Conceptual Site Arrangment, Project Sec

GENERATIONPGM

MAY 26, 2021

MARATHON PALLADIUM PROJECT



WATER MANAGEMENT DISCUSSION

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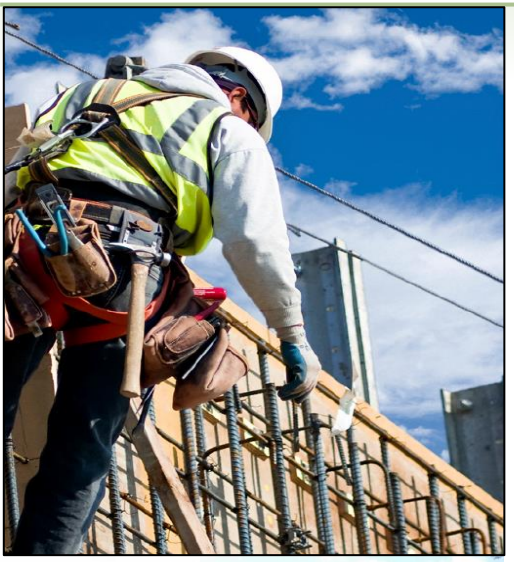

- Site Arrangement
- Project Sequencing
  - Stream and water bodies – overprinting, damming/diverting, altering and impact on fishery
- Site Water Balance
  - (Appendix D5, Volume 2 EIS Addendum)
- Life of Mine Storm Water Management
  - Collection systems, design events (1 in 25 yr vs 1 in 100 yr)
  - Appendices within Feasibility study

SITE ARRANGEMENT (CONCEPTUAL)

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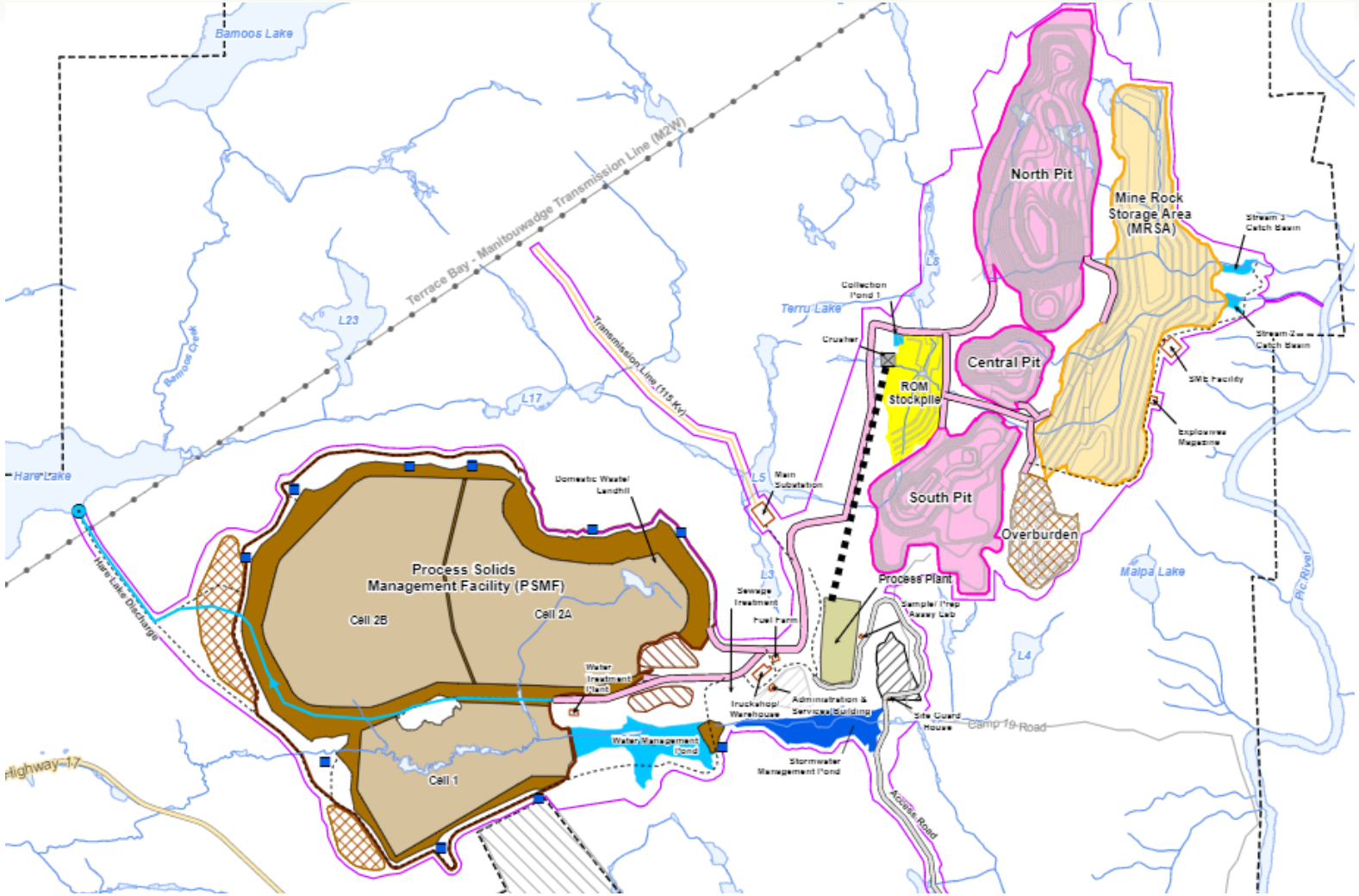

- Open Pits
- ROM Stockpile
- Mine Rock Storage Area (MRSA)
  - Type 1 = Non-Potentially Acid Generating
  - Type 2 = Potentially Acid Generating
- Overburden Stockpiles
- Access Road
- Plant Site
- Transmission Line
- Process Solids Management Facility (PSMF)
- Water Management Pond (WMP)
- Stormwater Management Pond

PROJECT SEQUENCING

- Pre-Construction
- Year -2
- Year -1
- Year 1
- Year 2
- Year 3
- Year 7
- Year 13

SEQUENCING – WATER BODIES

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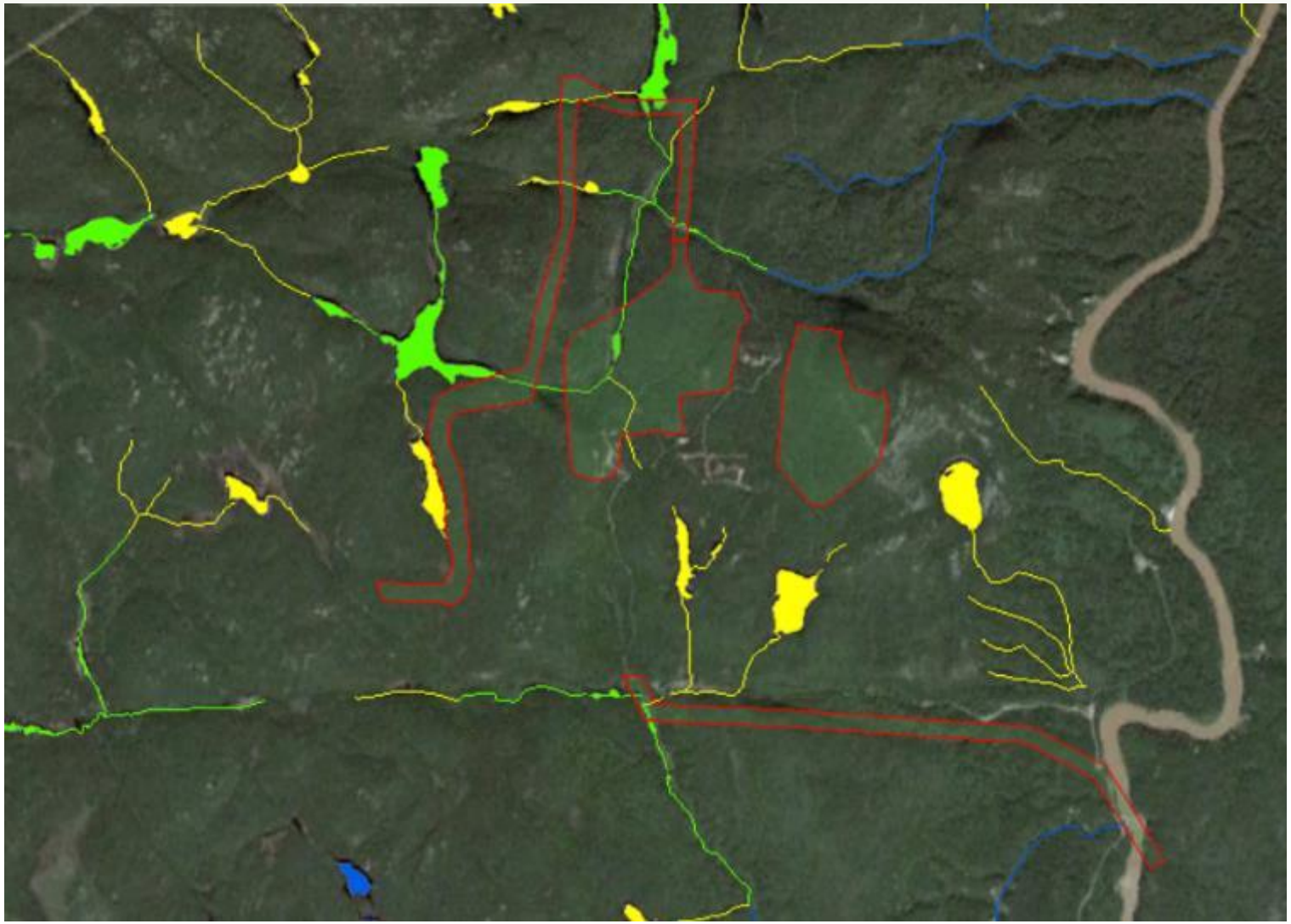

PRECONSTRUCTION

- Road upgrades (Camp19 Road)
- Timber harvest
- Upgrade of existing stream crossings (culverts)
- Timber harvest in this phase to occur adjacent to portions of the tributaries previously confirmed as non-fish bearing (not frequented by fish)

