DE BEERS CANADA INC.

SNAP LAKE MINE

SNAP LAKE SITE WATER BALANCE MODEL REPORT

December 2013

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LIST OF ACRONYMS

Abbreviation	Description
De Beers	De Beers Canada Inc.
EAR	Environmental Assessment Report
Golder	Golder Associates Ltd.
ID	identification
Mine	Snap Lake Mine
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
NWT	Northwest Territories
PK	processed kimberlite
WMP	water management pond
WTP	water treatment plant

UNITS OF MEASURE

Unit	Description
%	percent
ha	hectare
K	hydraulic conductivity
m^3/s	cubic metres per second
m^3/day	cubic metres per day
m^3/yr	cubic meters per year
mm/yr	millimetres per year
Mt	million tonnes

1 INTRODUCTION

De Beers Canada Inc. (De Beers) owns and operates the Snap Lake Mine (Mine) in the Northwest Territories (NWT). The Mine is located approximately 220 kilometres (km) northeast of Yellowknife, 30 km south of MacKay Lake, and 100 km south of Lac de Gras where the Diavik Diamond Mine and the Ekati Diamond Mine are located. The Mine officially opened on July 25, 2008.

The present report documents development and predictions from the water balance for the Mine. More specifically, this report presents the methods used to predict the water quantity discharging to Snap Lake from the Mine site, and provides the results of these predictions.

Water quantity predictions were prepared and submitted as part of the Environmental Assessment Report (EAR) for the Mine to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) in February 2002 (De Beers 2002). As part of the renewal process for Water Licence of the Mine (i.e., Type A Water License MV2001L2-0002), De Beers is required to provide the Mackenzie Valley Land and Water Board (MVLWB) with updated water balance predictions for Snap Lake (De Beers 2011, 2012).

The primary purpose of the Mine site water balance model is to better understand and characterize water storage and conveyance within the Mine site and Snap Lake watershed, to support planning decisions for the Mine. The water balance uses results from the hydrogeological (groundwater) model completed by Itasca (2013).

The sections that follow provide:

- a summary of the overall water balance (Section 2), with details of the model design included in Appendix I;
- the methods used for the development of the water balance (Section 3);
- a description of the water balance at key facilities (Sections 5 to 8); and,
- a summary of key results (Section 9).

2 SITE COMPONENTS

2.1 Key Site Components

Water storage and conveyance at the Mine and Snap Lake are illustrated in a flow diagram in Figure 2-1. The key components of that diagram are:

- **Underground Workings** – Inflow to the Mine includes seepage from the lake and natural (connate) groundwater (SE11 and SE10), which is pumped to the water treatment plant (WTP) or, in a contingency, to the water management pond (WMP).

- **North Pile** – Water quality is influenced by slurry water concentrations (processing), Minewater influence, and interactions of the water with solid phase materials in the North Pile. Water migrates through the North Pile towards the perimeter ditches and sumps (SP1, SP2, SP3, SP4, SP5, TS4, IL6, WCP3, WCP2, TP3). From the sumps, water is pumped to the Water Management Pond (WMP). At closure the pore water of the fines fraction of the processed kimberlite (PK) stored in the North Pile will drain and influence water quality over an extended period of time.

- **Water Treatment Plant/ Water Management Pond –** Flows from the underground workings, WMP, and the North Pile report to the WTP with treated effluent discharged to Snap Lake. The WMP collects site runoff from developed and undeveloped lands (RO10) as well as water pumped from the North Pile sumps, and provides backup and upset storage capacity during operations.

- **Snap Lake** – Snap Lake consists of two main waterbodies, the northwest arm and main basin, which are connected by a narrow channel. A portion of the main basin provides recharge to the Mine underground workings (SE11), and that water is ultimately recycled to Snap Lake through releases from the WTP (PR7) during mine operations. Other inflows to Snap Lake consist of surface runoff (RO11) from natural areas, the airport and explosives area, roads, and disturbed mine site areas (non-point sources). Seepage from the North Pile (SE8) and seepage from the WMP (SE9) also contribute directly to Snap Lake inflows. An intake allows collection of water from Snap Lake for potable use at the Mine (PR9).

The Mine site components described above are detailed further in Sections 5 through 8. A model (GoldSim), as described in Section 2.2 was used to integrate the flows from all of the Mine site components to develop an overall site-wide water balance.

2.2 Water Balance

The Mine site water balance model was developed using the GoldSim™ software developed by the GoldSim Technology Group. GoldSim is a highly graphical program for carrying out dynamic simulations to support decision-making. GoldSim is especially well-suited to simulating a dynamic, computationally intensive but well-defined networked model such as a water balance. The following sections present the conceptual framework developed for the Mine site water balance model.

The water balance for the Mine site was developed based on four sources of information. Flow from the Mine underground workings was provided through the hydrogeological modelling completed by Itasca (2013). A hydrological evaluation was completed as part of the EAR baseline studies (De Beers 2002), and the effective mixing volume of Snap Lake was calibrated using the lake model constructed by De Beers (2013a). Flows from the North Pile and Mine site were developed as part of the Optimization Study for the North Pile Management (Golder 2001). The resulting flows within the water balance, as illustrated in Figure 2-1, are described in Table 2-1.

Figure 2-1 Water Balance Flow Diagram

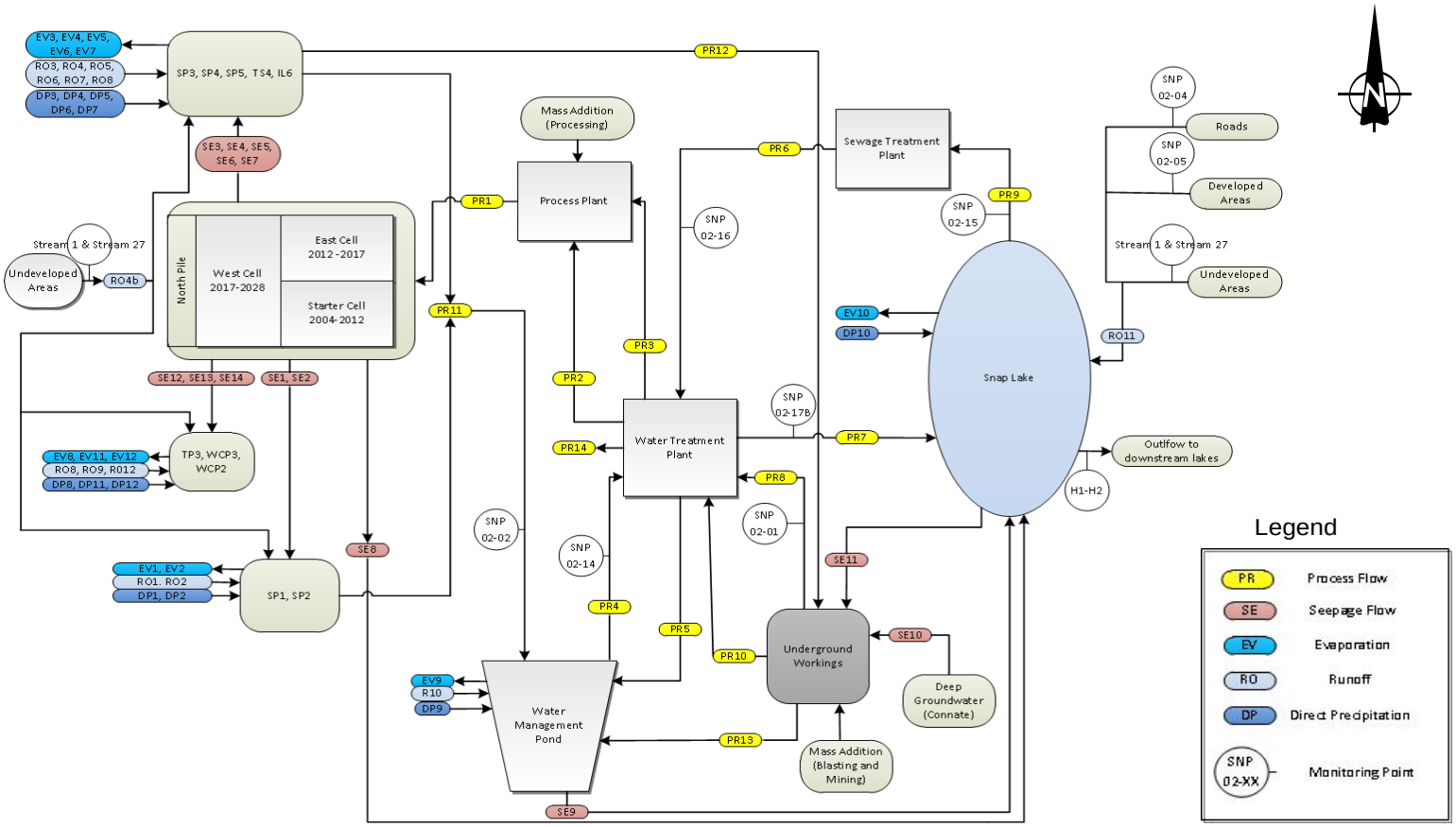


Table 2-1 Flow Description

Flow Type	Flow ID	Flow Description
Process Flow	PR1	Process water pumped to the North Pile from the Process Plant. The process water is mixed with processed kimberlite and pumped as a slurry.
	PR2	Make up water from the WTP pumped to the Process Plant.
	PR3	Thickener discharge from the WTP pumped to the Process Plant.
	PR4	Water from the WMP pumped to the WTP.
	PR5	Overflow water from the WTP directed to the WMP.
	PR6	Water from the Sewage Treatment Plant pumped to the WTP.
	PR7	Discharge from the WTP to Snap Lake (through the both diffusers).
	PR8	Water pumped from the underground workings to the WTP.
	PR9	Water withdrawn from Snap Lake and pumped to the Sewage Treatment Plant.
	PR10	Deep groundwater pumped from the underground workings through the Procon Line to the WTP
	PR11	Sum of water volume pumped from the North Pile sumps to the WMP.
	PR12	Water pumped from the North Pile sumps to the underground workings for storage.
	PR13	Deep groundwater pumped from the underground workings through the Procon Line to the WMP.
	PR14	Water for dust controfor the site is souced from the WTP and assumed to be lost from the water balance.
Seepage Flow	SE1-SE7, SE12-14	Water seeping from the North Pile to each of the North Pile sumps.
	SE8	Water seeping from the North Pile to Snap Lake.
	SE9	Water seeping from the WMP through Dam 1 to Snap Lake.
	SE10	Water seeping from deep groundwater sources (connate) to the underground workings.
	SE11	Water seeping from Snap Lake to the underground workings.
Direct Precipitation	DP1-DP12	Direct precipitation reporting to open water surfaces.
Runoff	RO1-R12	Runoff water reporting to site facilities and Snap Lake.
Evaporation	EV1-EV12	Evaporation water loses from open water surfaces.

WTP = water treatment plant; WMP = water management pond; ID = identification.

3 METHODS

3.1 Data and Information Sources

The estimates of discharge from the Mine site by the water balance model were supported by the following four sources of information and data:

- site monitoring data (see Section 3.2);
- data provided by hydrology (EAR baseline studies in De Beers 2002), and groundwater (Itasca 2013) models;
- mine plan (De Beers 2013c); and,
- materials and waste management plan (De Beers 2001), because this is the last report in which the conceptual design on the West Cell was presented.

3.2 On-Site Monitoring Data

Pre-mining monitoring data collected between 1999 and 2001 were used to represent baseline conditions and runoff where site conditions have not changed from baseline conditions. Monitoring data were incorporated into the Mine site model as flows, between 2012 and June 2013 from the following locations:

- Stream 1 and Stream 27 (combined to develop estimate of clean runoff to Snap Lake);
- SNP02-02 (used in part for initial North Pile discharges);
- SNP02-04 (runoff from the airstrip, roads, and laydown areas composed of granite); and,
- SNP02-05 (site runoff from developed areas).

Where appropriate, the monitoring data trends at the locations listed above were projected forward in the predictions.

