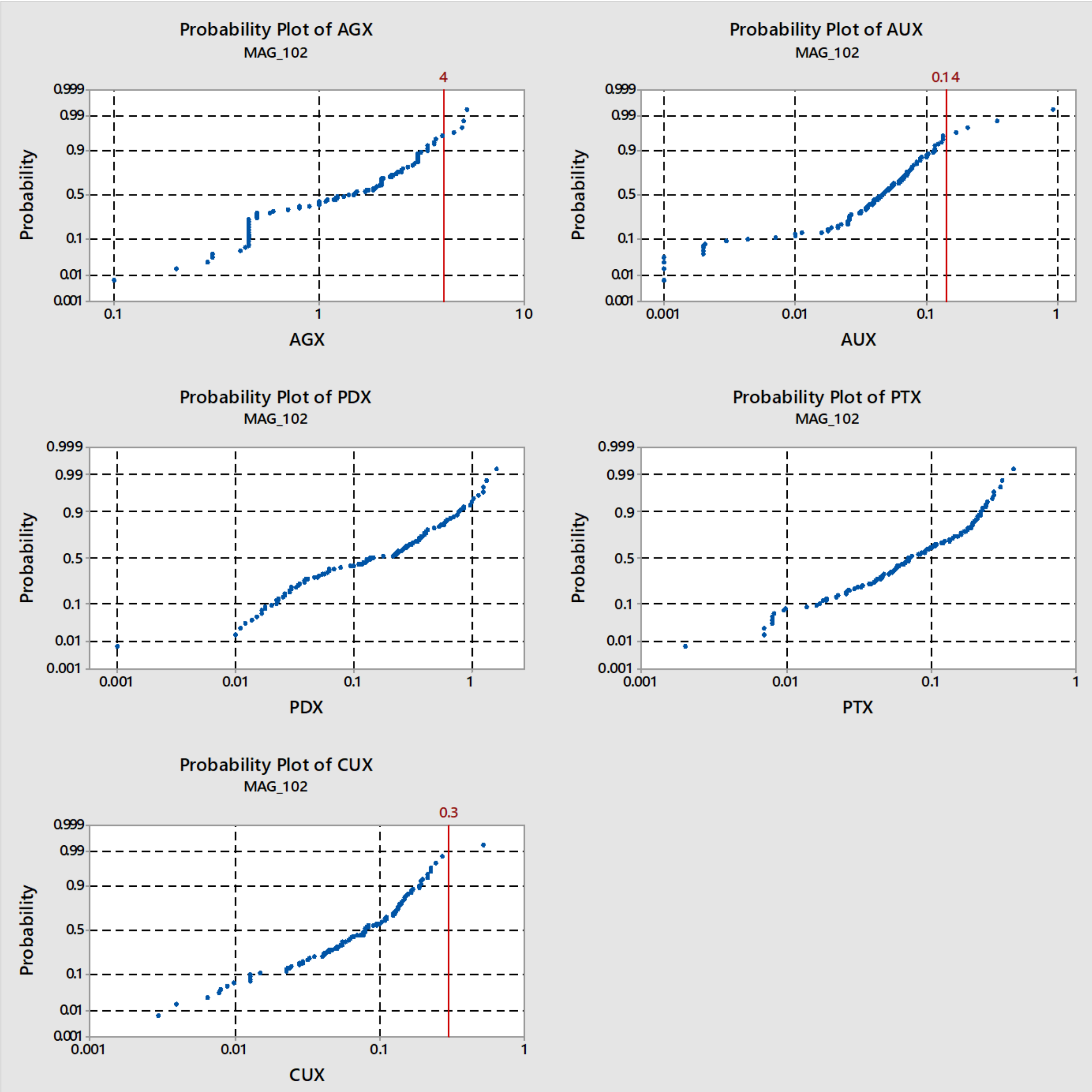

Probability Plot of AGX
MAG_101
6
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
10
AGX

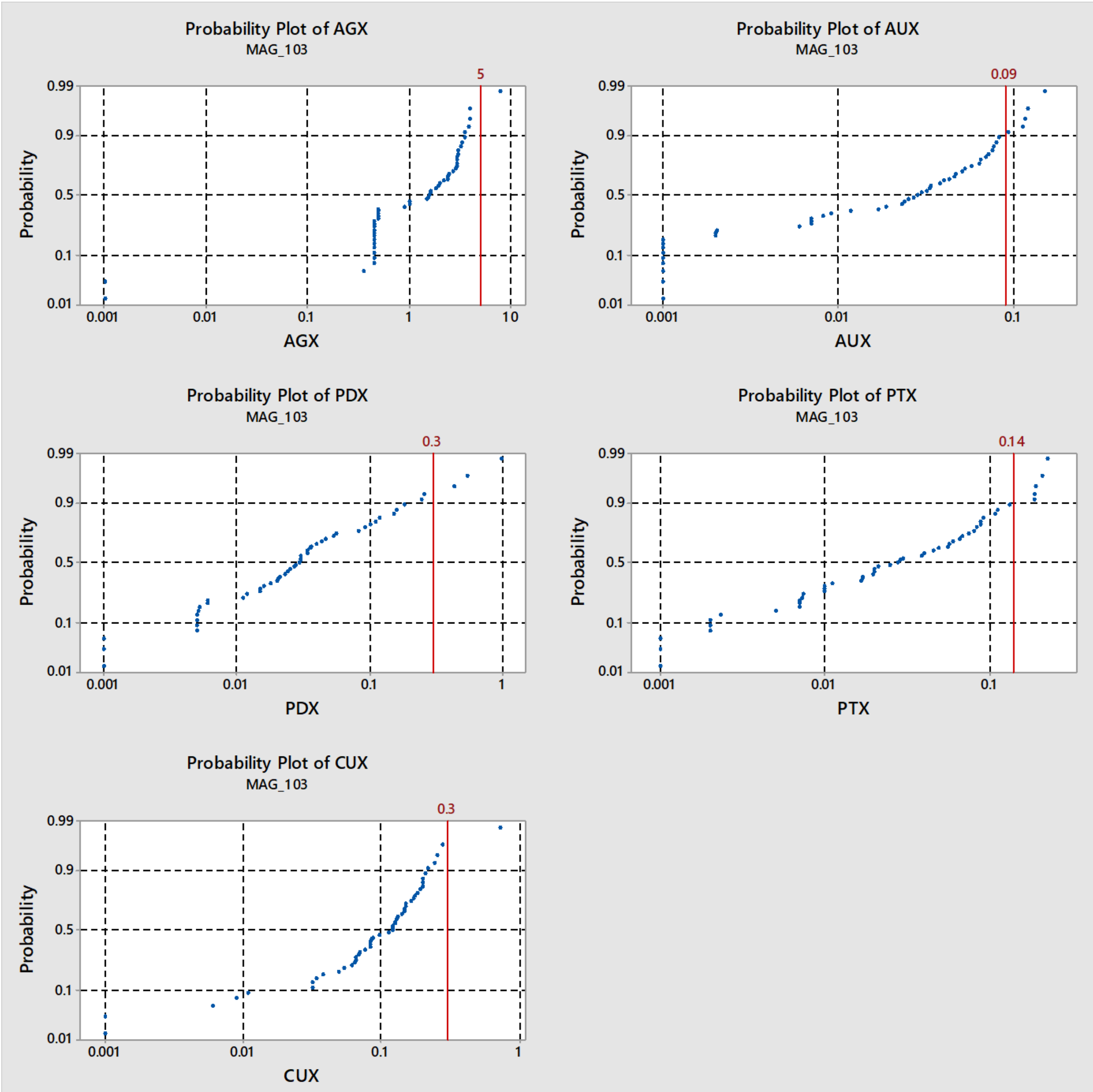

Probability Plot of AUX
MAG_101
0.2
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
AUX


Probability Plot of PDX
MAG_101
1.7
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PDX


Probability Plot of PTX
MAG_101
0.33
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
PTX

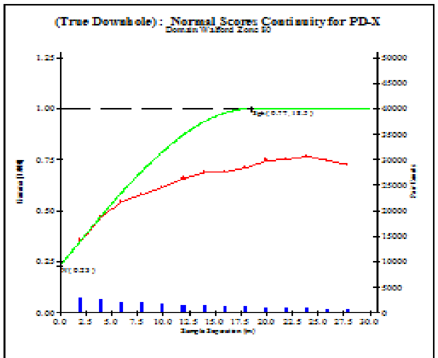

Probability Plot of CUX
MAG_101
0.23
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.001
0.01
0.1
1
CUX

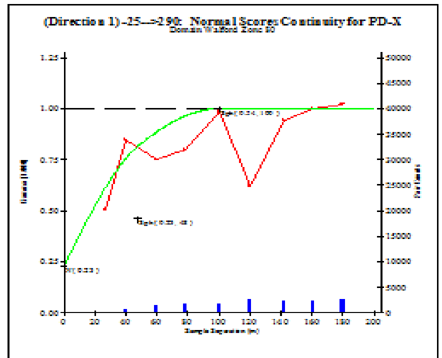

Probability Plot of AGX
MAG_102
4
Probability
0.999
0.99
0.9
0.5
0.1
0.01
0.001
0.1
1
10
AGX
Probability Plot of AUX
MAG_102
0.14
0.001
0.01
0.1
1
AUX
Probability Plot of PDX
MAG_102
PDX
Probability Plot of PTX
MAG_102
PTX
Probability Plot of CUX
MAG_102
0.3
CUX

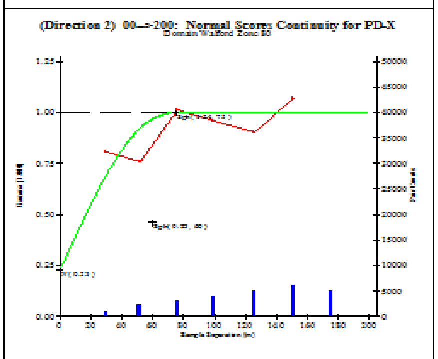

Probability Plot of AGX
MAG_103
5
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
10
AGX
Probability Plot of AUX
MAG_103
0.09
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
AUX
Probability Plot of PDX
MAG_103
0.3
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
PDX
Probability Plot of PTX
MAG_103
0.14
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
PTX
Probability Plot of CUX
MAG_103
0.3
Probability
0.99
0.9
0.5
0.1
0.01
0.001
0.01
0.1
1
CUX

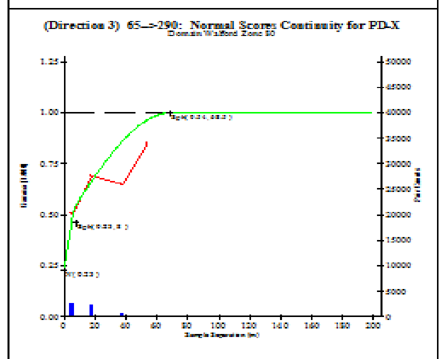
Marathon Deposit

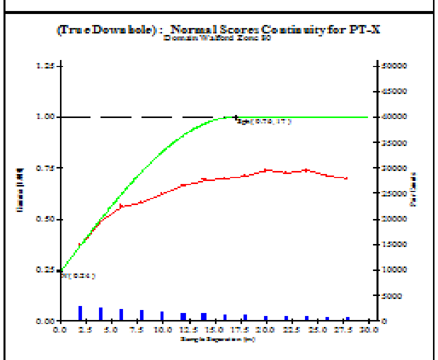
Variograms

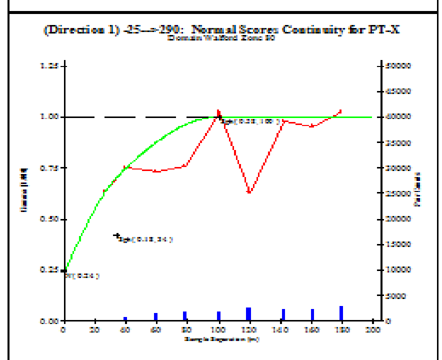

(True Downhole) : Normal Scores Continuity for PD-X

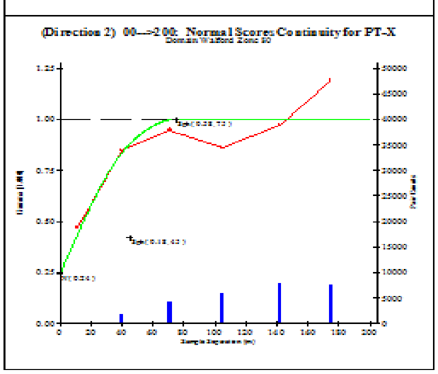

(Direction 1) -25-->290: Normal Scores Continuity for PD-X

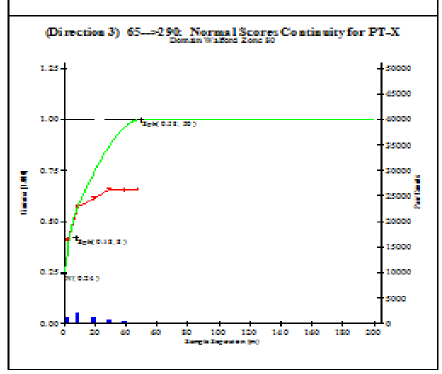

(Direction 2) 00-->200: Normal Scores Continuity for PD-X


(Direction 3) 65-->290: Normal Scores Continuity for PD-X

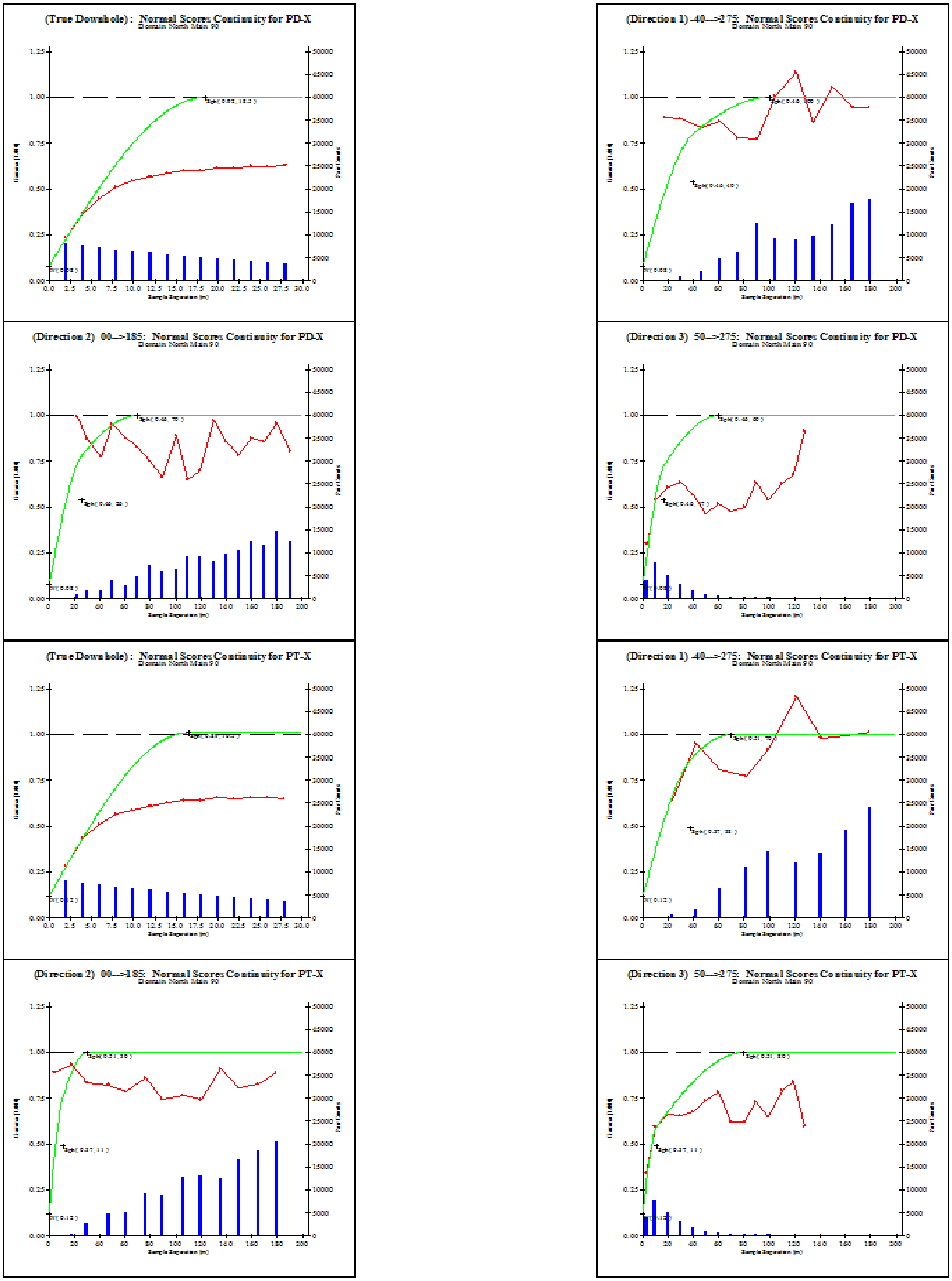

(True Downhole) : Normal Scores Continuity for PT-X


(Direction 1) -25-->290: Normal Scores Continuity for PT-X


(Direction 2) 00-->200: Normal Scores Continuity for PT-X


(Direction 3) 65-->290: Normal Scores Continuity for PT-X

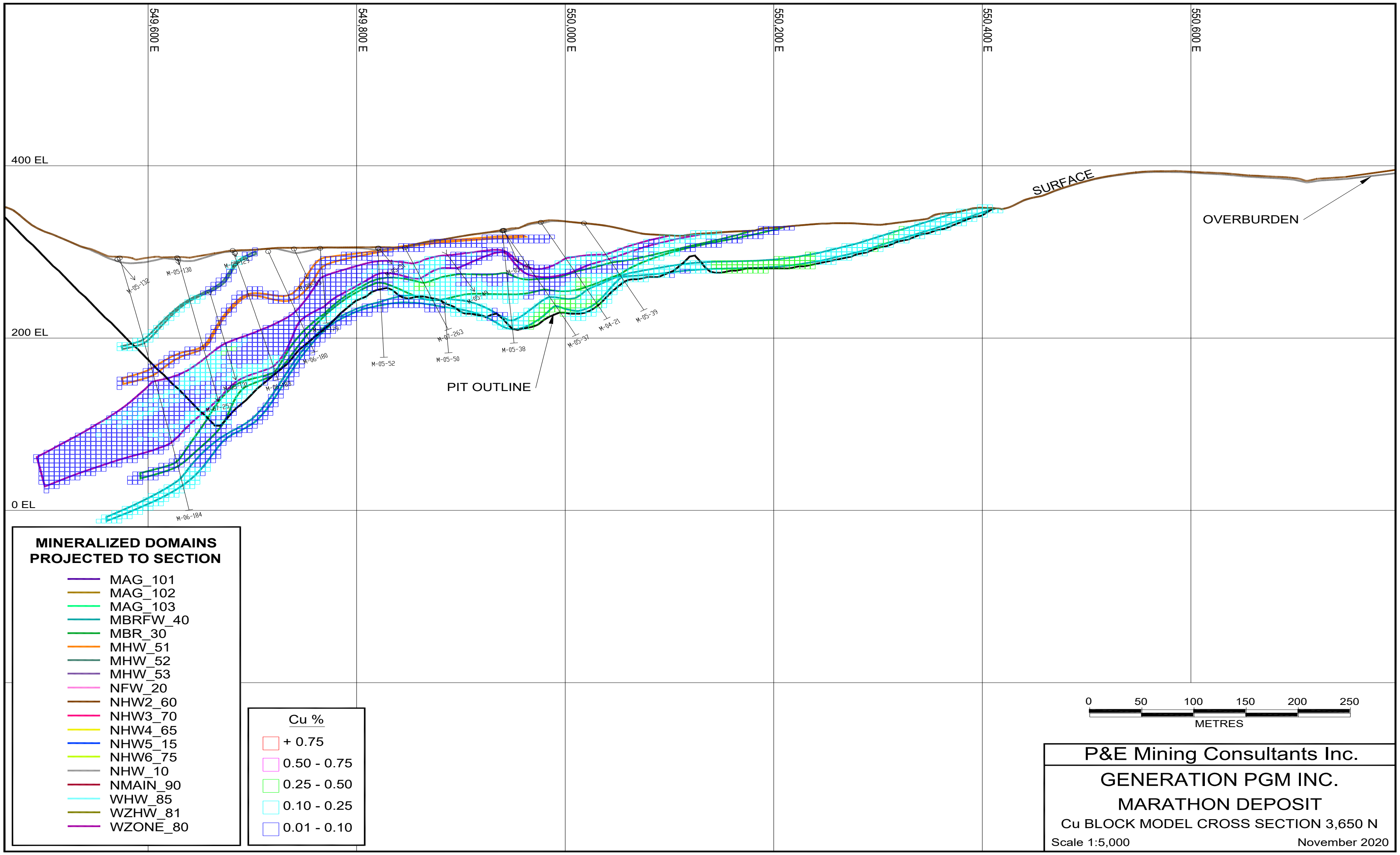
Walford Zone Semi-Variograms

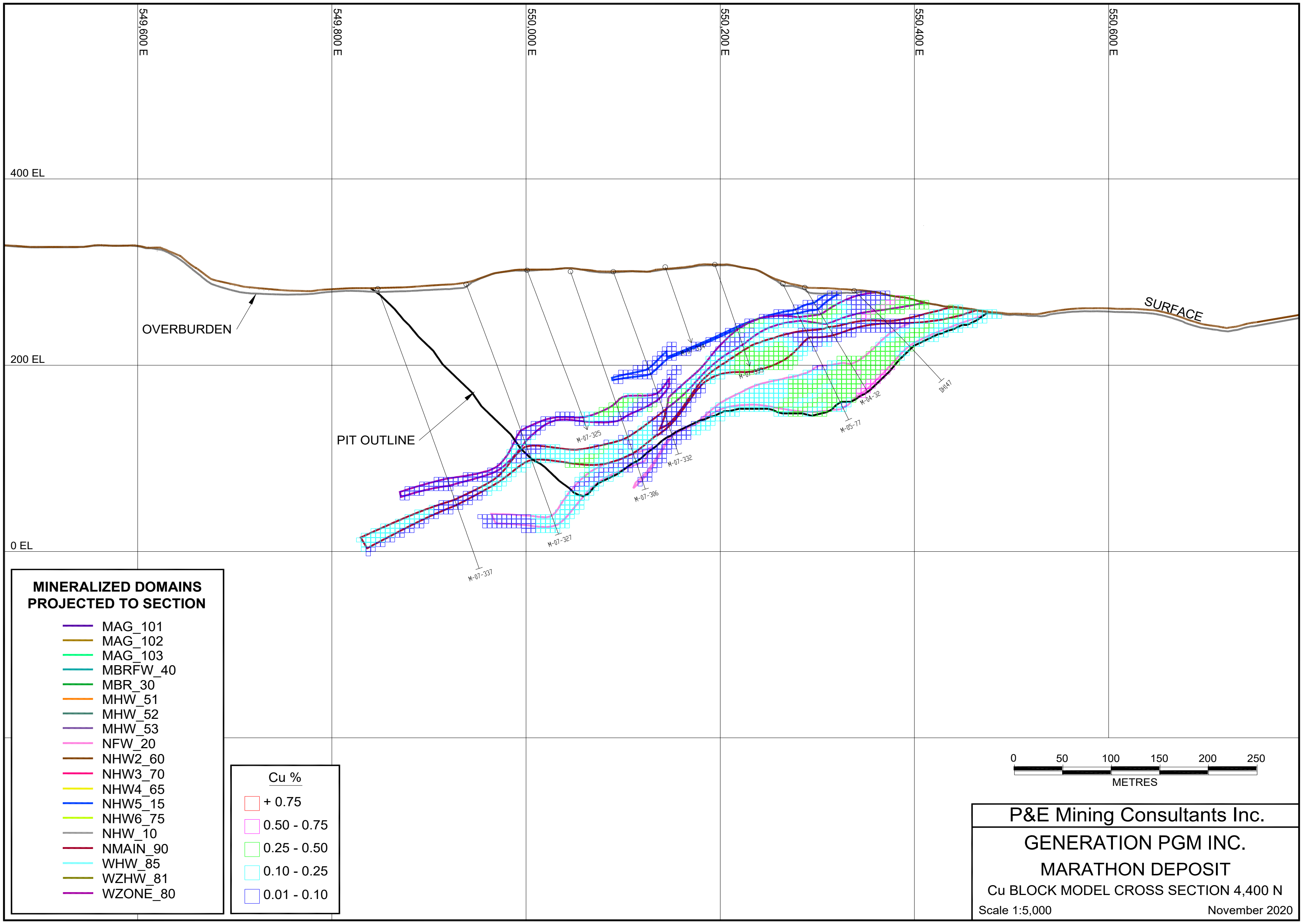


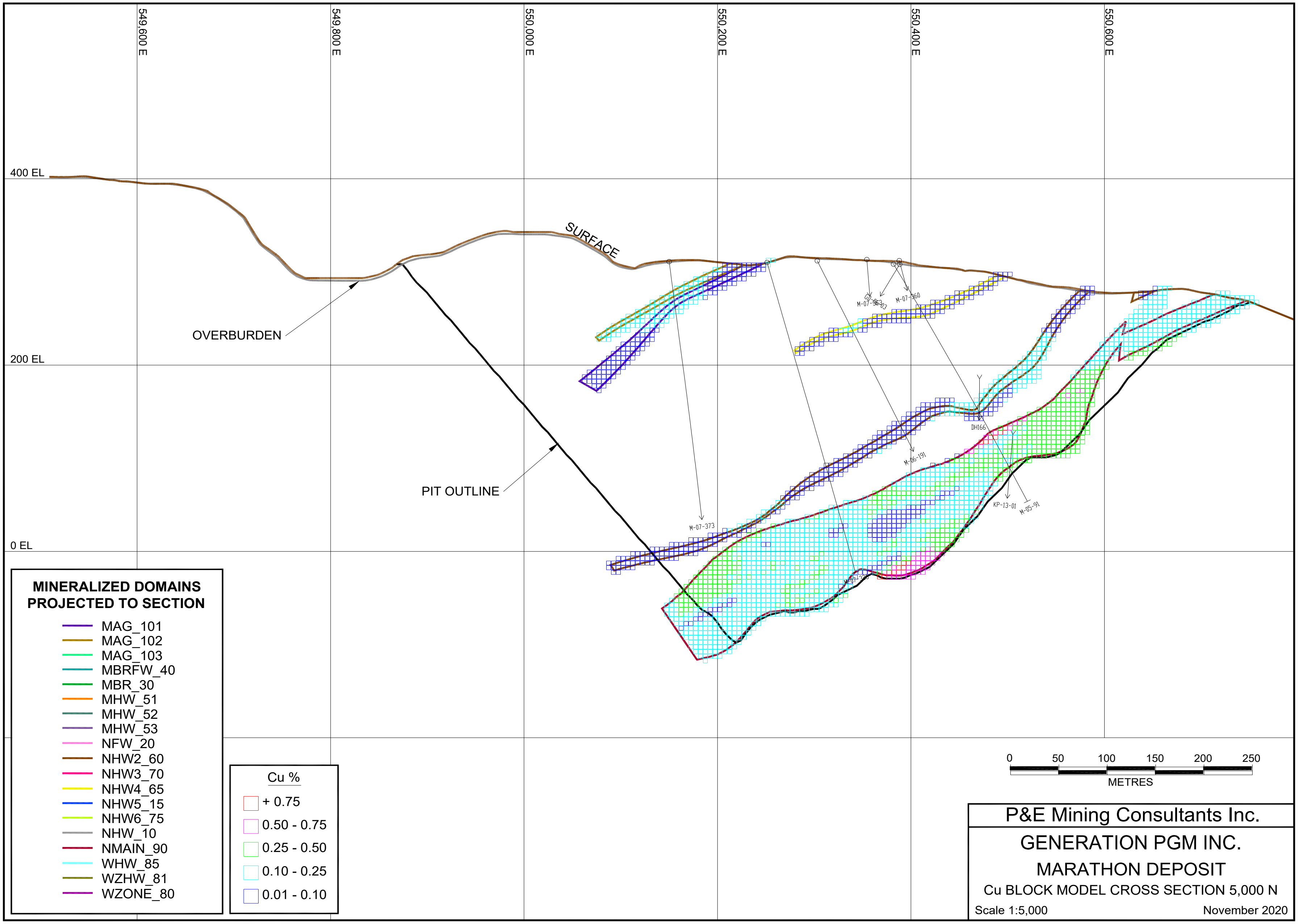
North Main Zone Semi-Variograms

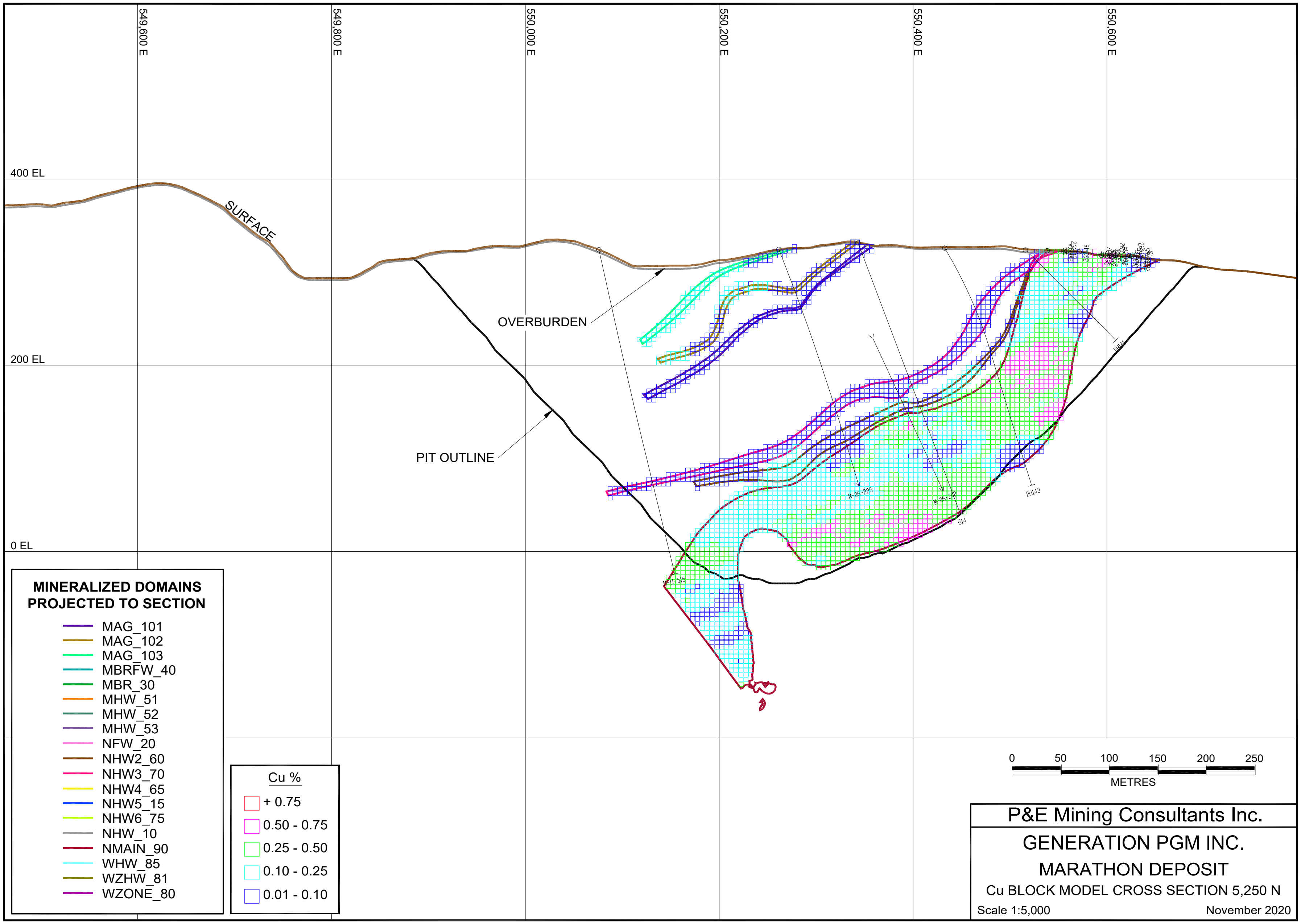
Marathon Deposit

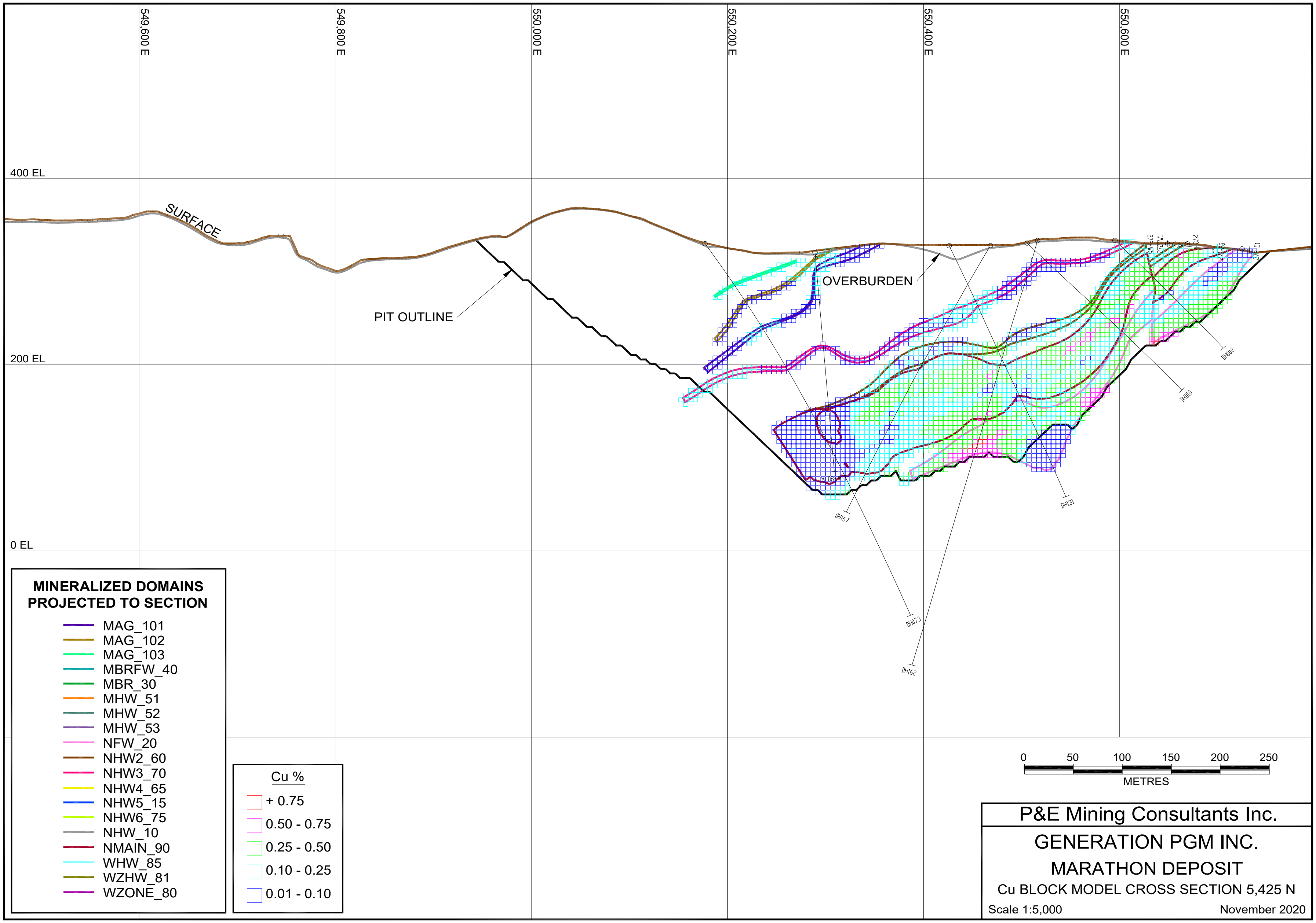
Cu Block Model Cross Sections And Plans

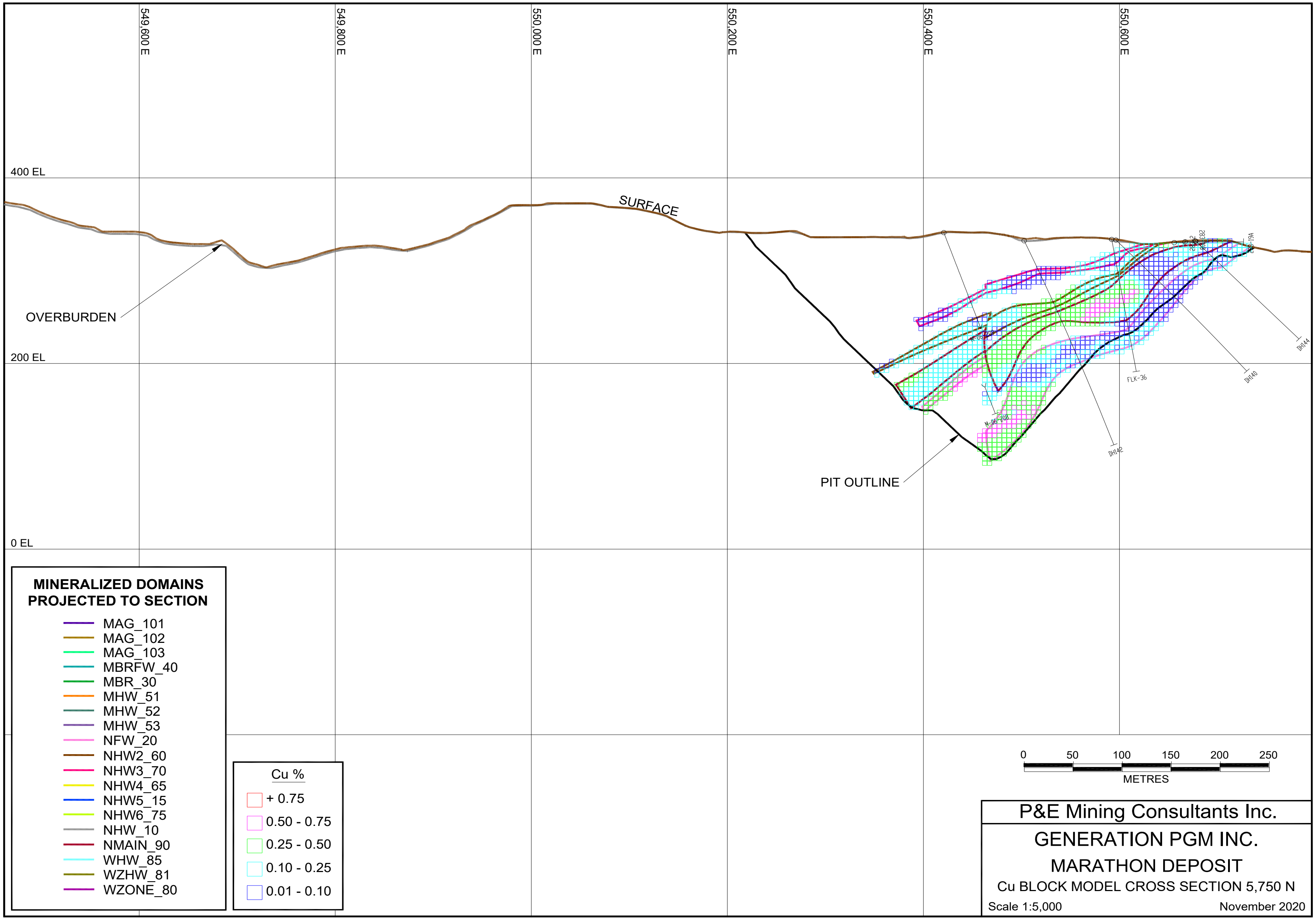

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 3,650 N
Scale 1:5,000
November 2020

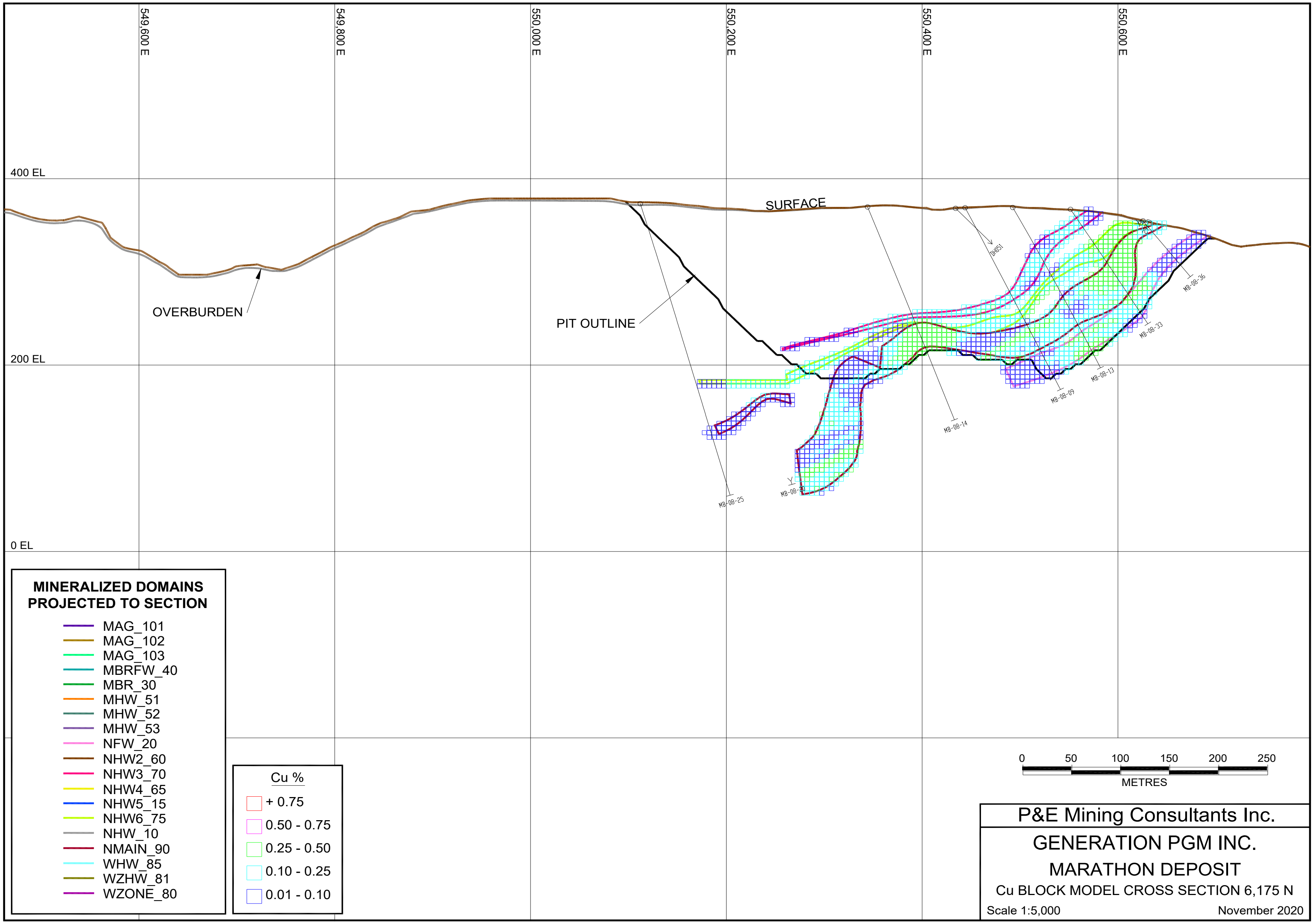

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
OVERBURDEN
PIT OUTLINE
SURFACE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 4,400 N
Scale 1:5,000
November 2020

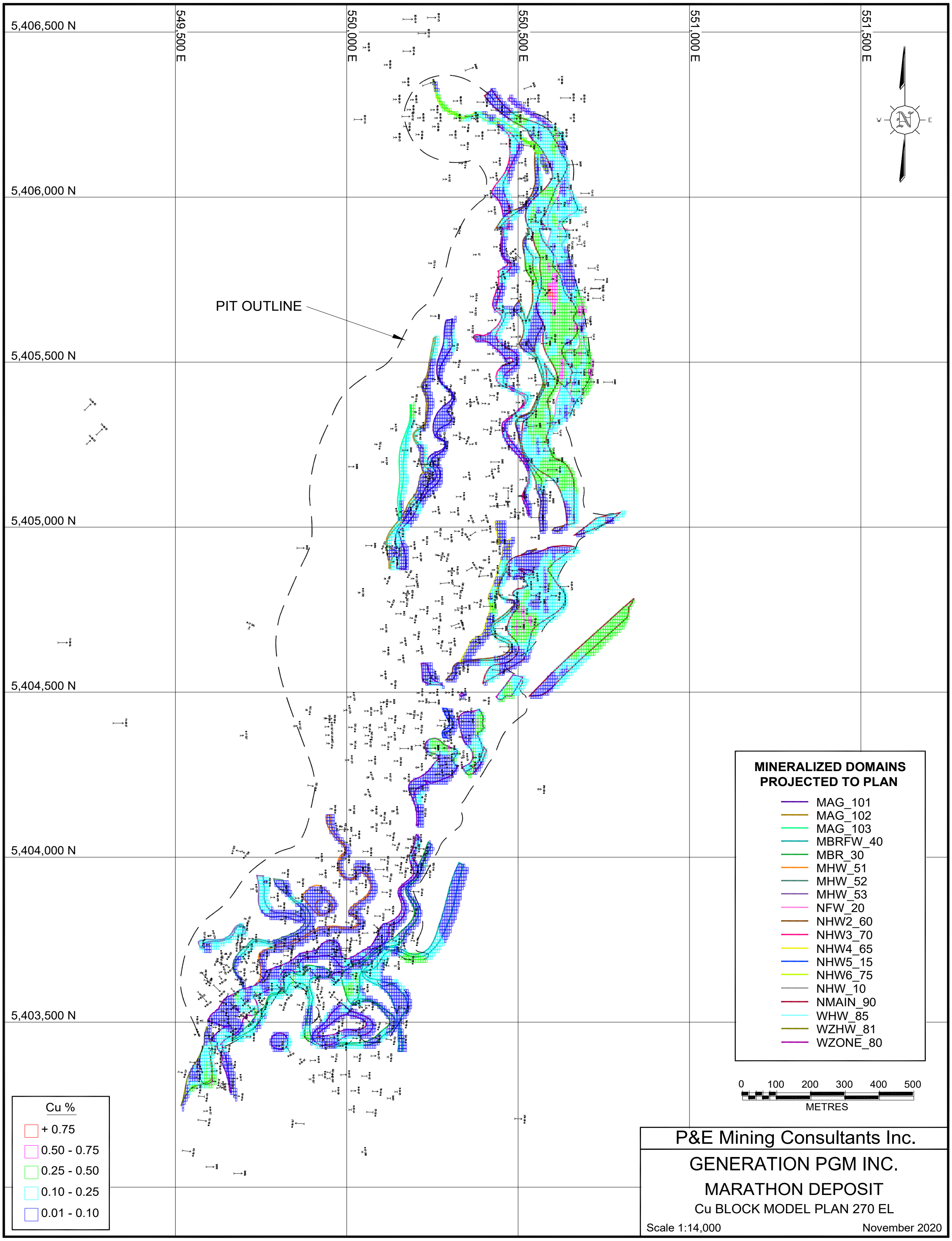

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 5,000 N
Scale 1:5,000
November 2020

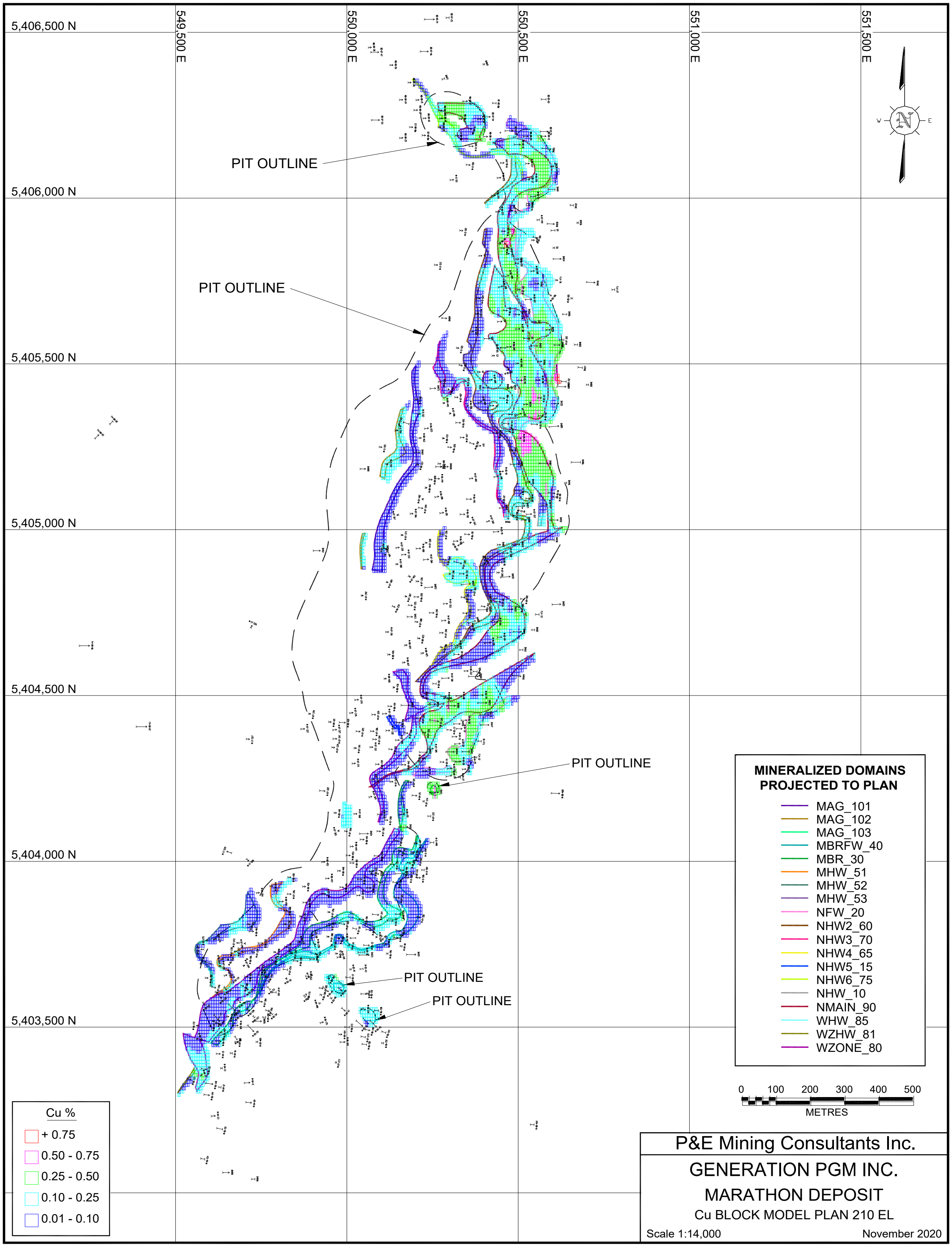

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 5,250 N
Scale 1:5,000
November 2020

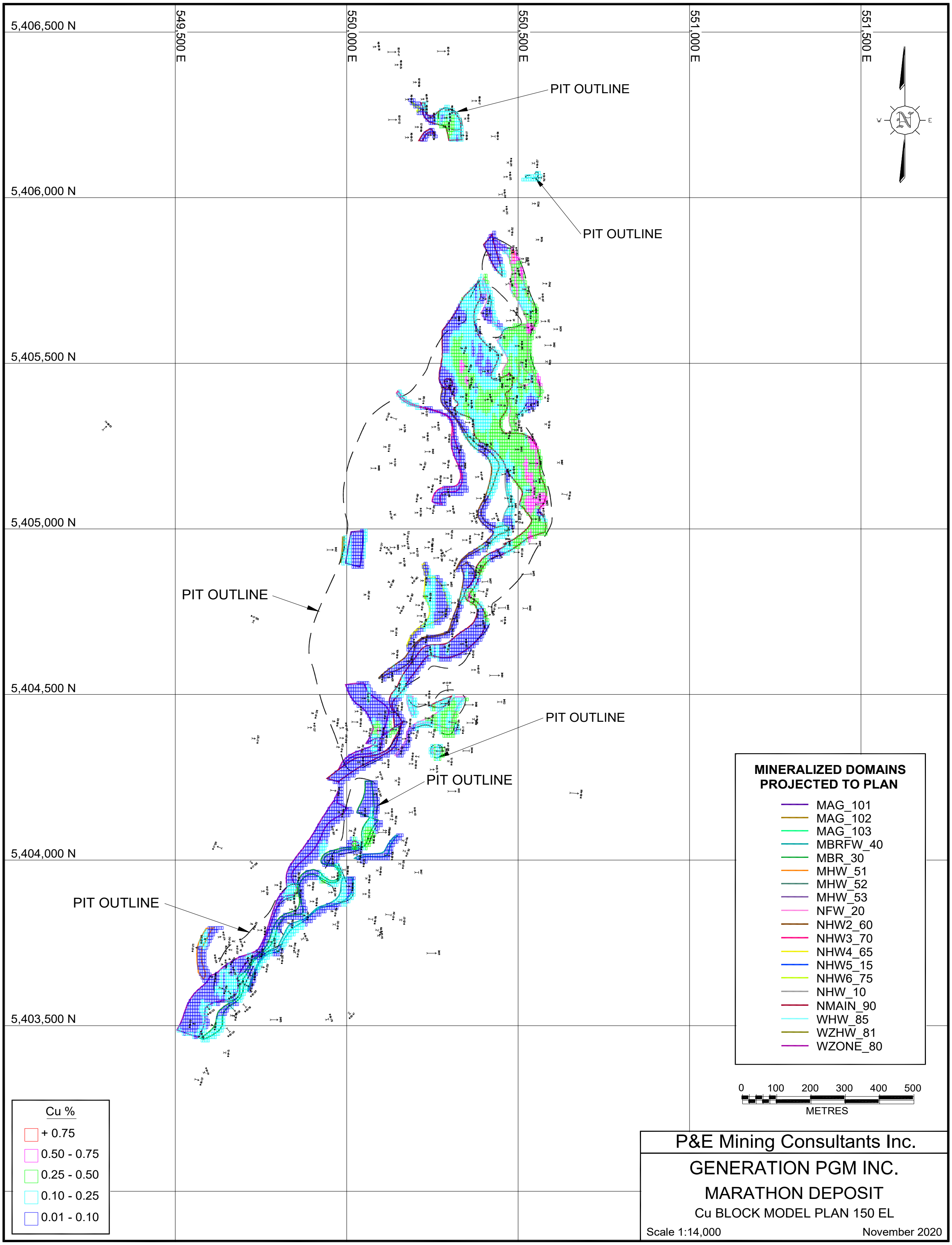

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
PIT OUTLINE
OVERBURDEN
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 5,425 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
FLK-36
DH140
DH142
DH144
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 5,750 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL CROSS SECTION 6,175 N
Scale 1:5,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL PLAN 270 EL
Scale 1:14,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL PLAN 210 EL
Scale 1:14,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
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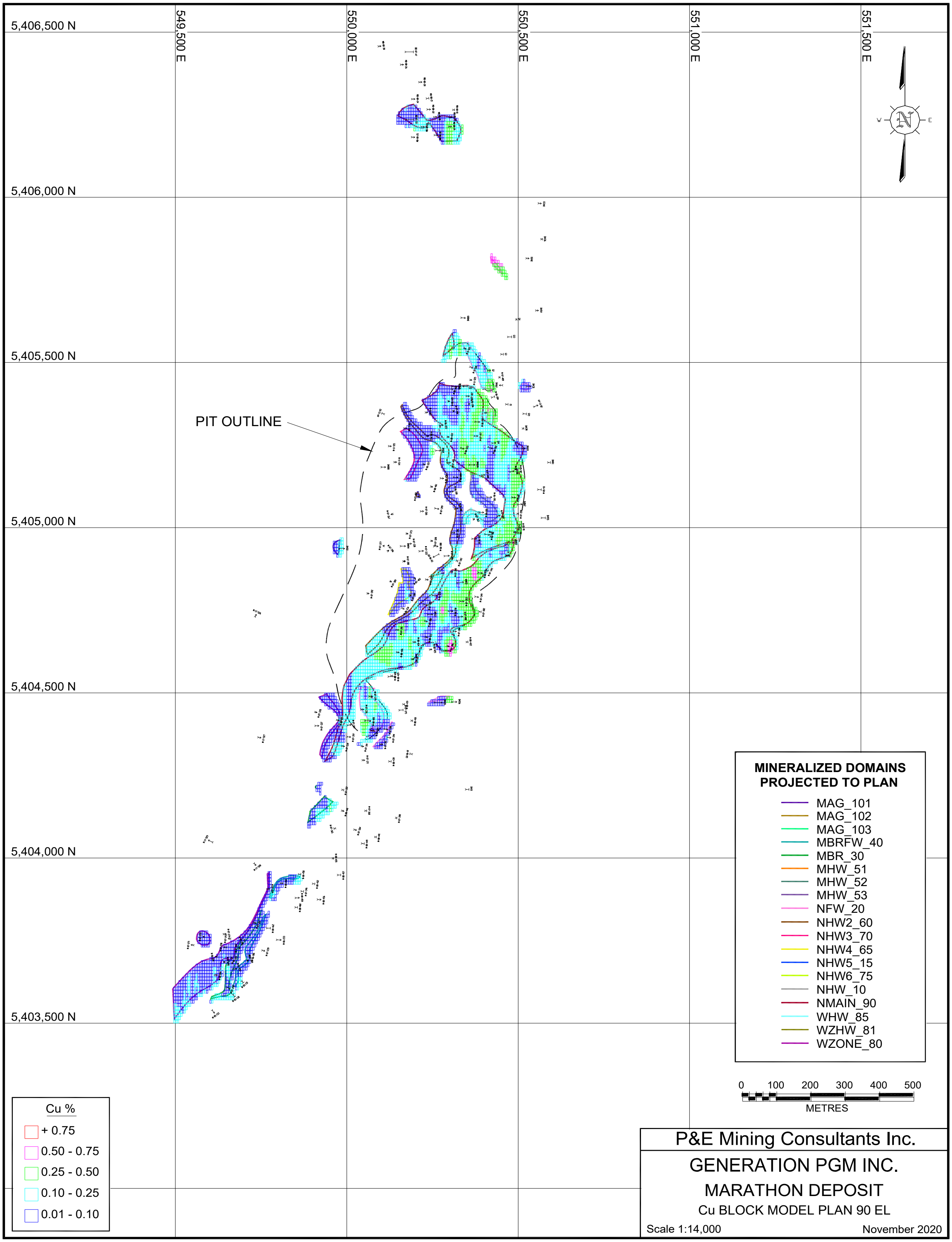
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL PLAN 150 EL
Scale 1:14,000
November 2020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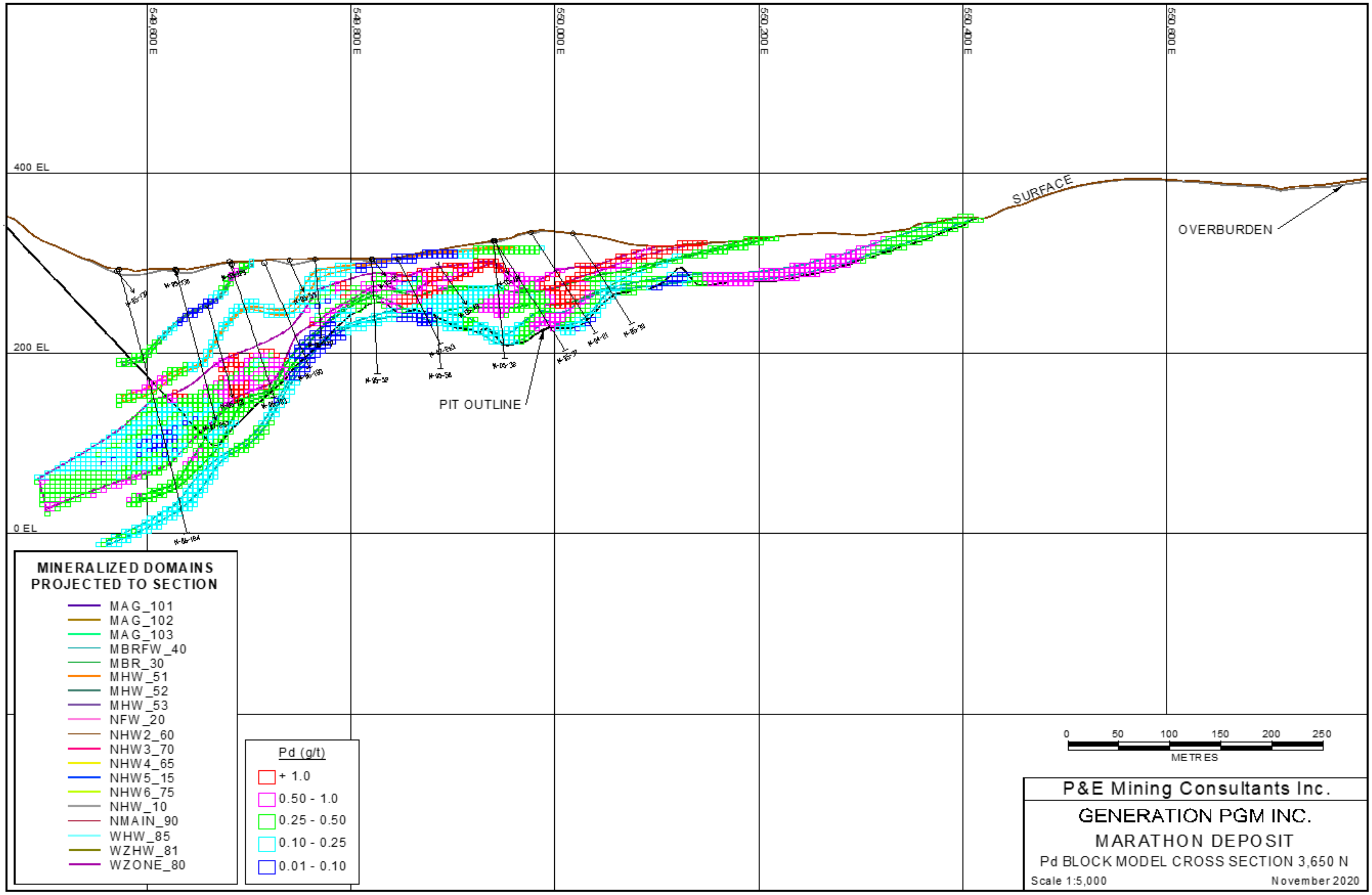
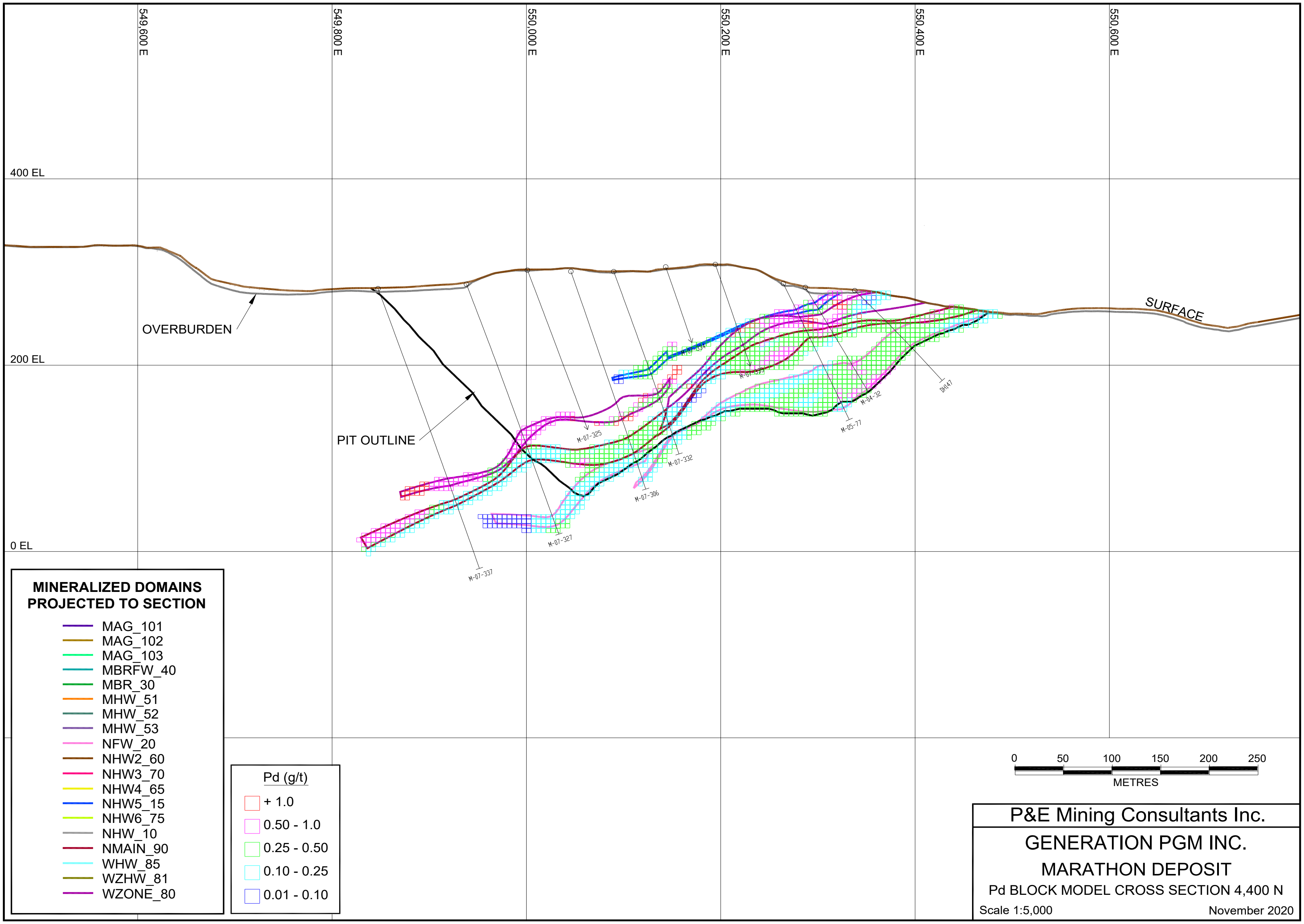
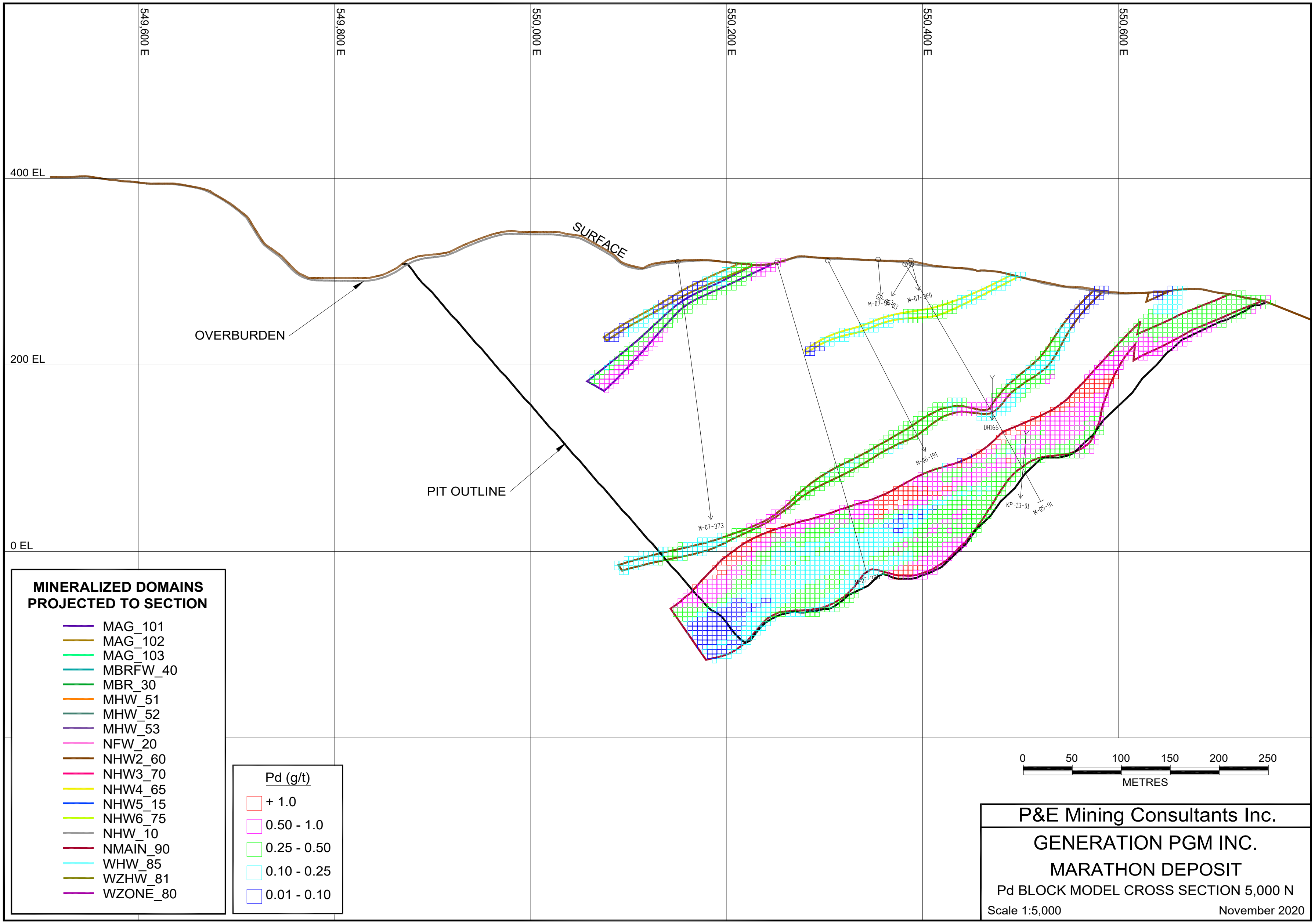
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Cu %
+ 0.75
0.50 - 0.75
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Cu BLOCK MODEL PLAN 90 EL
Scale 1:14,000
November 2020