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES

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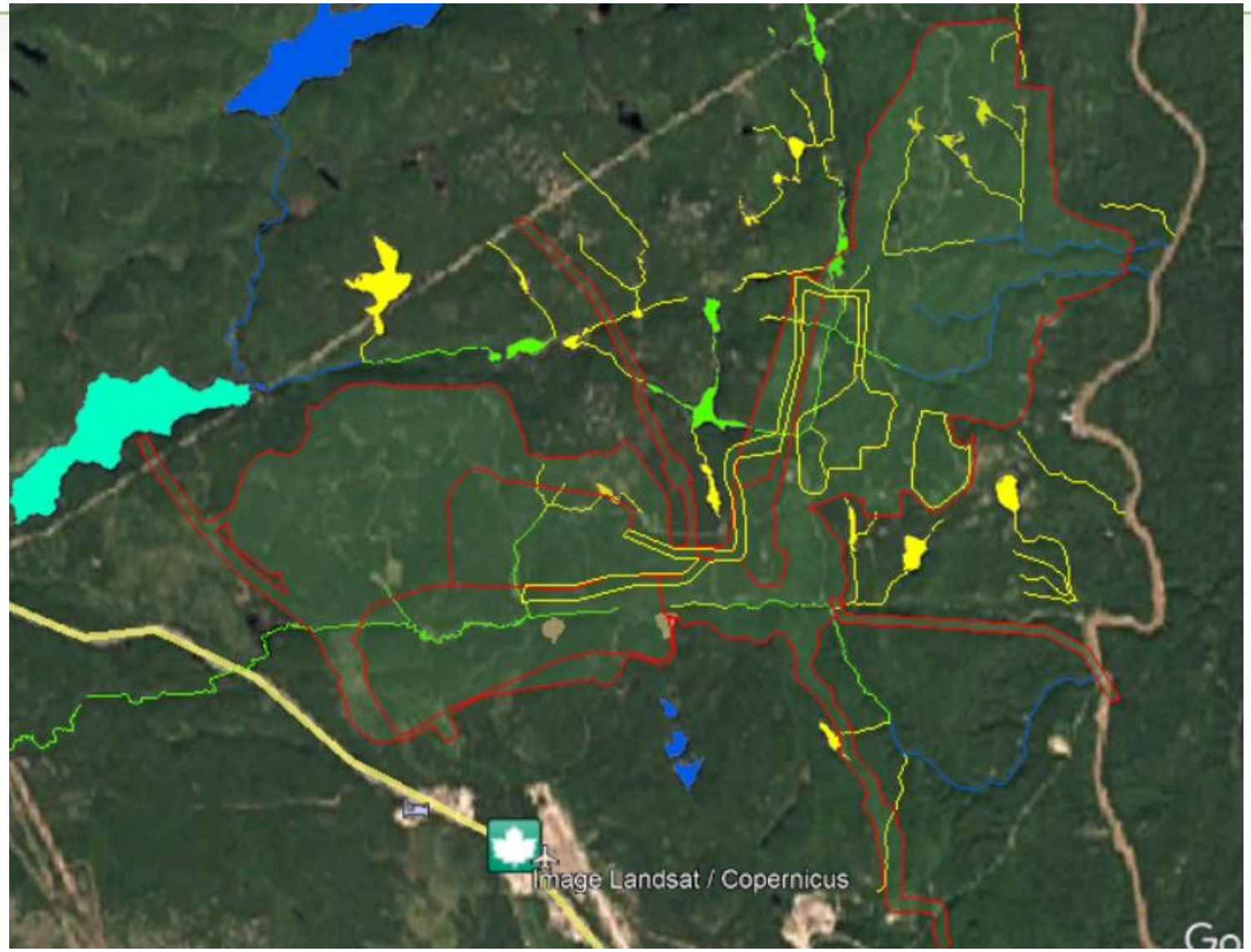

YEAR -2

- Timber harvest completion
- Stream crossings (to meet provincial work permit and DFO approval requirements).
- Section 34(1) / 35(2)
  - WMP dams constructed (east and west)

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES

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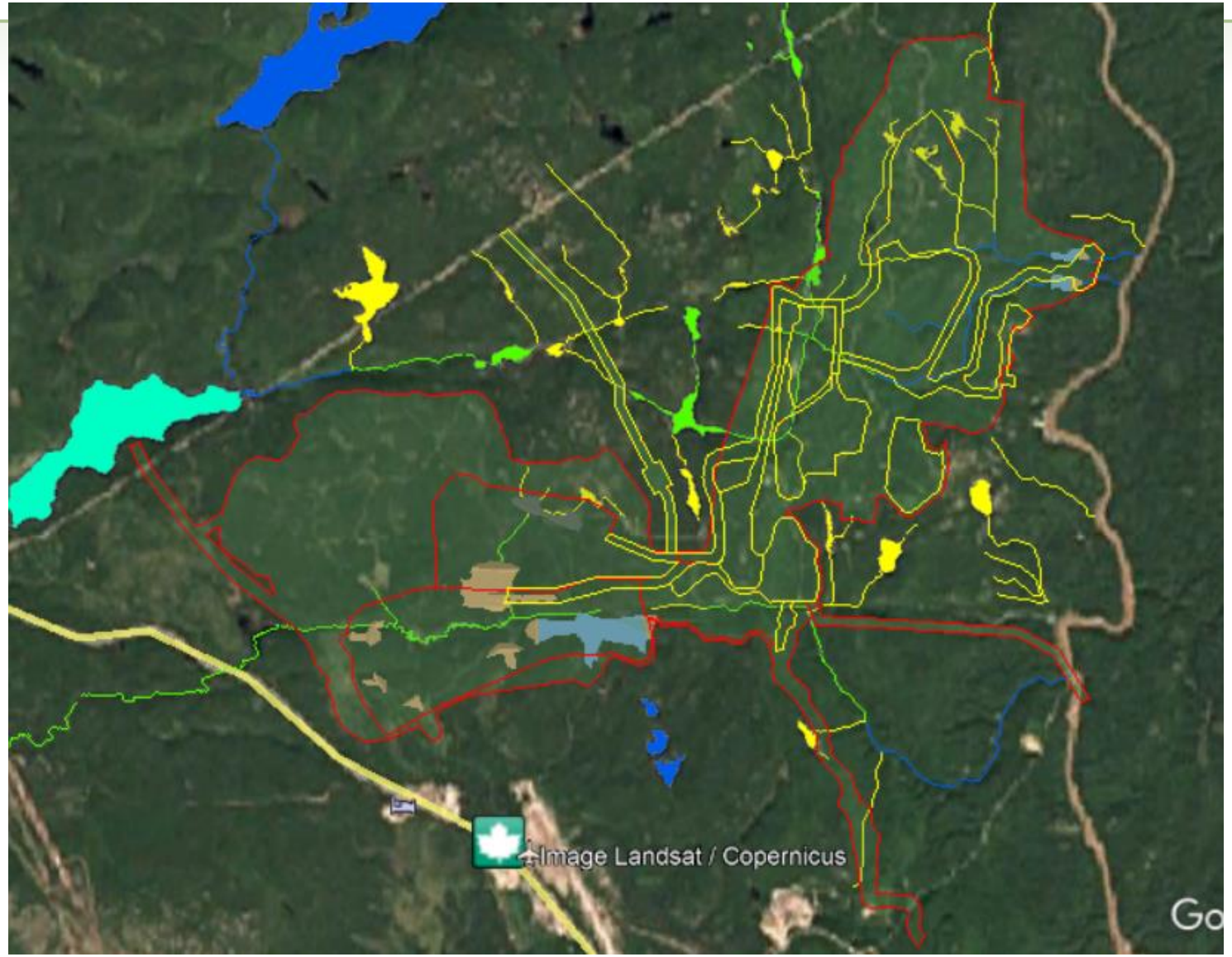


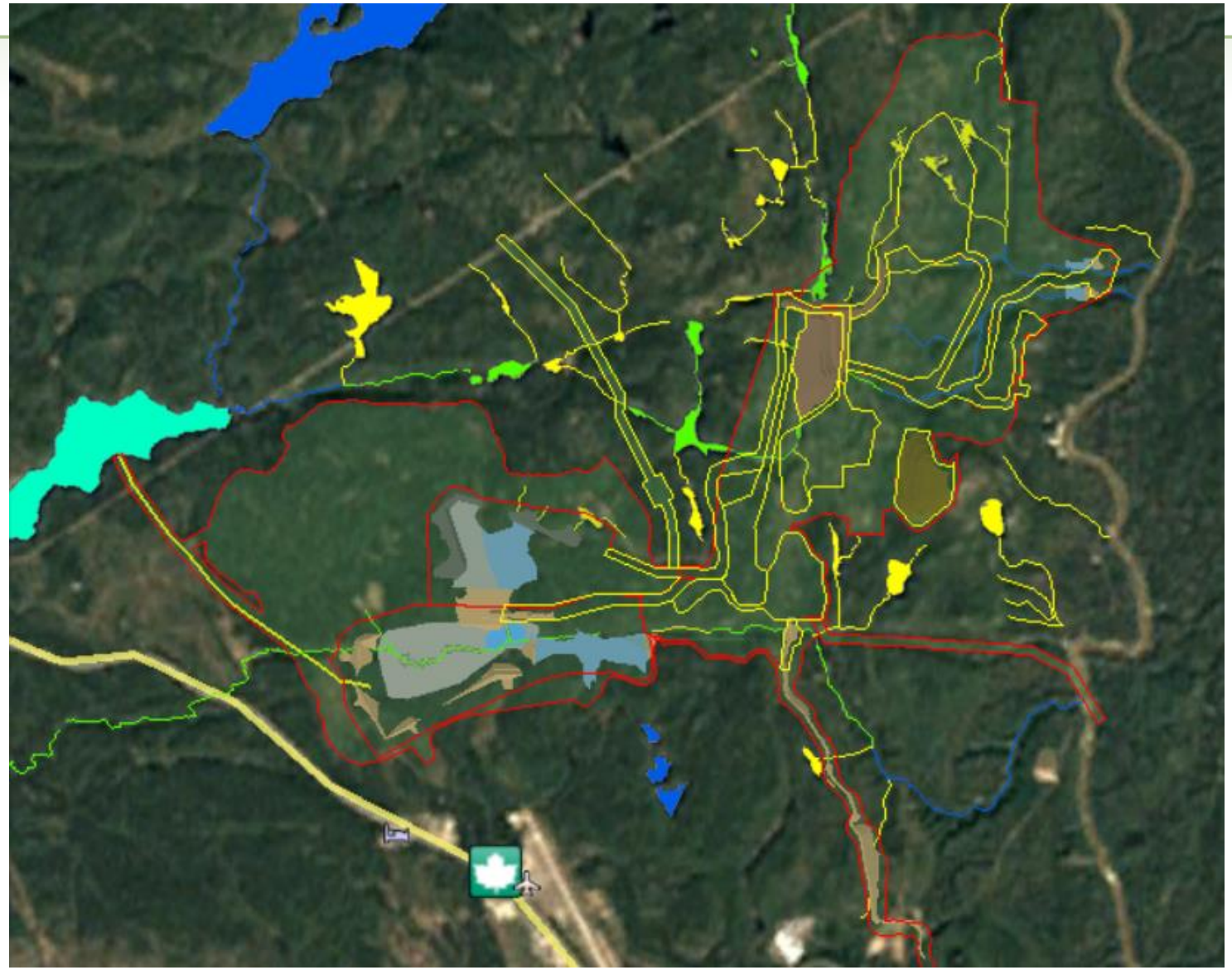
YEAR -1

- Powerline, laydown, ROM, Effluent Pipeline Clearing
- Schedule 2
  - PSMF Type 2 WR placement
- Section 34(1) / 35(2)
  - TH and Road Construction in 103 and 102 requiring crossing of waters frequented by fish (N.Pit, MRSA)
  - MRSA Catch Basin construction (103 & 102)
  - WMP Construction
  - PSMF C1 dam construction
  - SWP