3.3 Model Limitations

Detailed assumptions that govern the model are presented in Appendix I and throughout Sections 5 to 8. Key limitations of the GoldSim model are:

- **Changes to Mine or site conditions** – The Mine description and site conditions as identified in both projected and monitored data are the basis for the model. Changes in Mine or site conditions will necessarily result in changes to predictions.
- **Groundwater inflow data** – Uncertainty related to groundwater inflows is due to a lack of measured groundwater amounts, and the uncertainty of the potential extent and hydraulic conductivity (*K*) values of structure zones. These factors may limit the confidence level of the groundwater flow model (Itasca 2013).

- **System complexity** – For the Mine site, care was taken to incorporate known processes as understood during model development. However, in natural systems, and complex man-made systems, observed conditions will almost certainly vary with respect to estimated conditions.

3.4 Simulation Period

The model was used to run through the operations, and closure or post-closure phases of the Mine development. The phases were defined as follows:

- Operations: from 2012 to 2028 inclusive, or 17 years; and,
- Closure or post-closure: from 2029 to 2035 inclusive, or 7 years, which provides sufficient time for the system flows to reach a state of equilibrium within the water balance model.

Therefore, the model was run for a 24-year period with daily time steps. Table 3-1 presents the general modelling parameters and assumptions.

Mining activities that impact model results during this simulation period are:

- in mid-2017, the West Cell of the North Pile comes online;
- at closure (2029 and beyond), the underground workings are allowed to flood; and,
- at closure (2029 and beyond), PR11 (Figure 2-1) shuts down and water from the collection ponds around the North Pile is released directly to Snap Lake; however, for this modelling exercise, water continues to be collected in PR11 to provide a single flow for assessment.

Table 3-1 Water Balance Model General Input Parameters and Assumptions

Variable/Parameter	Value	Comment/Assumptions
Simulation Period	24 years	Seventeen years for the operation phase, and seven years for the closure phase, which provides sufficient time for the system flows to reach a state of equilibrium.
Number of Time Steps	8765	Based on 1-day time-steps. Results, however, plotted on daily basis, and summarized on an annual basis to provide a summaray of the movement of water through out the site

4 MODEL SCENARIOS

The Mine site model results included through Sections 5 to 8 apply to two scenarios, each of which included the geometric and arithmetic means for TDS concentrations:

- **Upper Bound Scenario A:** Based on minewater flows from Scenario 4 of the groundwater model (Itasca 2013) – elevated lake and connate water flows;
- **Lower Bound Scenario B:** Based on minewater flows from Base Case of the groundwater model (Itasca 2013) – decreased flows from lake and connate water.

The difference between these two model scenarios is the flow from the lake and connate water into the Mine.

5 UNDERGROUND WORKINGS

5.1 Background

The Mine includes underground workings from which a total of about 22 million tonnes (Mt) of ore and dilution rock will be extracted (De Beers 2002). The Mine has been developed as a series of drifts and panels from which ore is extracted via two haulage ramps. During operations, the groundwater inflow components to the underground workings include connate water and recharge from Snap Lake (Figure 2-1). Recharge water from Snap Lake passes through lake bed sediments and fractured bedrock before reporting to the underground workings (SE11). In addition, the underground workings receive connate groundwater (SE10). Water from the North Pile can be pumped to the underground when the WTP cannot operate, or has insufficient capacity (PR12). Water from the underground workings is collected and pumped to the surface for treatment at the WTP (PR8, PR10). When the WTP cannot operate, or has insufficient capacity, water from underground workings is pumped to the WMP (PR13) for interim storage before treatment and discharge. At closure, the underground workings will be flooded. An overview of the various inputs and their expected values for the Mine component is provided in Table 5-1.

Table 5-1 Summary of Mine flows and outflows

ID	Flow Direction	Description	Value	Source
SE10+SE11	Inflow	Total inflow to underground workings	See Figure 6-1	Itasca (2013)
SE11		Snap Lake recharge to mine workings	See Figure 6-1	Itasca (2013)
SE10		Connate water recharge to mine workings	See Figure 6-1	Itasca (2013)
PR12		Underground storage of North Pile Water	0 m^3/day – only used for upset conditions	
PR8+PR10+PR13	Outflow	Total water pumped from underground workings	Same as total inflows, see Figure 6-2	Itasca (2013)
PR8		Connate water recharge to mine workings	See Figure 6-2	Itasca (2013)
PR10		Snap Lake recharge to mine workings	See Figure 6-2	Itasca (2013)
PR13		Contingency flow	0 m^3/day	

ID = identification; m^3/d = cubic metres per day.

As summarized in Table 5-2, inflow estimates during the operations and closure or post-closure phases are based on the Itasca (2013) groundwater model.

Table 5-2 Underground Working Inflow and Outflow Summary

Phase	Years	Inflow (m^3/d)	Outflow (m^3/d)
Operations	2012 to 2028	Recharge as per Itasca (2013)	Recharge as per Itasca (2013)
Closure/post-closure	2029 to 2035	0	0

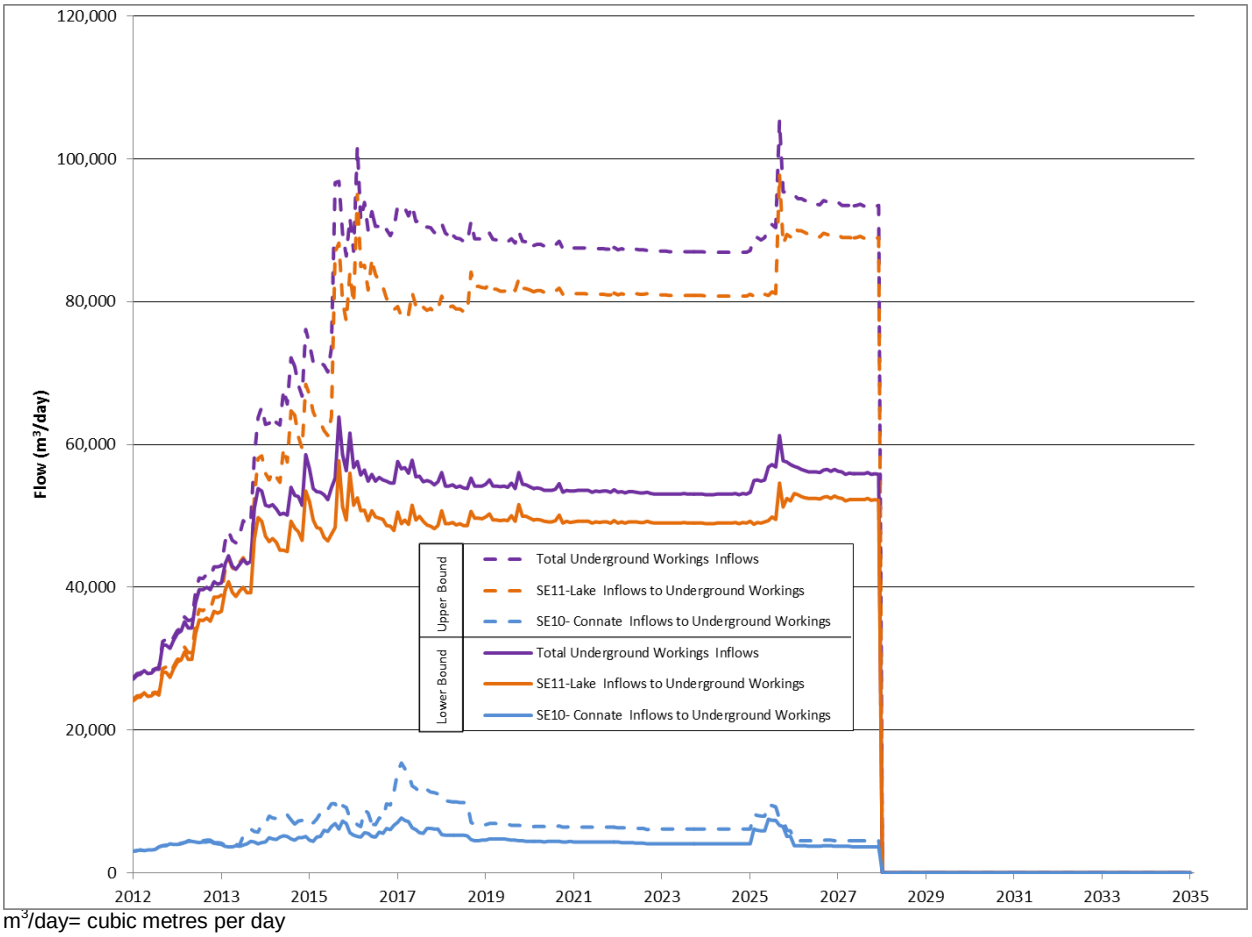
m^3/d = cubic metres per day.

5.2 Inflow and Outflow Summary

The Lower Bound scenario model reports flows for SE10 that vary from 1,276,690 to 1,282,910 cubic metres per year (m^3/yr) and from 9,544,566 to18,351,618 m^3/yr for SE11. The upper bound inflows vary from 1,285,901 to 1,577,043 m^3/yr for SE10, and from 9,668,382 to 31,224,640 m^3/yr for SE11. The proportion of recharge from Snap Lake to the underground workings used in the GoldSim model is approximately 84 percent (%) to 95% in the Upper Bound scenario, and 86% to 94% in the Lower Bound scenario (Itasca 2013). Outflows PR8 and PR10 are proportional to underground workings inflows SE10 and SE11, respectively.

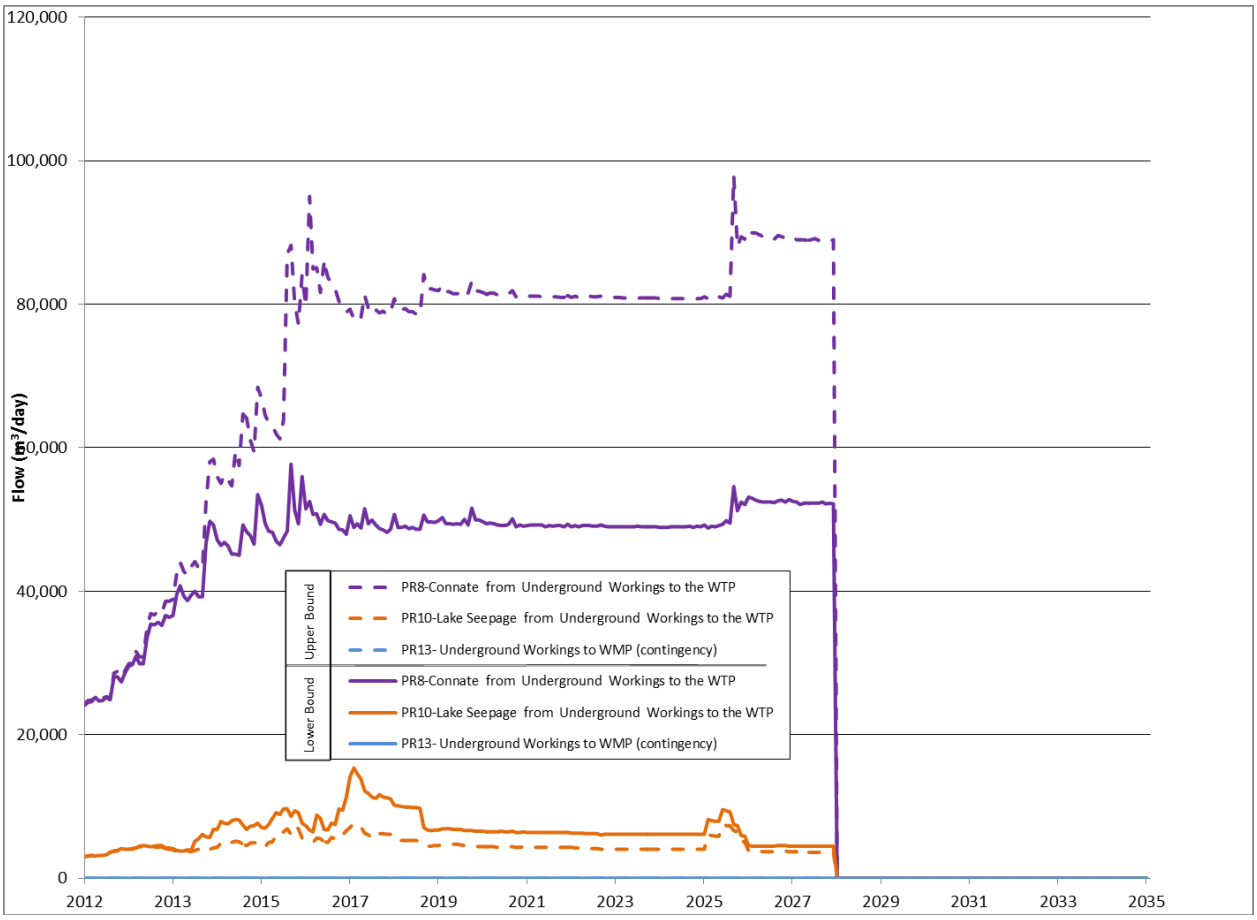
The total underground workings inflows, and the relative proportions of inflow from the connate water and from Snap Lake that are used in the GoldSim model are provided in Figure 5-1, while outflows are provided in Figure 5-2. Detailed flow results can found in Appendix II.