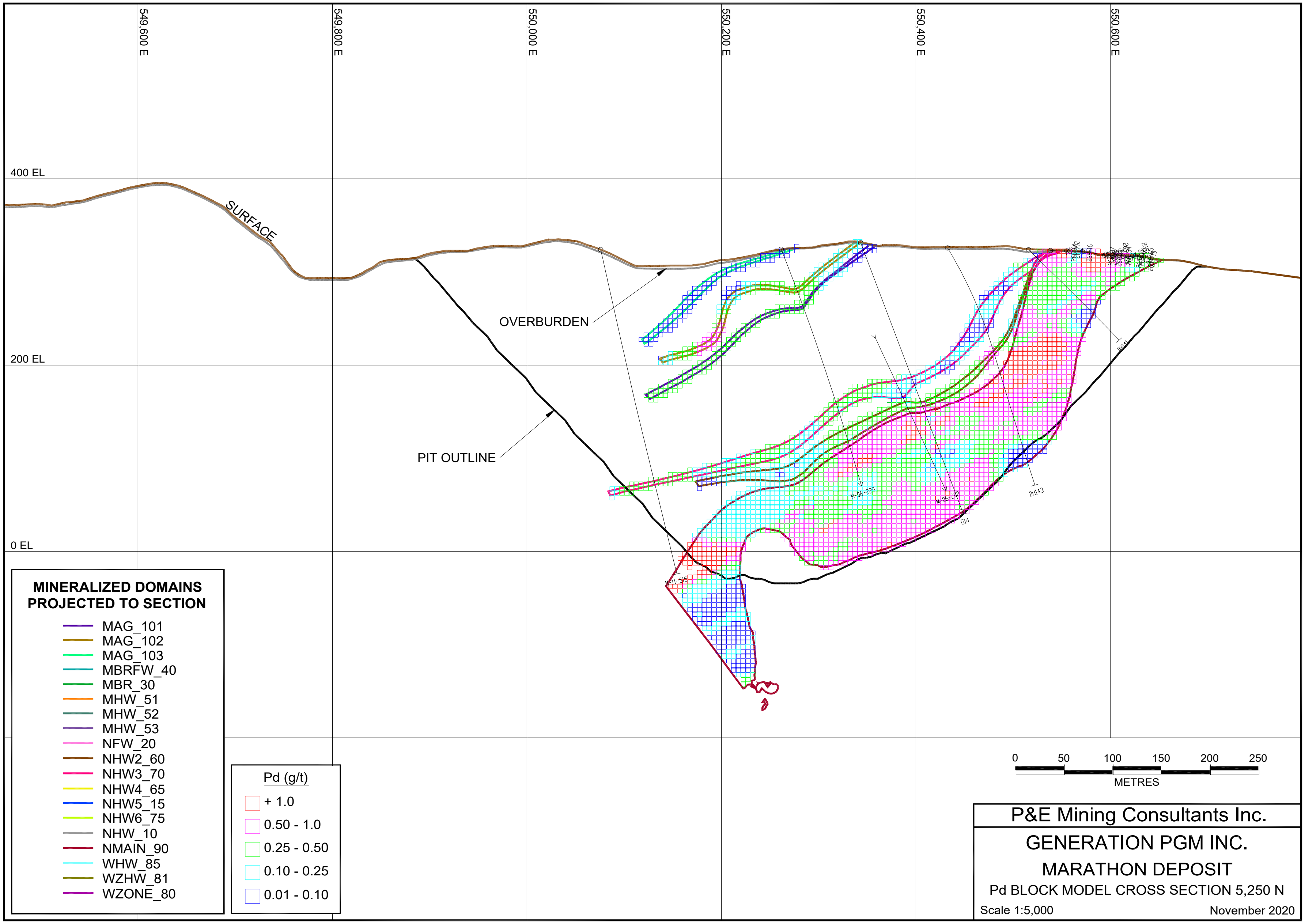
Marathon Deposit

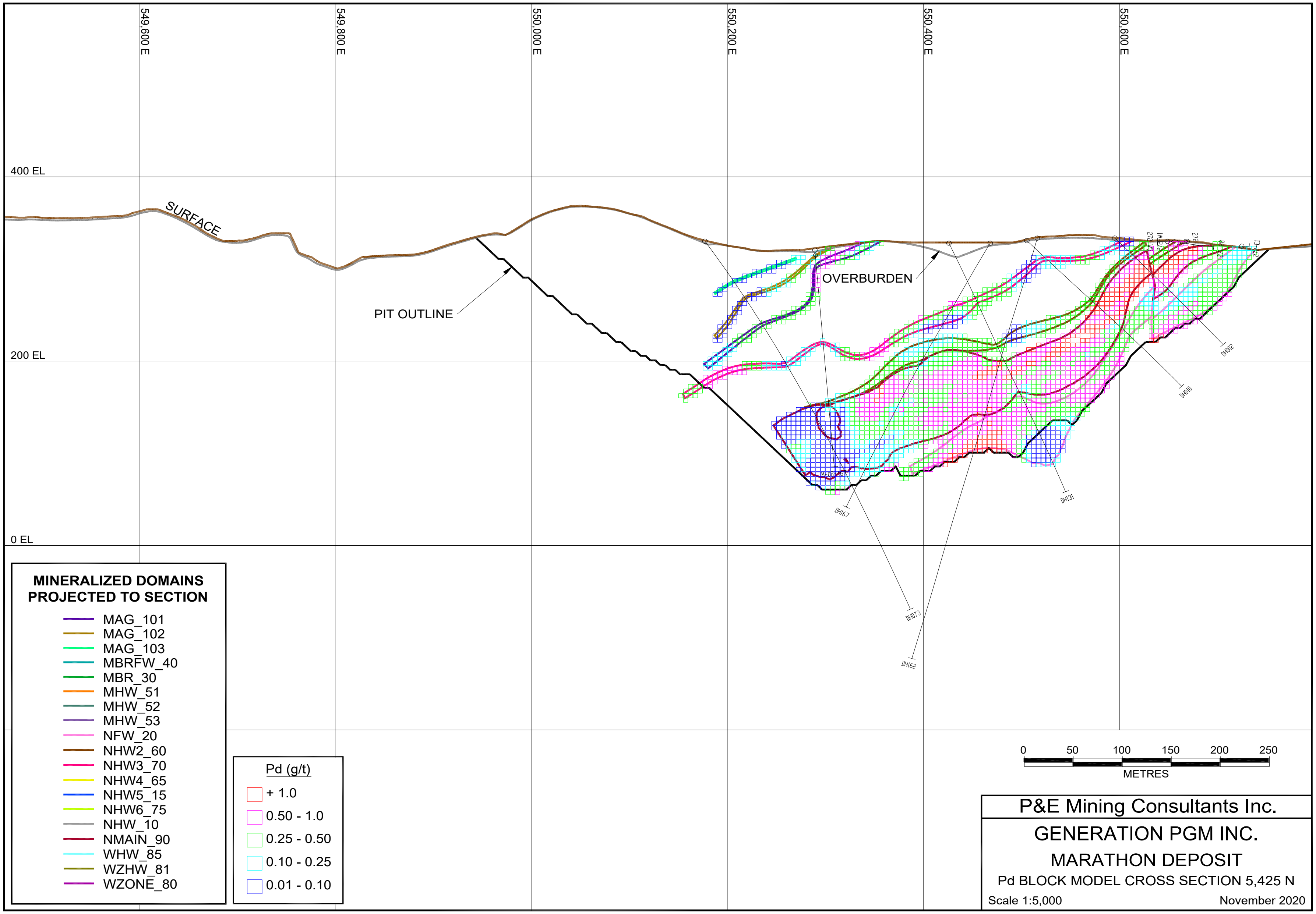
Pd Block Model Cross Sections And Plans

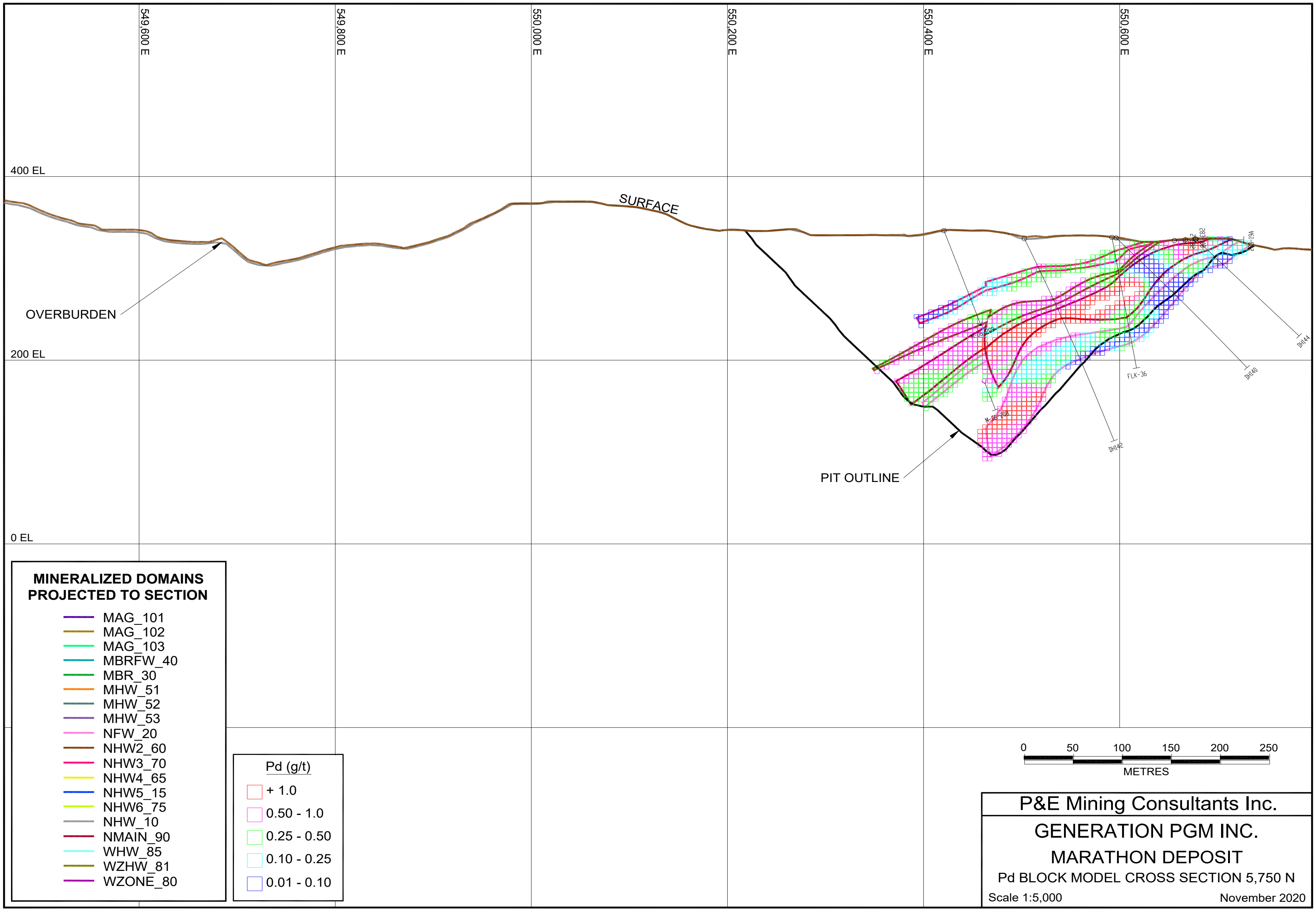

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS
PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 3,650 N
Scale 1:5,000
November 2020

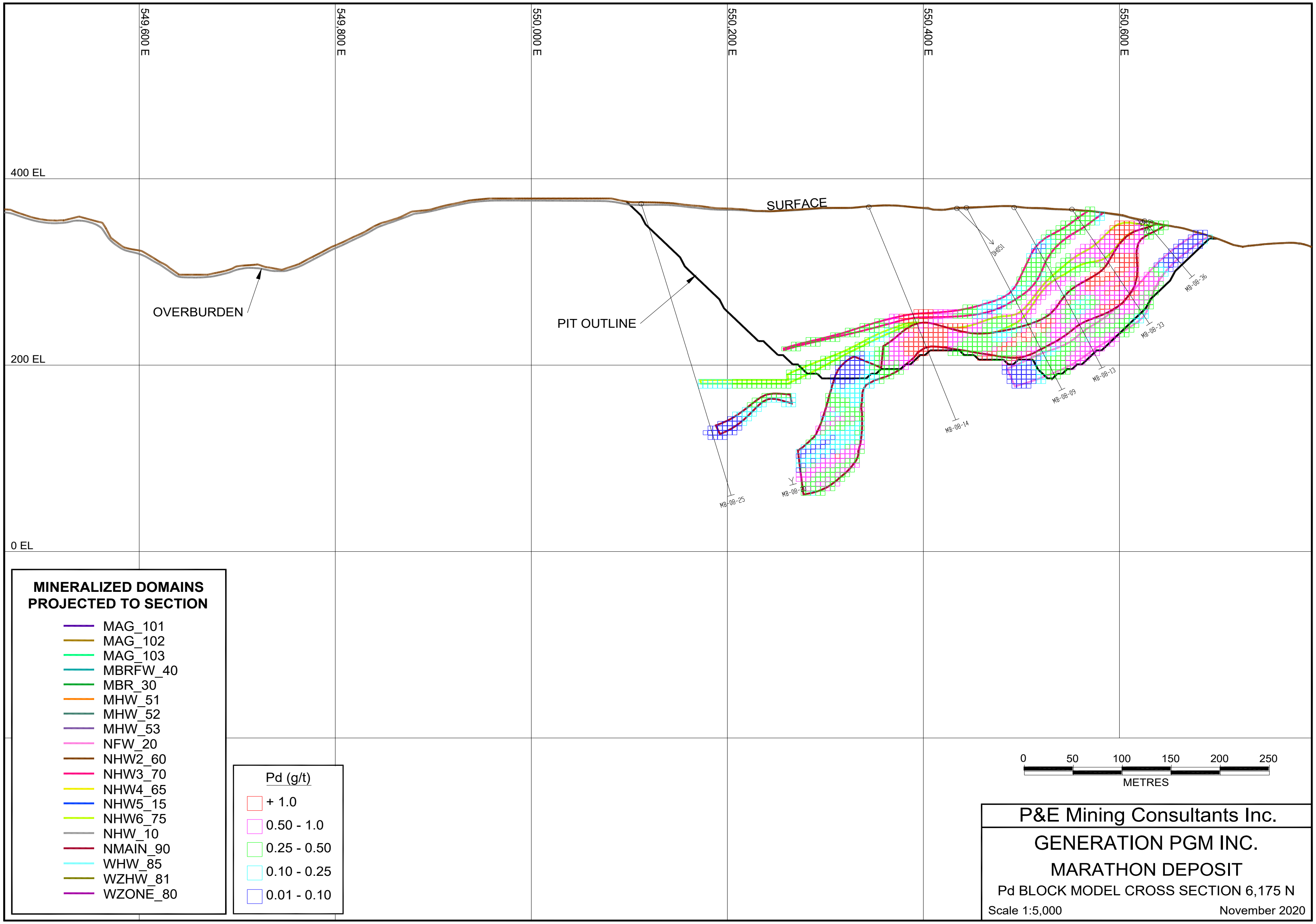

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
OVERBURDEN
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 4,400 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 5,000 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 5,250 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
PIT OUTLINE
OVERBURDEN
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 5,425 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 5,750 N
Scale 1:5,000
November 2020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550,400 E
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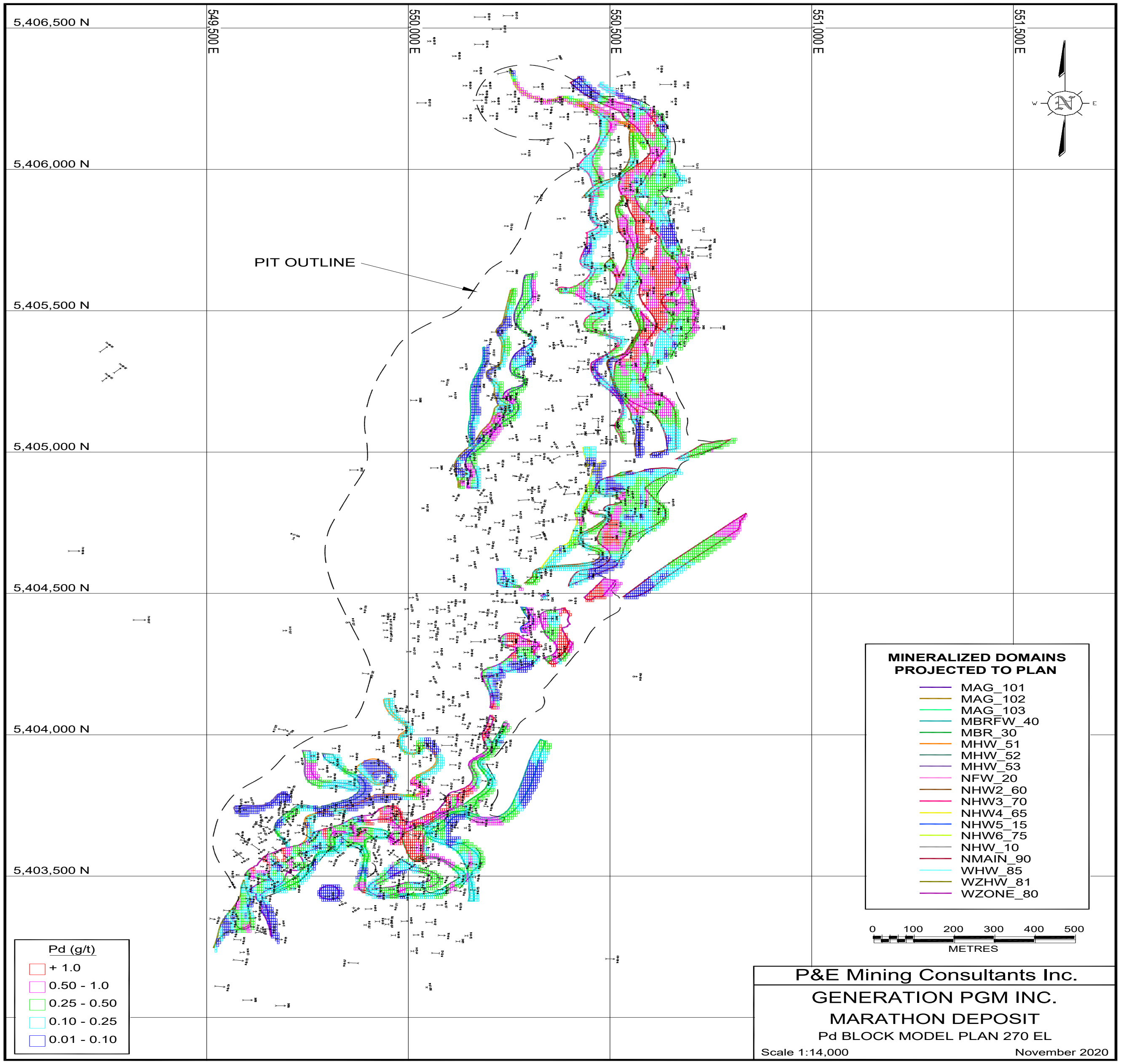
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL CROSS SECTION 6,175 N
Scale 1:5,000
November 2020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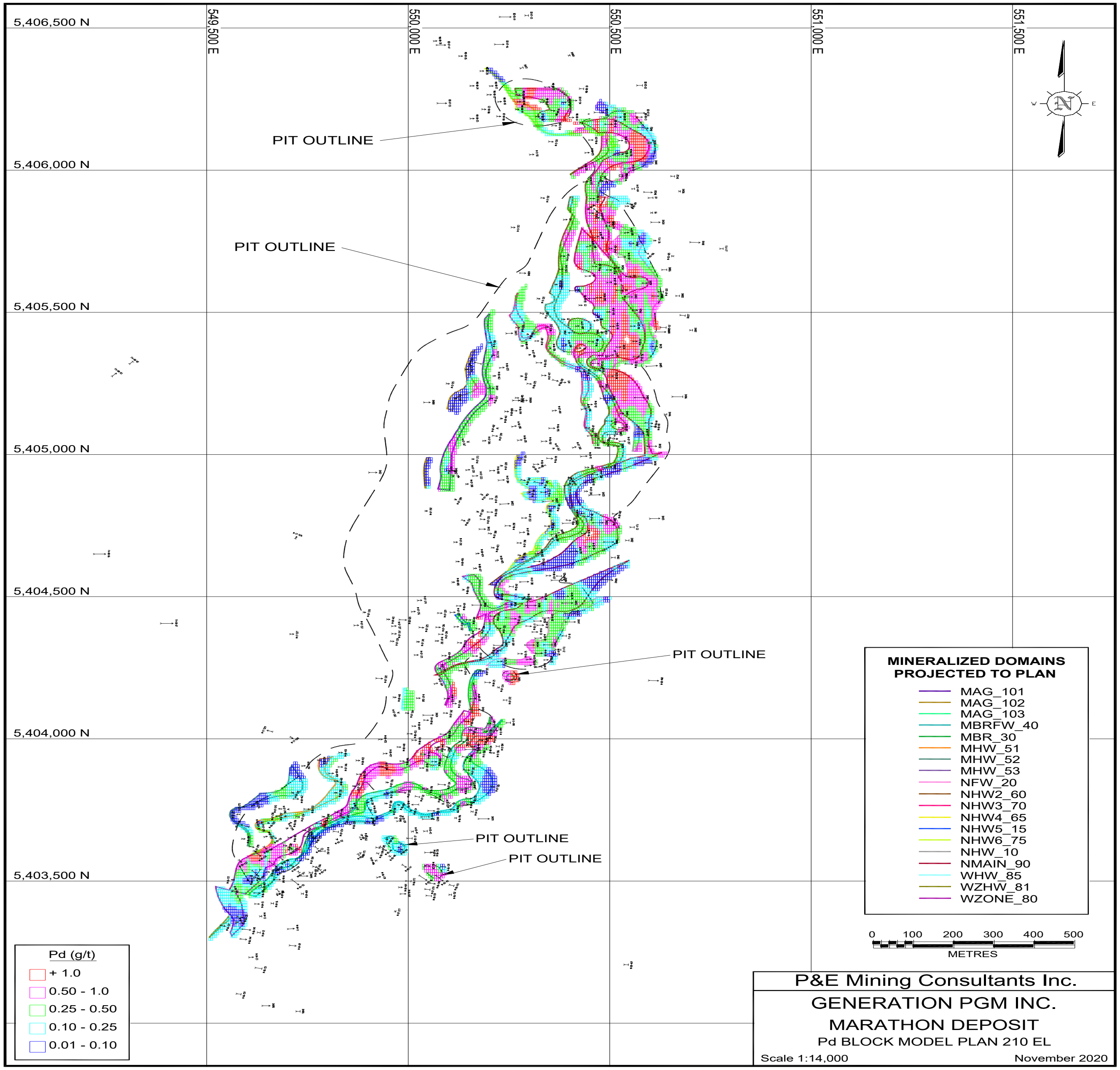
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
0 100 200 300 400 500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL PLAN 270 EL
Scale 1:14,000
November 2020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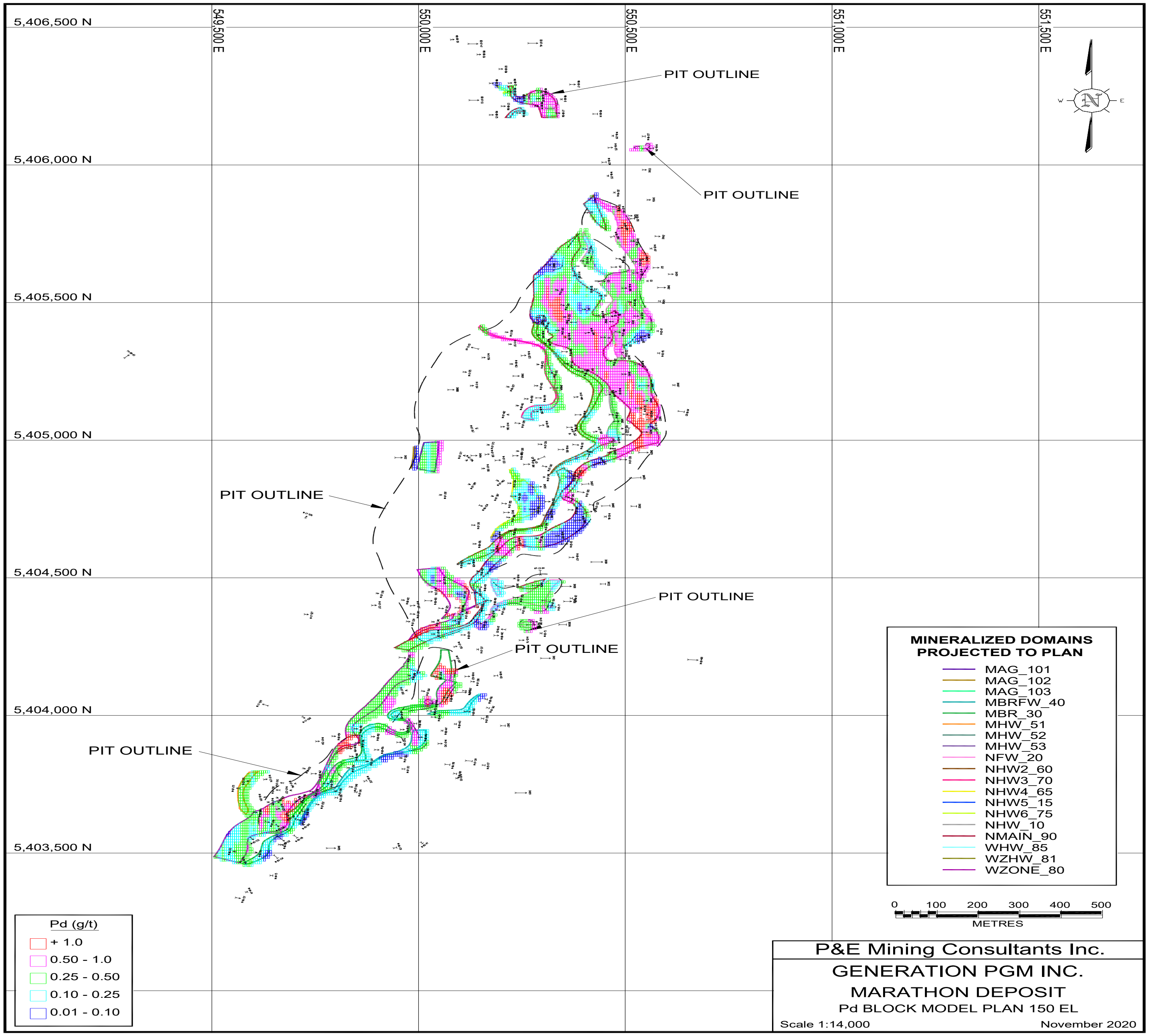
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
N
MINERALIZED DOMAINS
PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL PLAN 210 EL
Scale 1:14,000
November 2020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5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
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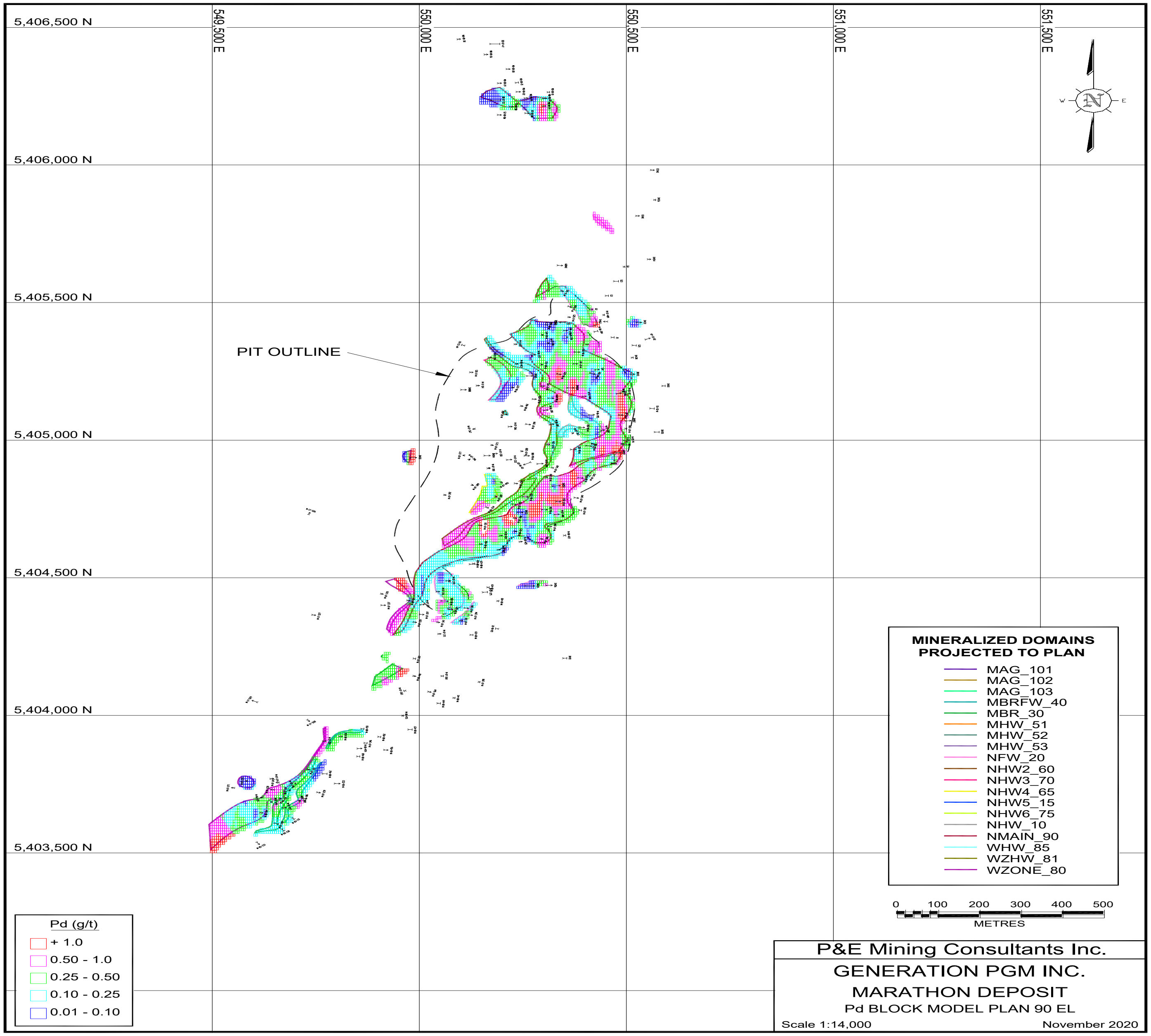
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL PLAN 150 EL
Scale 1:14,000
November 2020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5,404,000 N
5,403,500 N
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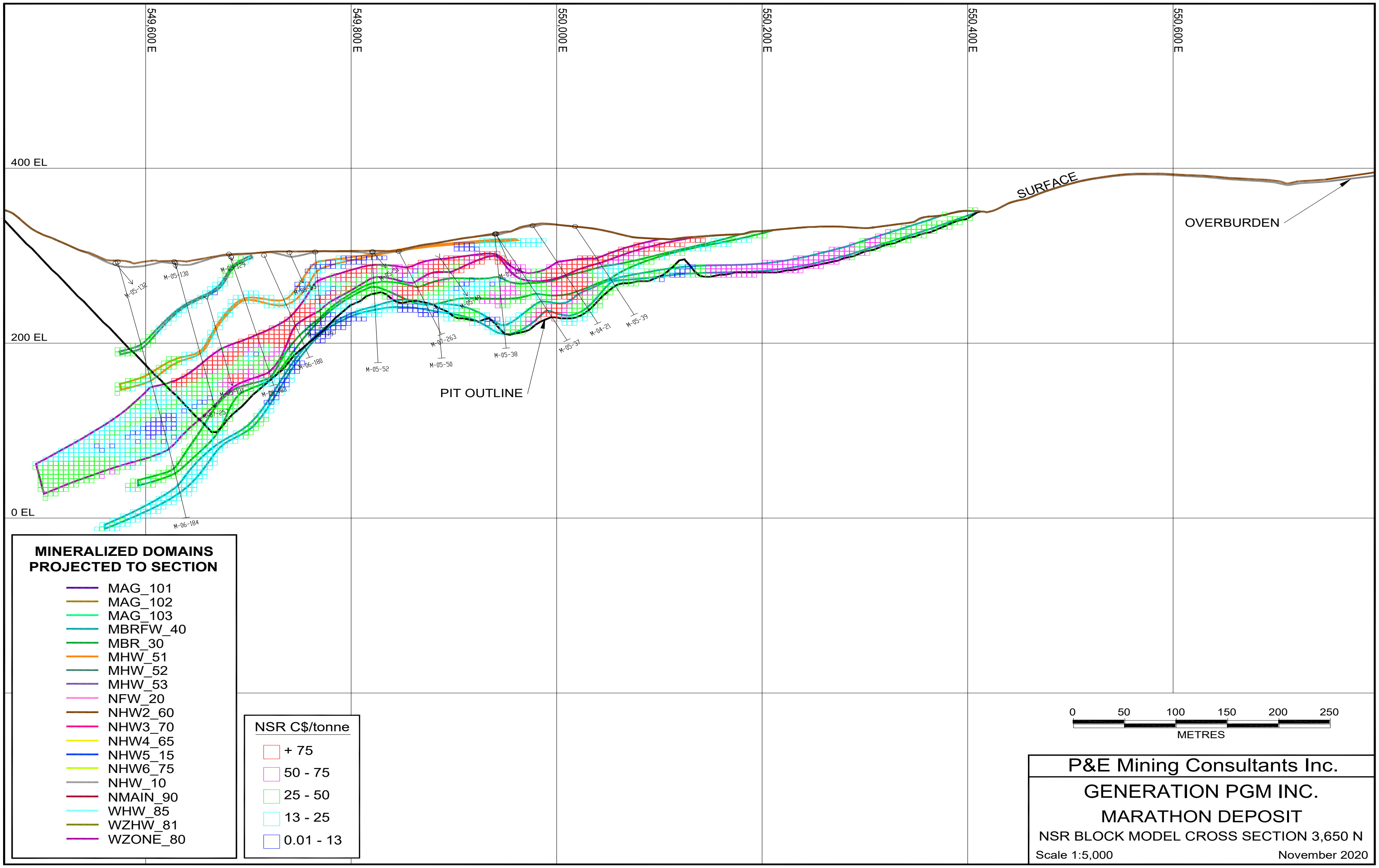
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
Pd (g/t)
+ 1.0
0.50 - 1.0
0.25 - 0.50
0.10 - 0.25
0.01 - 0.10
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
Pd BLOCK MODEL PLAN 90 EL
Scale 1:14,000
November 2020

Marathon Deposit

NSR Block Model Cross Sections and Plans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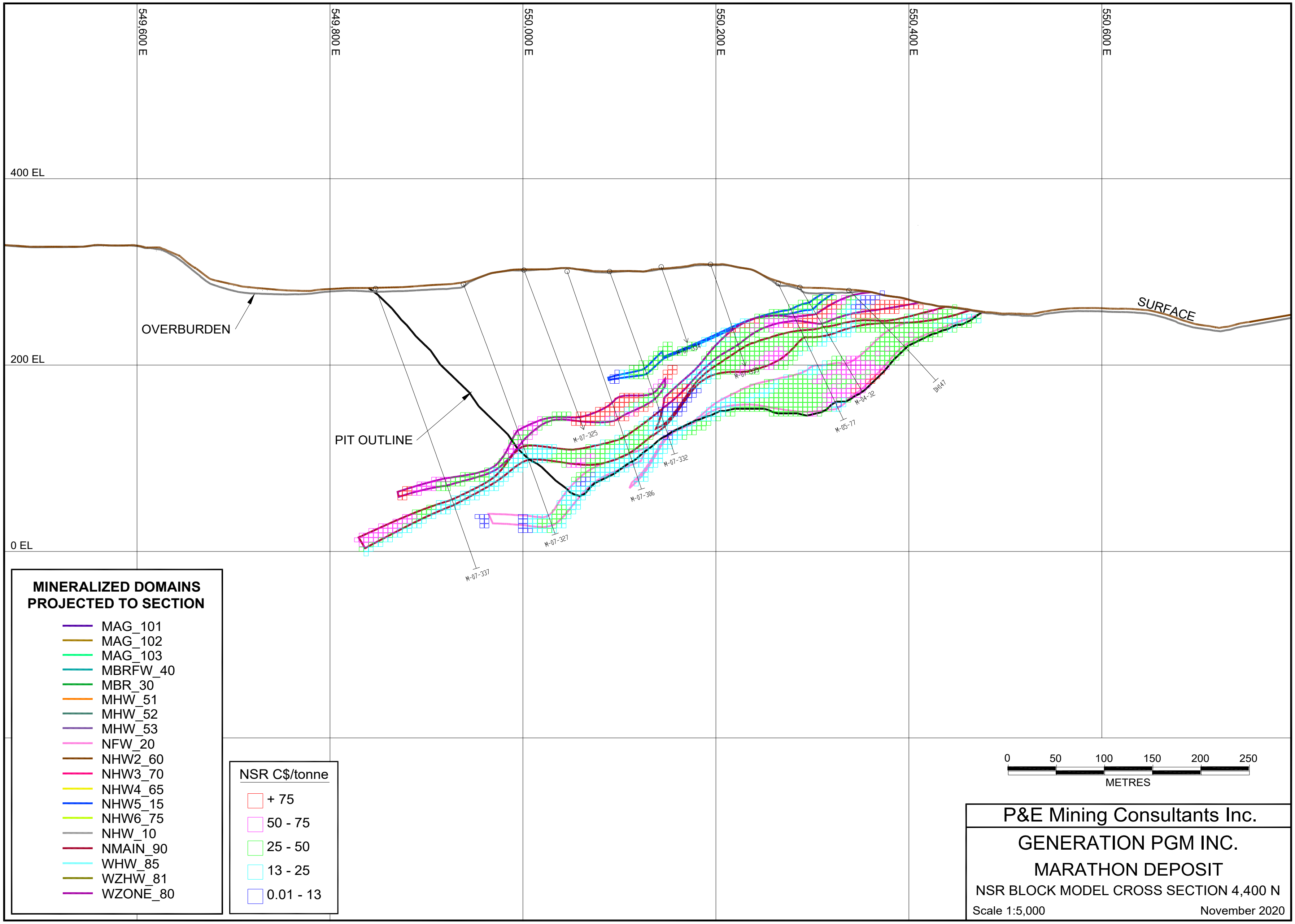
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 3,650 N
Scale 1:5,000
November 2020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549,800 E
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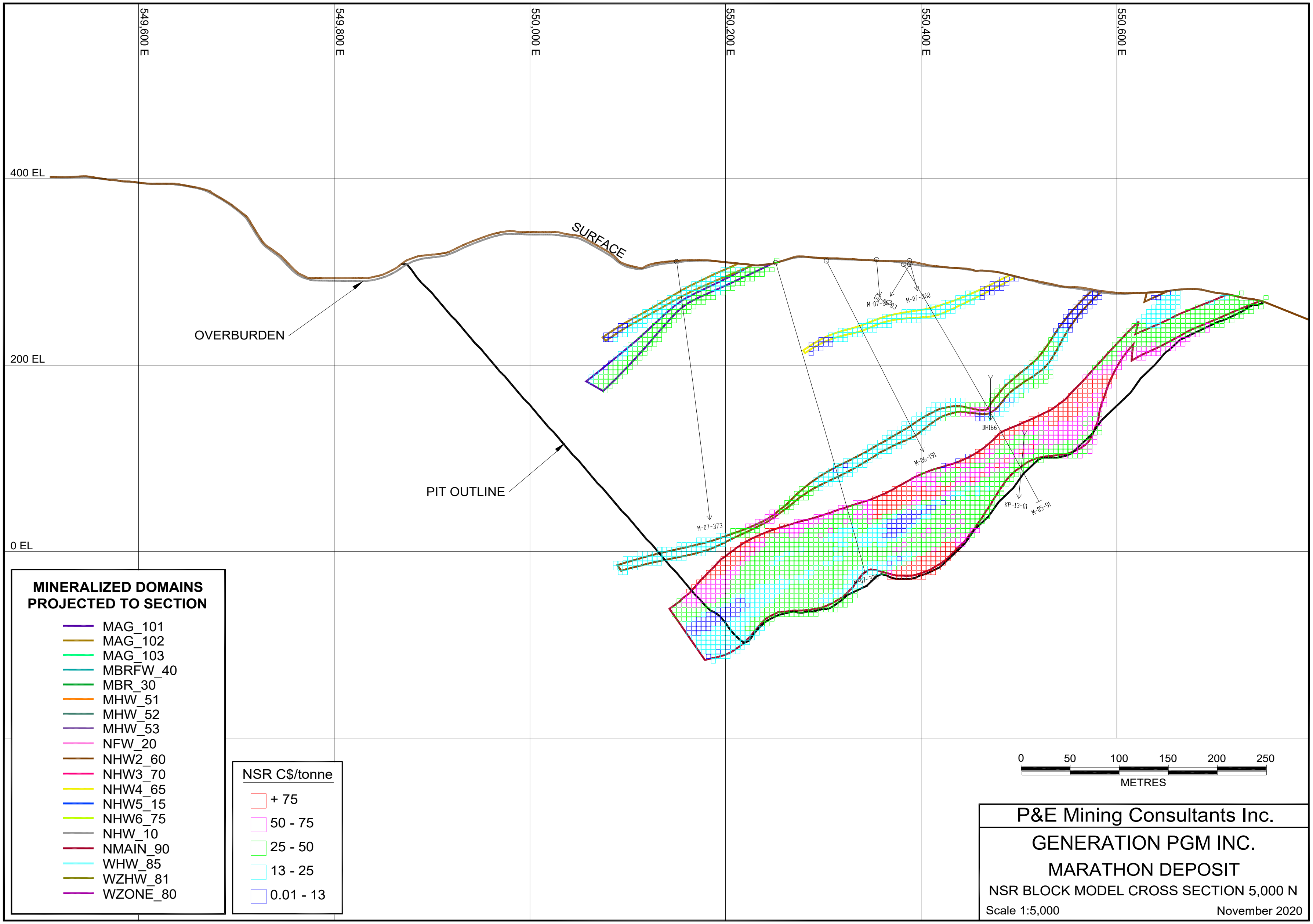
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
OVERBURDEN
PIT OUTLINE
SURFACE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 4,400 N
Scale 1:5,000
November 2020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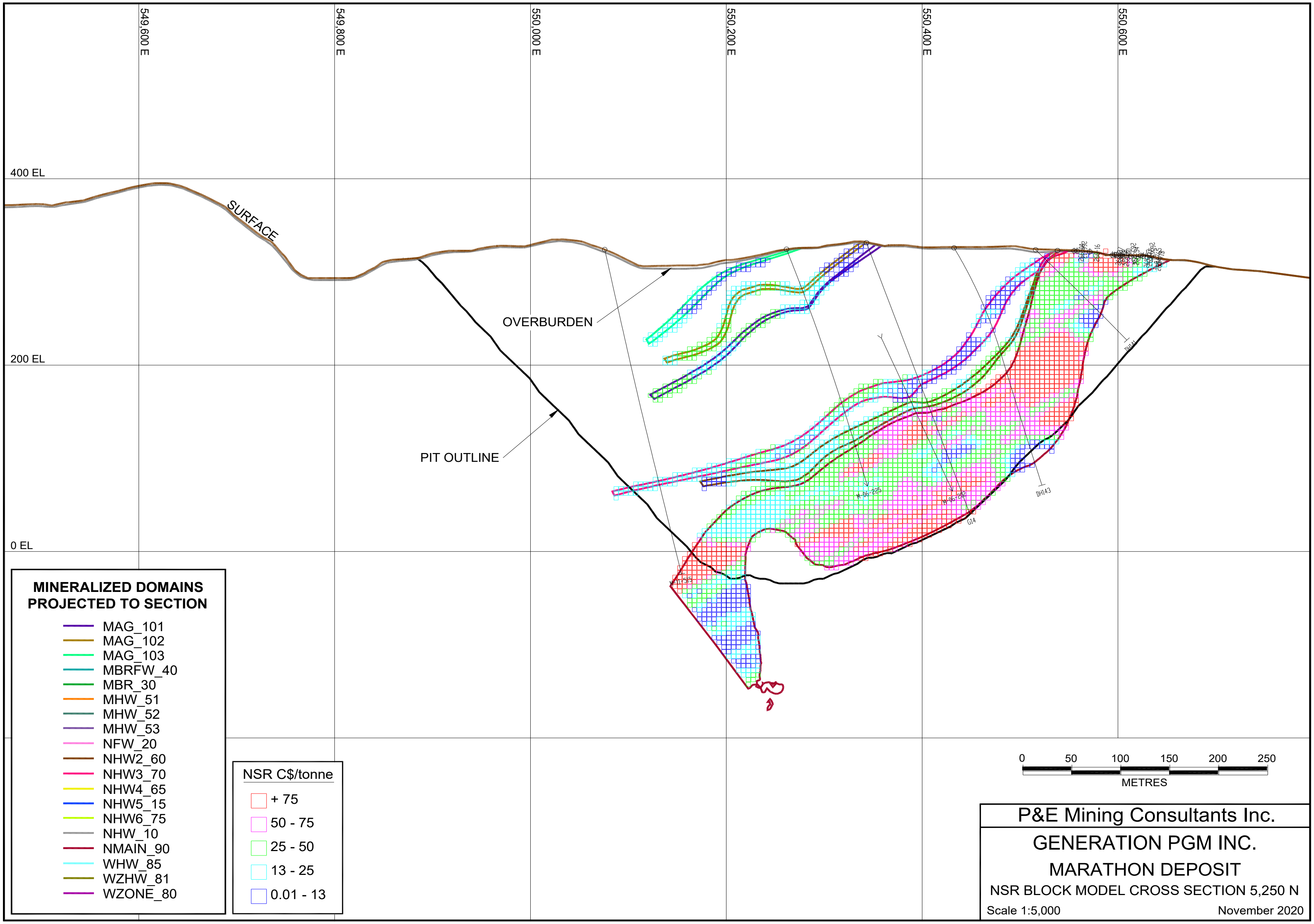
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 5,000 N
Scale 1:5,000
November 2020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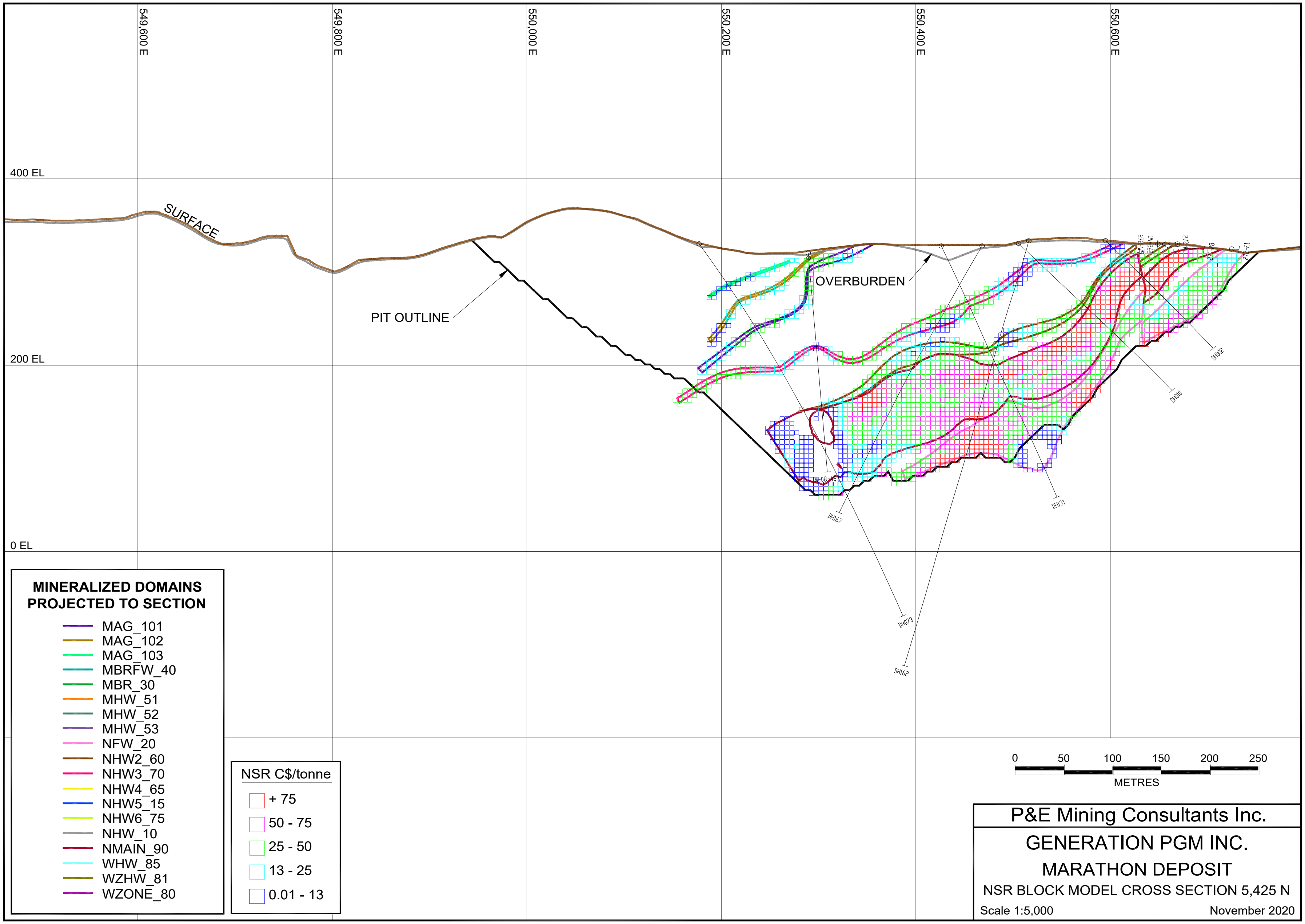
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 5,250 N
Scale 1:5,000
November 2020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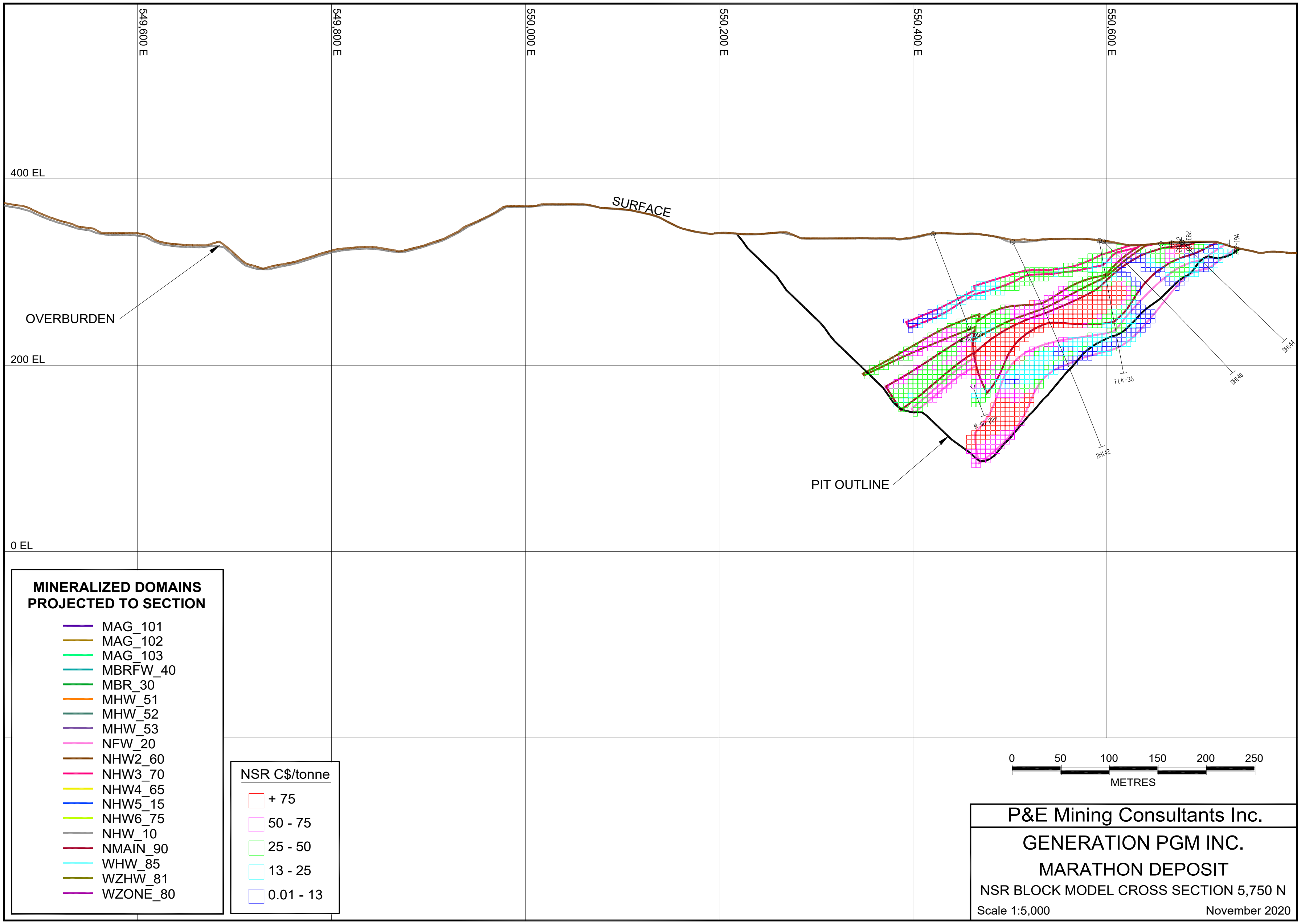
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
PIT OUTLINE
OVERBURDEN
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 5,425 N
Scale 1:5,000
November 2020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550,400 E
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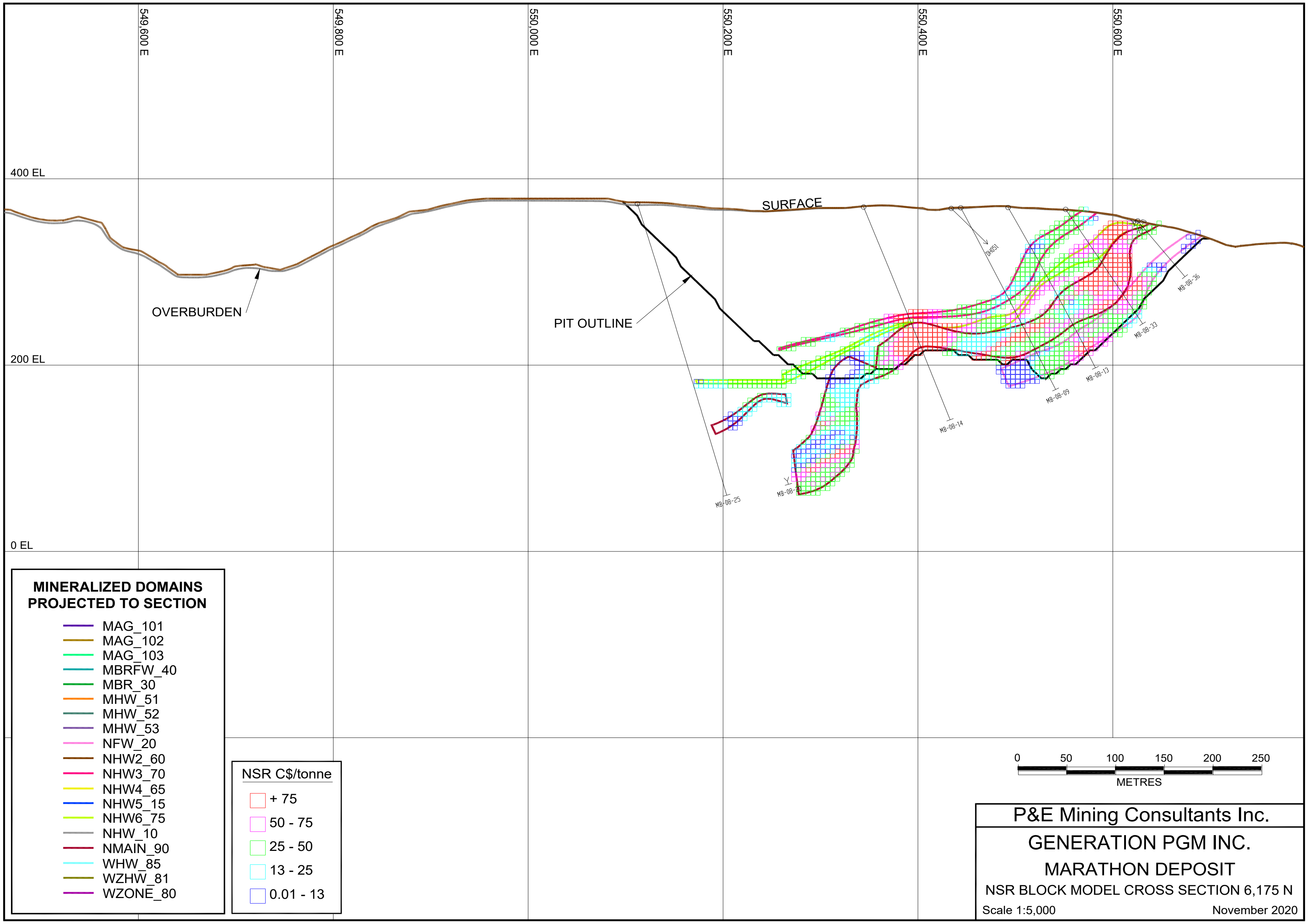
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 5,750 N
Scale 1:5,000
November 2020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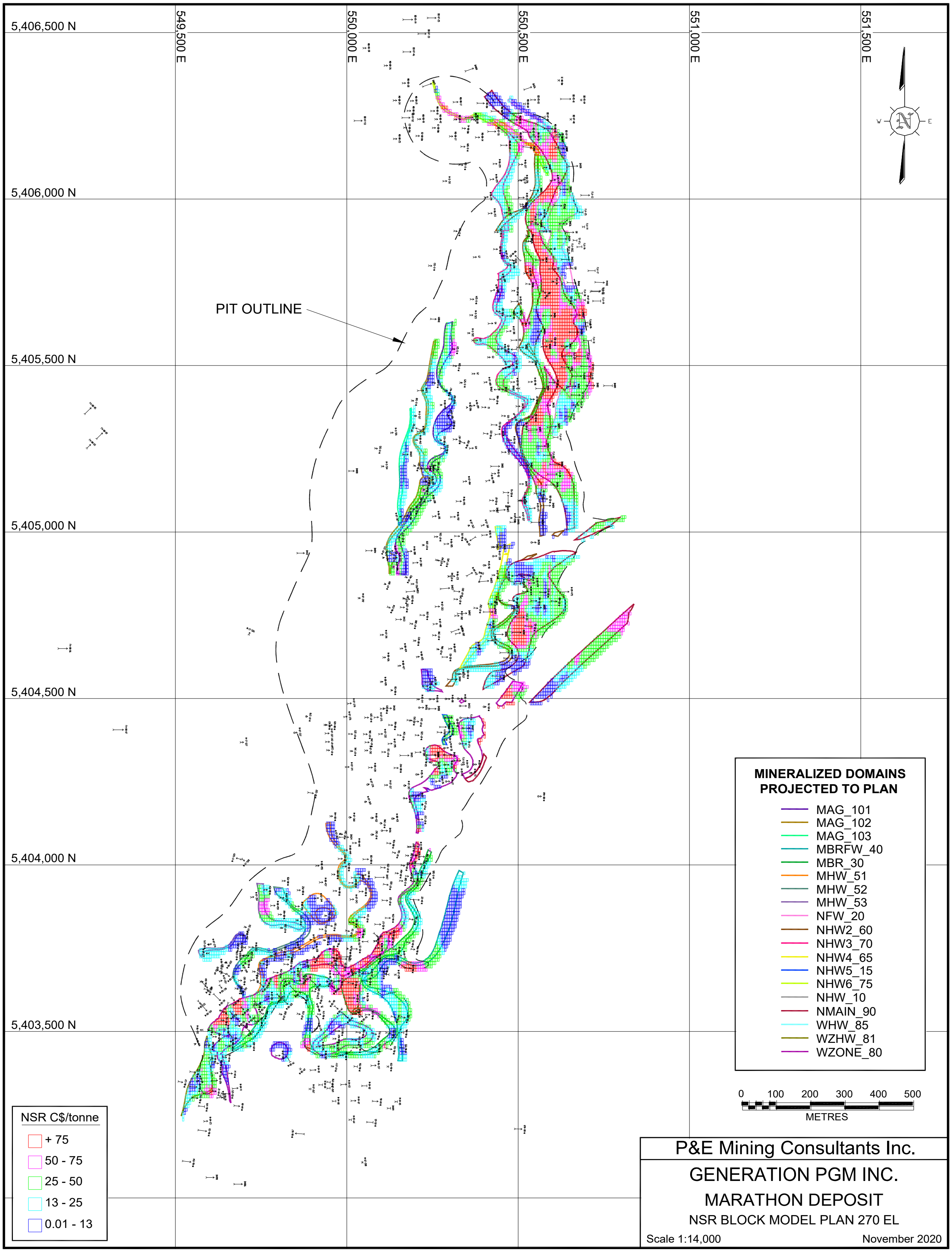
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL CROSS SECTION 6,175 N
Scale 1:5,000
November 2020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5,403,500 N
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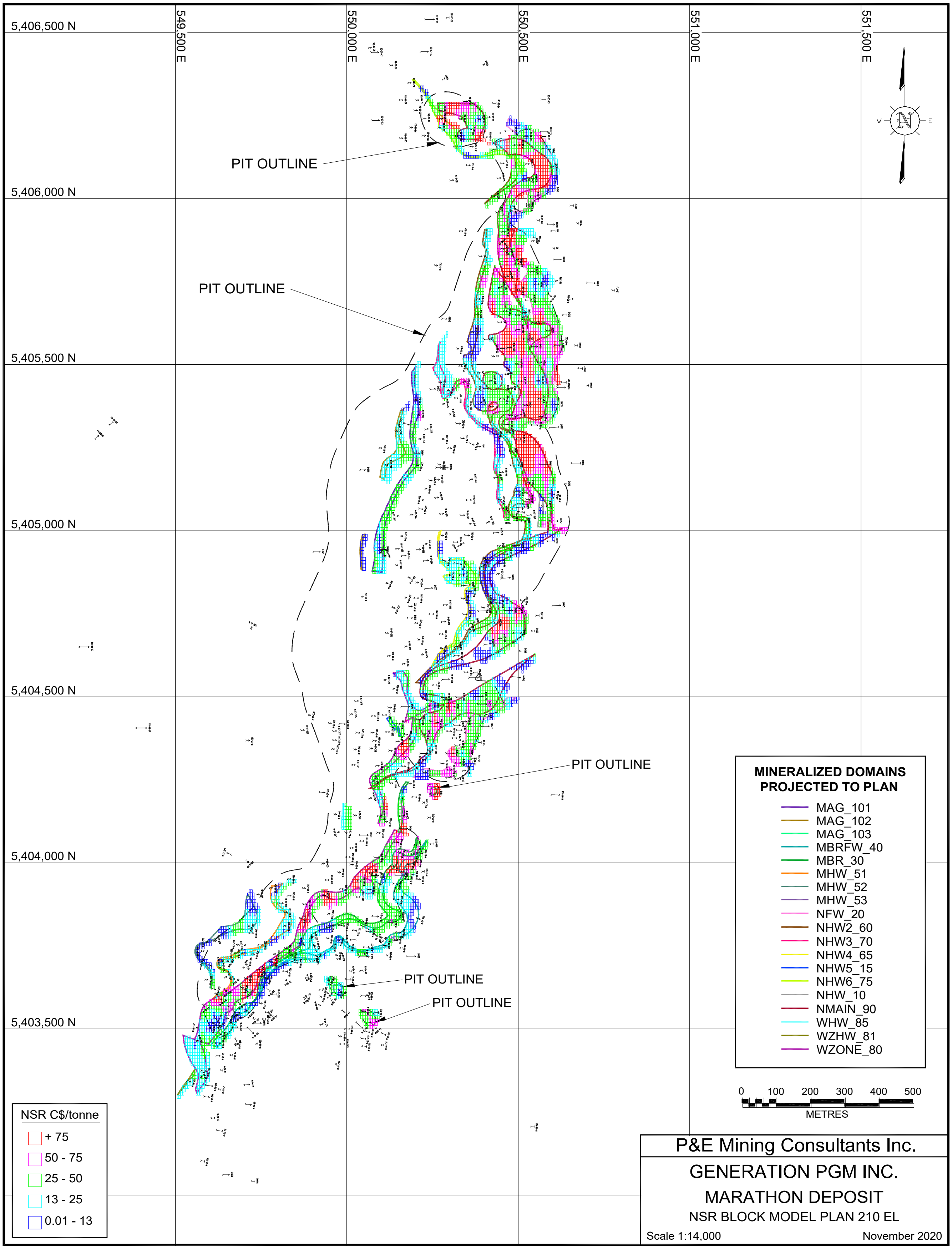
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL PLAN 270 EL
Scale 1:14,000
November 2020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5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
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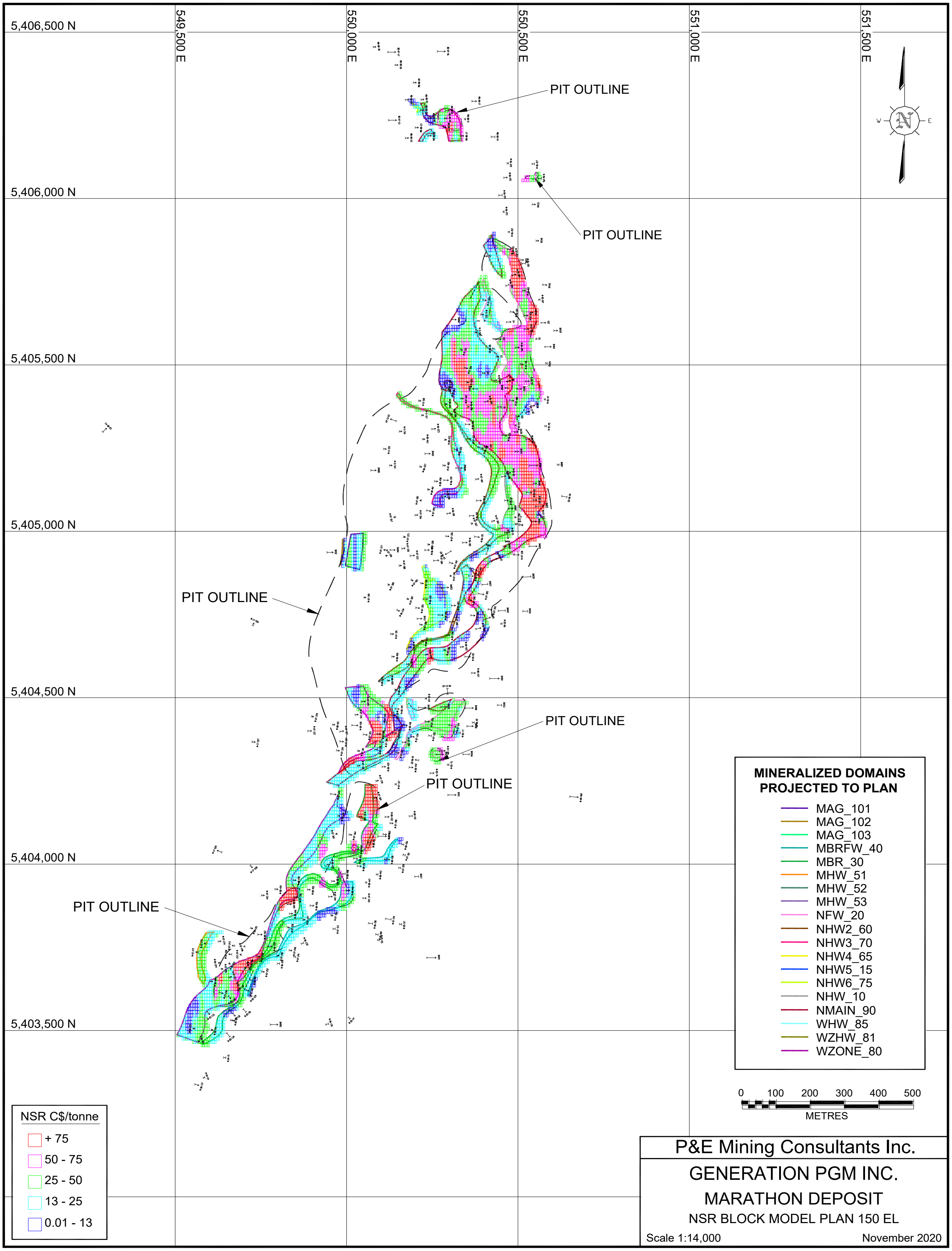
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL PLAN 210 EL
Scale 1:14,000
November 2020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5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
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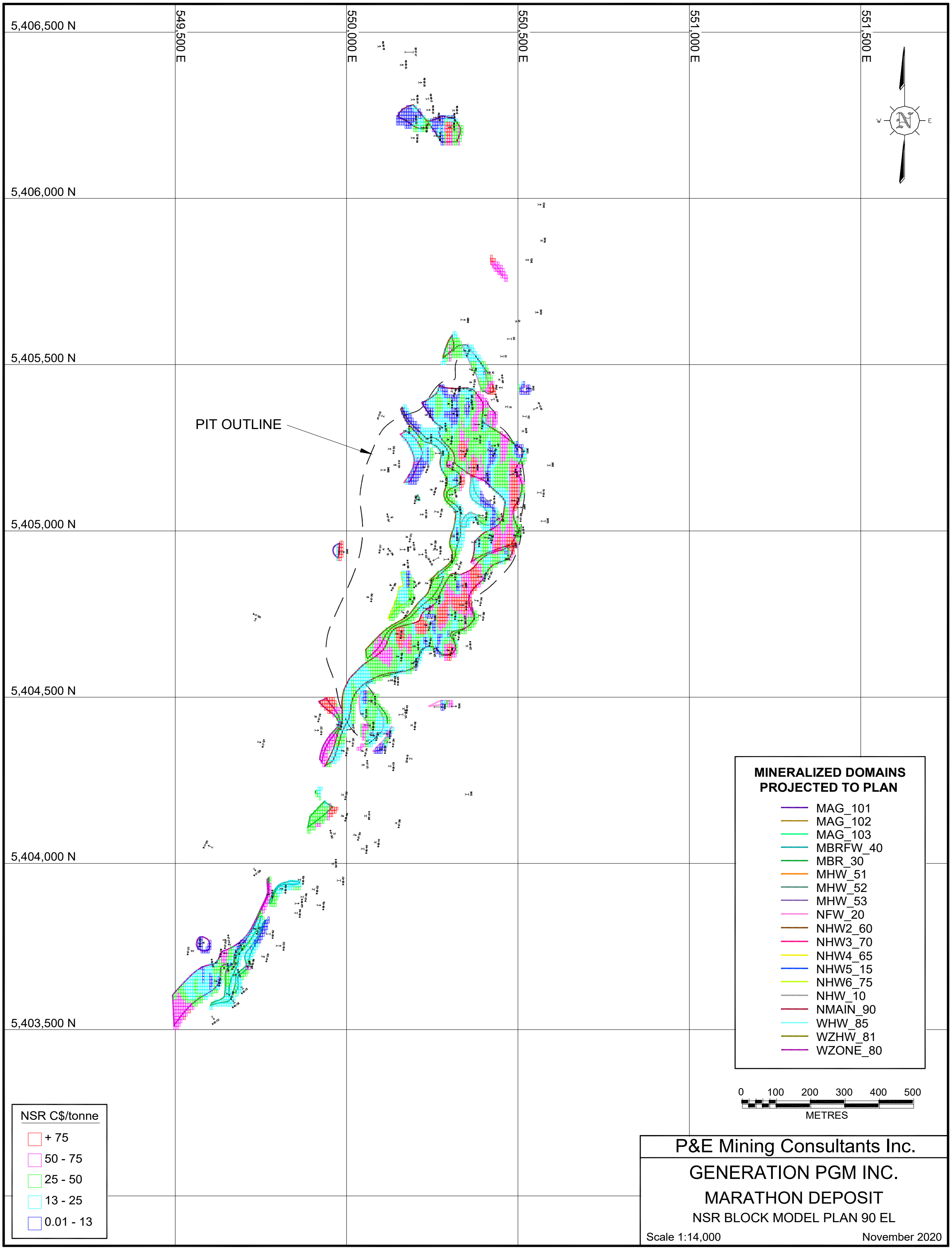
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL PLAN 150 EL
Scale 1:14,000
November 2020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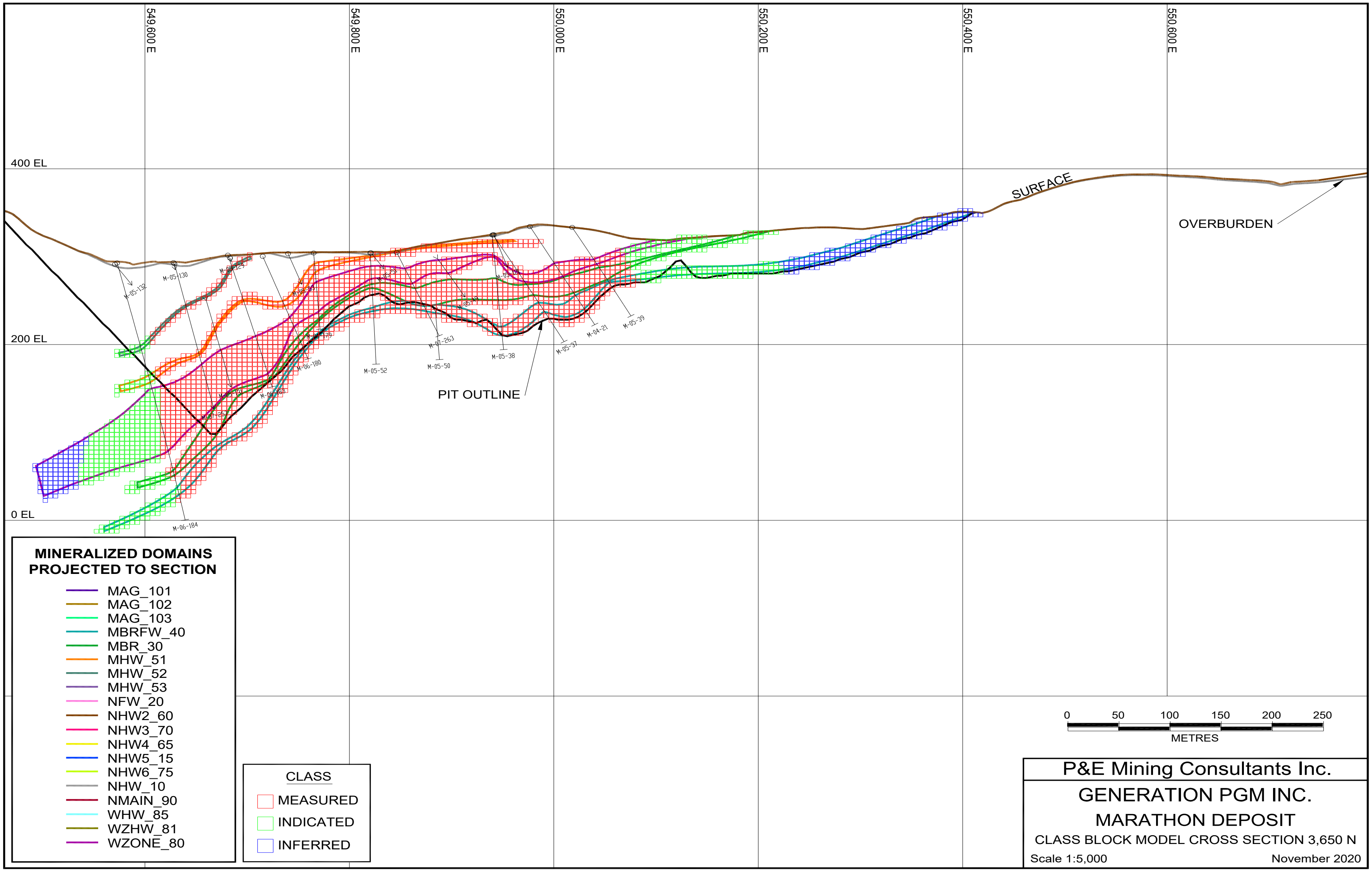
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
W
E
N
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0
100
200
300
400
500
METRES
NSR C$/tonne
+ 75
50 - 75
25 - 50
13 - 25
0.01 - 13
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
NSR BLOCK MODEL PLAN 90 EL
Scale 1:14,000
November 2020

