Closure Plan Amendment 3 (CPA3) Page –Flip and Approach to Closure

Detour Lake Mine, including West Detour Project

Environmental Update Meeting

Detour Lake Mine

June 10, 2021

KIRKLAND LAKE GOLD

Table of Contents – Key Features of CPA3

- Section 3: Project Information
- Section 4: Current Project Conditions
- Section 5: Project Description
- Section 6: Progressive Reclamation

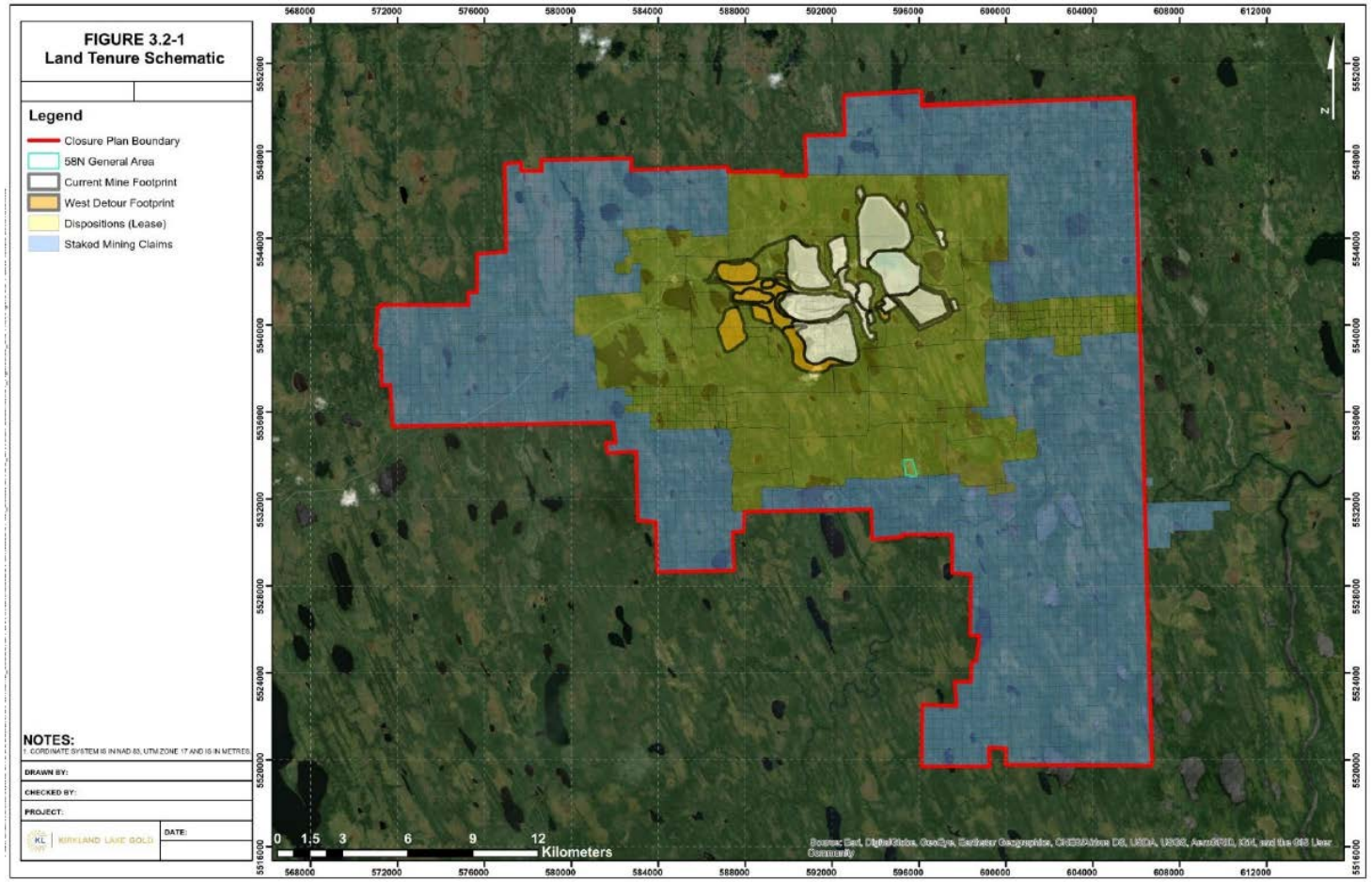
BREAK

- Section 7: Rehabilitation Measures – Temporary Suspension
- Section 8: Rehabilitation Measures – State of Inactivity
- Section 9: Rehabilitation Measures – Final Closure
- Section 10: Monitoring
- Section 11: Expected Site Conditions Post Closure
- Section 12: Estimated Closure Costs

Section 3

Project Information – Closure Boundary

DLM is situated on the Detour Lake property which occupies an area of approximately 646 km^2 property block located within Ontario.



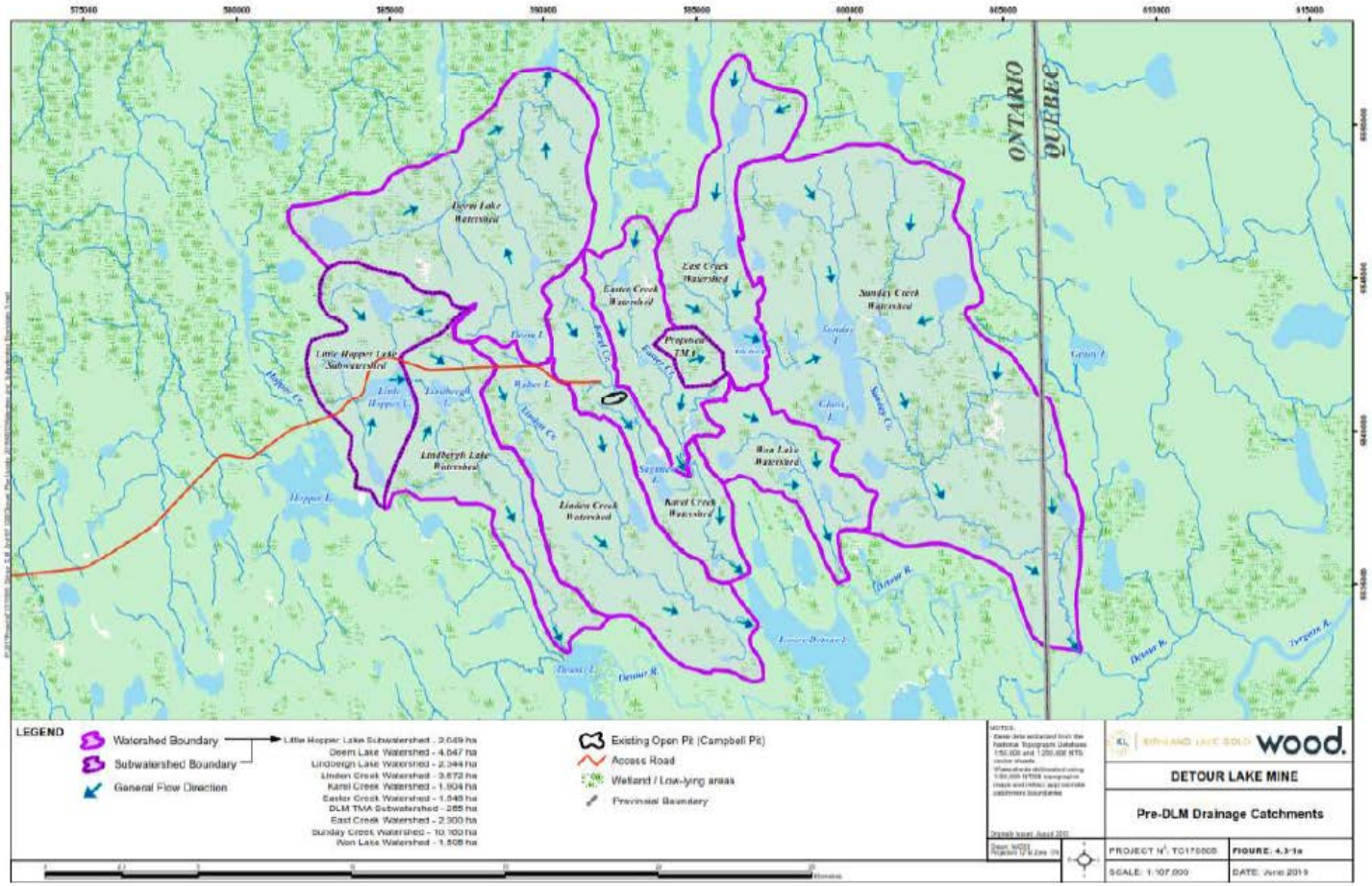
Section 4

Current Project Conditions - Watershed

The DLM site sits within eight different natural watershed areas.

The natural watershed areas are generally characterized by low gradient channels linking lakes and ponds.

All watersheds flow south into the Detour River with the exception of Deem Creek which flows north. All flows terminate at James bay.



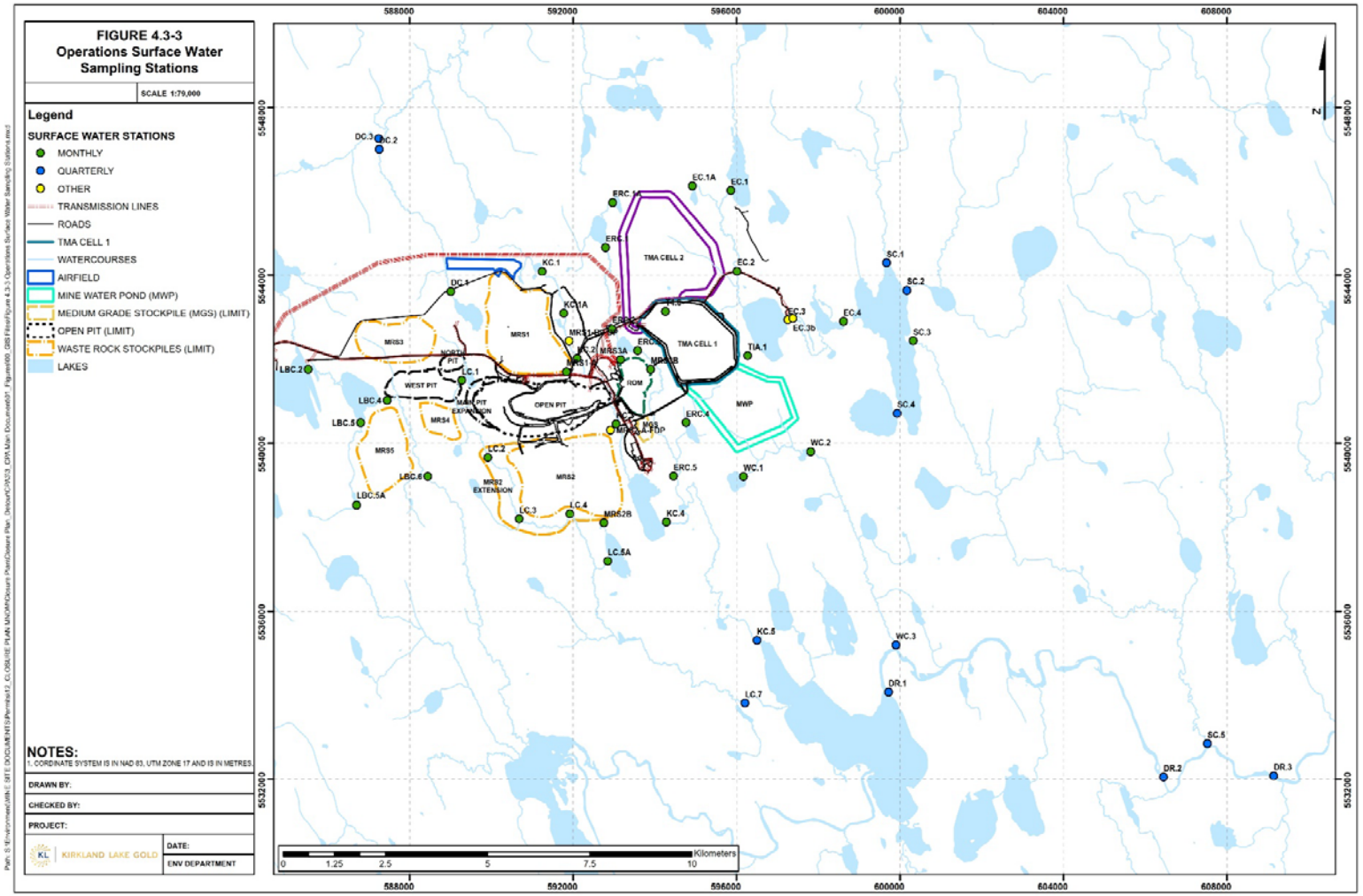
Section 4

Current Project Conditions – Surface Water

Extensive surface water quality monitoring occurred at the DLM site and surrounding area prior to development of DLM to document baseline conditions, and monitoring has continued to occur after development.