Figure 5-1 Underground Workings Inflows



m^3/day= cubic metres per day

Figure 5-2 Underground Workings Outflows



m^3/day= cubic metres per day; WMP= water management pond; WTP= water treatment plant.

6 NORTH PILE

6.1 Background

Of the 22 Mt of ore and dilution rock processed during the operations phase, about one half is expected to be pumped back underground as paste for use as mine backfill, with the remainder placed in the North Pile (De Beers 2002). Water from the North Pile originates from precipitation and from the process plant. Surface runoff and seepage to surface within (or near the base of) the North Pile are collected through a series of ditches and sumps and pumped to the WMP during operations; this will continue while closure is implemented. During operations, the flows from the North Pile report to Snap Lake via the WTP (transiting first from the sumps to the WMP via PR11, then from the WMP to the WTP via PR4) or as seepage to the northwest arm of Snap Lake (SE8). At closure, the North Pile will be capped and water released from this facility will report directly to the North Arm of Snap Lake once it meets acceptable discharge criteria.

For the purposes of the modelling exercise, the North Pile is treated as a single facility. Water collected in individual sumps, while modelled, will not represent actual conditions due to lenses of varying permeability within the North Pile directing seepage along low permeability layers. The sumps were modelled primarily to account for the proportion of direct precipitation and evaporation to and from open water surfaces. As such, results of individual sumps are not discussed. The properties of the North Pile as used in the GoldSim model are provided in Table 6-1 and Appendix I. The expected final configuration of the North Pile has not changed substantially from that described in the EAR (De Beers 2002). Therefore, most of the assumptions governing North Pile flows were taken from the Waste Management Report (Golder 2001), and the current Mine Plan (De Beers 2013c).

Table 6-1 North Pile Surface Area

Year (from start of operations)	Total Area (ha)	Area Closed (Capped) (ha)
2004 to 2012	~22[a]	0
2012 to 2017	~54[b]	~22
2017 to 2028	~84[c]	~54
>2028	~82	~82

a) Approximated area for Starter Cells (De Beers 2013c)

b) Approximated area for Starter + East Cells (De Beers 2013c)

c) Approximated area for Starter + East + West Cells (De Beers 2013c, 2001)

~ = approximately; ha= hectare.

Water from the North Pile originates from precipitation (RO1-R08, R12) and process water (PR1). The process water flows from the slurry deposition point, and is either incorporated into the pore space of the PK or flows through the North Pile to a sump (SE1-SE7, SE12-SE14). Approximately 100 millimetres per year (mm/yr) of net precipitation will infiltrate in the North Pile and form part of the seepage flows to the sumps (Golder 2001).

Water incorporated into the pore space of the PK is expected to remain at saturation until filling of the cell is completed. Once emplacement of PK ceases, water levels in the North Pile are expected to drop,

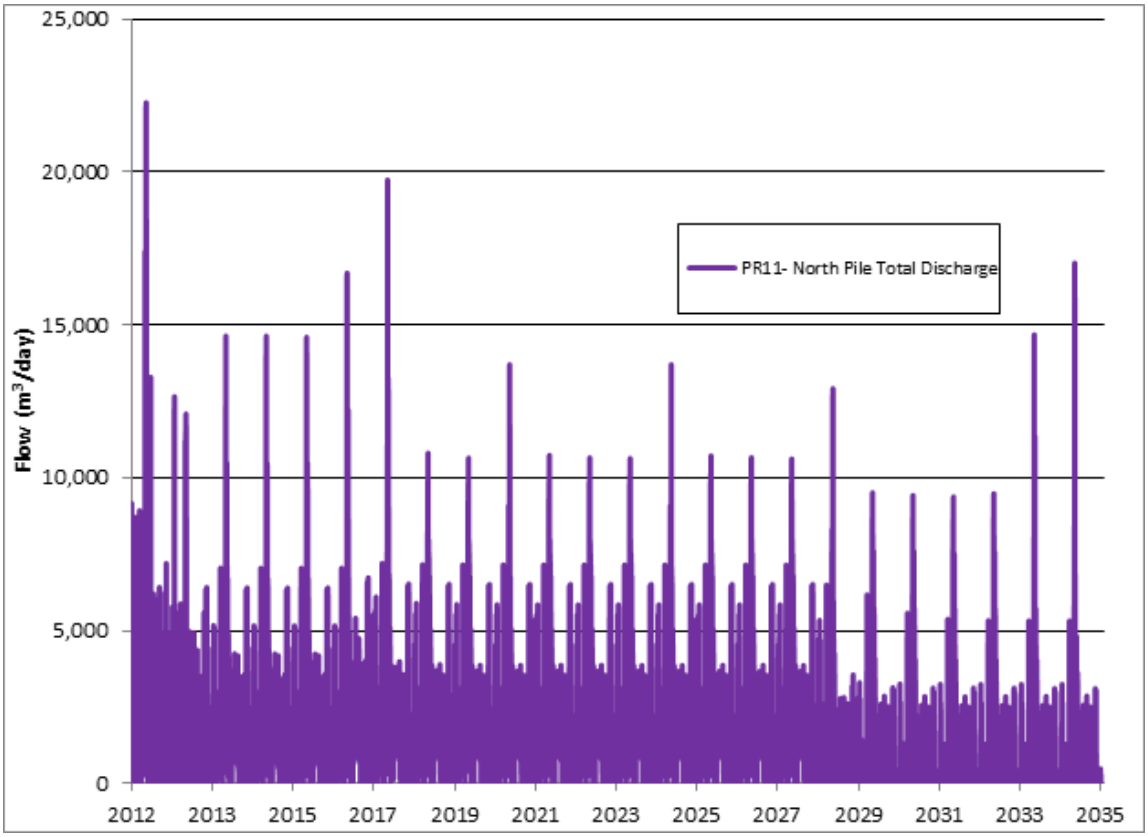
eventually reaching a state of equilibrium with respect to long-term average infiltration. During this period of time, water is expected to drain through the fines fraction of the PK downward and laterally outward from the North Pile cells to the coarser berm materials over time, and discharge as seepage at the toe (drain-down flows) of the coarse berm material near one of the collection ditches or sumps. The overall amount of water released from storage depends on the North Pile design, hydraulic conductivity, and saturation of the materials within the North Pile as well as the amount of precipitation infiltrating into the fines fraction of the PK (De Beers 2013b). De Beers (2013b) provide calculations on release rates, and timing for the pore water of the North Pile based on laboratory kinetic test data.

6.2 Inflow and Outflow Summary

It is expected that approximately 206,600 to 143,500 m^3/yr of runoff will report to the edges of the North Pile as toe seepage. This runoff will be captured and directed to the sumps. Seepage will contribute an additional 439,500 m^3/yr.

The relative proportions of deep seepage versus toe seepage are largely governed by the frozen conditions within the North Pile and foundation. The deep seepage from the North Pile (SE8) occurs at 0.000091 cubic metres per second (m^3/s) or 288 m^3/yr from the EAR (De Beers 2002). It is expected that the North Pile deep seepage directed to Snap Lake (SE8) will mix with precipitation, infiltrating into the overburden and granite located between the North Pile and Snap Lake before reporting to the base of the northwest arm of Snap Lake. Detailed flow results can be found is Appendix II. Total discharge flow (PR11) is shown in Figure 6-1. Upper and lower bounds are not presented separately, since these two scenarios yield the same results for the North Pile.

Figure 6-1 North Pile Total Discharge



m^3/day= cubic metres per day.

7 WATER TREATMENT PLANT AND WATER MANAGEMENT POND

7.1 Overview

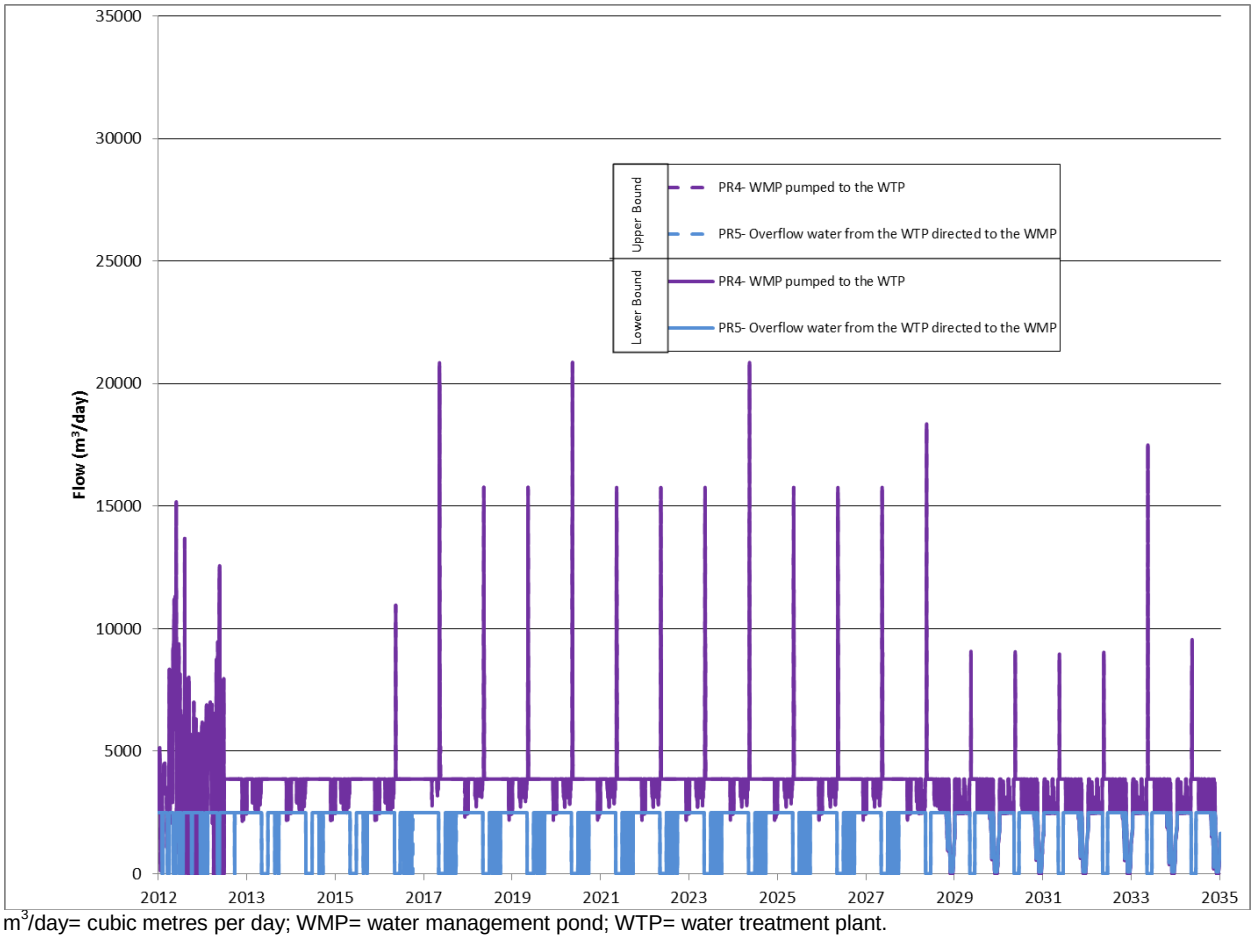
Flows from the underground workings (PR8, PR10, PR13) and the North Pile (PR11) report either to the WMP or to the WTP (Figure 2-1). The WMP collects runoff from the Mine site, and provides backup and upset storage capacity during operations. Direct discharge from the WMP to Snap Lake is not expected during operations.

