KINROSS Manh Choh
A JV with Contango ORE

Manh Choh Project

Support Document for the Waste Management Permit and Plan of Operations

Revision 1

January 2023

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Abbreviations

amsl	above mean sea level
ABA	acid base accounting
ACOE	U.S. Army Corps of Engineers
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
AP^*	site-specific acid potential
APDES	Alaska Pollutant Discharge Elimination System
dB	decibals
dBA Leq	equivalent continuous level
dBA Lmax	maximum sound level
Document	Manh Choh Support Document for the Waste Management Permit and Plan of Operations
ft	feet
ft^2	square feet
Fort Knox	Fort Knox Mine
GMU	Game Management Unit
gpm	gallons per minute
Mine	Manh Choh Mine
ML	metal leaching
MSGP	Multi-Sector General Permit
ML NAG	metal leaching non-acid generating metal
NAG	non-acid generating, non-potentially acid generating, or acid consuming
NP	neutralization potential
NP^*	site-specific neutralization potential
NP/AP	ratio of neutralization potential to acid potential
PAG	potentially acid generating
Peak Gold	Peak Gold, LLC.
POO	Plan of Operations
Project	Manh Choh Project
Rapid Onset PAG	potential to generate acid generating conditions rapidly within the mine life of 4.5 years
RCP	Reclamation and Closure Plan
SRCE	Standardized Reclamation Cost Estimator
SPCC	Spill Prevention, Control, and Countermeasure Plan
SWPPP	Storm Water Pollution Prevention Plan
Tetlin	Native Village of Tetlin
WMP	Waste Management Permit
WRD	Waste Rock Dump
WRSA	Waste Rock Storage Area
WOTUS	Waters of the United States

1.0 Introduction

Peak Gold, LLC (Peak Gold) is providing this combined Support Document (Document) for the Waste Management Permit (WMP) and Plan of Operations (POO) for the construction and operation of the Manh Choh Project (Project), an open-pit mining operation. Although the Project is located on Native Village of Tetlin (Tetlin) land, Peak Gold is submitting this Document to the Alaska Department of Environmental Conservation (ADEC) and Alaska Department of Natural Resources (ADNR) for support in issuing the ADEC Waste Management Permit and ADNR Reclamation Plan Approval for the Manh Choh Mine (Mine).

1.1 Site Description

The Project area is owned by Tetlin and is private Native Land or Tetlin Land, approximately 10 miles southeast of Tok, Alaska (Attachment 1). The Project is accessible from the Alaska Highway, on the approximately 5-mile Tetlin Village Road “Manh Choh (Twin Road),” and the approximately 9-mile Project access road “Manh Choh (Site Road).” The Twin Road, and Site Road are located on Tetlin Land. The Manh Choh deposit is located on top of a group of low hills in the northern part of the Tetlin Lease between Tetlin and Peak Gold (Attachment 2). The name ‘Manh Choh’ (“mon-CHO”) was chosen by the Village of Tetlin Chief, Michael Sam, and the Tribal Council and can be translated from the Upper Tanana Athabascan language to ‘Big Lake,’ referring to the nearby Tetlin Lake, a site of high cultural significance in the community.

The Project will require approximately two years of construction, followed by an active mine life of approximately 4.5 years. Mining activity will be conducted by conventional truck and shovel operation, operating year-round, seven days per week, twenty-four hours a day. Construction of support facilities (Twin Road and Site Road) for the Project is scheduled to begin in 2022, with mining to commence in 2023. The Project ore will be transported to the Fort Knox Mine and processed at its carbon-in-pulp mill. Major Project facilities include open pit mining areas, waste rock dumps, infrastructure, and growth-media (overburden) stockpiles (Attachment 3).

1.2 Referenced Documents Submitted Separately

Peak Gold performed multiple baseline investigations, studies, and Project plans to support permitting and this Document. These following documents are submitted separately from this Document.