The results of baseline water quality monitoring were compared to Provincial Water Quality Objectives (PWQO), as well as the Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life.

All results for surface water quality on baseline conditions and current operations is tabulated in Section 4.3.



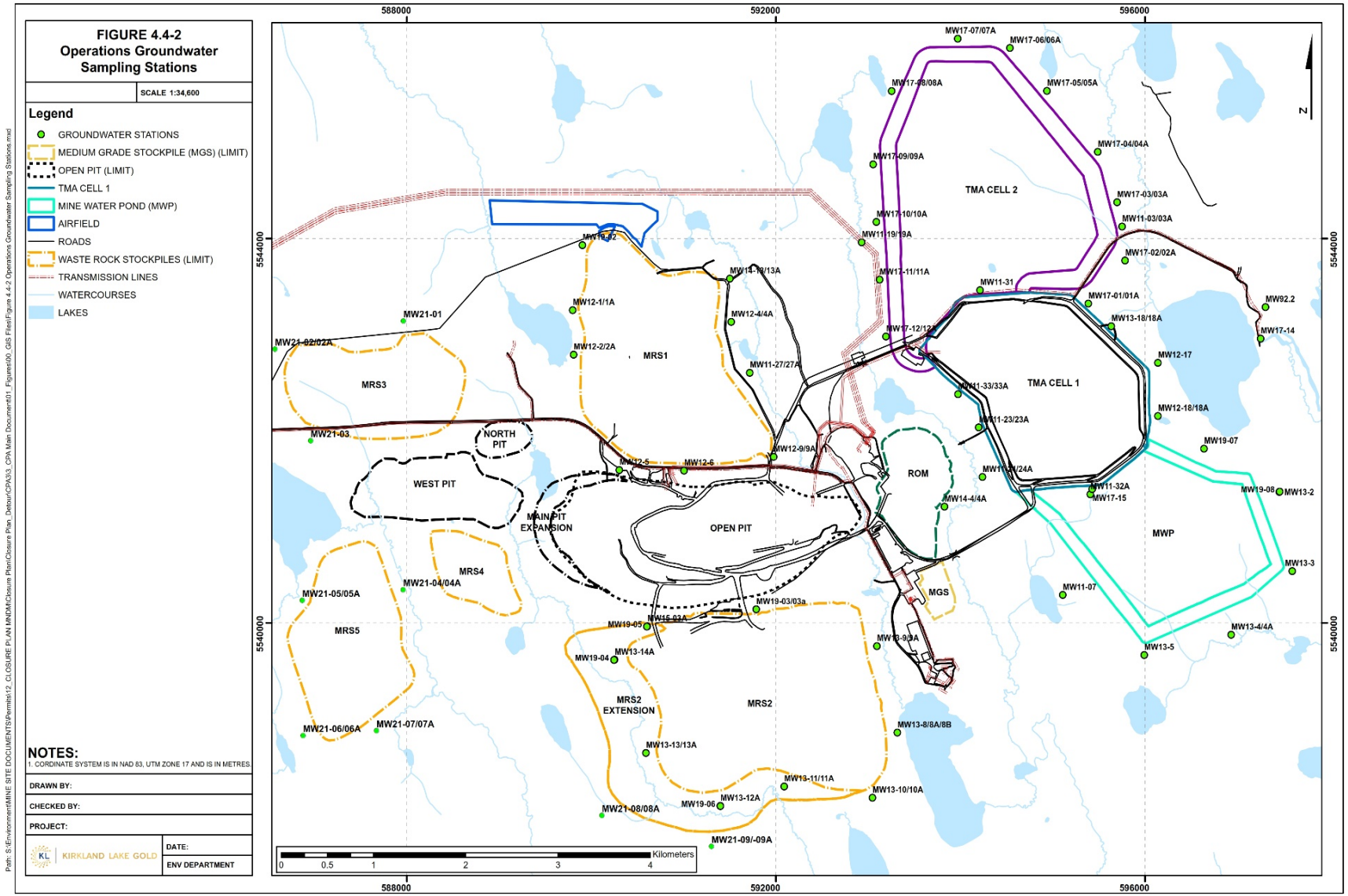
Section 4

Current Project Conditions - Groundwater

The groundwater table at the DLM site is inferred to be relatively flat, reflecting the low gradients characteristic of northern-Ontario till plains.

Groundwater baseline conditions demonstrate some higher values of dissolved minerals and metals (specifically Cd, Fe, Zn, Mg) than surface waters and often exceeds PWQO and CWQG criteria in the natural background condition.

Nonetheless, the data is generally comparable to these criteria with no distinctive trends.



Section 4

Current Project Conditions - Terrestrial Environment

Extensive baseline investigations were completed prior to the development of the DLM, which were followed by periodic monitoring programs as required by the DLM approvals and/or EA commitments as well as to supplement the baseline dataset in support of the WDP expansion.

A sample of the studies done to date are shown.

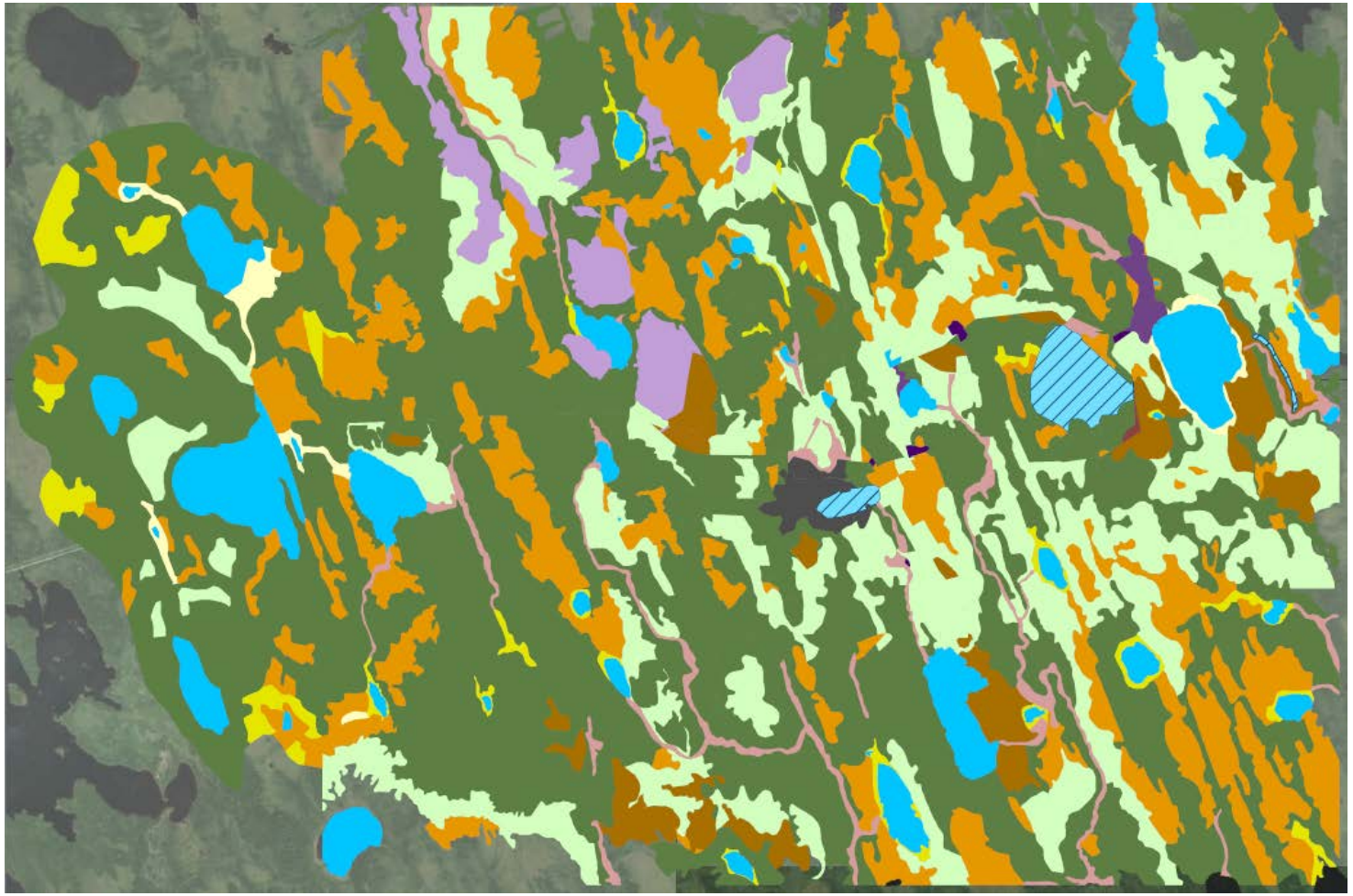
- AMEC. 2008. Winter Aerial Wildlife Survey of the Detour Gold Project Area.
- AMEC. 2009a. Detour Lake Project Terrestrial Resources Baseline Study (Appendix D-3).
- AMEC. 2009b. 2009 Winter Aerial Wildlife Survey of the Detour Lake Project Area.
- AMEC. 2010a. Bat Survey, Detour Lake Project.
- AMEC. 2010b. 2010 Winter Aerial Wildlife Survey of the Detour Lake Project Area.
- AMEC. 2011. 2011 Winter Aerial Wildlife Survey of the Detour Lake Project Area.
- AMEC. 2012a. Detour Lake Project. 2012 Winter Aerial Wildlife Surveys of the Detour Lake Project Area.
- AMEC. 2013a. Detour Lake Project Block A Expansion 2012 Terrestrial Resources Baseline Report (Appendix D-4).
- AMEC. 2013b. Detour Lake Mine 2013 Avian Follow-up Monitoring Study.
- Amec Foster Wheeler. 2014. 2013 Winter Aerial Wildlife Surveys of the Detour Lake Mine Area. Technical Report to Detour Gold.
- Amec Foster Wheeler. 2015a. 2014 Winter Aerial Wildlife Surveys of the Detour Lake Mine Area.
- Amec Foster Wheeler. 2015b. 2015 Annual Wildlife Monitoring Report, Winter Surveys, Detour Lake Mine.
- Amec Foster Wheeler. 2016a. West Detour Project. 2015 Terrestrial Resources Baseline Study (Appendix D-5).
- Amec Foster Wheeler. 2017. 2016 / 2017 Caribou Monitoring Report, Detour Lake Mine.
- Environmental Applications Group Limited (EAG). 1983. Environmental Assessment, Volume 1, Baseline Inventory.
- Wood. 2018a. West Detour Project 2016 / 2017 Terrestrial Resources Baseline Study (Appendix D-6).
- Wood. 2018b. Detour Lake Mine 2018 Caribou Monitoring Report.