Timber Harvest | Construction Area | Non-Fish | Warm / Cool | Cool/Cold

CONCEPTUAL

SEQUENCING – WATER BODIES

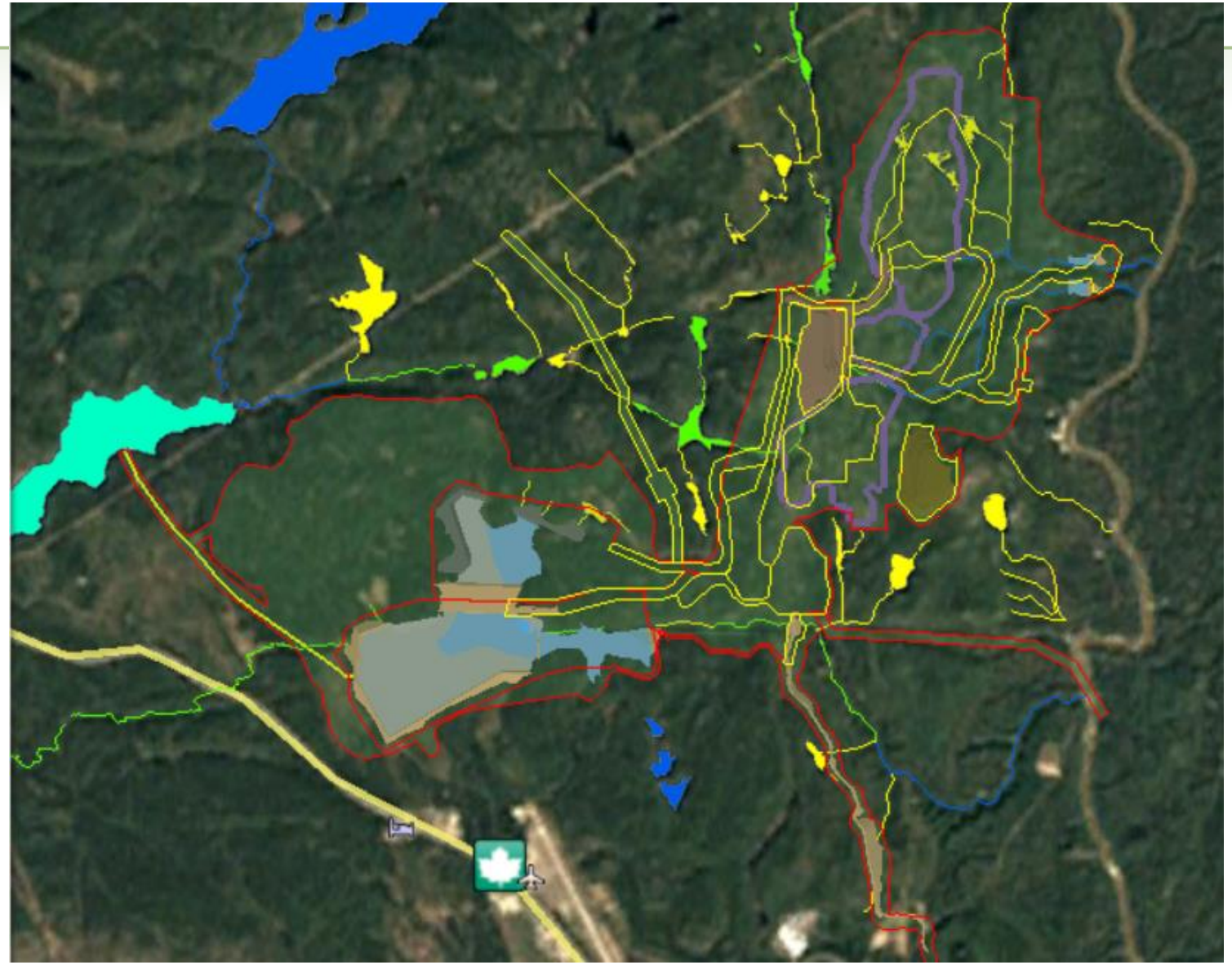


YEAR 1

- Overburden stockpile, PSMF Type 2 WR, effluent pipeline construction.
- Schedule 2
  - PSMF Cell 1 Processed Solids Deposition
  - PSMF Cell 2A Processed Solids Deposition
  - ROM Stockpile
- Section 34(1) / 35(2)
  - Site access road construction
  - PSMF Cell 1 dam construction

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES

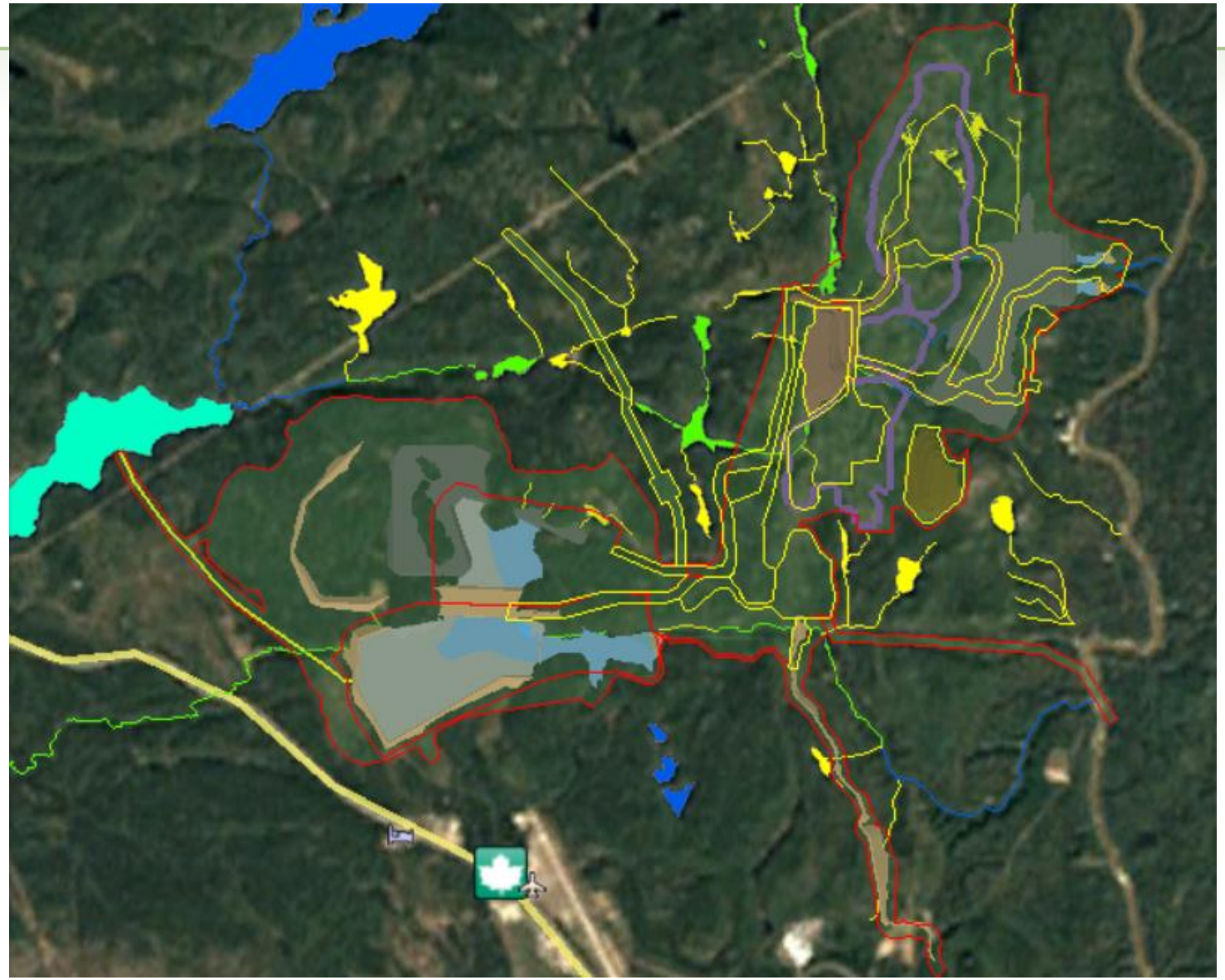


YEAR 2

- Open pits
- Schedule 2
  - PSMF Cell 1 Processed Solids Deposition
- Section 34(1) / 35(2)
  - Central and South Open Pits
  - PSMF Cell 1 dam construction

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES

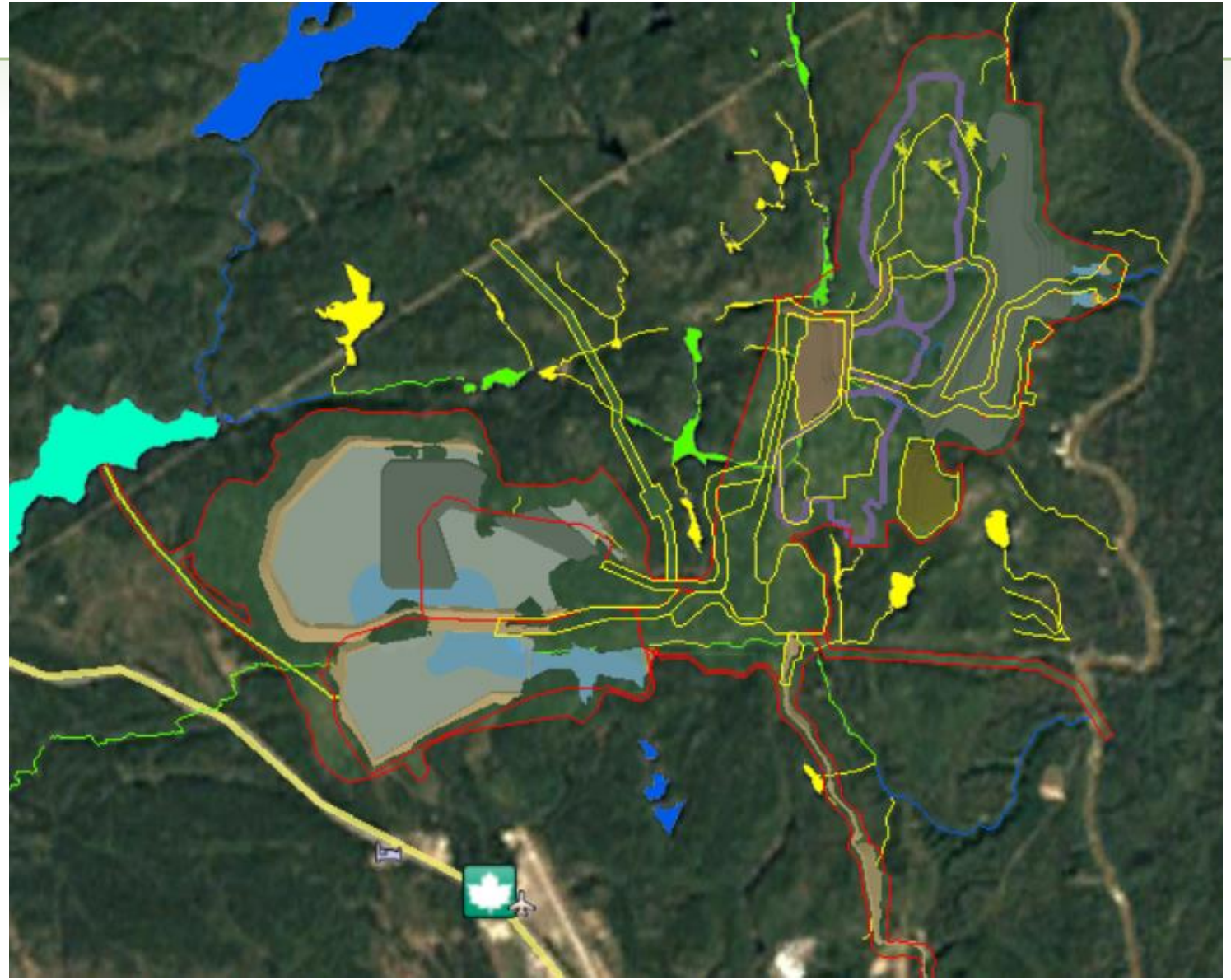


YEAR 3

- PSMF Cell 2B, PSMF Type 2 WR
- Schedule 2
  - MRSA (overprint 103 and 102)
- Section 34(1) / 35(2)
  - None