Treated effluent is discharged to Snap Lake via twin diffusers located offshore (underwater). A small component of the treated effluent is directed to Mine site dust suppression (PR14) and to the process plant for use in processing (PR2, PR3). Treated domestic waste water is piped to the WTP (PR6). Treatment discharge flows from the WTP were measured between 2004 and 2013, and continue to be measured routinely. Available monitoring data were used in the model to represent flows from treatment.

7.2 Inflow and Outflow Summary

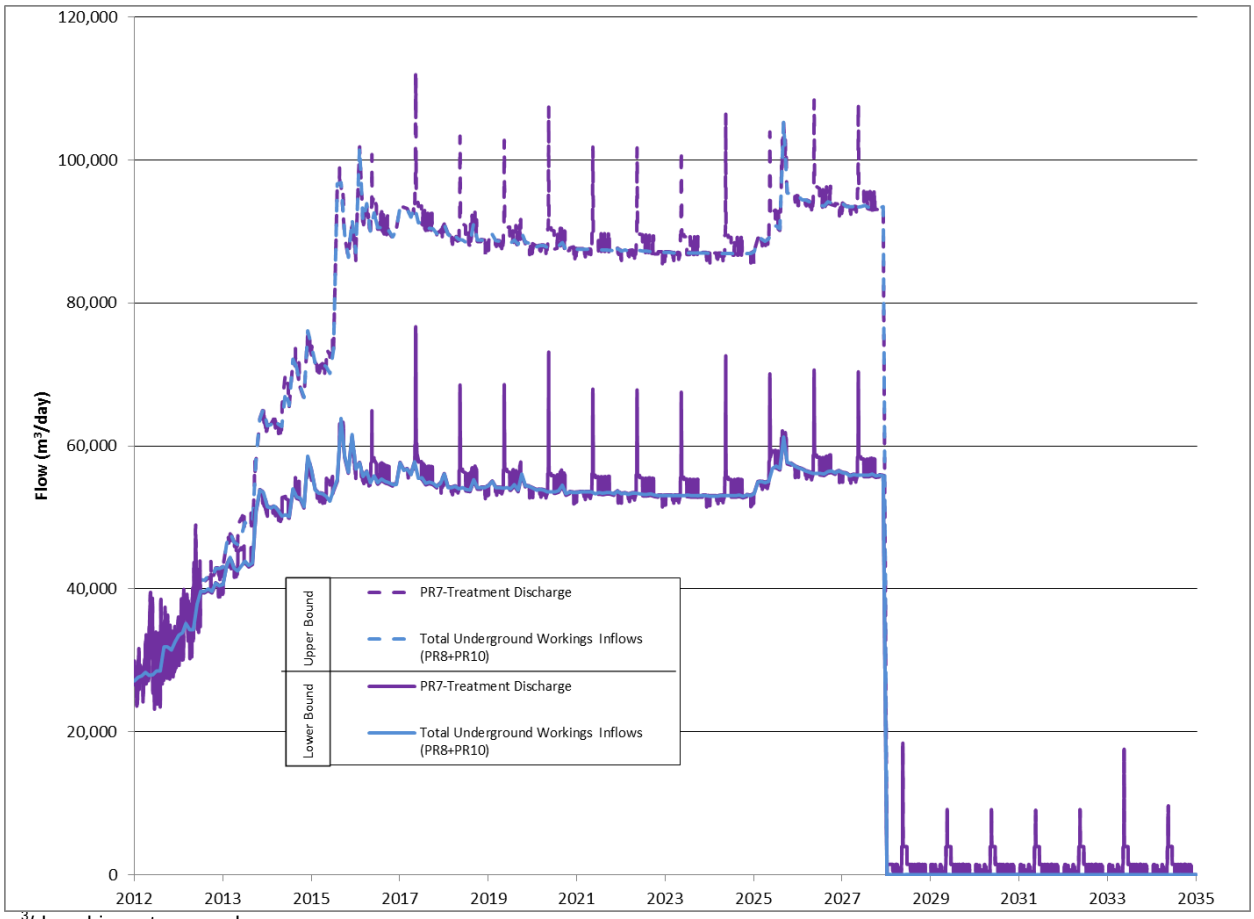
Figure 7-1 shows the exchange of water between the WMP and WTP (PR4 and PR5), while Figure 7-2 presents the major discharge from the WTP (PR7) and inflows to the WTP from the underground workings (PR8 plus PR10). Total flow reporting to, and discharging from the WTP is initially represented by measured data (2004 to 2010), followed in subsequent years by the summation of the calculated flows from the underground workings, and WMP less water used in the plant or for dust suppression. Water used for the makeup requirement of processing (PR2, 1,311 m^3/day) and the WTP thickener discharge (PR3, 52 m^3/d) originates from the WTP. In addition, a small component is drawn from the WTP for dust suppression (PR14, 300 m^3/day) from June to October. The remainder of the WTP outflows discharge to Snap Lake (PR7). All components are accounted for in the underground workings and North Pile, as discussed in Sections 6 and 7, respectively.

Figure 7-1 Water Exchange between the Water Management Pond and the Water Treatment Plant



m^3/day= cubic metres per day; WMP= water management pond; WTP= water treatment plant.

Figure 7-2 Underground Inflows to and Discharges from the Water Treatment Plant



m^3/d= cubic metres per day.

8 SNAP LAKE

8.1 Background

Snap Lake receives treated effluent discharge from the WTP (PR7), and non-point source discharge from the Mine site (RO11, SE8 and SE9). These discharges mix in Snap Lake and discharge to the Lockhart River system. During operations, water from Snap Lake will recharge the Mine underground workings (SE11); that water is then treated and discharged back to Snap Lake. Potable water is taken from the northwest arm of Snap Lake at the intake (PR6).

GoldSim modelling results from the underground workings, North Pile, WMP, and WTP are provided and discussed individually in Sections 5 through 7, respectively. To assess the relative contributions of these components to the overall discharge to Snap Lake, this section presents a comparison of model results from the following discharge locations:

- Treatment Plant discharge (PR7);
- North Pile seepage to Snap Lake (SE8);
- WMP seepage to Snap Lake (SE9); and,
- non-point source discharge from the Mine site, airstrip, and explosives storage to Snap Lake (R011).

8.2 Inflow and Outflow Summary

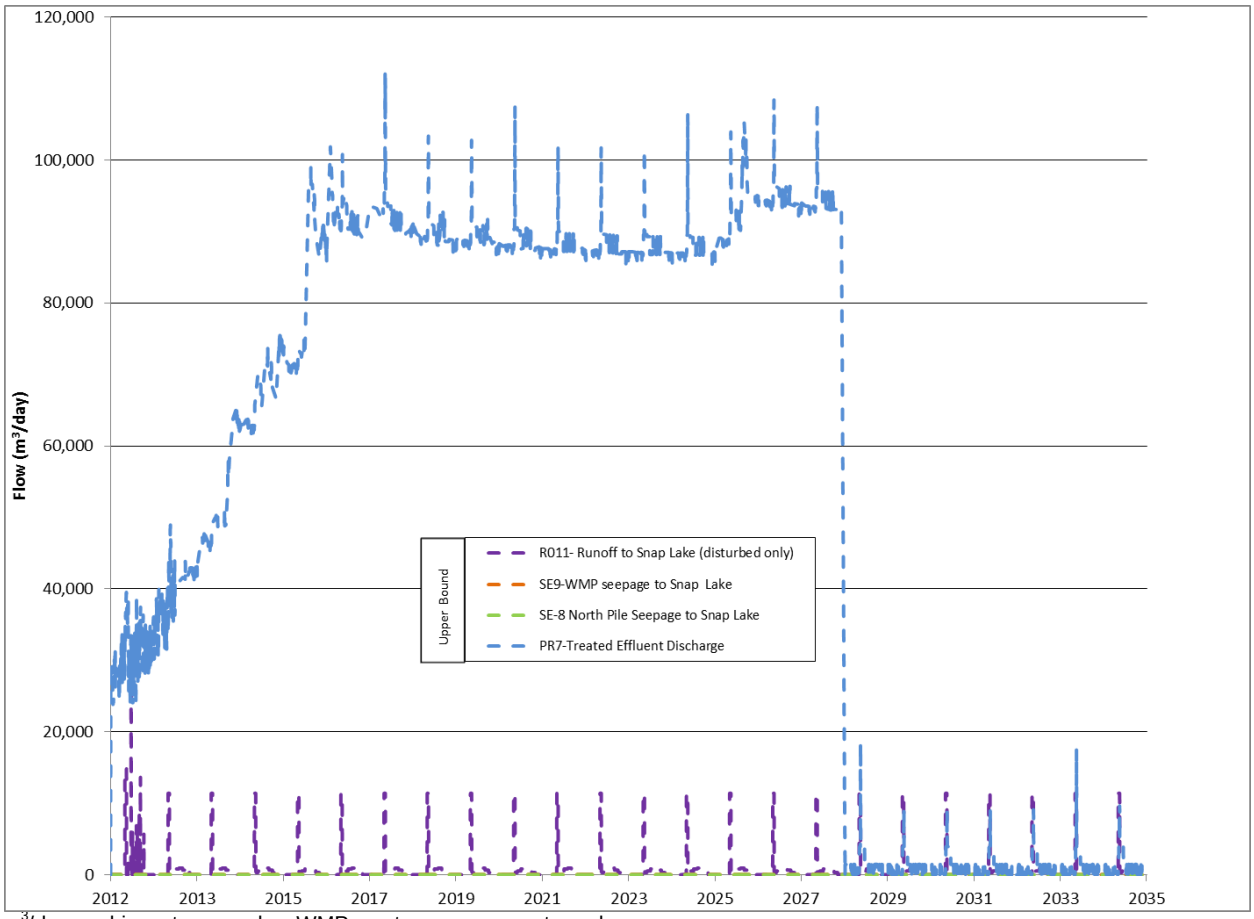
Mine site discharges to Snap Lake during operations and closure are shown in Figures 8-1 and 8-2. The flow from the WTP discharge is largely governed by the expected pumping rate from the underground workings, with seasonal increases resulting from spring freshet runoff from the North Pile and site runoff.

Relative to the WTP discharge during operations, which are typically greater than 50,000 m^3/day (averaged on a monthly basis) from September 2014 (Itasca 2013), discharge from the remainder of the Mine site is less than 700 m^3/day, when averaged on a monthly basis. An average flow of 313,300 m^3/yr from the site runoff is expected as seepage and runoff to Snap Lake. Runoff from the airstrip and from the explosives plant area is estimated at 29,000 m^3/yr distributed over the summer months. Seepage from the WMP is estimated at 12,000 m^3/day applied over the summer months. Detailed flow results can be found in Appendix II.

Discharge at closure will be limited to the summer months, and flow from the North Pile to the northwest arm of Snap Lake will dominate site runoff (Figure 6-1, compared to Figures 8-1 and 8-2).