Section 4

Current Project Conditions – Terrestrial (Vegetation)

The mine site area is located in northeastern region of Ontario Ecoregion 3E (Ecodistrict 3E-7), which encompasses the northern portion of the Canadian Shield and the southern portion of the Hudson Bay Lowlands.

- BBO1 - Riparian and Lakeshore
- BOO1-2 - Cotton-grass Open Bog
- CUW1 - Woodland
- MAM2 - Mineral Meadow Marsh
- MAS2-1 - Cattail Mineral Shallow Marsh
- SWT2 - Mineral Thicket Swamp
- TAO - Open talus slope
- TAO - Open talus slope (aerial seeding by drone)
- V20 V22 - Black Spruce - Jack Pine - Feathermoss; Black Spruce - Jack Pine - Feathermoss - Lichen
- V20 V22 V25 V26 - Black Spruce - Jack Pine - Feathermoss; Black Spruce - Jack Pine - Feathermoss - Lichen; Black-Spruce - Larch - Speckled Alder - Stair-step Moss; Black Spruce - Leatherleaf - Sphagnum
- V25 V26 - Black-Spruce - Larch - Speckled Alder - Stair-step Moss; Black Spruce - Leatherleaf - Sphagnum
- V28 - Black Spruce - Bog Rosemary - Pale Laurel - Sphagnum
- V8 - Trembling Aspen - Black Spruce - Herb Poor
- Water



Section 4

Current Project Conditions – Terrestrial (Birds)

Seven avian Species at Risk (SAR) were identified during DLM / WDP baseline investigations, including targeted studies:

- Common Nighthawk;
- Olive-sided Flycatcher;
- Canada Warbler;
- Rusty Blackbird;
- Bald Eagle;
- Barn Swallow; and
- Bank Swallow

As per the Federal EA commitments and Follow Up Program requirements, DLM committed to monitor avian SAR at four year intervals starting in 2013. The 2017 study found that overall DLM operations have not adversely affected songbird populations and may provide increased habitat.

SAR were uncommonly recorded and population levels are similar to the previous study. Overall, the data suggest that most birds are not avoiding areas associated with mine activities except where direct displacement has occurred.

Current Project Conditions – Terrestrial (Woodland Caribou)

Woodland Caribou around the DLM site area comprise part of the Canadian Boreal population (Environment Canada 2010).

Winter aerial surveys for caribou in the DLM study area have been conducted since 2008. In 2016, DLM implemented a more comprehensive monitoring program using satellite telemetry GPS collars on 20 adult female caribou.

Aerial survey data suggest a gradual trend of increasing mean relative density of Woodland Caribou in the study area near DLM across years.

Monitoring results continue to indicate that woodland caribou are largely avoiding areas within 10 km of DLM. The more detailed location data from the telemetry program across all seasons reveals that most collared woodland caribou do not spend significant amounts of time near DLM but do move through DLM lands in transit to seasonal ranges north, east and south of the mine.

Extensive work has been done through the Overall Benefits Permit on Woodland Caribou that covers caribou management plans

Current Project Conditions – Terrestrial (Other)

<u>Moose</u>

Moose were observed in both the northeast and southwest corners of the study area. No major change except spatial density changes of the herd between north and south.

<u>Predators</u>

The two large predators at the DLM site and area are Wolves and Black Bears. Wolves feed mainly on Moose, Woodland Caribou and Beaver, and can be expected to occur in habitats where these species are found. The distribution and abundance of Wolves using the DLM area mirrors that of Woodland Caribou and Moose. Black Bears are omnivorous and are associated with a wide variety of forest and open habitats.

<u>Furbearers</u>

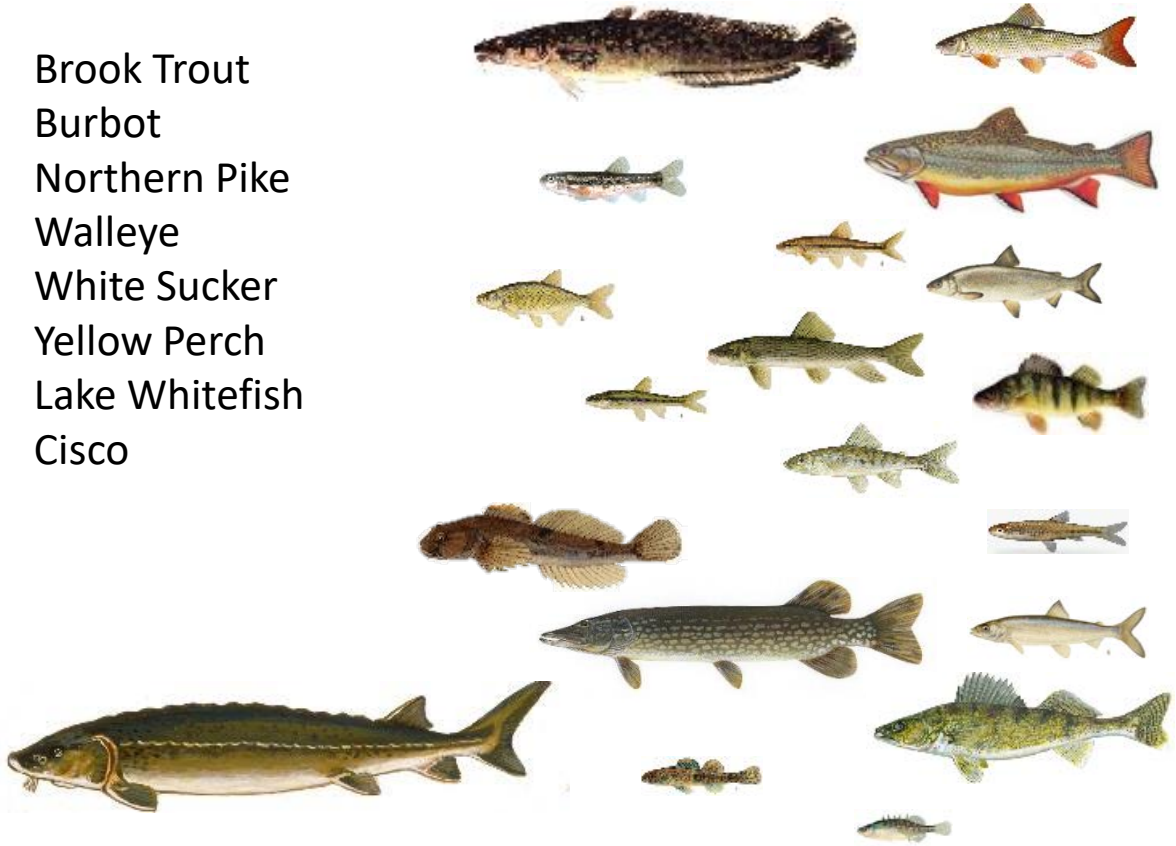
The principal furbearers expected to be found in the general area of the DLM site are: Beaver, Muskrat, Marten, Fisher, Mink, River Otter, Red Fox and Lynx, all of which have been reported from the DLM site area

Section 4

Current Project Conditions – Aquatic

There is considerable aquatics baseline information available from the predevelopment studies associated with the DLM, as well as from more recent investigations at the WDP. Aquatic baseline studies have determined the following species to have been observed on site:

- Blacknose Shiner
- Brook Stickleback
- Golden Shiner
- Iowa Darter
- Lake Sturgeon
- Lake Chub
- Mottled Sculpin
- Spottail Shiner
- Shorthead Redhorse
- Trout Perch
- Pearl Dace
- Brook Trout
- Burbot
- Northern Pike
- Walleye
- White Sucker
- Yellow Perch
- Lake Whitefish
- Cisco



The aquatic baselines were used in developing the Fish Habitat Compensation and Offset Plan.

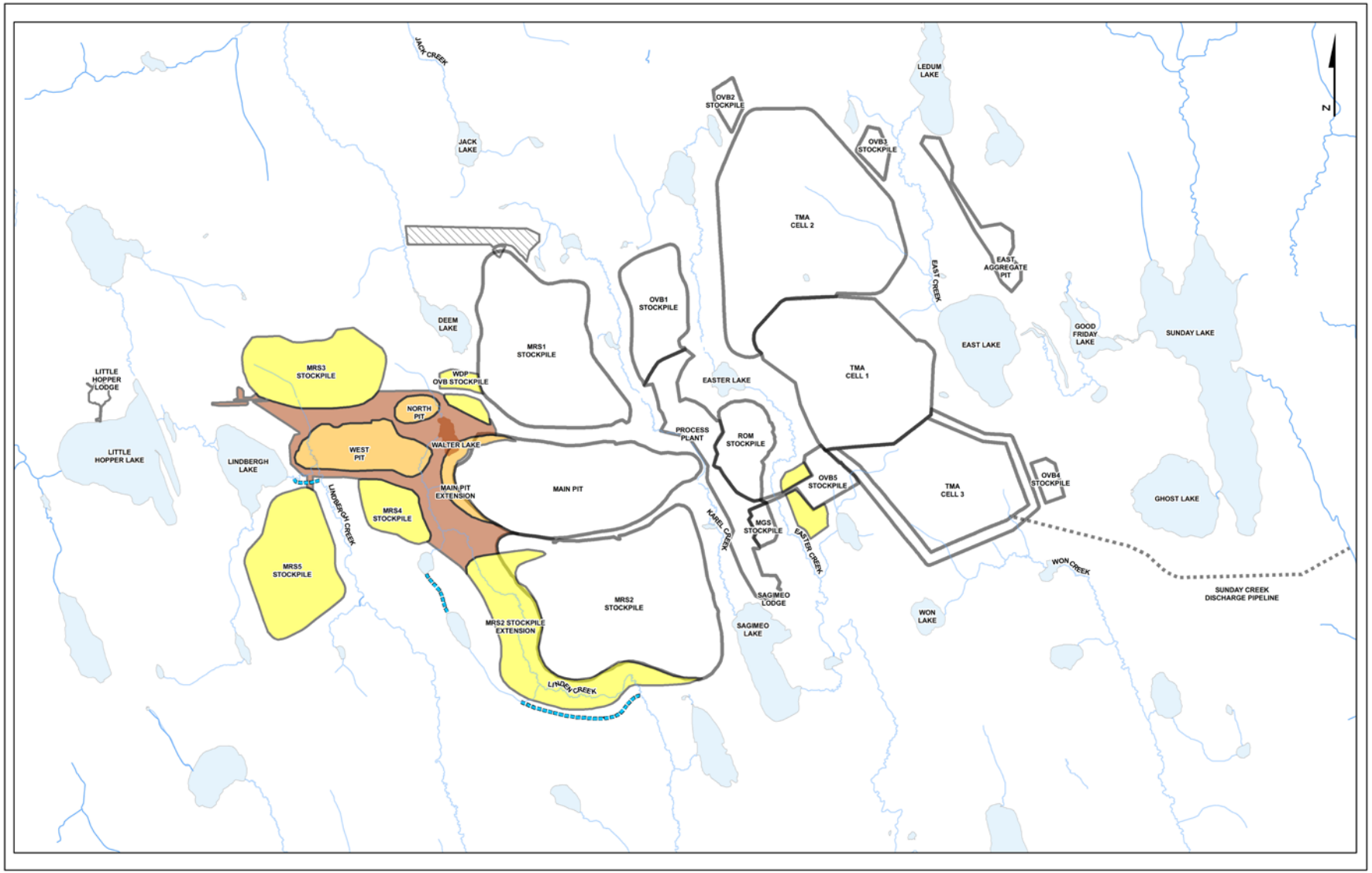
Project Description

DLM is an operating gold mine that was developed by expanding on the historic mine footprint. DLM was purposefully designed to utilize infrastructure and facilities already in place at the site, in order to minimize environmental disturbance as practical. Mine production was initiated in 2012.