- *Manh Choh Project Reclamation and Closure Plan, Revision 1,January 2023*
- *Manh Choh Project Reclamation Plan Basis of Estimate Revision 1, January 2023*
- *Manh Choh Project Standardized Reclamation Cost Estimator, Excel File, Revision 1 January 2023*
- *Manh Choh Project Geochemical Characterization Report, Revision 1, November 2022*

- *Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary, Revision 1, November 2022*
- *Manh Choh Cultural Resources Survey, December 2021*
- *Manh Choh Project Waste Rock Management Plan, Revision 1, November 2022*
- *Manh Choh Project Water Management Plan, Revision 1, November 2022*
- *Manh Choh Project Monitoring Plan, Revision 1, November 2022*
- *Manh Choh Project Solid Waste Management Plan, Revision 1, January 2023*
- *Manh Choh Project Preliminary Jurisdictional Determination Report, December 21, 2021*
- *Manh Choh Project Visual Simulation Report, December 2021*
- *Manh Choh Project Noise Technical Report, December 2021*
- *Manh Choh Project Fish Surveys, December 2021*
- *Manh Choh Project Terrestrial Mammal Report, December 2021*
- *Manh Choh Project Nesting Raptor Survey, December 2021*
- *Manh Choh Project Breeding Bird Survey, December 2021*
- *Manh Choh Project Subsistence Data Review, December 2021*

2.0 Manh Choh Mine

Peak Gold proposes to construct and operate the Mine which is approximately 10 miles southeast of Tok, Alaska (Attachment 1). Once construction (e.g., land clearing, infrastructure, Mine roads, etc.) of the Project is completed, it is anticipated mining will begin in 2023 and be active for 4.5 years followed by two years of reclamation. Concurrent reclamation will occur during mining operations including backfilling pits and recontouring or other reclamation activities when facilities mature or are no longer required for operations. The Mine's infrastructure facilities and Mine layout are identified in the figures of Attachments 3, 4, 5, and 7. The facilities include the following:

- Contractor support facilities
    - offices
    - two maintenance shops
        - mine infrastructure site
        - construction laydown area
    - warm storage
    - light duty vehicle parking
    - equipment parking
    - generators for electrical power
    - explosive storage area (powder magazine)
    - ore loadout area
        - weigh scale
        - office
        - highway truck shop

- Peak Gold support facilities
    - offices
    - light duty vehicle parking
    - water treatment (if needed)
    - Mine fuel island
    - generator for electrical power
    - communication tower
    - security office
    - security gate

- Two individual pits
    - North Pit
    - South Pit

- Two ore stockpiles
    - Mine Site Ore Stockpile
    - Ore Transfer Area Stockpile

- Four waste rock dumps
    - North Pit Waste Rock Dump
    - South Pit Waste Rock Dump
    - North Waste Rock Dump
    - Main Waste Rock Dump

- Three growth-media stockpiles

Footprints for each facility have been developed using the best available information. The final configuration may deviate slightly due to unknowns such as varying density of blasted waste rock and stacking height in WRDs but will remain within the disturbance footprints. The area of disturbance for Project is shown on the figures of Attachments 3, 4, and 5. The Project's area of disturbance is approximately 1,068 acres. The disturbance acreage is presented in Table 1.

Table 1. Project Surface Disturbances

Facility	**Acres**
Ore Transfer	20.55
Yards/Pads (Mine)	82.66
Roads (includes Manh Choh Site Road which may remain)	286.10
WRDs	275.21

Pits	91.28
Growth Media	16.56
Stockpiles	14.20
Diversions	30.85
Material Sites	125.79
Existing Road	124.81
TOTAL	**1068.01**

Access to the Project will be on the existing Tetlin Village Road and exploration roads from the Tetlin Village Road (Attachments 1, 3, and 7). Improvements to the existing Tetlin Village Road to the intersection of the existing exploration access road are required for safe ingress and egress of traffic (i.e., villagers, mining equipment, ore hauling trucks, supply delivery vehicles, and light duty vehicles). A "Twin Road" was constructed (2022) adjacent to the existing Tetlin Village Road with ADNR approval. The "Site Road" construction improvements and relocation of the existing exploration site access road (aka Pioneer Road) from the intersection of the Twin Road to the Mine began in 2022 with ADNR approval and will be completed in 2023. The "Site Road" will be limited to Mine traffic and will be closed to the public throughout the mining and reclamation activities of the Project.