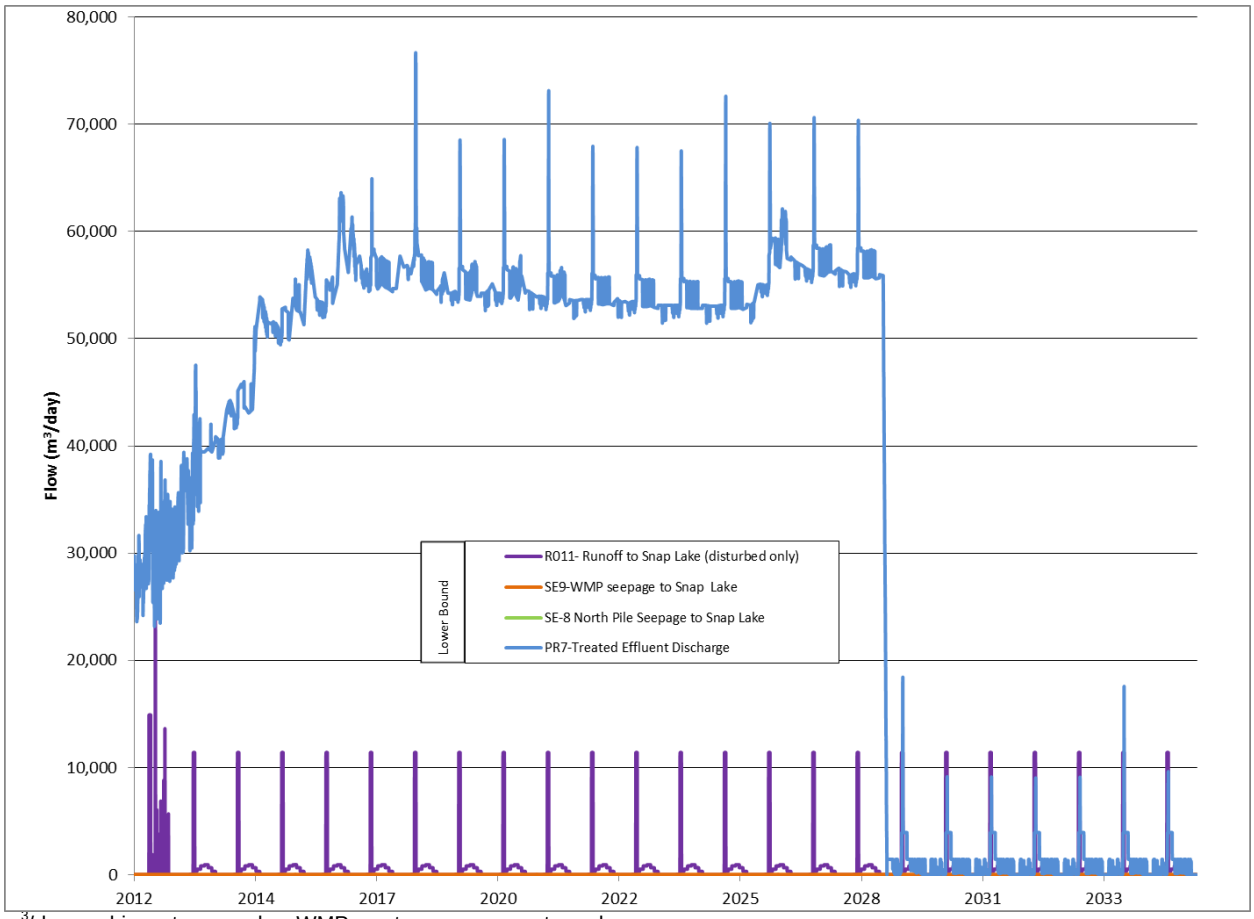
Detailed hydrodynamic modelling of Snap Lake and discussion of distribution of flow, and mass within the lake are reported in detail in De Beers (2013a).

Figure 8-1 Site Discharge – Upper Bound Scenario



m^3/day= cubic metres per day; WMP= water management pond.

Figure 8-2 Site Discharge – Lower Bound Scenario



m^3/day= cubic metres per day; WMP= water management pond.

9 SUMMARY OF KEY CONCLUSIONS

Based on the above assessment, the following conclusions result from the model calculations:

- underground minewater accounts for the majority of flows to treatment and to overall Mine site discharge to Snap Lake during operations. The influence of the North Pile and Mine runoff and seepage can be observed in seasonal increases added to the Snap Lake discharge; and,
- during operations flows from Mine runoff and seepage to Snap Lake are approximately 1.4% of the total discharge from the Mine site including the WTP discharge to Snap Lake (PR7) in the Lower Bound Scenario and 0.9% in the Upper Bound Scenario.

The two main contributors to water to Snap Lake are the underground workings and the North Pile. The proportion of connate water and the degree of recycling water between the lake and the Mine are the dominant influences to the water balance for the site. The underground Mine, North Pile, and Mine site, as modelled, are believed to be a reasonable representation of expected and observed conditions at the Mine.

10 REFERENCES

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APPENDIX I

WATER BALANCE MODEL INPUTS

December 2013

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LIST OF ACRONYMS

Term	Definition
De Beers	De Beers Canada Inc.
EAR	Environmental Assessment Report
PK	processed kimberlite
Rc	runoff coefficient
WMP	water management pond
WTP	water treatment plant

UNITS OF MEASURE

Term	Definition
%	percent
°C	degrees Celsius
m^2	square metre
m^3/d	cubic metres per day
mm	millimetre
t/d	tonnes per day
t/m^3	tonnes per metre

1 CLIMATE

Precipitation determines basin moisture input and is one of the most important climate parameters in water balance models. The present study used climate conditions measured on site throughout 2012 and conditions for the Mine site, as developed in the Environmental Assessment Report (EAR; De Beers 2002), and as shown in Table I-1 for modeling. Since the EAR value is slightly lower than the value used for engineering design (Golder 2001), it is conservative from a water quality perspective.

Snowfall is assumed to accumulate on the ground (i.e., the snowpack), and does not contribute to the water balance model from the start of October until the subsequent melt period from May 1 to 14. The snowpack was assumed to have sublimation losses of 25 percent (%).

Table I-1 Monthly Site Climate Parameters – Average Year

Month	Rainfall (mm)[a]	Snowfall (mm water equivalent)[a,b]	Total Precipitation (mm)	Average Monthly Temperature (°C)[a]	Lake Evaporation (mm)[a]
January	0	28	28	-27.3	0
February	0	25.5	25.5	-20.9	0
March	0.1	25.4	25.5	-19.1	0
April	2	15.6	17.6	-9.3	0
May	13	5.8	18.8	1.1	0
June	21.4	0.2	21.6	10.6	45
July	33.7	0	33.7	15.1	120
August	38.2	0.2	38.4	11.8	90
September	26.7	4.6	31.3	5.6	30
October	12.7	34.7	47.4	-3.1	15
November	0.6	48.7	49.3	-12.3	0
December	0.1	35.9	36	-22.7	0
Annual Total	**148.5**	**224.6**	**373.1**	**-5.9**	**300**

a) From De Beers (2002).

b) The snow water equivalent is based on a relative density of 0.1.

mm= millimetres; °C= degrees Celsius

2 SURFACE WATER AND TOPOGRAPHY

Table I-2 presents the water balance model input parameters and assumptions for runoff generation (i.e., runoff coefficients Rc) in the model. Runoff in the water balance model is estimated according to land types within the watershed of the Mine site. The following land types were assumed:

- disturbed lands – represent areas of disturbed natural growth;
- waste storage – represent areas where waste rock has been placed;
- natural lands – represent areas with no disturbance; and,
- pond surfaces – represents open water surfaces.

The watershed areas used in the model are summarized in Table I-3 according to land types.

Table I-2 Water Balance Model Input Parameters and Assumptions - Runoff Generation

Runoff Coefficient	Value	Source	Comment/Assumptions
Rc for disturbed lands	0.6	Assumed	Average annual runoff coefficient applied to roads, airport, and other disturbed areas.
Rc for waste storage	0.4 to 0.8	Assumed	Average annual runoff coefficient applied to the waste storage area (North Pile). The coefficient accounts for losses due to evaporation, storage, infiltration, etc. A value of 0.8 is assumed during freshet (May) and 0.6 for the remainder of the year. After Closure the runoff coefficient is decreased between 0.4 (all year except May) and 0.6 (May), due to the 1m cover placed on the North Pile.
Rc for natural lands	0.26	Assumed	Average annual runoff coefficient applied to the undisturbed areas of the Snap Lake watershed. The coefficient was set to ensure a steady lake level during the mine life.
Rc for pond surfaces	1.0	Assumed	Average annual runoff coefficient applied to pond surfaces (direct precipitation).

Table I-3 Watershed Areas Distributed According to Land Types

Watershed[(a)]	Pond Area (m^2)	Waste Area (m^2)	Natural Area (m^2)	Disturbed Areas (m^2)
Sump 1 (RO1, DP1)	2,129	67,586	0	19,750
Sump 2 (RO2, DP2)	2,816	23,998	0	25,734
Sump 3 (RO3, DP3)	22,352	82,566	0	23,394
Sump 4 (RO4, DP4)	3,623	109,172	0	0
Sump 5 (RO5, DP5)	12,163	87,296	0	3,979
Sump IL6 (RO6, DP6)	12,163	47,095	0	0
Sump TS4 (RO7, DP7)	2,208	48,452	0	5,572
Sump WCP2 (RO8, DP8)	13,777	35,083	0	0
Sump WCP3 (RO9, DP11)	6,628	6,594	0	0
Sump TP3 (RO12, DP12)	6,628	328,044	0	0
WMP (R10, DP9)	44,000	0	0	209,407
Airport (RO11)	-	-	0	143,239
Roads (RO11)	-	-	0	137,842
Snap Lake (RO11, DP10)	15,340,000	-	52,160,000	961,652

Terms in parentheses refer to the runoff identification in Figure 2.1.

m^2= square metres.

3 NORTH PILE

This waste management facility is assumed to collect and temporarily store surface runoff and process slurry water. Water from the waste management facility seeps to a series of collections sumps. Seepage collected in sumps SP1, SP2, SP3, SP4, SP5, IL6, TS4, WCP3, WCP2, and TP3 can then be pumped to the water management pond (WMP). Water from the WMP can be discharged to the environment after treatment at the water treatment plant (WTP), or pumped to the Process Plant. Pumped volumes were calculated to maintain monitored water levels from 2009 to 2012.

4 PROCESSING MILL

Water requirements at the Process Plant are satisfied from the WMP and water in the Ore. The slurry output is directed to the North Pile. Table I-4 summarizes the water balance input parameters and assumptions applied to the Process Plant.

Table I-4 Water Balance Model Input Parameters and Assumptions – Processing Mill

Variable/Parameter	Value	Source	Comment/Assumptions
Production rate	2,091 t/d	Calculated	Based on slurry density and slurry paste to the North Pile.
Slurry paste to the North Pile	1,311 m^3/d		Solids and water from the Process Plant.
Density of solids in slurry	2.5 t/m^3	Assumed	
Slurry density	1.32 t/m^3	Assumed	
Void ratio of slurry (e)	1	De Beers (2012a)	Volume of voids/volume of solids.
Water retained in PK	369 m^3/d	Calculation	(e/(Specific Gravity (Gs)) x Production Rate (assumes saturated PK)
Water available for seepage	368 m^3/d	Calculation	(Water in slurry to the North Pile - water retained in slurry)
% Solids in slurry (by mass)	40%	Calculation	The slurry output directed to the North Pile.
Water in ore	1% moisture content	Assumed	Water in ore feed to the Processing Mill assuming 2.0% moisture content.

m^3/d= cubic metres per day; t/m^3= tonnes per cubic metre; t/d = tonnes per day; %= percent; PK = processed kimberlite

5 GENERAL WATER REQUIREMENT PARAMETERS

Water requirement for potable water at the Mine site are satisfied from Snap Lake. Table I-5 summarizes this water requirement.

Table I-5 Water Balance Model Input Parameters and Assumptions – Miscellaneous Flows

Variable/Parameter	Value	Source	Comment/Assumptions
Potable water (PR6/PR9)	74 m^3/d		Potable water requirement for use in main buildings, truck shop, etc. Potable water requirement is satisfied from Snap Lake and ultimately reports to the WTP

m^3/d= cubic metres per day

6 REFERENCES

De Beers (De Beers Canada Inc.). 2002. Snap Lake Diamond Project: Environmental Assessment Report. Submitted to Mackenzie Valley Impact Review Board. Yellowknife, NWT, Canada.

De Beers. 2012. 2011 Annual Report. Aquatic Effects Monitoring Program Snap Lake Mine. Type A Water License MV2001L2-0002. Submitted to the Mackenzie Valley Land and Water Board. Yellowknife, NWT, Canada.

Golder (Golder Associates Ltd.). 2001. Snap Lake Diamond Project Surface Engineering Optimization Study North Pile Management. Submitted to AMEC Simons Mining & Metals, Toronto, ON, Canada.