Marathon Deposit

Classification Block Model Cross Sections and Plans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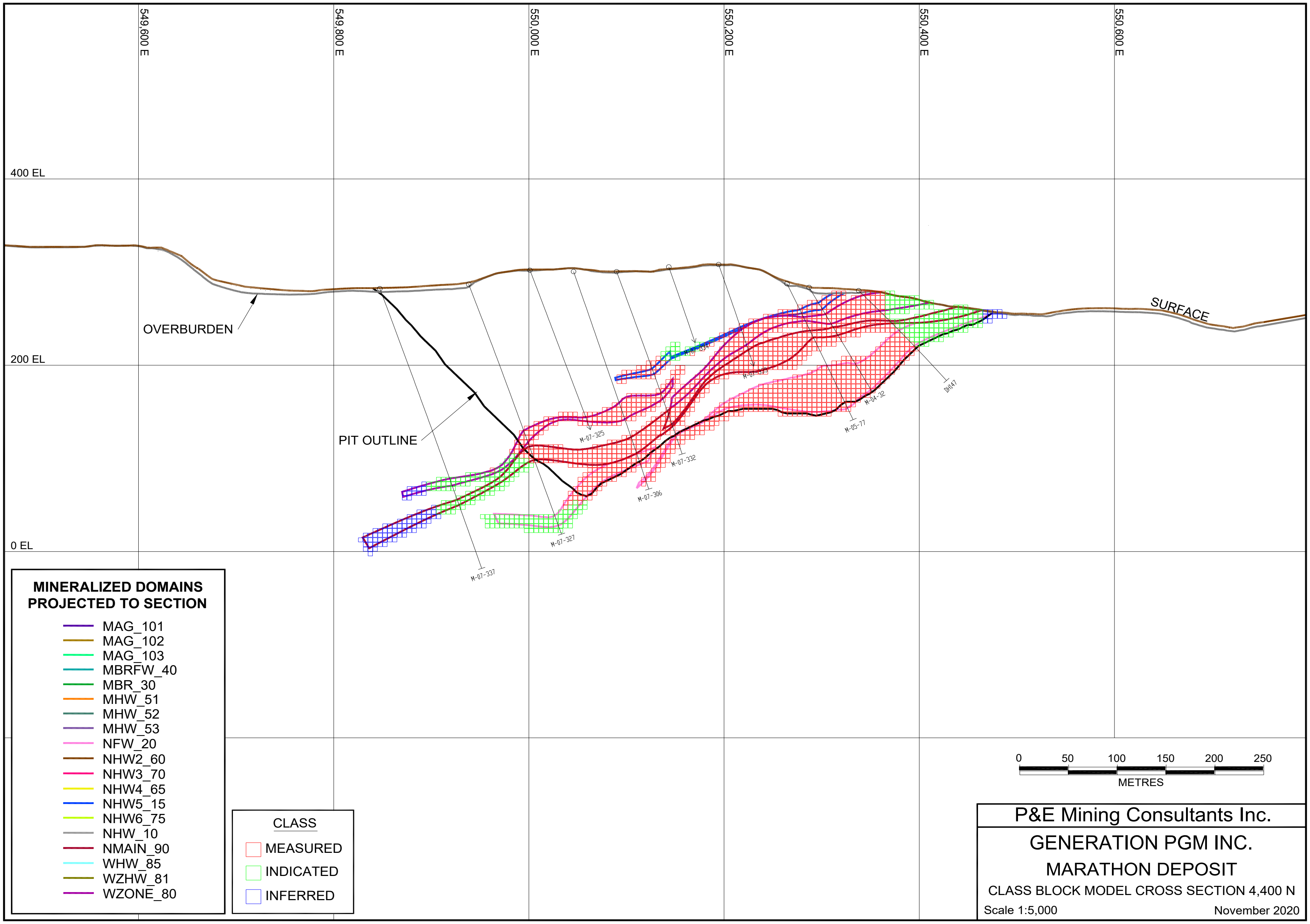
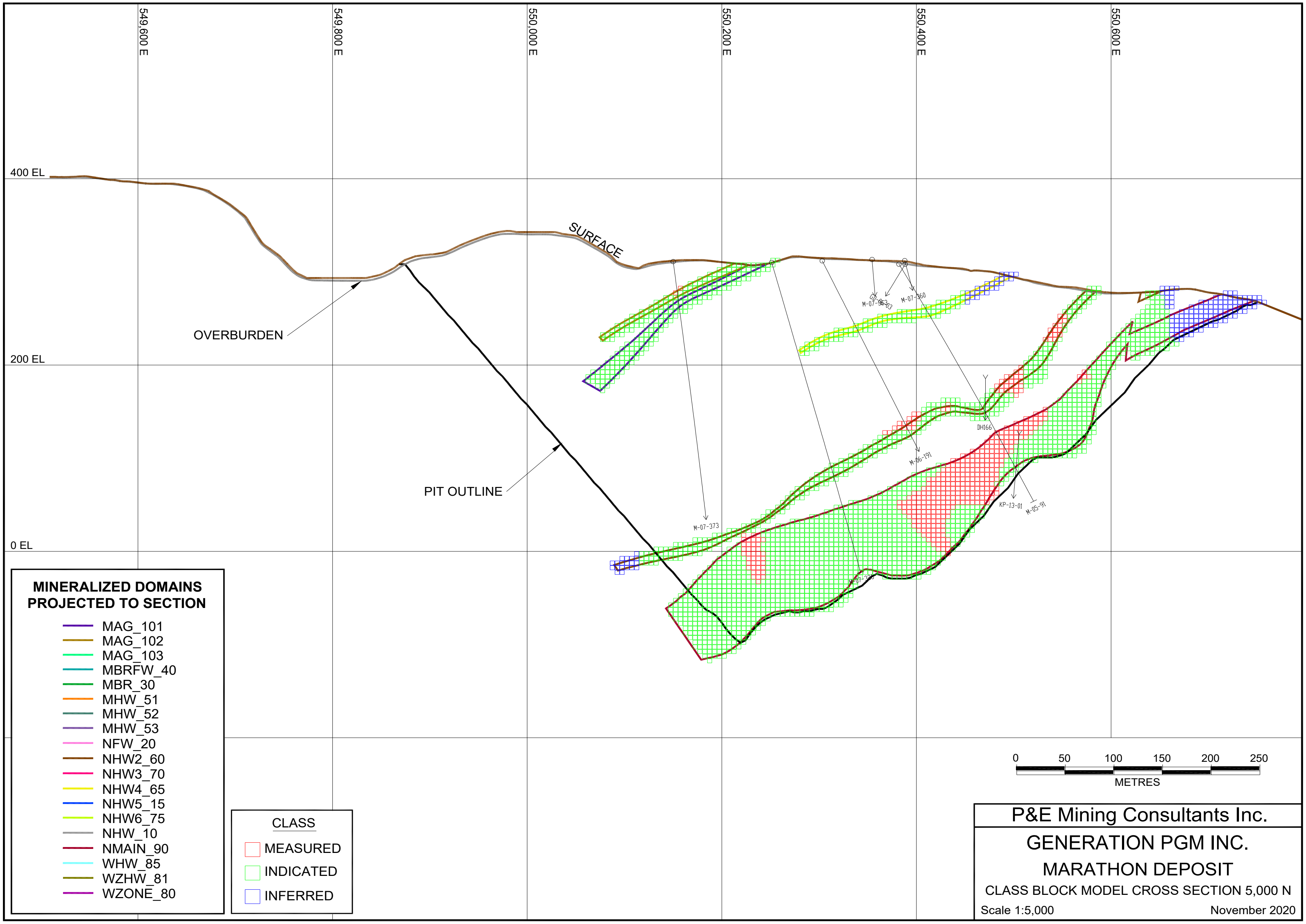
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 3,650 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
OVERBURDEN
PIT OUTLINE
SURFACE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 4,400 N
Scale 1:5,000
November 2020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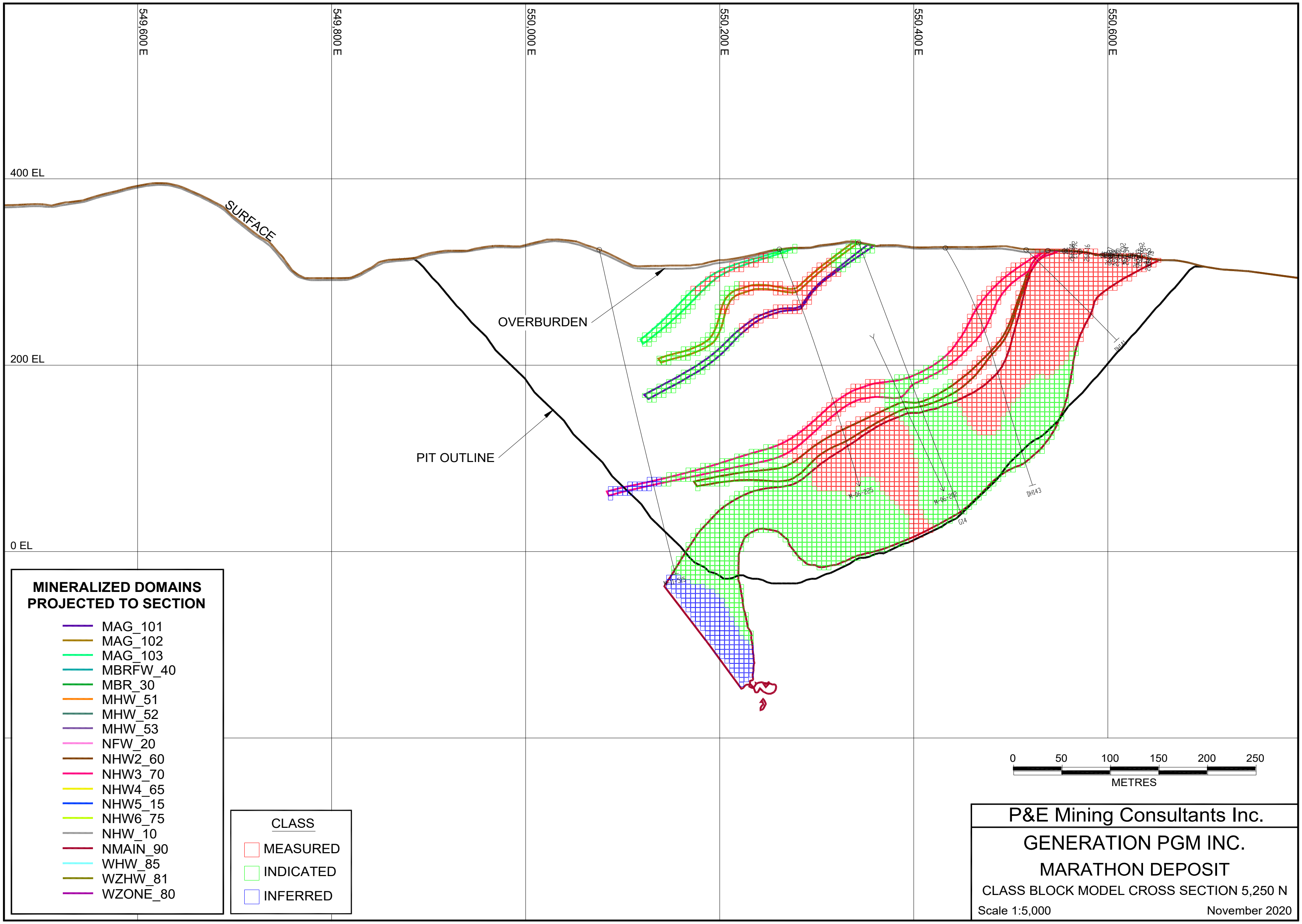
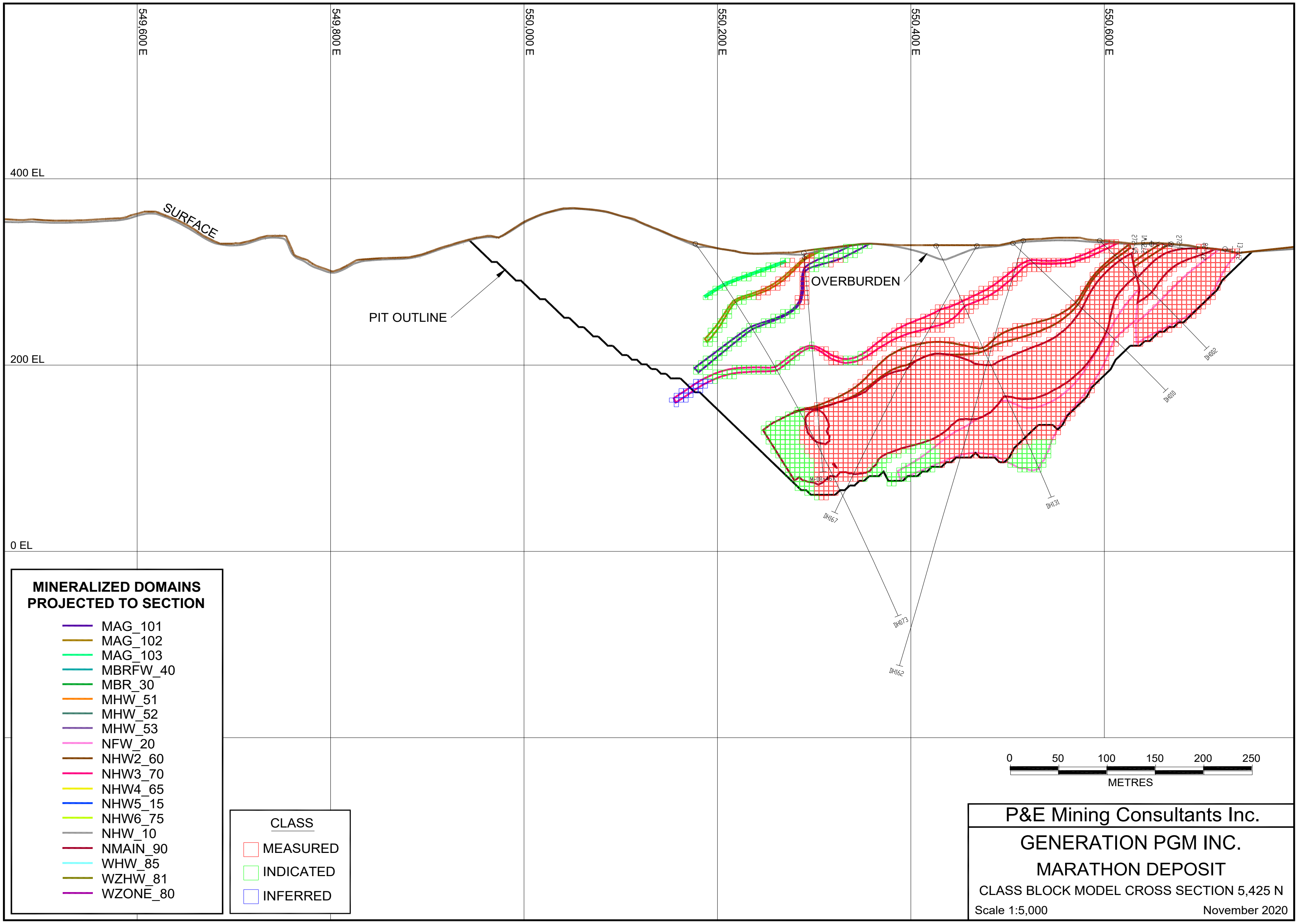
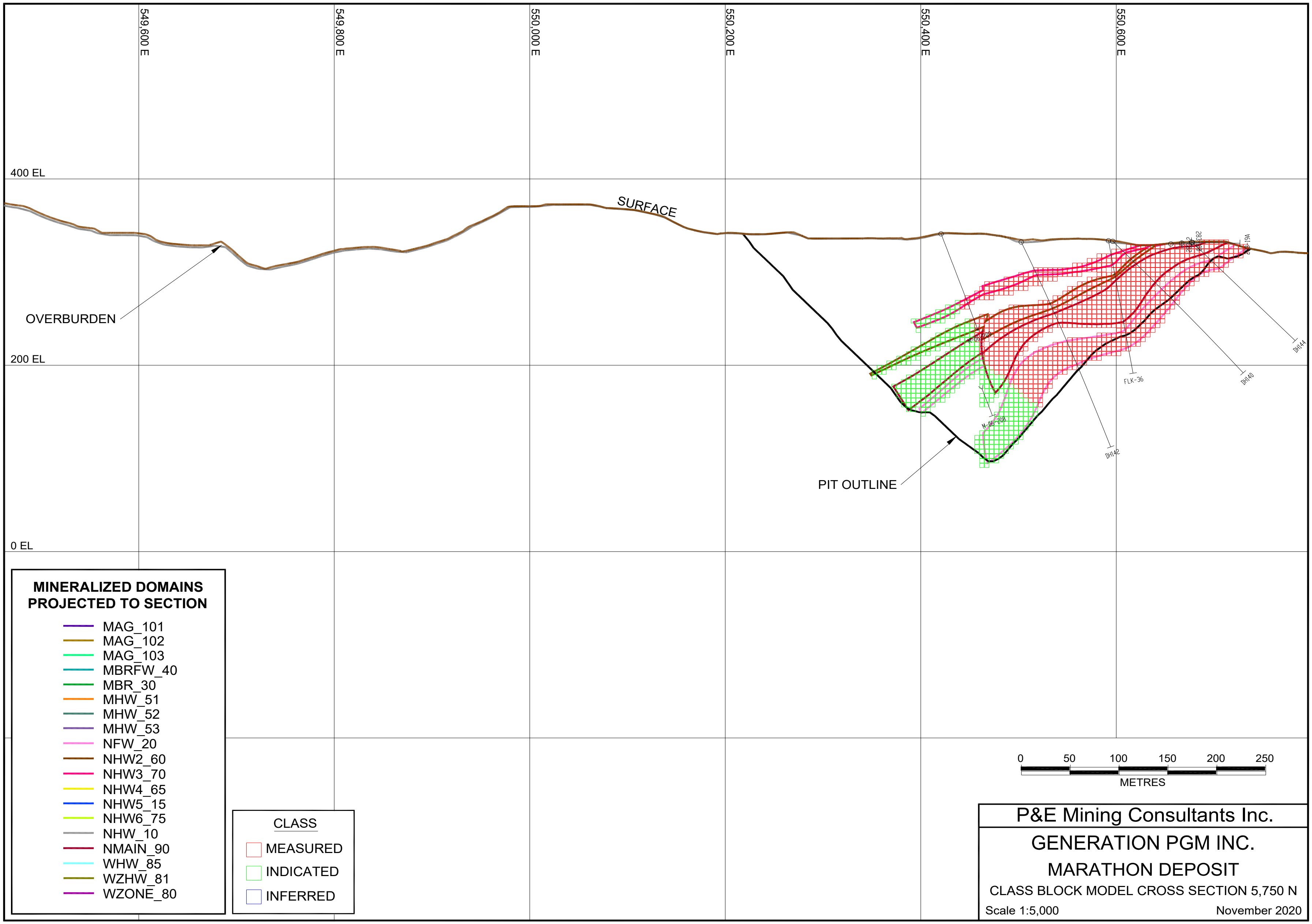
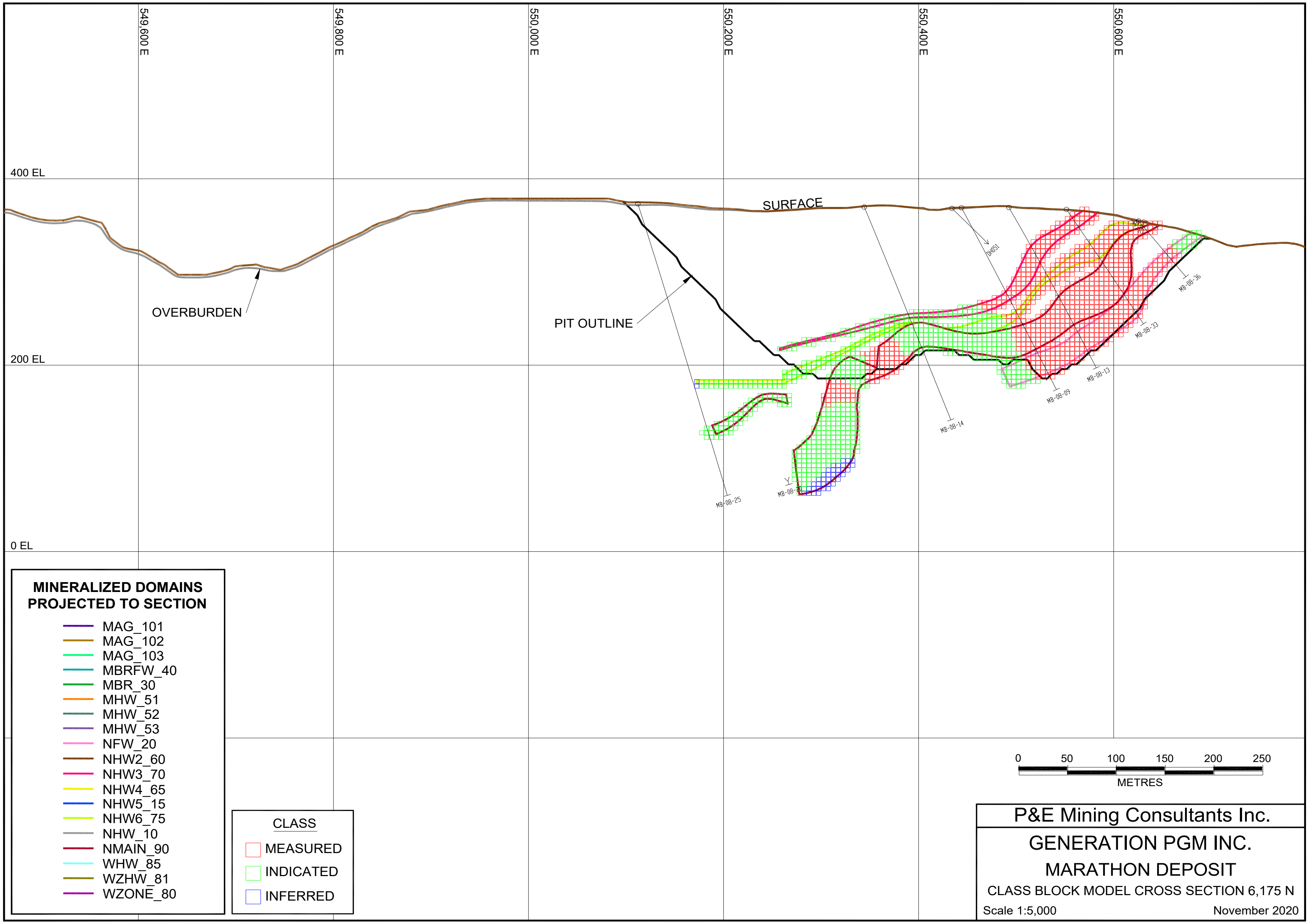
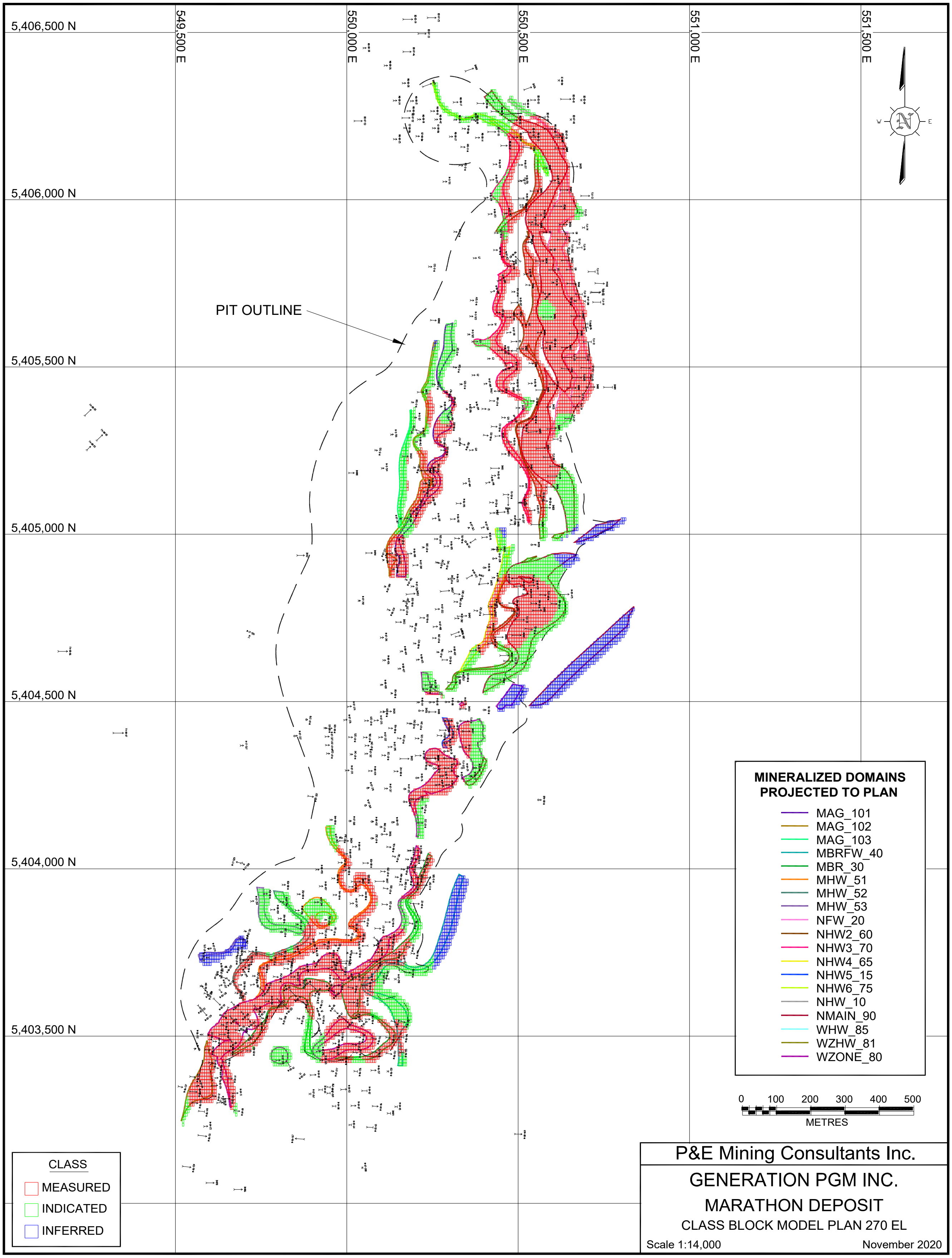
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 5,000 N
Scale 1:5,000
November 2020

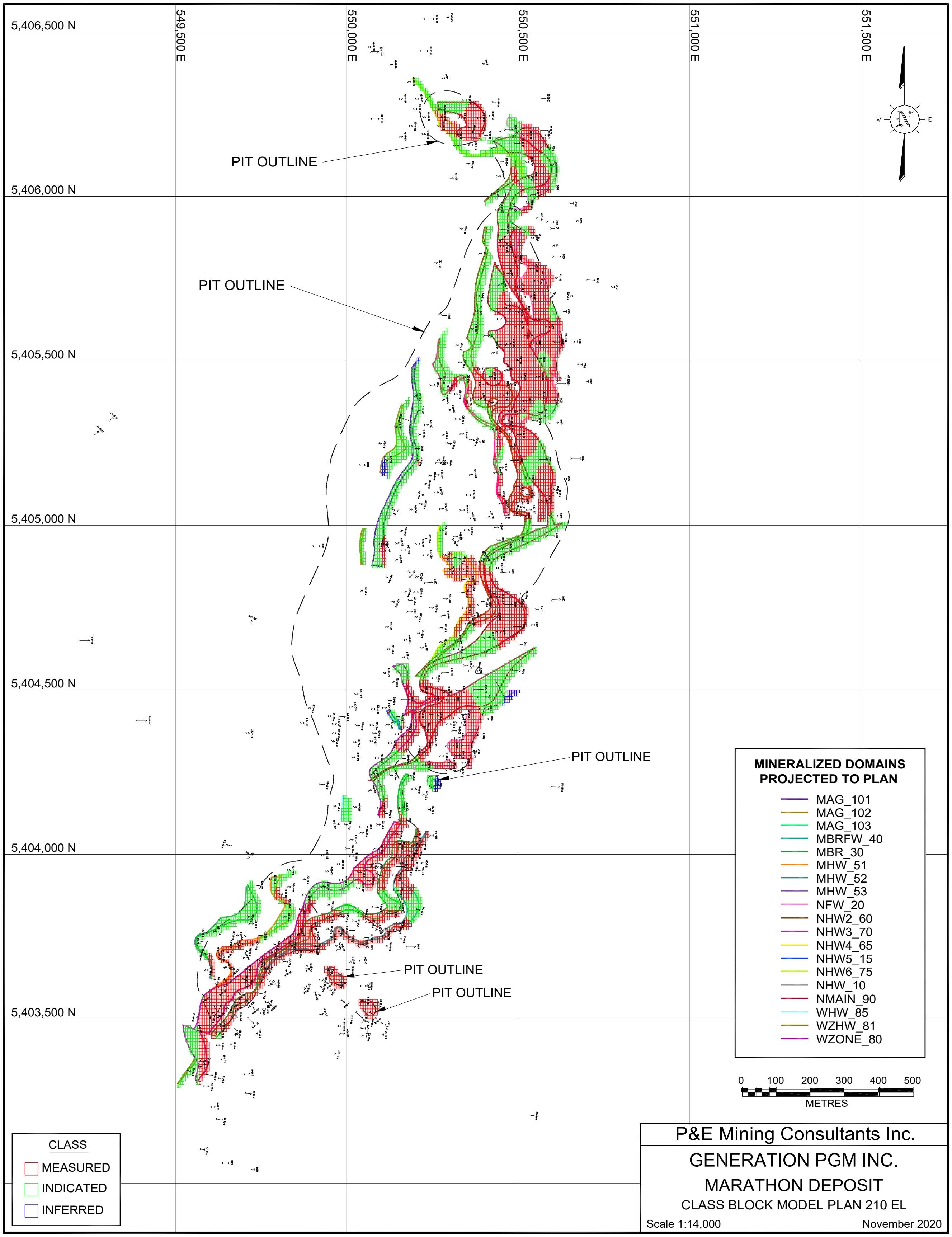

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0
50
100
150
200
250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 5,250 N
Scale 1:5,000
November 2020

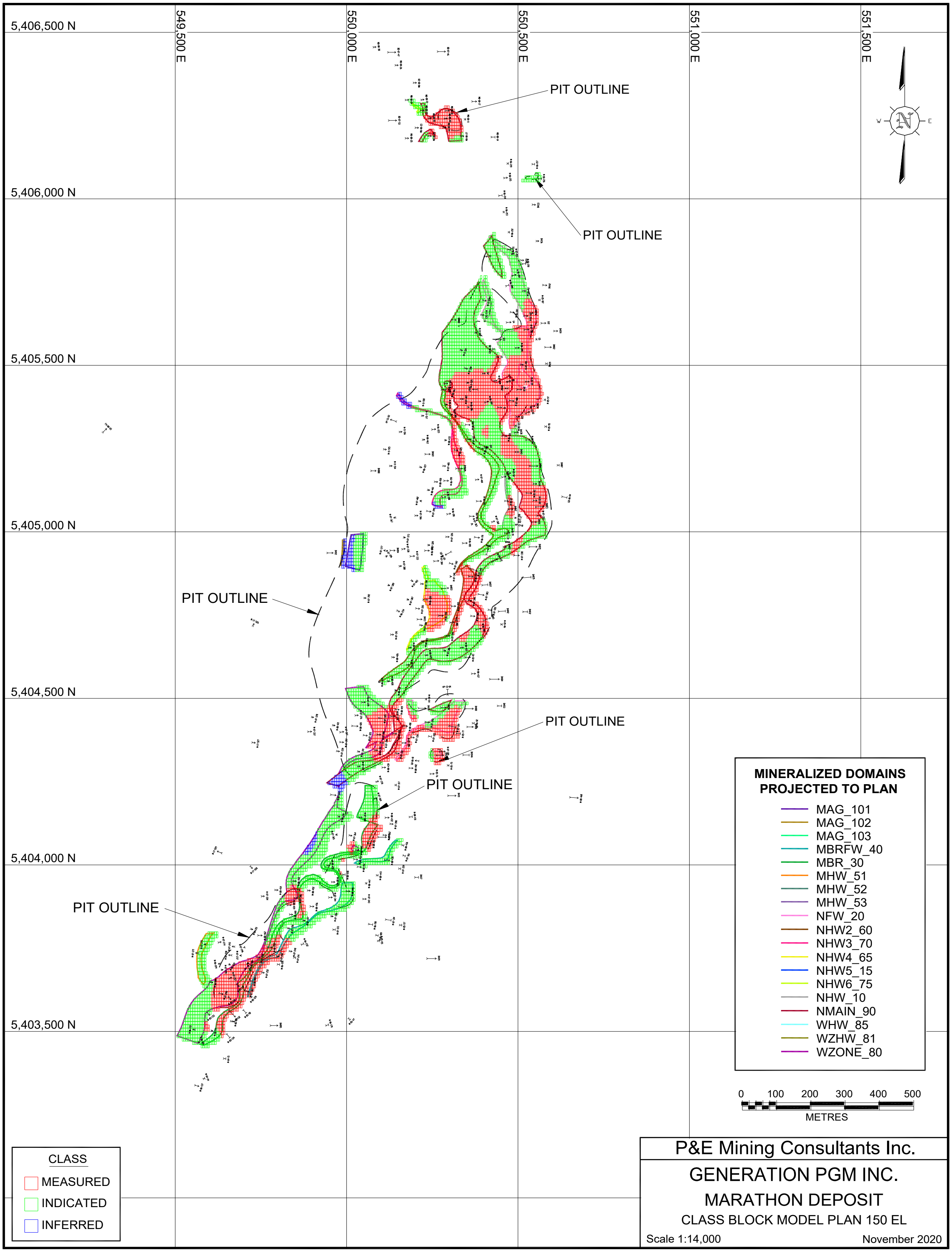

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
PIT OUTLINE
OVERBURDEN
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 5,425 N
Scale 1:5,000
November 2020

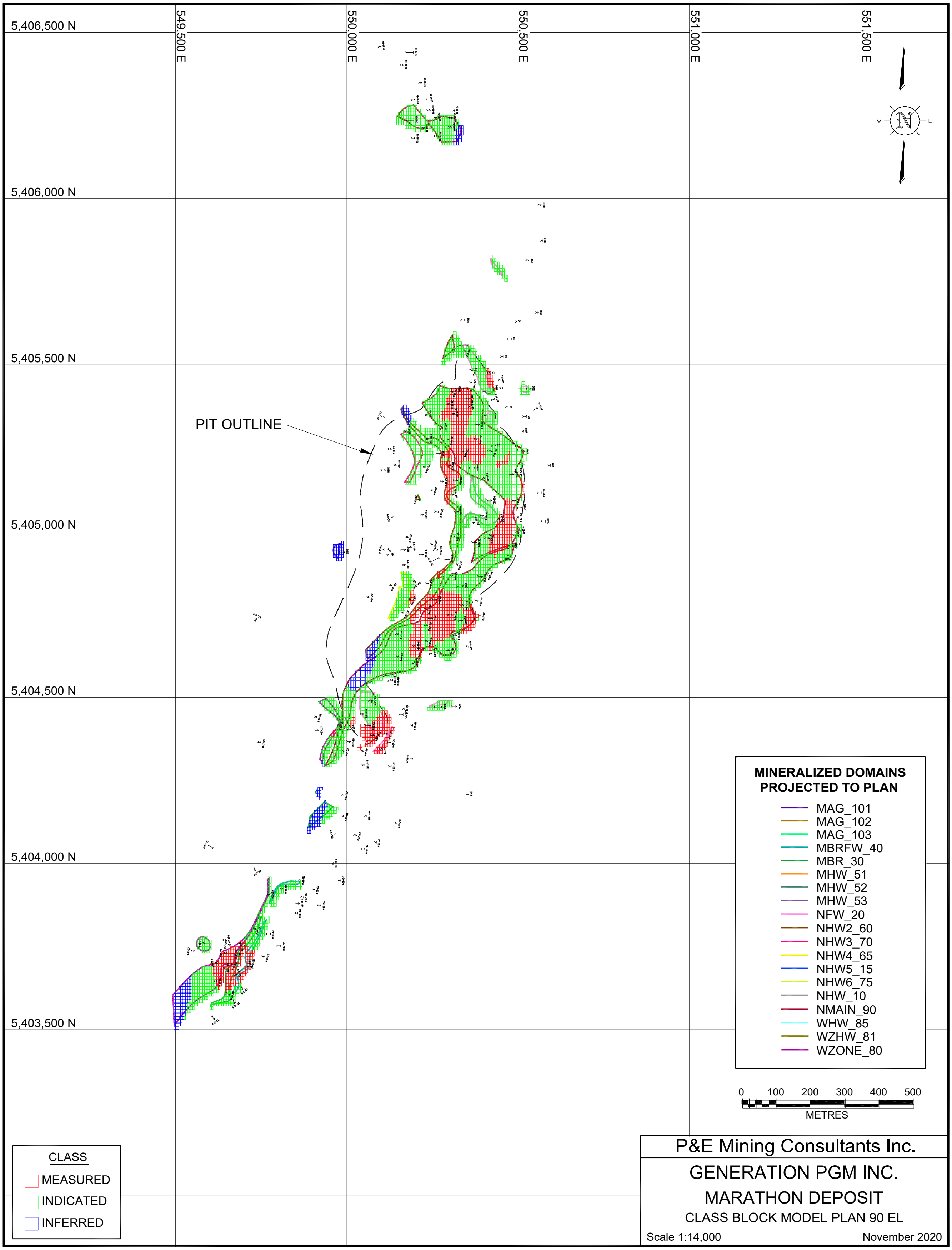

549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 5,750 N
Scale 1:5,000
November 2020


549,600 E
549,800 E
550,000 E
550,200 E
550,400 E
550,600 E
400 EL
200 EL
0 EL
SURFACE
OVERBURDEN
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
CLASS
MEASURED
INDICATED
INFERRED
0 50 100 150 200 250
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL CROSS SECTION 6,175 N
Scale 1:5,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS
PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
CLASS
MEASURED
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL PLAN 270 EL
Scale 1:14,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
CLASS
MEASURED
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL PLAN 210 EL
Scale 1:14,000
November 2020

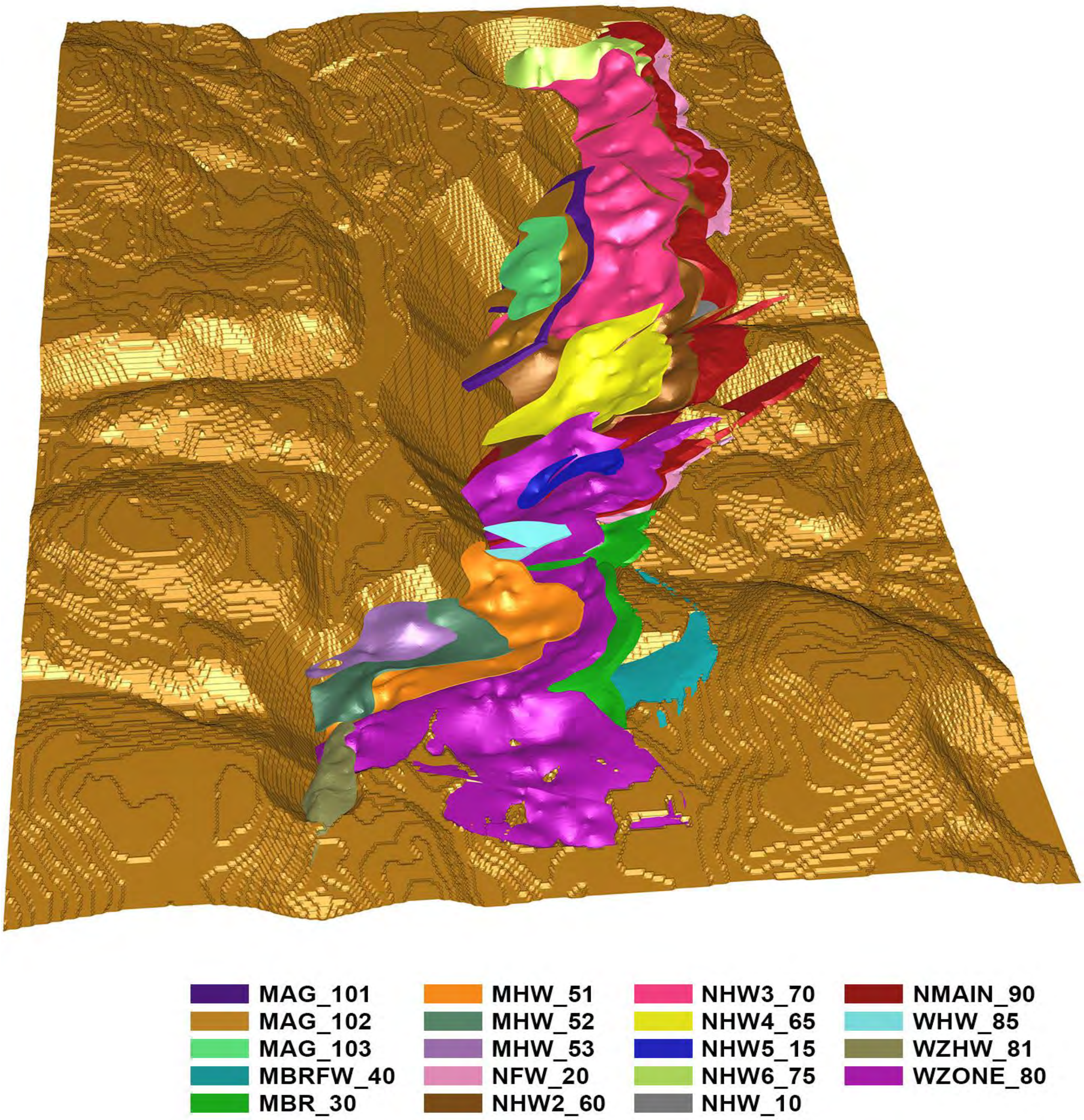

5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
PIT OUTLINE
N
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
CLASS
MEASURED
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL PLAN 150 EL
Scale 1:14,000
November 2020


5,406,500 N
5,406,000 N
5,405,500 N
5,405,000 N
5,404,500 N
5,404,000 N
5,403,500 N
549,500 E
550,000 E
550,500 E
551,000 E
551,500 E
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAG_101
MAG_102
MAG_103
MBRFW_40
MBR_30
MHW_51
MHW_52
MHW_53
NFW_20
NHW2_60
NHW3_70
NHW4_65
NHW5_15
NHW6_75
NHW_10
NMAIN_90
WHW_85
WZHW_81
WZONE_80
0 100 200 300 400 500
METRES
CLASS
MEASURED
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
MARATHON DEPOSIT
CLASS BLOCK MODEL PLAN 90 EL
Scale 1:14,000
November 2020

Marathon Deposit

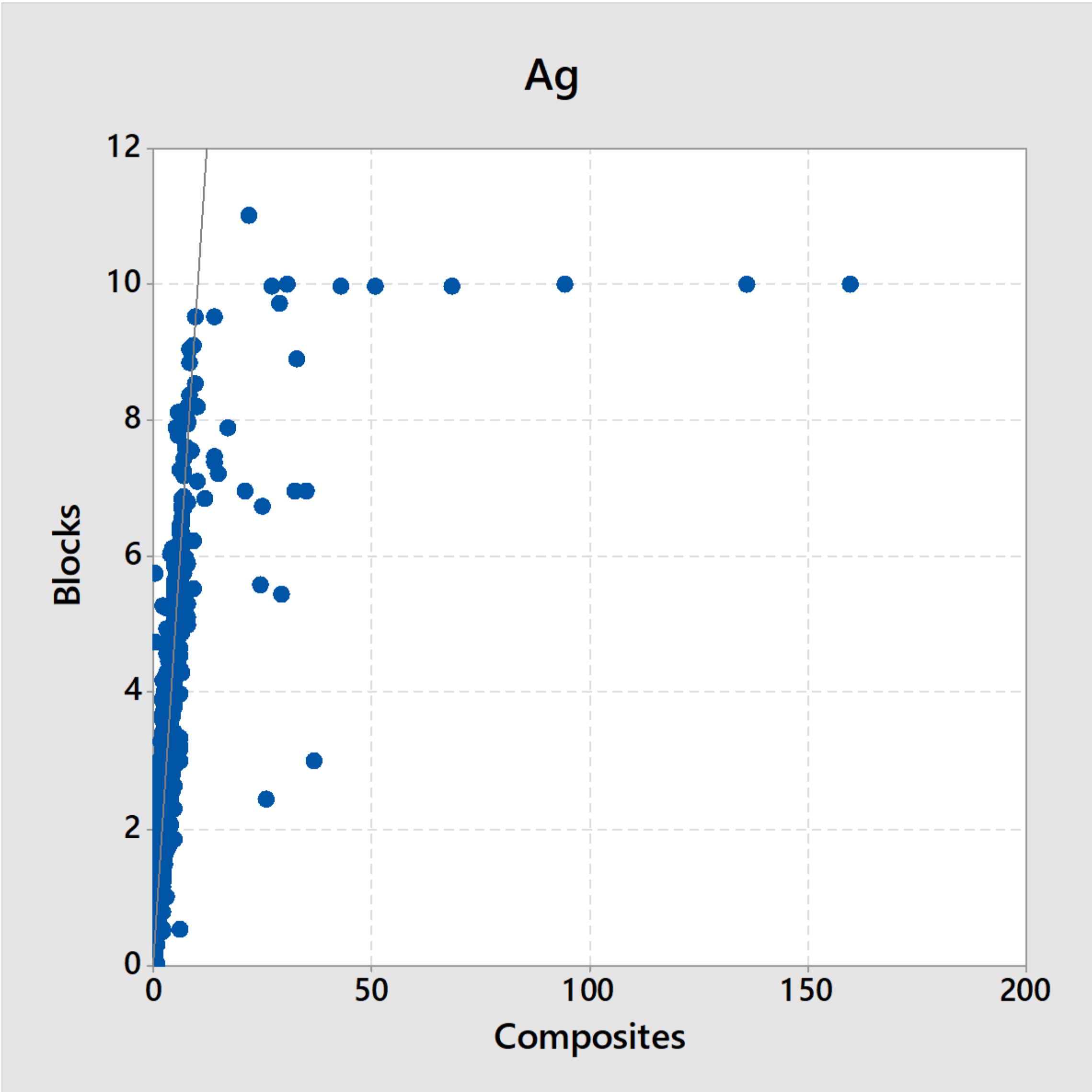
Optimized Pit Shell

GENERATION PGM INC.
MARATHON DEPOSIT - OPTIMIZED PIT SHELL

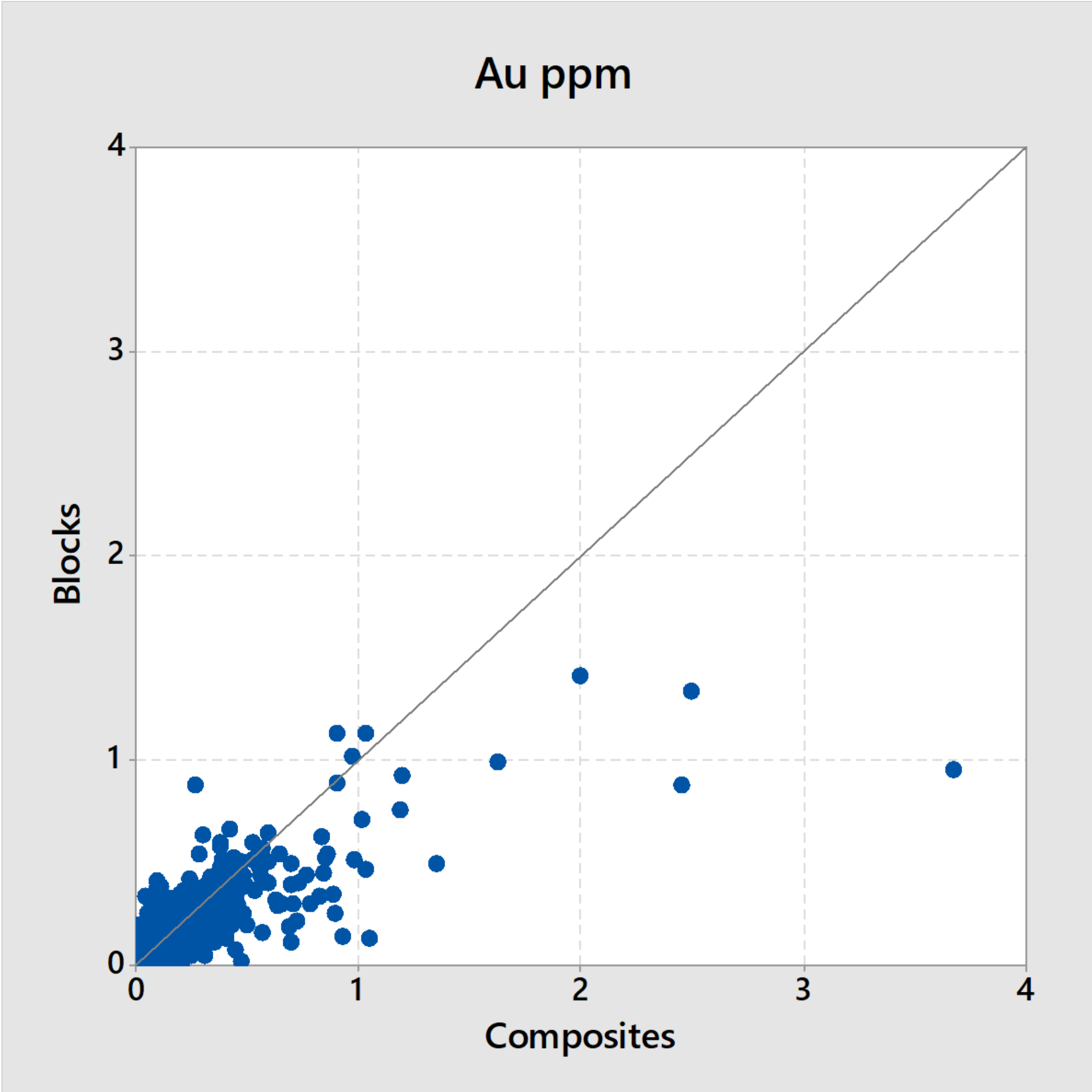


Marathon Deposit

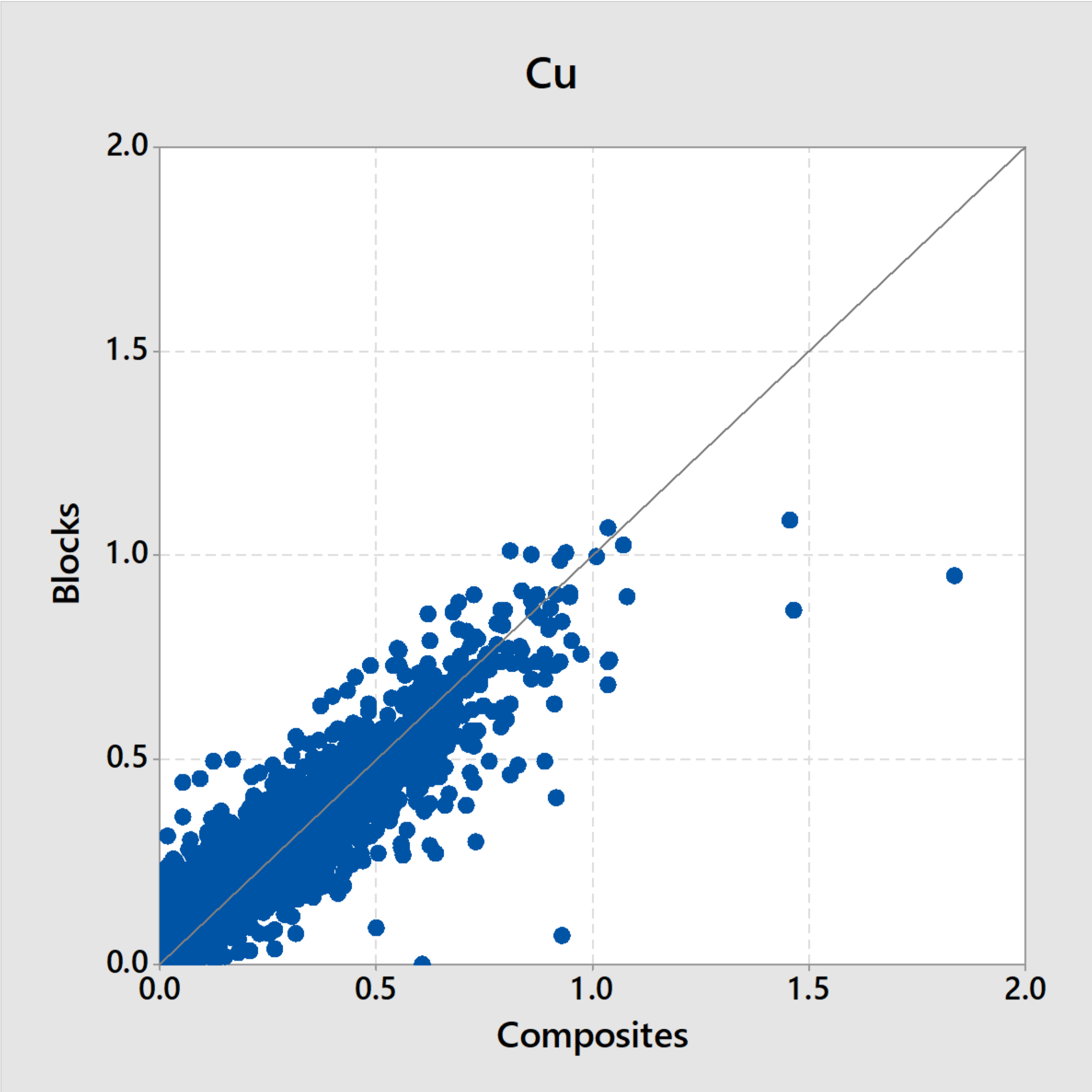
Block Grade Validation Check



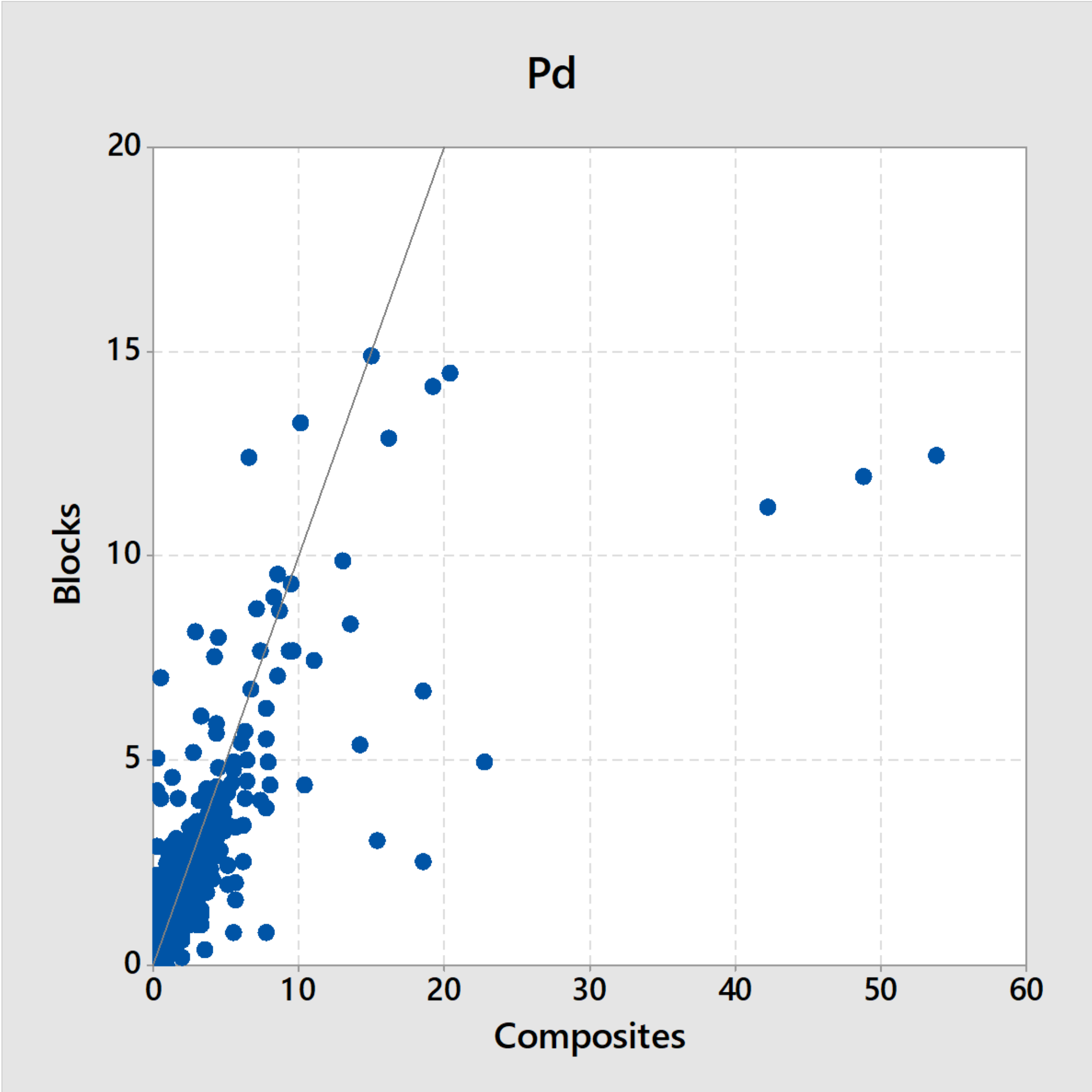
Comparison of Average Composite Grades and Estimated Block Grades: Ag



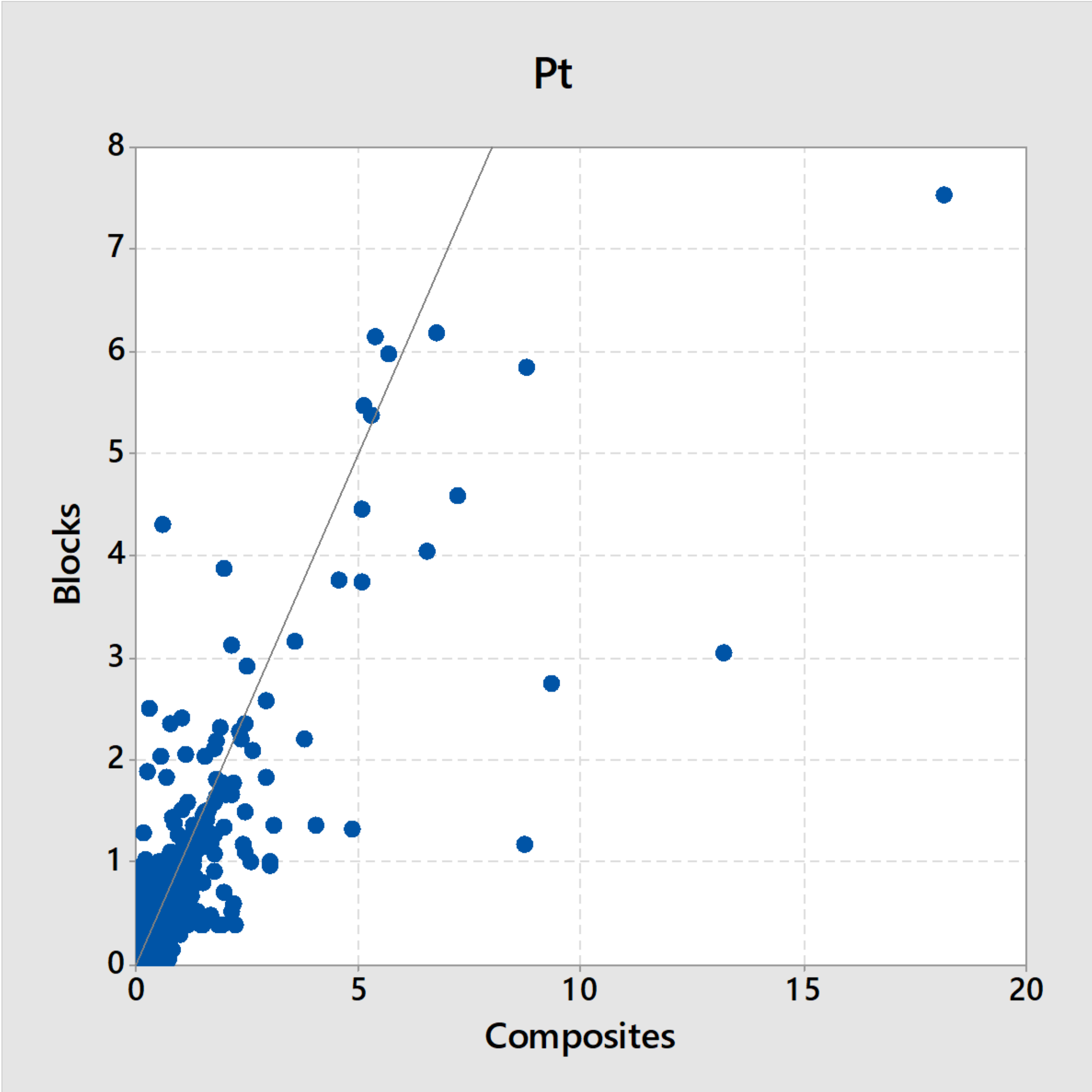
Comparison of Average Composite Grades and Estimated Block Grades: Au



Comparison of Average Composite Grades and Estimated Block Grades: Cu



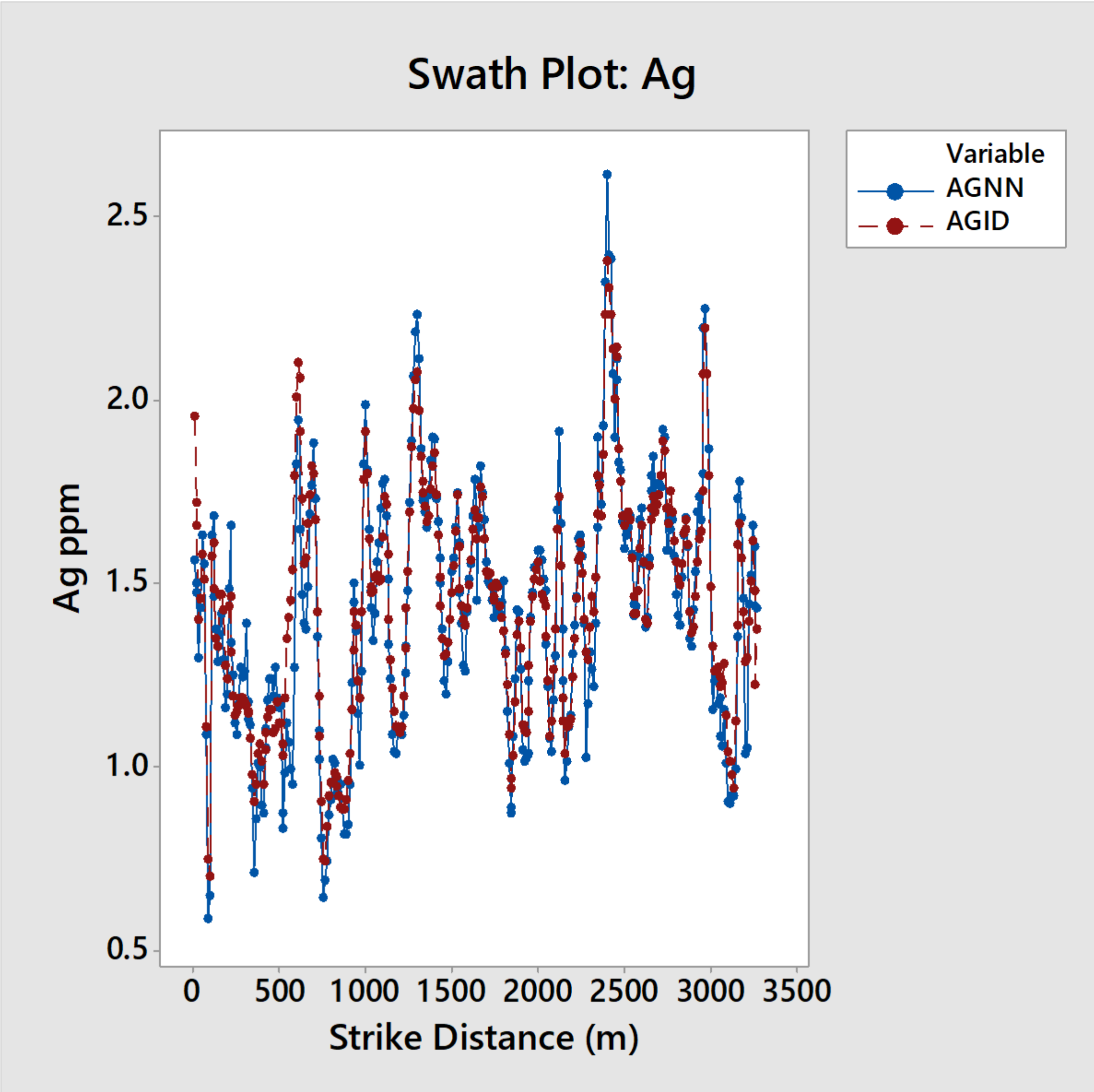
Comparison of Average Composite Grades and Estimated Block Grades: Pd



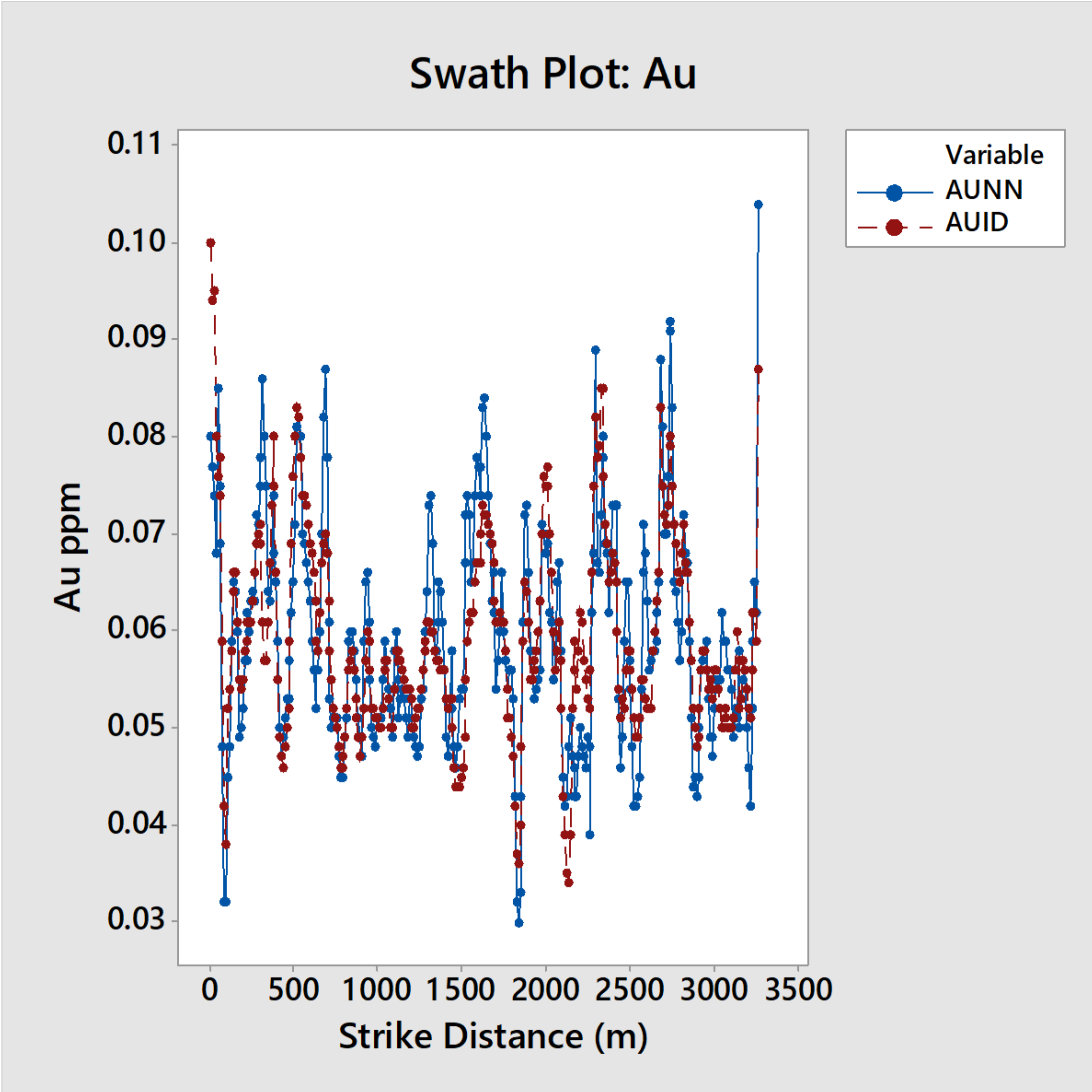
Comparison of Average Composite Grades and Estimated Block Grades: Pt