An electronic security gate will be located approximately 200 feet from the intersection of Alaska Hwy 2 and Twin Road to limit general public access and keep the public out of Mine traffic on the Twin Road and Site Road for safety and security purposes. Near the electronic gate, an Atco type security trailer will be manned 24/7 for security purposes. After mining is complete, a manual swing gate will replace the electronic gate on the Site Road to keep general public out of the area until reclamation is complete.

At the electronic gate a vehicle (i.e., light duty vehicles, tractor/trailer vehicles, miscellaneous equipment) tire cleaning system will be installed to prevent tracking mud onto Alaska Hwy 2 as required by Alaska Department of Transportation and Public Facilities (DOT&PF), US Environmental Protection Agency (EPA), and US Army Corps of Engineers (ACOE).

Further, the tire cleaning system will minimize the potential to import and/or spread propagules of invasive plant species in the Project area from offsite vehicles entering the Project area as specified by the ACOE Wetlands Fill Permit Number POA-2013-00286, Special Condition 5.

A Waste Management Permit is required from the ADEC for the Project's waste rock dumps. The Project's Geochemical Characterization Report classified waste rock to contain potentially acid generating (PAG) in 83% of all oxide materials. The *Manh Choh Project Geochemical Characterization Report, Revision 1, November 2022* was submitted separately with specific details of the baseline waste rock study.

Ore stockpiles will be managed appropriately as determined by analytical geochemical results, e.g., potential acid generating (PAG), non-acid generating (NAG), and metal leaching (ML).

Water management for Manh Choh will be performed in accordance with the *Manh Choh Project Water Management Plan, Revision 1, November 2022 and Manh Choh Project Monitoring Plan, Revision 1, November 2022*. Both plans were submitted separately.

Storm water control during construction of the access road improvements for the Project, co-permittee applications (contractor and Peak Gold) as specified by the Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit Number AKR100000 were submitted to and approved by ADEC. Storm water pollution prevention plans (SWPPP) are prepared and implemented to control storm water and minimize runoff erosion during construction activities. The following are construction storm water authorizations.

- General Permit Authorization Number AKR10H01U issued July 24, 2022 to Qayaq Construction, LLC
- General Permit Authorization Number AKR10H01V issued July 25, 2022 to Peak Gold, LLC
- General Permit Authorization Number AKR10H035 issued August 17, 2022 to Alaska Log Works, Inc
- General Permit Authorization Number AKR10H039 issued August 17, 2022 to Peak Gold, LLC

During the life of the Mine, an APDES storm water general permit authorization application as specified by the APDES Multi-Sector General Permit (MSGP) Number AKR060000 will be submitted to the ADEC, and mining will not begin until a general permit authorization has been received. It is anticipated the existing MSGP Authorization Number AKR06GA93 for the Tetlin Project (hard rock exploration) will be amended for the Project mining activities. The existing SWPPP for the Tetlin Project will be amended and implemented for the Project mining activities.

An APDES individual permit is required for Project wastewater discharge to surface water. Any wastewater discharge to surface water will not occur before an APDES individual permit is issued to the Project by the ADEC.

An Alaska Department of Environmental Conservation Air Quality Control Minor Permit Number AQ1616MSSO1 Revision 1 was issued by the Department on July 12, 2022. The Air Quality Control Minor Permit was issued for air emissions from the Project.

Fugitive dust from ore and waste rock hauling will be managed with dust suppression water and applied by water trucks. It is anticipated dust control water will be provided from the Project's onsite water supplies.

Management of petroleum will comply with requirements specified 40 CFR Part 112, Oil Pollution Prevention. A Spill Prevention, Control, and Countermeasure Plan (SPCC) will be developed and implemented for the Project. Currently, there is an existing SPCC for the ongoing exploration project.

2.1 Reclamation and Closure

The reclamation and closure will be performed in accordance with the Project's reclamation and closure plan (RCP) *Manh Choh Project Reclamation and Closure Plan, Revision 1, January 2023*. The RCP was submitted separately.