DLM is projected to continue operating for an additional 22 years (i.e., to 2043) based on the current mine plan.

As of year-end 2020, 766 Mt of material has been mined from the Main Pit, including 156 Mt of ore. The mine production schedule forecasts 1,725 Mt to be mined over a period of 18 years (2021 - 2038). A total of 597 Mt of ore is planned to be milled over a period of 22 years (2021 - 2042); with the last four years of production supported through processing of stockpiled low grade ore. Mining will be carried to a maximum 32.85 Mt of ore processed per year, based on a 24-hour per day, 365 days per year operating schedule.

Project Description- West Detour Project



The layout being presented in CPA3 is the result of consultations that occurred through the Alternative Assessment process (since 2016), as well as the ESR process which concluded in July 2020.

This layout is consistent to the layout carried in the Overall Benefit Permit and Fish Habitat Compensation and Offset Plan.

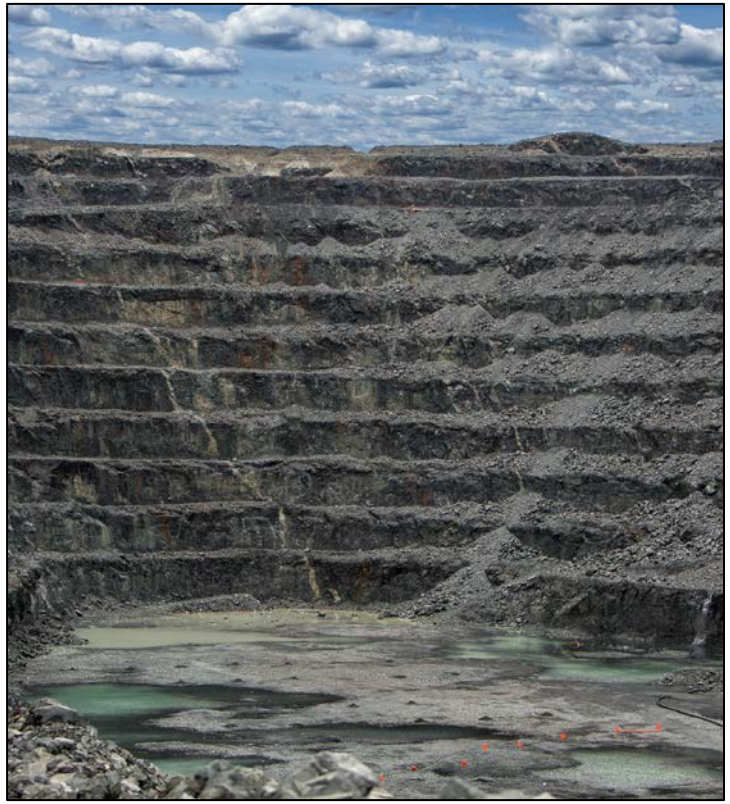
Section 5

Project Description - Minerology of Ore and Host Rock

There has been extensive geochemical investigations since the start of mining dating back to 1990. The geochemistry of the samples was analyzed to characterize the acid generating potential of the waste rock material.

In 2016, the MLARD characterization study was extended to capture the WDP, which is a geological extension of the Detour Lake deposit being mined via the Main Pit. Overall, results established that the extension of the deposit that would be mined through the WDP is geochemically similar to the materials mined through the Main Pit.

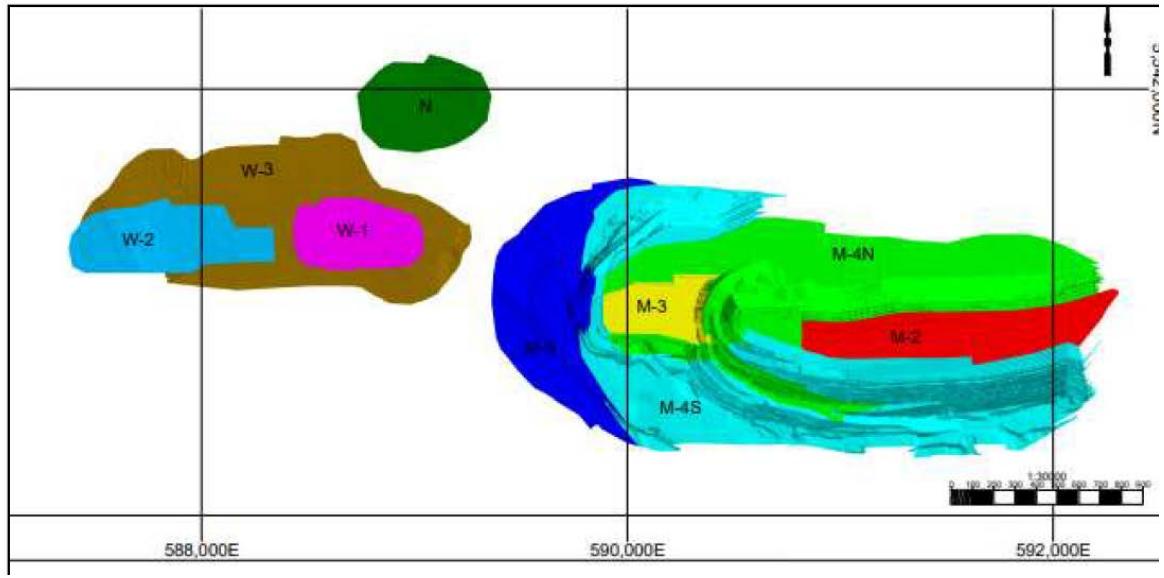
ARD has not developed over the 30 years of historical monitoring of four original waste rock piles. Ongoing monitoring and research programs of remaining historic waste rock piles is planned to allow for further extension over time to create an overall time record of 40 to 50 years of observations. This is unique in the mining industry and will provide a solid basis for predicting expected performance of these wastes for closure and post closure periods.

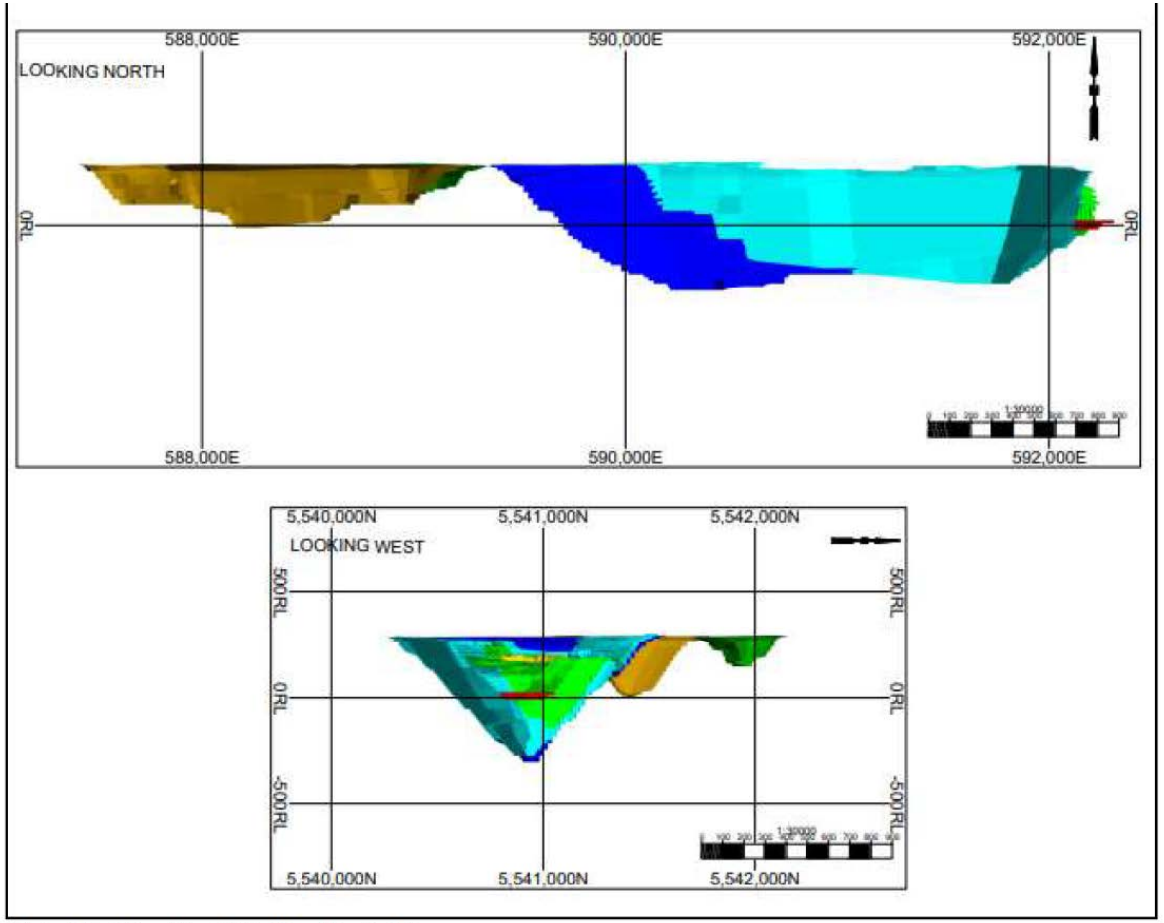


Section 5

Project Description – Mining

	Unit	Main Pit	West Pit	North Pit
Width	m	1,310	810	460
Length	m	3,070	1,890	640
Depth	m	606	302	144





M = Main Pit; W = West Pit; N = North Pit

Project Description - Processing

All ore processing takes place within the process plant complex. Ore from the Main Pit, West Pit and North Pit, along with stockpiled ore will be processed in the process plant complex, blended as needed. Processing will be carried to a maximum ore throughput of 32.85 Mt per year.

Crushing and grinding are required to reduce the ore to a size fraction which is suitable for further processing.

DLM is certified under the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (Cyanide Code). The Cyanide Code is a voluntary program for the gold mining industry to promote:

- Responsible management of cyanide used in gold mining
- Enhanced protection of human health; and
- Reduction of the potential for environmental impacts.