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES

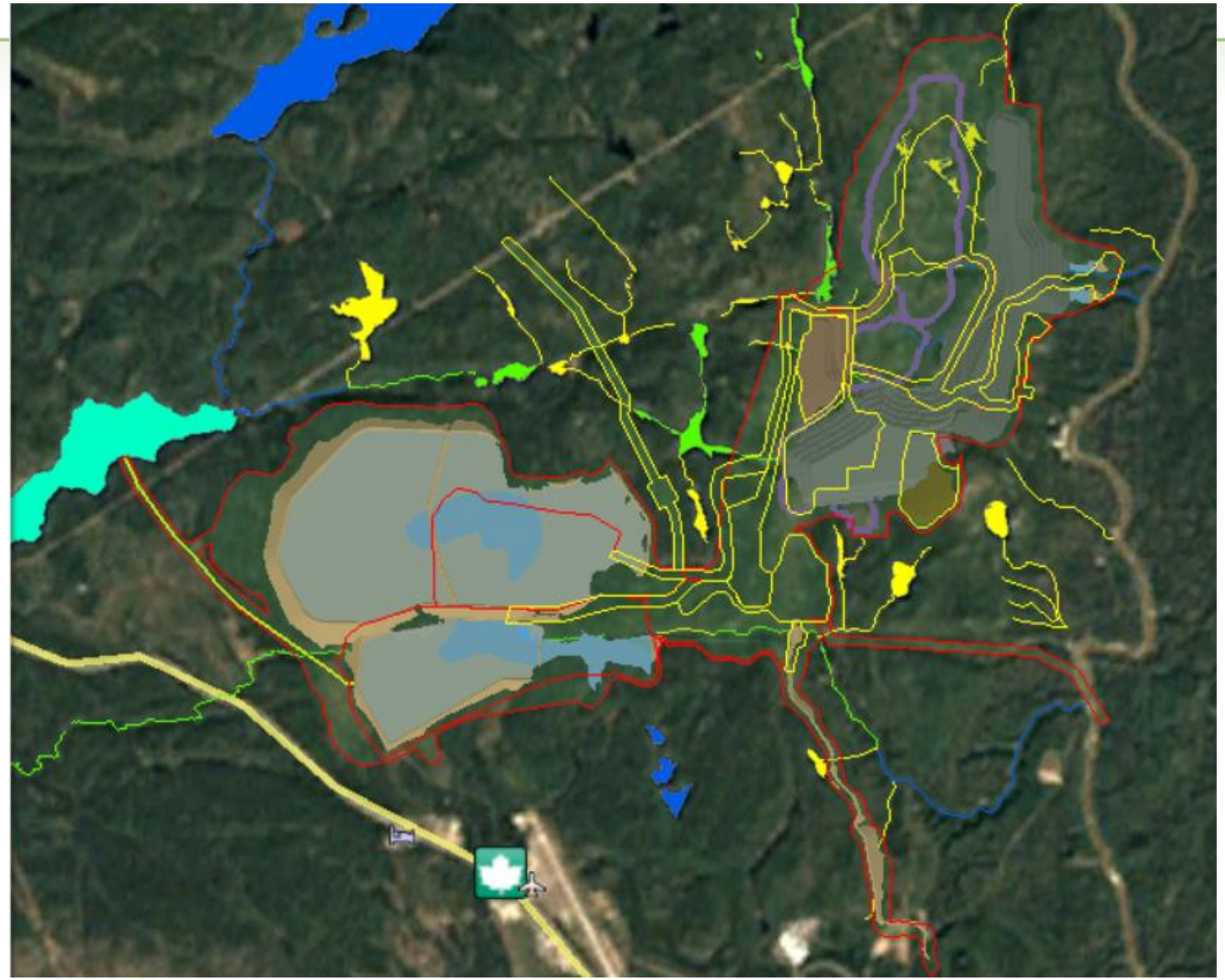


YEAR 7

- MRSA expansion, PSMF C2A & C2B dams, PSMF Type 2 WR,
- Schedule 2
  - PSMF Cell 2B processed solids deposition (starting in year 4)
- Section 34(1) / 35(2)
  - None

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SEQUENCING – WATER BODIES



YEAR 13

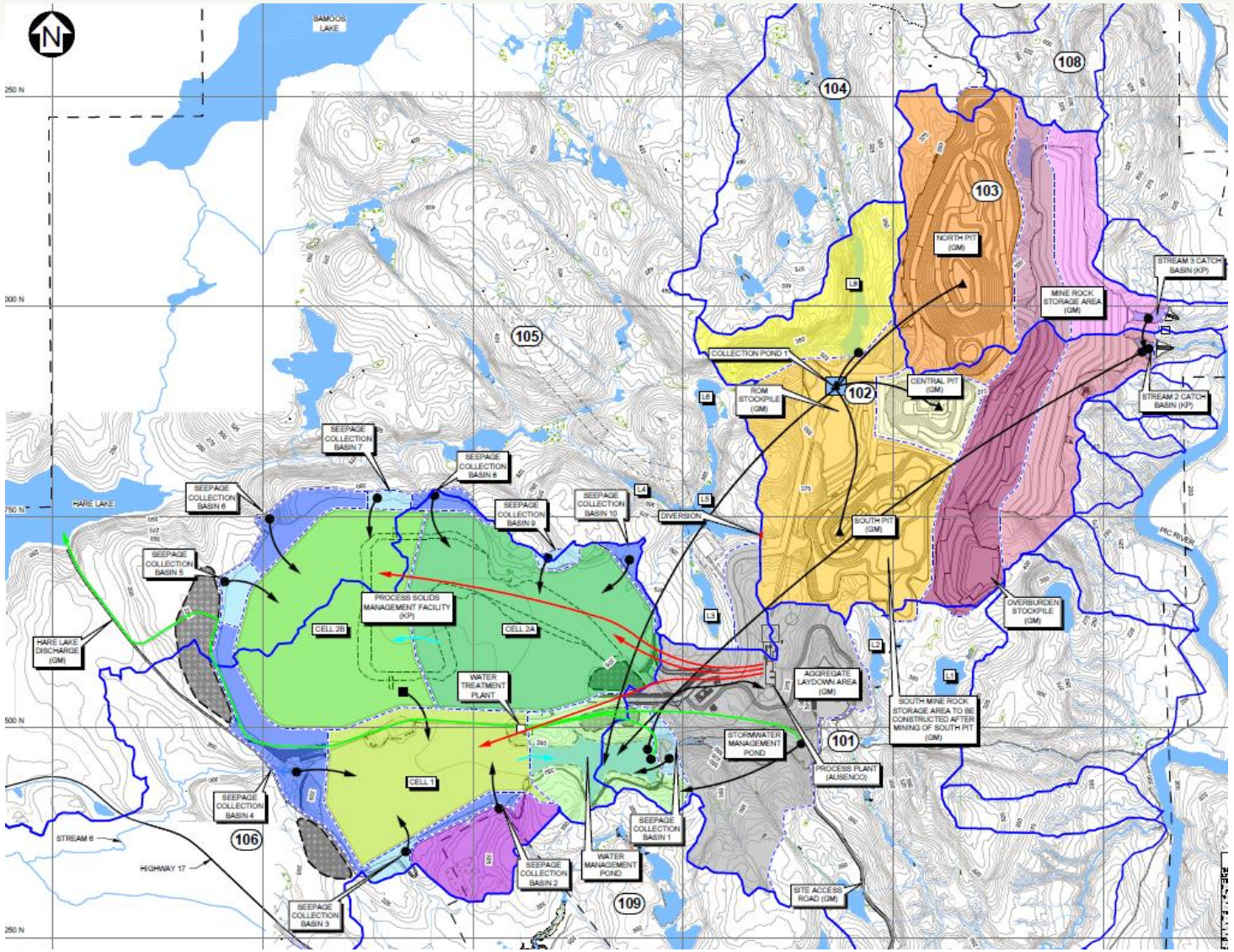
- MRSA, PSMF C2AB divider, PSMF C2B & C2A dams
- Schedule 2
  - PSMF Cell 2B Processed Solids Deposition
- Section 34(1) / 35(2)
  - None

Timber Harvest Construction Area Non-Fish Warm / Cool Cool/Cold

SITE WATER BALANCE

- Overview
- Water Management Strategy
- Water Balance

SITE WATER BALANCE - OVERVIEW

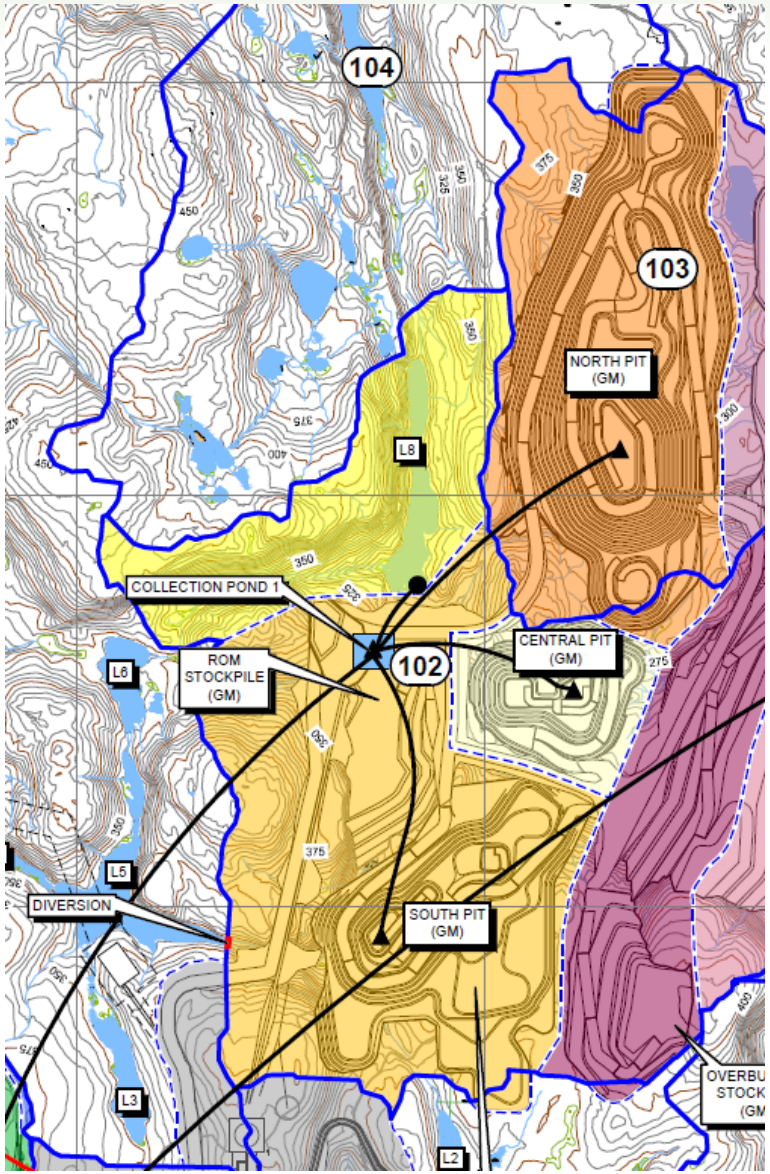


- Contact water from site managed within the Water Management Pond
- Excess contact water to be treated and discharged to Hare Lake
- Water balance developed in GoldSIM for construction, operations and closure project phases
- Water balance evaluated median, wet and dry climatic conditions

WATER MANAGEMENT STRATEGY - CONSTRUCTION

- Manage runoff from cleared and disturbed areas
- Stormwater drainage channels, coffer dams and retentions ponds
- Reduce suspended solids
  - Installation of silt fencing, waddles, straw bales, etc…
  - Removal of suspended solids via geotubes or similar technology
- Contact water to be retained in WMP at end of Year -2 / start of Year -1

WATER MANAGEMENT STRATEGY - OPEN PIT AREA



- Contact water will be collected in base of pits
- Collected water to be transferred to Collection Pond 1 (CP1) and then to the WMP
- Water level in water body L8 to be controlled by transferring water to CP1

WATER MANAGEMENT STRATEGY - MINE ROCK STORAGE AREA (MRSA)