Marathon Deposit

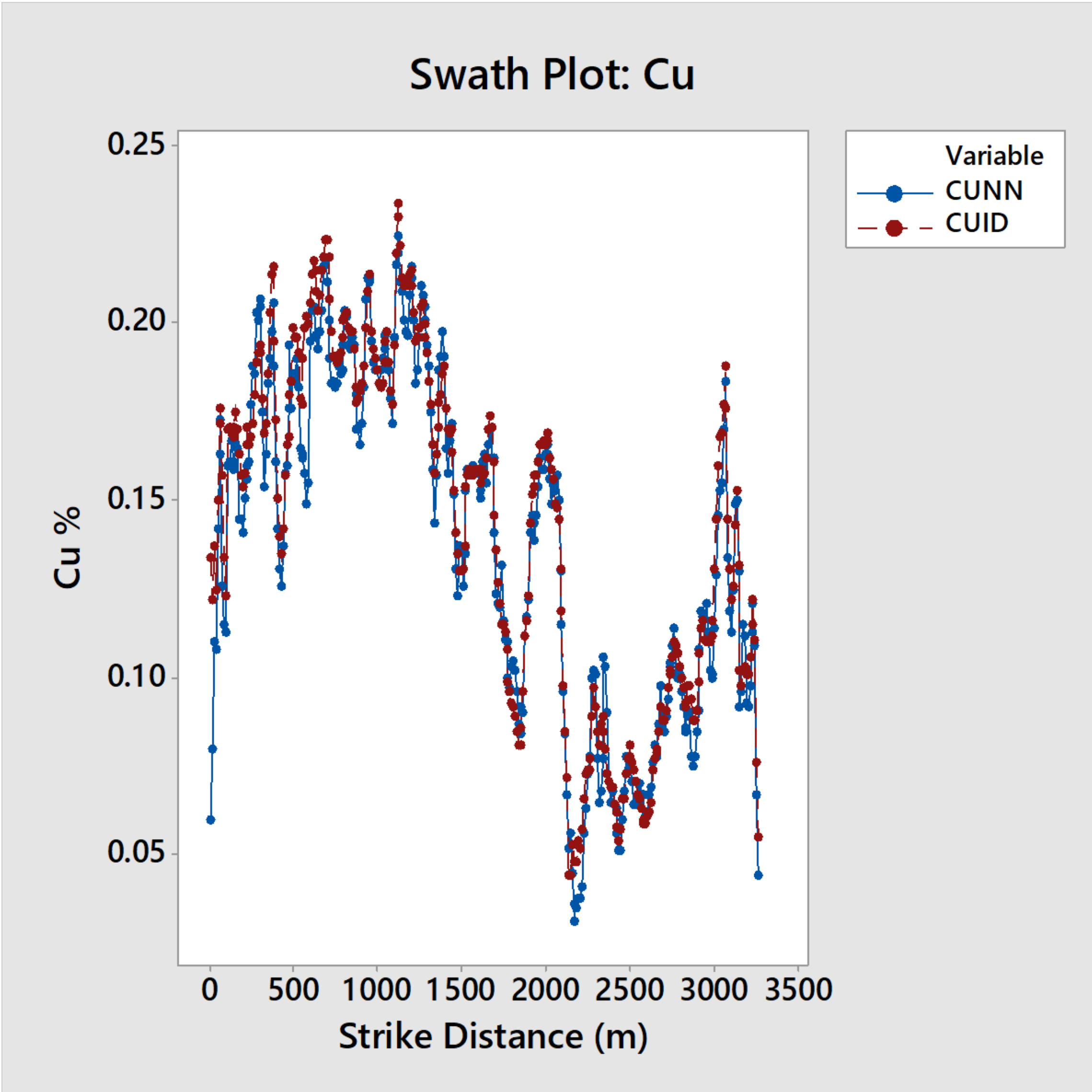
Swath Plots



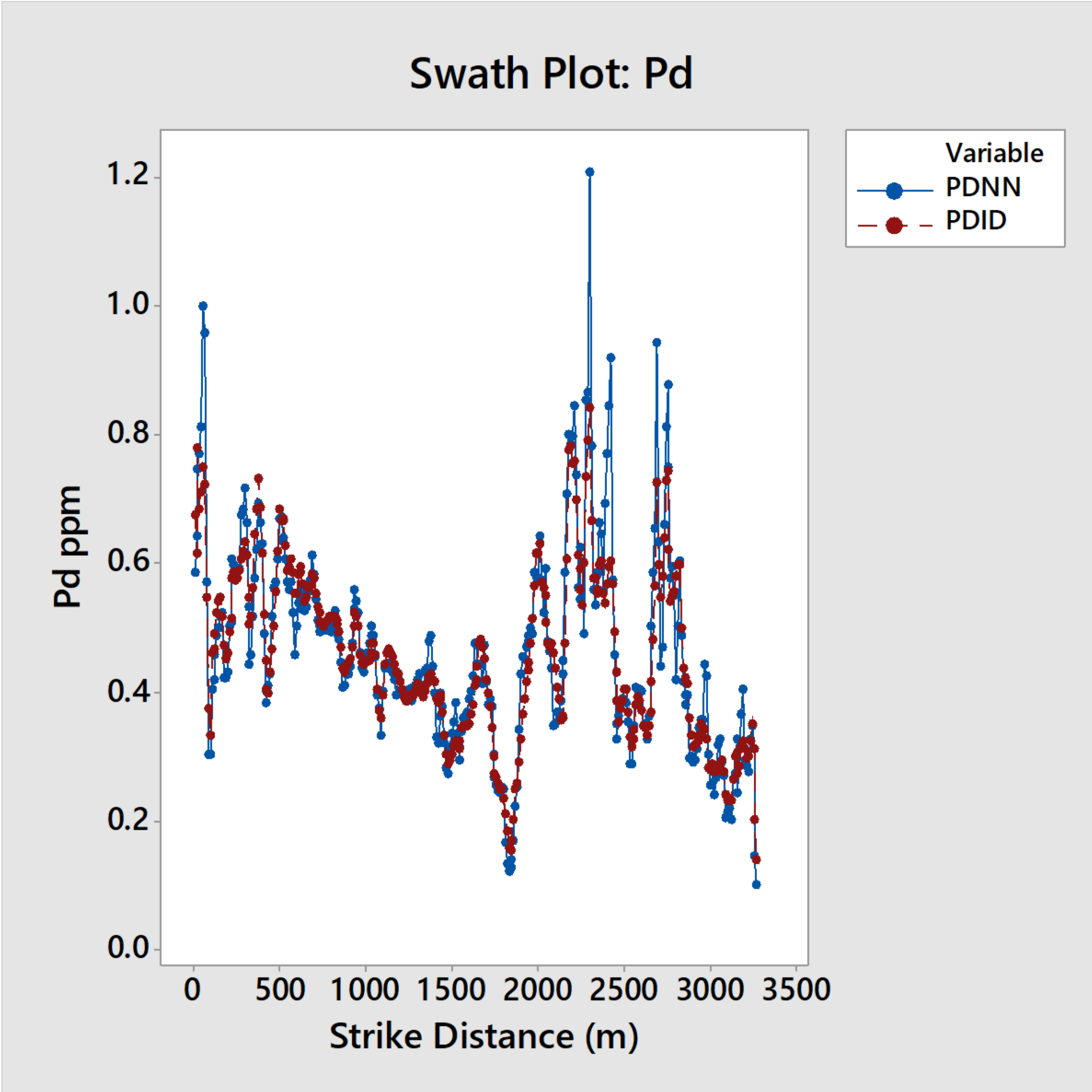
Swath Plot: Ag



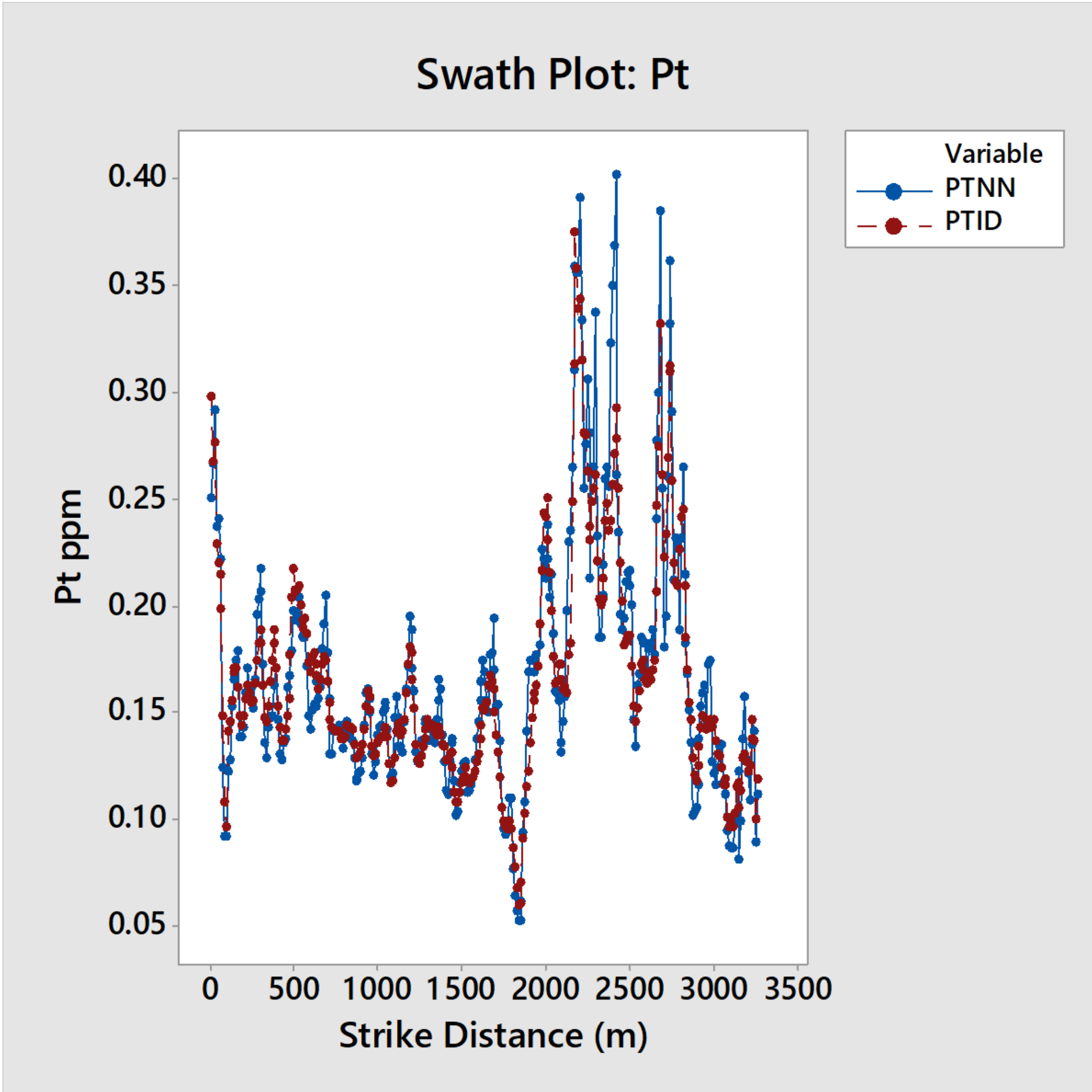
Swath Plot: Au



Swath Plot: Cu



Swath Plot: Pd

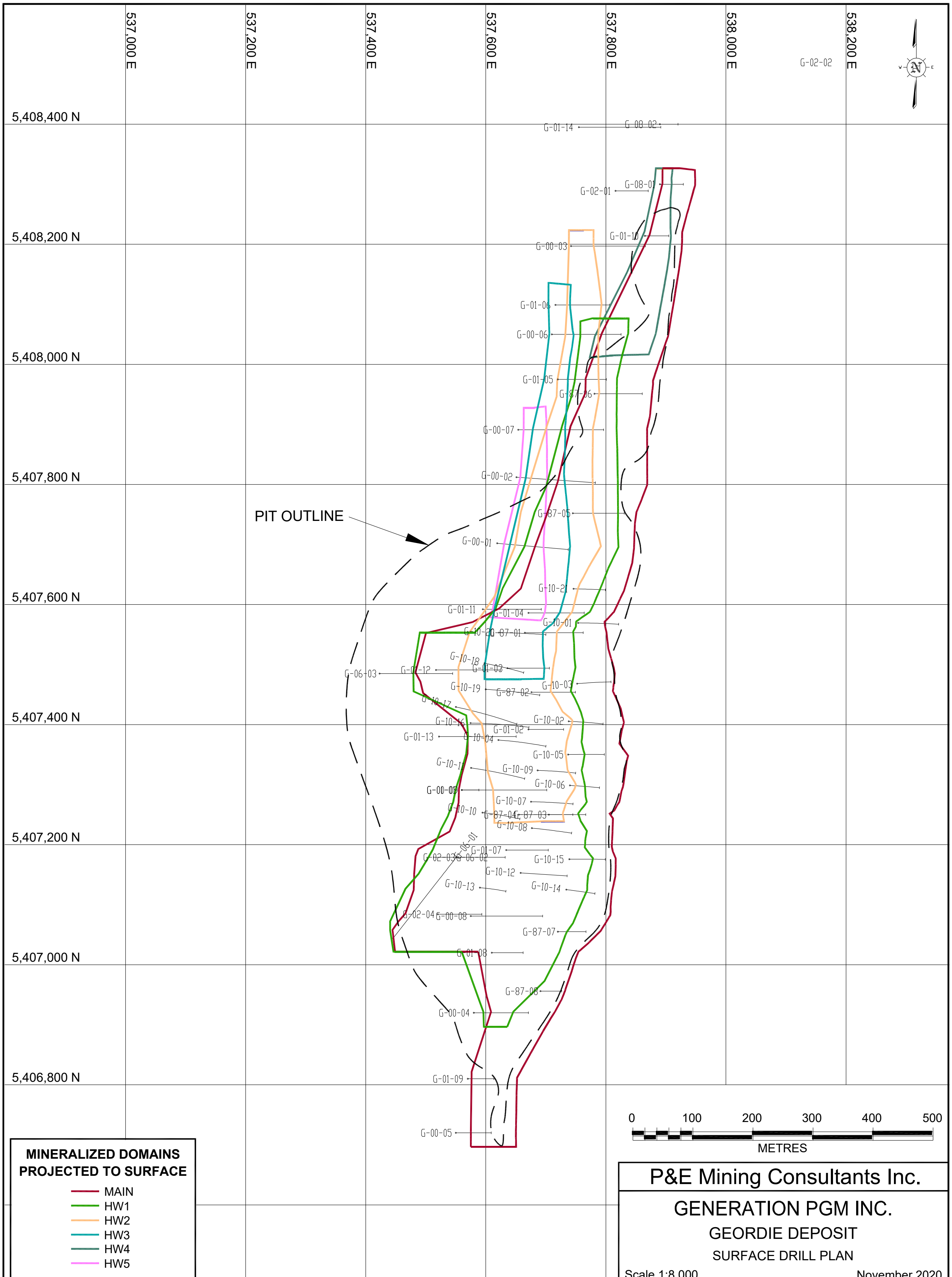


Swath Plot: Pt

GEORDIE DEPOSIT APPENDICES

Geordie Deposit

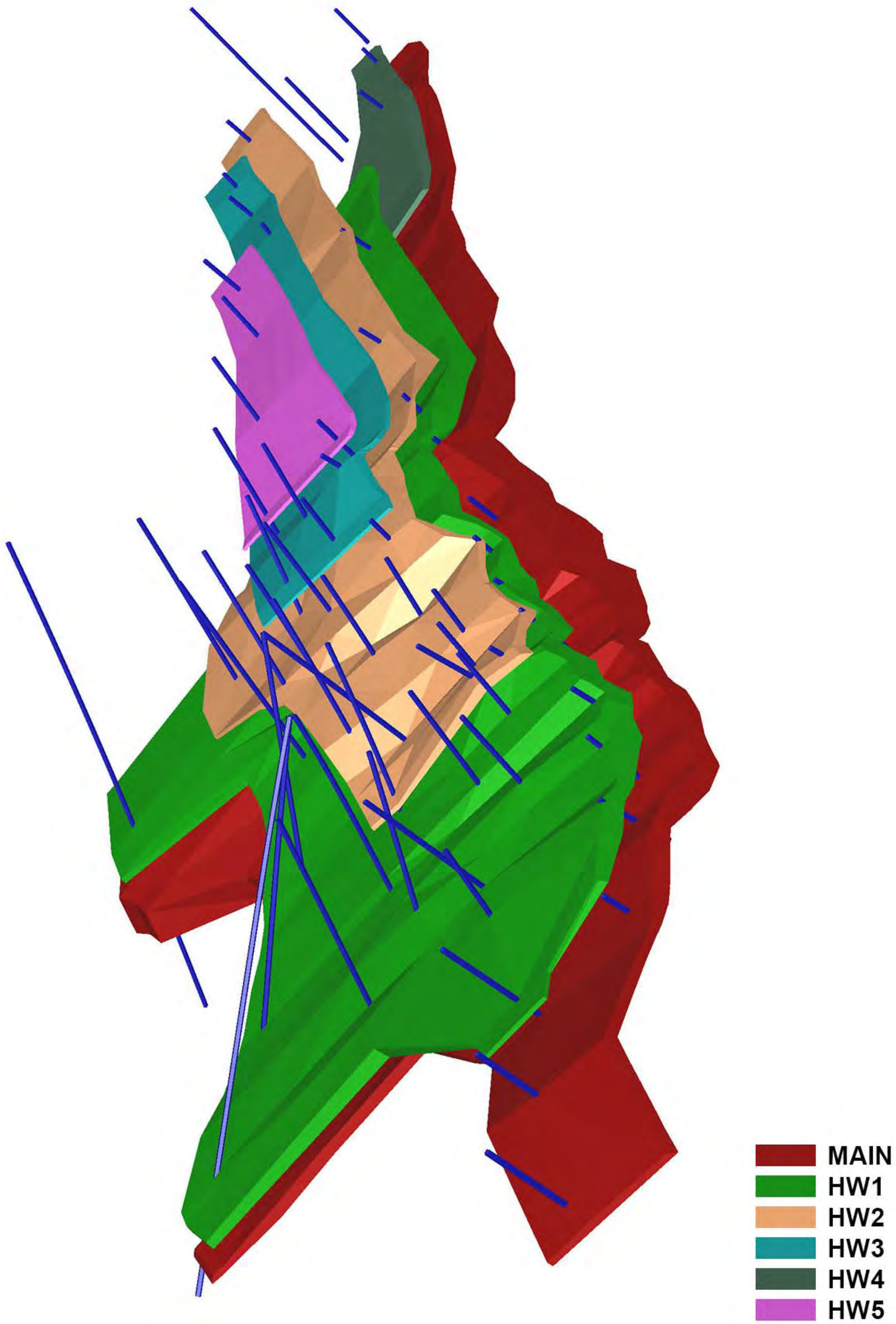
Surface Drill Hole Plan


537,000 E
537,200 E
537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
5,408,400 N
5,408,200 N
5,408,000 N
5,407,800 N
5,407,600 N
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
0
100
200
300
400
500
METRES
MINERALIZED DOMAINS PROJECTED TO SURFACE
MAIN
HW1
HW2
HW3
HW4
HW5
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
SURFACE DRILL PLAN
Scale 1:8,000
November 2020

Geordie Deposit

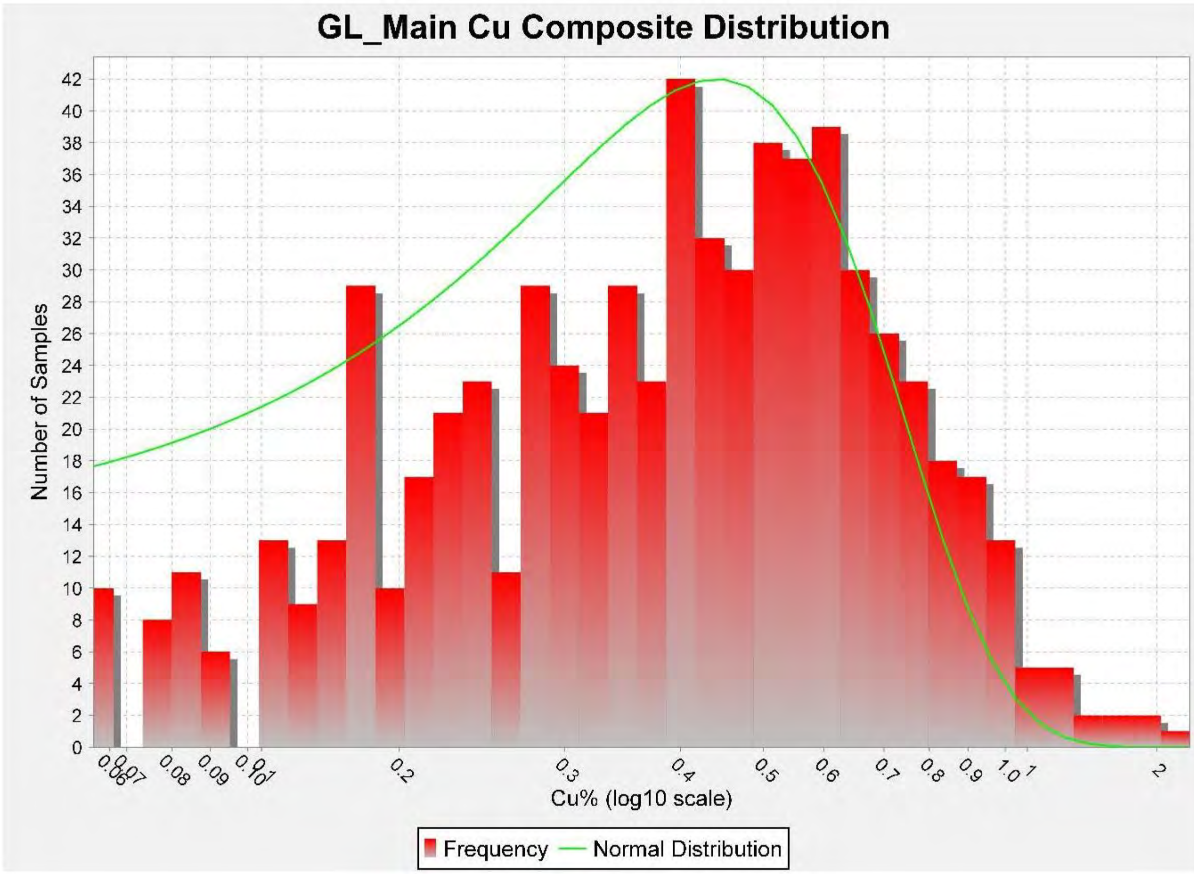
3-D Domains

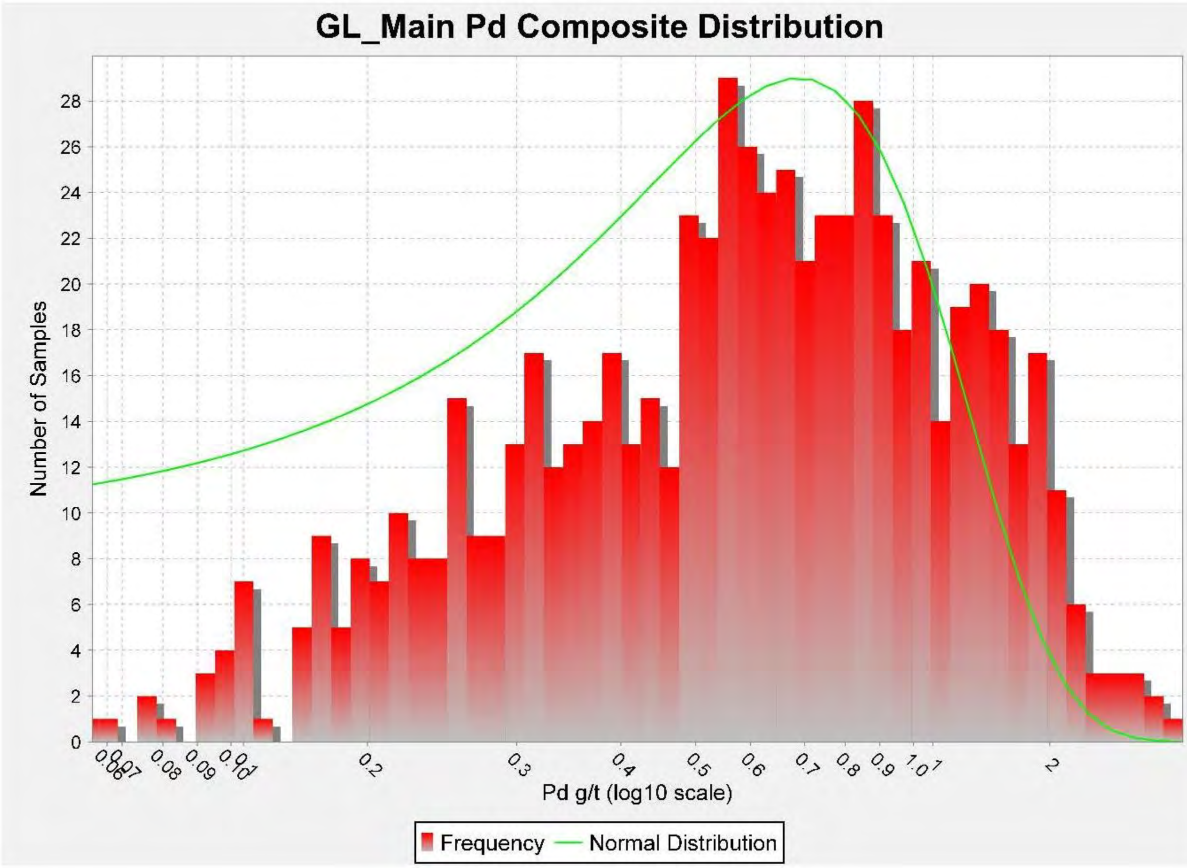
GEORDIE DEPOSIT - 3D DOMAINS

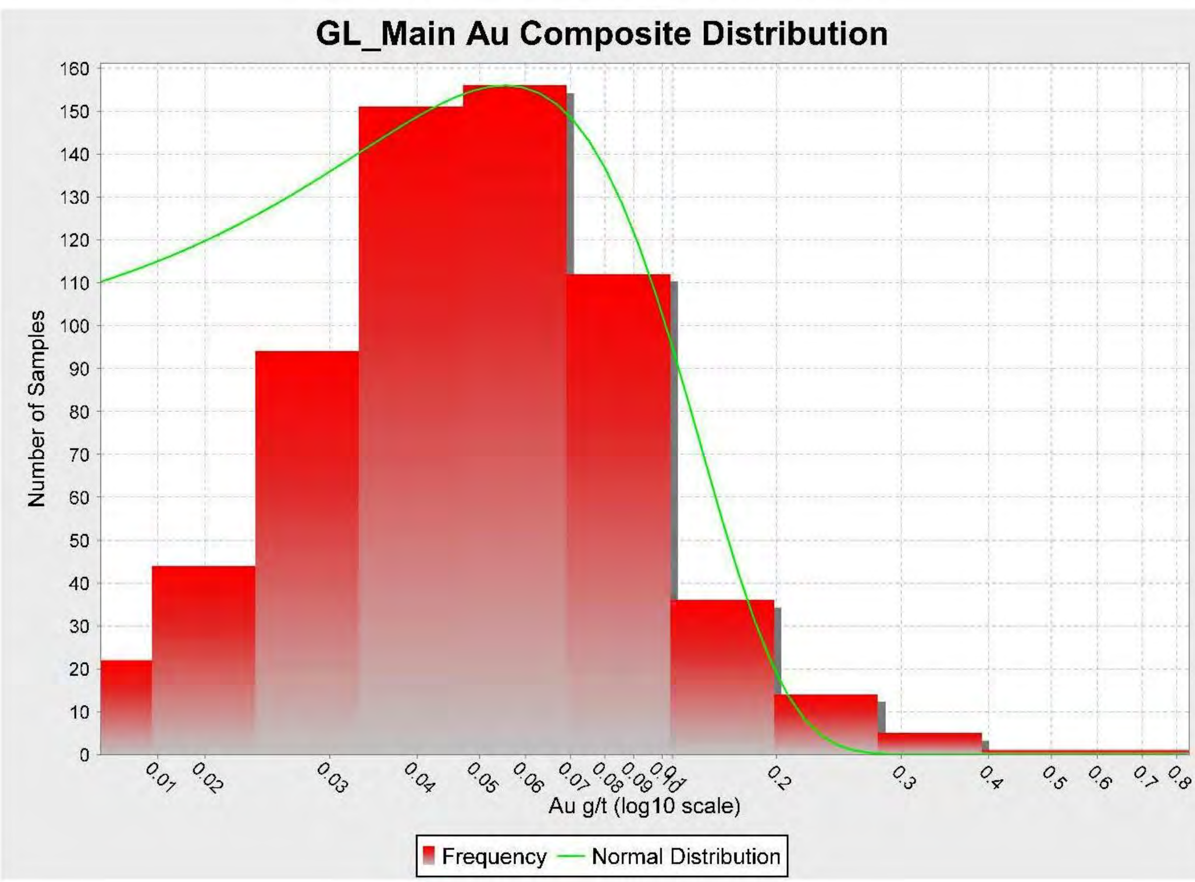


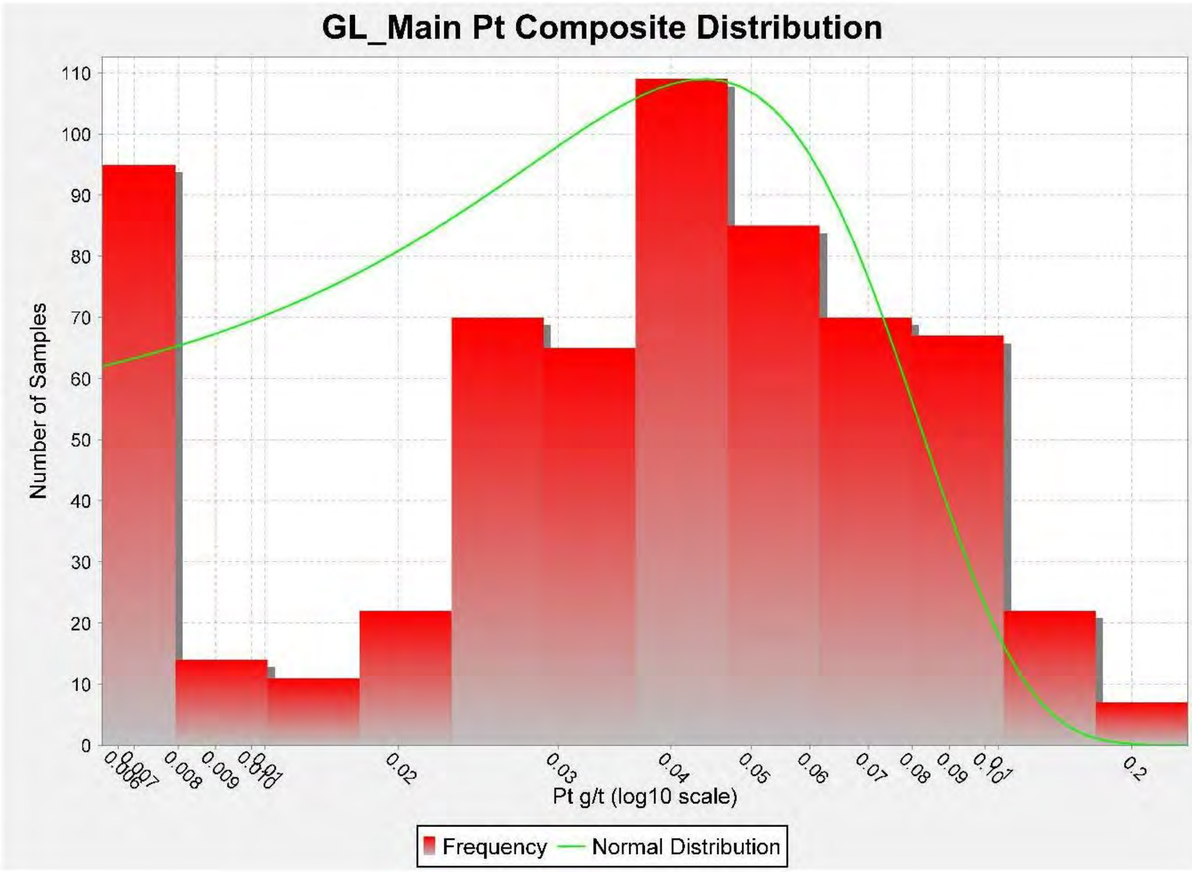
Geordie Deposit

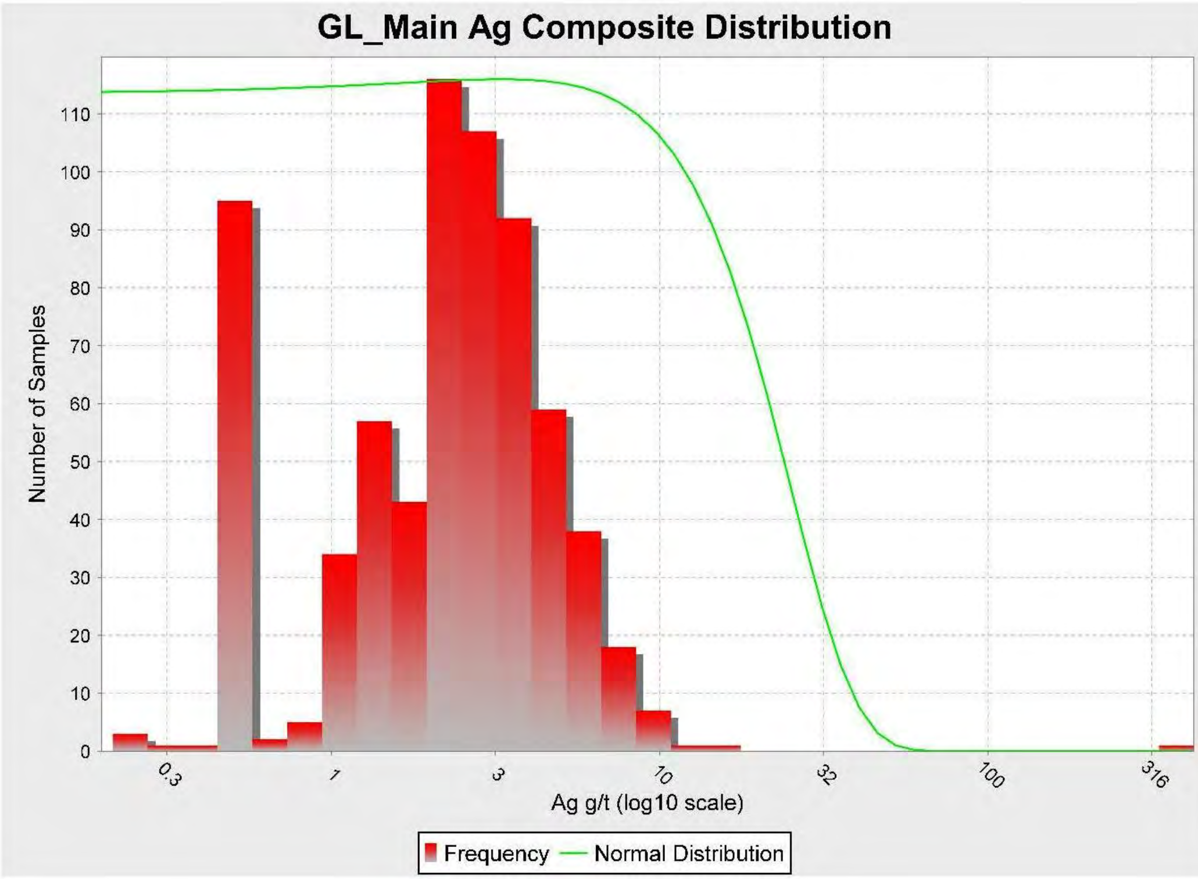
Log Normal Histograms


GL_Main Cu Composite Distribution
Number of Samples
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
Cu% (log10 scale)
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
2
Frequency
Normal Distribution


GL_Main Pd Composite Distribution
Number of Samples
Pd g/t (log10 scale)
Frequency
Normal Distribution

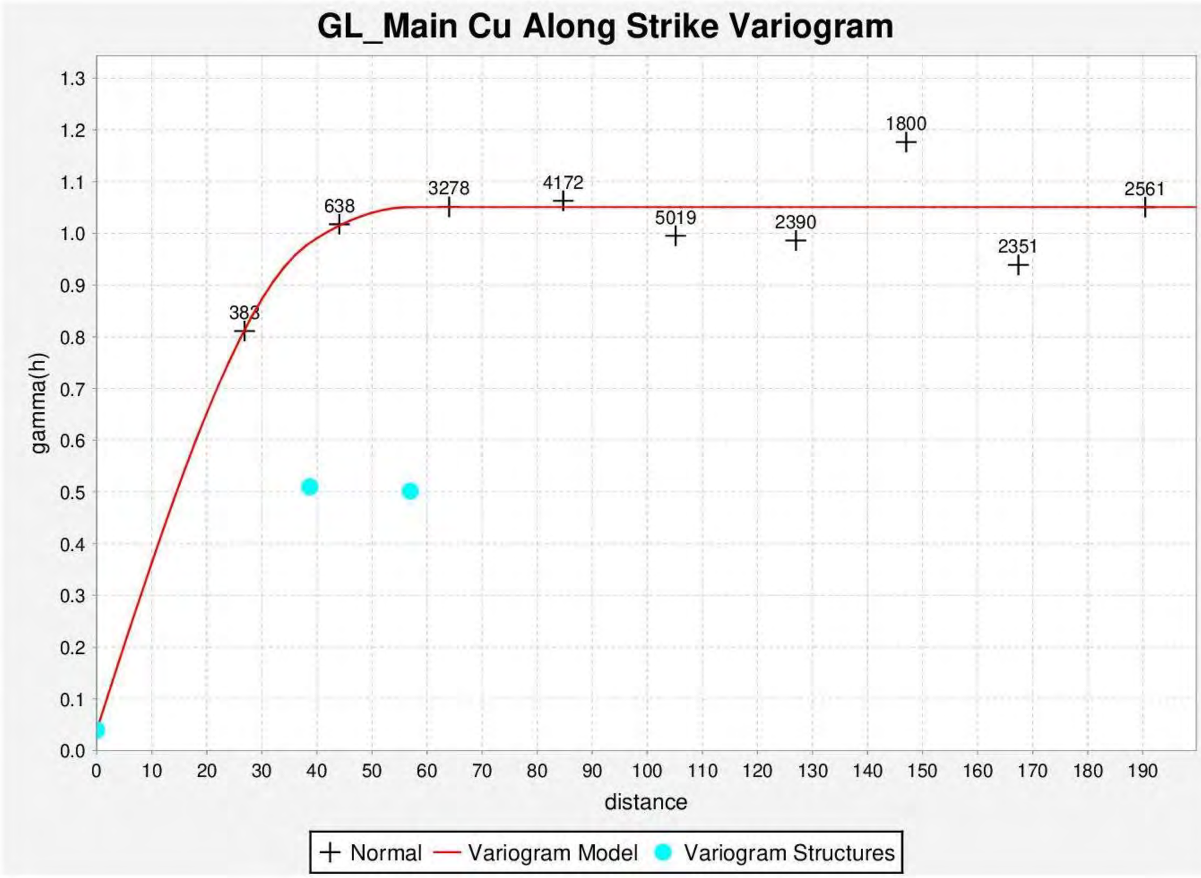

GL_Main Au Composite Distribution
Number of Samples
Au g/t (log10 scale)
Frequency
Normal Distribution

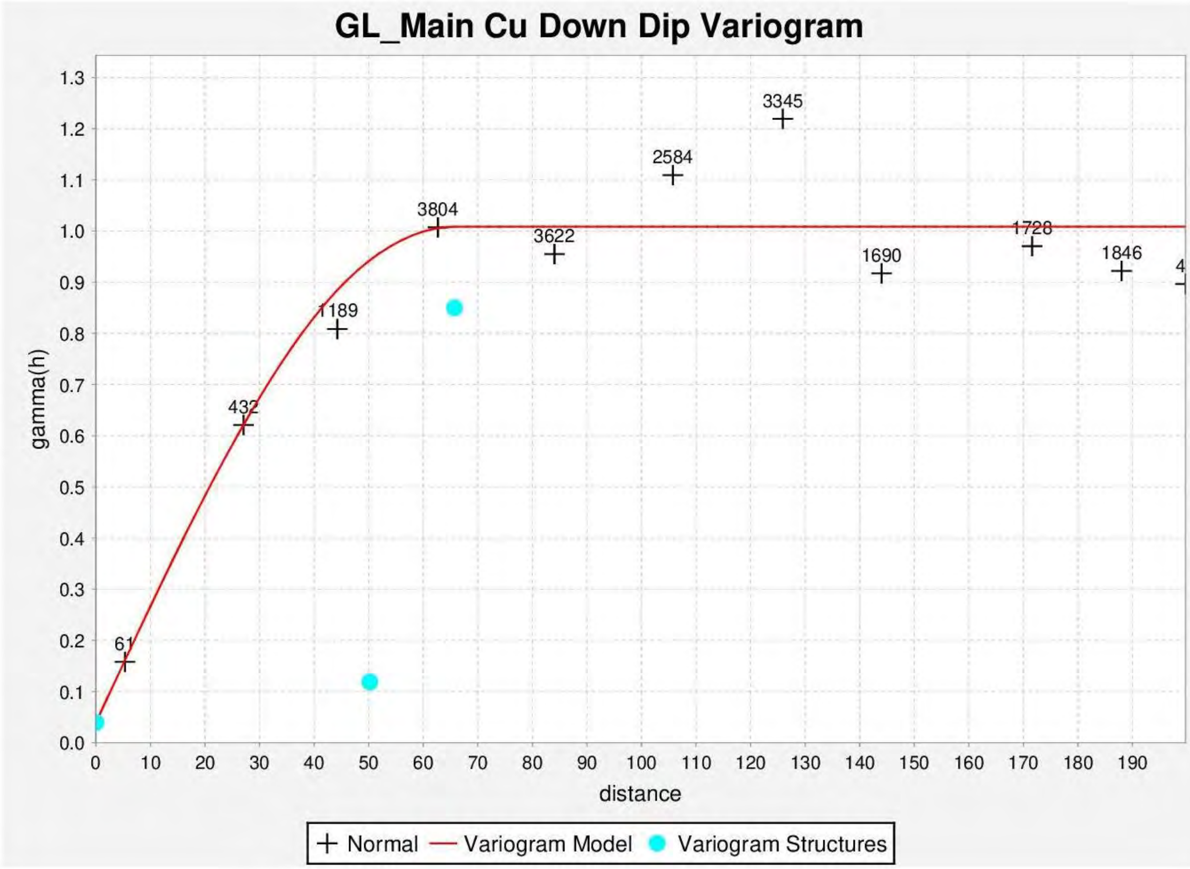

GL_Main Pt Composite Distribution
Number of Samples
110
100
90
80
70
60
50
40
30
20
10
0
0.006
0.007
0.008
0.009
0.01
0.010
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.10
0.2
Pt g/t (log10 scale)
Frequency
Normal Distribution

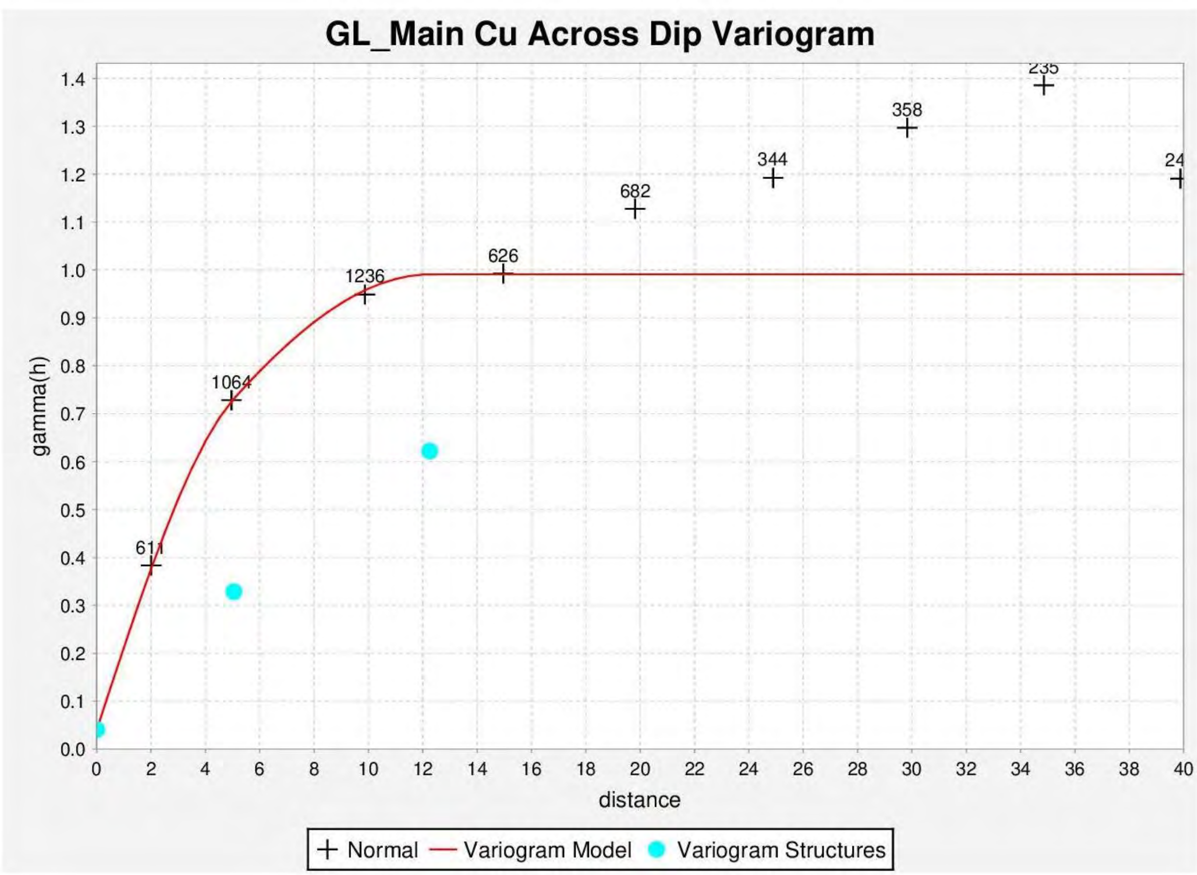

GL_Main Ag Composite Distribution
Number of Samples
110
100
90
80
70
60
50
40
30
20
10
0
0.3
1
3
10
32
100
316
Ag g/t (log10 scale)
Frequency
Normal Distribution

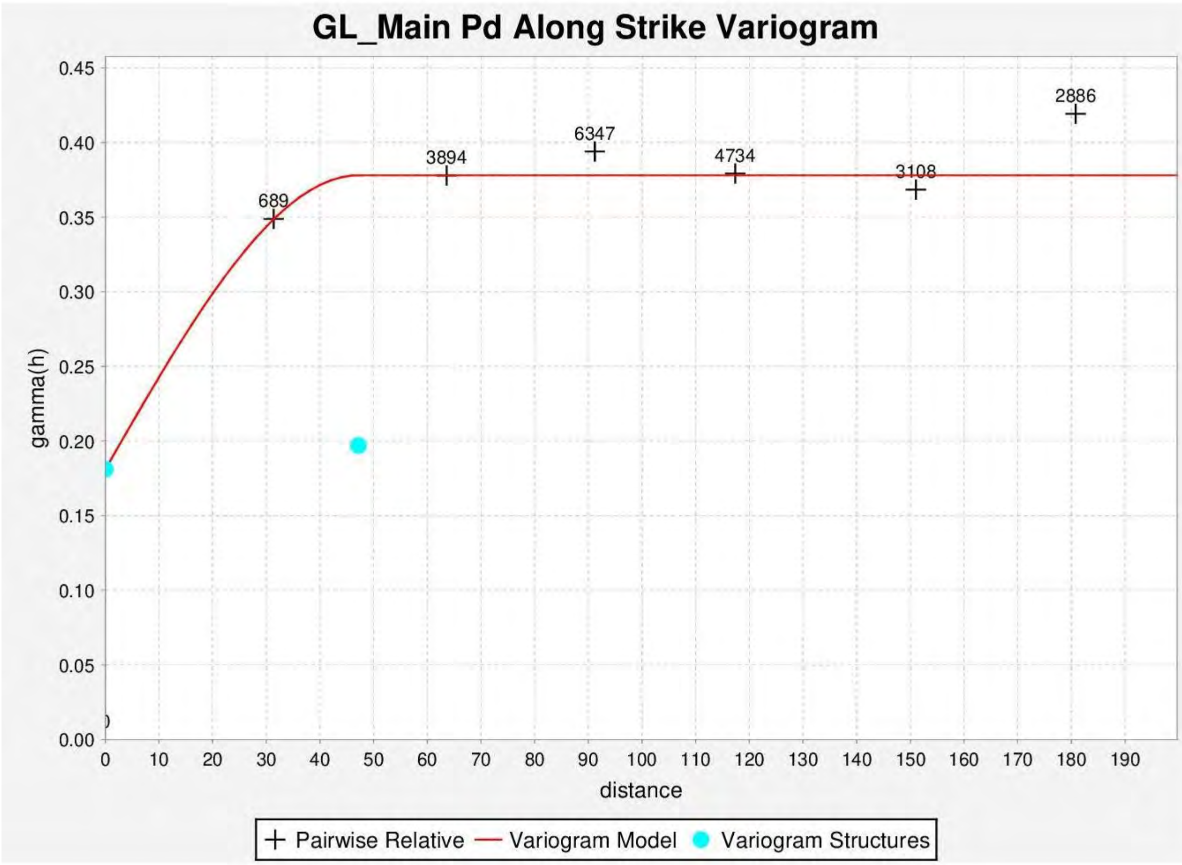
Geordie Deposit

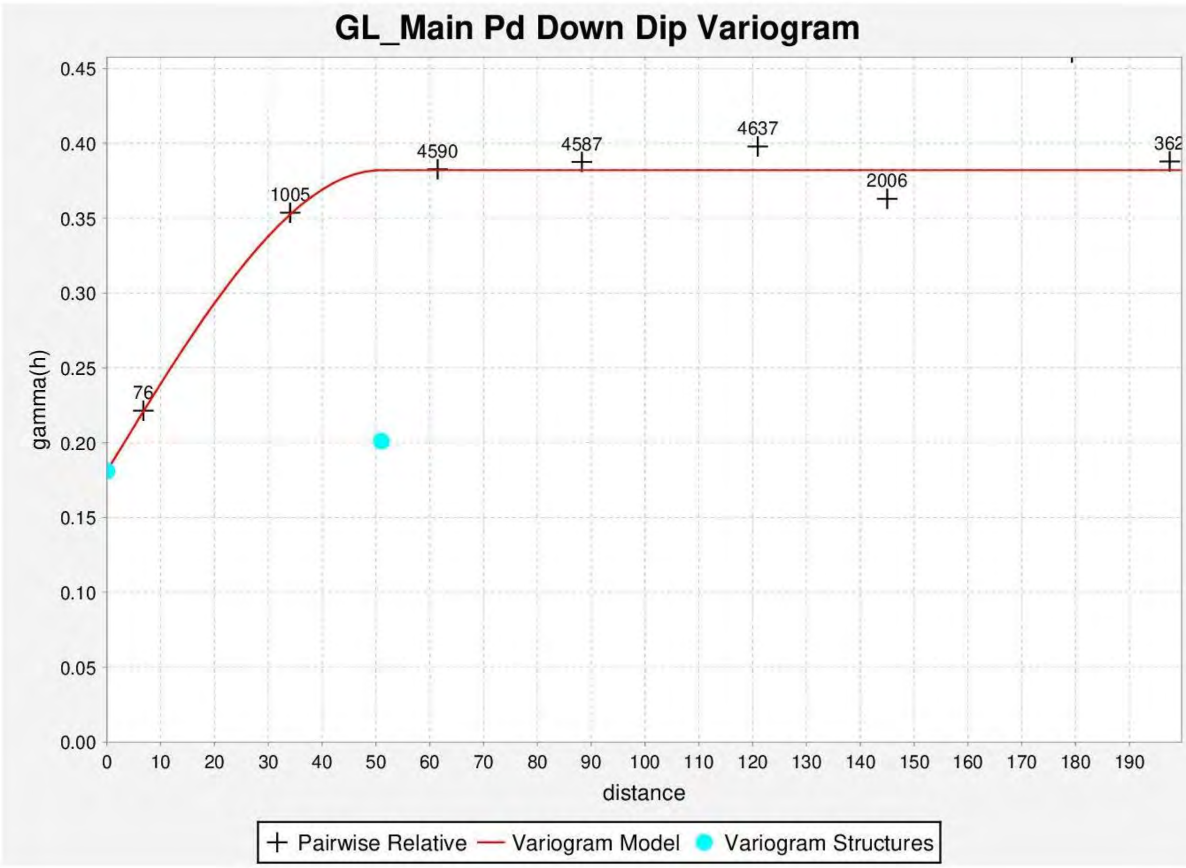
Variograms

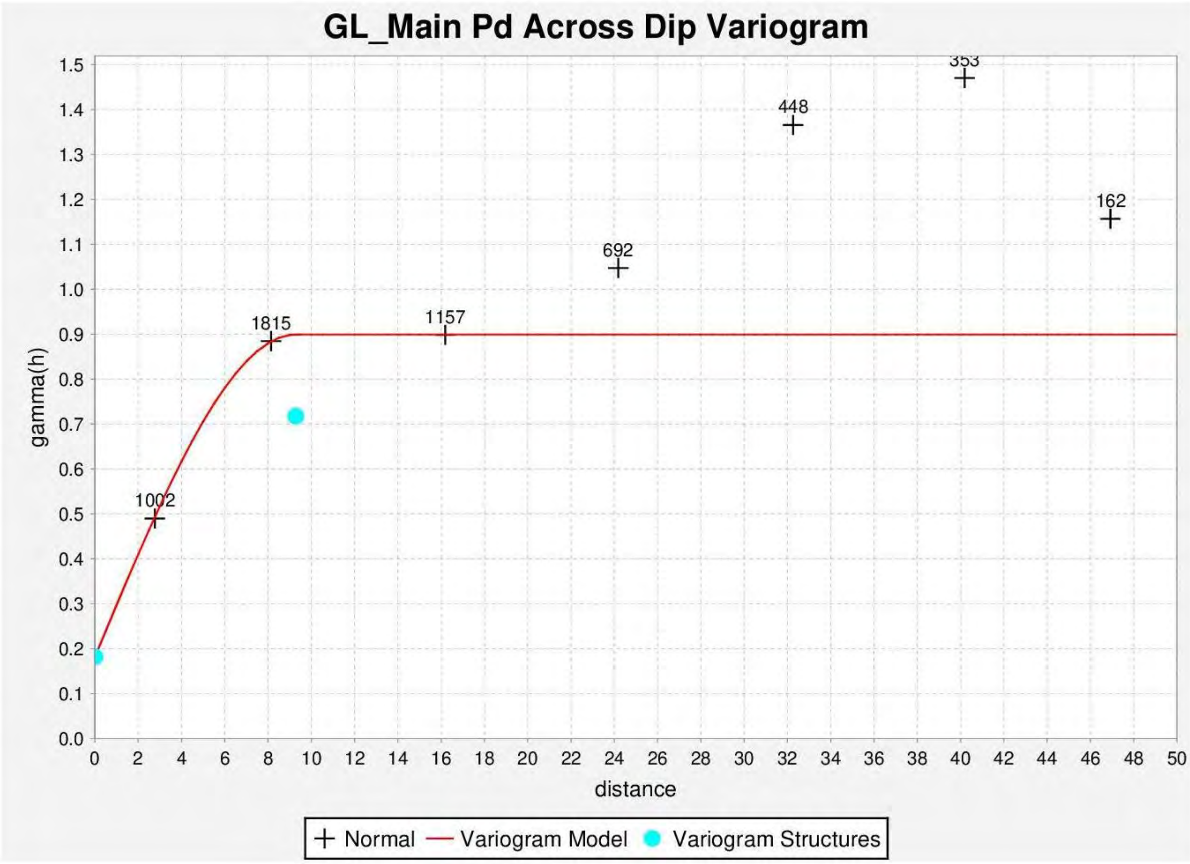

GL_Main Cu Along Strike Variogram
gamma(h)
distance
1800
4172
3278
2561
638
5019
2390
2351
383
Normal
Variogram Model
Variogram Structures


GL_Main Cu Down Dip Variogram
gamma(h)
distance
3345
2584
3804
3622
1690
1728
1846
1189
432
61
Normal
Variogram Model
Variogram Structures


GL_Main Cu Across Dip Variogram
gamma(h)
distance
358
344
682
626
1236
1064
611
Normal
Variogram Model
Variogram Structures

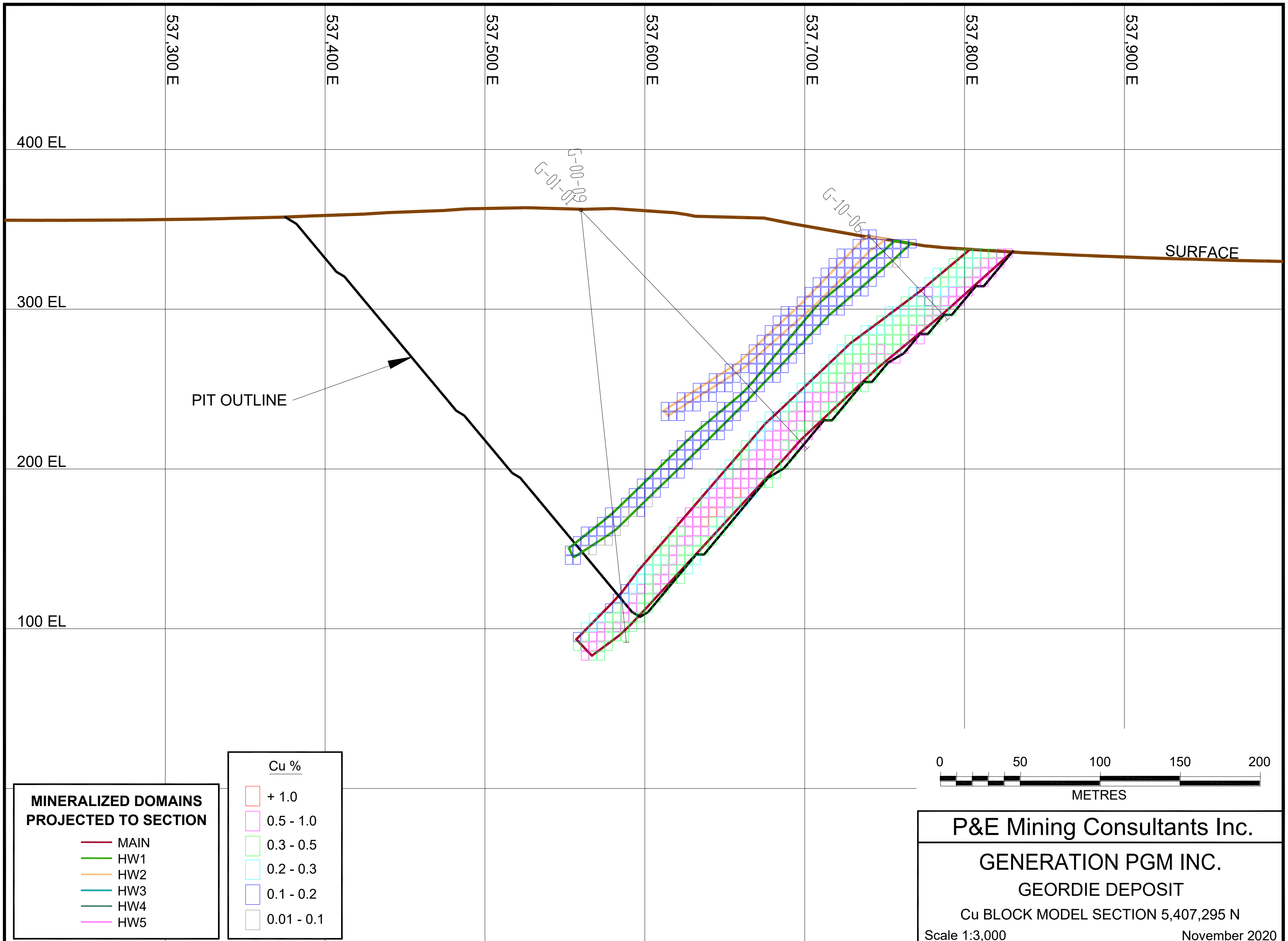

GL_Main Pd Along Strike Variogram
gamma(h)
distance
689
3894
6347
4734
3108
2886
Pairwise Relative
Variogram Model
Variogram Structures

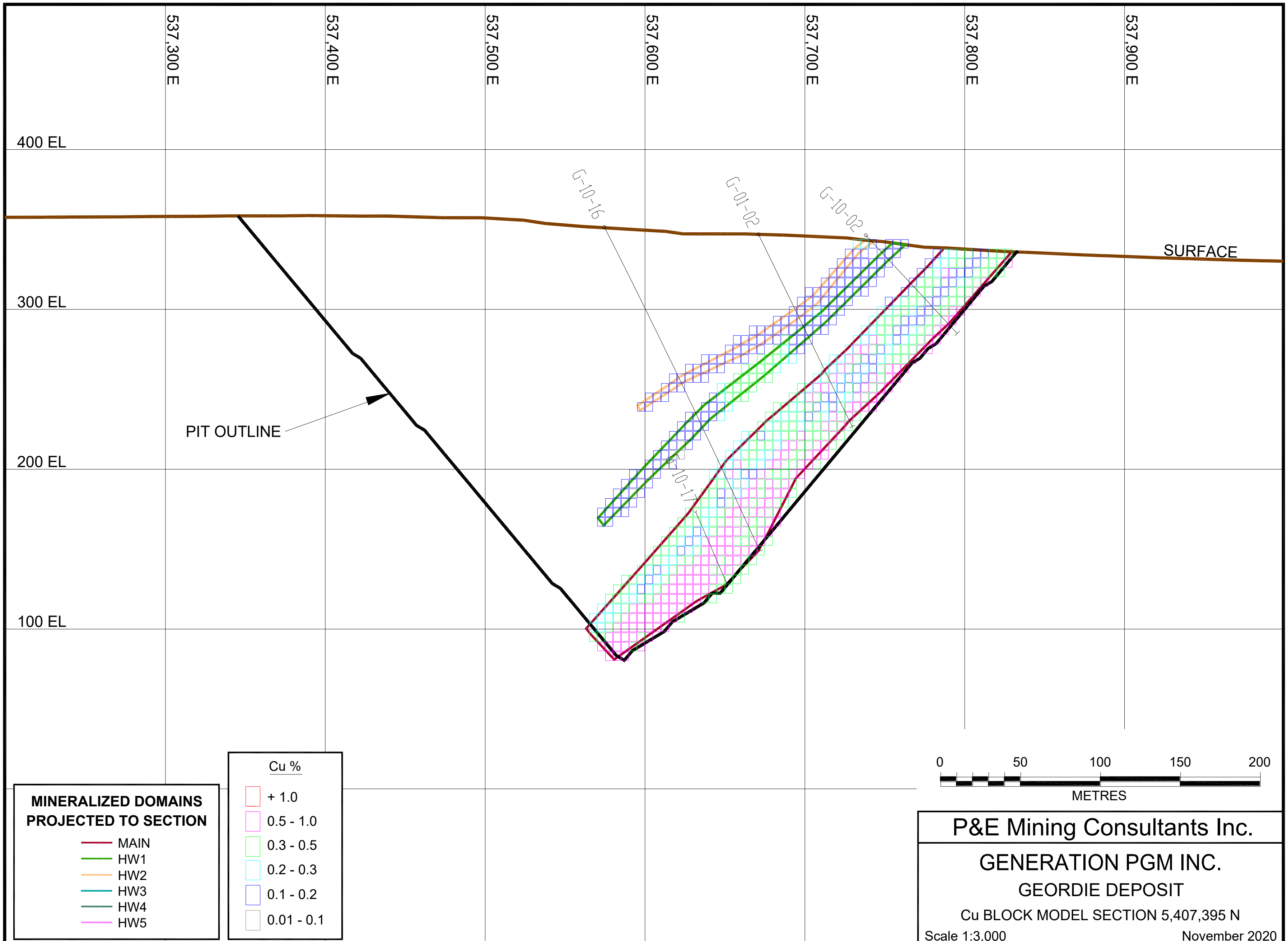

GL_Main Pd Down Dip Variogram
gamma(h)
distance
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
76
1005
4590
4587
4637
2006
362
Pairwise Relative
Variogram Model
Variogram Structures

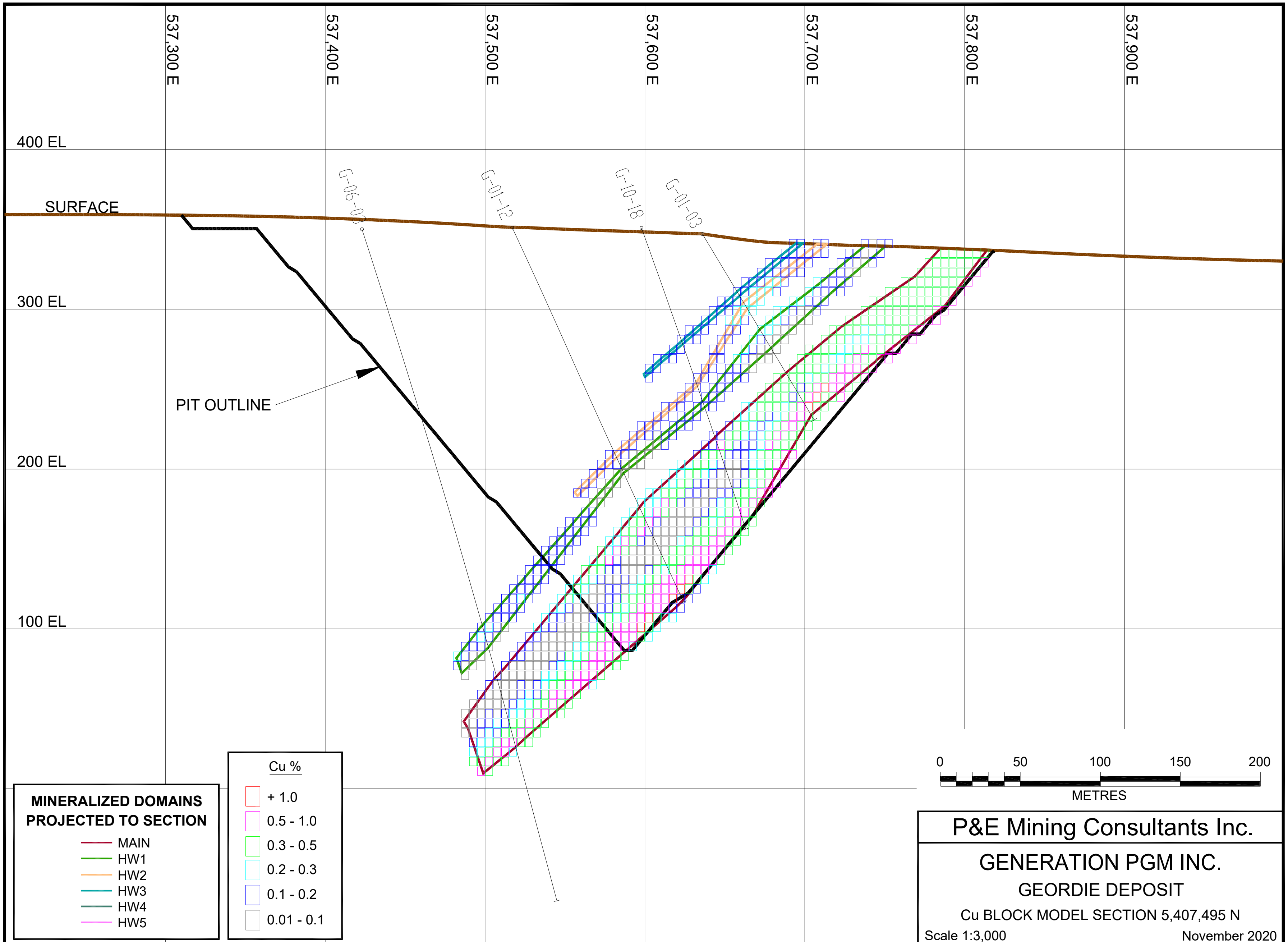

GL_Main Pd Across Dip Variogram
gamma(h)
distance
1002
1815
1157
692
448
353
162
Normal
Variogram Model
Variogram Structures

Geordie Deposit

Cu Block Model Cross Sections and Plans


537,300 E
537,400 E
537,500 E
537,600 E
537,700 E
537,800 E
537,900 E
400 EL
300 EL
200 EL
100 EL
G-00-09
G-01-07
G-10-06
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Cu BLOCK MODEL SECTION 5,407,295 N
Scale 1:3,000
November 2020


537,300 E
537,400 E
537,500 E
537,600 E
537,700 E
537,800 E
537,900 E
400 EL
300 EL
200 EL
100 EL
G-10-16
G-01-02
G-10-02
G-10-17
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Cu BLOCK MODEL SECTION 5,407,395 N
Scale 1:3,000
November 2020


537,300 E
537,400 E
537,500 E
537,600 E
537,700 E
537,800 E
537,900 E
400 EL
300 EL
200 EL
100 EL
SURFACE
PIT OUTLINE
G-06-03
G-01-12
G-10-18
G-01-03
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
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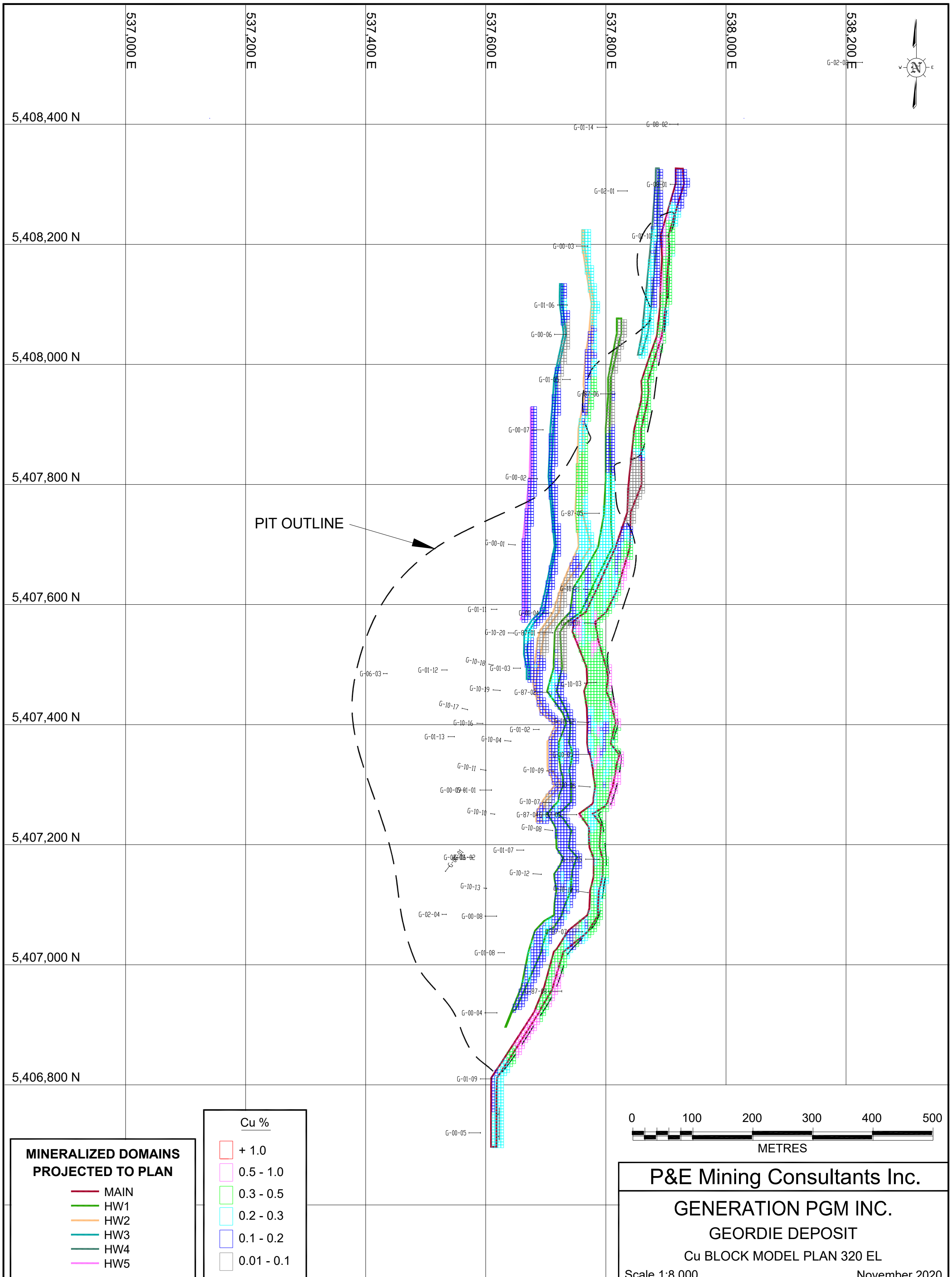
GENERATION PGM INC.
GEORDIE DEPOSIT
Cu BLOCK MODEL SECTION 5,407,495 N
Scale 1:3,000
November 2020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PIT OUTLINE
MINERALIZED DOMAINS
PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
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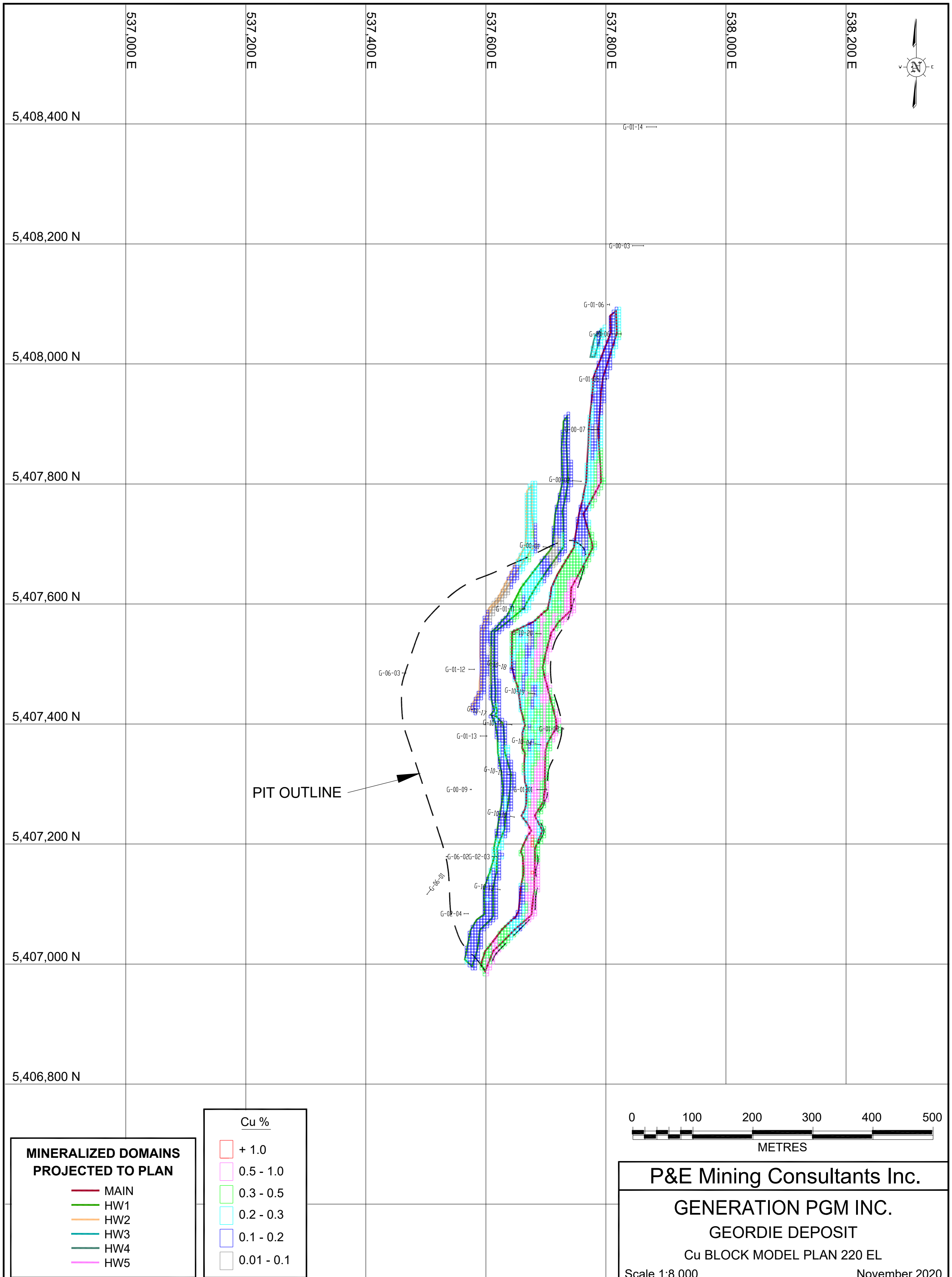
GEORDIE DEPOSIT
Cu BLOCK MODEL PLAN 320 EL
Scale 1:8,000
November 2020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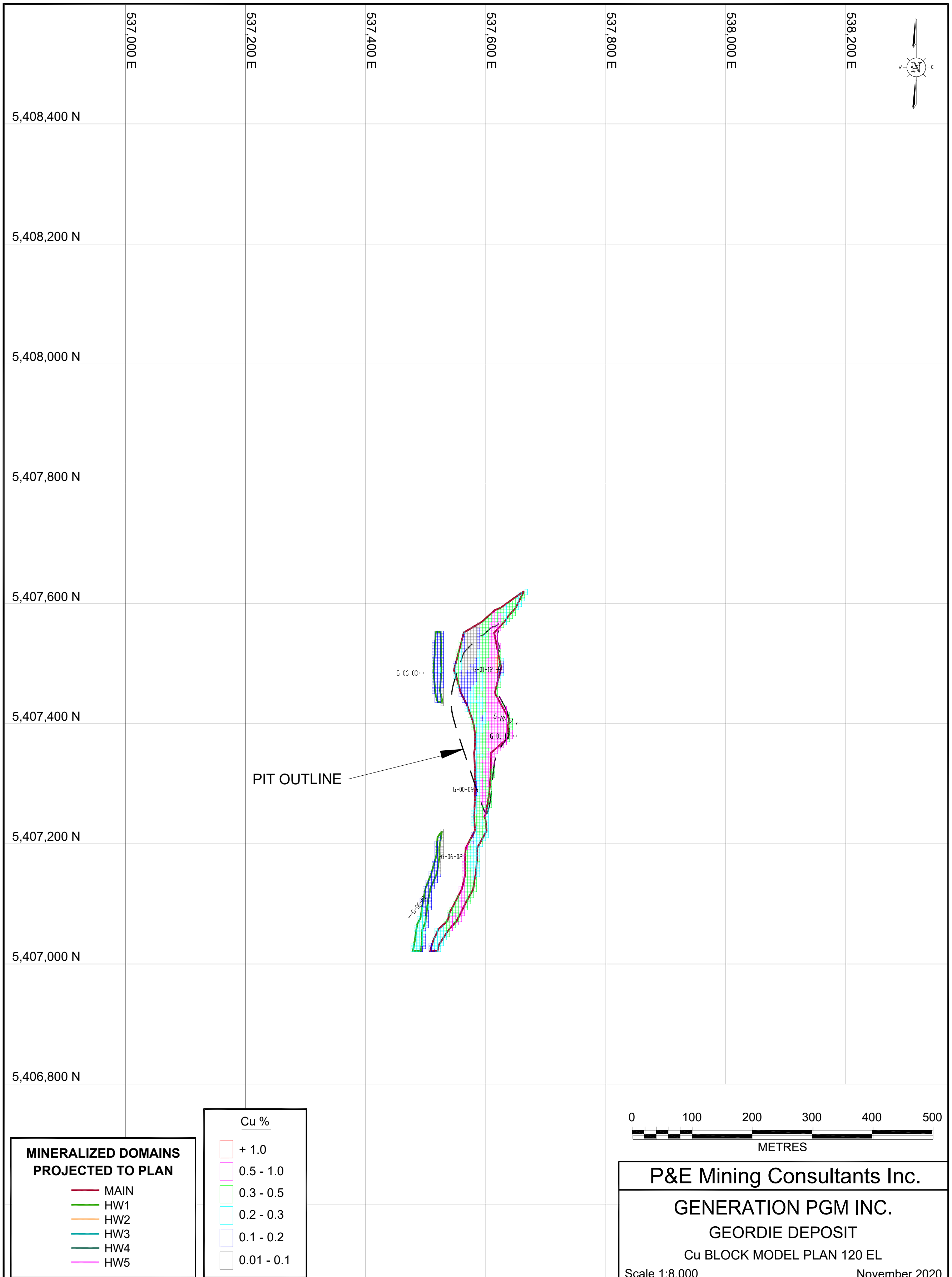
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Cu BLOCK MODEL PLAN 220 EL
Scale 1:8,000
November 2020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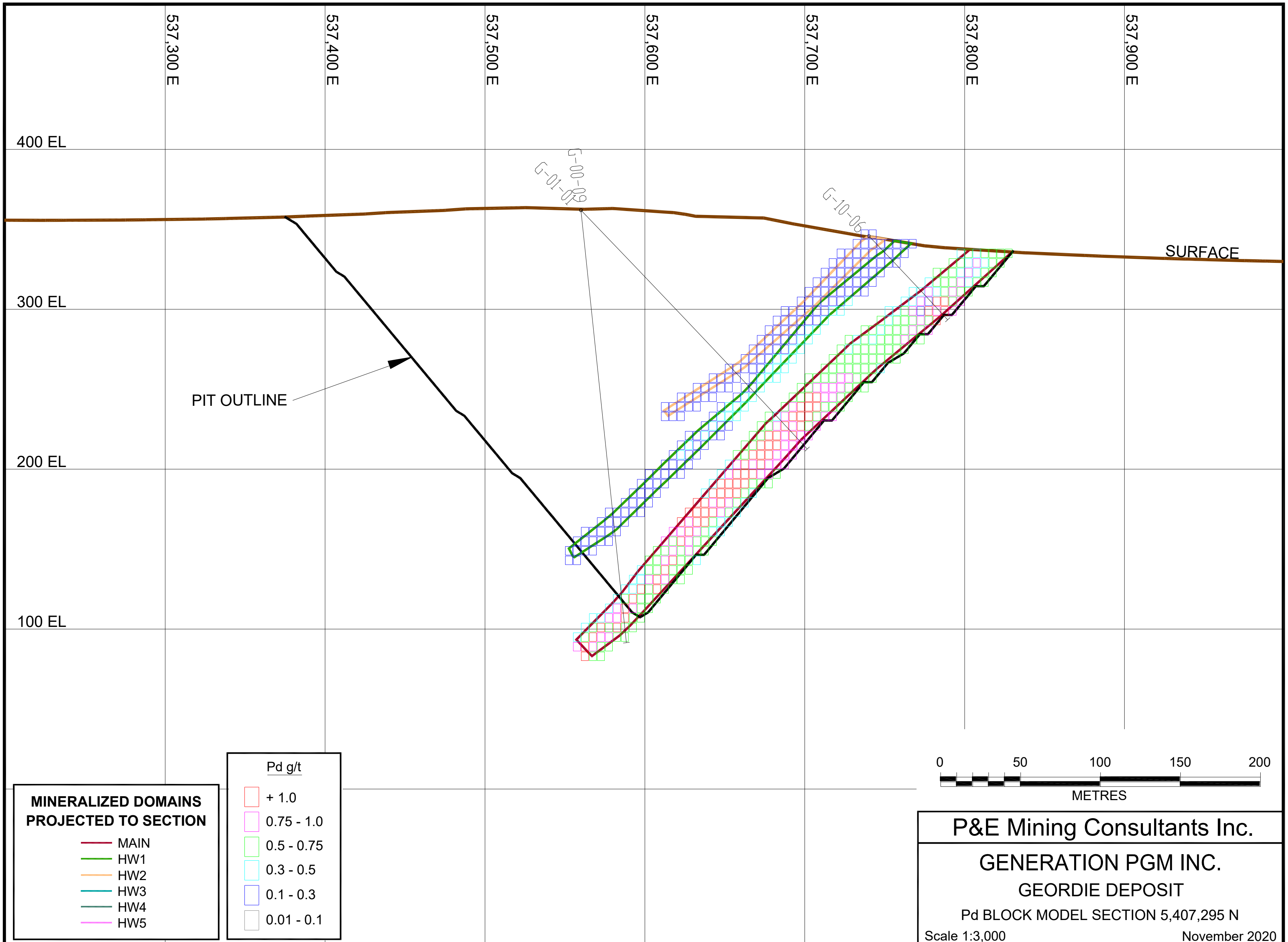
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Cu BLOCK MODEL PLAN 120 EL
Scale 1:8,000
November 2020