Project Description – Buildings and Infrastructure

A complete list of buildings and infrastructure is provided in Table 5.5-1 (as of December 31, 2020) however notable buildings include:

- Process Plant Complex – where ore is processed
- Mine Service Facility – includes workshops, bays and administrative facilities
- Explosives Plant – Where explosives are made
- Site Accommodations – Little Hopper Lodge and Sagimeo Lodge

Other infrastructure:

- Access road and Airfield
- Sunday Creek Effluent discharge pipeline
- Power supply
- Aggregate sources

Section 5

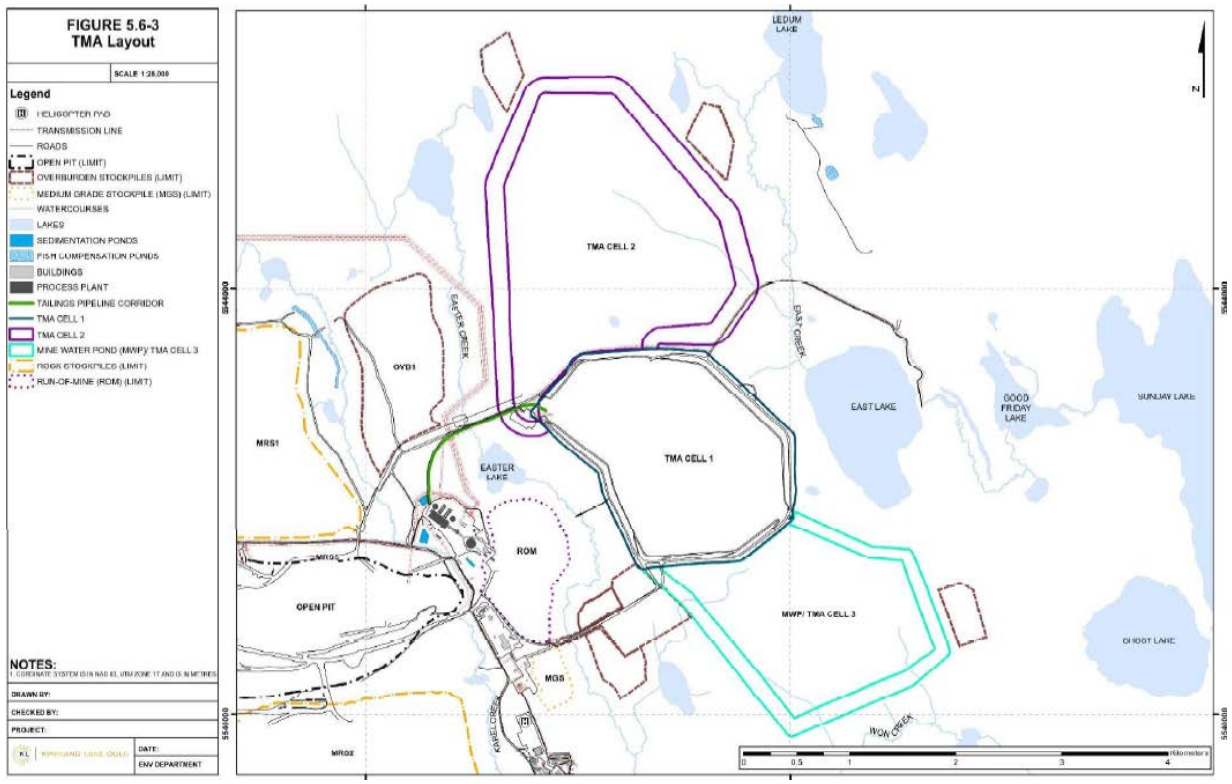
Project Description - Tailings

Tailings produced by DLM process plant are stored in a surface, engineered TMA east of the process plant at the historic tailings storage area location.

The TMA consists of three cells being developed in a planned, progressive manner:

- Cell 1 has been built over the historic tailings storage facility
- Cell 2 is currently in development to the north of Cell 1
- Cell 3 area has been cleared to the south of Cell 1

Cells 1 and 2 are dominantly tailings storage cells, while Cell 3 will be developed first as a water management facility, until being used to store tailings later in the mine life.



Project Description – Material Handling

A large surplus of overburden material is predicted relative to the quantities of overburden needed for the progressive and final reclamation of DLM. A total of approximately 58 Mt (26 Mm^3) of overburden will be stored in the OVB1 stockpile, and a total of 9Mt (4 Mm^3) will be stored in the WDP OVB stockpile.

This surplus affords flexibility should design changes occur. Overburden is stored in a number of stockpiles on site.

Table 5.7-2: Summary of Design Parameters for Waste Rock Storage Facilities

	Units	MRS1	MRS2	MRS3	In-pit
Material Classification	N/A	PAG/NAG	NAG	PAG/NAG	PAG/NAG
Capacity	Mm^3	193.4	247.8	0	4.46
Maximum height	m	110.5	84	19	N/A
Footprint	ha	161	603	164,6	12.07
Bench height	m	15	30	15	14.5
Catchbench	m	26	20	26	26
Overall slope angle	°	18	27	18	18

Table 5.7-3: Low-Grade Ore Storage Summary

	Temporary MRS2	MRS4	MRS5
Processing Period	2022-2028	2039-2042	2039-2042
Capacity (Mm^3)	8.4	11.53	58.23
Maximum height (m)	46.5	41.75	46
Footprint (ha)	54.2	57.2	188
Bench height (m)	8	15	15
Catchbench width (m)	14	26	26
Overall slope angle (°)	18	18	18

Project Description – Material Handling

A Waste Rock Geochemistry Management Plan (WRMP) was developed and submitted to the ENDM as required by a condition of the 2010 Closure Plan. The Plan is periodically updated to reflect most current practices and procedures. The method of classifying rock as outlined in the WRMP classifies mined rock according to the following five categories:

- Ore;
- NAG Waste Rock;
- PAG Waste Rock;
- NAG Low-Grade Ore (previously identified as Mineralized Waste); or
- PAG Low-Grade Ore (previously identified as Mineralized Waste).

Results for operational monitoring of waste rock geochemistry have been consistent with original predictions for PAG proportions, as presented in the Annual Closure Reports prepared for ENDM. Based on modelling, the percentage of PAG material for the remaining life-of-mine is expected to be approximately 14%.

Project Description – Waste Management Facilities

Domestic effluent, non-hazardous wastes, and special management solid wastes comprise the majority of wastes that are managed at DLM:

- Domestic sewage and greywater from DLM is treated at one of two, package treatment plants using Membrane Bioreactor (MBR) technology. An additional phase consisting of a sequencing batch reactor is planned to be installed at each location in 2021. Effluent from the treatment plants is discharged to wetlands for supplemental passive treatment to help remove residual nutrients (nitrates and ammonia).

- Non-hazardous solid wastes (domestic and non-hazardous solid industrial) are disposed of within a 6.15 ha landfill north of the Main Pit that was approved in June 1984 (Provisional Certificate of Approval A7383503) during the former mine operations. The landfill site and recycling program is operated in accordance with the Landfill Management Procedure.

- Special management wastes including hazardous wastes are temporarily stored on site, until they can either be transported to an appropriately licensed facility off the site by licensed waste contractors for recycling or disposal, or they are managed on site. Special management wastes are stored in appropriate containers with secondary containment where required.

Section 5

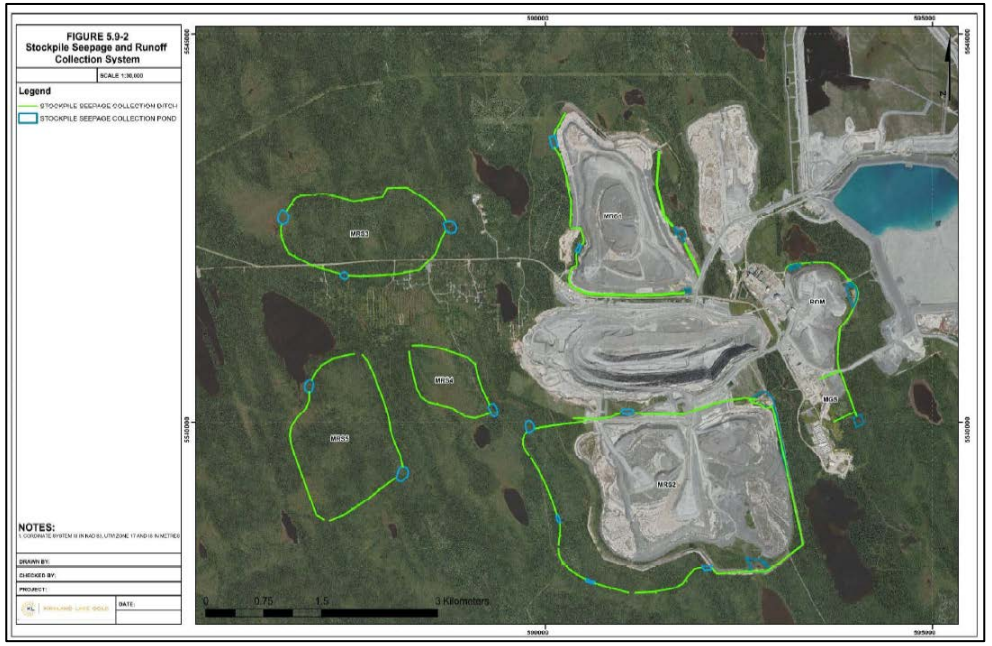
Project Description – Water Management and Treatment

Environmental protection is ensured through the water management network, which collects seepage and runoff from all mine waste facilities through a system of ditching, pumping, and pipeline infrastructure.

The modular design allows for the addition of treatment facilities if required. In 2020, a mine water pond with a capacity of 3.5 Mm^3 was completed.

Water collected from the mine site (that has not been in contact with process reagents) is pumped to the MWP. Surplus mine water collected in the MWP is discharged to East Creek to prevent the accumulation of water above target operating levels.

In 2023, the discharge location for surplus mine water collected in the MWP will be transferred to a location on Sunday Creek, a larger receiver, subject to receiving environmental approvals.

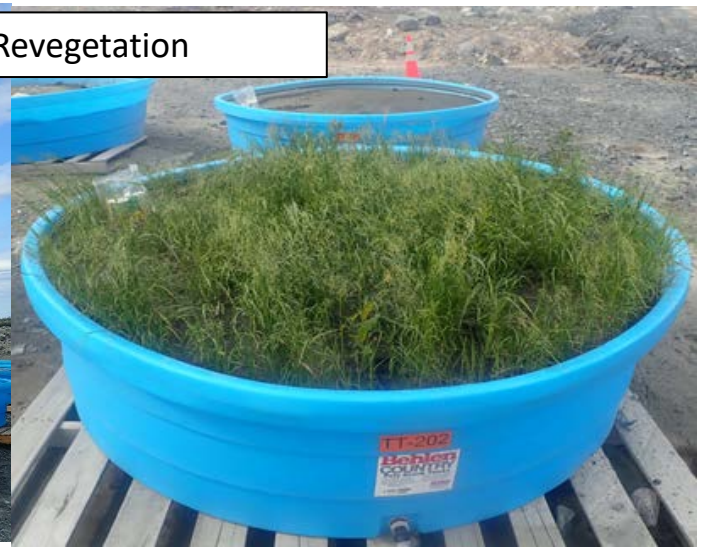


Progressive Reclamation

- The following objectives have been established for the Closure Plan and reclamation measures:
  - Prevent, reduce or mitigate the adverse effects associated with each phase of DLM, including closure and post-closure phases;
  - Provide for the reclamation of all affected sites and landscapes to a stable and safe condition;
  - Reduce the need for long-term monitoring and maintenance by designing for closure and instituting progressive reclamation, where possible;
  - Provide for mine closure using current available proven technologies in a manner consistent with sustainable development.

Section 6

Progressive Reclamation - Research Program Overview



Progressive Reclamation - Waste Rock Research Program

In 2011, DLM initiated a research partnership with the University of Waterloo, the University of Alberta and Carlton University, to characterize the physical and geochemical properties of the historic and current waste rock storage facilities.

Overall, the waste rock research program aims to:

- Determine the distribution and reactivity of acid-generating sulfide minerals, acid-consuming components, including carbonate minerals and secondary minerals within the existing waste rock stockpiles at DLM, and to determine the mechanisms controlling the release, transport and attenuation of acidity and dissolved trace elements;
- Assess the effect of pile construction and configuration on the rates of gas transport, sulfide mineral oxidation, water transport and water chemistry within waste rock stockpiles;
- Determine scaling relationships between small-scale laboratory measurements and measurements made on the operational waste rock piles at DLM and evaluate differing scaling approaches;
- Investigate the influence of different slope and cover configurations on air and water transport into waste rock;
- Investigate the effects of the different slope, cover and vegetation options on microbial activity, sulfide oxidation and ARD generation and release in the underlying waste rock;
- Develop applicable conceptual models of ARD generation within the MRS, taking into account the progressive reclamation approaches that DLM is implementing

Progressive Reclamation - Habitat and Native Plant Research Program

A collaborative research program was established with the University of Guelph in 2013 and is intended to continue throughout the life of the mine. The long-term objective is to evaluate the most effective methods for establishing habitats and native plant communities during progressive reclamation and closure. Three specific research goals have been developed to support this long-term objective:

- Evaluate practical methods for restoring native plant communities and the soil microbiome;
- Determine the viability and suitability of *Cladonia* subgenus *Cladina* (i.e. lichen) and Biological Soil Crusts as species for use in reclamation, and develop methods for including these species in the restoration efforts; and
- Establish and evaluate innovative practices for restoring forest roadways to increase vegetation growth and discourage predation, thus benefitting woodland caribou.