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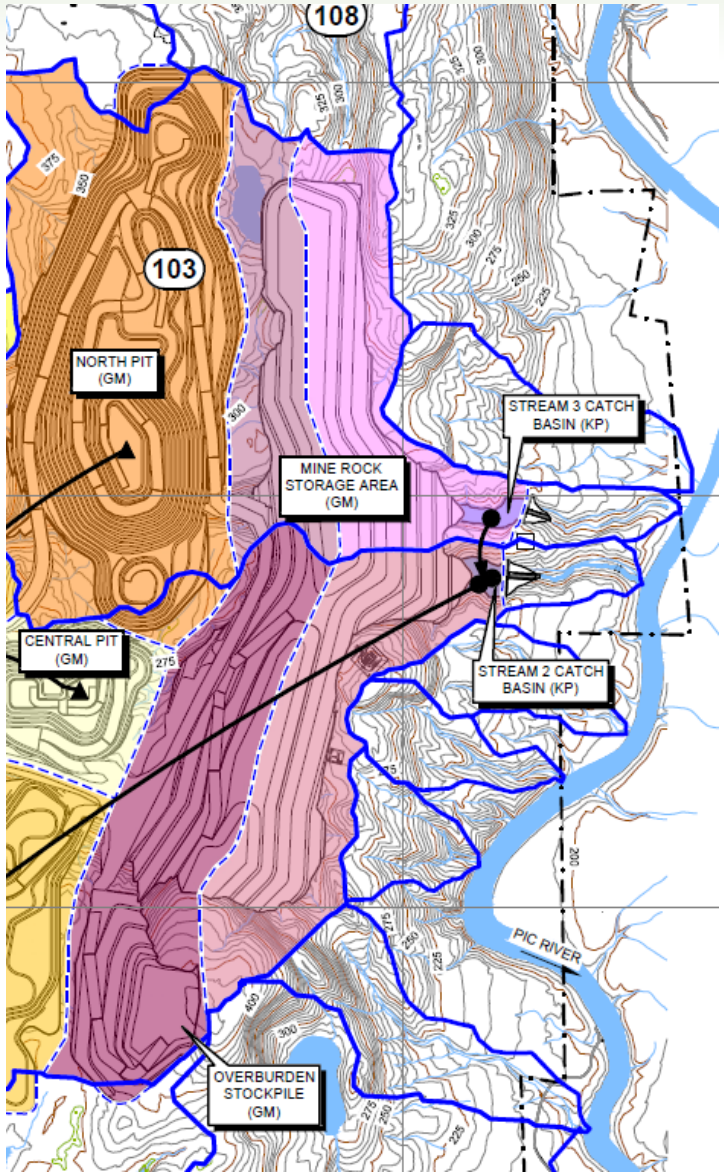

- Contact water will be collected in Stream 2 and Stream 3 Catch Basins
- Collected water to be transferred to the WMP

WATER MANAGEMENT STRATEGY – PROCESS SOLIDS MANAGEMENT FACILITY (PSMF)

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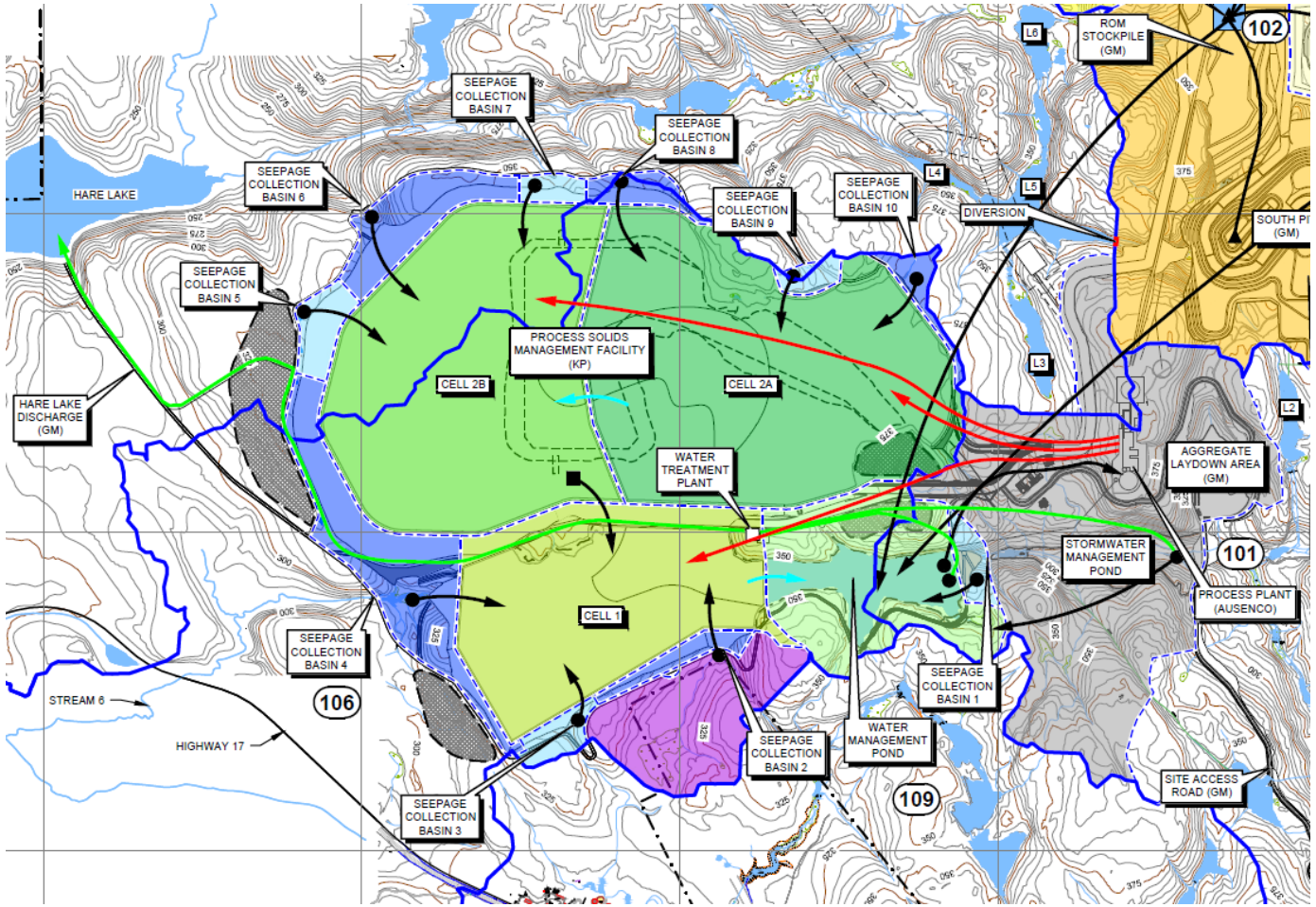

- Tailings deposition to Cell 1 (Type 1), Cell 2A (Type 1 & 2) and Cell 2A (Type1)
- Water transfer from Cell 2A & 2B to Cell 1
- Water transfer to from Cell 1 to WMP
- Reclaim from WMP to Cell 1
- Collect seepage pumped back to storage cell from Seepage Collections Basins (SCBs)
- Contact water from Plant Site collected in Stormwater Management Pond (SWP), pumped to WMP

WATER BALANCE – WMP, EXCESS WATER DISCHARGE

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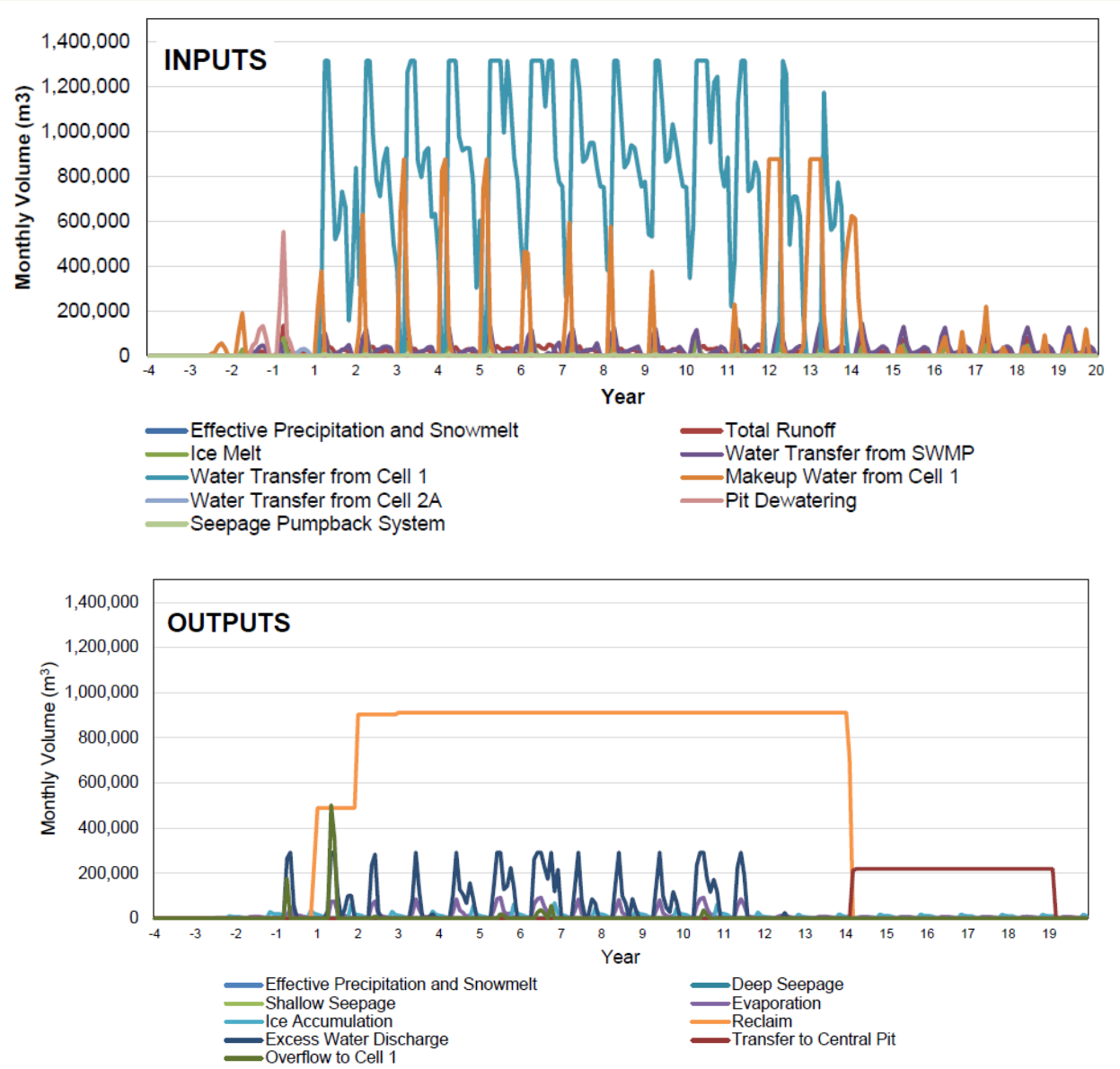

- WMP constructed in Year -2
- Accumulate water during Year -1 for commissioning Process Plant
- Overflow swale to Cell 1
- Annual excess water discharge to Hare Lake ranges from 0.6 to 1.9 million m^3
- Discharge from April to November (330 m^3/hr)
- Maximum estimated annual water deficit during dry conditions of about 0.9 million m^3 (Year 2)