Geordie Deposit

Pd Block Model Cross Sections and Plans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100 EL
G-00-09
G-01-07
G-10-06
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
METRES
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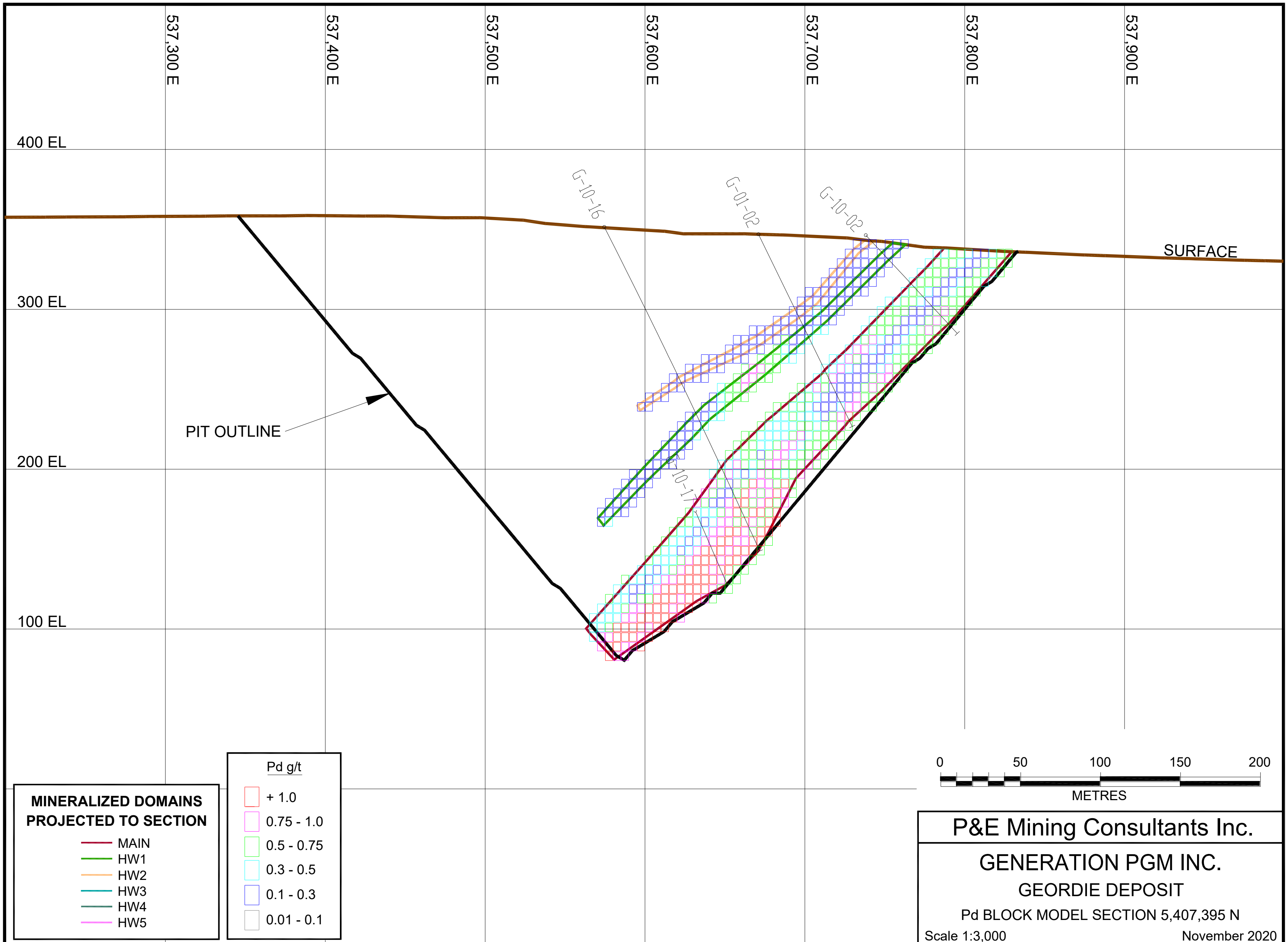
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL SECTION 5,407,295 N
Scale 1:3,000
November 2020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G-10-16
G-01-02
G-10-02
G-10-17
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
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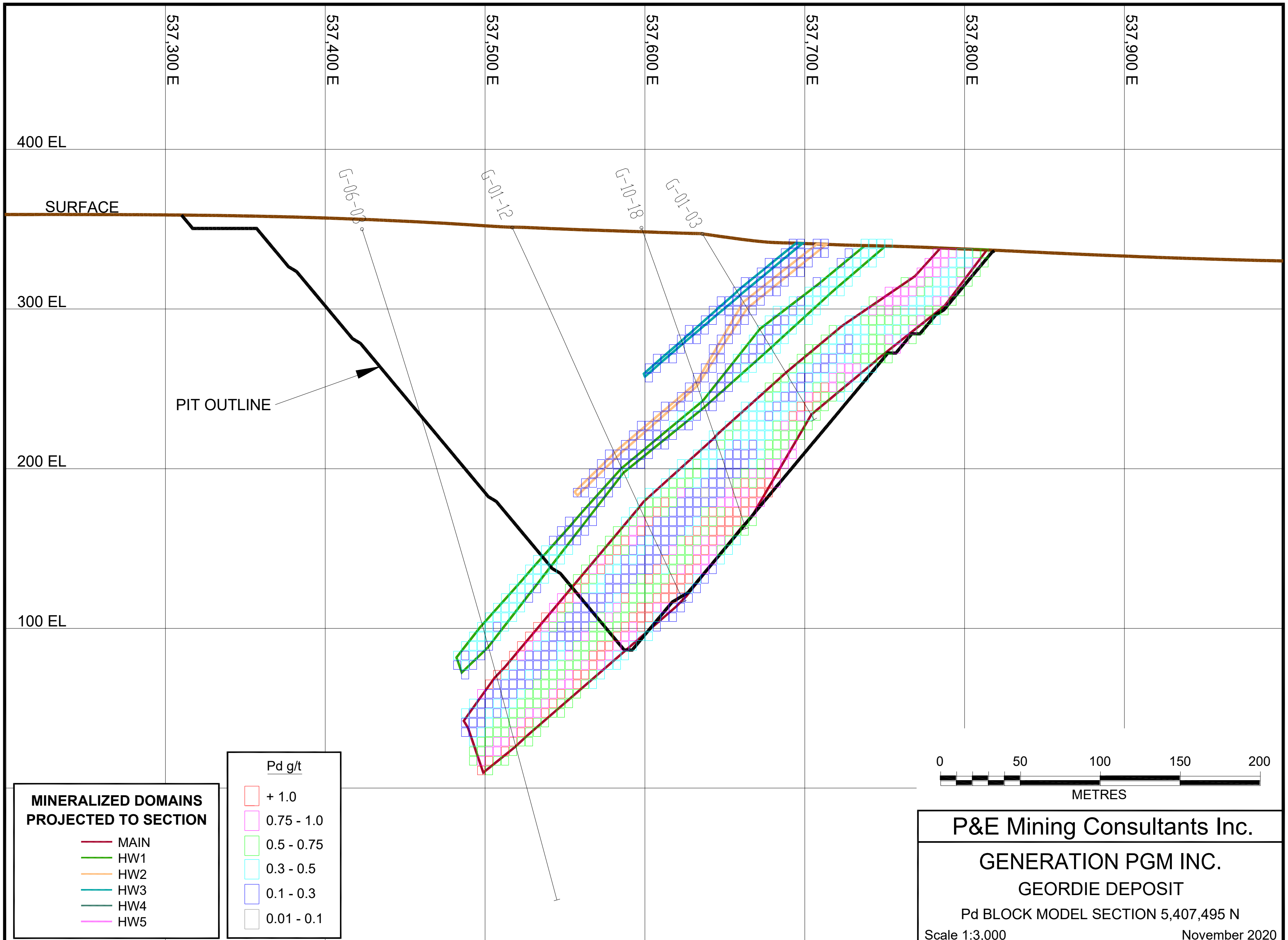
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL SECTION 5,407,395 N
Scale 1:3,000
November 2020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SURFACE
PIT OUTLINE
G-06-03
G-01-12
G-10-18
G-01-03
MINERALIZED DOMAINS
PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
METRES
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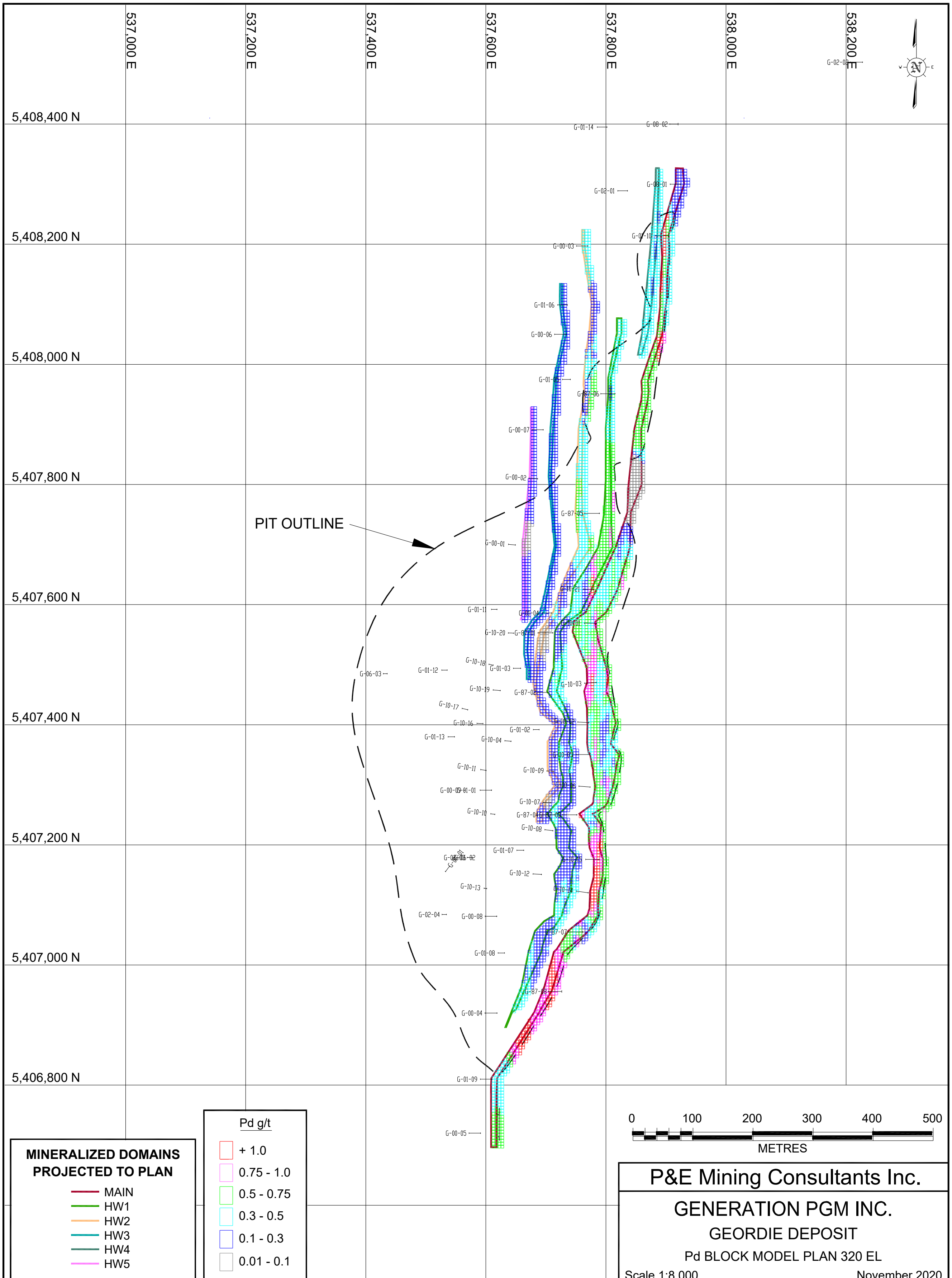
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL SECTION 5,407,495 N
Scale 1:3,000
November 2020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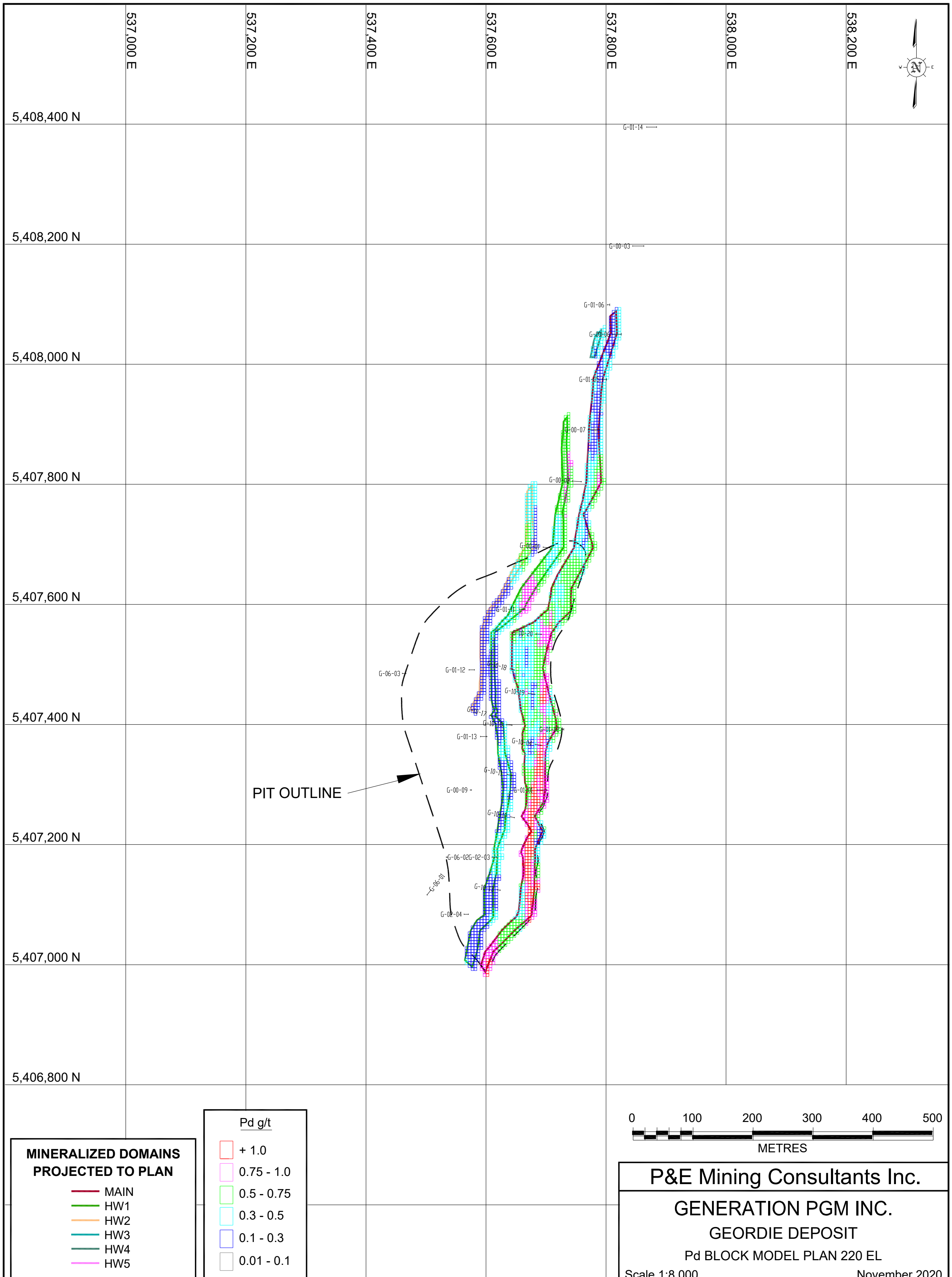
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL PLAN 320 EL
Scale 1:8,000
November 2020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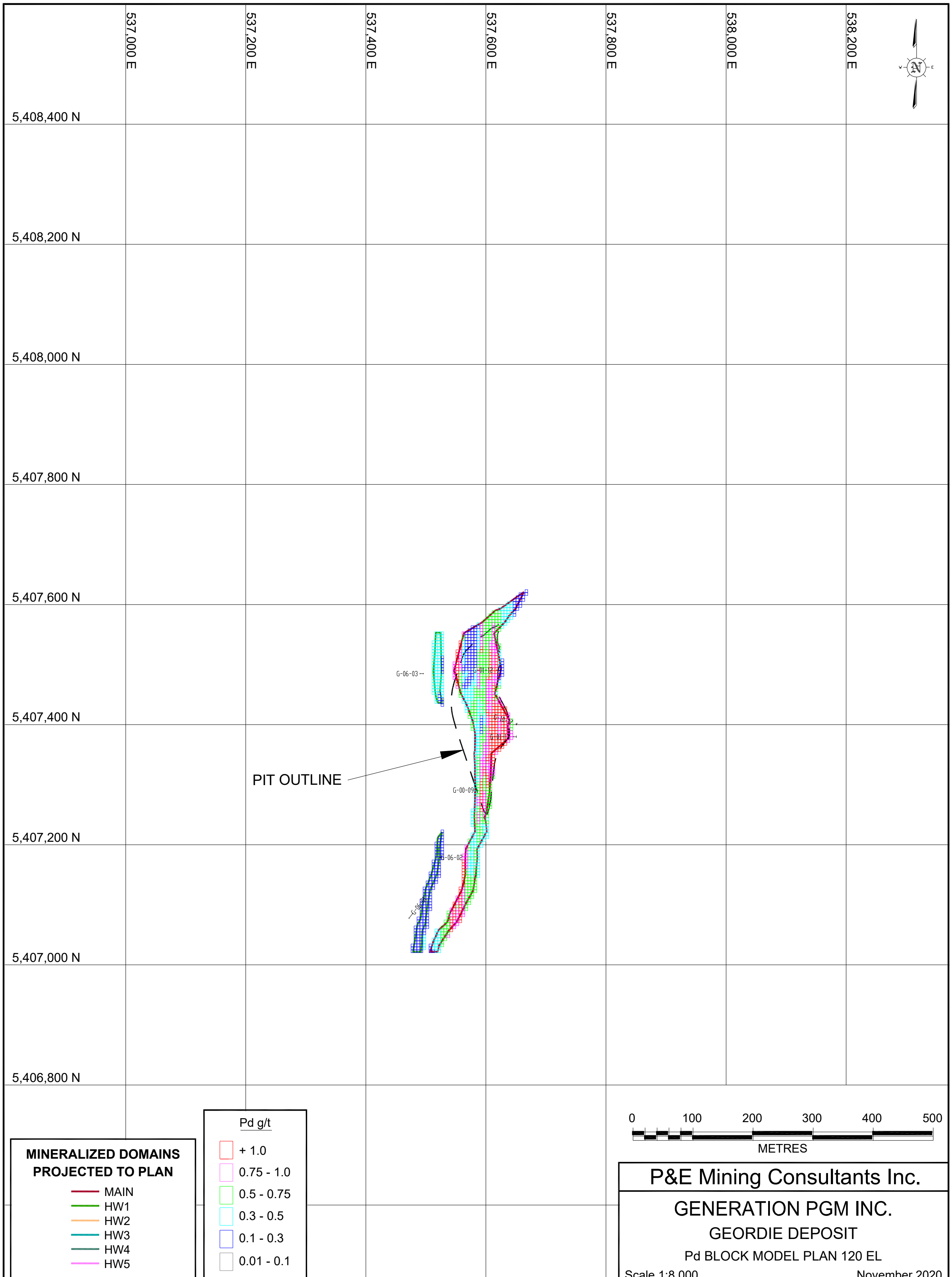
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL PLAN 220 EL
Scale 1:8,000
November 2020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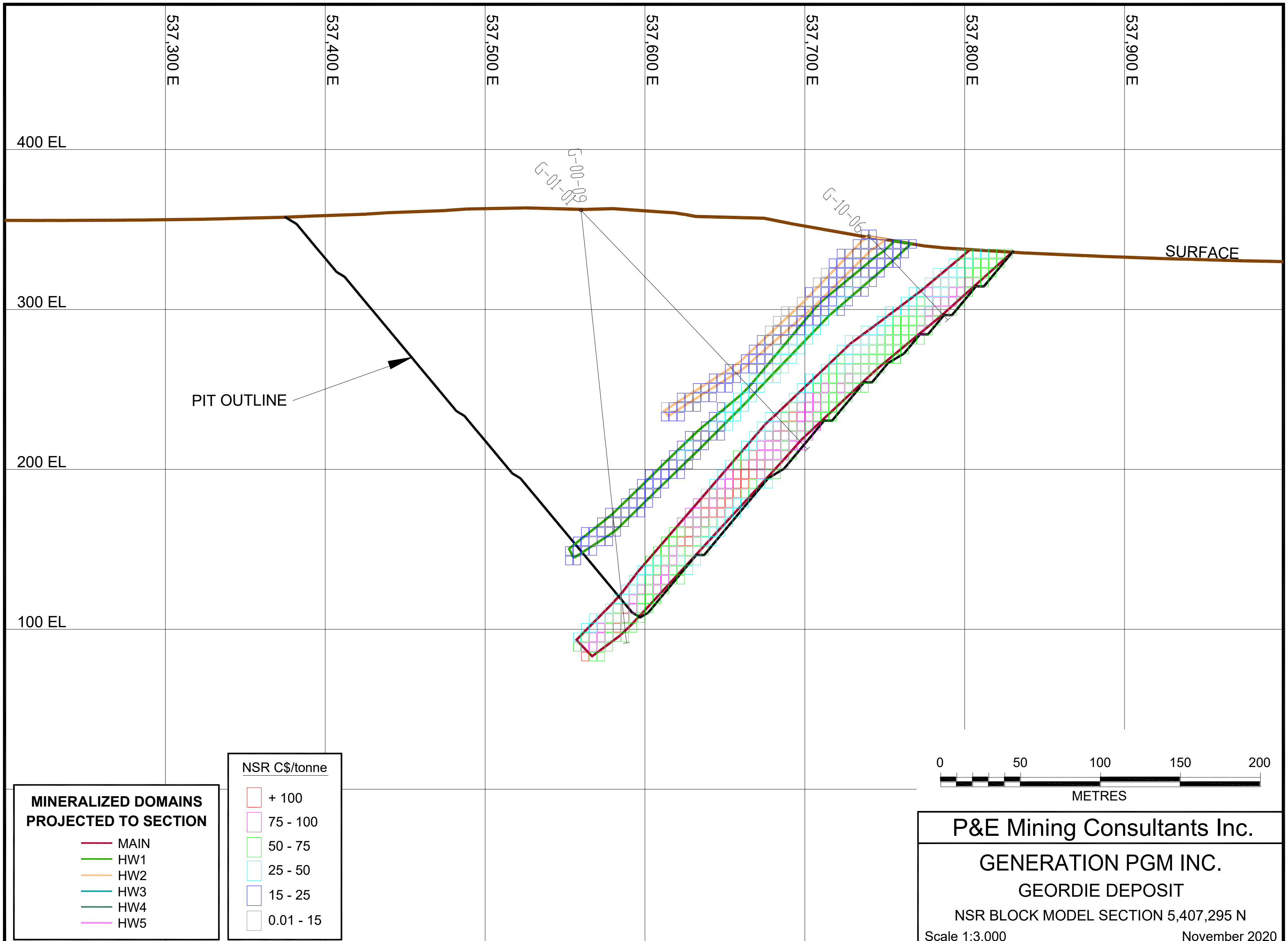
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
Pd BLOCK MODEL PLAN 120 EL
Scale 1:8,000
November 2020

Geordie Deposit

NSR Block Model Cross Sections and Plans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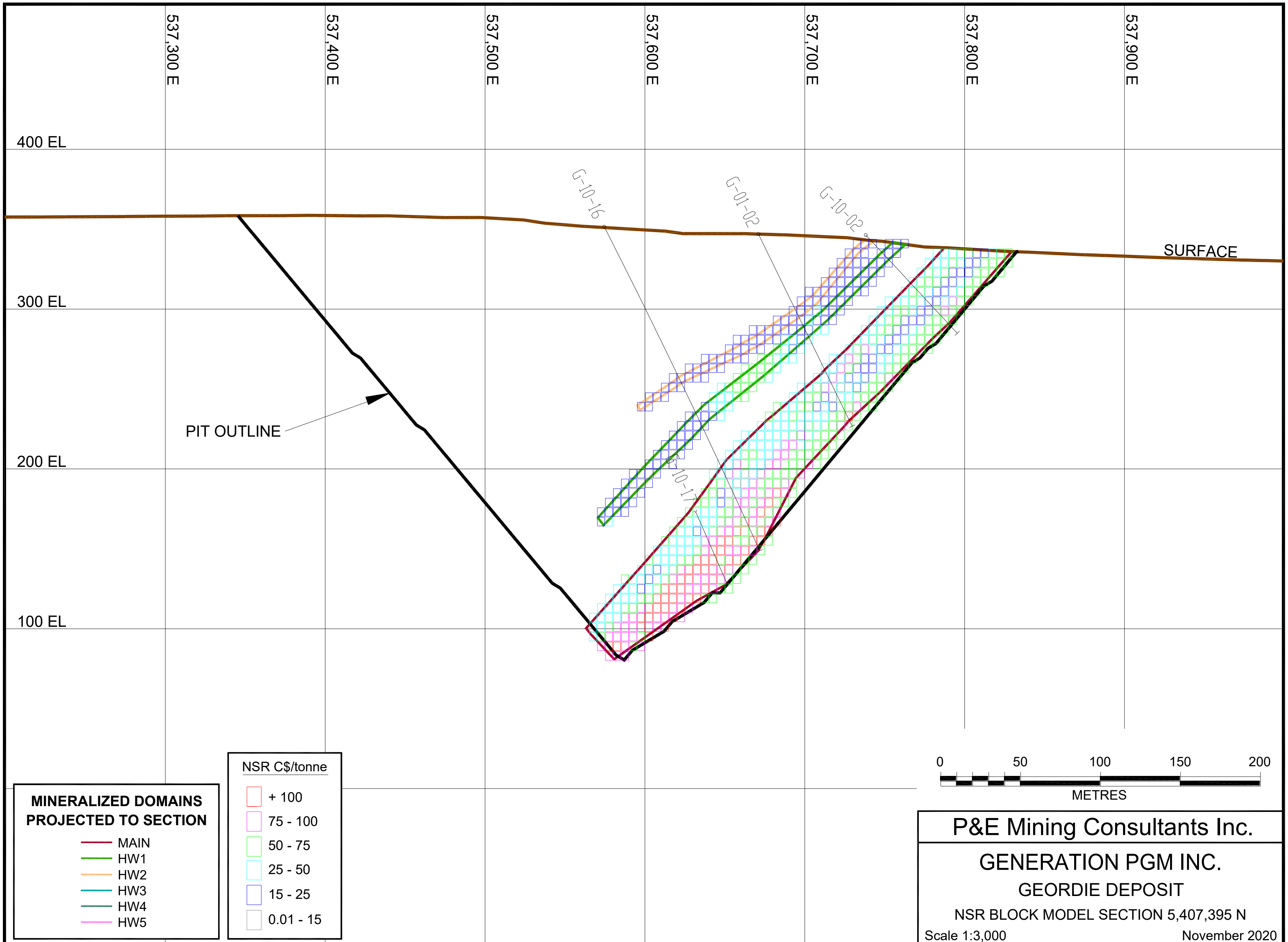
300 EL
200 EL
100 EL
G-00-09
G-01-01
G-10-06
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL SECTION 5,407,295 N
Scale 1:3,000
November 2020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300 EL
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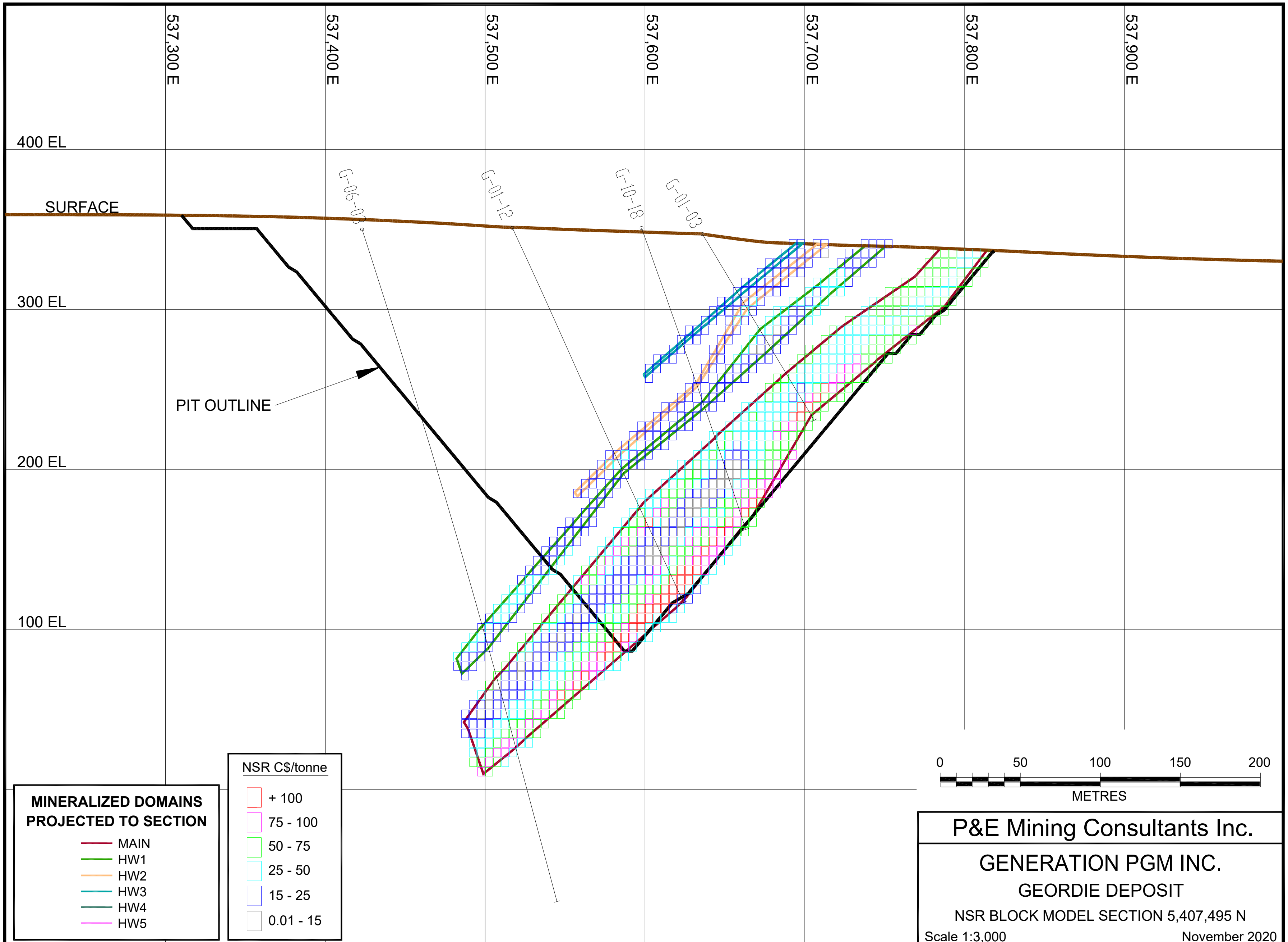
100 EL
G-10-16
G-01-02
G-10-02
G-10-17
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL SECTION 5,407,395 N
Scale 1:3,000
November 2020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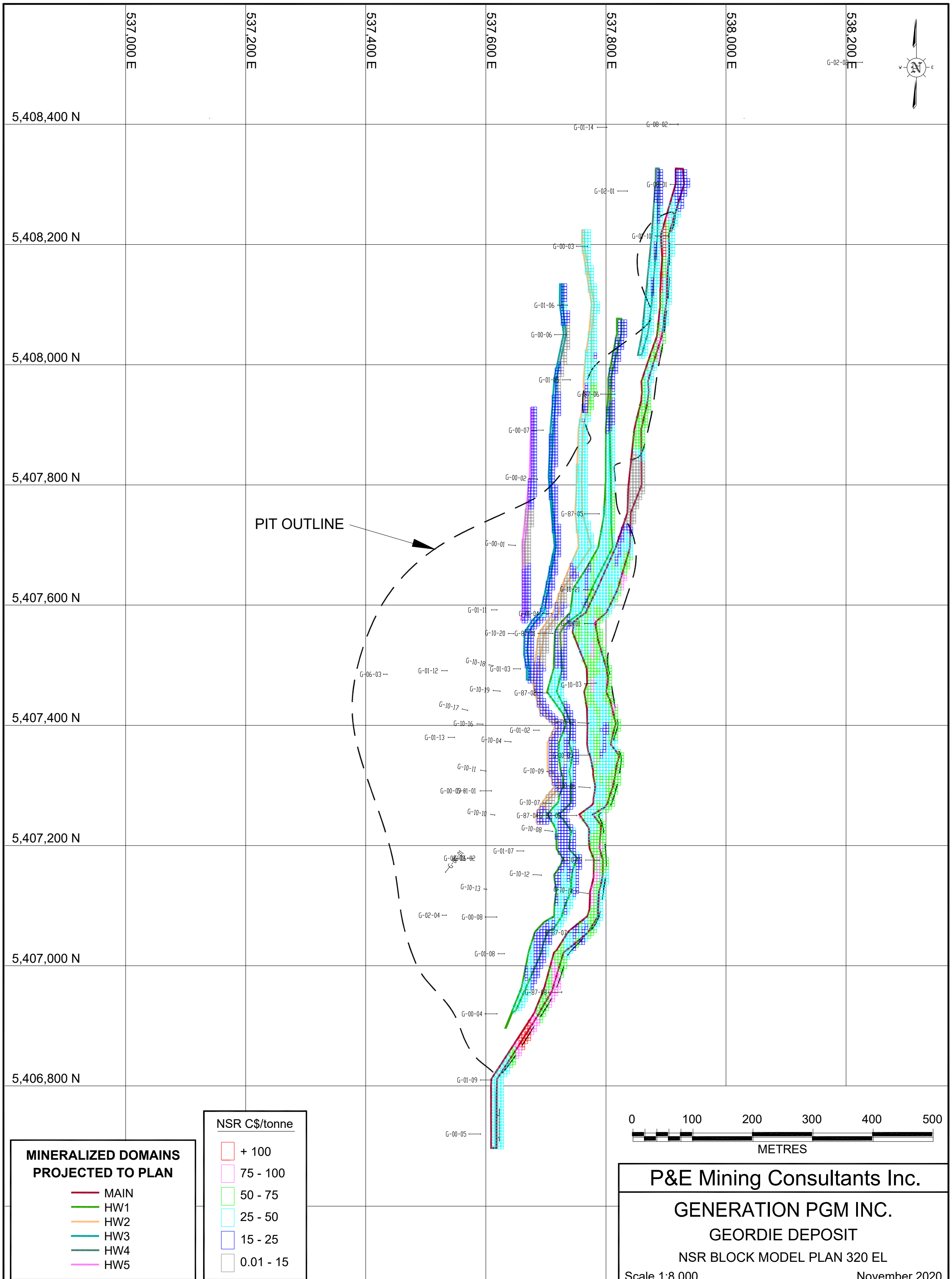
300 EL
200 EL
100 EL
SURFACE
G-06-03
G-01-12
G-10-18
G-01-03
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL SECTION 5,407,495 N
Scale 1:3,000
November 2020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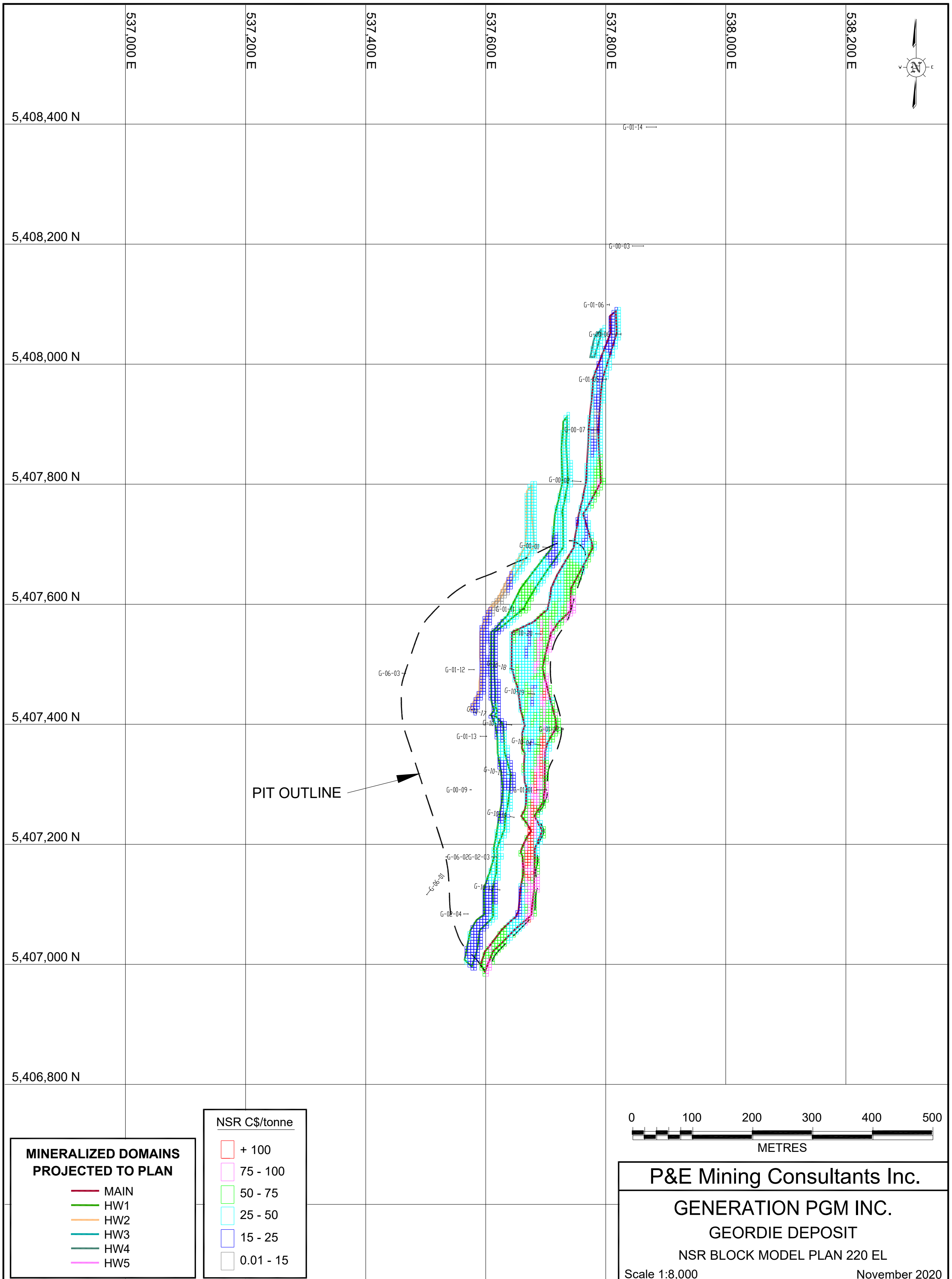
5,407,800 N
5,407,600 N
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL PLAN 320 EL
Scale 1:8,000
November 2020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5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
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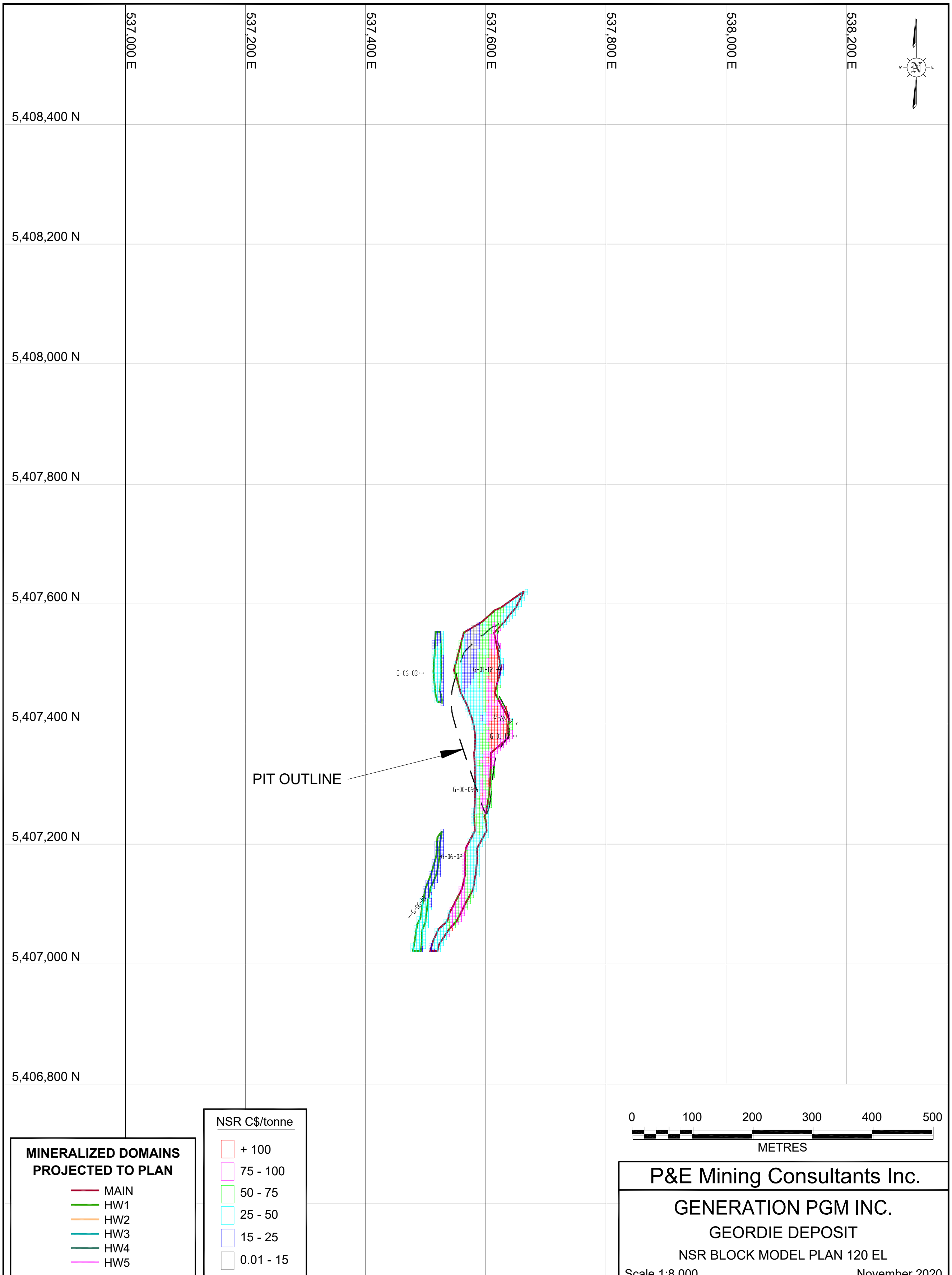
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL PLAN 220 EL
Scale 1:8,000
November 2020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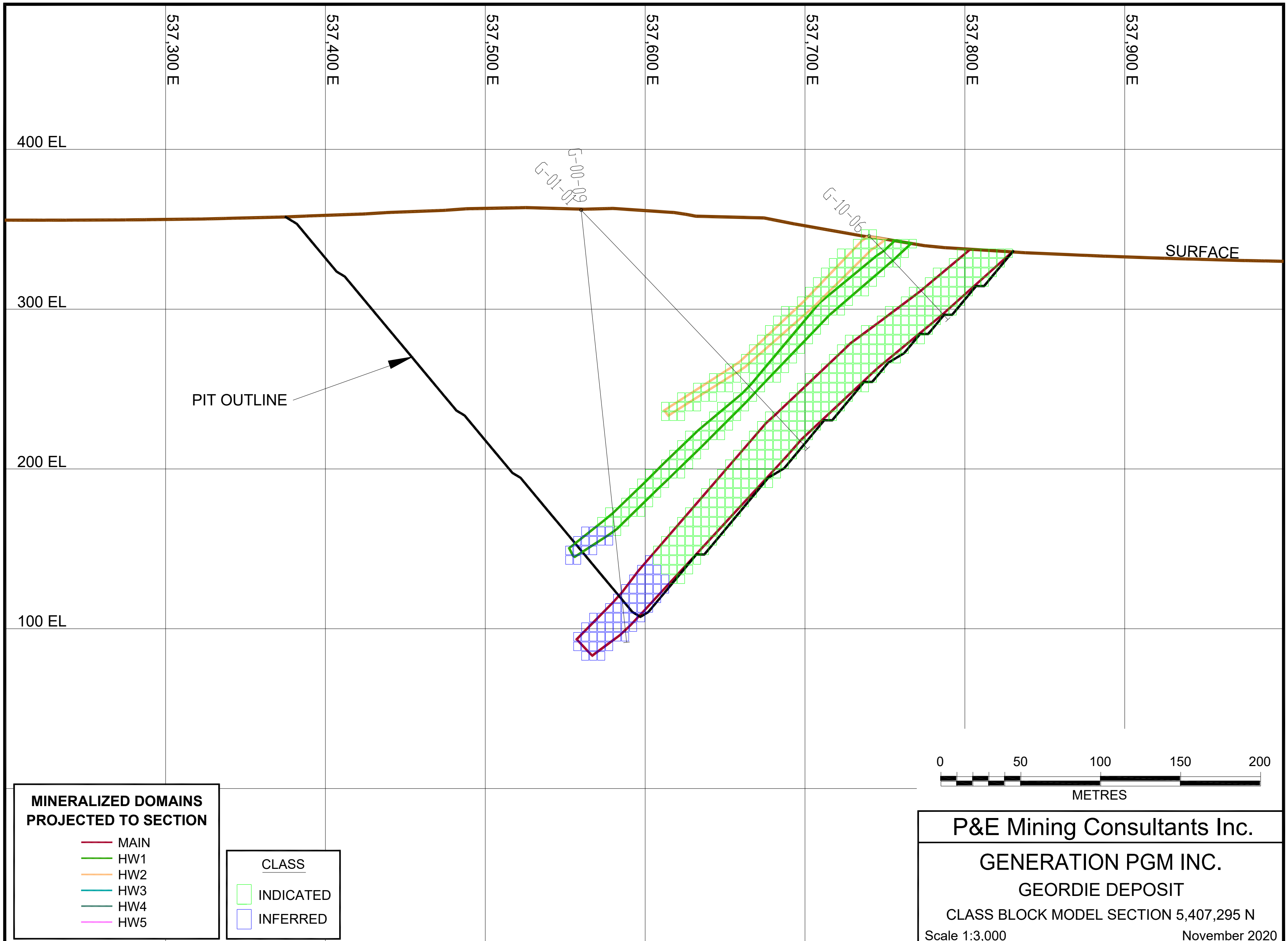
5,408,000 N
5,407,800 N
5,407,600 N
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
NSR BLOCK MODEL PLAN 120 EL
Scale 1:8,000
November 2020

Geordie Deposit

Classification Block Model Cross Sections And Plans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300 EL
200 EL
100 EL
G-00-09
G-01-01
G-10-06
SURFACE
PIT OUTLINE
0
50
100
150
200
METRES
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
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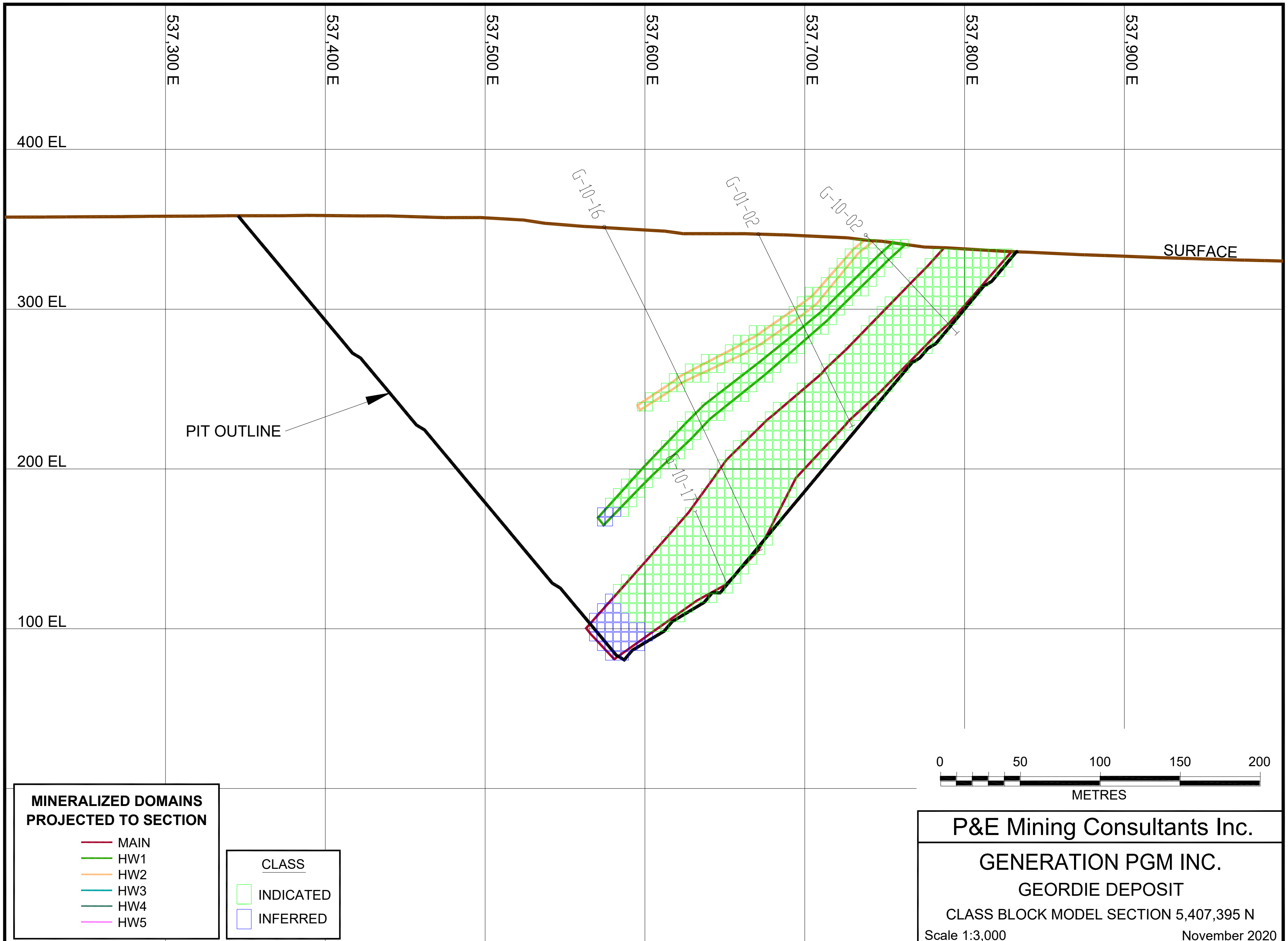
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL SECTION 5,407,295 N
Scale 1:3,000
November 2020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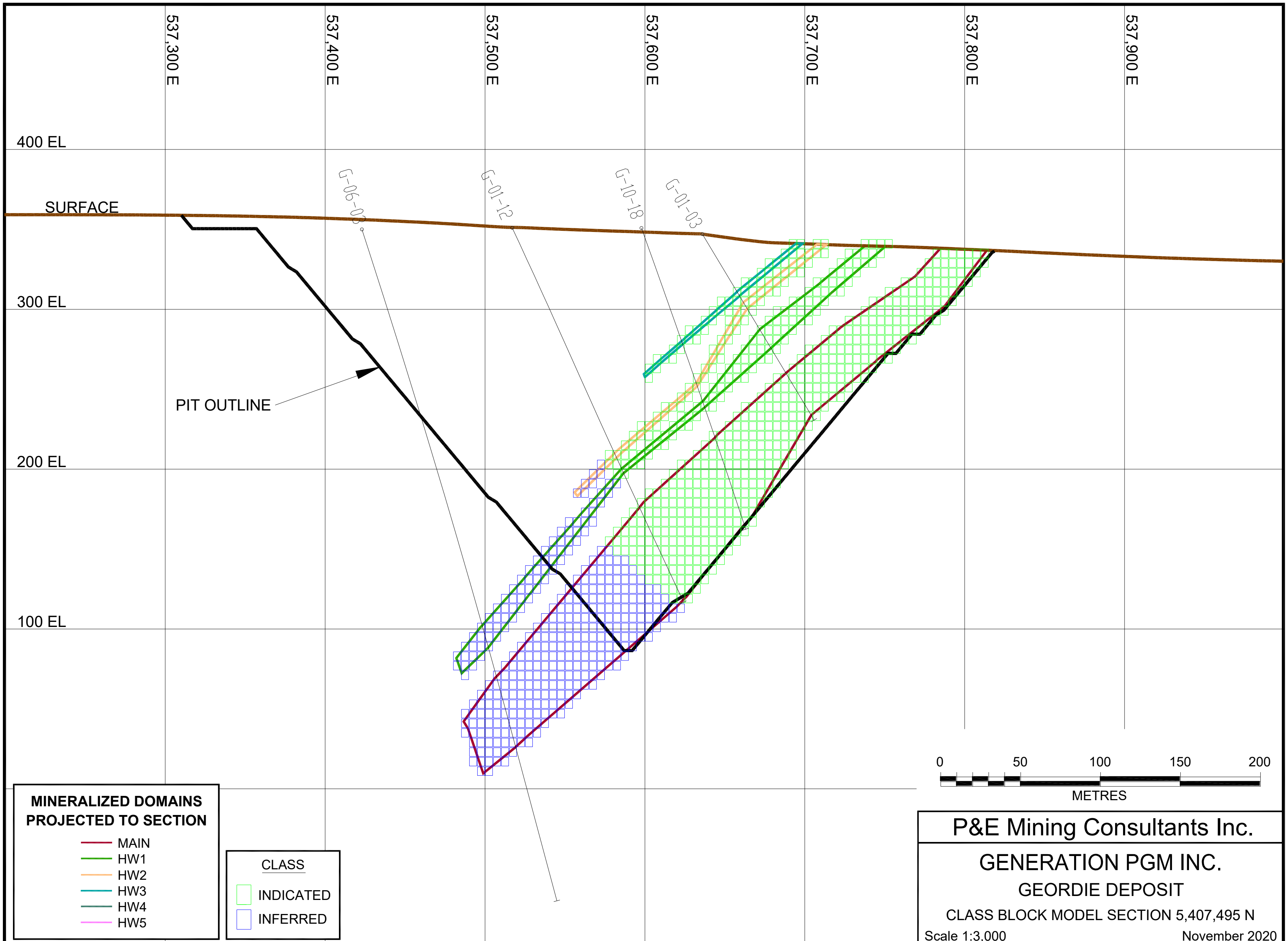
100 EL
G-10-16
G-01-02
G-10-02
G-10-17
SURFACE
PIT OUTLINE
0
50
100
150
200
METRES
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL SECTION 5,407,395 N
Scale 1:3,000
November 2020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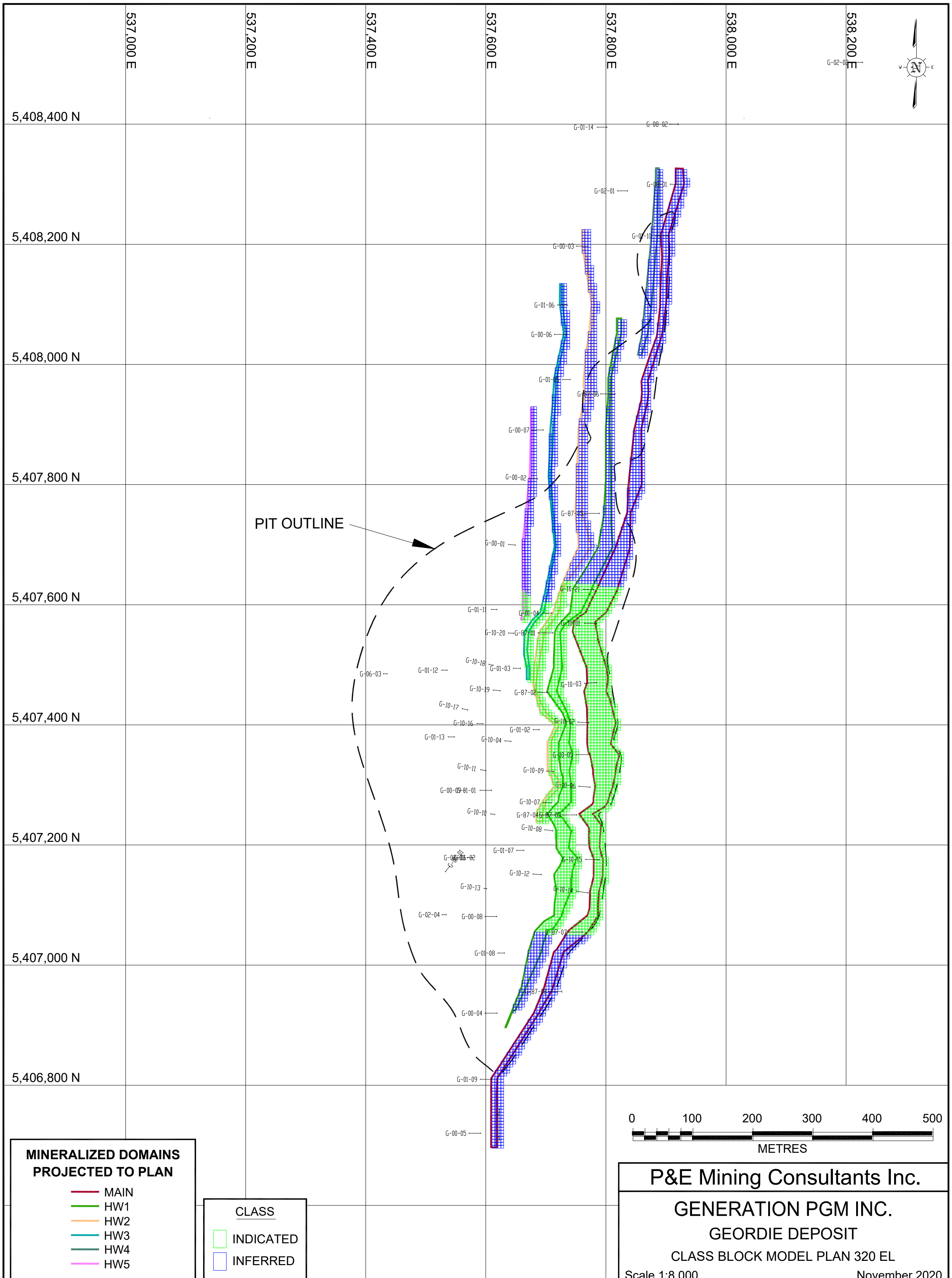
300 EL
200 EL
100 EL
SURFACE
PIT OUTLINE
G-06-03
G-01-12
G-10-18
G-01-03
0
50
100
150
200
METRES
MINERALIZED DOMAINS PROJECTED TO SECTION
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL SECTION 5,407,495 N
Scale 1:3,000
November 2020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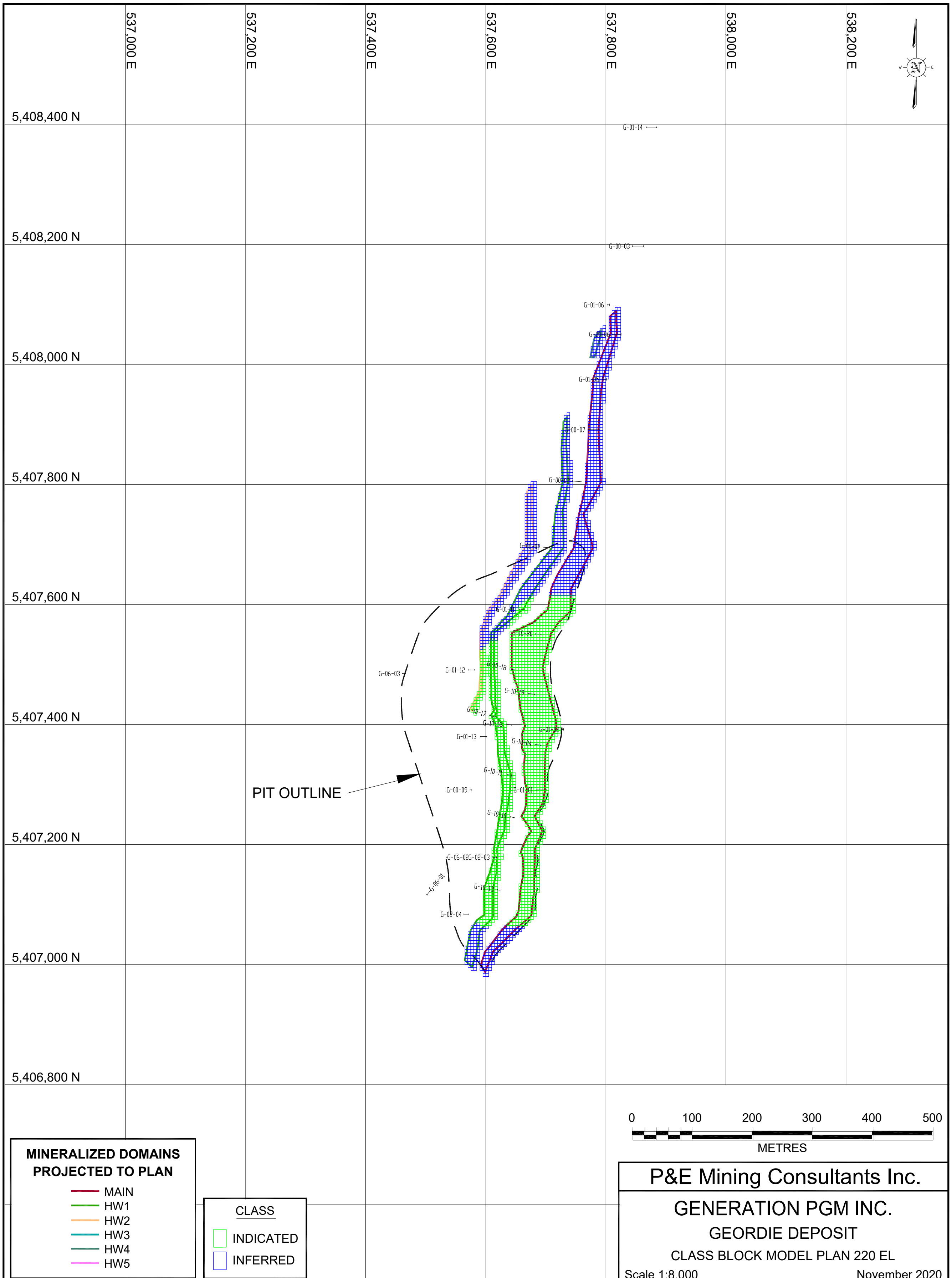
5,408,000 N
5,407,800 N
5,407,600 N
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
0 100 200 300 400 500
METRES
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL PLAN 320 EL
Scale 1:8,000
November 2020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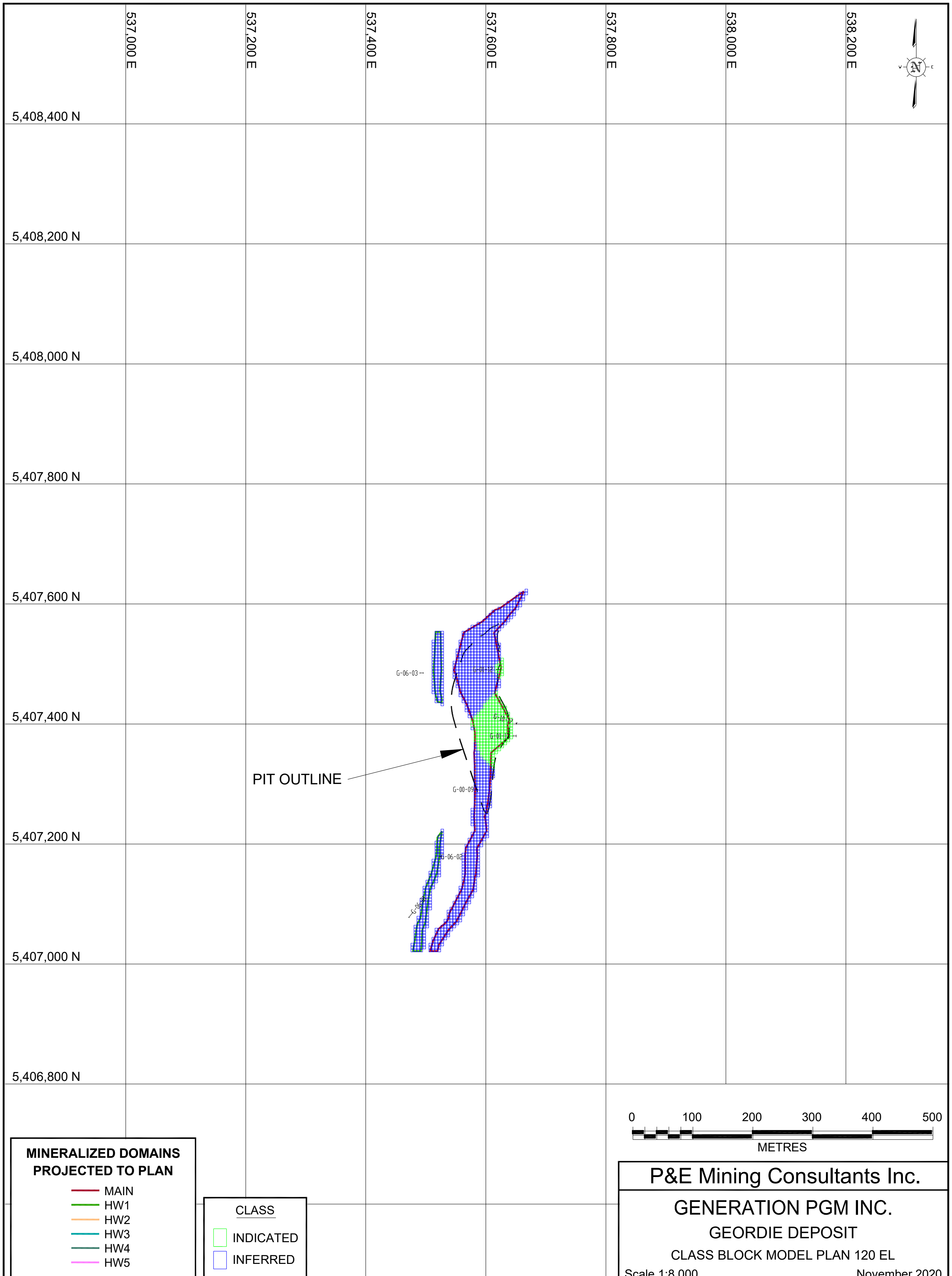
5,407,800 N
5,407,600 N
5,407,400 N
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
0 100 200 300 400 500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL PLAN 220 EL
Scale 1:8,000
November 2020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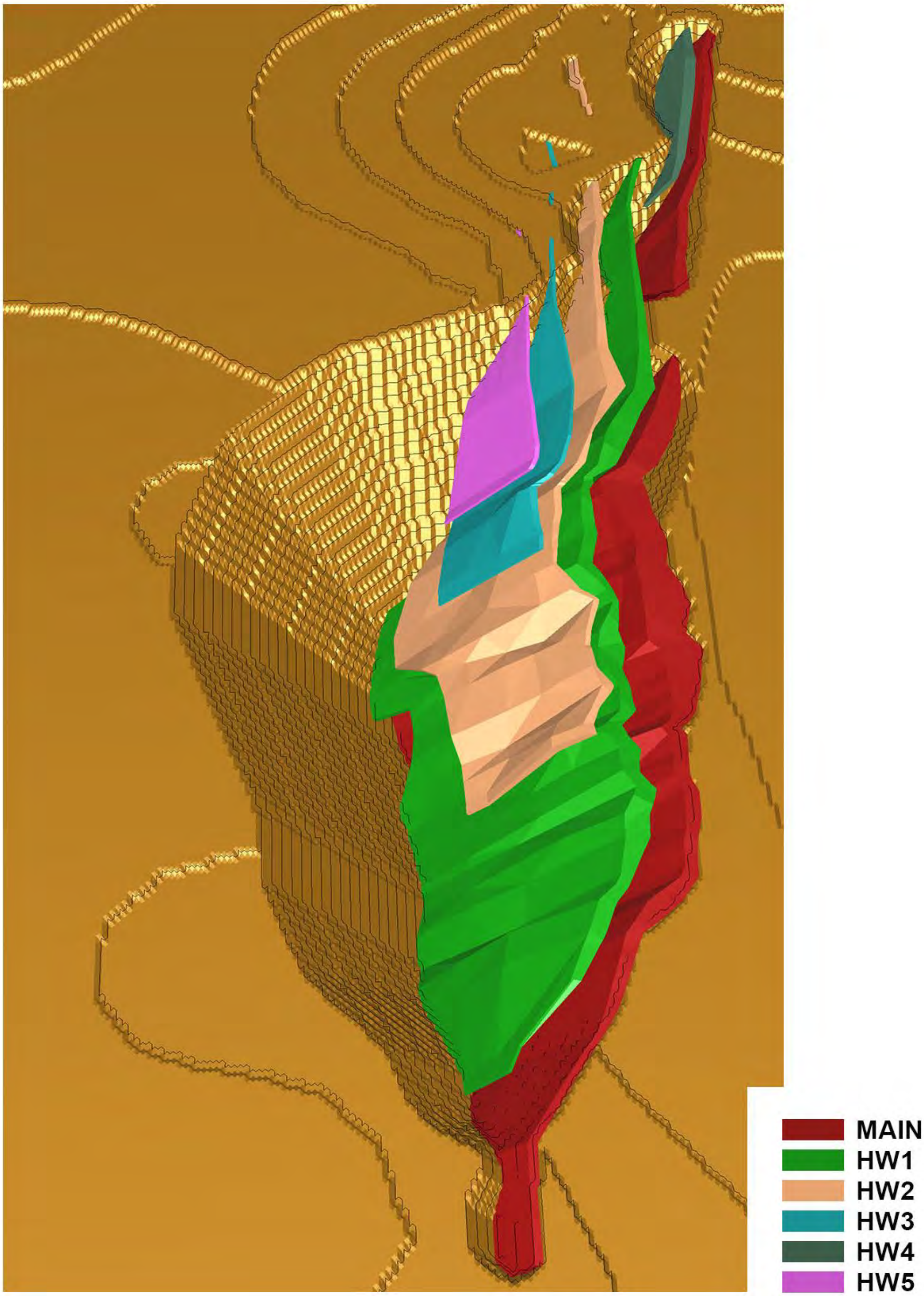
5,407,200 N
5,407,000 N
5,406,800 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
MAIN
HW1
HW2
HW3
HW4
HW5
CLASS
INDICATED
INFERRED
0
100
200
300
400
500
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
GEORDIE DEPOSIT
CLASS BLOCK MODEL PLAN 120 EL
Scale 1:8,000
November 2020