Section 6

Progressive Reclamation - Vegetation, Soil Health & Amendment Trial

The vegetation, soil health and amendment trial began on the mine property in 2015. Various soil amendments (such as peat, fertilizer, biosolids, and winter-kill crops) were applied to experimental plots of till, the material that will be used for DLM reclamation covers. Over time, data has been gathered on plant establishment and soil health, with a special focus on the soil microbial community assemblages.

Overall, it was demonstrated that soil amendment selection was a key driver for long-term soil chemistry, microbial community assemblage and extent of vegetative cover. This has direct implications for mine reclamation and has allowed DLM to draw conclusions regarding the suitability of various amendments for its reclamation program.

The DLM study will continue to be maintained and sampled annually, in order to gather a robust, long-term dataset that will inform key management decisions for the progressive reclamation program.

Progressive Reclamation – Lichen, Biological Soil Crusts and Forest Roadways

Lichens and biological soil crusts can provide several important ecological functions: reduce erosion, enhance soil nutrient content and effectively create seedbeds for vascular plant growth.

Between 2015 and 2017, a field trial was conducted to evaluate techniques for establishing lichen (*Cladonia* subgenus *Cladina*), using a combination of lichen fragments, lichen mats, soil amendments and erosion blankets.

Preliminary results indicated that glacial till overburden present at DLM does not support the establishment and growth of transplanted *Cladonia* subgenus *Cladina* fragments or mats, regardless of the amendment. *Cladonia* subgenus *Cladina* was however, successfully established in field trials on the coarse gravel material of forest roadways, identifying these areas as potential target for reclamation efforts that benefit caribou.

Current greenhouse studies and planned additional field trials will determine the most suitable substrate and best methods for establishing lichen on gravel capped forest roadways.

Section 6

Progressive Reclamation – MRS1 Test Cover Program

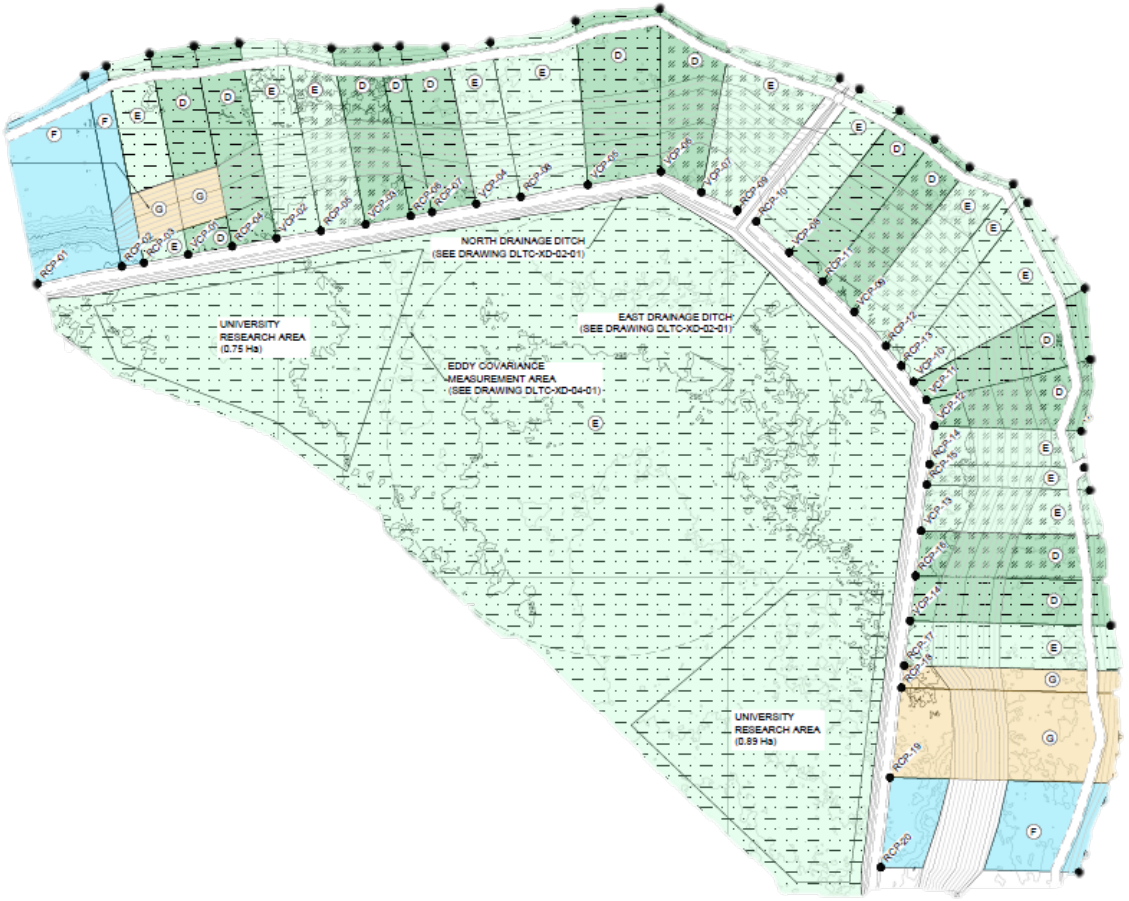
Cover system designs for mineral waste stockpiles are subject to multiple geotechnical considerations.

DLM has designed and constructed approximately 10 ha of vegetated test cover cells on the MRS1 (PAG waste rock stockpile). The goal of the test cover program is to evaluate the performance of different cover system options to support waste rock reclamation and landform design at DLM. The test cover program design includes 13 cover trial plots to evaluate geotechnical aspects.

Comprehensive monitoring of the test cover program is ongoing to ensure valuable information is gathered to inform progressive and final reclamation activities. It is expected that the test cover program will continue to provide valuable data for multiple years and will help to further refine the DLM reclamation design.

Section 6

Progressive Reclamation – MRS1 Test Cover Program



VEGETATION PRESCRIPTION:

- D — CONIFER VEGETATION (NOTE 6)
- E — CONIFER AND DECIDUOUS VEGETATION (NOTE 6)
- F — HYDROSEEDING (NOTE 7)
- G — BROADCAST SEEDING (NOTE 7)

SEEDING PRESCRIPTION (NOTE 8):

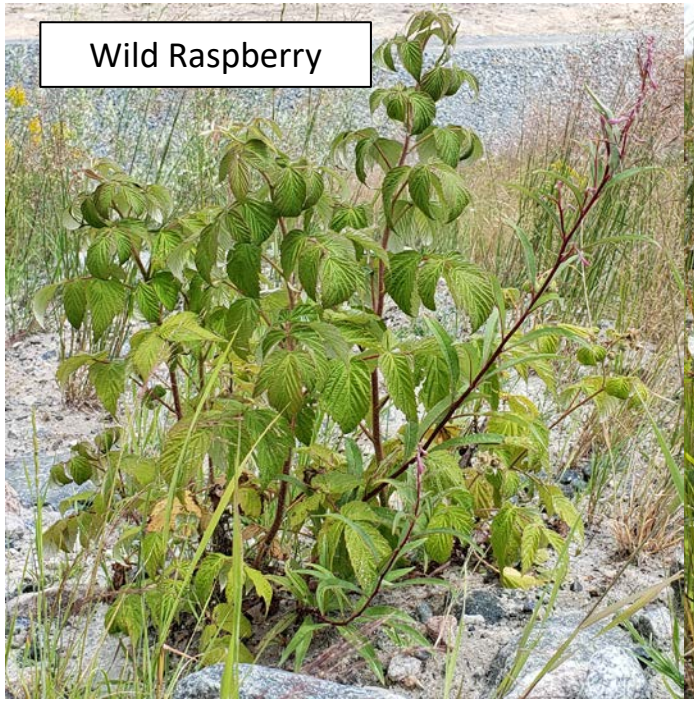
- INTERSEEDING
- DELAYED INTERSEEDING

- Considers different slopes, cover thicknesses, surface treatments (e.g. corrugation, microtopography, ripping), aspect, peat content, seeding (species and timings), vegetation species, hydrological parameters
- Instrumented with temperature, moisture, gas monitoring
  - Monitoring geochemical processes through time

Section 6

MRS1 Test Cover Area (July 2020)

- Some erosion and rill formation, but no major failures
- Self-armoring properties, and vegetation localized to rills
- Microtopography surface treatment performed best with respect to stability & revegetation
- Native grasses and deciduous trees performing best (mixed results for coniferous species)
    - Decompaction allowing for faster grass establishment
- New species from surrounding forest already colonizing area



Section 6

MRS1 Natural Revegetation

- Active soil placement and revegetation of the MRS1 Test Cover area produced a similar vegetation cover and community in one growing season, compared to five growing seasons of an unmanaged, naturally revegetated area of till on MRS1.

Section 6

Progressive Reclamation - Tailings Revegetation Trial

A tailings revegetation trial is also underway to assess various methods for final reclamation of tailings surfaces. DLM proposes to reclaim two of the three tailings cells during operations, with the reclamation of TMA Cell 1 beginning as early as 2021.

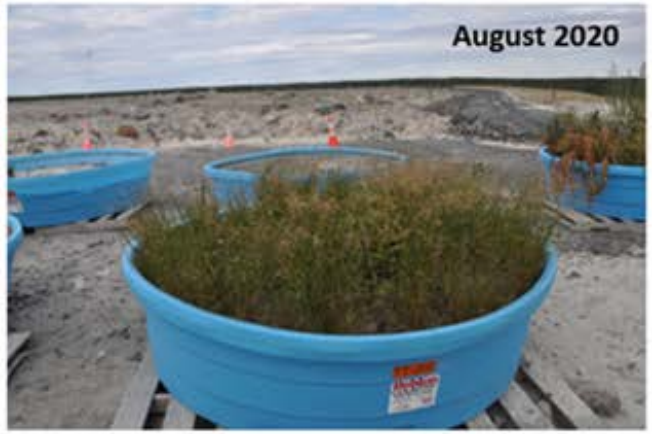
Test cells were established in 2019 to test the performance of various soil amendments applied to beached tailings. Fertilizer, overburden, peat, combinations of the three, as well as a combination of overburden and biosolids were applied to test cells filled with beach tailings.

The test cells were each planted with a native seed mix, and native coniferous and deciduous species. Key information being gathered from this trial include the evaluation of cover and amendment combinations for vegetation establishment and long-term sustainability, plant metal uptake and seepage water and soil quality . The data collected from this research will help to develop results-driven tailings reclamation practices for long-term vegetation establishment.