WATER BALANCE – PSMF, CELL 1

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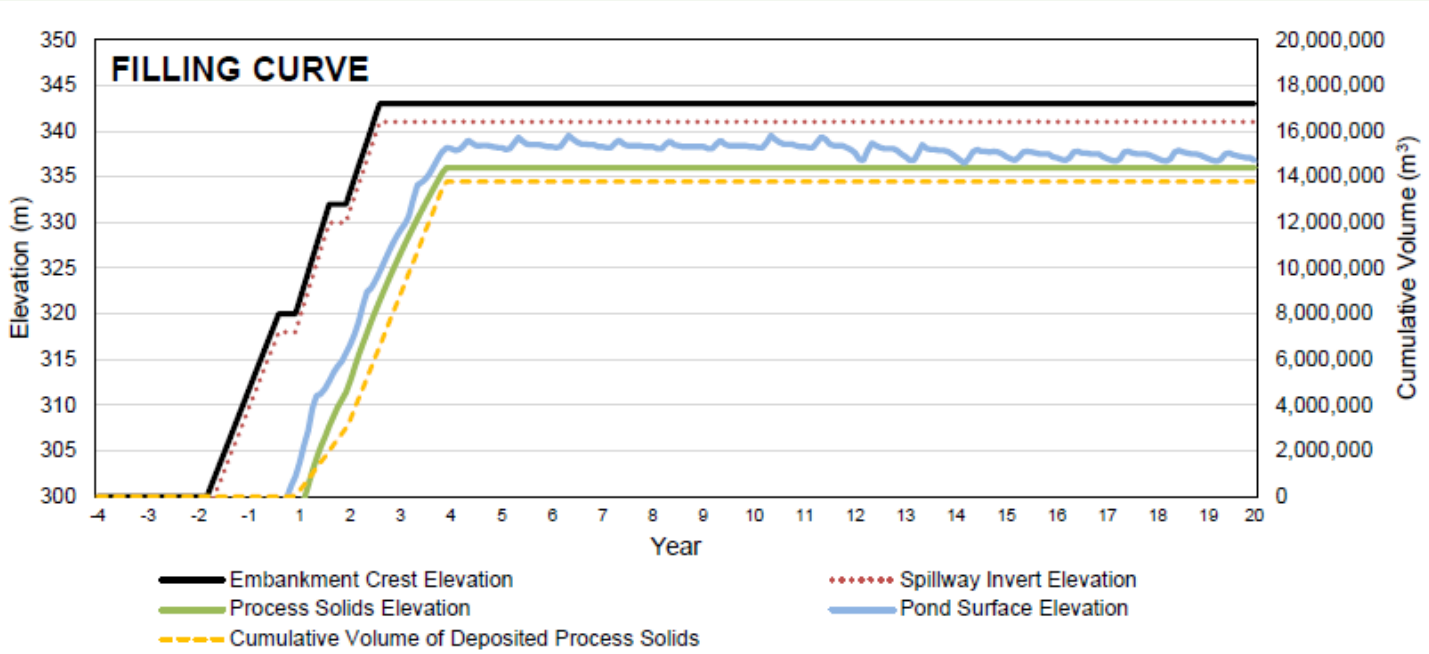
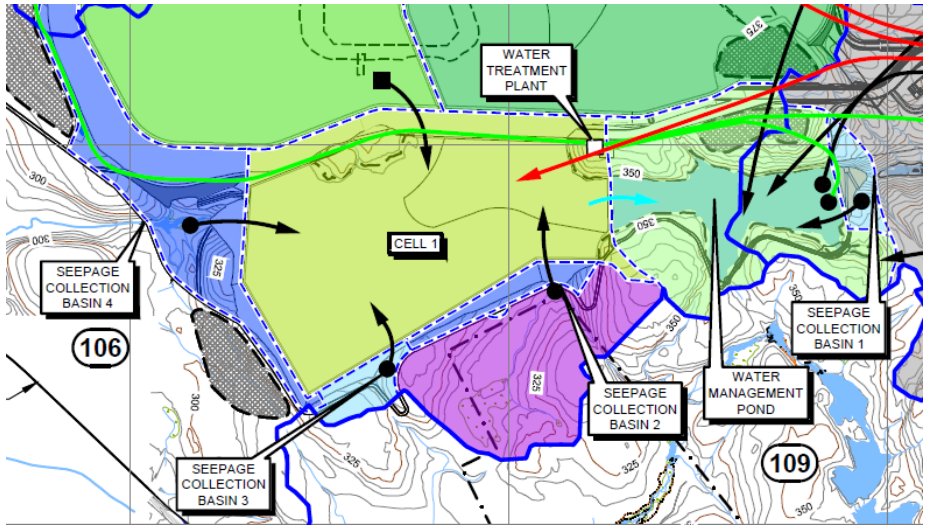
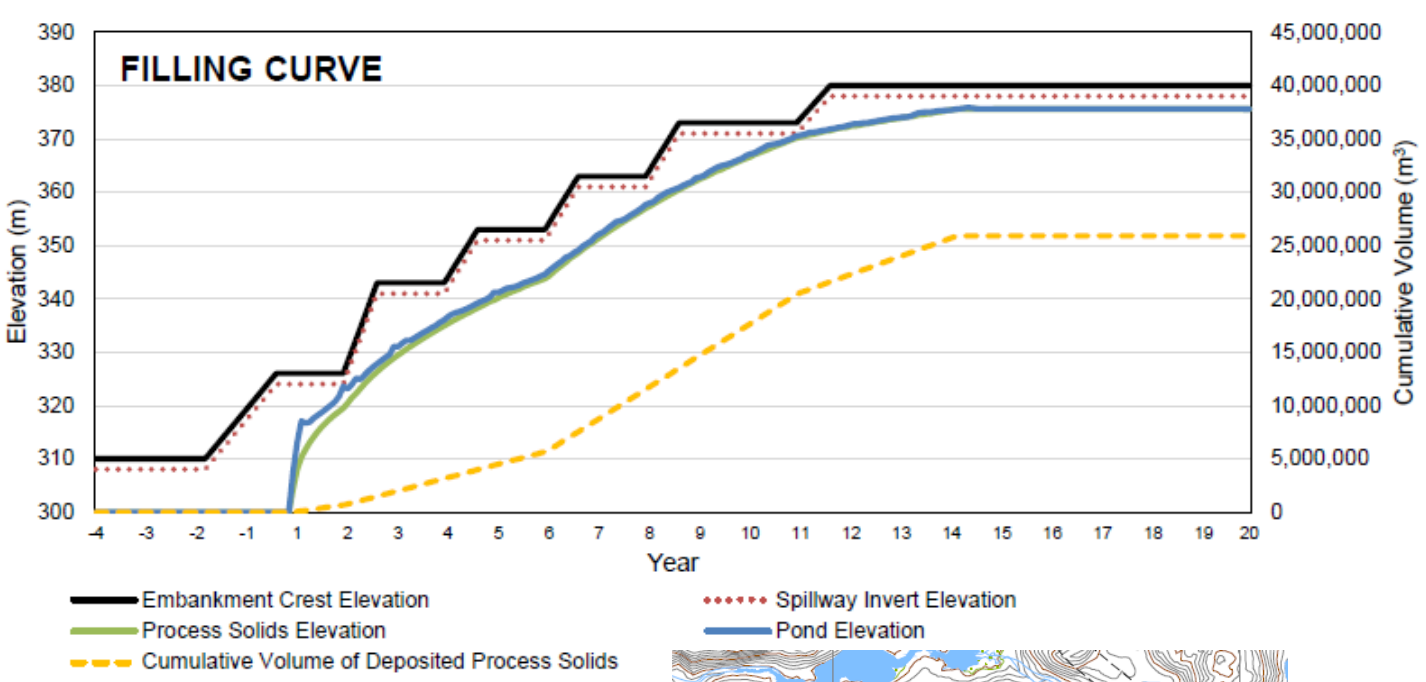
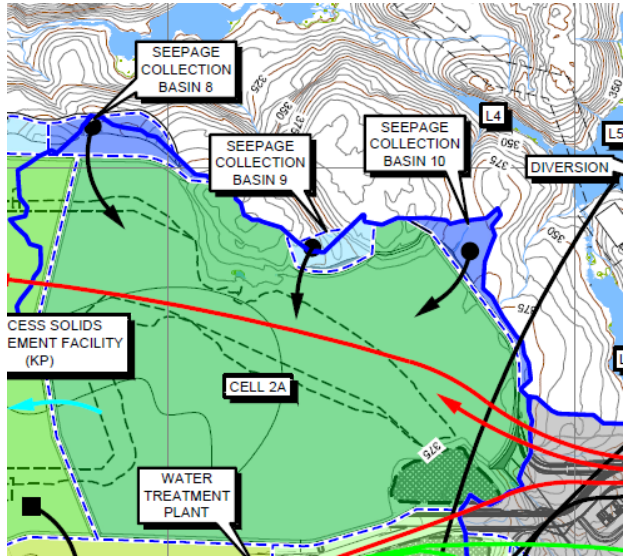




- Commissioned in Year -1 to accumulate water for initial operations
- Type 1 process solids deposition during first 3 years of operations
- Operating pond volume fluctuates seasonally
- Supernatant water transferred from Cell 2A and 2B to Cell 1
- Pump back from SCBs 2 ,3, and 4

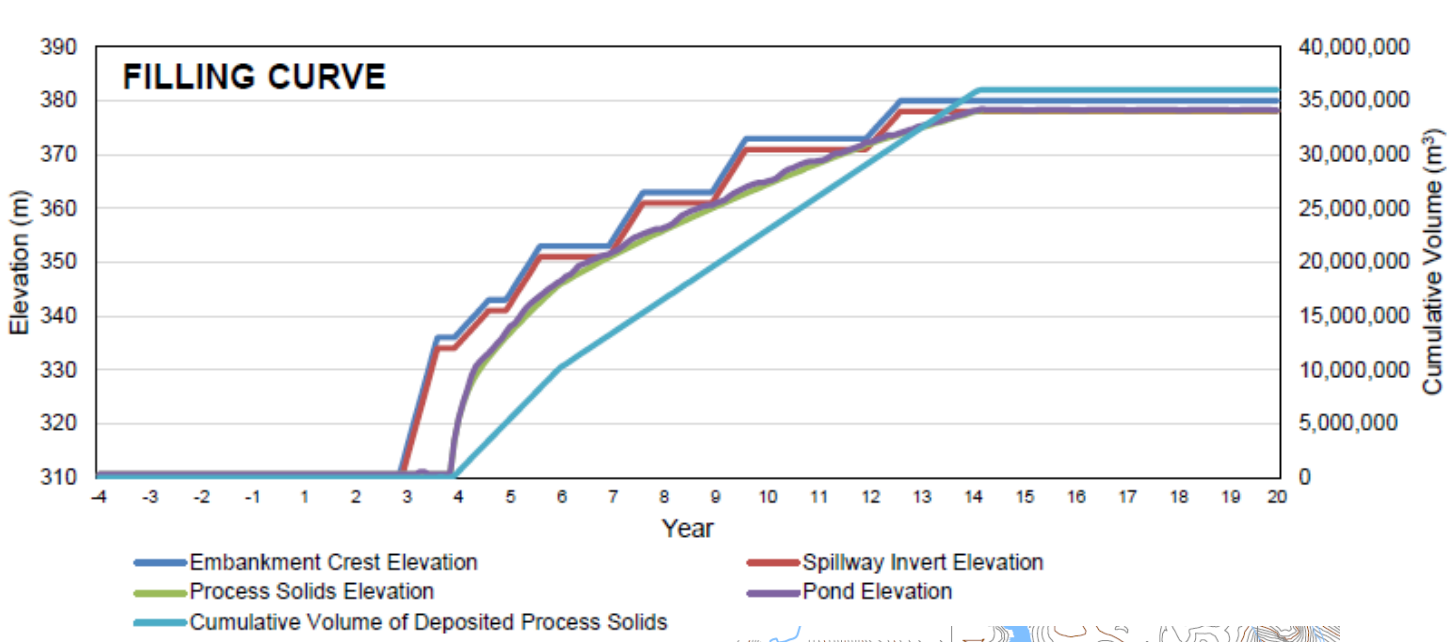
WATER BALANCE – PSMF, CELL 2A

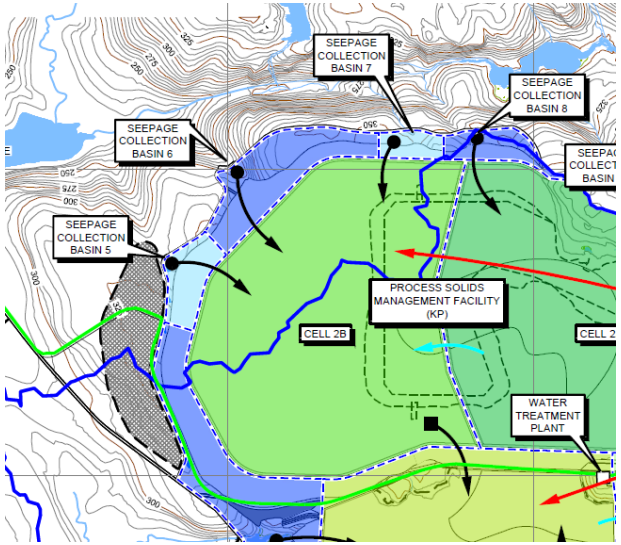




- Commissioned in Year -1
- Type 2 process solids deposition during first 10 years of operations
- Type 1 process solids deposition from Year 4 until end of operations
- Supernatant water transferred to Cell 1
- Pump back from SCBs 8, 9, and 10