APPENDIX II

WATER BALANCE RESULTS

December 2013

Snap Lake Water Balance Results- Snap Lake Lower Bound

Flow Description	2012 Inflows	2012 Outflows	2013 Inflows	2013 Outflows	2014 Inflows	2014 Outflows	2015 Inflows	2015 Outflows	2016 Inflows	2016 Outflows
Snap Lake										
Pumped from WTP (PR7)	11,066,525		13,950,064		16,859,959		19,195,552		20,583,792	
Direct Precipitation (DP10)	6,976,673		5,037,782		5,037,782		5,037,782		5,037,776	
Seepage from North Pile (SE8)	288		287		287		287		288	
Seepage from WMP (SE9)	12,030		11,994		11,994		11,994		12,030	
Natural and Disturbed Runoff (RO11)	14,572,605		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	14,233,532		10,277,799		10,277,799		10,277,799		10,277,800	
RO Airport and Explosives	39,088		28,224		28,224		28,224		28,224	
RO Disturbed	262,420		189,489		189,489		189,489		189,489	
RO Roads	37,615		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		9,544,566		12,226,238		15,326,077		17,335,551		18,347,687
Potable Water (PR9)		28,469		27,648		26,834		26,834		26,908
Evaporation (EV10)		5,353,967		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	1,276,690		1,547,986		1,448,582		1,774,872		2,151,187	
Seepage from Snap Lake (SE11)	9,544,566		12,226,238		15,326,077		17,335,551		18,347,687	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		9,544,566		12,226,238		15,326,077		17,335,551		18,347,687
Pumped from to Treatment (PR10)		1,276,690		1,547,986		1,448,582		1,774,872		2,151,187
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	10,821,256	10,821,256	13,774,224	13,774,224	16,774,659	16,774,659	19,110,423	19,110,423	20,498,874	20,498,874
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	72,530		52,019		52,019		52,019		52,011	
Direct Precipitation (DP9)	20,011		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	744,769		586,924		562,994		562,139		562,569	
Overflow from WTP (PR5)	726,045		800,895		763,470		763,470		765,965	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,503,425		1,523,653		1,365,394		1,365,207		1,368,776
Evaporation (EV9)		15,357		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		12,030		11,994		11,994		11,994		12,030
Subtotal	1,563,356	1,530,812	1,454,288	1,548,939	1,392,933	1,390,681	1,392,078	1,390,494	1,394,995	1,394,099
Change in Storage Volume	32,544		-94,651		2,252		1,584		897	
WTP										
Sewage (PR6)	28,469		27,648		26,834		26,834		26,908	
Underground Water (SE11)	9,544,566		12,226,238		15,326,077		17,335,551		18,347,687	
Underground water (SE10)	1,276,690		1,547,986		1,448,582		1,774,872		2,151,187	
Pumped from WMP (PR4)	1,503,425		1,523,653		1,365,394		1,365,207		1,368,776	
Pumped to Mill (PR2)		492,628		505,762		478,406		478,406		479,716
Pumped to Mill (PR3)		22,055		22,905		19,145		19,145		19,197
Pumped to Snap (PR7)		11,066,525		13,950,064		16,859,959		19,195,552		20,583,792
Overflow to WMP (PR5)		726,045		800,895		763,470		763,470		765,965
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	12,353,150	12,353,153	15,325,524	15,325,526	18,166,888	18,166,879	20,502,465	20,502,472	21,894,559	21,894,570
Change in Storage Volume	-4		-2		9		-7		-12	
North Pile										
Direct Precipitation on Sumps	26,130		18,868		18,868		18,868		18,868	
Runoff to Sumps	206,592		148,386		148,386		148,386		148,369	
Seepage from North Pile to Sumps from Process Water	503,296		435,178		406,766		405,465		406,275	
Draindown flows	74,142		8,051		1,695		395		95	
Evaporation from Sumps		23,001		19,909		19,909		18,064		17,357
Discharge to WMP (PR11)		744,769		586,924		562,994		562,139		562,569
Seepage to Snap Lake (SE8)		288		287		287		287		288
Subtotal	810,161	768,058	610,483	607,120	575,715	583,189	573,114	580,490	573,607	580,213
Change in Storage Volume	42,103		3,364		-7,475		-7,376		-6,606	

Snap Lake Water Balance Results- Snap Lake Lower Bound

Flow Description	2017 Inflows	2017 Outflows	2018 Inflows	2018 Outflows	2019 Inflows	2019 Outflows	2020 Inflows	2020 Outflows	2021 Inflows	2021 Outflows
Snap Lake										
Pumped from WTP (PR7)	20,433,254		20,495,007		19,940,132		20,036,097		19,722,061	
Direct Precipitation (DP10)	5,037,782		5,037,782		5,037,782		5,037,776		5,037,782	
Seepage from North Pile (SE8)	287		287		287		288		287	
Seepage from WMP (SE9)	11,994		11,994		11,994		12,030		11,994	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,799		10,277,799		10,277,800		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		18,226,640		18,007,922		17,997,922		18,230,443		18,009,746
Potable Water (PR9)		26,834		26,834		26,834		26,908		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	2,059,603		2,329,128		1,825,070		1,691,669		1,599,134	
Seepage from Snap Lake (SE11)	18,226,640		18,007,922		17,997,922		18,230,443		18,009,746	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		18,226,640		18,007,922		17,997,922		18,230,443		18,009,746
Pumped from to Treatment (PR10)		2,059,603		2,329,128		1,825,070		1,691,669		1,599,134
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	20,286,243	20,286,243	20,337,050	20,337,050	19,822,992	19,822,992	19,922,112	19,922,112	19,608,880	19,608,880
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,019		52,019		52,011		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	627,119		631,186		595,800		593,091		597,222	
Overflow from WTP (PR5)	731,035		746,005		755,985		758,480		758,480	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,394,635		1,420,570		1,389,677		1,390,351		1,388,267
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		11,994		11,994		12,030		11,994
Subtotal	1,424,622	1,419,922	1,443,660	1,445,856	1,418,254	1,414,963	1,418,032	1,415,673	1,422,171	1,413,554
Change in Storage Volume	4,700		-2,196		3,291		2,359		8,617	
WTP										
Sewage (PR6)	26,834		26,834		26,834		26,908		26,834	
Underground Water (SE11)	18,226,640		18,007,922		17,997,922		18,230,443		18,009,746	
Underground water (SE10)	2,059,603		2,329,128		1,825,070		1,691,669		1,599,134	
Pumped from WMP (PR4)	1,394,635		1,420,570		1,389,677		1,390,351		1,388,267	
Pumped to Mill (PR2)		478,406		478,406		478,406		479,716		478,406
Pumped to Mill (PR3)		19,145		19,145		19,145		19,197		19,145
Pumped to Snap (PR7)		20,433,254		20,495,007		19,940,132		20,036,097		19,722,061
Overflow to WMP (PR5)		731,035		746,005		755,985		758,480		758,480
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	21,707,713	21,707,739	21,784,454	21,784,462	21,239,504	21,239,567	21,339,371	21,339,390	21,023,982	21,023,991
Change in Storage Volume	-26		-8		-63		-20		-9	
North Pile										
Direct Precipitation on Sumps	21,898		27,746		27,746		27,746		27,746	
Runoff to Sumps	160,955		170,884		149,269		149,233		149,269	
Seepage from North Pile to Sumps from Process Water	474,774		450,263		435,147		433,667		431,892	
Draindown flows	57,290		18,552		3,437		773		182	
Evaporation from Sumps		19,011		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		627,119		631,186		595,800		593,091		597,222
Seepage to Snap Lake (SE8)		287		287		287		288		287
Subtotal	714,917	646,417	667,445	651,382	615,599	615,996	611,419	613,287	609,090	617,418
Change in Storage Volume	68,500		16,063		-397		-1,868		-8,328	

Snap Lake Water Balance Results- Snap Lake Lower Bound

Flow Description	2022 Inflows	2022 Outflows	2023 Inflows	2023 Outflows	2024 Inflows	2024 Outflows	2025 Inflows	2025 Outflows	2026 Inflows	2026 Outflows
Snap Lake										
Pumped from WTP (PR7)	19,633,674		19,545,184		19,530,649		19,476,266		20,785,536	
Direct Precipitation (DP10)	5,037,782		5,037,782		5,037,776		5,037,782		5,037,782	
Seepage from North Pile (SE8)	287		287		288		287		287	
Seepage from WMP (SE9)	11,994		11,994		12,030		11,994		11,994	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,799		10,277,800		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		17,943,823		17,917,706		17,931,295		17,880,955		18,443,033
Potable Water (PR9)		26,834		26,834		26,908		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	1,576,800		1,515,024		1,486,253		1,482,192		2,229,638	
Seepage from Snap Lake (SE11)	17,943,823		17,917,706		17,931,295		17,880,955		18,443,033	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		17,943,823		17,917,706		17,931,295		17,880,955		18,443,033
Pumped from to Treatment (PR10)		1,576,800		1,515,024		1,486,253		1,482,192		2,229,638
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	19,520,623	19,520,623	19,432,730	19,432,730	19,417,548	19,417,548	19,363,147	19,363,147	20,672,671	20,672,671
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,019		52,011		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	587,255		591,400		591,954		596,682		587,400	
Overflow from WTP (PR5)	753,490		755,985		758,480		758,480		753,490	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,383,161		1,385,100		1,389,626		1,388,246		1,382,963
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		11,994		12,030		11,994		11,994
Subtotal	1,407,214	1,408,447	1,413,854	1,410,386	1,416,895	1,414,948	1,421,630	1,413,532	1,407,359	1,408,249
Change in Storage Volume	-1,233		3,467		1,947		8,098		-891	
WTP										
Sewage (PR6)	26,834		26,834		26,908		26,834		26,834	
Underground Water (SE11)	17,943,823		17,917,706		17,931,295		17,880,955		18,443,033	
Underground water (SE10)	1,576,800		1,515,024		1,486,253		1,482,192		2,229,638	
Pumped from WMP (PR4)	1,383,161		1,385,100		1,389,626		1,388,246		1,382,963	
Pumped to Mill (PR2)		478,406		478,406		479,716		478,406		478,406
Pumped to Mill (PR3)		19,145		19,145		19,197		19,145		19,145
Pumped to Snap (PR7)		19,633,674		19,545,184		19,530,649		19,476,266		20,785,536
Overflow to WMP (PR5)		753,490		755,985		758,480		758,480		753,490
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	20,930,618	20,930,614	20,844,664	20,844,619	20,834,082	20,833,942	20,778,227	20,778,196	22,082,469	22,082,476
Change in Storage Volume	4		45		139		31		-7	
North Pile										
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746		27,746	
Runoff to Sumps	149,269		149,269		149,233		149,269		149,269	
Seepage from North Pile to Sumps from Process Water	431,754		431,721		432,896		431,711		431,711	
Draindown flows	44		11		3		1		0	
Evaporation from Sumps		19,909		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		587,255		591,400		591,954		596,682		587,400
Seepage to Snap Lake (SE8)		287		287		288		287		287
Subtotal	608,813	607,451	608,747	611,595	609,877	612,150	608,727	616,877	608,726	607,596
Change in Storage Volume	1,363		-2,849		-2,273		-8,150		1,130	