Progressive Reclamation – Tailings Revegetation

Results from the Tailings Revegetation Trial have been scaled up to one hectare reclamation trial on TMA Cell 1:

- Trial tailings surface accessibility
- Determine appropriate equipment for cover placement
- Use of most successful treatment in MRS1 trial (Peat and Fertilizer)



Progressive Reclamation - Water Management Planning

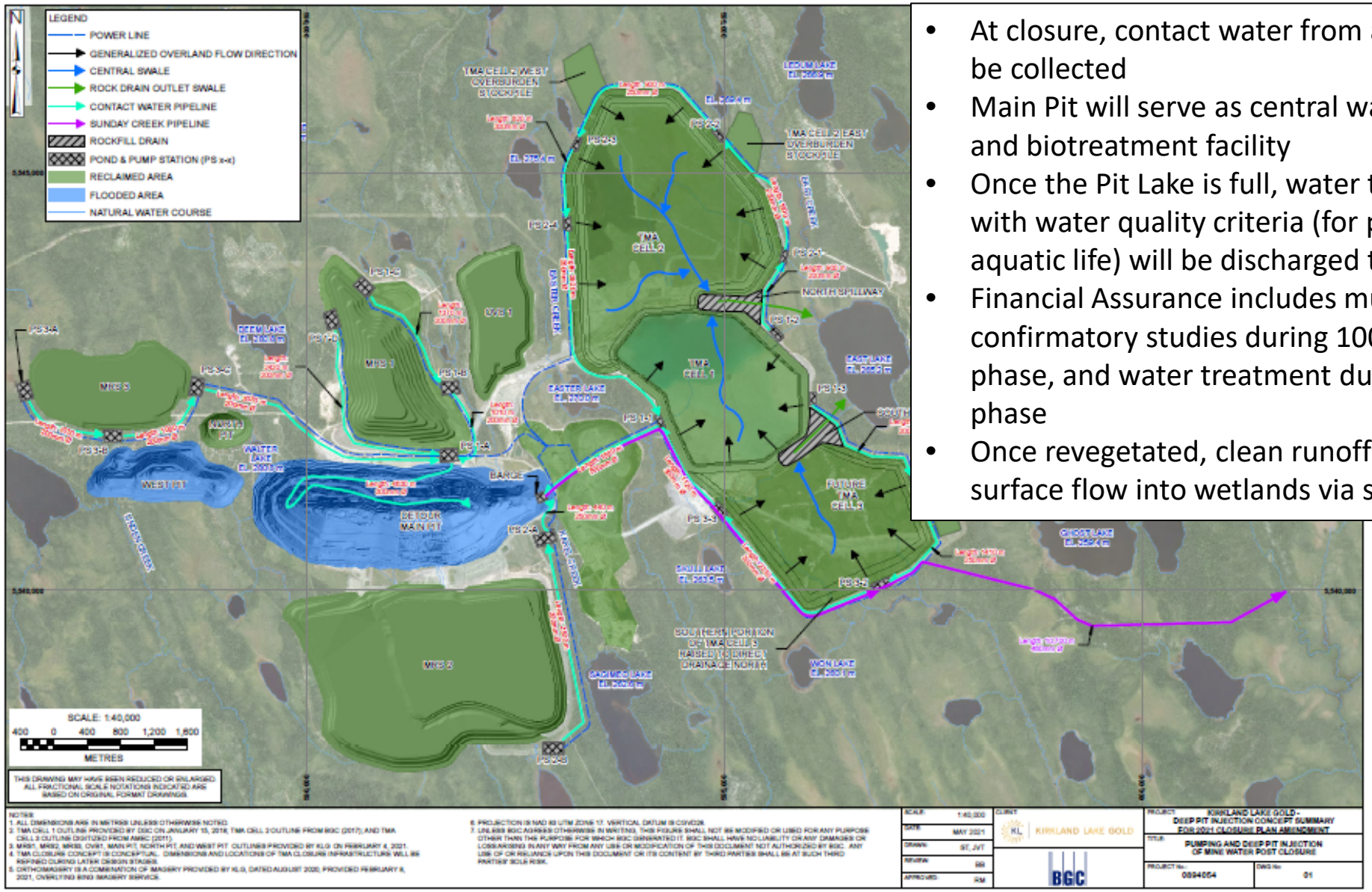
In support of closure planning for the site, water quality predictions for site discharges and receiver water courses were re-evaluated by Lorax (2021) to provide long-term (160 years post-closure) predictions of the physical and chemical evolution of the pit lake water column.

The model was used to generate predictions of flow and water quality for water that will be pumped from the pit lake for discharge to the receiving environment.

Pit lake predictions were conducted using PitMod, a one-dimensional, laterally-averaged numerical hydrodynamic model. Four model scenarios were evaluated: 1) a base case; 2) a conservative case using upper source terms; 3) a climate change case (RCP 8.5 climate inputs); and 4) a bioremediation case.

Closure water management-related reports are provided in Appendices F-1 through F-3.

Progressive Reclamation - Water Management Planning



- At closure, contact water from all facilities will be collected
- Main Pit will serve as central water management and biotreatment facility
- Once the Pit Lake is full, water that is compliant with water quality criteria (for protection of aquatic life) will be discharged to Sunday Creek
- Financial Assurance includes multiple confirmatory studies during 100-year pit filling phase, and water treatment during discharge phase
- Once revegetated, clean runoff water from TMA surface flow into wetlands via spillways

Progressive Reclamation Completed to Date

- Three Aggregate pits have been completed and reclaimed with the north aggregate pit becoming fish habitat along Karel Creek;
- Historic tailings from the previous open pit were transferred and encapsulated in TMA Cell 1;
- Construction areas along the transmission line ROW were cleaned-up and infrastructure removed;
- Approximately 20 hectares of MRS1 have been progressively reclaimed.

Progressive Reclamation

- DLM's Research and Progressive Reclamation Program increases certainty that reclamation methods are effective, and decreases the amount of work required at final closure.
- Progressive reclamation has been incorporated into the Life-of-Mine Plan as a cyclical, annual activity.

Progressive Reclamation

DLM's Research and Progressive Reclamation Program has been recognized and was recently awarded the Tom Peters Memorial Mine Reclamation Award.

Detour Lake Mine Reclamation Program

Due to its long mine life (2040 or beyond), progressive reclamation at Detour Lake Mine will occur in parallel with ongoing operations. The Progressive Reclamation Program at Detour Lake Mine, as well as the eventual site closure, are supported by a long-term, multidisciplinary research program that was initiated in 2012. The extensive efforts of this program continue to address several aspects critical to successful mine reclamation, including ecosystem restoration with native species, innovative methodologies (such as seeding via drone), and the management of metal leaching and acid rock drainage from mine waste materials. The research program has not only led to the development and initiation of full-scale progressive reclamation at Detour Lake Mine, but also contributed knowledge to industry-wide mine reclamation practices in general.

In 2020, Detour Lake Mine was honoured with the prestigious Tom Peters Memorial Mine Reclamation Award. This award is presented by the Canadian Land Reclamation Association in recognition of outstanding achievements in the practice of mine reclamation in Ontario.

KL Gold also contributes to industry best practices through its membership with the North American Mine Closure Working Group (NAMCWG).

Rehabilitation Measures – Temporary Suspension

- Site access will be restricted, and 24-hour security maintained;
- Entrances to active mine areas will be blocked;
- Mechanical, hydraulic and electrical systems will be maintained to ensure safety, security and environmental protection of the site;
- All water management systems will remain active;
- Stockpiles will be assessed for stability;
- Dam safety inspections will continue;
- Environmental monitoring will continue;
- All activities will be maintained in compliance with O. Reg 240/00.

Rehabilitation Measures – State of Inactivity

- All previously mentioned items will be followed in addition to the following:
- Open pits will be allowed to flood, a safety berms will be constructed around the pits;
- The onsite landfill will be progressively reclaimed, all hazardous waste will be removed from site;
- A site insection program will be implemented.

Approach to Closure- Open Pits

- Open pit closure will include:
  - Removal of all in pit infrastructure (pumps, pipes, etc);
  - Inspection to ensure no contaminated materials are present;
  - Placement of a barricade at the top of the ramp;
  - Completion of a rock berm around the pit;
  - Conduct a pit wall stability assessment;
  - When confirmed everything is safe, flooding of the pit will proceed in line with closure water management:
    - For the main pit this involves pumping poorer quality water to the bottom of the pit and other runoff to the top of the pit to promote lake stratification. During phase 3 of closure water will be pumped out of the pit and discharged seasonally to Sunday Creek to maintain a water elevation of 255 masl in the pit. Water is anticipated to be able to passively flow into Karel Creek during phase 4 of closure 200+ years after mining ceases.
    - For West Pit it will be allowed to refill naturally and eventually flood passively to Linden or Lindbergh Creeks.

Approach to Closure- Waste Rock Piles

- Closure to Waste Rock Piles is as follows:
  - MRS1 and MRS3
    - Overburden will be salvaged from the most proximal overburden stockpile and placed on remaining unreclaimed surface areas of MRS1 and MRS3, to obtain 0.7 m thickness and 100% coverage; and
    - The remaining unreclaimed surfaces areas will be revegetated consistent with the End Land Use Plan and ongoing revegetation studies.
  - MRS2
    - Overburden will be salvaged from OVB1 and placed on the benches and plateau of MRS2 to obtain a minimum thickness of overburden cover of 0.3 m;
    - The placed overburden will be revegetated consistent with the End Land Use Plan and ongoing revegetation studies;
    - Side-slopes will be seeded directly.

Approach to Closure- Low grade stockpiles

- Low grade stockpile closure will include:
  - Removal of all low-grade stockpiles via processing the material;
  - Grade final foundation areas and restore the land to productive use, with wide range of biodiversity;
    - Revegetate with Black Spruce, Jack Pine, Feathermoss and Lichen
  - Achieve passive system where all-natural surface drainage can be routed into local streams as a water source;
  - Achieve no impacts on groundwater to support overall passive system;
  - In-migration of local wildlife; range of biodiversity based on research conducted and projected for the future.

Approach to Closure- Tailing Dams and Cells

Tailings Dams closure will include:

- Cell 1 and 2
  - Will be closed during progressive rehabilitation before end of life;
  - Draw down the tailing ponds in Cell to allow for access on the tailings surface;
  - Placement of a layer of peat (minimum 0.1 m);
  - Seeding and tree planting to encourage early establishment of vegetation for erosion and dust control. The vegetation prescription will be informed by the ongoing tailings revegetation trials.
- Cell 3
  - Will be closed in the same manner during active closure.

Approach to Closure- Buildings and Infrastructure

Closure of buildings and infrastructure includes the following:

- Buildings on the site will be decontaminated and dismantled in a sequential manner;
- Concrete foundations will be demolished to within 1 m of final ground surface, infilled with NAG waste rock (or overburden), as needed, and covered with overburden to support revegetation;
- All surface pipelines not required for ongoing site management after rinsing if appropriate, will be cut apart and disposed, if other alternatives (recycle or resale as scrap, etc.) are not practical;
- Any roads not required for closure monitoring will be scarified and seeded to promote vegetation restablishment.

Approach to Closure- Powerlines

- Powerline closure will include:
  - Establish solar infrastructure for long term site power;
  - Remove existing diesel backup generators from site;
  - Remove 230 kV Transmission Line to Island Falls, and Site Overhead / Buried Distribution Lines;
  - The conductor (wire) is anticipated to be able to be recycled or re-used;
  - Wooden poles will be cut off at surface and the poles offered to others for re-use if possible;
  - Demolition materials that cannot reasonably be recycled or re-used will be disposed of in a licensed landfill and will not be left on the ROW corridor;
  - The ROW corridor will be allowed to naturally revegetate and additional work is not proposed unless erosion is present, which is not expected.

Rehabilitation Measures – Final Closure

Closure Stage	Description
Stage 1 **(Years 1 to 5)**	**Active Closure:** • The majority of the physical decommissioning, demolition, reclamation and revegetation of the site will occur during this time. • Flooding of Main Pit and West Pit may be initiated during this stage (the North Pit will be backfilled during operations). • Active management and monitoring of site conditions.
Stage 2 **(Years 6 to 102)**	**Passive Closure / Flooding of Open Pits:** • Main Pit and West Pit will flood to become pit lakes. • Main Pit will be used as a central water management facility for mine contact water and in-pit biotreatment. • Environmental monitoring will confirm success of Phase 1 reclamation. • Ongoing site management.
Stage 3 **(Years 103 to 202)**	**Final Closure / Active Discharge:** • Discharge of treated water from Main Pit Lake. • Passive discharge of West Pit Lake. • Active management and monitoring of site conditions. • Ongoing periodic management of structures as needed.
Stage 4 **(Years 203+)**	**Post Closure / Passive Discharge:** • Active decommissioning and demolition of remaining buildings and infrastructure no longer required. • Final reclamation of affected lands as needed. • Passive discharge of water from pit lakes. • Environmental monitoring to ensure Phase 3 reclamation was successful. • No active ongoing site management.