WATER BALANCE – PSMF, CELL 2B





- Commissioned in Year 3
- Type 1 process solids deposition from Year 4 until end of operations
- Supernatant water transferred to Cell 1
- Pump back from SCBs 5, 6, and 7

WATER BALANCE – CLOSURE

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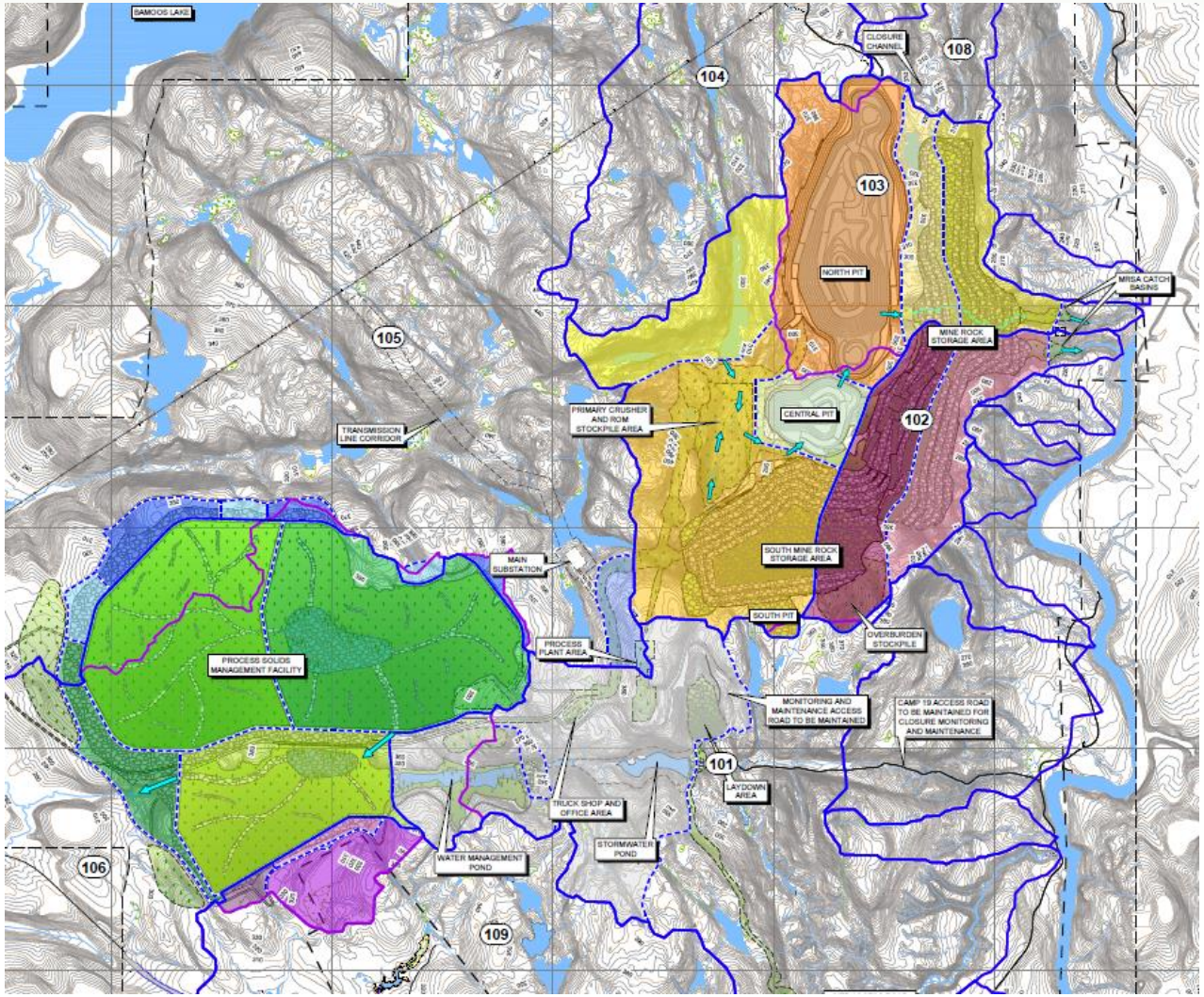
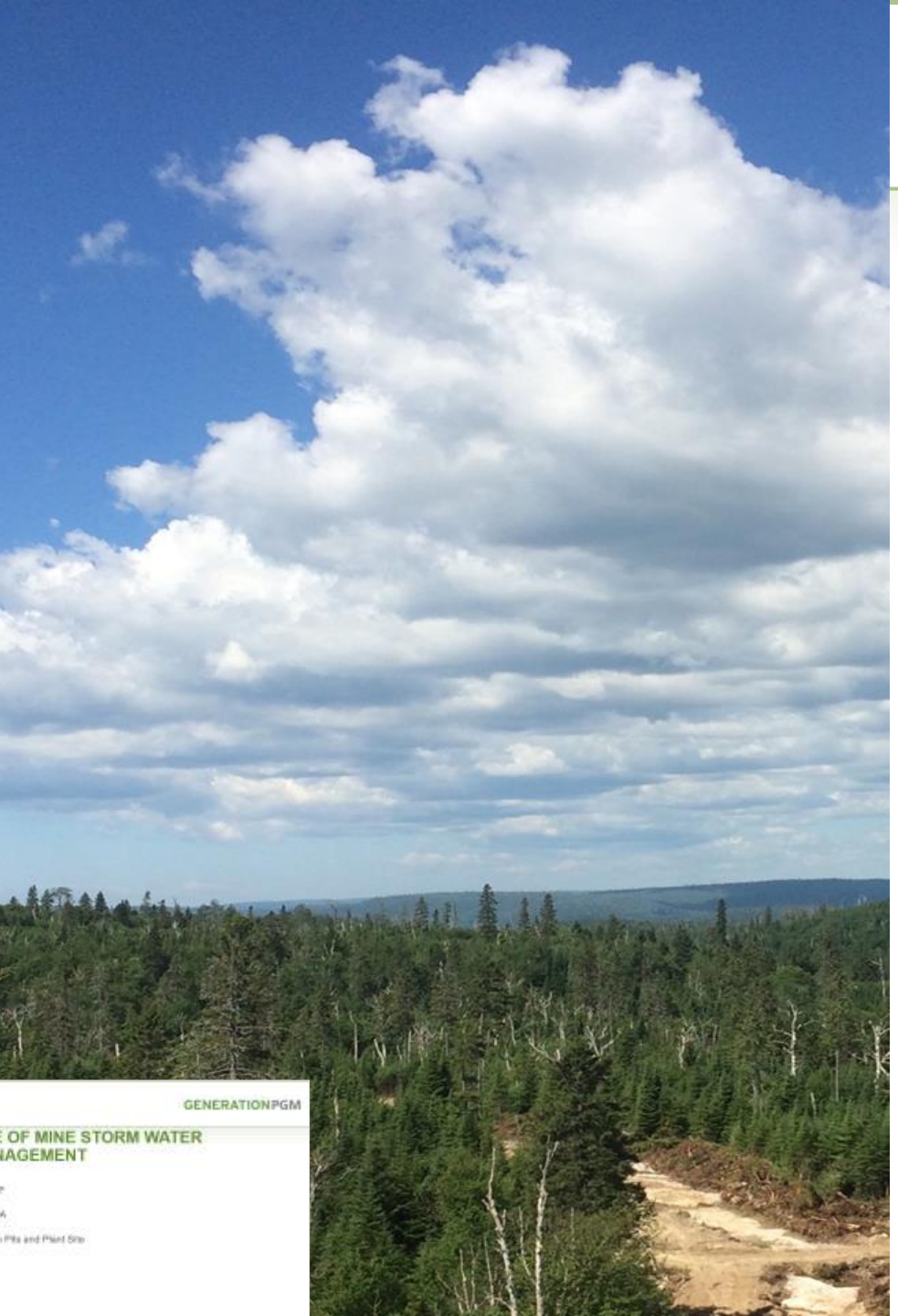


- Active Closure (Initial 5 Years)
  - Runoff and seepage from PSMF, MRSA and mine disturbance areas collected and transferred to open pits
- Passive Closure
  - Decommission water management infrastructure
  - Runoff from PSMF to Stream 6
  - Runoff from MRSA to Pic River via Stream 2 and 3
  - Following flooding of North Pit (30 years), overflow to Stream 3



LIFE OF MINE STORM WATER MANAGEMENT

- PSMF
- MRSA
- Open Pits and Plant Site

PSMF STORM WATER MANAGEMENT

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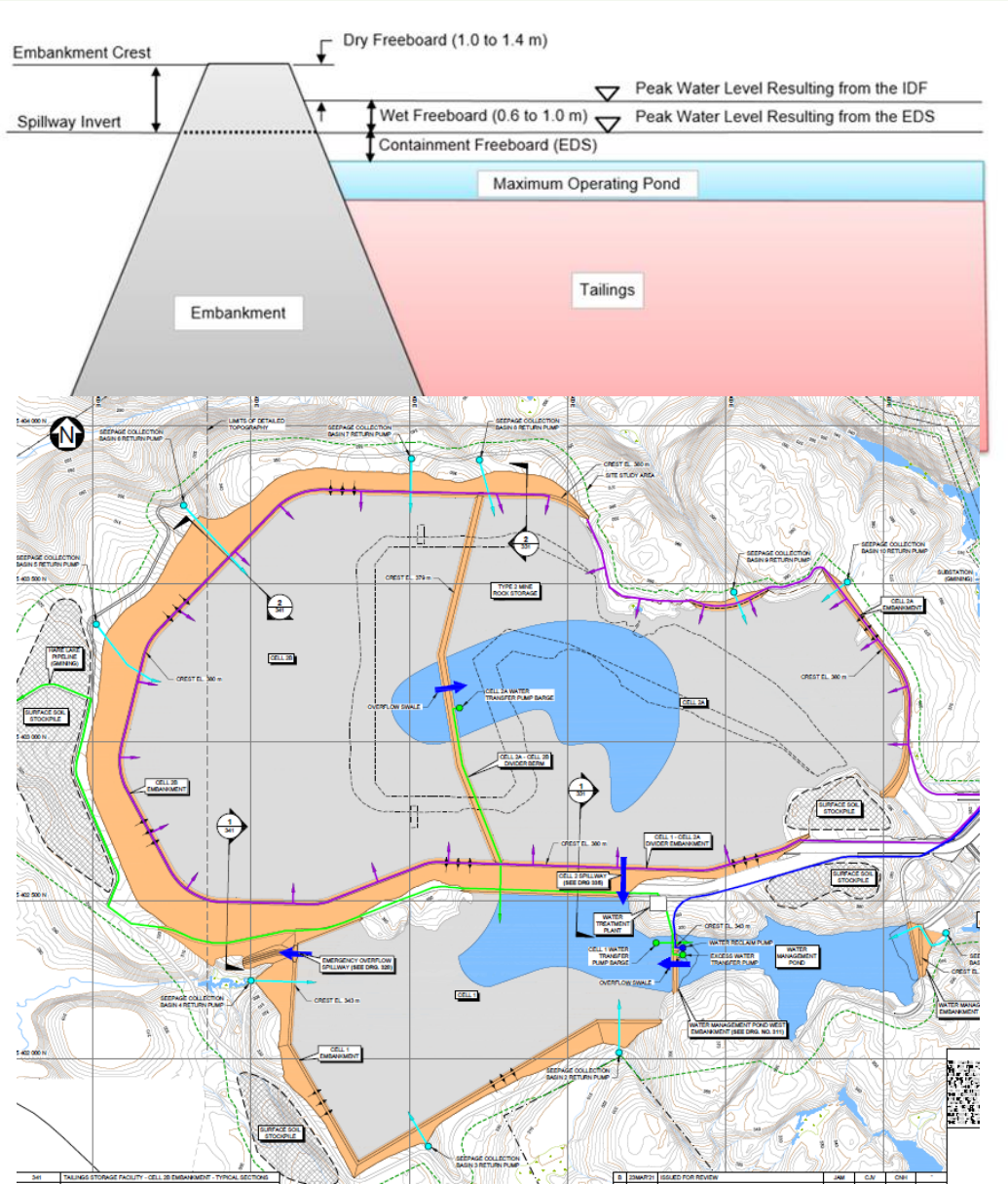