Geordie Deposit

Optimized Pit Shell

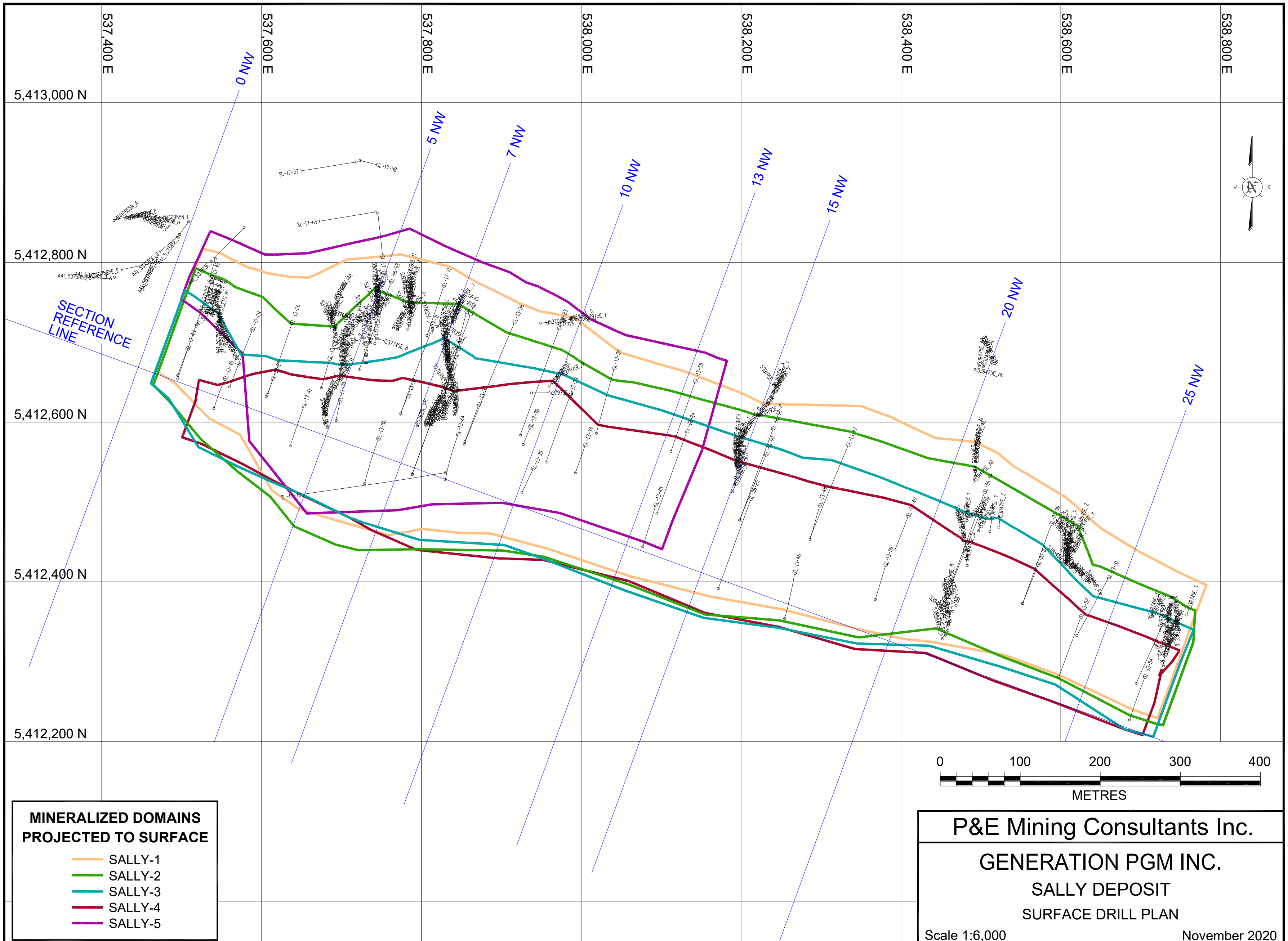
GEORDIE DEPOSIT OPTIMIZED PIT SHELL



SALLY DEPOSIT APPENDICES

Sally Deposit

Surface Drill Hole Plan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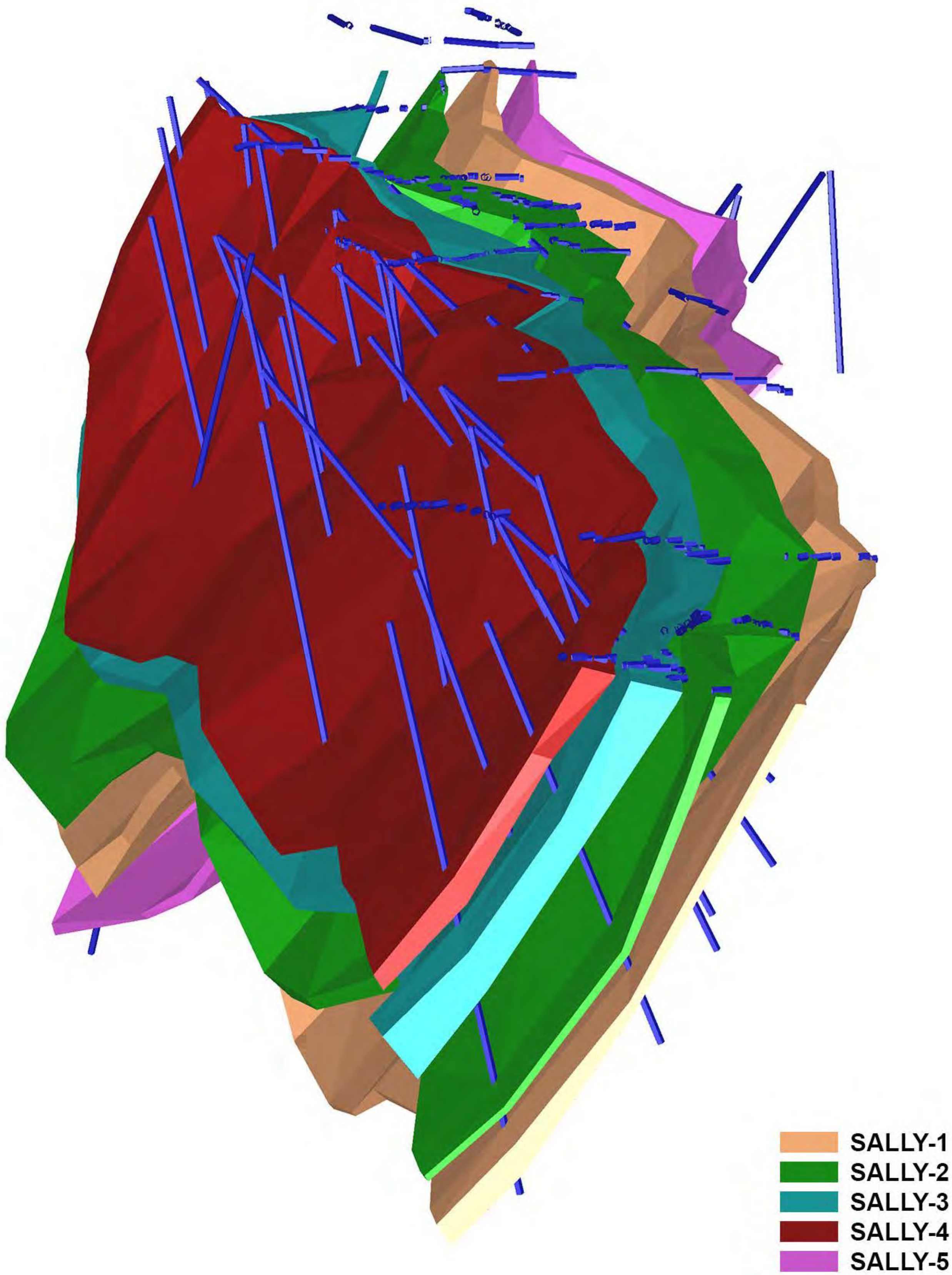
5,412,200 N
0 NW
5 NW
7 NW
10 NW
13 NW
15 NW
20 NW
25 NW
SECTION REFERENCE LINE
0
100
200
300
400
METRES
MINERALIZED DOMAINS PROJECTED TO SURFACE
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
SURFACE DRILL PLAN
Scale 1:6,000
November 2020

Sally Deposit

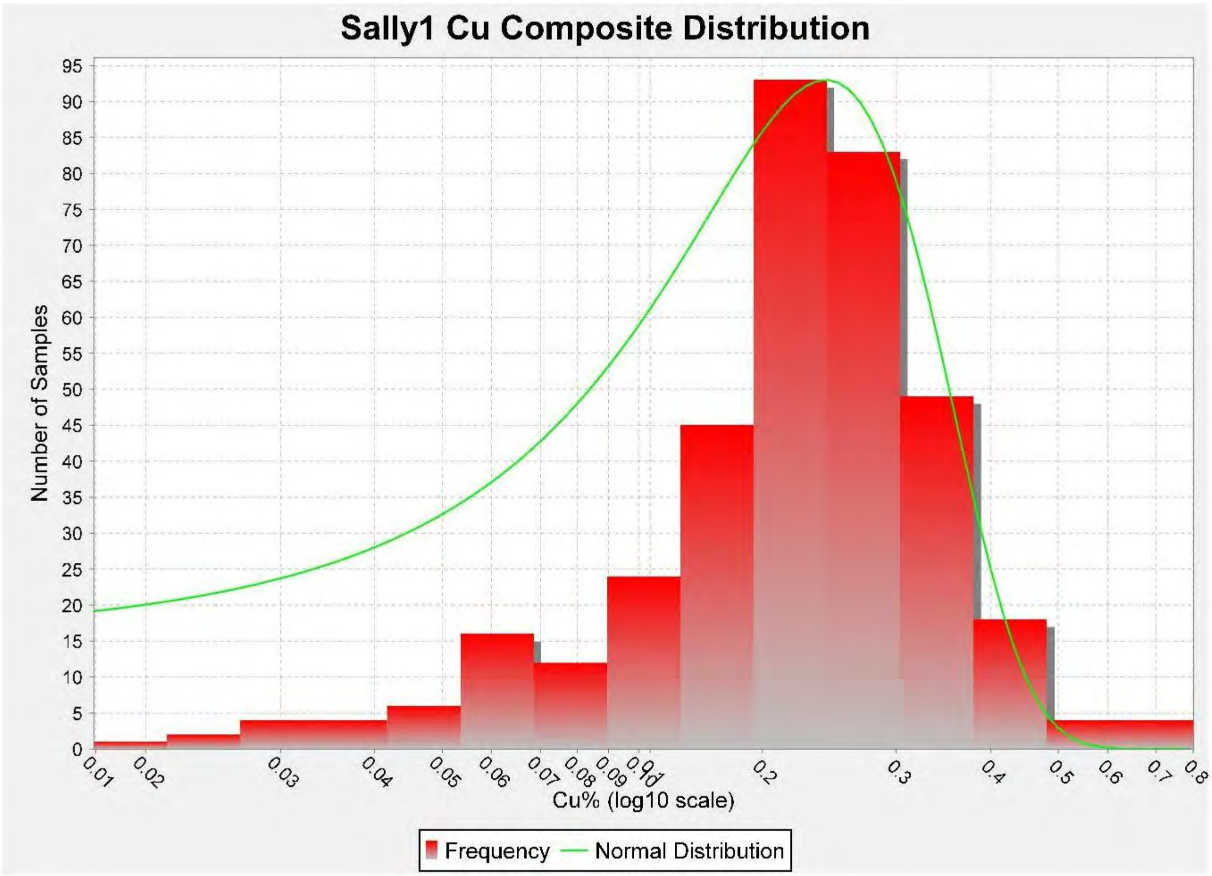
3-D Domains

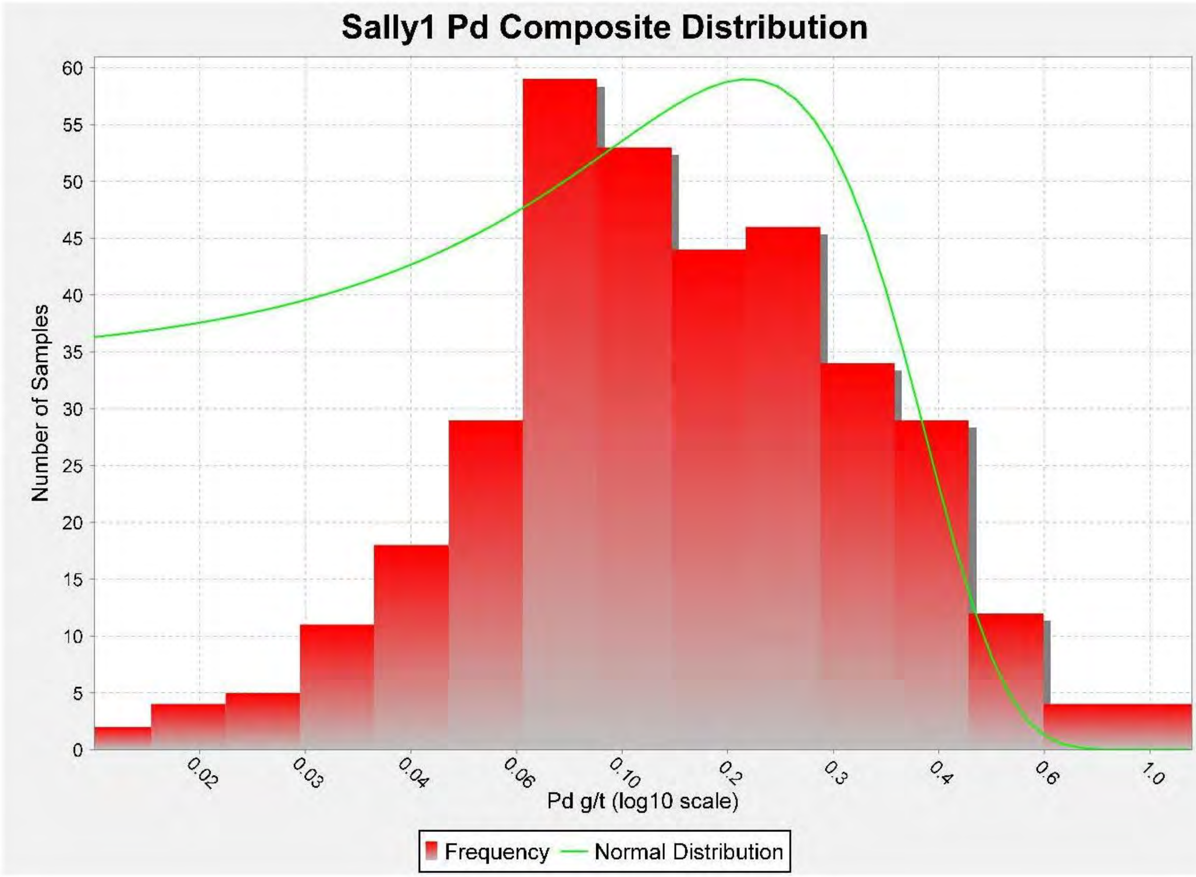
SALLY DEPOSIT - 3D DOMAINS

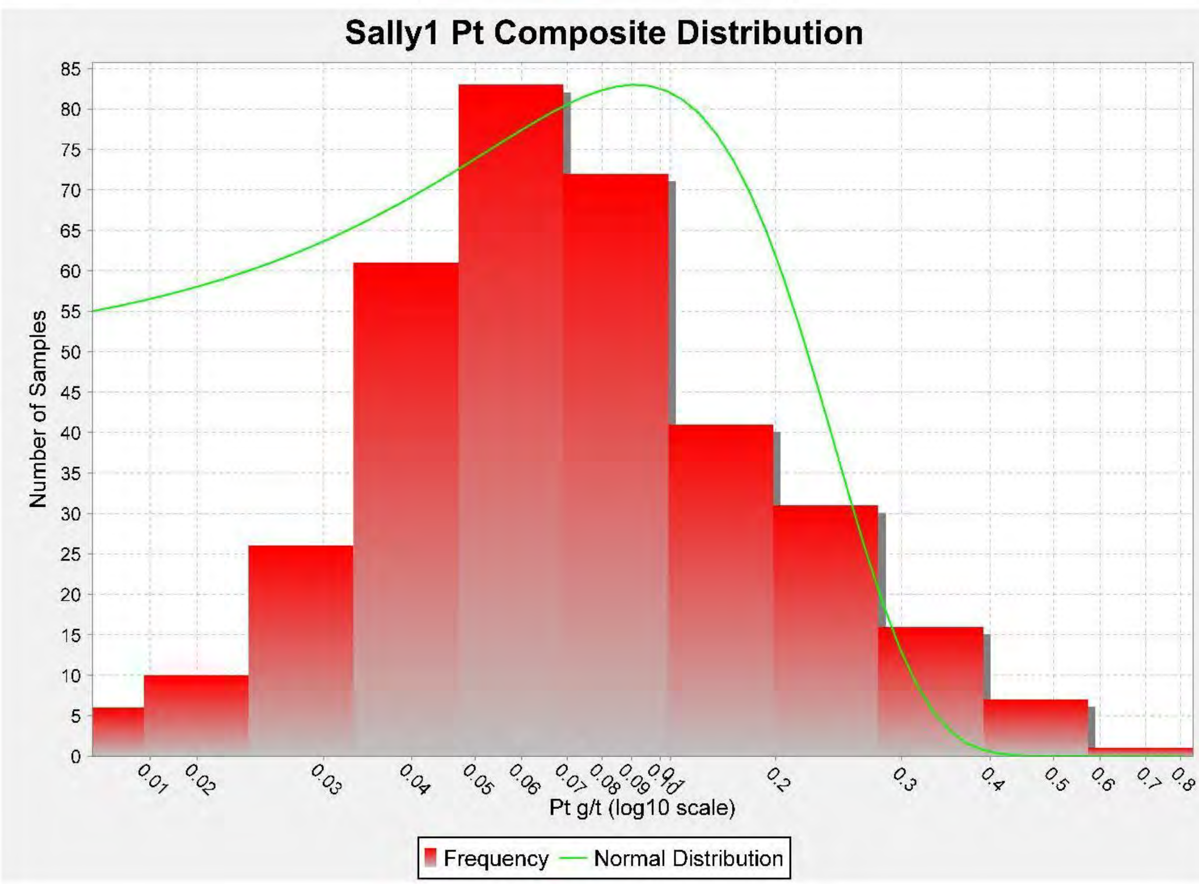


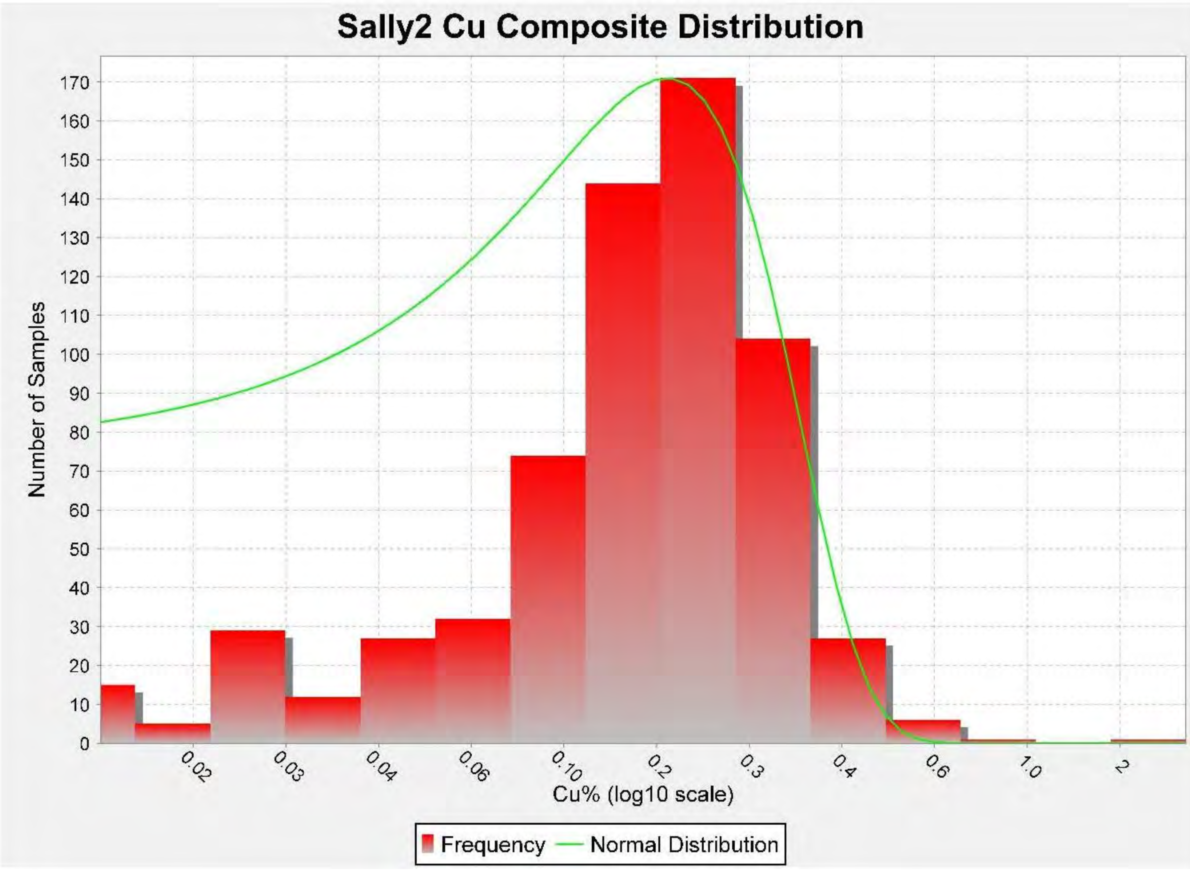
Sally Deposit

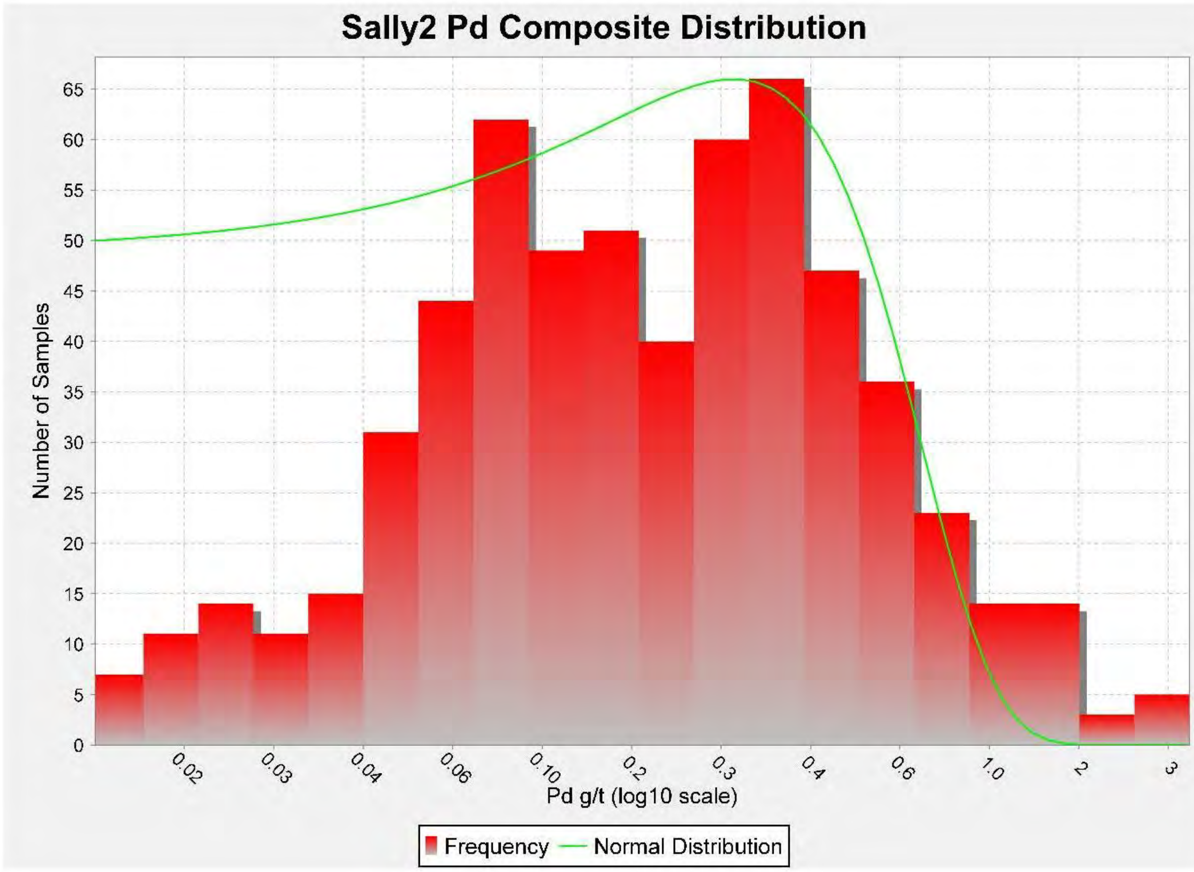
Log Normal Histograms

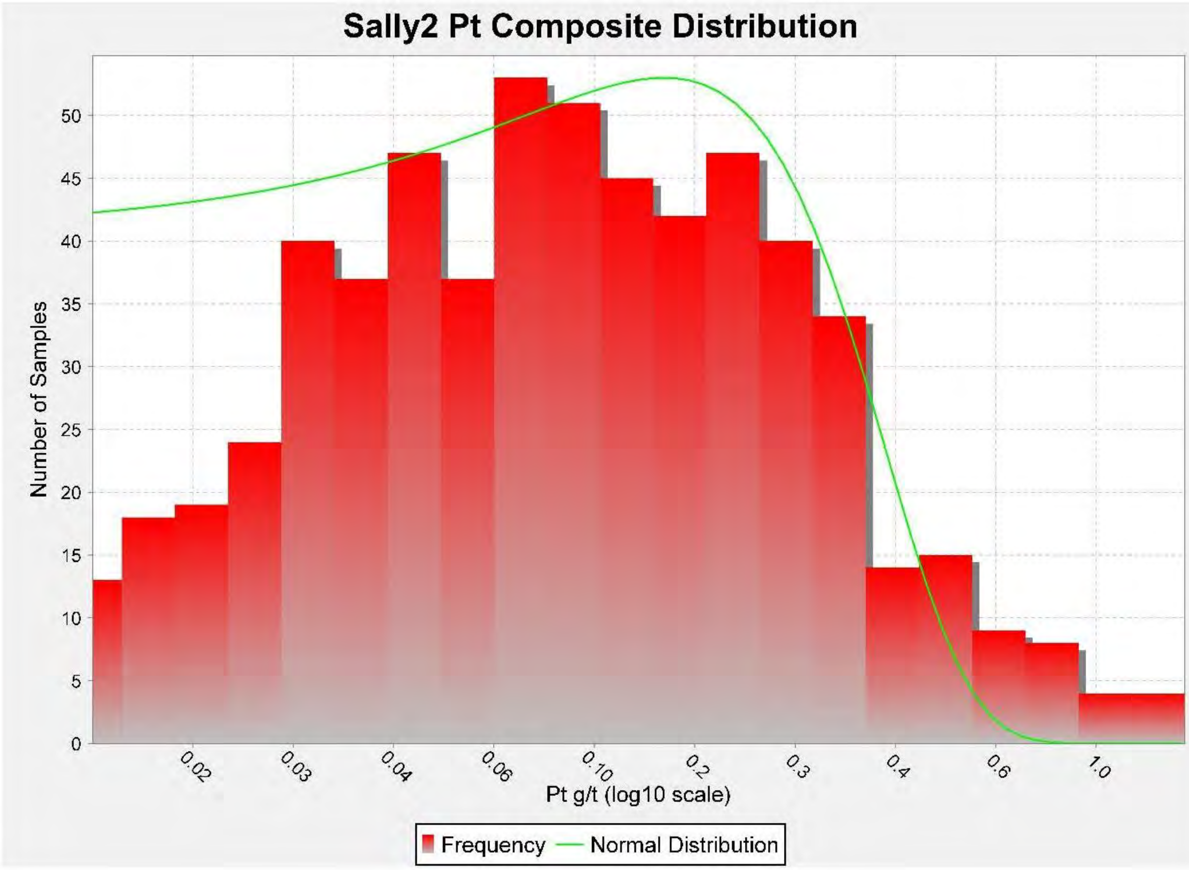

Sally1 Cu Composite Distribution
Number of Samples
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Cu% (log10 scale)
Frequency
Normal Distribution

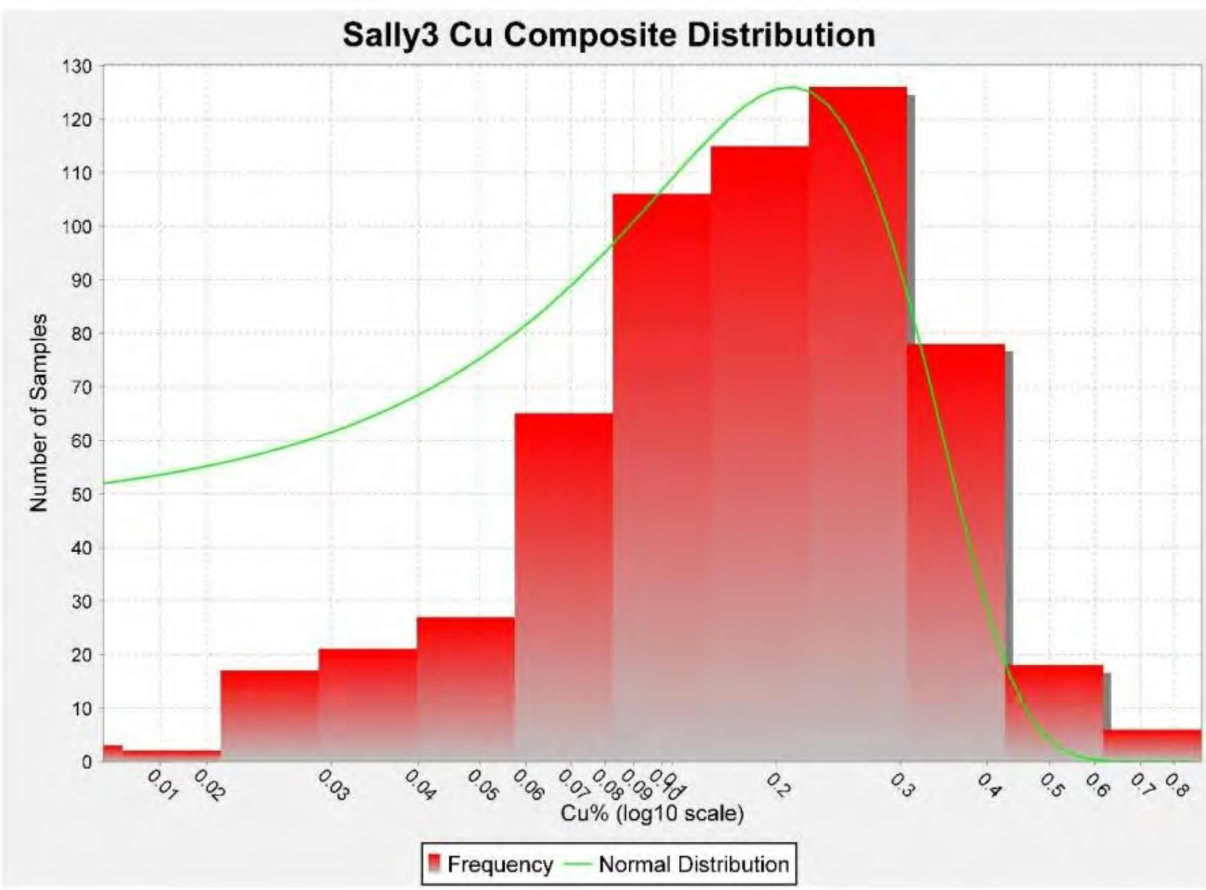

Sally1 Pd Composite Distribution
Number of Samples
60
55
50
45
40
35
30
25
20
15
10
5
0
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
Pd g/t (log10 scale)
Frequency
Normal Distribution

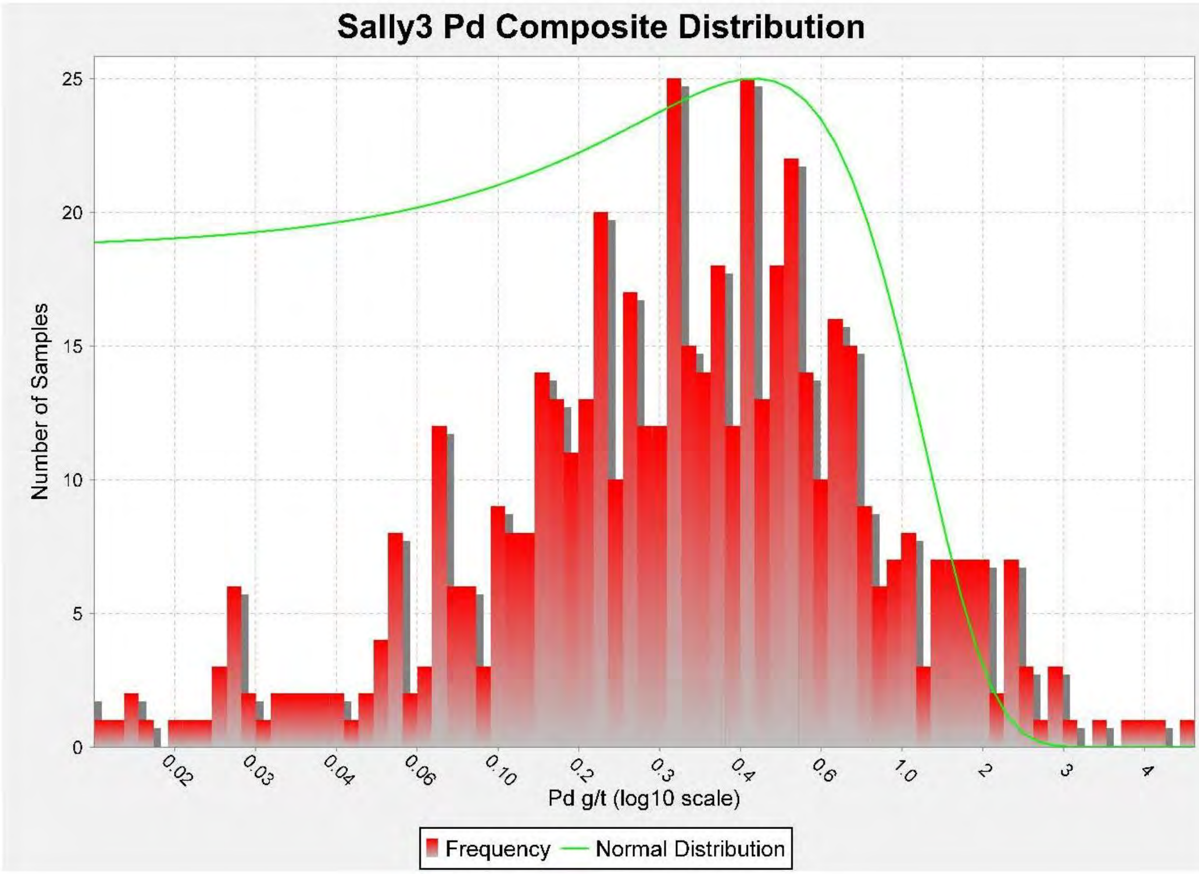

Sally1 Pt Composite Distribution
Number of Samples
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Pt g/t (log10 scale)
Frequency
Normal Distribution

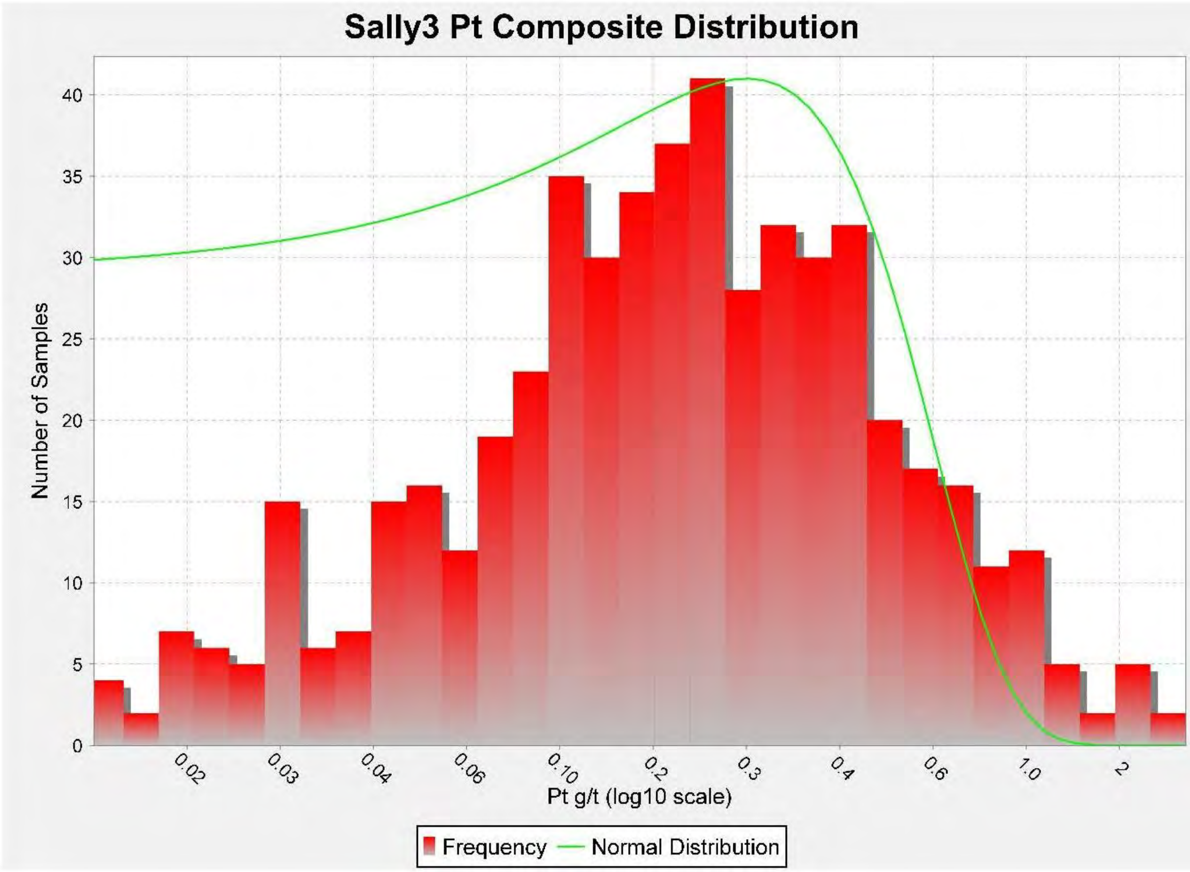

Sally2 Cu Composite Distribution
Number of Samples
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
Cu% (log10 scale)
Frequency
Normal Distribution

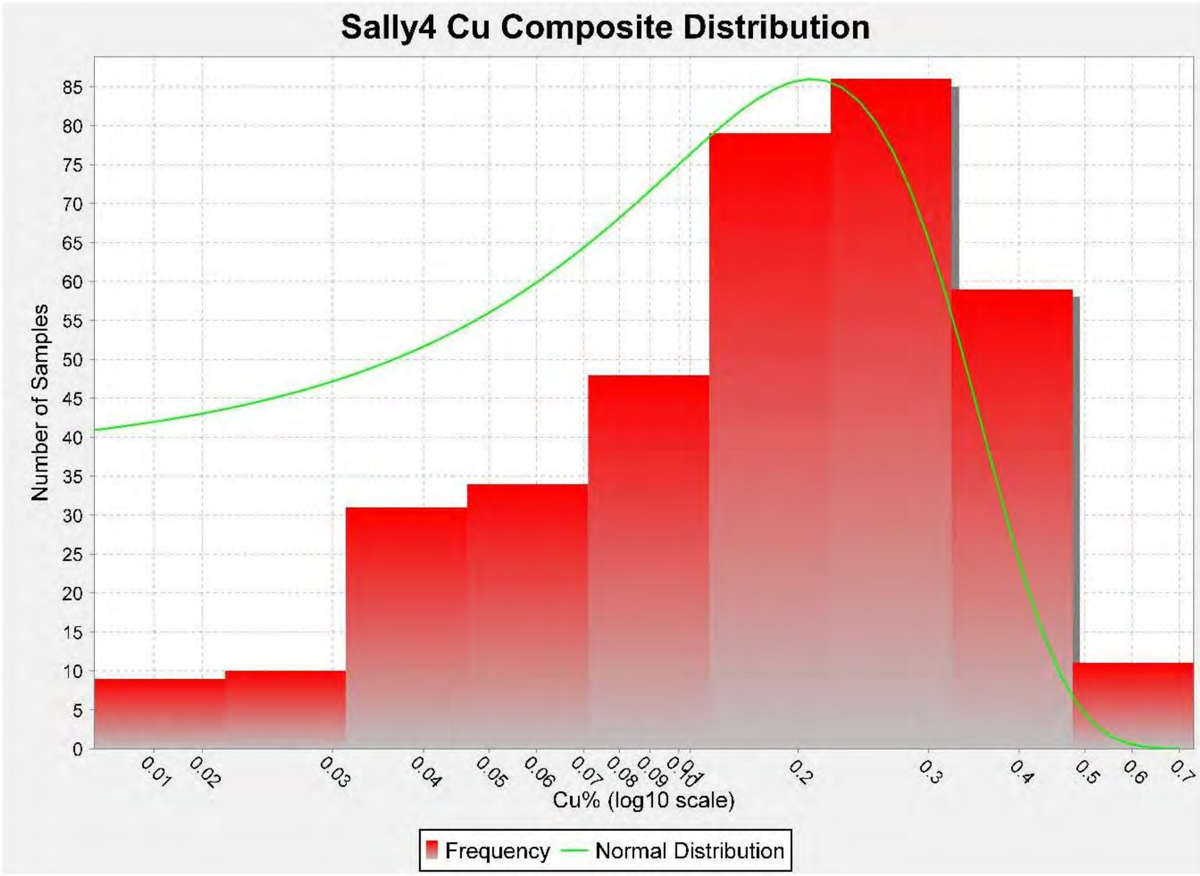

Sally2 Pd Composite Distribution
Number of Samples
0
5
10
15
20
25
30
35
40
45
50
55
60
65
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
3
Pd g/t (log10 scale)
Frequency
Normal Distribution

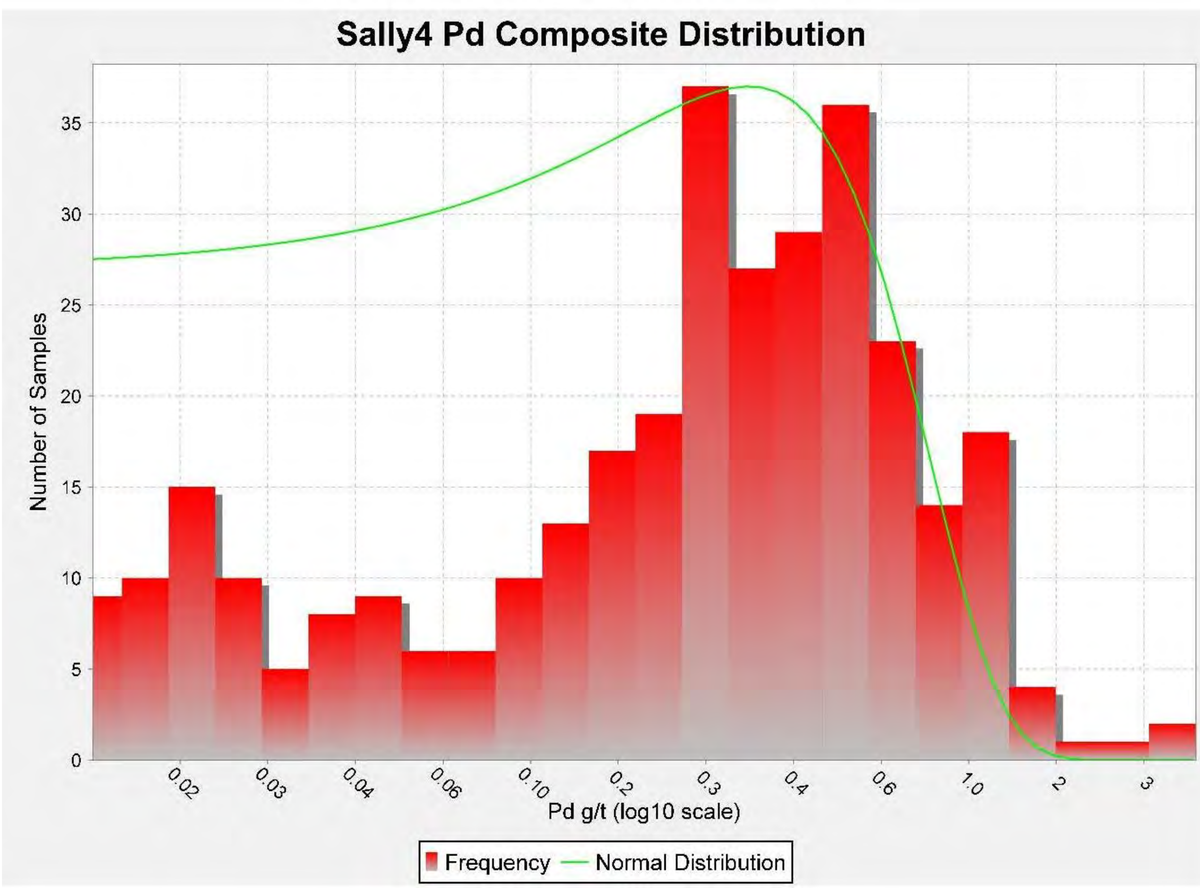

Sally2 Pt Composite Distribution
Number of Samples
Pt g/t (log10 scale)
Frequency
Normal Distribution

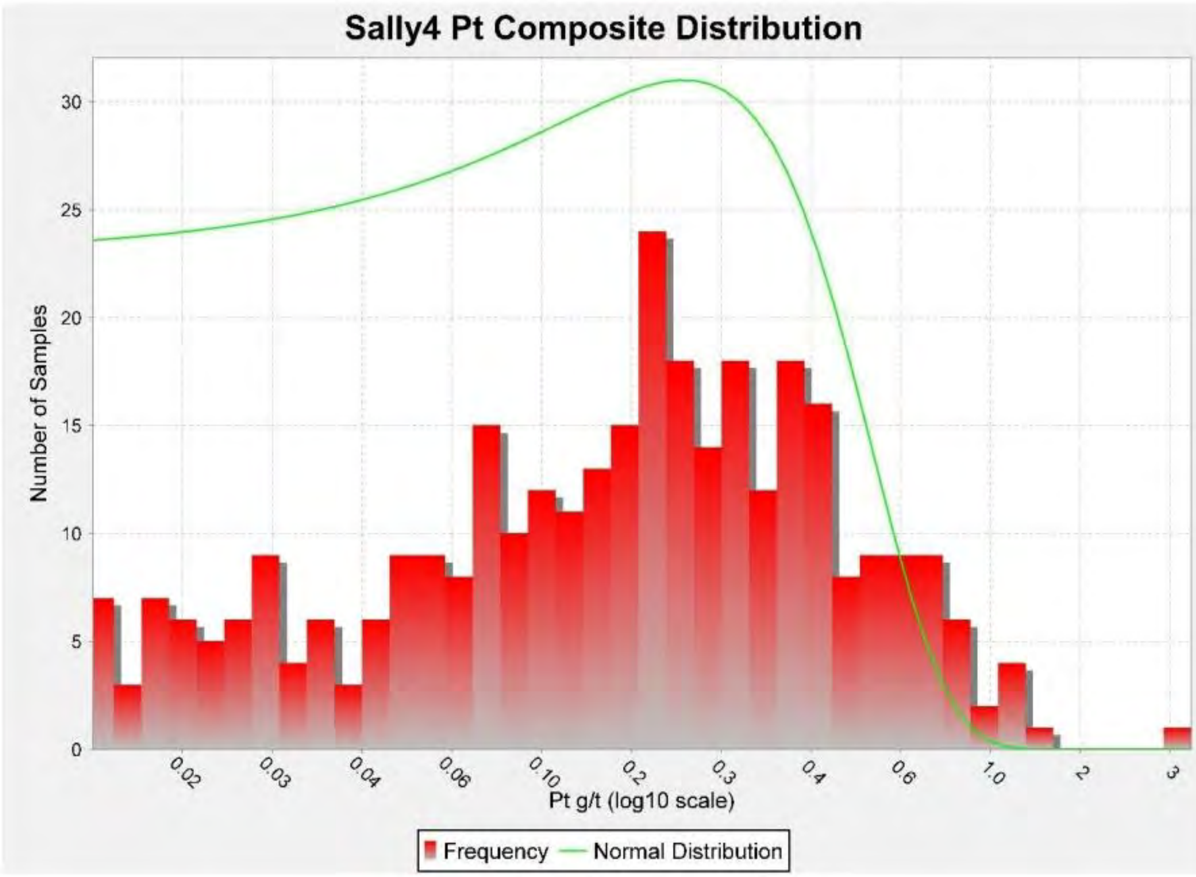

Sally3 Cu Composite Distribution
Number of Samples
Cu% (log10 scale)
Frequency
Normal Distribution

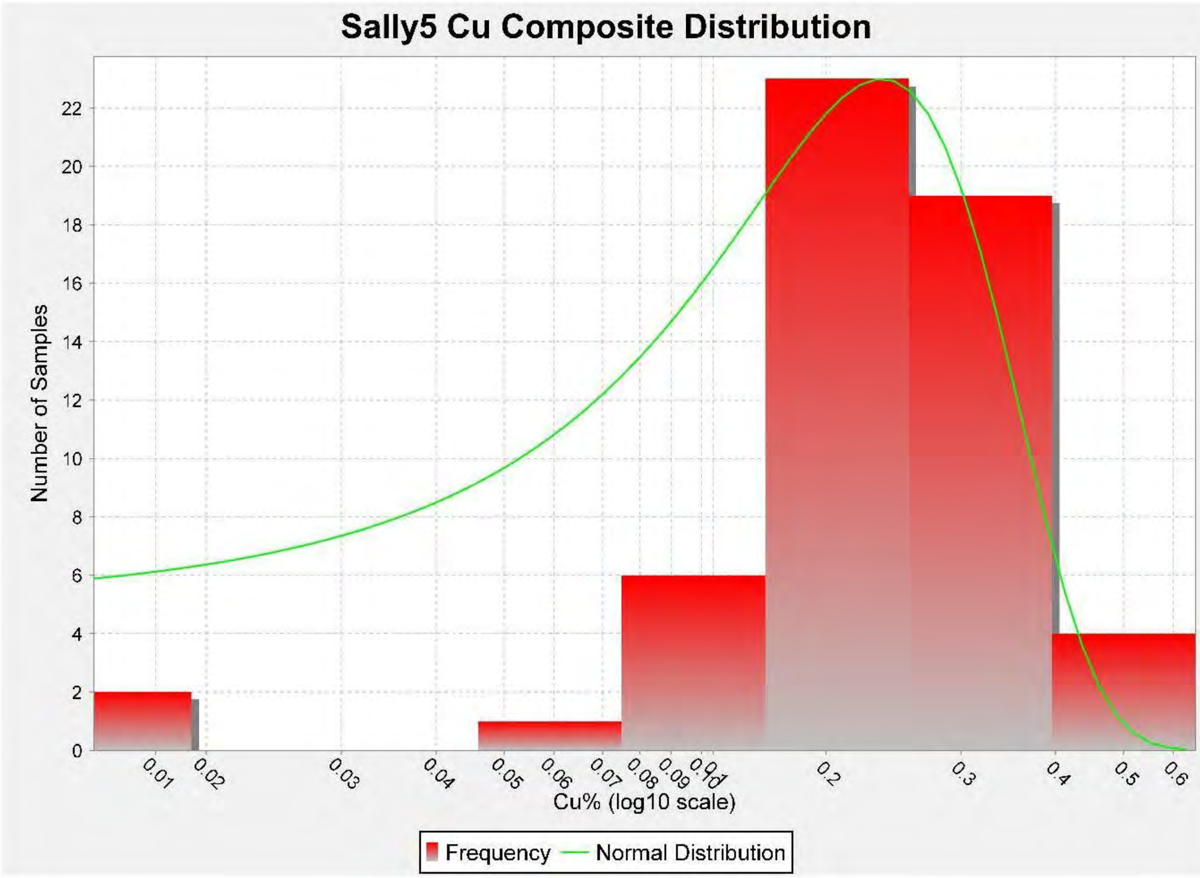

Sally3 Pd Composite Distribution
Number of Samples
0
5
10
15
20
25
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
3
4
Pd g/t (log10 scale)
Frequency
Normal Distribution

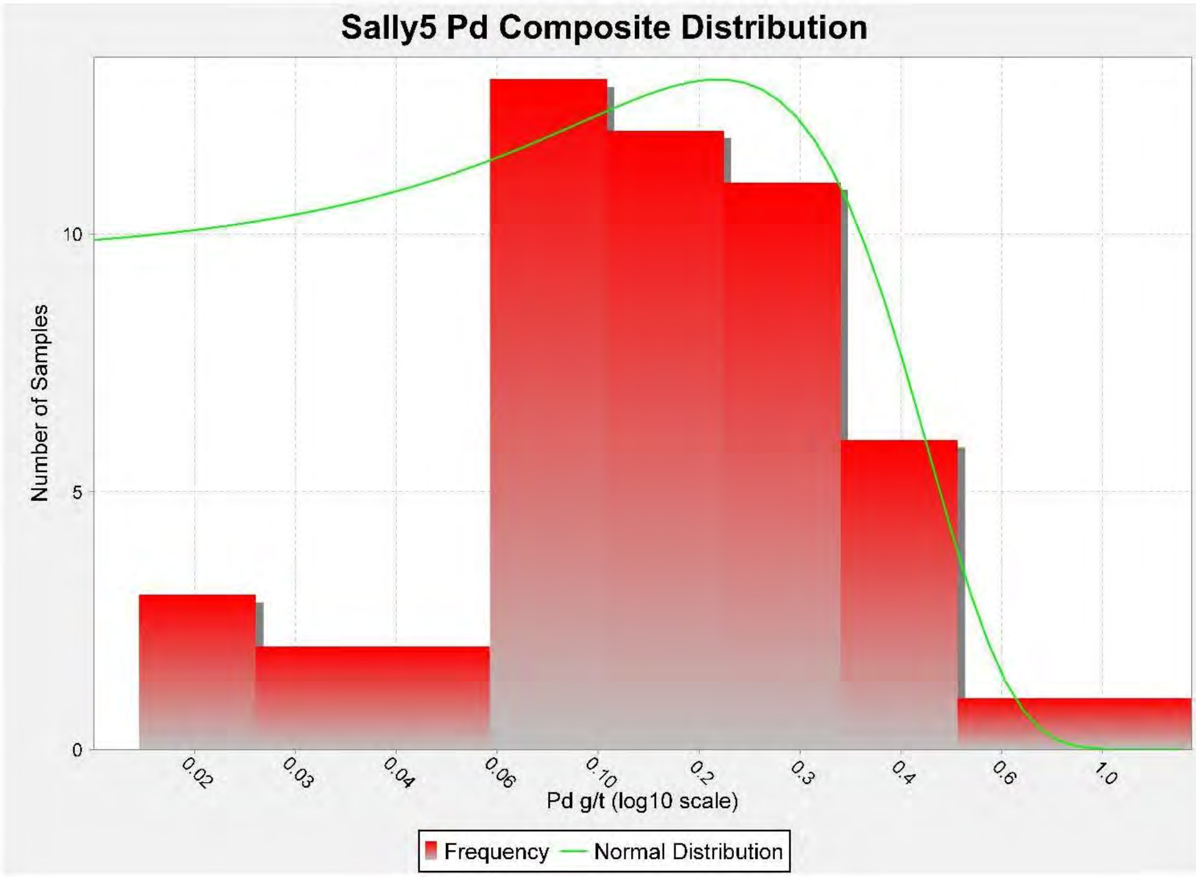

Sally3 Pt Composite Distribution
Number of Samples
0
5
10
15
20
25
30
35
40
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
Pt g/t (log10 scale)
Frequency
Normal Distribution

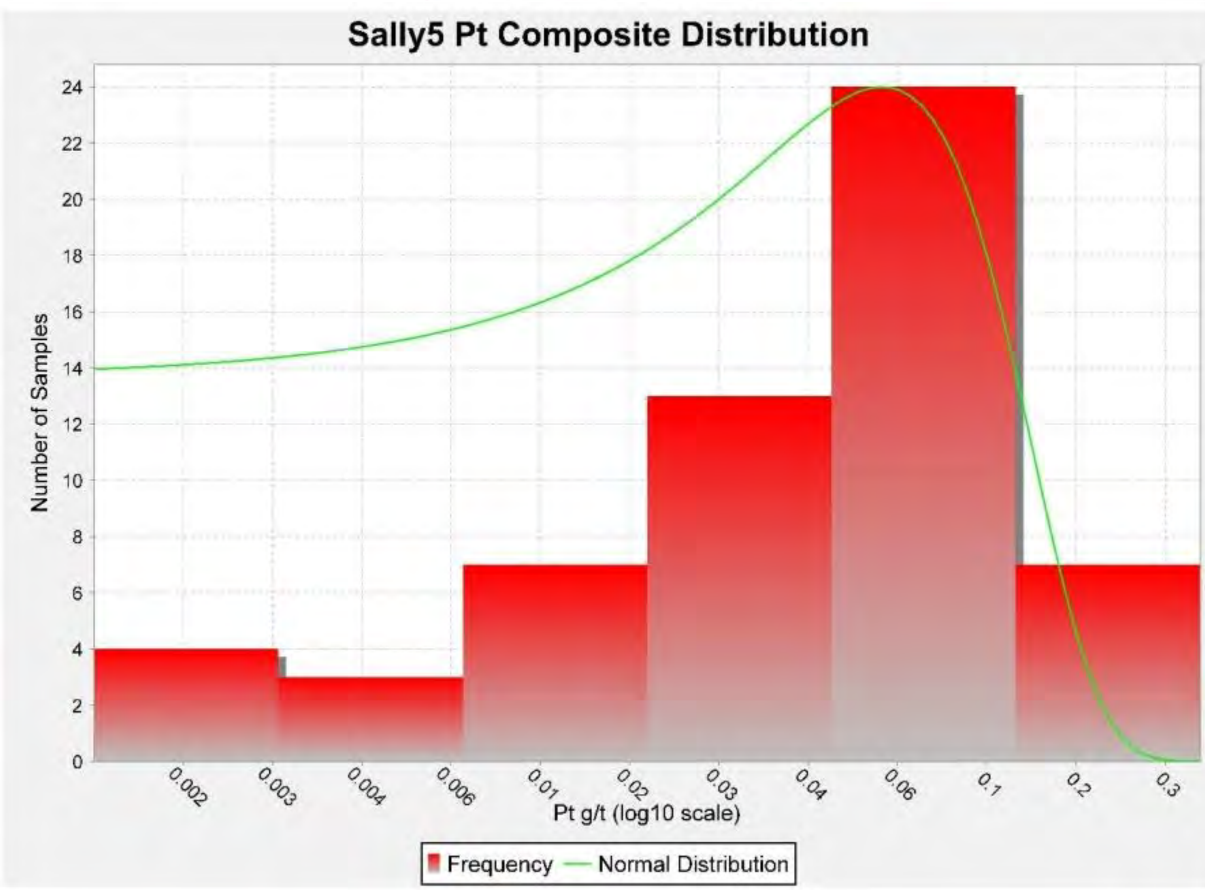

Sally4 Cu Composite Distribution
Number of Samples
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Cu% (log10 scale)
Frequency
Normal Distribution


Sally4 Pd Composite Distribution
Number of Samples
35
30
25
20
15
10
5
0
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
3
Pd g/t (log10 scale)
Frequency
Normal Distribution


Sally4 Pt Composite Distribution
Number of Samples
30
25
20
15
10
5
0
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
2
3
Pt g/t (log10 scale)
Frequency
Normal Distribution

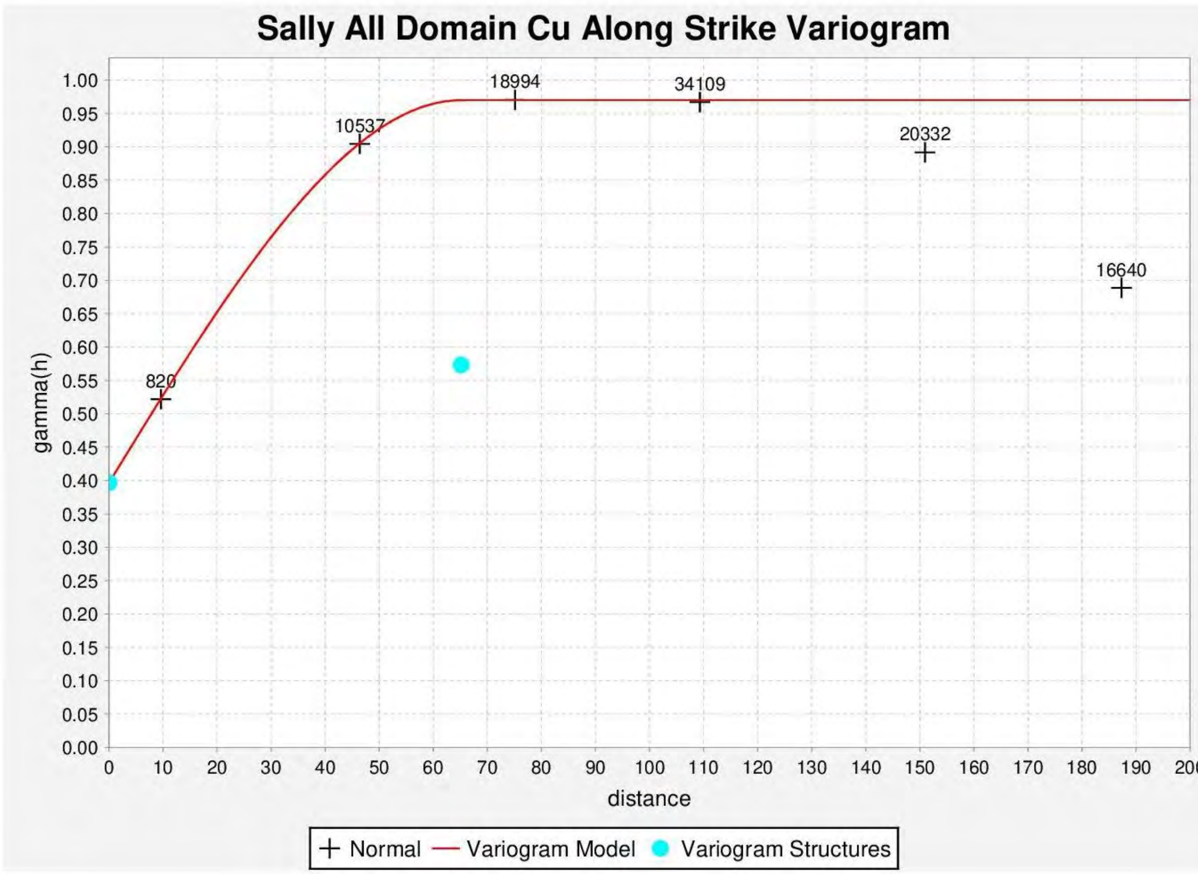

Sally5 Cu Composite Distribution
Number of Samples
0
2
4
6
8
10
12
14
16
18
20
22
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
0.2
0.3
0.4
0.5
0.6
Cu% (log10 scale)
Frequency
Normal Distribution

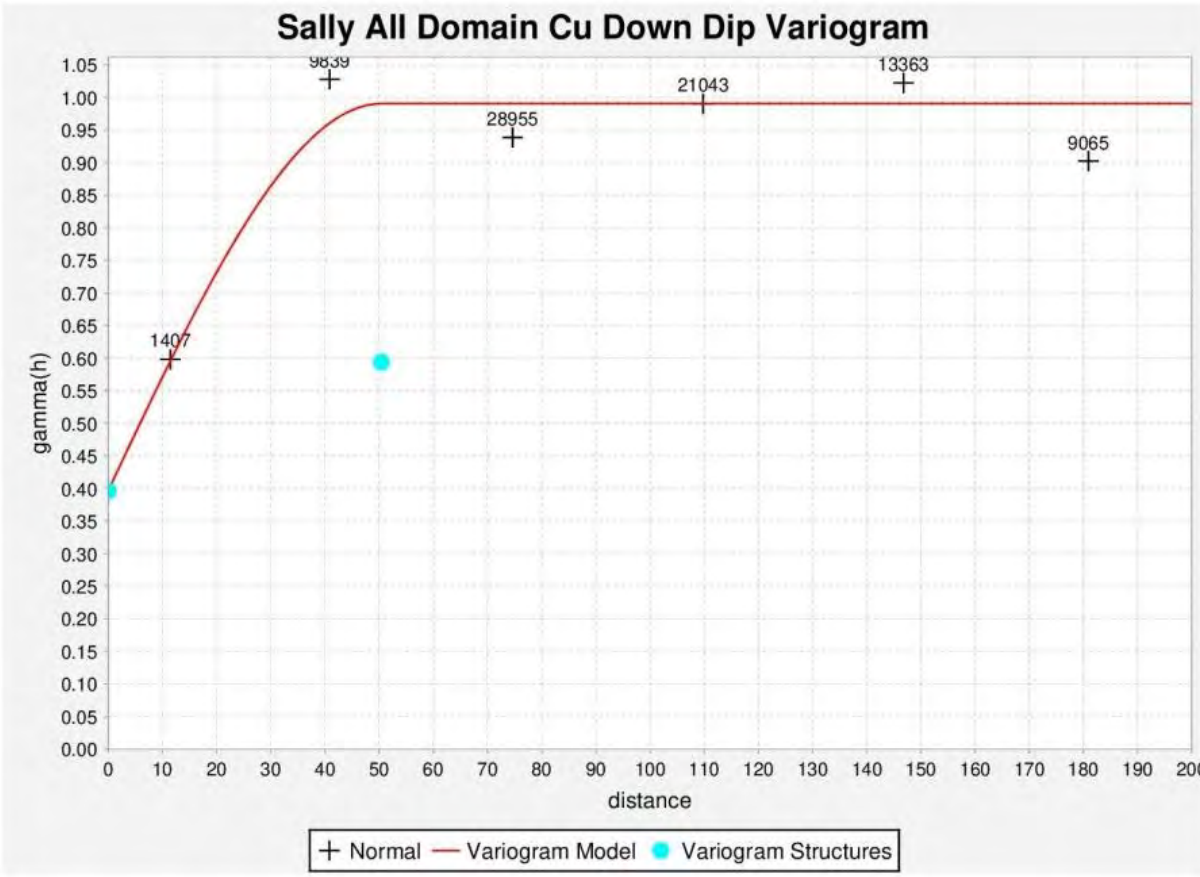

Sally5 Pd Composite Distribution
Number of Samples
0
5
10
0.02
0.03
0.04
0.06
0.10
0.2
0.3
0.4
0.6
1.0
Pd g/t (log10 scale)
Frequency
Normal Distribution

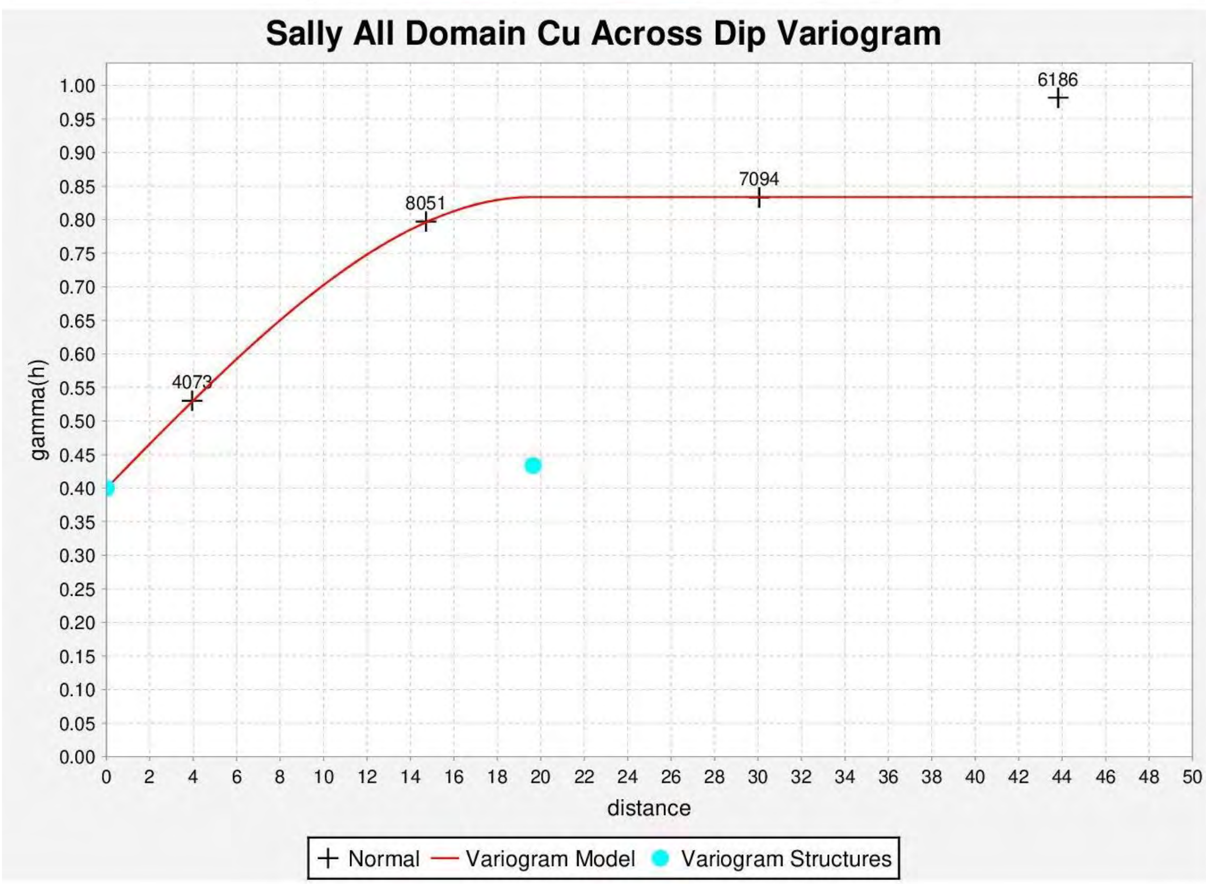

Sally5 Pt Composite Distribution
Number of Samples
0
2
4
6
8
10
12
14
16
18
20
22
24
0.002
0.003
0.004
0.006
0.01
0.02
0.03
0.04
0.06
0.1
0.2
0.3
Pt g/t (log10 scale)
Frequency
Normal Distribution