Flow Description	2027 Inflows	2027 Outflows	2028 Inflows	2028 Outflows	2029 Inflows	2029 Outflows	2030 Inflows	2030 Outflows	2031 Inflows	2031 Outflows
Snap Lake										
Pumped from WTP (PR7)	20,686,906		19,749,178		395,751		304,873		297,982	
Direct Precipitation (DP10)	5,037,782		5,037,776		5,037,782		5,037,782		5,037,782	
Seepage from North Pile (SE8)	287		288		287		287		287	
Seepage from WMP (SE9)	11,994		12,030		11,351		11,375		11,375	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,800		10,277,799		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		19,201,332		18,351,618		0		0		0
Potable Water (PR9)		26,834		26,908		26,834		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	1,373,069		1,282,910		0		0		0	
Seepage from Snap Lake (SE11)	19,201,332		18,351,618		0		0		0	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		19,201,332		18,351,618		0		0		0
Pumped from to Treatment (PR10)		1,373,069		1,282,910		0		0		0
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	20,574,401	20,574,401	19,634,528	19,634,528	0	0	0	0	0	0
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,011		52,019		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	591,507		591,764		316,126		225,407		218,064	
Overflow from WTP (PR5)	755,985		758,480		706,772		712,020		710,936	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,385,095		1,389,625		1,075,692		990,061		982,086
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		12,030		11,351		11,375		11,375
Subtotal	1,413,960	1,410,382	1,416,705	1,414,948	1,089,367	1,100,335	1,003,896	1,014,729	995,469	1,006,753
Change in Storage Volume	3,579		1,758		-10,968		-10,833		-11,284	
WTP										
Sewage (PR6)	26,834		26,908		26,834		26,834		26,834	
Underground Water (SE11)	19,201,332		18,351,618		0		0		0	
Underground water (SE10)	1,373,069		1,282,910		0		0		0	
Pumped from WMP (PR4)	1,385,095		1,389,625		1,075,692		990,061		982,086	
Pumped to Mill (PR2)		478,406		478,406		0		0		0
Pumped to Mill (PR3)		19,145		19,145		0		0		0
Pumped to Snap (PR7)		20,686,906		19,749,178		395,751		304,873		297,982
Overflow to WMP (PR5)		755,985		758,480		706,772		712,020		710,936
Dust Suppression (PR14)		45,900		45,900		0		0		0
Subtotal	21,986,330	21,986,341	21,051,062	21,051,108	1,102,526	1,102,523	1,016,896	1,016,893	1,008,920	1,008,918
Change in Storage Volume	-11		-46		3		3		2	
North Pile										
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746		27,746	
Runoff to Sumps	149,269		149,233		149,269		143,510		143,510	
Seepage from North Pile to Sumps from Process Water	431,710		432,893		150,193		70,592		62,892	
Draindown flows	0		0		89,353		9,753		2,052	
Evaporation from Sumps		19,909		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		591,507		591,764		316,126		225,407		218,064
Seepage to Snap Lake (SE8)		287		288		287		287		287
Subtotal	608,726	611,702	609,872	611,960	416,561	336,322	251,601	245,602	236,200	238,260
Change in Storage Volume	-2,977		-2,088		80,240		5,999		-2,060	

Snap Lake Water Balance Results- Snap Lake Lower Bound

Flow Description	2032 Inflows	2032 Outflows	2033 Inflows	2033 Outflows	2034 Inflows	2034 Outflows	2035 Inflows	2035 Outflows
Snap Lake								
Pumped from WTP (PR7)	293,192		293,264		293,263		290,451	
Direct Precipitation (DP10)	5,037,776		5,037,782		5,037,782		5,037,782	
Seepage from North Pile (SE8)	288		287		287		287	
Seepage from WMP (SE9)	11,410		11,151		11,215		11,279	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,800		10,277,799		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		0		0		0		0
Potable Water (PR9)		26,908		26,834		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136
Underground								
Seepage from Concatenate Water (SE10)	0		0		0		0	
Seepage from Snap Lake (SE11)	0		0		0		0	
Pumped flows from the North Pile (PR12)	0		0		0		0	
Pumped Flows to Treatment (PR8)		0		0		0		0
Pumped from to Treatment (PR10)		0		0		0		0
Pumped from to WMP (PR13)		0		0		0		0
Subtotal	0	0	0	0	0	0	0	0
Change in Storage Volume	0		0		0		0	
WMP								
Runoff (R10)	52,011		52,019		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	215,795		215,738		222,424		215,437	
Overflow from WTP (PR5)	712,664		711,033		710,938		709,076	
Pumped from UG (PR13)	0		0		0		0	
Pumped to WTP (PR4)		978,951		977,464		977,369		972,695
Evaporation (EV9)		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,410		11,151		11,215		11,279
Subtotal	994,920	1,003,653	993,239	1,001,907	999,831	1,001,876	990,981	997,267
Change in Storage Volume	-8,732		-8,668		-2,045		-6,285	
WTP								
Sewage (PR6)	26,908		26,834		26,834		26,834	
Underground Water (SE11)	0		0		0		0	
Underground water (SE10)	0		0		0		0	
Pumped from WMP (PR4)	978,951		977,464		977,369		972,695	
Pumped to Mill (PR2)		0		0		0		0
Pumped to Mill (PR3)		0		0		0		0
Pumped to Snap (PR7)		293,192		293,264		293,263		290,451
Overflow to WMP (PR5)		712,664		711,033		710,938		709,076
Dust Suppression (PR14)		0		0		0		0
Subtotal	1,005,859	1,005,856	1,004,299	1,004,296	1,004,203	1,004,201	999,530	999,527
Change in Storage Volume	3		2		3		3	
North Pile								
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746	
Runoff to Sumps	143,471		143,510		143,510		143,508	
Seepage from North Pile to Sumps from Process Water	61,485		60,954		60,867		60,680	
Draindown flows	478		114		28		7	
Evaporation from Sumps		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		215,795		215,738		222,424		215,418
Seepage to Snap Lake (SE8)		288		287		287		286
Subtotal	233,180	235,992	232,324	235,934	232,151	242,620	231,941	235,612
Change in Storage Volume	-2,812		-3,610		-10,469		-3,672	

Snap Lake Water Balance Results- Snap Lake Upper Bound

Flow Description	2012 Inflows	2012 Outflows	2013 Inflows	2013 Outflows	2014 Inflows	2014 Outflows	2015 Inflows	2015 Outflows	2016 Inflows	2016 Outflows
Snap Lake										
Pumped from WTP (PR7)	11,201,806		14,485,644		18,998,836		24,693,696		29,701,111	
Direct Precipitation (DP10)	6,976,673		5,037,782		5,037,782		5,037,782		5,037,776	
Seepage from North Pile (SE8)	288		287		287		287		288	
Seepage from WMP (SE9)	12,030		11,994		11,994		11,994		12,030	
Natural and Disturbed Runoff (RO11)	14,572,605		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	14,233,532		10,277,799		10,277,799		10,277,799		10,277,800	
RO Airport and Explosives	39,088		28,224		28,224		28,224		28,224	
RO Disturbed	262,420		189,489		189,489		189,489		189,489	
RO Roads	37,615		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		9,668,382		12,710,515		17,086,881		21,838,264		26,490,926
Potable Water (PR9)		28,469		27,648		26,834		26,834		26,908
Evaporation (EV10)		5,353,967		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	1,285,901		1,599,412		1,826,647		2,770,295		3,125,098	
Seepage from Snap Lake (SE11)	9,668,382		12,710,515		17,086,881		21,838,264		26,490,926	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		9,668,382		12,710,515		17,086,881		21,838,264		26,490,926
Pumped from to Treatment (PR10)		1,285,901		1,599,412		1,826,647		2,770,295		3,125,098
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	10,954,283	10,954,283	14,309,927	14,309,927	18,913,528	18,913,528	24,608,559	24,608,559	29,616,024	29,616,024
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	72,530		52,019		52,019		52,019		52,011	
Direct Precipitation (DP9)	20,011		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	743,490		586,913		562,986		561,961		562,510	
Overflow from WTP (PR5)	728,540		800,895		763,470		763,470		765,965	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,506,878		1,523,545		1,365,394		1,365,208		1,368,961
Evaporation (EV9)		15,357		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		12,030		11,994		11,994		11,994		12,030
Subtotal	1,564,571	1,534,265	1,454,276	1,548,832	1,392,925	1,390,681	1,391,900	1,390,494	1,394,936	1,394,283
Change in Storage Volume	30,307		-94,555		2,244		1,406		653	
WTP										
Sewage (PR6)	28,469		27,648		26,834		26,834		26,908	
Underground Water (SE11)	9,668,382		12,710,515		17,086,881		21,838,264		26,490,926	
Underground water (SE10)	1,285,901		1,599,412		1,826,647		2,770,295		3,125,098	
Pumped from WMP (PR4)	1,506,878		1,523,545		1,365,394		1,365,208		1,368,961	
Pumped to Mill (PR2)		491,334		505,782		478,406		478,406		479,716
Pumped to Mill (PR3)		22,055		22,905		19,145		19,145		19,197
Pumped to Snap (PR7)		11,201,806		14,485,644		18,998,836		24,693,696		29,701,111
Overflow to WMP (PR5)		728,540		800,895		763,470		763,470		765,965
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	12,489,629	12,489,635	15,861,120	15,861,126	20,305,756	20,305,756	26,000,601	26,000,616	31,011,893	31,011,889
Change in Storage Volume	-6		-6		0		-15		3	
North Pile										
Direct Precipitation on Sumps	26,130		18,868		18,868		18,868		18,868	
Runoff to Sumps	206,592		148,386		148,386		148,386		148,369	
Seepage from North Pile to Sumps from Process Water	502,145		435,178		406,766		405,465		406,275	
Draindown flows	72,991		8,051		1,695		395		95	
Evaporation from Sumps		23,001		19,909		19,909		18,064		17,357
Discharge to WMP (PR11)		743,490		586,913		562,986		561,961		562,510
Seepage to Snap Lake (SE8)		288		287		287		287		288
Subtotal	807,858	766,778	610,483	607,108	575,715	583,182	573,114	580,313	573,607	580,154
Change in Storage Volume	41,080		3,375		-7,467		-7,199		-6,547	

WTP= water treatment plant; WMP= water management pond.

Snap Lake Water Balance Results- Snap Lake Upper Bound

Flow Description	2017 Inflows	2017 Outflows	2018 Inflows	2018 Outflows	2019 Inflows	2019 Outflows	2020 Inflows	2020 Outflows	2021 Inflows	2021 Outflows
Snap Lake										
Pumped from WTP (PR7)	33,617,757		33,601,537		32,730,128		32,632,988		32,252,321	
Direct Precipitation (DP10)	5,037,782		5,037,782		5,037,782		5,037,776		5,037,782	
Seepage from North Pile (SE8)	287		287		287		288		287	
Seepage from WMP (SE9)	11,994		11,994		11,994		12,030		11,994	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,799		10,277,799		10,277,800		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		30,397,262		28,895,164		29,351,962		29,987,101		29,712,301
Potable Water (PR9)		26,834		26,834		26,834		26,908		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	3,056,043		4,489,853		3,197,757		2,469,031		2,365,286	
Seepage from Snap Lake (SE11)	30,397,262		28,895,164		29,351,962		29,987,101		29,712,301	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		30,397,262		28,895,164		29,351,962		29,987,101		29,712,301
Pumped from to Treatment (PR10)		3,056,043		4,489,853		3,197,757		2,469,031		2,365,286
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	33,453,305	33,453,305	33,385,017	33,385,017	32,549,719	32,549,719	32,456,132	32,456,132	32,077,587	32,077,587
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,019		52,019		52,011		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	646,966		689,436		656,151		653,946		651,795	
Overflow from WTP (PR5)	713,570		726,045		733,530		738,520		738,520	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,394,635		1,459,179		1,430,546		1,433,266		1,429,858
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		11,994		11,994		12,030		11,994
Subtotal	1,427,005	1,419,922	1,481,950	1,484,466	1,456,150	1,455,832	1,458,928	1,458,588	1,456,783	1,455,144
Change in Storage Volume	7,083		-2,516		318		339		1,639	
WTP										
Sewage (PR6)	26,834		26,834		26,834		26,908		26,834	
Underground Water (SE11)	30,397,262		28,895,164		29,351,962		29,987,101		29,712,301	
Underground water (SE10)	3,056,043		4,489,853		3,197,757		2,469,031		2,365,286	
Pumped from WMP (PR4)	1,394,635		1,459,179		1,430,546		1,433,266		1,429,858	
Pumped to Mill (PR2)		478,406		478,406		478,406		479,716		478,406
Pumped to Mill (PR3)		19,145		19,145		19,145		19,197		19,145
Pumped to Snap (PR7)		33,617,757		33,601,537		32,730,128		32,632,988		32,252,321
Overflow to WMP (PR5)		713,570		726,045		733,530		738,520		738,520
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	34,874,775	34,874,777	34,871,030	34,871,032	34,007,099	34,007,108	33,916,306	33,916,321	33,534,279	33,534,291
Change in Storage Volume	-2		-2		-10		-15		-12	
North Pile										
Direct Precipitation on Sumps	21,898		27,746		27,746		27,746		27,746	
Runoff to Sumps	179,623		231,635		210,020		209,972		210,020	
Seepage from North Pile to Sumps from Process Water	474,774		450,263		435,147		433,667		431,892	
Draindown flows	57,290		18,552		3,437		773		182	
Evaporation from Sumps		19,011		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		646,966		689,436		656,151		653,946		651,795
Seepage to Snap Lake (SE8)		287		287		287		288		287
Subtotal	733,586	666,265	728,196	709,632	676,350	676,347	672,158	674,143	669,841	671,990
Change in Storage Volume	67,322		18,565		3		-1,984		-2,149	

WTP= water treatment plant; WMP= water management pond.