The purpose of the RCP is to provide guidelines for implementing stabilization and reclamation procedures for the various facilities associated with the Project. These guidelines are based on the best available reclamation technologies. Peak Gold is committed to concurrent reclamation of portions of the site during operations, these guidelines may be modified as actual reclamation data are gathered during field reclamation of individual facilities or reclamation test plots. Revisions to the RCP will be made to address changes in the design, construction, operations, and concurrent stabilization and reclamation of the facilities.

A summary of the Project's mining and reclamation schedule is presented in Attachment 11.

2.2 Financial Assurance

The Project RCP includes the closure costs associated with the Mine. The RCP Appendix A includes the *Manh Choh Project Reclamation Plan Basis of Estimate Revision 1, January 2023.* The Project RCP includes the Standardized Reclamation Cost Estimator (SRCE) model estimated costs for reclamation and closure, which will be used for providing the financial assurance amount provided to ADNR and ADEC. The *Manh Choh Project SRCE, Excel File, Revision 1, January 2023* was submitted separately. The SRCE model estimated the total cost at $63,475,880. Table 2 shows this cost estimate identified by Table 4-1 from the Project's RCP Appendix A, *Manh Choh Project Reclamation Plan Basis of Estimate, Revision 1, January 2023*.

Table 2. Project Reclamation Plan Basis of Estimate's Table 4-1 Summary for Premature Closure Scenario

Facility	Reclamation Cost $
Waste Rock Dumps	3,629,647
North Pit Liner Cover	9,148,031
Solution Management	196,067
Pits	36,477
Yards	884,584
Roads	618,369

Borrow Area	615,764
Buildings	541,097
Other Demo	180,898
Sediment and Drainage Control	750,391
Monitoring	933,105
Road Maintenance	478,792
Well Abandonment	294,630
Construction Management and OH	3,205,331
Mobilization-demobilization	611,760
Human Resources	7,133,963
North Pit Rehandle (dry WR)	1,977,442
South Pit Backfill	12,659,646
Solid Waste Disposal	823,544
Reclamation Maintenance	620,376
Subtotal	**45,339,914**
Engineering, Design and Construction Plan	1,813,597
Contingency	6,800,987
Contractor OH and Profit	6,800,987
Contract Administration	2,720,395
TOTAL COST	**63,475,880**

3.0 Supporting Documents

3.1 Manh Choh Cultural Resources Survey

Cultural resources analysis was conducted by Higgs Research and Consulting LLC (HRC) *Manh Choh Cultural Resources Survey, December 2021)*. The *Manh Choh Cultural Resources Survey, December 2021* was submitted separately. Cultural resource information is not public, and so baseline and impact analysis are summaries. Interested parties can contact the State Historic Preservation Officer (SHPO) for more detailed information.

HRC surveyed the Mine development area in the Tetlin Hills, and the corridors of new and existing infrastructure in the Tetlin Hills (e.g., Project access roads, potential Mine camp area). A Phase I pedestrian ground survey was conducted in May and June 2021 to identify high to moderate potential landforms for an intensified Phase II survey and archaeological testing in June and July 2021.

No historic-age buildings or historic sites were found. Seven prehistoric archaeological sites were identified and further evaluated during Phase II testing. Based on the Phase II testing and subsequent data analysis, HRC is recommending that five of the seven sites meet federal archaeological site significance criteria making them eligible for listing on the National Register of Historic Places

(NRHP). The five eligible sites retain integrity and important archaeological information relevant to understanding the past land use patterns by prehistoric peoples and the development of Native Alaskan culture in the Upper Tanana River region. For two of the seven sites, HRC is recommending that they lack significance or integrity to meet NRHP eligibility criteria.