- PSMF sized to contain an Environmental Design Storm (EDS) consisting of a 1 in 100 yr 24-hr precip. event and 30-day spring snowmelt (408 mm)
- Emergency spillways included to convey a Inflow Design Flood (IDF) resulting from a 24-hr Probable Maximum Precipitation (PMP) event (328 mm) (over and above EDS event)
- SCBs sized to contain estimated seepage and runoff from a 1 in 25-yr 24-hr storm event, water transfer system sized to dewater SCBs in 12 hours

MRSA STORM WATER MANAGEMENT

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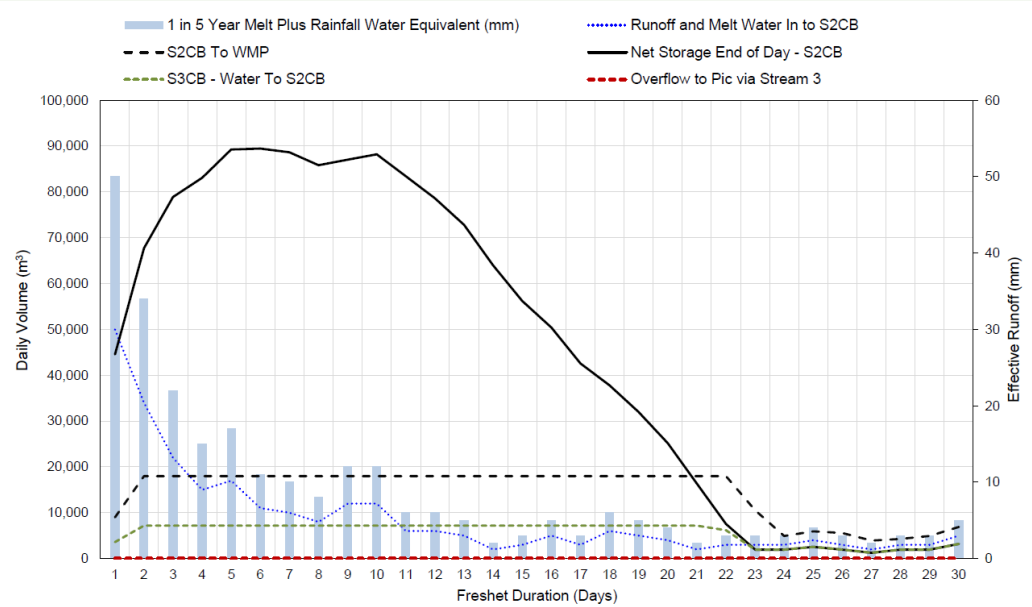
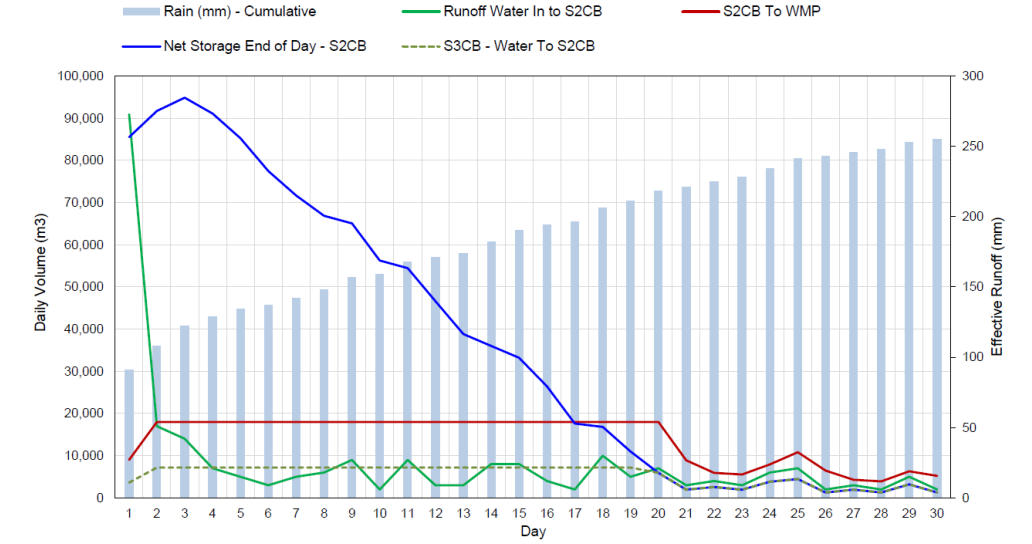




- Catch Basins sized to contain an EDS consisting of a 1 in 25-yr 24-hr duration
- Water transfer rate (300 m^3/hr) to manage/contain a 1 in 5-yr spring freshet without discharge to Pic River
- Larger water transfer rate (750 m^3/hr) included to manage 1 in 100-yr 30-day rainfall event
  - Approximately 10% of runoff would report to overflow spillways when Pic River is at the 1 in 100-yr flood level
- Overflow spillways sized to convey the 1 in 200 yr 24-hr storm event

MRSA STORM WATER MANAGEMENT

GENERATIONPGM

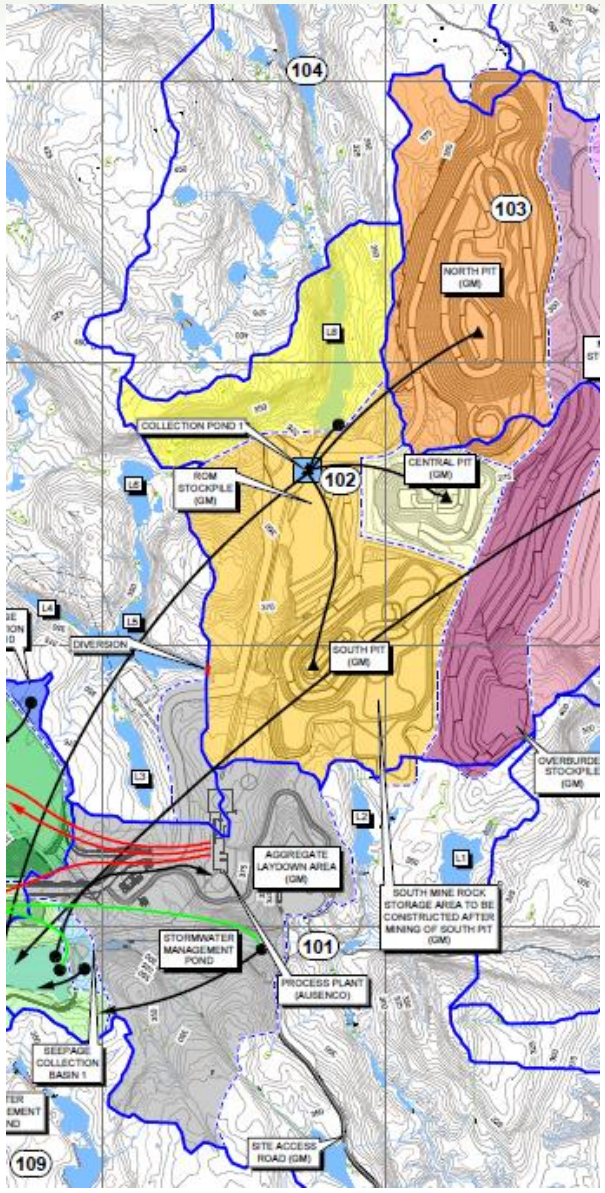
Table 6.3-1: Predictions of Constituent Concentrations in the Pic River Following a Controlled Release of Water from the MRSA

Constituent	Background Conc. (mg/L)	Stormwater mixing in Pic River (300m from release) Conc. D/S (mg/L)	Water Quality Objective
Aluminum	0.11	0.11	[1]
Arsenic	0.001	0.001	0.005 (PWQO & CCME))
Cadmium	0.0001	0.0001	0.0005 (PWQO) / 0.0002(CCME)
Cobalt	0.0005	0.0005	0.0005 (PWQO)
Copper	0.002	0.002	0.005 (PWQO) / 0.003 (CCME)
Iron	0.91	0.91	[2]
Molybdenum	0.001	0.001	0.04 (PWQO) / 0.073 (CCME)
Nickel	0.002	0.002	0.025 (PWQO) / 0.12 (CCME)
Lead	0.001	0.001	0.005 (PWQO) / 0.005 (CCME)
Selenium	0.0004	0.0005	0.1 (PWQO) / 0.001 (CCME)
Uranium	0.005	0.005	0.005 (PWQO) / 0.005 (CCME)
Zinc	0.004	0.005	0.02 (PWQO) / 0.04 (CCME)
Total Ammonia-N	0.02	0.07	0.86 (CCME)
Nitrate	0.03	0.4607	3.0 (CCME)

Notes:
[1] The aluminum water quality objective is for a filtered sample and the concentrations shown are total concentrations.
[2] The PWQO and CCME iron water quality objectives are 0.3 mg/L. Where the ambient concentration is greater than the water quality objective the background concentration serves as the water quality objective.

- Discharge from MRSA Catch Basins during a 1 in 100 yr event is not predicted to impact water quality in the Pic River
  - Section 6.3 (subsection 6.3.2.10), Volume 2 of EIS Addendum

OPEN PIT AND PLANT SITE STORM WATER MANAGEMENT



- Sumps within base of open pits to be sized to manage 1 in 25-yr 24 hr event
- Excess storage capacity within Stormwater Management Pond (500,000 m^3) to manage storm water runoff and upset operating conditions at the Plant Site

SUMMARY

- Majority of disturbance within water bodies occurs during first few years (pre-construction through Year 1)
- Placement of mine waste in water bodies (Schedule 2) to commence in Year -1
- Contact water from site will be managed within the Water Management Pond
- Contact water collection systems include for stormwater management to minimize discharge to the environment

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More Information on the Project can be found at
www.genmining.com
and the Impact Assessment Registry at
https://iaac-aeic.gc.ca/050/evaluations/proj/54755?culture=en-CA

If you have additional questions,

please email us at comments@genpgm.com