Monitoring after Closure

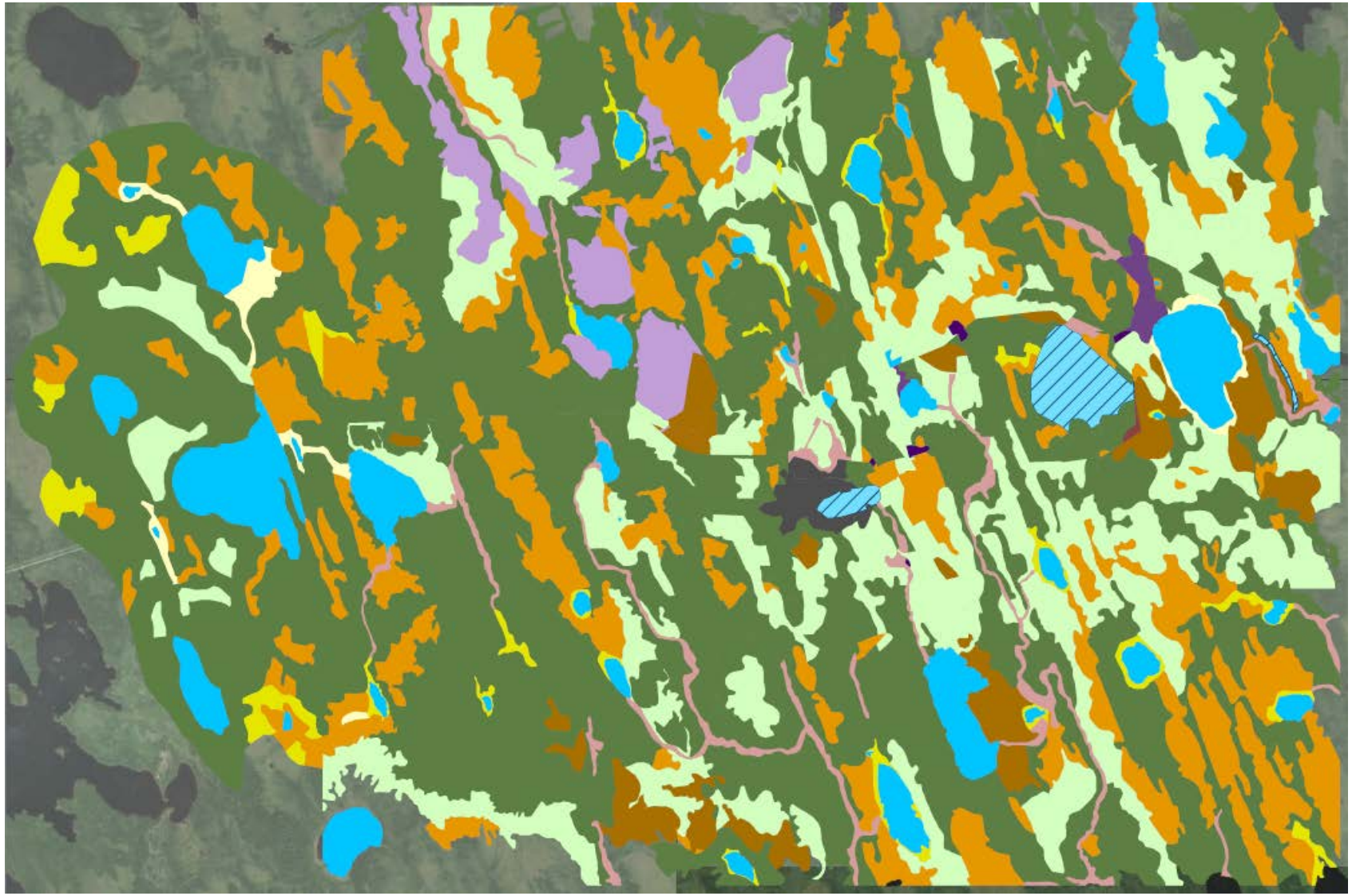
- Physical Stability monitoring:
  - Inspection of stockpiles by professional engineer following completion of slope reshaping and vegetation;
  - Annual inspections thereafter;
  - Dam Safety inspections completed annually, and Dam Safety Reviews completed every 10 years.
- Chemical Stability monitoring:
  - Proposed monitoring programs are outlined in CPA3 but include:
  - Following applicable permits and regulations for effluent monitoring;
  - 10 years post closure identified background and receiver monitoring will continue on a quarterly basis;
  - Groundwater monitoring will continue as outlined in environmental approvals until year 6 when sampling will be reduced to annual collection
  - Sediment Quality samples will be collected in association with aquatic resources investigations in years 1, 4, 7, and 10 after closure;

Monitoring after Closure

- Pit Lakes will be monitored for:
  - Pit filling rates;
  - Timing and magnitude of pit lake stratification;
  - Evolution of redox conditions in pit bottom waters;
  - Attenuation processes in suboxic zones of the water column;
  - Evolution of pit lake water quality.
- Biological Monitoring will follow applicable approvals and regulations but also:
  - Aquatic resource monitoring will continue every 3 years post closure;
  - Wildlife surveys (aerial) will be conducted at years 1, 3, 5 and 10 in early winter for Caribou, Moose and Wolf monitoring;
  - Revegetation will be inspected at the start and end of each growing season during phase 1 of closure and every 10 years during phase 2.

Section 11

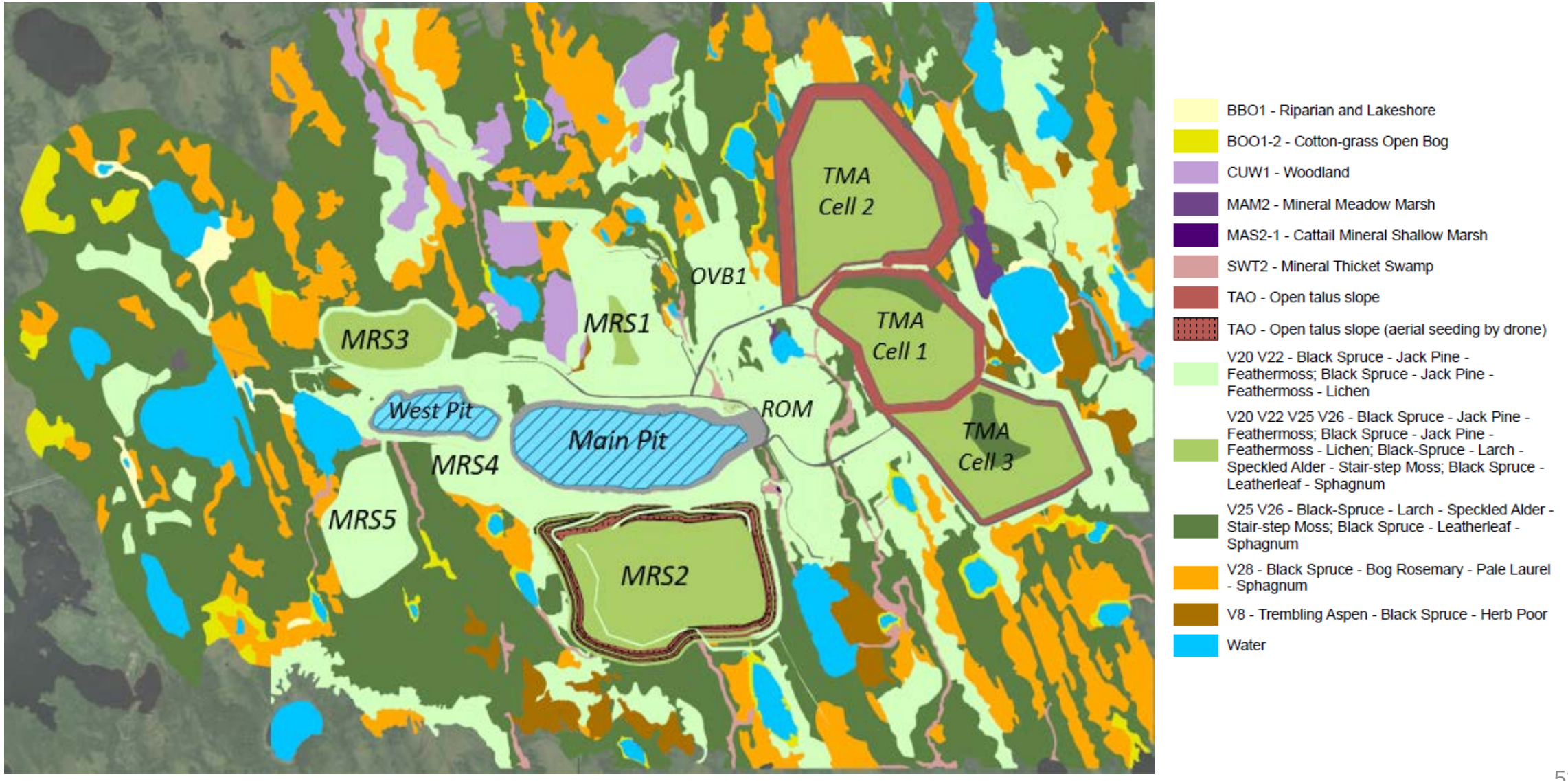
Expected Site Conditions Post Closure



- Ecosystems that existed before the construction of the mine site were mapped
- Primary closure objectives:
  - Returning ecotypes to pre-development to extent possible
  - Habitat for native species (i.e. caribou)
- Future ecotypes projected based on soil, climate, vegetation conditions & community considerations

Section 11

Expected Site Conditions Post Closure



Estimated Closure Costs and Financial Assurance

CPA3's Closure Bond is ~$260M (pending government review) and includes funding for 300 years of post-closure management

- Decommissioning and demolition for DLM's facilities
- Decontamination and removal of waste, including hazardous waste and reagents
- Revegetation of disturbed areas (including stockpiles) with native plant species, with a focus on creating caribou habitat
- Various environmental and engineering studies (such as dam inspections) to ensure safety and stability
- Environmental monitoring (including water quality, fisheries surveys, and terrestrial surveys)
- Solar power and water management infrastructure, including treatment
- Labour, equipment, and maintenance costs for all of the above

Process for CPA3 Preparation, Consultation & Filing

- Preparation of Draft CPA3 - complete
- Advanced Review by Indigenous Communities –ongoing until June 28, 2021
- Address comments received from Indigenous Communities – July 19, 2021
- Submit to Ministry of Energy, Northern Development & Mines (ENDM) –July 23, 2021
- KL Gold to receive ENDM comments on CPA3 – August 20, 2021
- KL Gold to submit comment responses and revisions to CPA3- September 20, 2021
- ENDM review and filing of Final CPA3 – November 4, 2021
- Financial Assurance top-up provided - Upon filing

Dates are approximate and subject to change

Summary

- Closure planning and execution is a collaborative, iterative process
- CPA3 follows the same methodology as previous closure plans
- Builds upon ongoing engagement and consultations for previous studies and permits
- CPA3 has been shared for community review
- Early research/reclamation results are encouraging
- Progressive reclamation refines methodology over time and increase certainty that closure objectives will be achieved

Meegwetch!

Questions?