Snap Lake Water Balance Results- Snap Lake Upper Bound

Flow Description	2022 Inflows	2022 Outflows	2023 Inflows	2023 Outflows	2024 Inflows	2024 Outflows	2025 Inflows	2025 Outflows	2026 Inflows	2026 Outflows
Snap Lake										
Pumped from WTP (PR7)	32,096,789		32,013,761		32,024,345		31,905,573		33,920,592	
Direct Precipitation (DP10)	5,037,782		5,037,782		5,037,776		5,037,782		5,037,782	
Seepage from North Pile (SE8)	287		287		288		287		287	
Seepage from WMP (SE9)	11,994		11,994		12,030		11,994		11,994	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,799		10,277,800		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		29,588,616		29,572,876		29,601,132		29,490,045		30,935,966
Potable Water (PR9)		26,834		26,834		26,908		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	2,332,505		2,265,196		2,245,044		2,238,910		2,811,515	
Seepage from Snap Lake (SE11)	29,588,616		29,572,876		29,601,132		29,490,045		30,935,966	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		29,588,616		29,572,876		29,601,132		29,490,045		30,935,966
Pumped from to Treatment (PR10)		2,332,505		2,265,196		2,245,044		2,238,910		2,811,515
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	31,921,121	31,921,121	31,838,072	31,838,072	31,846,176	31,846,176	31,728,955	31,728,955	33,747,481	33,747,481
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,019		52,011		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	648,827		653,054		652,496		651,418		648,186	
Overflow from WTP (PR5)	736,025		736,025		736,025		738,520		738,520	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,428,247		1,428,297		1,432,024		1,431,682		1,428,228
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		11,994		12,030		11,994		11,994
Subtotal	1,451,321	1,453,534	1,455,547	1,453,584	1,454,982	1,457,346	1,456,407	1,456,969	1,453,174	1,453,515
Change in Storage Volume	-2,213		1,964		-2,365		-562		-340	
WTP										
Sewage (PR6)	26,834		26,834		26,908		26,834		26,834	
Underground Water (SE11)	29,588,616		29,572,876		29,601,132		29,490,045		30,935,966	
Underground water (SE10)	2,332,505		2,265,196		2,245,044		2,238,910		2,811,515	
Pumped from WMP (PR4)	1,428,247		1,428,297		1,432,024		1,431,682		1,428,228	
Pumped to Mill (PR2)		478,406		478,406		479,716		478,406		478,406
Pumped to Mill (PR3)		19,145		19,145		19,197		19,145		19,145
Pumped to Snap (PR7)		32,096,789		32,013,761		32,024,345		31,905,573		33,920,592
Overflow to WMP (PR5)		736,025		736,025		736,025		738,520		738,520
Dust Suppression (PR14)		45,900		45,900		45,900		45,900		45,900
Subtotal	33,376,203	33,376,264	33,293,204	33,293,236	33,305,108	33,305,183	33,187,472	33,187,543	35,202,543	35,202,562
Change in Storage Volume	-61		-33		-75		-71		-19	
North Pile										
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746		27,746	
Runoff to Sumps	210,020		210,020		209,972		210,020		210,020	
Seepage from North Pile to Sumps from Process Water	431,754		431,721		432,896		431,711		431,711	
Draindown flows	44		11		3		1		0	
Evaporation from Sumps		19,909		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		648,827		653,054		652,496		651,418		648,186
Seepage to Snap Lake (SE8)		287		287		288		287		287
Subtotal	669,565	669,023	669,498	673,249	670,617	672,692	669,478	671,614	669,477	668,381
Change in Storage Volume	542		-3,751		-2,075		-2,136		1,096	

WTP= water treatment plant; WMP= water management pond.

Snap Lake Water Balance Results- Snap Lake Upper Bound

Flow Description	2027 Inflows	2027 Outflows	2028 Inflows	2028 Outflows	2029 Inflows	2029 Outflows	2030 Inflows	2030 Outflows
Snap Lake								
Pumped from WTP (PR7)	34,496,998		32,978,796		472,916		344,682	
Direct Precipitation (DP10)	5,037,782		5,037,776		5,037,782		5,037,782	
Seepage from North Pile (SE8)	287		288		287		287	
Seepage from WMP (SE9)	11,994		12,030		11,349		11,375	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,800		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		32,672,147		31,224,640		0		0
Potable Water (PR9)		26,834		26,908		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136
Underground								
Seepage from Concatenate Water (SE10)	1,649,190		1,577,043		0		0	
Seepage from Snap Lake (SE11)	32,672,147		31,224,640		0		0	
Pumped flows from the North Pile (PR12)	0		0		0		0	
Pumped Flows to Treatment (PR8)		32,672,147		31,224,640		0		0
Pumped from to Treatment (PR10)		1,649,190		1,577,043		0		0
Pumped from to WMP (PR13)		0		0		0		0
Subtotal	34,321,337	34,321,337	32,801,683	32,801,683	0	0	0	0
Change in Storage Volume	0		0		0		0	
WMP								
Runoff (R10)	52,019		52,011		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	652,456		652,843		396,158		263,482	
Overflow from WTP (PR5)	736,025		738,520		705,409		705,455	
Pumped from UG (PR13)	0		0		0		0	
Pumped to WTP (PR4)		1,428,295		1,432,148		1,151,494		1,023,305
Evaporation (EV9)		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,994		12,030		11,349		11,375
Subtotal	1,454,950	1,453,581	1,457,824	1,457,470	1,168,036	1,176,136	1,035,406	1,047,973
Change in Storage Volume	1,369		355		-8,100		-12,567	
WTP								
Sewage (PR6)	26,834		26,908		26,834		26,834	
Underground Water (SE11)	32,672,147		31,224,640		0		0	
Underground water (SE10)	1,649,190		1,577,043		0		0	
Pumped from WMP (PR4)	1,428,295		1,432,148		1,151,494		1,023,305	
Pumped to Mill (PR2)		478,406		478,406		0		0
Pumped to Mill (PR3)		19,145		19,145		0		0
Pumped to Snap (PR7)		34,496,998		32,978,796		472,916		344,682
Overflow to WMP (PR5)		736,025		738,520		705,409		705,455
Dust Suppression (PR14)		45,900		45,900		0		0
Subtotal	35,776,466	35,776,473	34,260,739	34,260,767	1,178,329	1,178,324	1,050,140	1,050,137
Change in Storage Volume	-7		-28		4		3	
North Pile								
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746	
Runoff to Sumps	210,020		209,972		210,020		178,164	
Seepage from North Pile to Sumps from Process Water	431,710		432,893		173,953		73,186	
Draindown flows	0		0		113,113		12,346	
Evaporation from Sumps		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		652,456		652,843		396,158		263,482
Seepage to Snap Lake (SE8)		287		288		287		287
Subtotal	669,477	672,652	670,612	673,040	524,833	416,354	291,442	283,678
Change in Storage Volume	-3,175		-2,428		108,479		7,765	

WTP= water treatment plant; WMP= water management pond.

Snap Lake Water Balance Results- Snap Lake Upper Bound

Flow Description	2031 Inflows	2031 Outflows	2032 Inflows	2032 Outflows	2033 Inflows	2033 Outflows	2034 Inflows	2034 Outflows	2035 Inflows	2035 Outflows
Snap Lake										
Pumped from WTP (PR7)	336,562		332,715		331,752		333,223		323,543	
Direct Precipitation (DP10)	5,037,782		5,037,776		5,037,782		5,037,782		5,037,782	
Seepage from North Pile (SE8)	287		288		287		287		287	
Seepage from WMP (SE9)	11,375		11,410		11,151		11,215		11,279	
Natural and Disturbed Runoff (RO11)	10,522,717		10,522,717		10,522,717		10,522,717		10,522,717	
RO11	10,277,799		10,277,800		10,277,799		10,277,799		10,277,799	
RO Airport and Explosives	28,224		28,224		28,224		28,224		28,224	
RO Disturbed	189,489		189,489		189,489		189,489		189,489	
RO Roads	27,161		27,161		27,161		27,161		27,161	
Seepage to Mine Workings (SE11)		0		0		0		0		0
Potable Water (PR9)		26,834		26,908		26,834		26,834		26,834
Evaporation (EV10)		4,634,136		4,634,136		4,634,136		4,634,136		4,634,136
Underground										
Seepage from Concatenate Water (SE10)	0		0		0		0		0	
Seepage from Snap Lake (SE11)	0		0		0		0		0	
Pumped flows from the North Pile (PR12)	0		0		0		0		0	
Pumped Flows to Treatment (PR8)		0		0		0		0		0
Pumped from to Treatment (PR10)		0		0		0		0		0
Pumped from to WMP (PR13)		0		0		0		0		0
Subtotal	0	0	0	0	0	0	0	0	0	0
Change in Storage Volume	0		0		0		0		0	
WMP										
Runoff (R10)	52,019		52,011		52,019		52,019		52,019	
Direct Precipitation (DP9)	14,450		14,450		14,450		14,450		14,450	
Pumped from North Pile (PR11)	253,040		250,309		249,974		257,447		250,448	
Overflow from WTP (PR5)	701,791		703,443		701,891		699,504		706,359	
Pumped from UG (PR13)	0		0		0		0		0	
Pumped to WTP (PR4)		1,011,522		1,009,253		1,006,813		1,005,895		1,003,070
Evaporation (EV9)		13,292		13,292		13,292		13,292		13,292
Seepage to Snap (SE9)		11,375		11,410		11,151		11,215		11,279
Subtotal	1,021,300	1,036,189	1,020,212	1,033,955	1,018,335	1,031,255	1,023,420	1,030,402	1,023,276	1,027,642
Change in Storage Volume	-14,889		-13,742		-12,921		-6,982		-4,366	
WTP										
Sewage (PR6)	26,834		26,908		26,834		26,834		26,834	
Underground Water (SE11)	0		0		0		0		0	
Underground water (SE10)	0		0		0		0		0	
Pumped from WMP (PR4)	1,011,522		1,009,253		1,006,813		1,005,895		1,003,070	
Pumped to Mill (PR2)		0		0		0		0		0
Pumped to Mill (PR3)		0		0		0		0		0
Pumped to Snap (PR7)		336,562		332,715		331,752		333,223		323,543
Overflow to WMP (PR5)		701,791		703,443		701,891		699,504		706,359
Dust Suppression (PR14)		0		0		0		0		0
Subtotal	1,038,356	1,038,354	1,036,161	1,036,158	1,033,647	1,033,644	1,032,729	1,032,727	1,029,905	1,029,902
Change in Storage Volume	3		3		3		3		3	
North Pile										
Direct Precipitation on Sumps	27,746		27,746		27,746		27,746		27,746	
Runoff to Sumps	178,164		178,102		178,164		178,164		178,163	
Seepage from North Pile to Sumps from Process Water	63,437		61,612		60,984		60,875		60,681	
Draindown flows	2,598		605		144		35		8	
Evaporation from Sumps		19,909		19,909		19,909		19,909		19,909
Discharge to WMP (PR11)		253,040		250,309		249,974		257,447		250,429
Seepage to Snap Lake (SE8)		287		288		287		287		286
Subtotal	271,946	273,236	268,065	270,505	267,039	270,170	266,820	277,643	266,599	270,624
Change in Storage Volume	-1,290		-2,440		-3,131		-10,822		-4,025	

WTP= water treatment plant; WMP= water management pond.