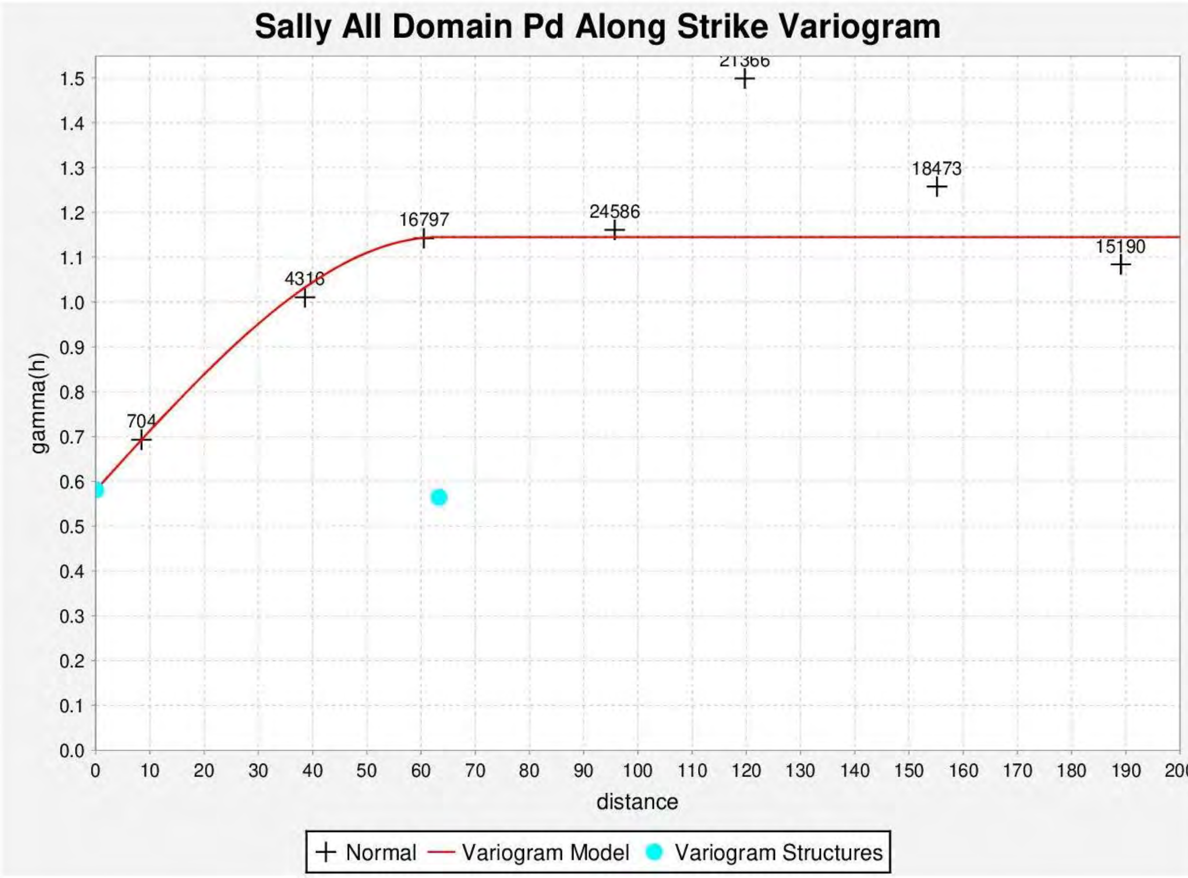
Sally Deposit

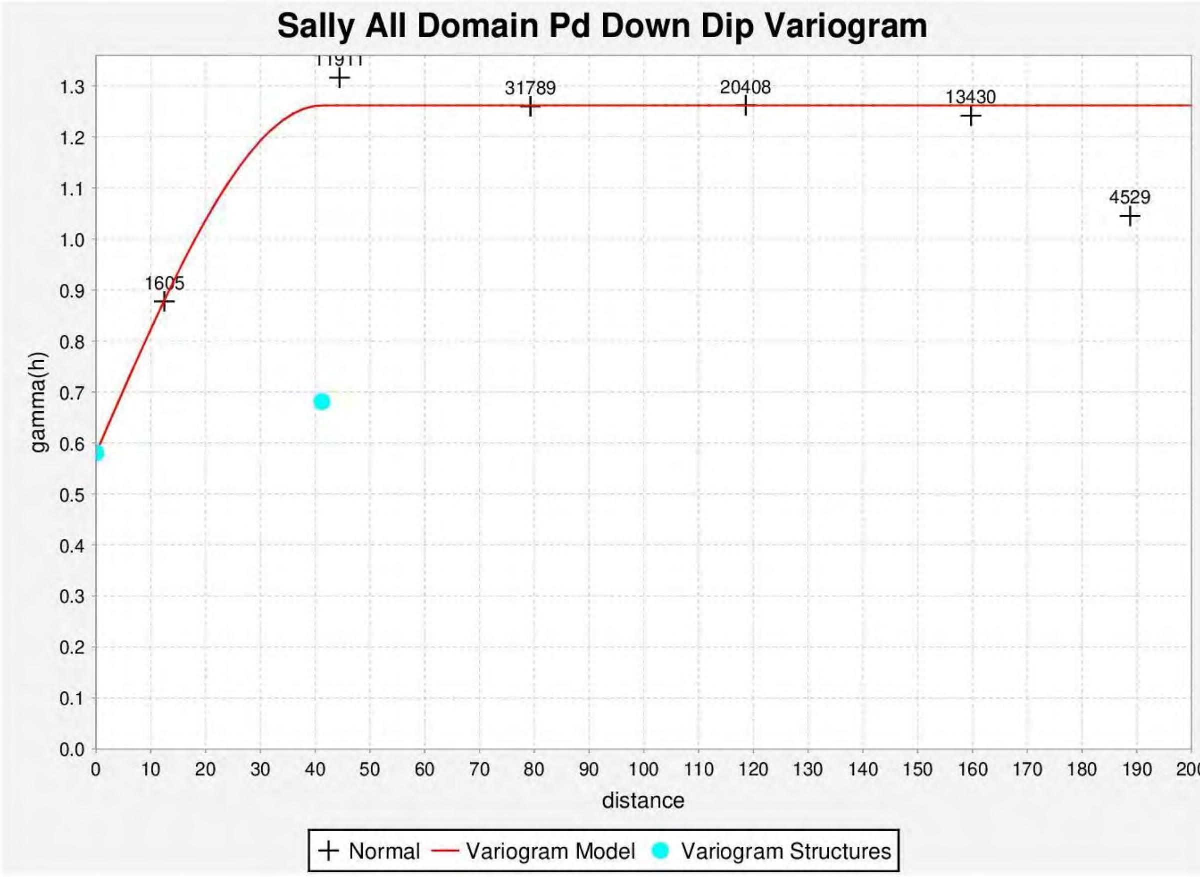
Variograms

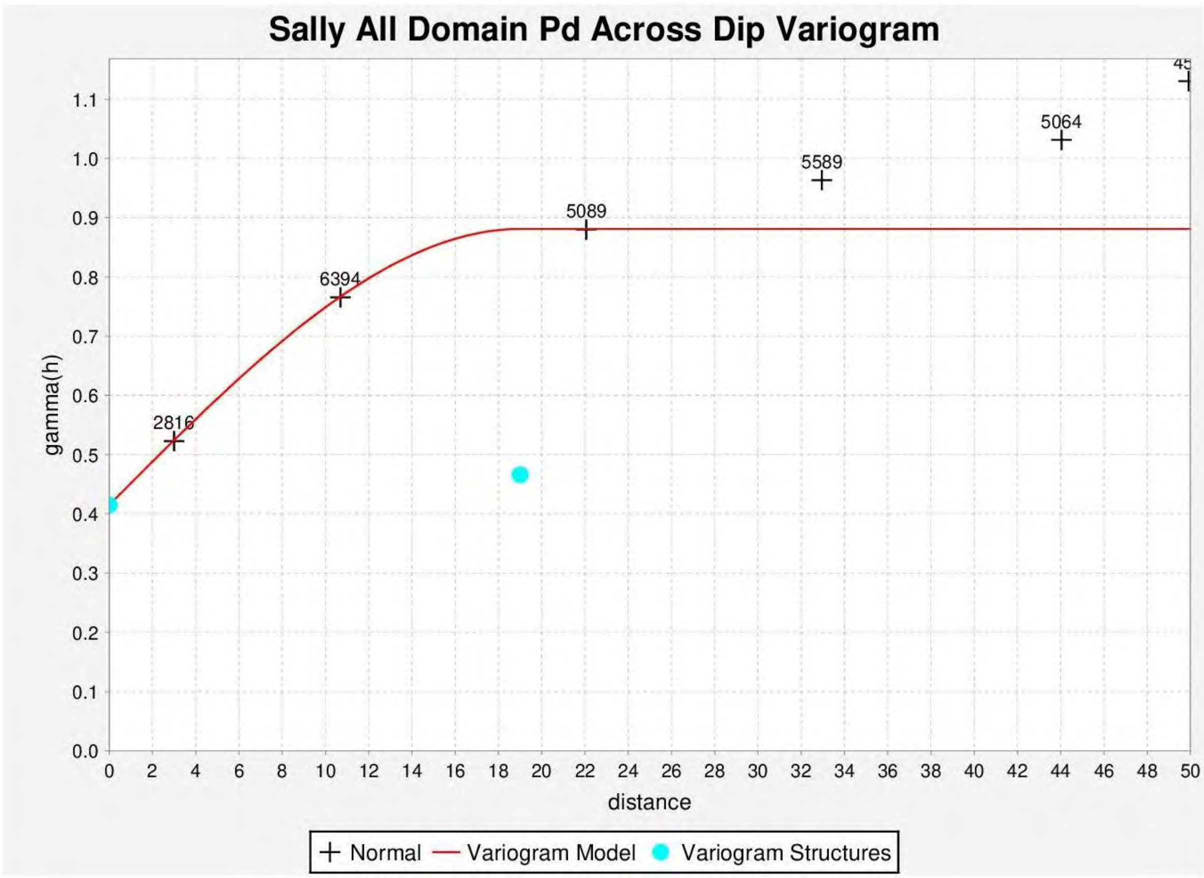

Sally All Domain Cu Along Strike Variogram
gamma(h)
distance
820
10537
18994
34109
20332
16640
Normal
Variogram Model
Variogram Structures


Sally All Domain Cu Down Dip Variogram
gamma(h)
distance
9839
13363
21043
28955
9065
1407
Normal
Variogram Model
Variogram Structures


Sally All Domain Cu Across Dip Variogram
gamma(h)
distance
6186
7094
8051
4073
Normal
Variogram Model
Variogram Structures

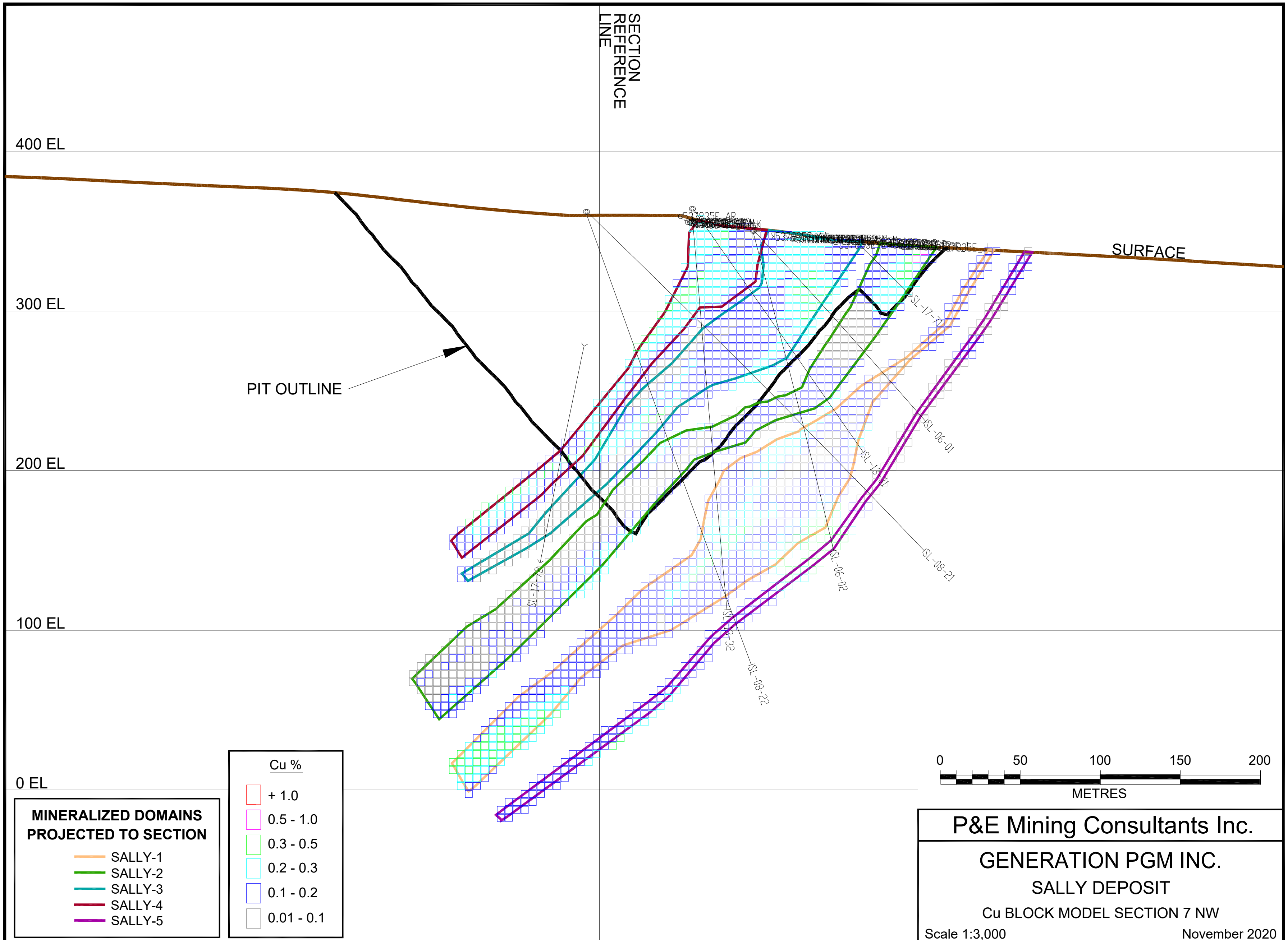

Sally All Domain Pd Along Strike Variogram
gamma(h)
distance
21366
18473
16797
24586
15190
4316
704
Normal
Variogram Model
Variogram Structures

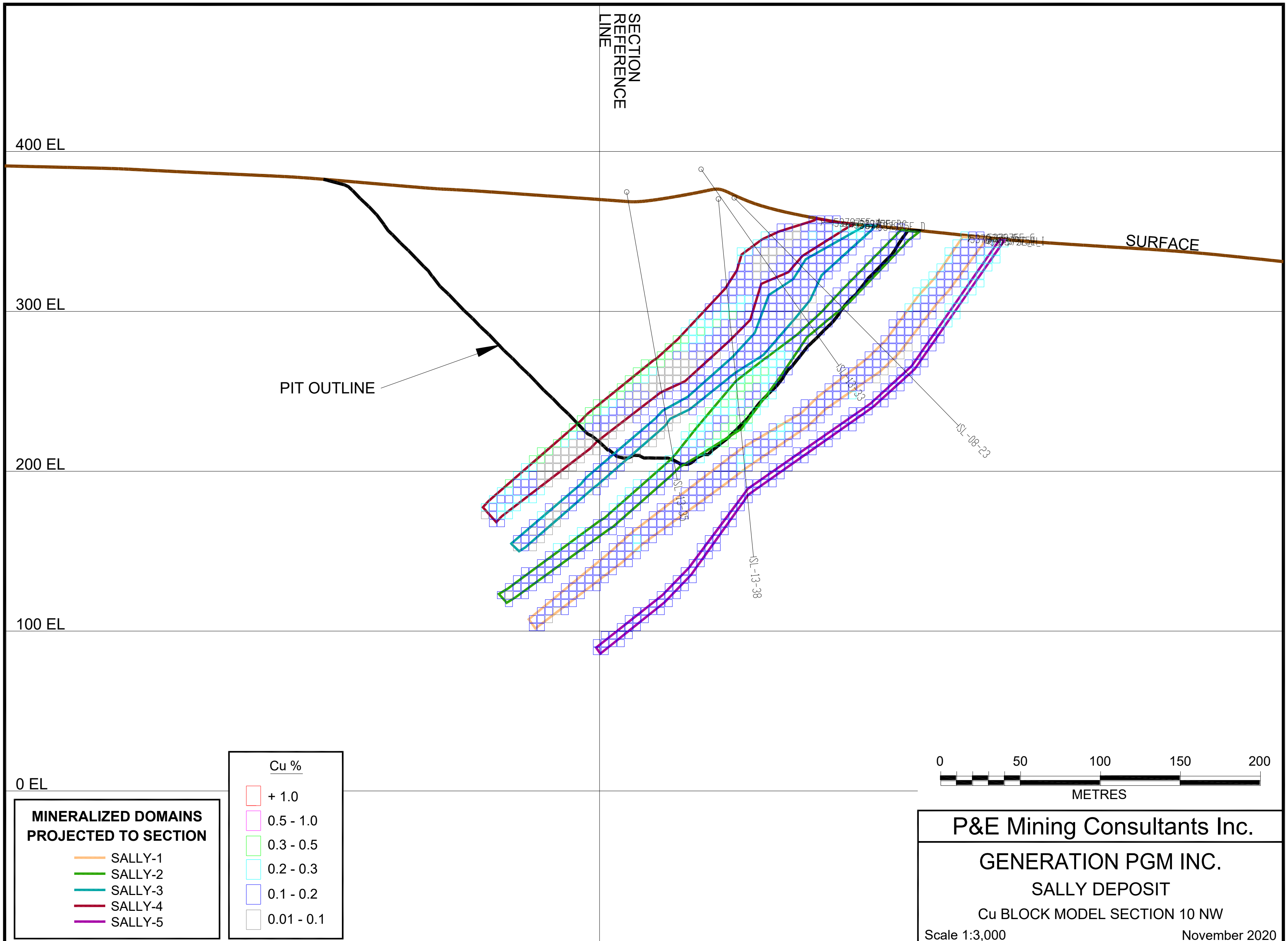

Sally All Domain Pd Down Dip Variogram
gamma(h)
distance
11911
31789
20408
13430
4529
1605
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
Normal
Variogram Model
Variogram Structures

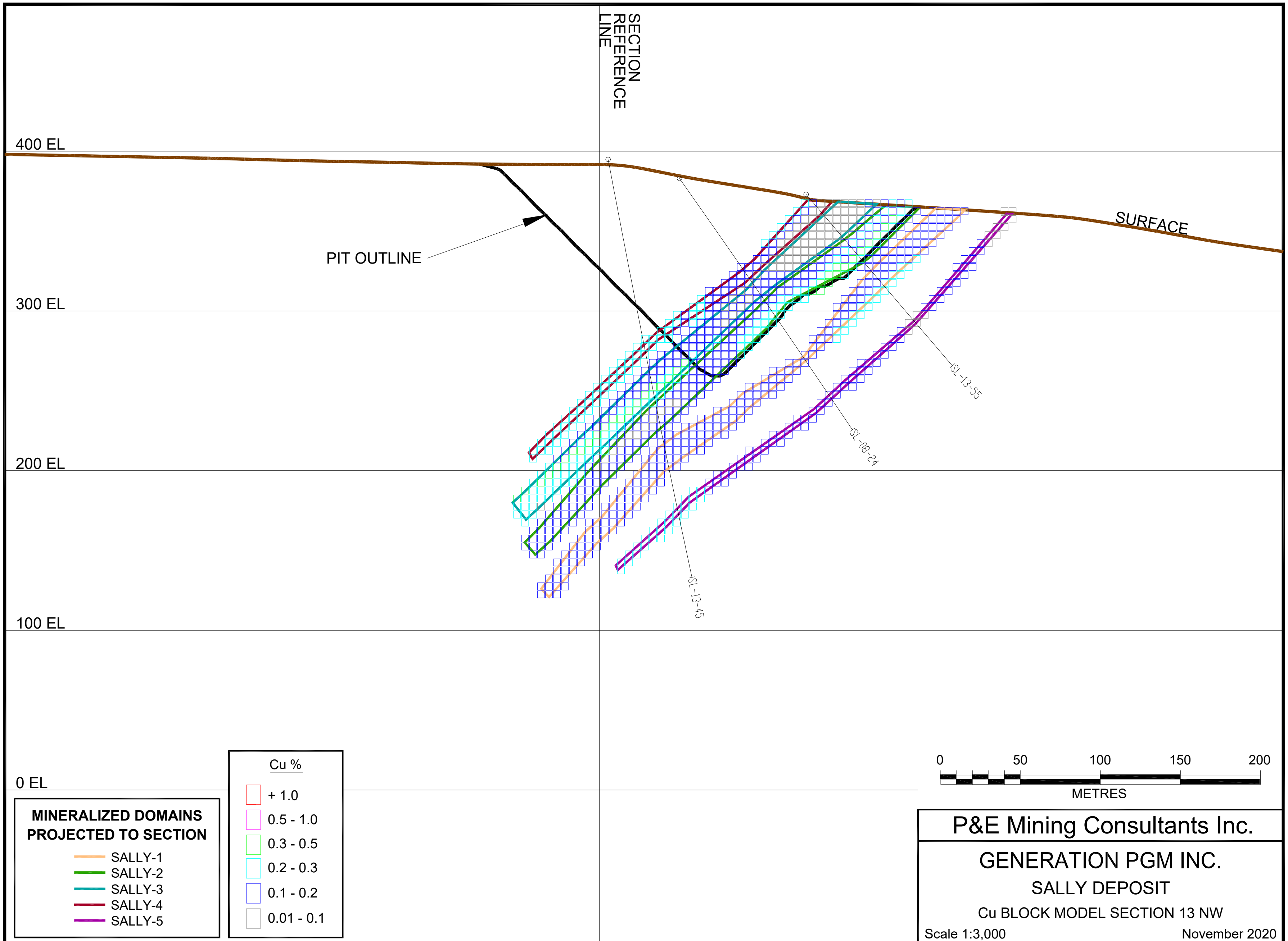

Sally All Domain Pd Across Dip Variogram
gamma(h)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
distance
2816
6394
5089
5589
5064
Normal
Variogram Model
Variogram Structures

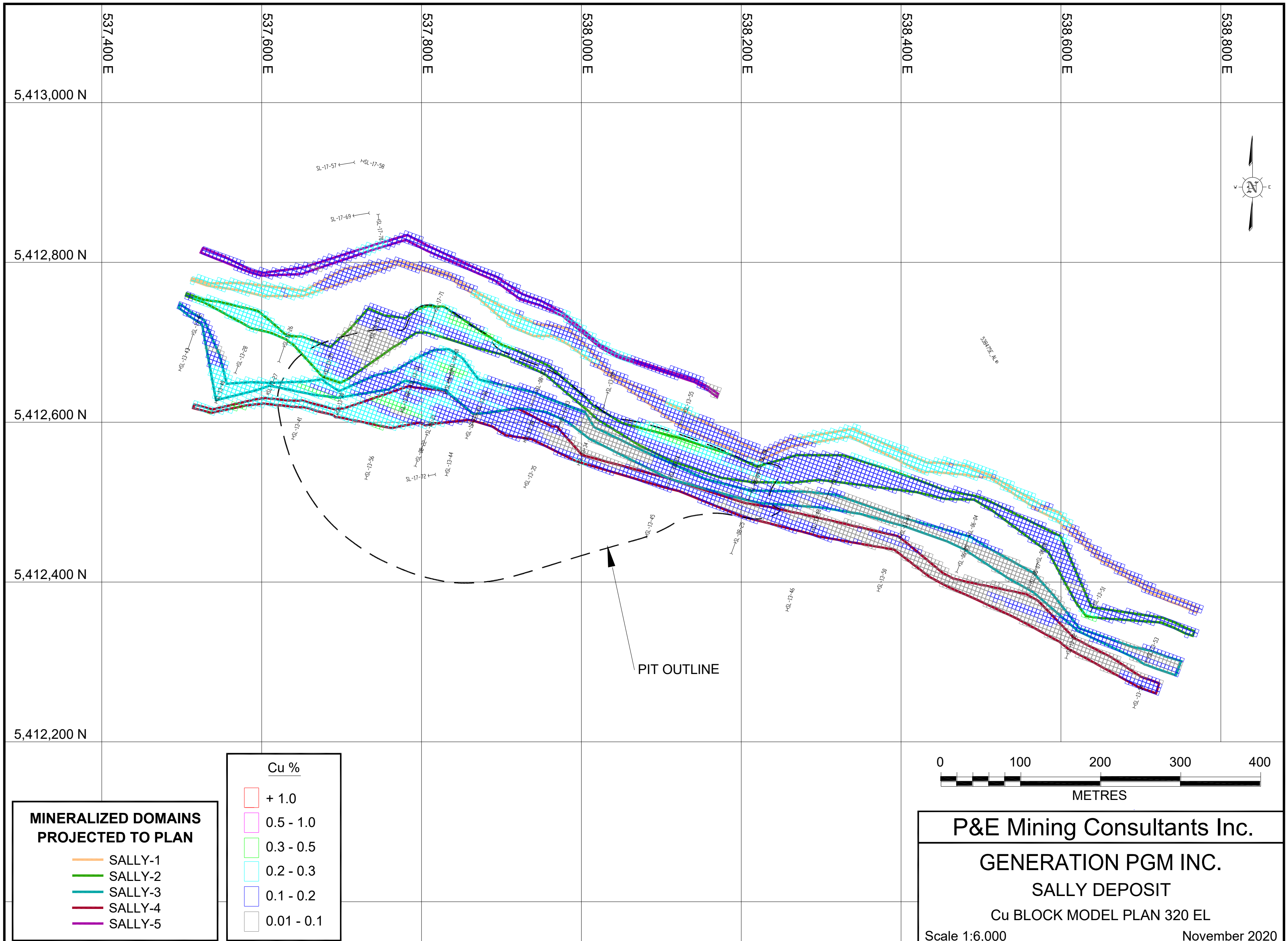
Sally Deposit

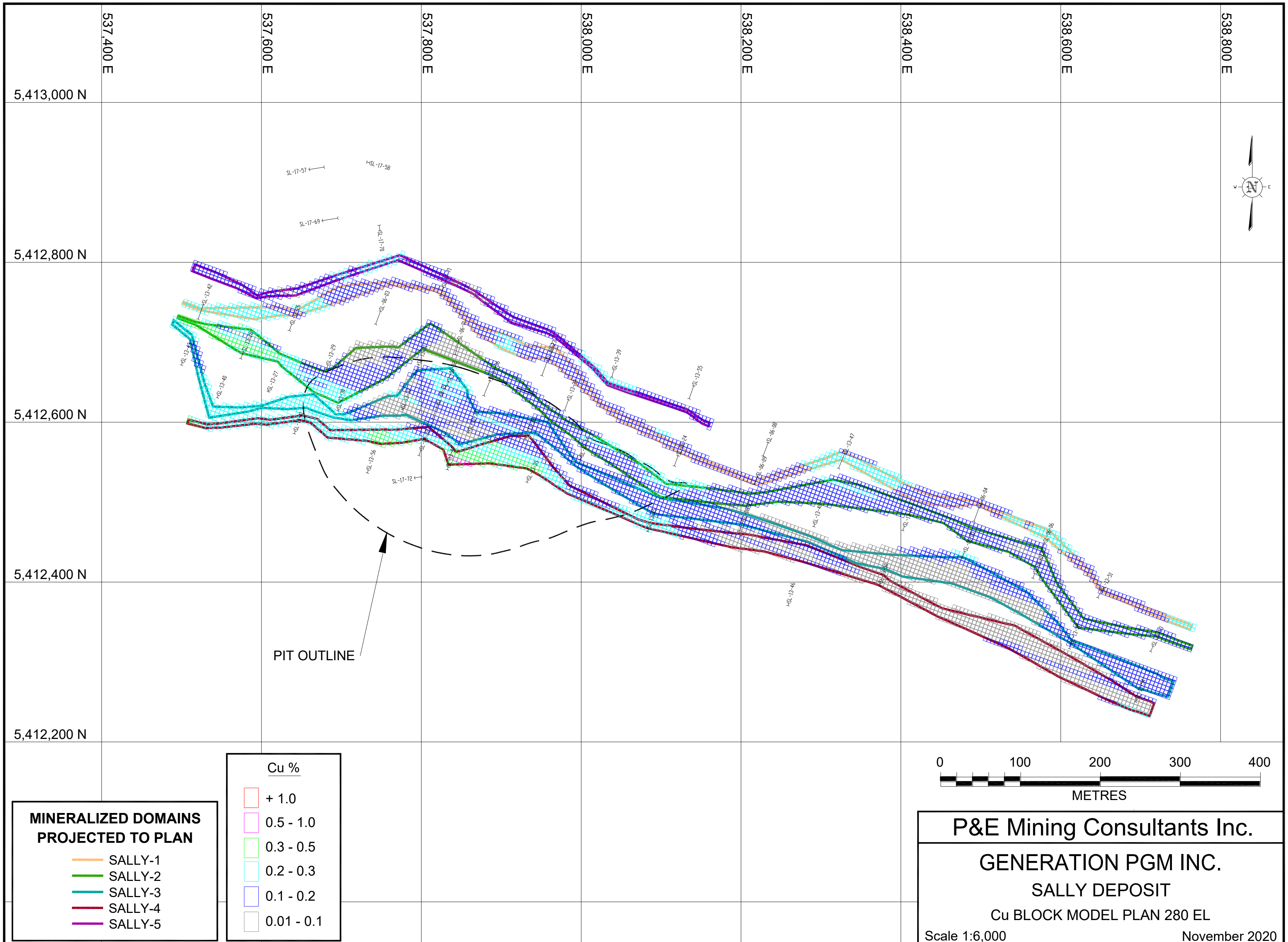
Cu Block Model Cross Sections and Plans

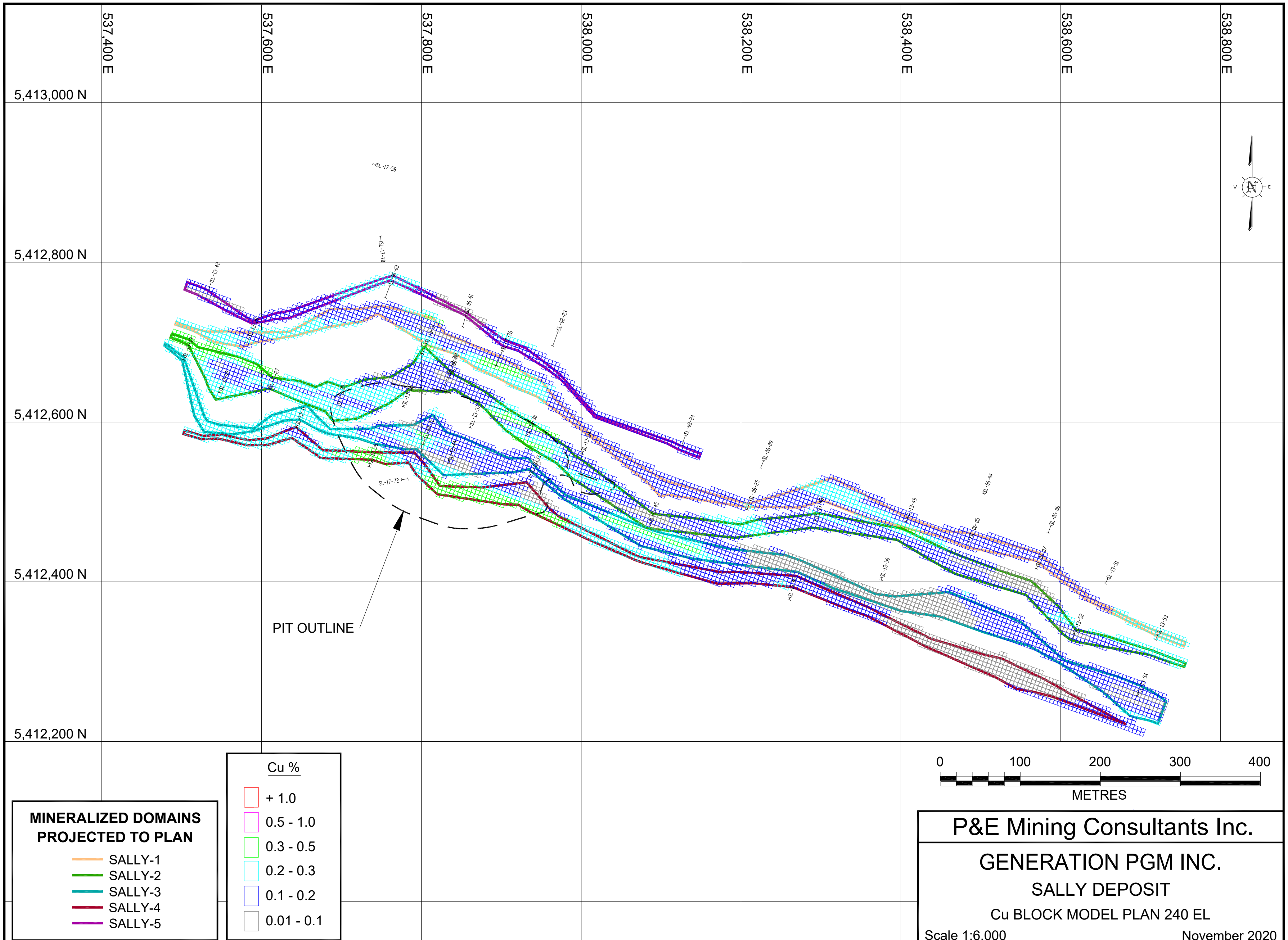

SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
SL-17-71
SL-06-01
SL-18-
SL-08-21
SL-06-02
SL-08-22
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL SECTION 7 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
SL-13-33
SL-08-23
SL-13-38
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL SECTION 10 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
PIT OUTLINE
SURFACE
SL-13-55
SL-08-24
SL-13-45
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL SECTION 13 NW
Scale 1:3,000
November 2020

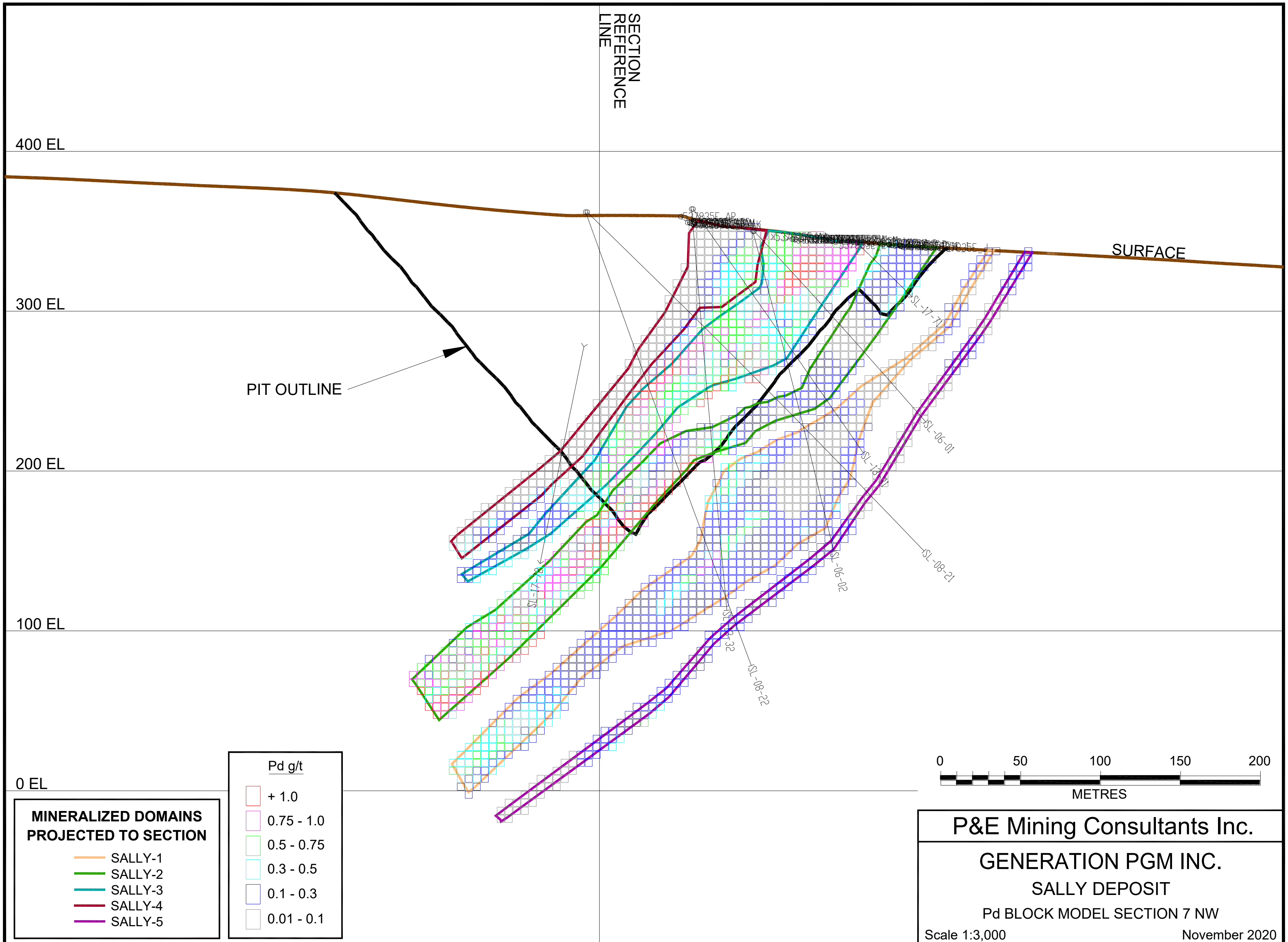

537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL PLAN 320 EL
Scale 1:6,000
November 2020

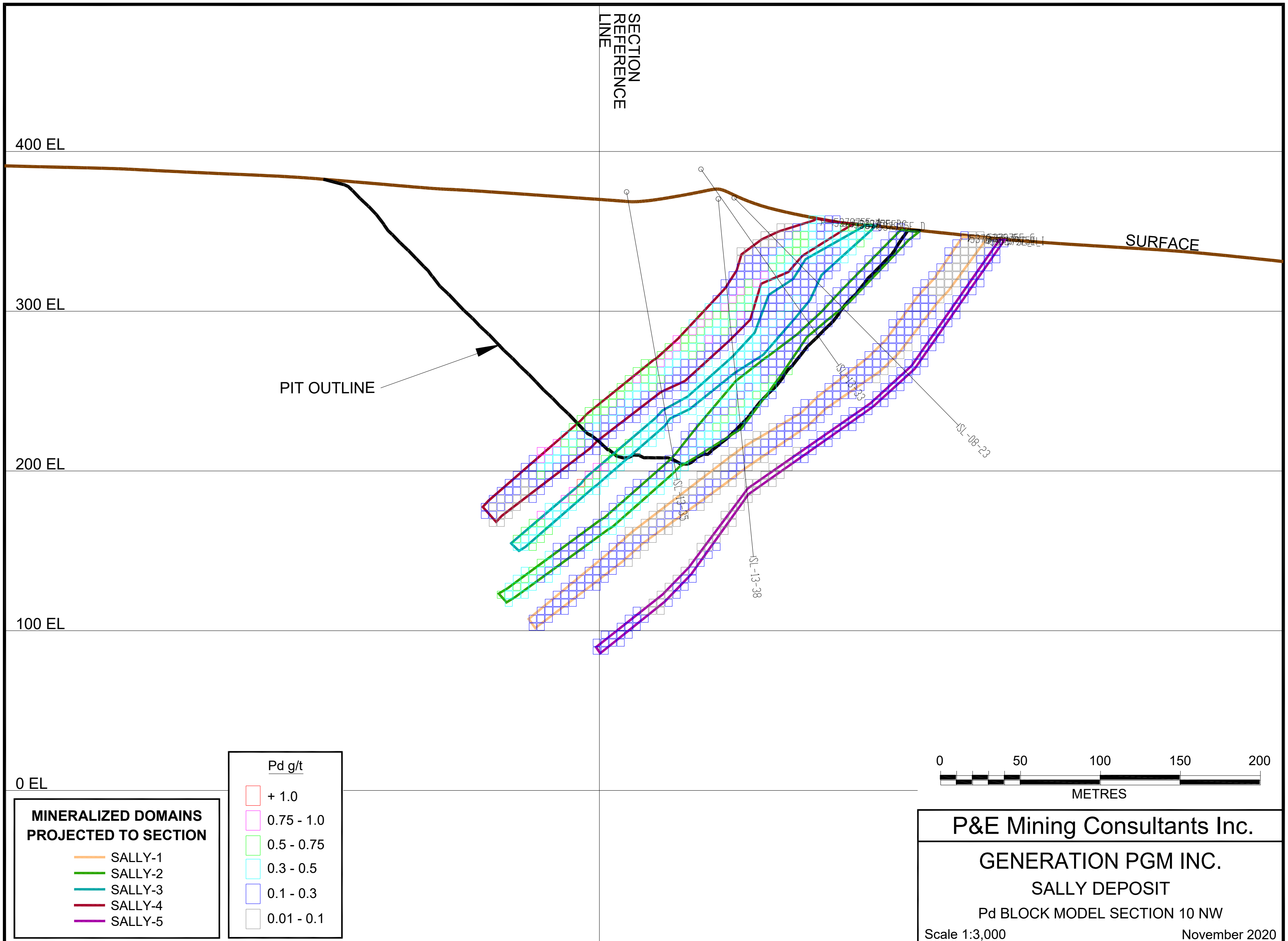

537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL PLAN 280 EL
Scale 1:6,000
November 2020

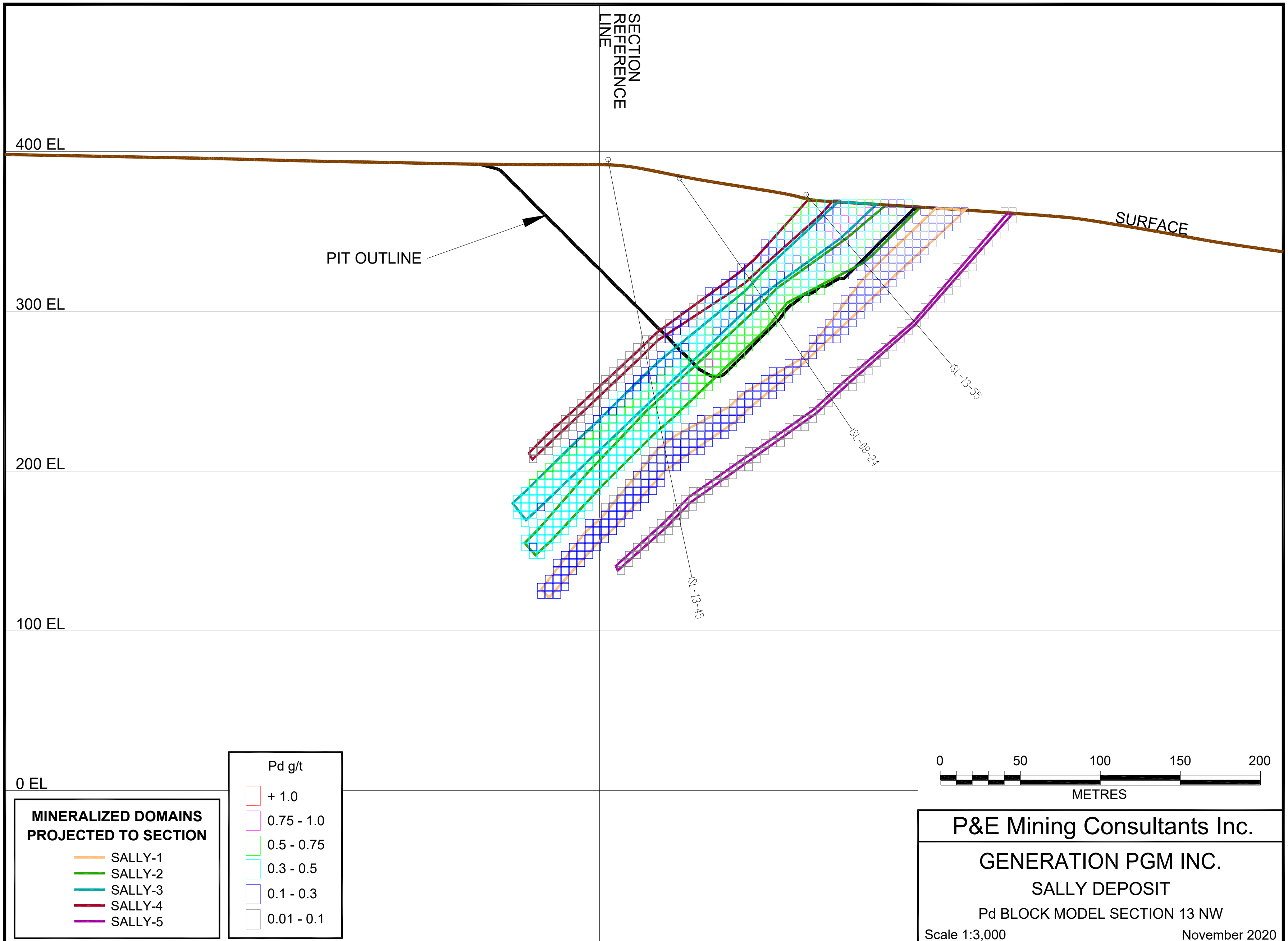

537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Cu %
+ 1.0
0.5 - 1.0
0.3 - 0.5
0.2 - 0.3
0.1 - 0.2
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Cu BLOCK MODEL PLAN 240 EL
Scale 1:6,000
November 2020

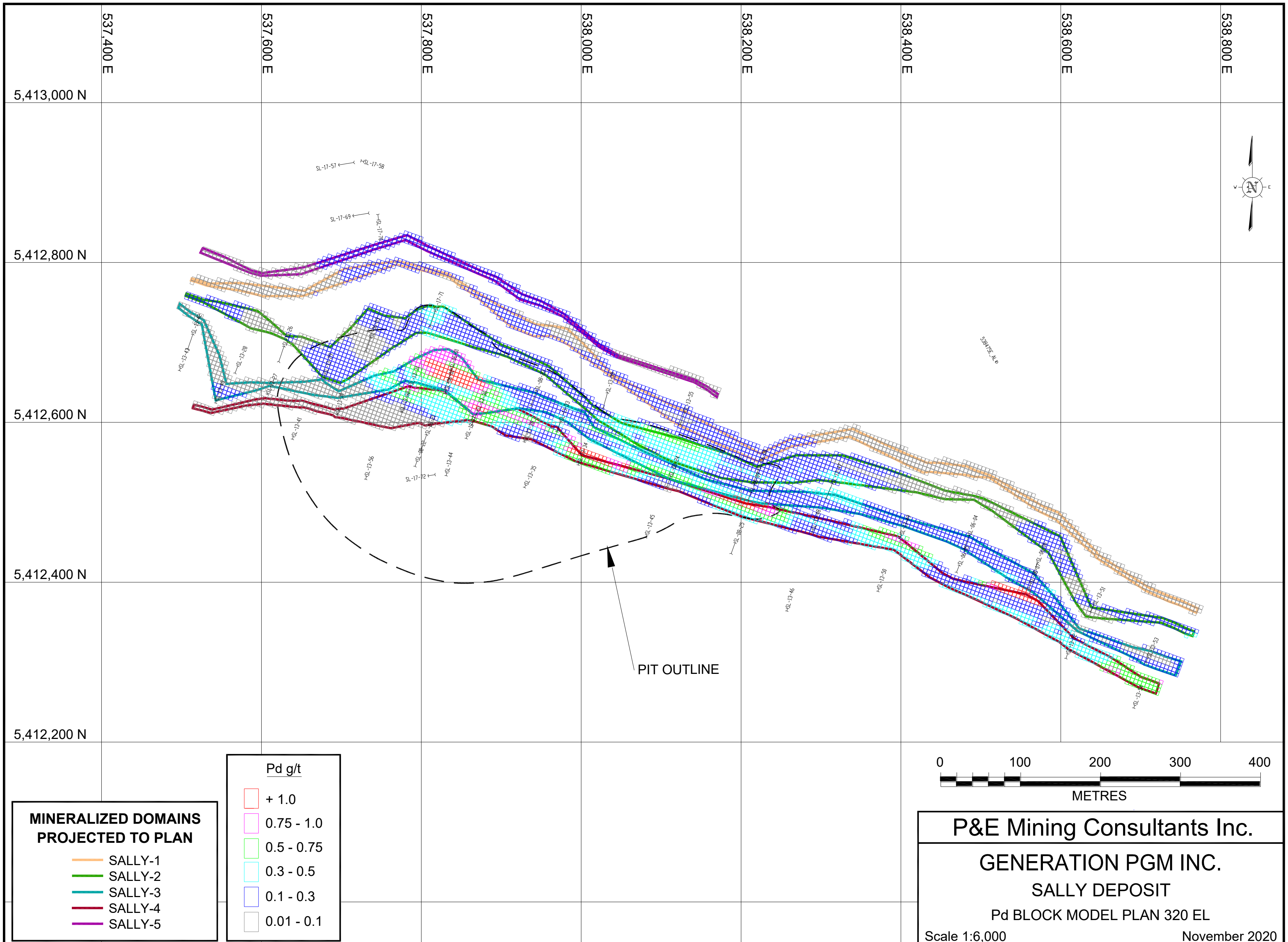
Sally Deposit

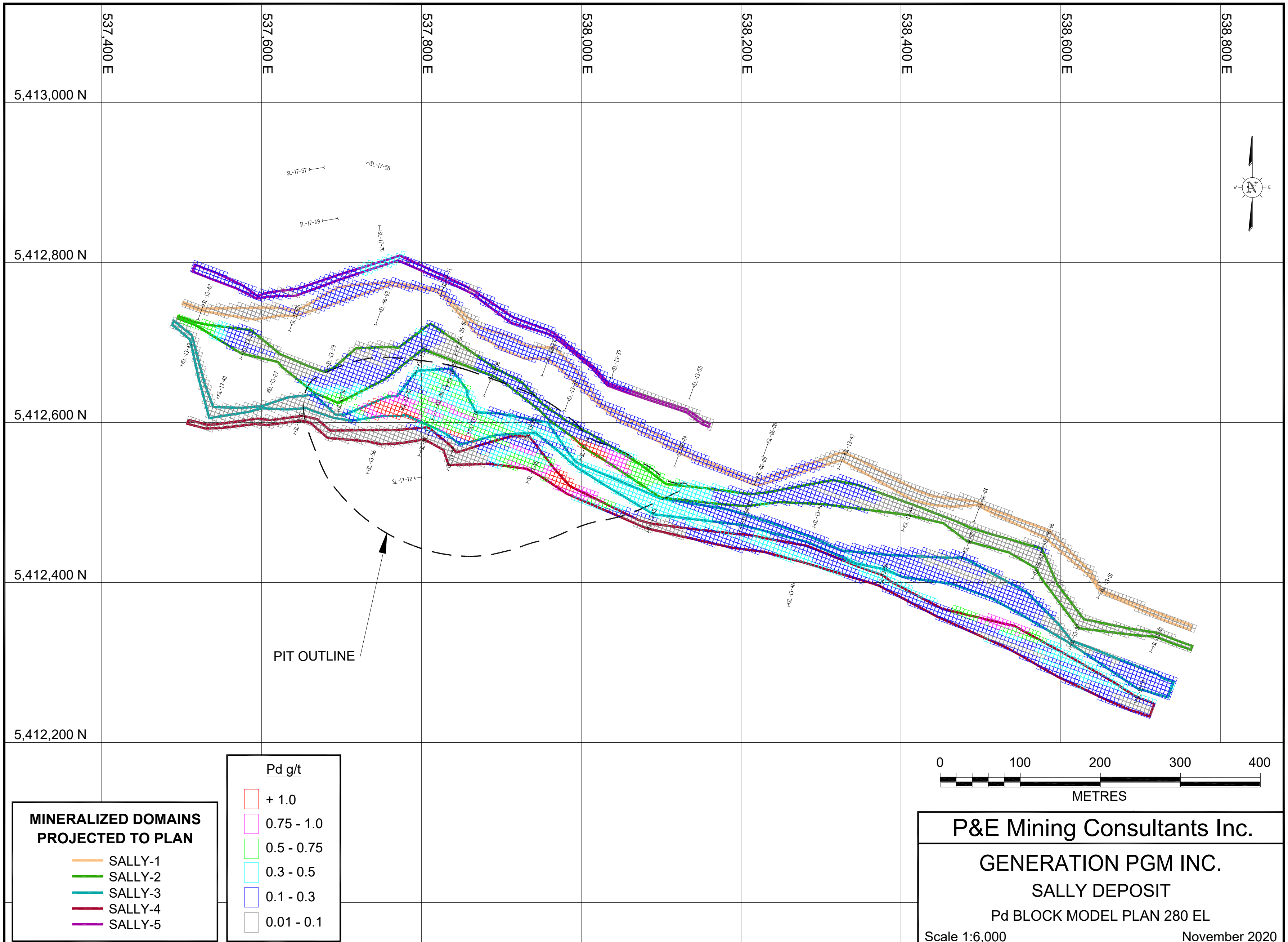
Pd Block Model Cross Sections and Plans


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL SECTION 7 NW
Scale 1:3,000
November 2020


SECTION
REFERENCE
LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
ISL-08-23
ISL-13-38
ISL-13-35
MINERALIZED DOMAINS
PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL SECTION 10 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
PIT OUTLINE
SURFACE
ISL-13-55
ISL-08-24
ISL-13-45
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL SECTION 13 NW
Scale 1:3,000
November 2020


537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL PLAN 320 EL
Scale 1:6,000
November 2020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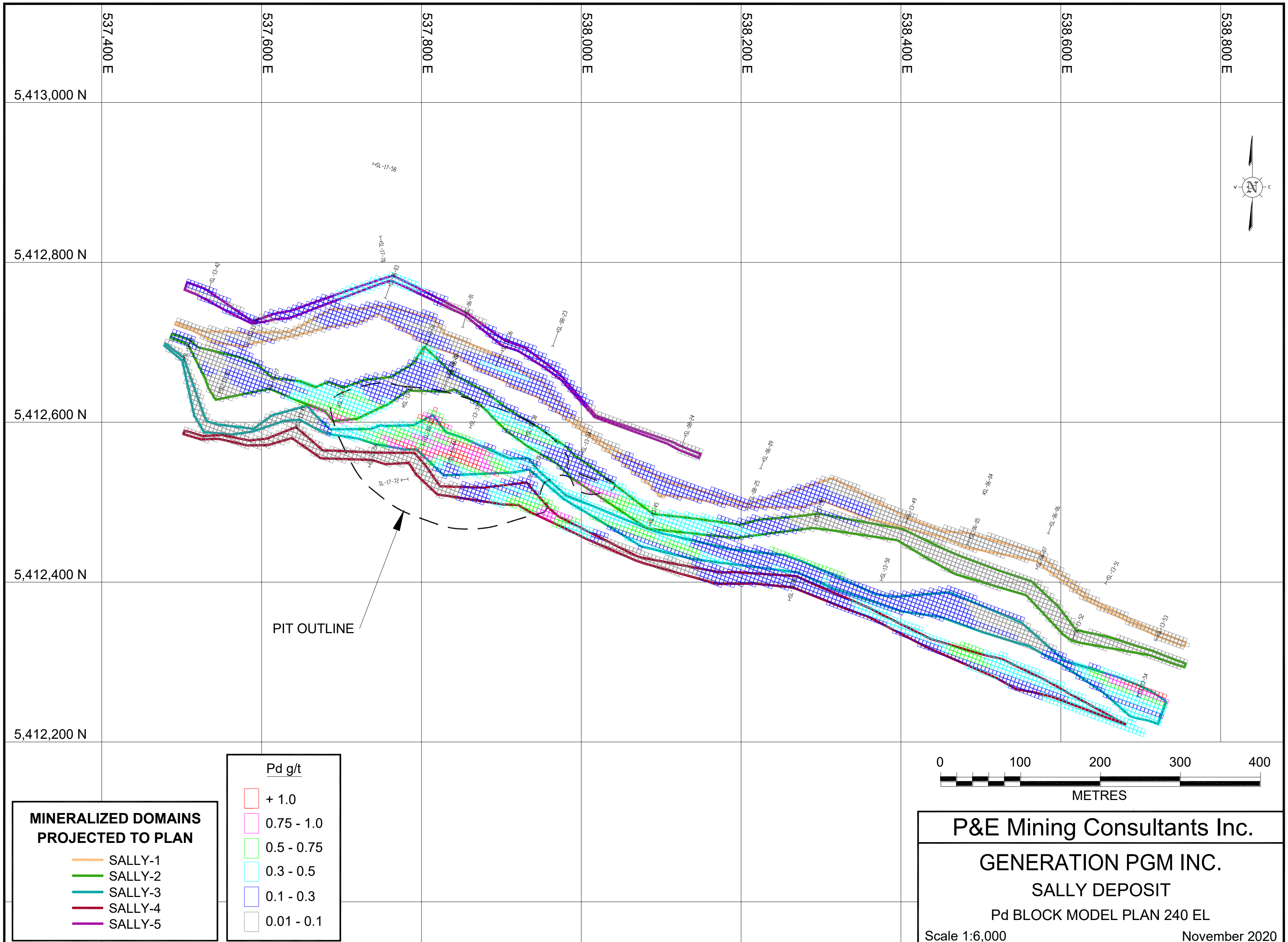
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL PLAN 280 EL
Scale 1:6,000
November 2020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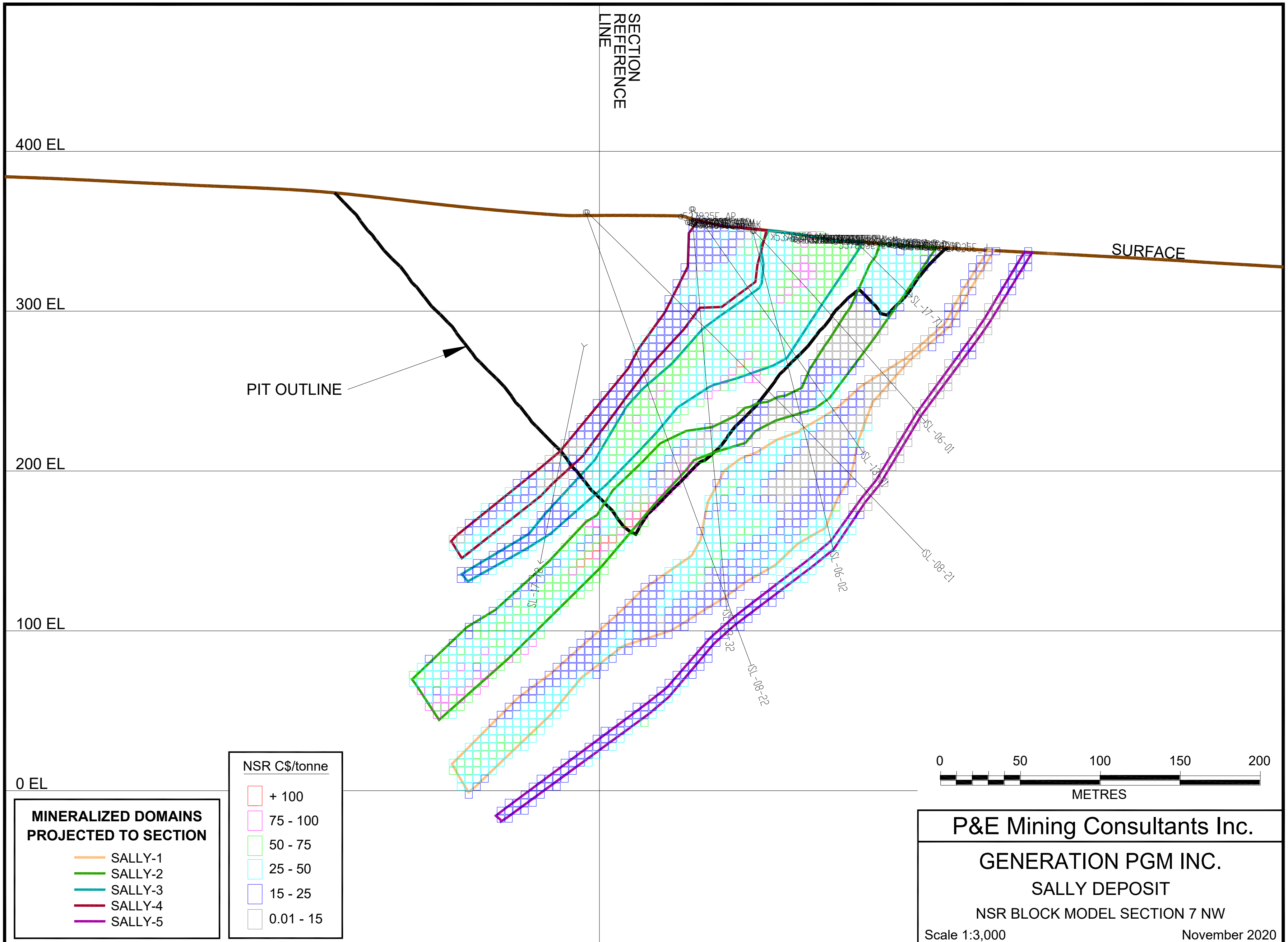
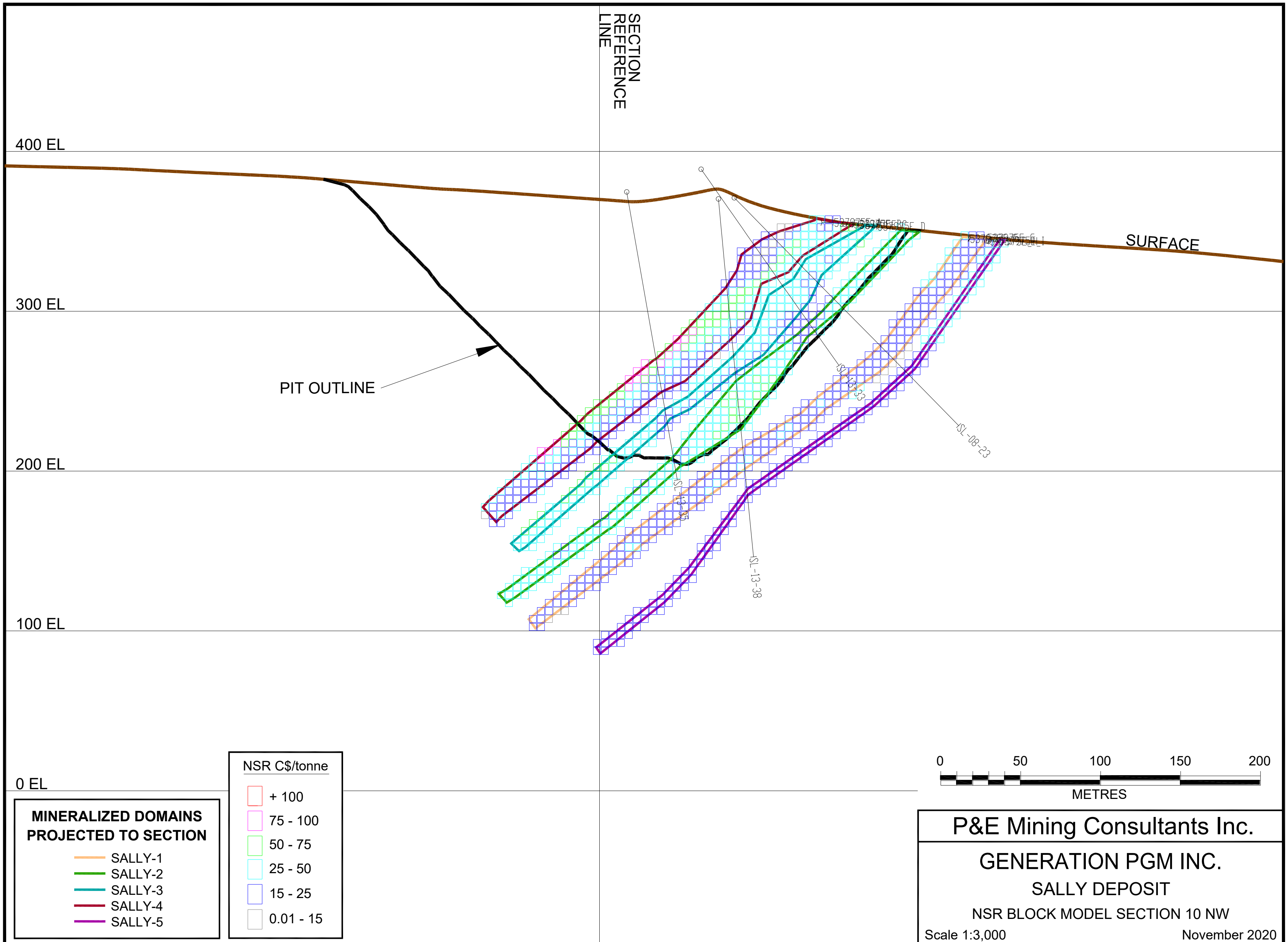
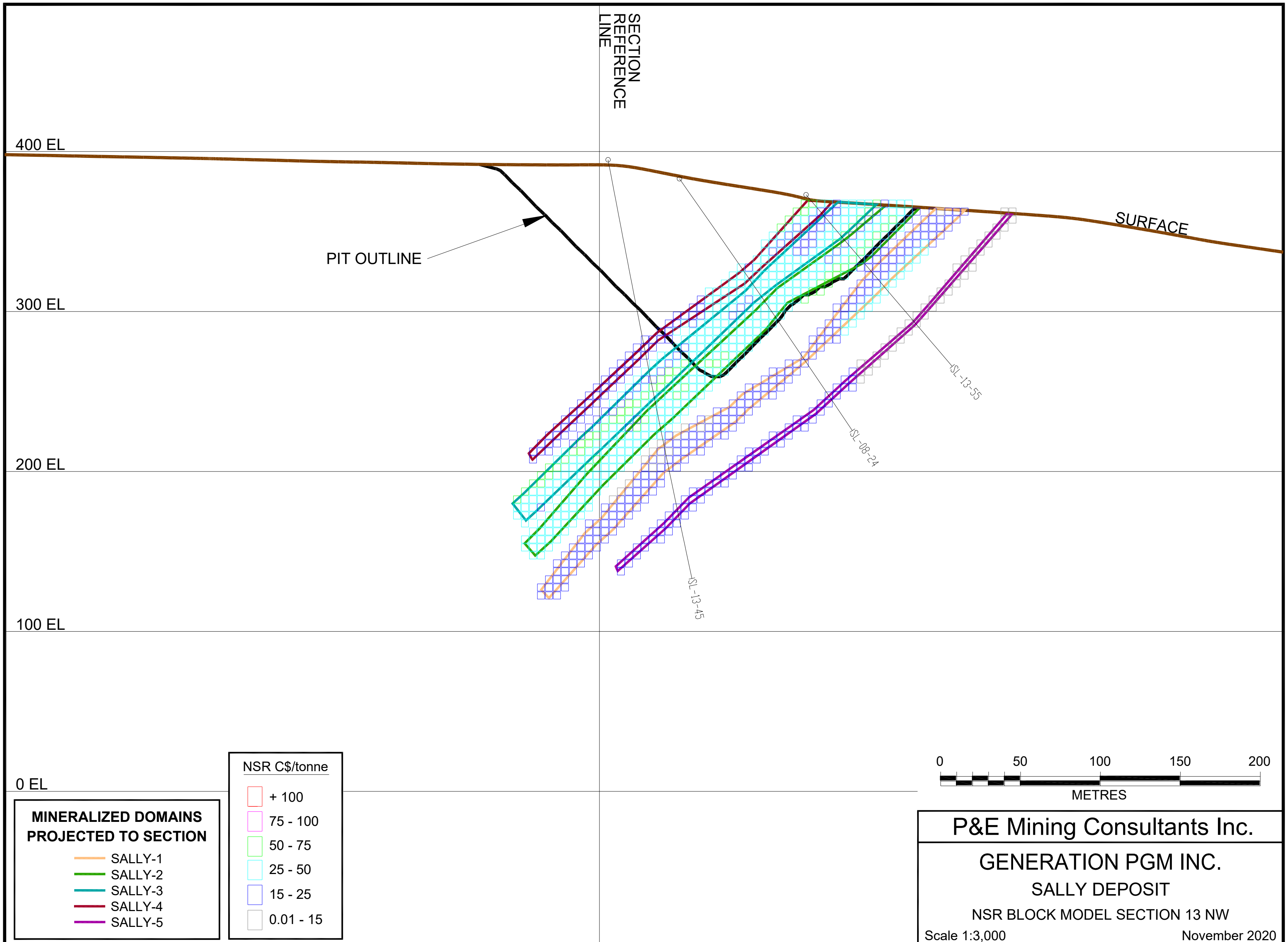
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
Pd g/t
+ 1.0
0.75 - 1.0
0.5 - 0.75
0.3 - 0.5
0.1 - 0.3
0.01 - 0.1
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
Pd BLOCK MODEL PLAN 240 EL
Scale 1:6,000
November 2020

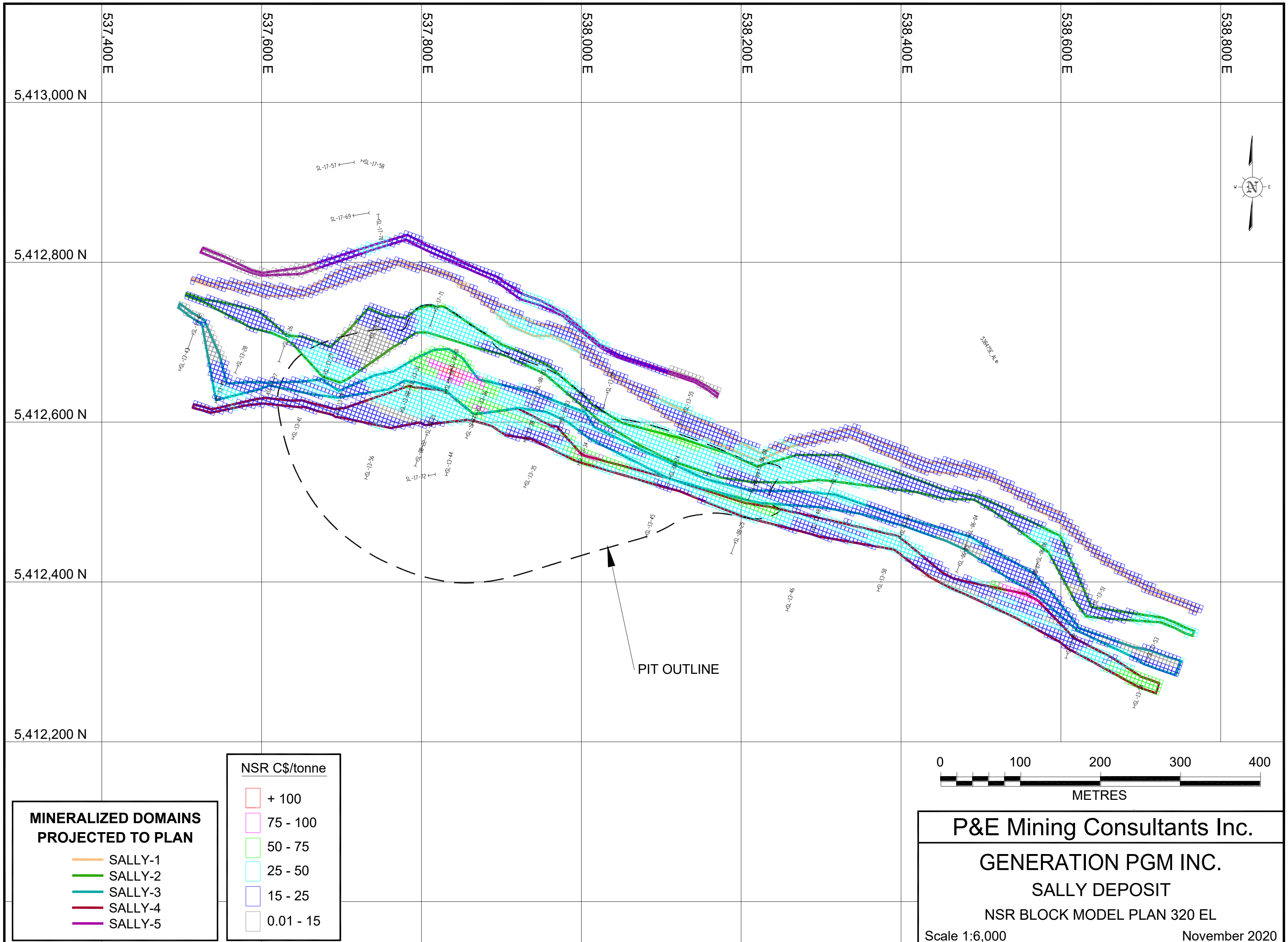
Sally Deposit

NSR Block Model Cross Sections and Plans


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL SECTION 7 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
ISL-13-33
ISL-08-23
ISL-13-38
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL SECTION 10 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
PIT OUTLINE
SURFACE
SL-13-55
SL-08-24
SL-13-45
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL SECTION 13 NW
Scale 1:3,000
November 2020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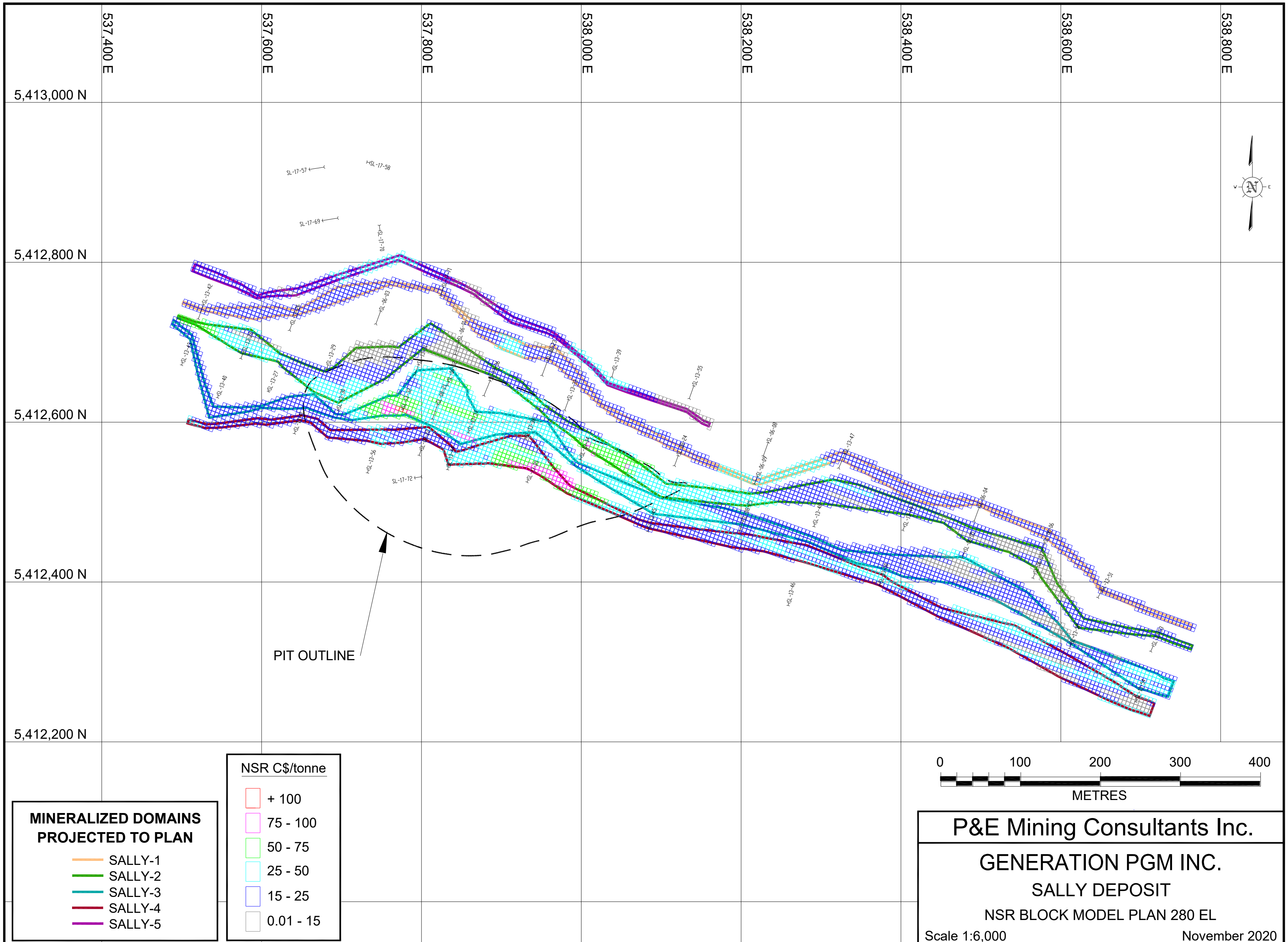
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL PLAN 320 EL
Scale 1:6,000
November 2020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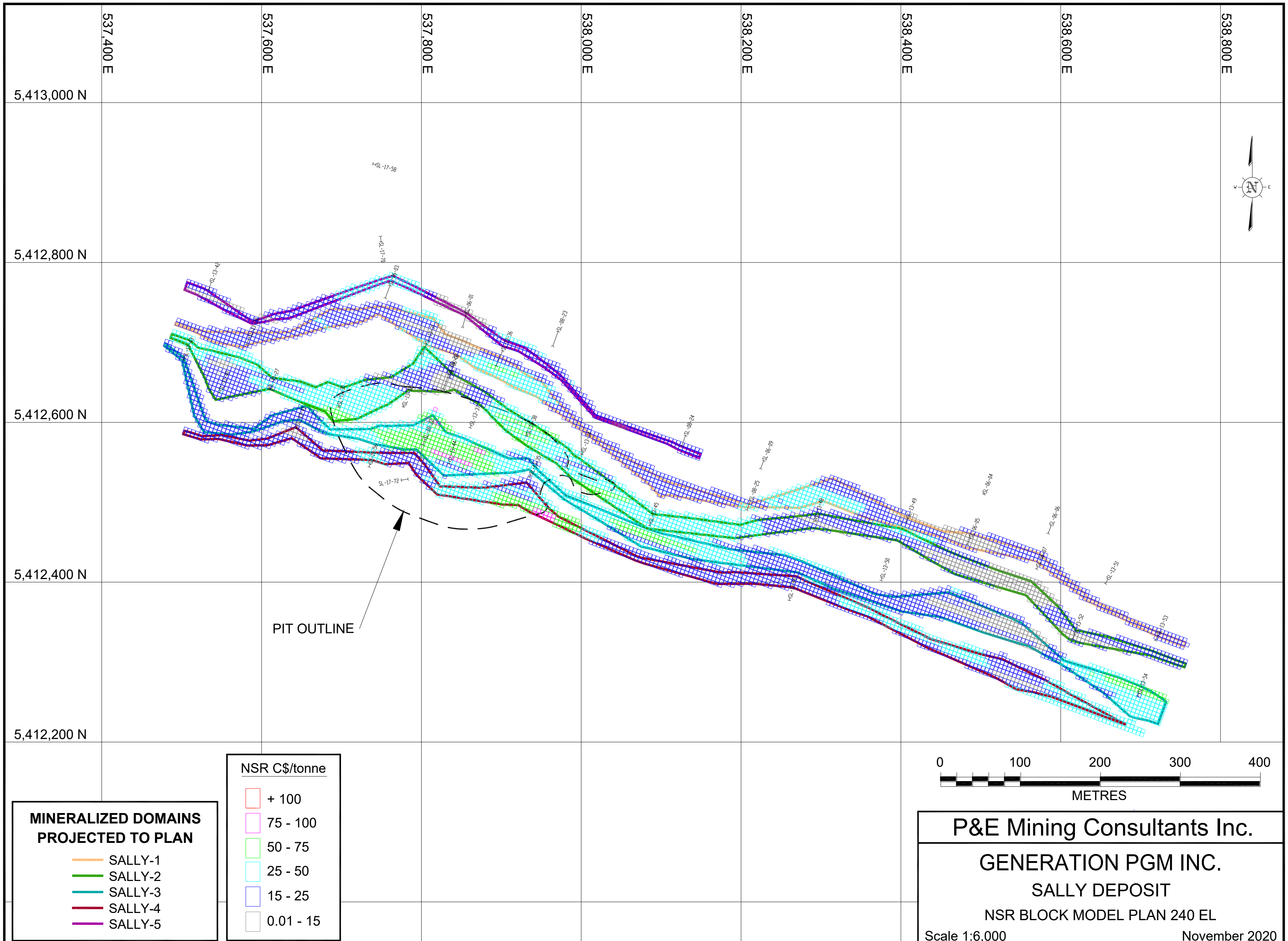
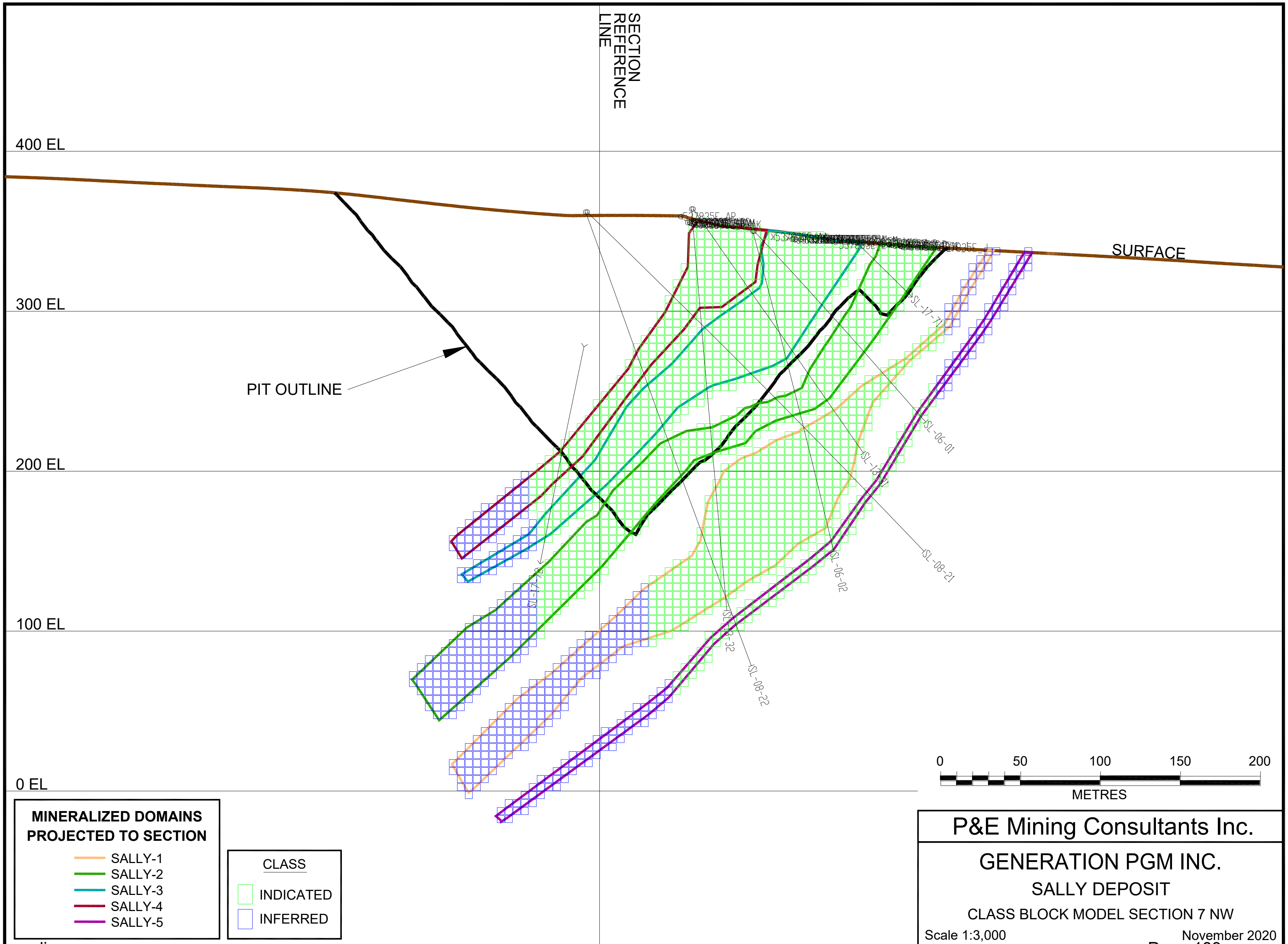
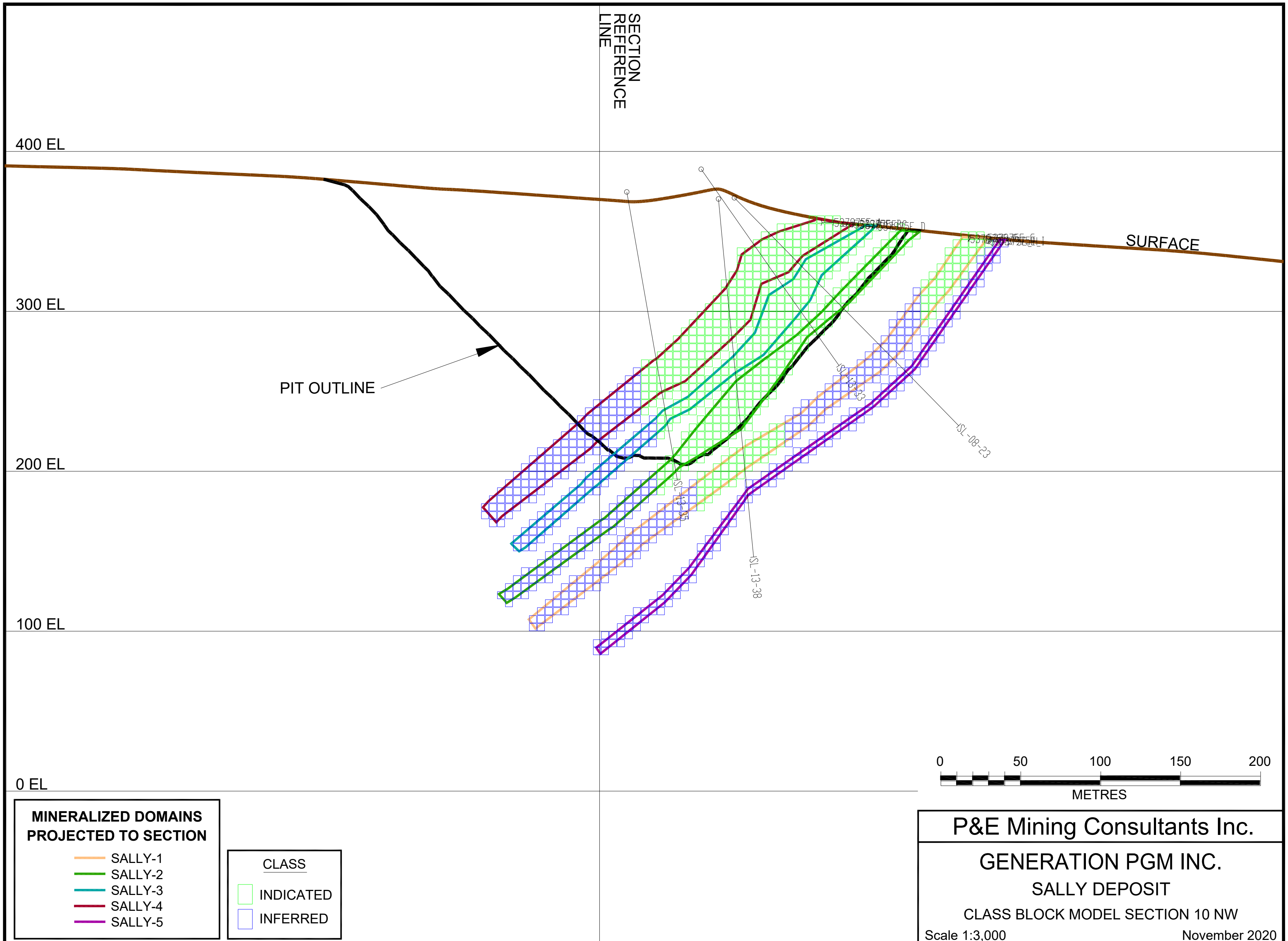
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
N
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL PLAN 280 EL
Scale 1:6,000
November 2020

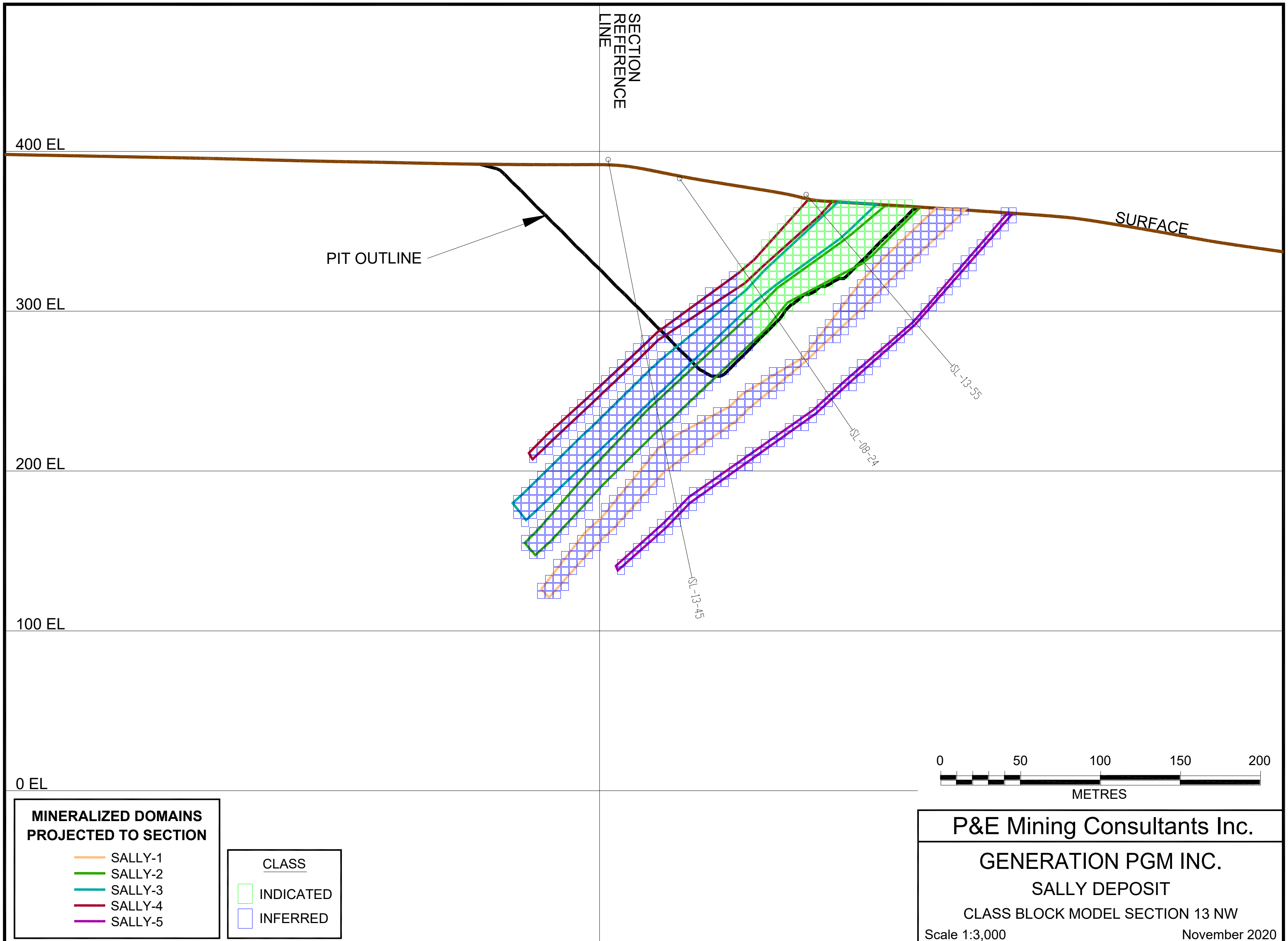

537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
NSR C$/tonne
+ 100
75 - 100
50 - 75
25 - 50
15 - 25
0.01 - 15
0
100
200
300
400
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
NSR BLOCK MODEL PLAN 240 EL
Scale 1:6,000
November 2020

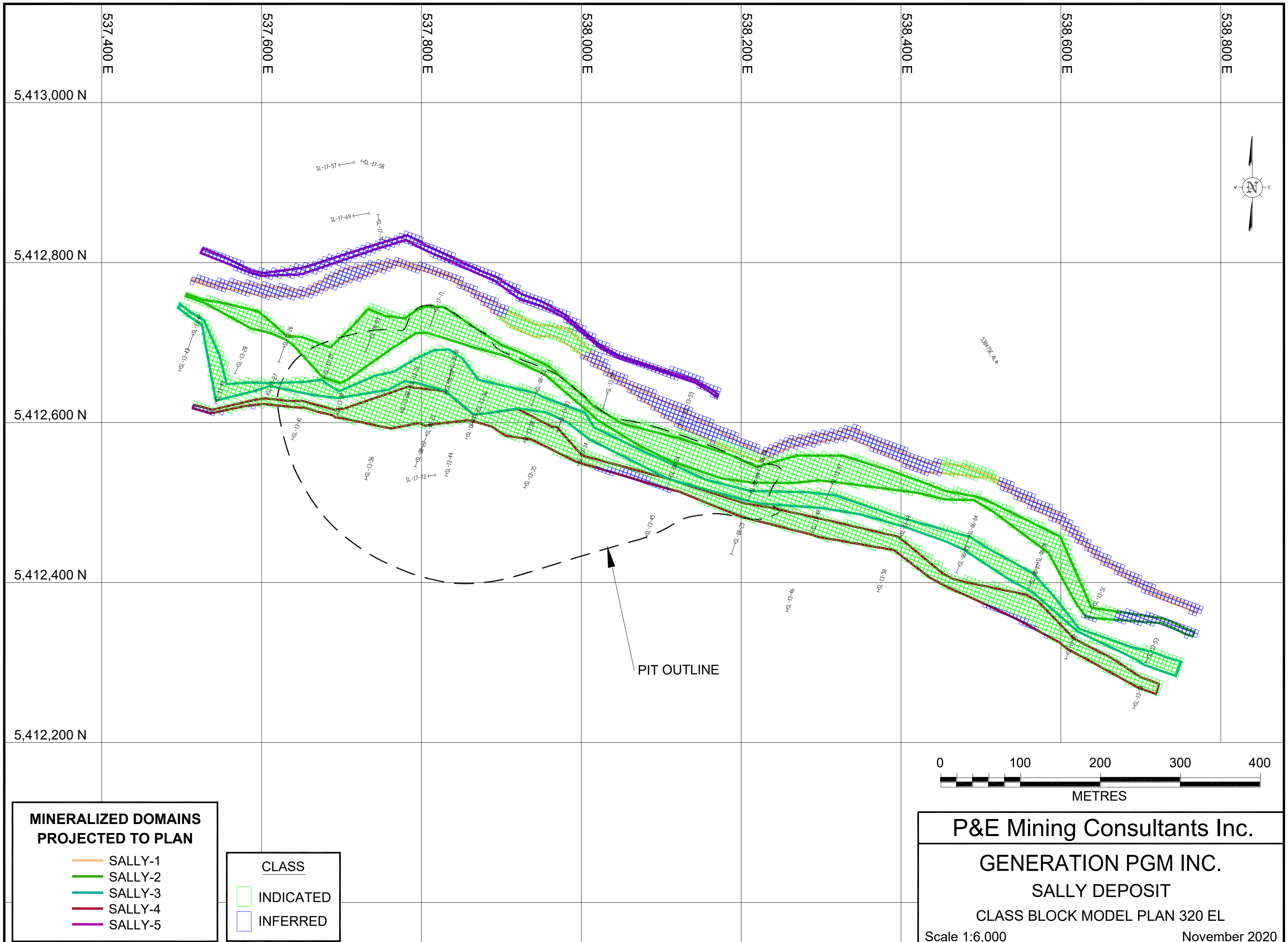
Salle Lake Deposit

Classification Block Model Cross Sections And Plans


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
0 50 100 150 200
METRES
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL SECTION 7 NW
Scale 1:3,000
November 2020


SECTION
REFERENCE
LINE
400 EL
300 EL
200 EL
100 EL
0 EL
SURFACE
PIT OUTLINE
ISL-08-23
ISL-13-38
MINERALIZED DOMAINS
PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
0
50
100
150
200
METRES
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL SECTION 10 NW
Scale 1:3,000
November 2020


SECTION REFERENCE LINE
400 EL
300 EL
200 EL
100 EL
0 EL
PIT OUTLINE
SURFACE
SL-13-55
SL-08-24
SL-13-45
0 50 100 150 200
METRES
MINERALIZED DOMAINS PROJECTED TO SECTION
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL SECTION 13 NW
Scale 1:3,000
November 2020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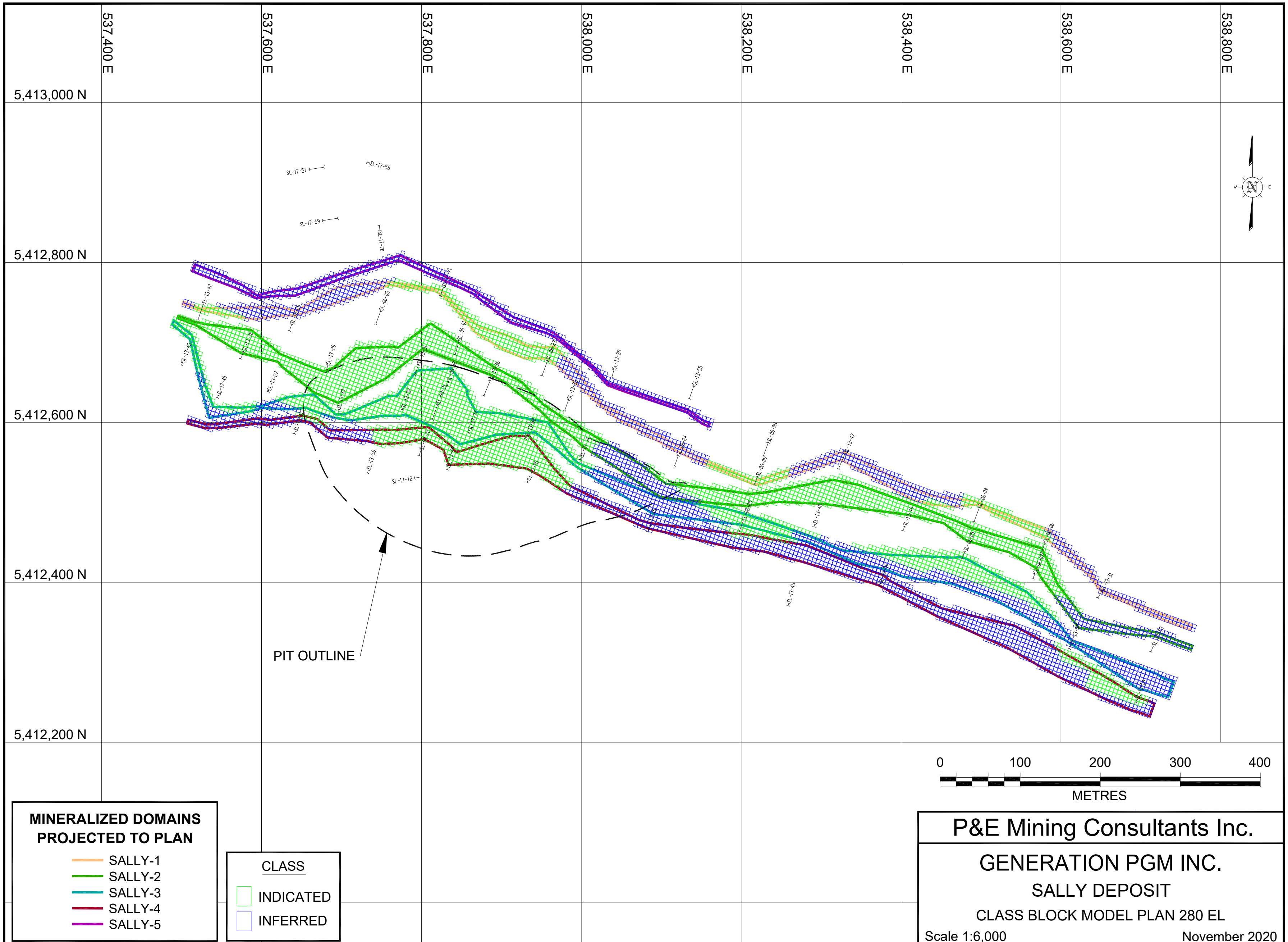
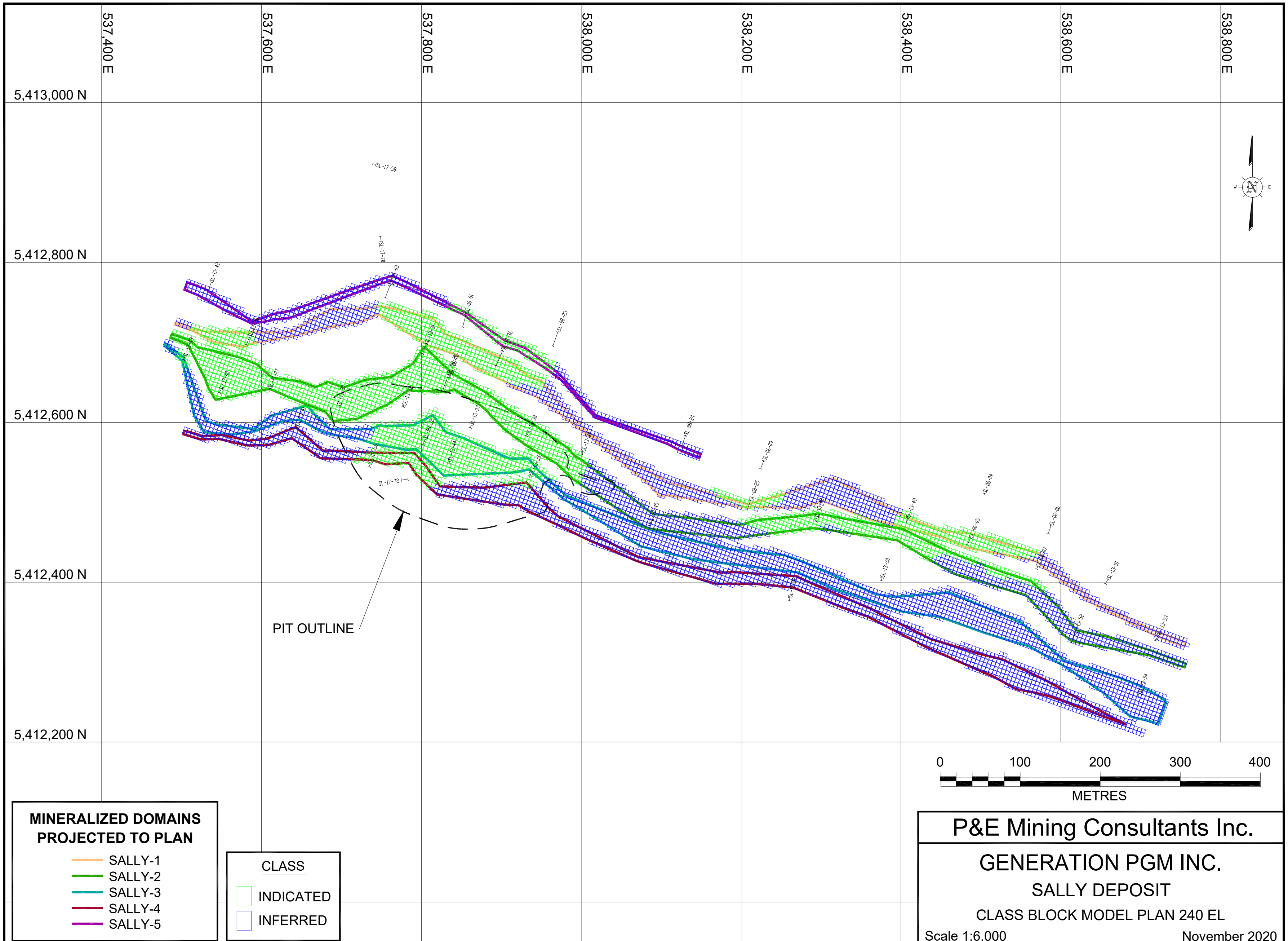
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
0
100
200
300
400
METRES
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL PLAN 320 EL
Scale 1:6,000
November 2020


537,400 E
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
0
100
200
300
400
METRES
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL PLAN 280 EL
Scale 1:6,000
November 2020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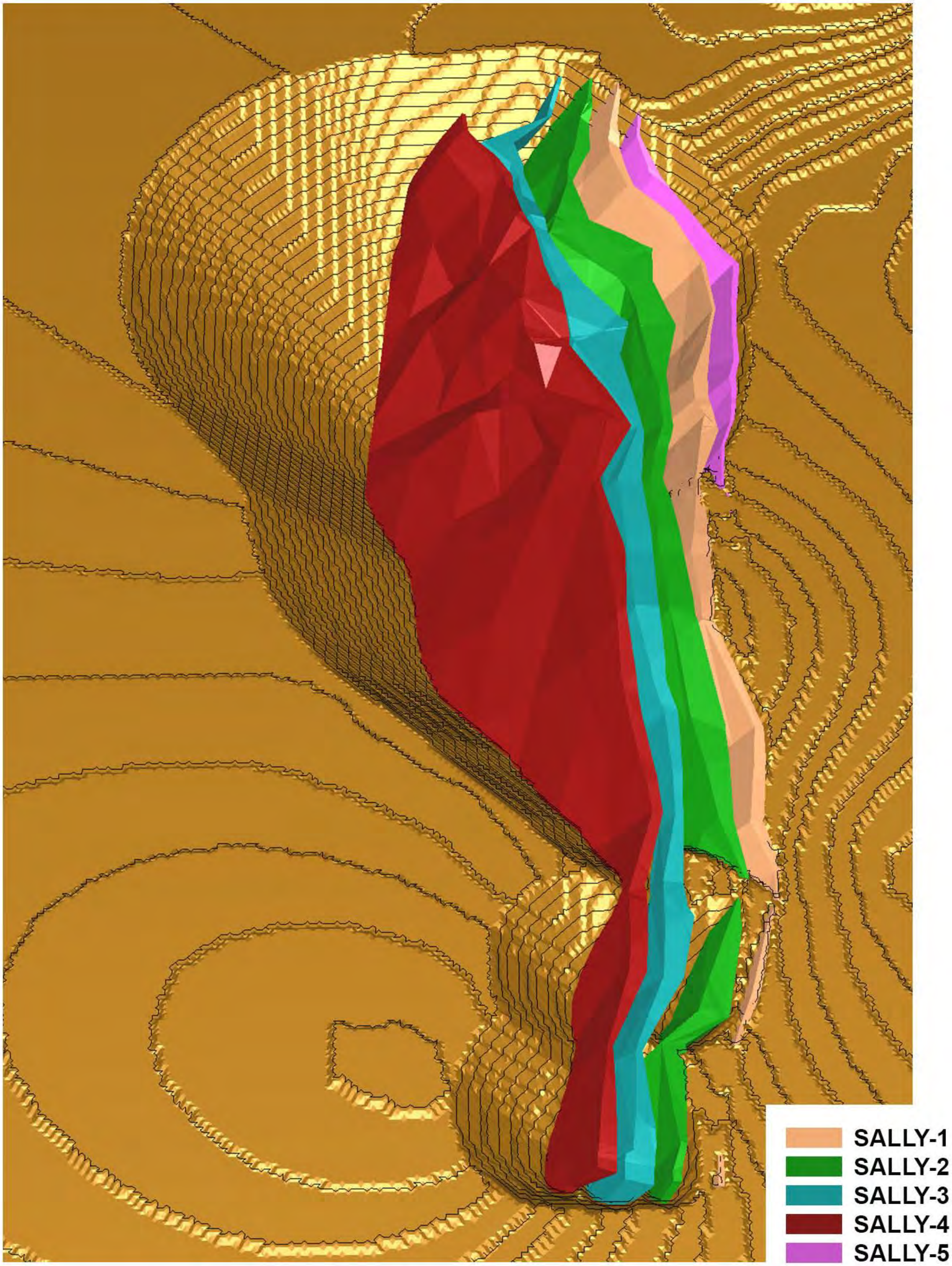
537,600 E
537,800 E
538,000 E
538,200 E
538,400 E
538,600 E
538,800 E
5,413,000 N
5,412,800 N
5,412,600 N
5,412,400 N
5,412,200 N
PIT OUTLINE
0 100 200 300 400
METRES
MINERALIZED DOMAINS PROJECTED TO PLAN
SALLY-1
SALLY-2
SALLY-3
SALLY-4
SALLY-5
CLASS
INDICATED
INFERRED
P&E Mining Consultants Inc.
GENERATION PGM INC.
SALLY DEPOSIT
CLASS BLOCK MODEL PLAN 240 EL
Scale 1:6,000
November 2020

Sally Deposit

Optimized Pit Shell

SALLY DEPOSIT - OPTIMIZED PIT SHELL



MARATHON CLAIMS LIST

Generation PGM Inc. Claims

BCMC = boundary cell mining claims
SCMC = single cell mining claims
= Pending clarification from MENDM post legacy claim conversion to mining lease

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
194327	Bermuda	SCMC		400					400
296077	Bermuda	SCMC		400					400
109473	Bermuda	SCMC		400					400
194326	Bermuda	SCMC		400					400
312953	Bermuda	SCMC		400					400
248941	Bermuda	SCMC		400					400
194328	Bermuda	SCMC		400					400
228080	Bermuda	SCMC		400					400
228079	Bermuda	SCMC		400					400
312954	Bermuda	SCMC		400					400
140278	Bermuda	SCMC		400					400
140277	Bermuda	SCMC		400					400
140276	Bermuda	SCMC		400					400
211039	Bermuda	SCMC		400					400
312955	Bermuda	SCMC		400					400
304492	Bermuda	BCMC		200					200
208665	Bermuda	BCMC		200					200
333334	Bermuda	BCMC		200					200
265337	Bermuda	BCMC		200					200
294335	Bermuda	BCMC		200					200
272575	Bermuda	SCMC		400					400
197295	Bermuda	SCMC		400					400
252487	Bermuda	SCMC		400					400
196627	Bermuda	SCMC		400					400
204589	Bermuda	SCMC		400					400
175751	Bermuda	SCMC		400					400
153966	Bermuda	SCMC		400					400
321951	Bermuda	SCMC		400					400
198581	Bermuda	SCMC		400					400
319050	Bermuda	SCMC		400					400
301213	Bermuda	SCMC		400					400
152718	Bermuda	SCMC		400					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
153967	Bermuda	SCMC		400					400
272576	Bermuda	SCMC		400					400
331269	Bermuda	SCMC		400					400
152719	Bermuda	SCMC		400					400
149742	Bermuda	SCMC		400					400
245049	Bermuda	SCMC		200					400
133149	Bermuda	BCMC		200					200
111266	Bermuda	SCMC		400					400
149743	Bermuda	SCMC		400					400
264613	Bermuda	SCMC		200					400
287592	Bermuda	BCMC		200					200
311416	Bermuda	SCMC		400					400
294334	Bermuda	SCMC		400					400
114818	Bermuda	SCMC		400					400
228286	Bermuda	SCMC		200					400
324139	Bermuda	SCMC		400					400
209450	Bermuda	SCMC		400					400
228285	Bermuda	SCMC		400					400
172155	Bermuda	SCMC		400					400
257480	Bermuda	SCMC		400					400
155571	Bermuda	SCMC		400					400
221527	Bermuda	SCMC		400					400
155570	Bermuda	SCMC		400					400
287593	Bermuda	SCMC		400					400
190215	Bermuda	SCMC		400					400
344937	Bermuda	SCMC		400					400
144206	Bermuda	SCMC		400					400
218108	Bermuda	SCMC		400					400
300505	Bermuda	SCMC		400					400
151994	Bermuda	SCMC		400					400
111326	Bermuda	SCMC		400					400
318432	Bermuda	SCMC		400					400
271264	Bermuda	SCMC		400					400
252486	Bermuda	SCMC		400					400
263844	Bermuda	SCMC		400					400
151995	Bermuda	SCMC		400					400
263843	Bermuda	SCMC		400					400
109766	Bermuda	SCMC		400					400
155029	Bermuda	SCMC		400					400
238984	Bermuda	SCMC		200					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
127090	Bermuda	SCMC		200					400
137727	Bermuda	SCMC		400					400
127088	Bermuda	SCMC		400					400
124057	Bermuda	BCMC		200					200
124056	Bermuda	BCMC		200					200
291402	Bermuda	BCMC		200					200
236183	Bermuda	BCMC		200					200
303513	Bermuda	BCMC		200					200
303512	Bermuda	BCMC		200					200
235333	Bermuda	BCMC		200					200
128220	Bermuda	BCMC		200					200
143404	Bermuda	SCMC		400					400
157516	Bermuda	SCMC		400					400
279025	Bermuda	SCMC		400					400
216734	Bermuda	BCMC		200					200
211413	Bermuda	BCMC		200					200
211412	Bermuda	SCMC		200					400
325555	Bermuda	SCMC		200					400
326122	Bermuda	SCMC		400					400
296852	Bermuda	SCMC		400					400
259468	Bermuda	SCMC		200					400
223527	Bermuda	SCMC		200					400
157577	Bermuda	BCMC		200					200
153444	Bermuda	BCMC		200					200
115333	Bermuda	BCMC		200					200
206781	Bermuda	BCMC		200					200
169483	Bermuda	BCMC		200					200
198743	Bermuda	BCMC		200					200
218871	Bermuda	BCMC		200					200
218902	Bermuda	BCMC			200				200
218904	Bermuda	BCMC			200				200
220374	Bermuda	BCMC			200				200
275573	Bermuda	BCMC			200				200
246869	Bermuda	BCMC			200				200
246871	Bermuda	BCMC			200				200
108297	Bermuda	BCMC			200				200
331141	Bermuda	BCMC			200				200
155028	Bermuda	BCMC			200				200
331123	Bermuda	BCMC			200				200
185158	Bermuda	BCMC			200				200

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
270652	Bermuda	BCMC			200				200
335995	Bermuda	BCMC			200				200
227844	Bermuda	SCMC			400				400
127089	Bermuda	SCMC			400				400
267594	Bermuda	SCMC			200				400
267593	Bermuda	SCMC			400				400
246870	Bermuda	SCMC			400				400
138234	Bermuda	SCMC			400				400
144205	Bermuda	SCMC			400				400
144204	Bermuda	SCMC			400				400
190214	Bermuda	SCMC			400				400
238872	Bermuda	SCMC			400				400
185159	Bermuda	SCMC			400				400
318431	Bermuda	SCMC			400				400
208679	Bermuda	BCMC			200				200
208680	Bermuda	BCMC			200				200
274675	Bermuda	BCMC			200				200
220721	Bermuda	BCMC			200				200
295847	Bermuda	BCMC			200				200
307953	Bermuda	SCMC			200				400
335573	Bermuda	SCMC			200				400
220680	Bermuda	SCMC			200				400
104775	Bermuda	SCMC			200				400
325123	Bermuda	SCMC			400				400
325122	Bermuda	SCMC			400				400
172397	Bermuda	SCMC			400				400
287212	Bermuda	SCMC			400				400
155919	Bermuda	BCMC			200				200
172396	Bermuda	SCMC			400				400
191384	Bermuda	SCMC			400				400
155918	Bermuda	SCMC			400				400
127909	Bermuda	SCMC			400				400
127910	Bermuda	SCMC			400				400
307954	Bermuda	SCMC			400				400
172398	Bermuda	BCMC			200				200
139377	Bermuda	BCMC			200				200
181526	Bermuda	SCMC			400				400
256300	Bermuda	SCMC			400				400
292968	Bermuda	SCMC			400				400
256301	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
188962	Bermuda	SCMC			400				400
237633	Bermuda	SCMC			400				400
188963	Bermuda	SCMC			400				400
311684	Bermuda	SCMC			400				400
267767	Bermuda	SCMC			400				400
157575	Bermuda	SCMC			400				400
100487	Bermuda	SCMC			400				400
314083	Bermuda	SCMC			400				400
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168575	Bermuda	SCMC			400				400
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277495	Bermuda	SCMC			400				400
211483	Bermuda	SCMC			400				400
100488	Bermuda	SCMC			400				400
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112617	Bermuda	SCMC			400				400
198544	Bermuda	SCMC			400				400
265300	Bermuda	SCMC			400				400
230299	Bermuda	SCMC			400				400
117128	Bermuda	SCMC			400				400
326119	Bermuda	SCMC			400				400
128289	Bermuda	SCMC			400				400
223525	Bermuda	SCMC			400				400
332703	Bermuda	SCMC			400				400
133075	Bermuda	SCMC			400				400
111199	Bermuda	SCMC			400				400
271263	Bermuda	SCMC			400				400
244476	Bermuda	SCMC			400				400
244475	Bermuda	SCMC			400				400
318485	Bermuda	SCMC			400				400
186414	Bermuda	SCMC			400				400
133076	Bermuda	SCMC			400				400
133879	Bermuda	BCMC			200				200
253790	Bermuda	BCMC			200				200
157598	Bermuda	BCMC			200				200
145362	Bermuda	SCMC			200				400
279554	Bermuda	SCMC			200				400
128316	Bermuda	SCMC			200				400
279555	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
101842	Bermuda	SCMC			200				400
278189	Bermuda	SCMC			200				400
260137	Bermuda	SCMC			200				400
312770	Bermuda	SCMC			200				400
259491	Bermuda	SCMC			400				400
211500	Bermuda	SCMC			400				400
212178	Bermuda	SCMC			400				400
279713	Bermuda	SCMC			400				400
204082	Bermuda	SCMC			400				400
297005	Bermuda	SCMC			400				400
260138	Bermuda	SCMC			400				400
102007	Bermuda	SCMC			400				400
230971	Bermuda	SCMC			400				400
117127	Bermuda	SCMC			400				400
260139	Bermuda	SCMC			400				400
297007	Bermuda	SCMC			400				400
297006	Bermuda	SCMC			400				400
158264	Bermuda	SCMC			400				400
296850	Bermuda	SCMC			400				400
203375	Bermuda	SCMC			200				400
279008	Bermuda	SCMC			200				400
100469	Bermuda	SCMC			200				400
223004	Bermuda	SCMC			200				400
326105	Bermuda	SCMC			200				400
143471	Bermuda	SCMC			400				400
258945	Bermuda	SCMC			400				400
128266	Bermuda	SCMC			400				400
163587	Bermuda	SCMC			400				400
143470	Bermuda	SCMC			400				400
203376	Bermuda	BCMC			200				200
211411	Bermuda	BCMC			200				200
128294	Bermuda	SCMC			400				400
128293	Bermuda	SCMC			400				400
211485	Bermuda	SCMC			400				400
296854	Bermuda	SCMC			400				400
259470	Bermuda	SCMC			400				400
163608	Bermuda	SCMC			400				400
277499	Bermuda	SCMC			400				400
279026	Bermuda	SCMC			200				400
163588	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
314067	Bermuda	SCMC			400				400
100470	Bermuda	SCMC			200				400
143485	Bermuda	SCMC			200				400
326107	Bermuda	SCMC			400				400
211461	Bermuda	SCMC			400				400
279009	Bermuda	SCMC			200				400
326123	Bermuda	SCMC			400				400
230300	Bermuda	SCMC			400				400
203392	Bermuda	SCMC			200				400
277412	Bermuda	SCMC			400				400
211410	Bermuda	SCMC			400				400
202813	Bermuda	SCMC			400				400
211460	Bermuda	SCMC			200				400
222953	Bermuda	SCMC			200				400
163521	Bermuda	SCMC			200				400
296255	Bermuda	SCMC			400				400
278948	Bermuda	SCMC			400				400
258876	Bermuda	SCMC			200				400
143403	Bermuda	BCMC			200				200
296254	Bermuda	BCMC			200				200
311393	Bermuda	SCMC			200				400
296264	Bermuda	SCMC			200				400
143407	Bermuda	SCMC			200				400
258883	Bermuda	SCMC			200				400
157519	Bermuda	SCMC			200				400
154873	Bermuda	BCMC			200				200
302681	Bermuda	BCMC			200				200
154874	Bermuda	BCMC			200				200
336611	Bermuda	BCMC			200				200
308997	Bermuda	BCMC			200				200
302682	Bermuda	BCMC			200				200
227591	Bermuda	BCMC			200				200
227592	Bermuda	BCMC			200				200
110954	Bermuda	BCMC			200				200
315704	Bermuda	BCMC			200				200
293074	Bermuda	BCMC			200				200
160474	Bermuda	BCMC			200				200
174959	Bermuda	BCMC			200				200
258907	Bermuda	SCMC			400				400
128240	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
277446	Bermuda	SCMC			400				400
117075	Bermuda	SCMC			400				400
230273	Bermuda	SCMC			400				400
202837	Bermuda	SCMC			400				400
258908	Bermuda	SCMC			400				400
277447	Bermuda	SCMC			400				400
222987	Bermuda	SCMC			400				400
117088	Bermuda	SCMC			400				400
203358	Bermuda	SCMC			400				400
157554	Bermuda	SCMC			400				400
201363	Bermuda	SCMC			400				400
294296	Bermuda	SCMC			400				400
172128	Bermuda	SCMC			400				400
201362	Bermuda	SCMC			400				400
202816	Bermuda	SCMC			400				400
203396	Bermuda	SCMC			400				400
326124	Bermuda	SCMC			400				400
157579	Bermuda	SCMC			400				400
115931	Bermuda	SCMC			400				400
100643	Bermuda	SCMC			400				400
115930	Bermuda	SCMC			400				400
115929	Bermuda	SCMC			400				400
157517	Bermuda	SCMC			400				400
223530	Bermuda	SCMC			400				400
296853	Bermuda	SCMC			400				400
157578	Bermuda	SCMC			400				400
172130	Bermuda	SCMC			400				400
172129	Bermuda	SCMC			400				400
324110	Bermuda	SCMC			400				400
115932	Bermuda	SCMC			400				400
157518	Bermuda	SCMC			400				400
100644	Bermuda	SCMC			200				400
324111	Bermuda	SCMC			200				400
296263	Bermuda	SCMC			400				400
100403	Bermuda	SCMC			400				400
296262	Bermuda	SCMC			400				400
258881	Bermuda	SCMC			400				400
163527	Bermuda	SCMC			400				400
314013	Bermuda	SCMC			400				400
100404	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
258882	Bermuda	SCMC			400				400
230235	Bermuda	SCMC			400				400
302679	Bermuda	SCMC			400				400
266814	Bermuda	SCMC			400				400
286892	Bermuda	SCMC			400				400
302678	Bermuda	SCMC			400				400
118164	Bermuda	SCMC			400				400
125696	Bermuda	SCMC			400				400
200190	Bermuda	SCMC			400				400
200189	Bermuda	SCMC			400				400
125598	Bermuda	SCMC			400				400
266224	Bermuda	SCMC			400				400
189077	Bermuda	SCMC			400				400
302680	Bermuda	SCMC			400				400
310710	Bermuda	SCMC			400				400
286893	Bermuda	SCMC			400				400
293073	Bermuda	SCMC			400				400
226446	Bermuda	SCMC			400				400
286894	Bermuda	SCMC			400				400
125697	Bermuda	SCMC			400				400
266225	Bermuda	SCMC			400				400
208218	Bermuda	SCMC			400				400
153675	Bermuda	SCMC			400				400
249206	Bermuda	SCMC			400				400
212500	Bermuda	SCMC			400				400
554561	Bermuda	SCMC			400				400
554562	Bermuda	SCMC			400				400
554563	Bermuda	SCMC			400				400
554564	Bermuda	SCMC			400				400
554565	Bermuda	SCMC			400				400
554566	Bermuda	SCMC			400				400
554567	Bermuda	SCMC			400				400
554568	Bermuda	SCMC			400				400
554569	Bermuda	SCMC			400				400
554570	Bermuda	SCMC			400				400
554571	Bermuda	SCMC			400				400
554572	Bermuda	SCMC			400				400
554573	Bermuda	SCMC			400				400
554574	Bermuda	SCMC			400				400
554575	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
554576	Bermuda	SCMC			400				400
554577	Bermuda	SCMC			400				400
554578	Bermuda	SCMC			400				400
554579	Bermuda	SCMC			400				400
554580	Bermuda	SCMC			400				400
554581	Bermuda	SCMC			400				400
554582	Bermuda	SCMC			400				400
554583	Bermuda	SCMC			400				400
554584	Bermuda	SCMC			400				400
554585	Bermuda	SCMC			400				400
554586	Bermuda	SCMC			400				400
554587	Bermuda	SCMC			400				400
554588	Bermuda	SCMC			400				400
554589	Bermuda	SCMC			400				400
554590	Bermuda	SCMC			400				400
554591	Bermuda	SCMC			400				400
554592	Bermuda	SCMC			400				400
554593	Bermuda	SCMC			400				400
554594	Bermuda	SCMC			400				400
554595	Bermuda	SCMC			400				400
554596	Bermuda	SCMC			400				400
554597	Bermuda	SCMC			400				400
554598	Bermuda	SCMC			400				400
554599	Bermuda	SCMC			400				400
554600	Bermuda	SCMC			400				400
554601	Bermuda	SCMC			400				400
554602	Bermuda	SCMC			400				400
554603	Bermuda	SCMC			400				400
554604	Bermuda	SCMC			400				400
554605	Bermuda	SCMC			400				400
554606	Bermuda	SCMC			400				400
554607	Bermuda	SCMC			400				400
554608	Bermuda	SCMC			400				400
554609	Bermuda	SCMC			400				400
554610	Bermuda	SCMC			400				400
554611	Bermuda	SCMC			400				400
554612	Bermuda	SCMC			400				400
554613	Bermuda	SCMC			400				400
554614	Bermuda	SCMC			400				400
554615	Bermuda	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
554616	Bermuda	SCMC			400				400
554617	Bermuda	SCMC			400				400
554618	Bermuda	SCMC			400				400
554619	Bermuda	SCMC			400				400
554620	Bermuda	SCMC			400				400
554621	Bermuda	SCMC			400				400
554622	Bermuda	SCMC			400				400
554623	Bermuda	SCMC			400				400
554624	Bermuda	SCMC			400				400
554625	Bermuda	SCMC			400				400
554626	Bermuda	SCMC			400				400
554627	Bermuda	SCMC			400				400
554628	Bermuda	SCMC			400				400
554629	Bermuda	SCMC			400				400
554630	Bermuda	SCMC			400				400
554631	Bermuda	SCMC			400				400
554632	Bermuda	SCMC			400				400
554633	Bermuda	SCMC			400				400
554634	Bermuda	SCMC			400				400
554635	Bermuda	SCMC			400				400
554636	Bermuda	SCMC			400				400
554637	Bermuda	SCMC			400				400
554638	Bermuda	SCMC			400				400
334439	Bermuda	BCMC			200				200
311810	Bermuda	BCMC			200				200
201200	Bermuda	BCMC			200				200
324021	Bermuda	SCMC			400				400
255852	Bermuda	SCMC			400				400
113254	Bermuda	SCMC			400				400
311808	Bermuda	SCMC			400				400
334438	Bermuda	SCMC			400				400
141991	Bermuda	SCMC			400				400
170727	Bermuda	SCMC			400				400
311809	Bermuda	SCMC			400				400
334440	Bermuda	SCMC			400				400
112618	Bermuda	SCMC			400				400
272535	Bermuda	SCMC			400				400
272029	Bermuda	SCMC			400				400
187185	Bermuda	SCMC			400				400
260281	Bermuda	BCMC			200				200

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
280335	Bermuda	BCMC			200				200
117044	Bermuda	SCMC			200				400
268282	Bermuda	BCMC			200				200
211409	Bermuda	SCMC			200				400
202812	Bermuda	SCMC			200				400
211408	Bermuda	SCMC			200				400
314084	Bermuda	SCMC			200				400
143484	Bermuda	SCMC			200				400
203393	Bermuda	SCMC			200				400
158913	Bermuda	BCMC			200				200
301811	Bermuda	BCMC			200				200
265222	Bermuda	BCMC			200				200
264685	Bermuda	BCMC			200				200
245137	Bermuda	BCMC			200				200
333034	Bermuda	BCMC			200				200
333033	Bermuda	BCMC			200				200
253177	Bermuda	BCMC			200				200
321306	Bermuda	SCMC			400				400
167991	Bermuda	SCMC			400				400
284250	Bermuda	SCMC			400				400
265223	Bermuda	SCMC			400				400
264686	Bermuda	SCMC			400				400
115302	Bermuda	SCMC			400				400
253178	Bermuda	SCMC			400				400
187101	Bermuda	SCMC			400				400
253179	Bermuda	SCMC			400				400
187102	Bermuda	SCMC			400				400
245138	Bermuda	SCMC			400				400
321307	Bermuda	SCMC			400				400
333503	Bermuda	BCMC			200				200
319326	Bermuda	BCMC			200				200
206113	Bermuda	BCMC			200				200
555320	Central	SCMC			400				400
555321	Central	SCMC			400				400
555322	Central	SCMC			400				400
555323	Central	SCMC			400				400
555324	Central	SCMC			400				400
555325	Central	SCMC			400				400
555326	Central	SCMC			400				400
555327	Central	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
555328	Central	SCMC			400				400
555329	Central	SCMC			400				400
555330	Central	SCMC			400				400
555331	Central	SCMC			400				400
555332	Central	SCMC			400				400
555333	Central	SCMC			400				400
555334	Central	SCMC			400				400
555335	Central	SCMC			400				400
555336	Central	SCMC			400				400
555337	Central	SCMC			400				400
555338	Central	SCMC			400				400
555339	Central	SCMC			400				400
555340	Central	SCMC			400				400
555341	Central	SCMC			400				400
555342	Central	SCMC			400				400
555343	Central	SCMC			400				400
555344	Central	SCMC			400				400
555345	Central	SCMC			400				400
555346	Central	SCMC			400				400
555347	Central	SCMC			400				400
555348	Central	SCMC			400				400
555349	Central	SCMC			400				400
555350	Central	SCMC			400				400
555351	Central	SCMC			400				400
555352	Central	SCMC			400				400
555353	Central	SCMC			400				400
555354	Central	SCMC			400				400
555355	Central	SCMC			400				400
555356	Central	SCMC			400				400
555357	Central	SCMC			400				400
555358	Central	SCMC			400				400
555359	Central	SCMC			400				400
555360	Central	SCMC			400				400
555361	Central	SCMC			400				400
555362	Central	SCMC			400				400
555363	Central	SCMC			400				400
555364	Central	SCMC			400				400
555365	Central	SCMC			400				400
555366	Central	SCMC			400				400
555367	Central	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
555368	Central	SCMC			400				400
555369	Central	SCMC			400				400
555370	Central	SCMC			400				400
555371	Central	SCMC			400				400
555372	Central	SCMC			400				400
555373	Central	SCMC			400				400
555374	Central	SCMC			400				400
555375	Central	SCMC			400				400
555376	Central	SCMC			400				400
555377	Central	SCMC			400				400
555378	Central	SCMC			400				400
555379	Central	SCMC			400				400
555380	Central	SCMC			400				400
555381	Central	SCMC			400				400
555382	Central	SCMC			400				400
555383	Central	SCMC			400				400
555384	Central	SCMC			400				400
555385	Central	SCMC			400				400
555386	Central	SCMC			400				400
555387	Central	SCMC			400				400
555388	Central	SCMC			400				400
555389	Central	SCMC			400				400
555390	Central	SCMC			400				400
555391	Central	SCMC			400				400
555392	Central	SCMC			400				400
555393	Central	SCMC			400				400
555394	Central	SCMC			400				400
555395	Central	SCMC			400				400
555396	Central	SCMC			400				400
555397	Central	SCMC			400				400
555398	Central	SCMC			400				400
555399	Central	SCMC			400				400
555400	Central	SCMC			400				400
555401	Central	SCMC			400				400
555402	Central	SCMC			400				400
555403	Central	SCMC			400				400
555404	Central	SCMC			400				400
555405	Central	SCMC			400				400
555406	Central	SCMC			400				400
555407	Central	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
555408	Central	SCMC			400				400
555409	Central	SCMC			400				400
555410	Central	SCMC			400				400
555411	Central	SCMC			400				400
555412	Central	SCMC			400				400
555413	Central	SCMC			400				400
555414	Central	SCMC			400				400
555415	Central	SCMC			400				400
555416	Central	SCMC			400				400
555417	Central	SCMC			400				400
555418	Central	SCMC			400				400
555419	Central	SCMC			400				400
555420	Central	SCMC			400				400
555421	Central	SCMC			400				400
555422	Central	SCMC			400				400
555423	Central	SCMC			400				400
555424	Central	SCMC			400				400
555425	Central	SCMC			400				400
555426	Central	SCMC			400				400
555427	Central	SCMC			400				400
555428	Central	SCMC			400				400
555429	Central	SCMC			400				400
555430	Central	SCMC			400				400
555431	Central	SCMC			400				400
555432	Central	SCMC			400				400
555433	Central	SCMC			400				400
555434	Central	SCMC			400				400
555435	Central	SCMC			400				400
555436	Central	SCMC			400				400
555437	Central	SCMC			400				400
555438	Central	SCMC			400				400
555439	Central	SCMC			400				400
555440	Central	SCMC			400				400
555441	Central	SCMC			400				400
102006	Geordie	BCMC		200					200
164285	Geordie	BCMC		200					200
277496	Geordie	BCMC		200					200
230234	Geordie	BCMC		200					200
202814	Geordie	BCMC		200					200
100401	Geordie	SCMC		400					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
277416	Geordie	SCMC		400					400
100402	Geordie	SCMC		400					400
296259	Geordie	SCMC		400					400
314010	Geordie	BCMC		200					200
163524	Geordie	SCMC		400					400
163523	Geordie	SCMC		400					400
145505	Geordie	SCMC		400					400
224203	Geordie	SCMC		400					400
164286	Geordie	SCMC		400					400
277415	Geordie	SCMC		400					400
296258	Geordie	SCMC		400					400
100400	Geordie	BCMC		200					200
278949	Geordie	SCMC		400					400
163522	Geordie	SCMC		400					400
314009	Geordie	BCMC		200					200
297004	Geordie	SCMC		400					400
128992	Geordie	SCMC		400					400
163604	Geordie	SCMC		400					400
145506	Geordie	SCMC		400					400
212177	Geordie	SCMC		400					400
143482	Geordie	SCMC		400					400
128993	Geordie	BCMC		200					200
164287	Geordie	BCMC		200					200
117130	Geordie	BCMC		200					200
126273	Geordie	BCMC		200					200
128315	Geordie	SCMC		400					400
296265	Geordie	SCMC		400					400
221530	Geordie	SCMC		400					400
221529	Geordie	SCMC		400					400
230316	Geordie	SCMC		400					400
172158	Geordie	SCMC		400					400
211415	Geordie	SCMC		400					400
142801	Geordie	SCMC		400					400
177740	Geordie	BCMC		200					200
287595	Geordie	BCMC		200					200
311420	Geordie	SCMC		400					400
155574	Geordie	SCMC		400					400
155573	Geordie	SCMC		400					400
210762	Geordie	SCMC		400					400
115085	Geordie	SCMC		400					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
325426	Geordie	SCMC		400					400
229575	Geordie	SCMC		400					400
224325	Geordie	BCMC		200					200
314738	Geordie	BCMC		200					200
177739	Geordie	BCMC		200					200
177741	Geordie	SCMC		400					400
314739	Geordie	SCMC		400					400
102120	Geordie	SCMC		400					400
268281	Geordie	SCMC		400					400
116475	Geordie	SCMC		400					400
212816	Geordie	SCMC		400					400
164907	Geordie	SCMC		400					400
194148	Geordie	BCMC		200					200
231613	Geordie	BCMC		200					200
231612	Geordie	BCMC		200					200
280334	Geordie	BCMC		200					200
116474	Geordie	BCMC		200					200
128291	Geordie	BCMC			200				200
128290	Geordie	BCMC			200				200
296851	Geordie	BCMC			200				200
277497	Geordie	BCMC			200				200
211484	Geordie	BCMC			200				200
143483	Geordie	BCMC			200				200
117129	Geordie	SCMC			400				400
143480	Geordie	SCMC			400				400
163605	Geordie	SCMC			400				400
143481	Geordie	SCMC			400				400
279024	Geordie	SCMC			400				400
326121	Geordie	SCMC			400				400
277498	Geordie	BCMC			200				200
163606	Geordie	BCMC			200				200
157576	Geordie	BCMC			200				200
128317	Geordie	BCMC			200				200
163629	Geordie	BCMC			200				200
259492	Geordie	BCMC			200				200
145363	Geordie	SCMC			400				400
326106	Geordie	BCMC			200				200
277477	Geordie	BCMC			200				200
277478	Geordie	BCMC			200				200
143472	Geordie	BCMC			200				200

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
258946	Geordie	BCMC			200				200
157561	Geordie	BCMC			200				200
275490	Geordie	SCMC			400				400
555293	Geordie	SCMC			400				400
555294	Geordie	SCMC			400				400
555295	Geordie	SCMC			400				400
555296	Geordie	SCMC			400				400
555297	Geordie	SCMC			400				400
555298	Geordie	SCMC			400				400
555299	Geordie	SCMC			400				400
555300	Geordie	SCMC			400				400
555301	Geordie	SCMC			400				400
555302	Geordie	SCMC			400				400
555303	Geordie	SCMC			400				400
555304	Geordie	SCMC			400				400
555305	Geordie	SCMC			400				400
555306	Geordie	SCMC			400				400
555307	Geordie	SCMC			400				400
172157	Geordie	SCMC			400				400
325554	Geordie	SCMC			400				400
128217	Geordie	SCMC			400				400
277413	Geordie	SCMC			400				400
128218	Geordie	SCMC			400				400
157515	Geordie	SCMC			400				400
277414	Geordie	SCMC			400				400
296257	Geordie	SCMC			400				400
296256	Geordie	SCMC			400				400
157537	Geordie	SCMC			400				400
296297	Geordie	SCMC			400				400
296296	Geordie	SCMC			400				400
277445	Geordie	SCMC			400				400
230249	Geordie	SCMC			400				400
296295	Geordie	SCMC			400				400
157538	Geordie	SCMC			400				400
230250	Geordie	SCMC			400				400
100427	Geordie	SCMC			400				400
325573	Geordie	SCMC			400				400
257483	Geordie	SCMC			400				400
325557	Geordie	SCMC			400				400
211416	Geordie	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
117047	Geordie	SCMC			400				400
172160	Geordie	SCMC			400				400
311421	Geordie	SCMC			400				400
275491	Geordie	SCMC			400				400
325427	Geordie	SCMC			400				400
156876	Geordie	SCMC			400				400
127580	Geordie	SCMC			400				400
258266	Geordie	SCMC			400				400
294340	Geordie	SCMC			400				400
144771	Geordie	SCMC			400				400
222317	Geordie	SCMC			400				400
295623	Geordie	SCMC			400				400
172159	Geordie	SCMC			400				400
201400	Geordie	SCMC			400				400
278950	Geordie	SCMC			400				400
296267	Geordie	SCMC			400				400
296266	Geordie	SCMC			400				400
128219	Geordie	SCMC			400				400
278951	Geordie	SCMC			400				400
325559	Geordie	SCMC			400				400
325558	Geordie	SCMC			400				400
258877	Geordie	SCMC			400				400
128221	Geordie	SCMC			400				400
230236	Geordie	SCMC			400				400
296268	Geordie	SCMC			400				400
314014	Geordie	SCMC			400				400
142802	Geordie	BCMC			200				200
239825	Marathon	BCMC		133	67				200
305787	Marathon	BCMC		133	67				200
172029	Marathon	SCMC		133	67				400
231905	Marathon	BCMC		200					200
316784	Marathon	BCMC		200					200
279909	Marathon	BCMC		200					200
177294	Marathon	SCMC		400					400
300157	Marathon	SCMC		200					400
132075	Marathon	BCMC		200					200
132074	Marathon	BCMC		200					200
231906	Marathon	BCMC		200					200
177295	Marathon	SCMC		200					400
223863	Marathon	SCMC		200					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
250880	Marathon	SCMC		200					400
338880	Marathon	SCMC		400					400
303095	Marathon	BCMC		200					200
323980	Marathon	SCMC		400					400
136479	Marathon	SCMC		400					400
169277	Marathon	SCMC		200					400
273230	Marathon	SCMC		200					400
200673	Marathon	SCMC		200					400
170694	Marathon	SCMC		200					400
323981	Marathon	SCMC		200					400
237770	Marathon	SCMC		200					400
169276	Marathon	BCMC		200					200
149744	Marathon	BCMC		200					200
274532	Marathon	BCMC		200					200
143049	Marathon	BCMC		200					200
343821	Marathon	BCMC		200					200
137000	Marathon	BCMC		200					200
189626	Marathon	SCMC		400					400
110708	Marathon	SCMC		400					400
137001	Marathon	BCMC		200					200
182191	Marathon	SCMC		200					400
238266	Marathon	BCMC		200					200
257853	Marathon	BCMC		200					200
206776	Marathon	BCMC		50	150				200
198766	Marathon	SCMC		50	150				400
303281	Marathon	BCMC		50	150				200
319364	Marathon	SCMC		50	150				400
241555	Marathon	BCMC		200					200
321671	Marathon	SCMC		400					400
211645	Marathon	SCMC		400					400
285633	Marathon	SCMC		400					400
321672	Marathon	SCMC		400					400
109585	Marathon	BCMC		200					200
315645	Marathon	SCMC		400					400
241554	Marathon	SCMC		400					400
175440	Marathon	SCMC		400					400
230024	Marathon	SCMC		400					400
192910	Marathon	SCMC		400					400
140916	Marathon	SCMC		400					400
194455	Marathon	SCMC		400					400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
249564	Marathon	SCMC		400					400
140918	Marathon	SCMC		400					400
140917	Marathon	SCMC		400					400
308905	Marathon	SCMC		200					400
175441	Marathon	BCMC		200					200
129383	Marathon	BCMC		200					200
188413	Marathon	BCMC		200					200
152066	Marathon	BCMC		200					200
301081	Marathon	SCMC		200					400
132483	Marathon	SCMC		400					400
267762	Marathon	SCMC		400					400
152067	Marathon	SCMC		200					400
132485	Marathon	SCMC		200					400
132484	Marathon	SCMC		400					400
256294	Marathon	SCMC		400					400
167251	Marathon	SCMC		200					400
337992	Marathon	SCMC		400					400
149078	Marathon	SCMC		400					400
188956	Marathon	SCMC		400					400
208477	Marathon	BCMC		200					200
332647	Marathon	SCMC		200					400
318427	Marathon	SCMC		400					400
252422	Marathon	SCMC		400					400
311676	Marathon	SCMC		400					400
142403	Marathon	BCMC		200					200
157801	Marathon	SCMC		200					400
238413	Marathon	SCMC		400					400
209781	Marathon	SCMC		400					400
292965	Marathon	SCMC		400					400
156521	Marathon	BCMC		200					200
256295	Marathon	BCMC		200					200
238570	Marathon	BCMC		200					200
171947	Marathon	BCMC		200					200
312532	Marathon	BCMC		200					200
256568	Marathon	BCMC		200					200
111125	Marathon	BCMC		200					200
331128	Marathon	BCMC		200					200
171948	Marathon	SCMC		200					400
137248	Marathon	BCMC		200					200
132456	Marathon	BCMC		200					200

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
142402	Marathon	BCMC		200					200
337986	Marathon	BCMC		200					200
167246	Marathon	BCMC		200					200
150706	Marathon	BCMC		200					200
321504	Marathon	BCMC		200					200
206782	Marathon	BCMC		200					200
198767	Marathon	BCMC		200					200
303288	Marathon	BCMC		200					200
115334	Marathon	BCMC		200					200
265368	Marathon	BCMC		200					200
235553	Marathon	BCMC		200					200
264638	Marathon	BCMC		200					200
303280	Marathon	BCMC		50	150				200
218898	Marathon	BCMC		50	150				200
157365	Marathon	BCMC		200					200
172007	Marathon	BCMC		200					200
312584	Marathon	BCMC		200					200
134699	Marathon	BCMC		200					200
136420	Marathon	BCMC			200				200
208560	Marathon	BCMC			200				200
304952	Marathon	BCMC			200				200
110624	Marathon	SCMC			400				400
291532	Marathon	SCMC			400				400
256377	Marathon	SCMC			200				400
156595	Marathon	SCMC			200				400
343752	Marathon	SCMC			200				400
256376	Marathon	SCMC			200				400
136421	Marathon	SCMC			200				400
304953	Marathon	SCMC			400				400
156596	Marathon	SCMC			400				400
110625	Marathon	SCMC			200				400
267833	Marathon	SCMC			200				400
181593	Marathon	SCMC			200				400
311766	Marathon	SCMC			200				400
136423	Marathon	SCMC			200				400
274443	Marathon	SCMC			400				400
304954	Marathon	SCMC			200				400
201721	Marathon	SCMC			200				400
142476	Marathon	SCMC			200				400
304955	Marathon	SCMC			200				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
343753	Marathon	SCMC			200				400
189033	Marathon	SCMC			200				400
150705	Marathon	BCMC			200				200
218903	Marathon	BCMC			200				200
321501	Marathon	BCMC			200				200
235551	Marathon	BCMC			200				200
206780	Marathon	BCMC			200				200
303284	Marathon	BCMC			200				200
206778	Marathon	BCMC			200				200
115328	Marathon	BCMC			200				200
265367	Marathon	BCMC			200				200
235550	Marathon	SCMC			400				400
153442	Marathon	SCMC			400				400
319367	Marathon	SCMC			400				400
206779	Marathon	SCMC			400				400
275572	Marathon	BCMC			200				200
156036	Marathon	BCMC			200				200
156037	Marathon	BCMC			200				200
334400	Marathon	BCMC			200				200
207242	Marathon	BCMC			200				200
187736	Marathon	BCMC			200				200
208681	Marathon	BCMC			200				200
220737	Marathon	BCMC			200				200
156038	Marathon	BCMC			200				200
136480	Marathon	BCMC			200				200
271336	Marathon	BCMC			200				200
167893	Marathon	BCMC			200				200
186486	Marathon	BCMC			200				200
208479	Marathon	BCMC			200				200
256297	Marathon	BCMC			200				200
188960	Marathon	BCMC			200				200
292966	Marathon	SCMC			400				400
292967	Marathon	SCMC			200				400
156527	Marathon	SCMC			400				400
201139	Marathon	SCMC			400				400
311680	Marathon	BCMC			200				200
181524	Marathon	BCMC			200				200
201140	Marathon	BCMC			200				200
136344	Marathon	BCMC			200				200
265451	Marathon	BCMC			200				200

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
272849	Marathon	BCMC			200				200
244404	Marathon	SCMC			200				400
244406	Marathon	SCMC			200				400
111129	Marathon	SCMC			200				400
149086	Marathon	SCMC			200				400
263948	Marathon	SCMC			200				400
111130	Marathon	SCMC			200				400
169511	Marathon	SCMC			400				400
185177	Marathon	BCMC			200				200
149085	Marathon	BCMC			200				200
149084	Marathon	SCMC			200				400
111128	Marathon	SCMC			400				400
244405	Marathon	BCMC			200				200
344056	Marathon	BCMC			200				200
207625	Marathon	SCMC			400				400
182471	Marathon	SCMC			400				400
125046	Marathon	SCMC			400				400
153038	Marathon	BCMC			200				200
125045	Marathon	BCMC			200				200
273036	Marathon	SCMC			400				400
169673	Marathon	SCMC			400				400
321670	Marathon	SCMC			400				400
265583	Marathon	SCMC			400				400
102686	Marathon	SCMC			400				400
273037	Marathon	SCMC			400				400
182470	Marathon	SCMC			200				400
207624	Marathon	SCMC			200				400
285632	Marathon	BCMC			200				200
265584	Marathon	BCMC			200				200
344487	Marathon	BCMC			200				200
190289	Marathon	BCMC			200				200
305685	Marathon	BCMC			200				200
190290	Marathon	BCMC			200				200
258497	Marathon	SCMC			200				400
202469	Marathon	SCMC			200				400
143683	Marathon	SCMC			400				400
275150	Marathon	SCMC			400				400
275149	Marathon	SCMC			200				400
202470	Marathon	SCMC			200				400
257105	Marathon	SCMC			400				400

MARATHON CLAIMS HELD BY GENERATION PGM INC.									
Claim ID	Project	Title Type	Amount Required Per Year ($)						Work Required ($)
			2021	2022	2023	2024	2025	2026	
257104	Marathon	SCMC			400				400
305684	Marathon	BCMC			200				200
264684	Marathon	BCMC			200				200
226211	Marathon	SCMC			400				400
333883	Marathon	SCMC			400				400
218936	Marathon	SCMC			400				400
151253	Marathon	SCMC			400				400
333884	Marathon	SCMC			400				400
312531	Marathon	BCMC			200				200
238569	Marathon	BCMC			200				200
150675	Marathon	BCMC			200				200
265224	Marathon	BCMC			200				200
149843	Marathon	BCMC			200				200
303307	Marathon	SCMC			400				400
319892	Marathon	SCMC			200				400
284928	Marathon	SCMC			400				400
319891	Marathon	SCMC			200				400
169535	Marathon	SCMC			400				400
284929	Marathon	SCMC			400				400
198789	Marathon	SCMC			200				400
133242	Marathon	SCMC			400				400
226191	Marathon	SCMC			400				400
153455	Marathon	SCMC			200				400
169536	Marathon	SCMC			200				400
153454	Marathon	SCMC				400			400
218239	Marathon	SCMC					200		400
318699	Marathon	SCMC					200		400
151252	Marathon	BCMC						200	200

MARATHON LEASES

MARATHON LEASES HELD BY GENERATION PGM INC.		
Leases	**Legal Right**	**Area**
109811	Mining & Surface	119.683
109720	Mining & Surface	433.299
108565	Mining & Surface	271.423
108564	Mining & Surface	224.54
108563	Mining & Surface	185.014
108562	Mining & Surface	180.866
108561	Mining & Surface	15.864
108560	Mining & Surface	1.716
108559	Mining & Surface	16.527
108558	Mining & Surface	29.324
108557	Mining & Surface	8.098
108556	Mining & Surface	19.117
108555	Mining & Surface	22.889
108554	Mining	11.024
108553	Mining & Surface	9.81
108552	Mining & Surface	4.435
108551	Mining & Surface	19.397
108550	Mining & Surface	19.255
108549	Mining & Surface	8.413
108548	Mining & Surface	13.472
108547	Mining & Surface	17.79
108546	Mining & Surface	16.888
108545	Mining & Surface	22.521
108544	Mining & Surface	7.62
108543	Mining & Surface	18.506
108542	Mining & Surface	3.411
108541	Mining & Surface	13.796
108540	Mining & Surface	26.369
108539	Mining & Surface	5.787
108538	Mining & Surface	29.174
108537	Mining & Surface	19.291
108536	Mining & Surface	12.052
108535	Mining & Surface	16.79
108534	Mining & Surface	9.522
108533	Mining & Surface	9.522
108532	Mining & Surface	11.627
108531	Mining & Surface	22.039
108530	Mining	23.006
108529	Mining & Surface	25.301
107323	Mining	65.393

MARATHON LEASES HELD BY GENERATION PGM INC.		
Leases	Legal Right	Area
109814	Mining	1110.55
109766	Mining	216.742
109338	Mining & Surface	125.369
109525	Mining & Surface	71.698
109764	Surface	1302.612
109919	Mining & Surface	1822.057