3.2 Manh Choh Wetlands Delineation Survey

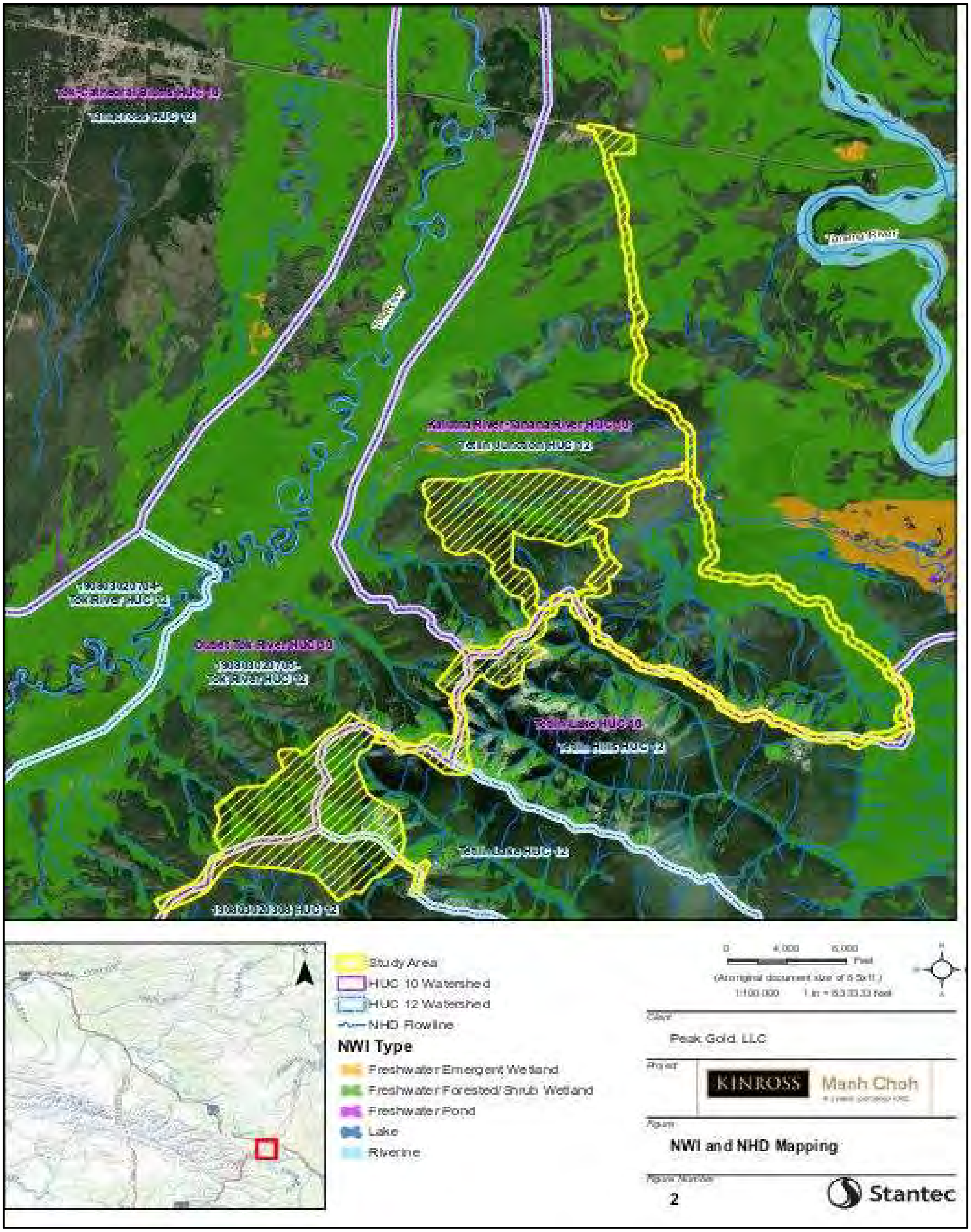
A wetlands delineation was performed by Stantec (*Manh Choh Project Preliminary Jurisdictional Determination Report, December 21, 2021*). The *Manh Choh Project Preliminary Jurisdictional Determination Report, December 21, 2021* was submitted separately.

The 2021 delineation report presents the findings of the baseline fieldwork for a 6,024-acre study area (Figure 1 and Attachment 6). This includes the extent of vegetation cover and the wetlands and waters within the Project study area. Wetlands and waters include wetlands, streams, and ponds. The Project study area is located southeast of Tok, Alaska in the Interior Alaska Lowlands Major Land Resource Area. Waters of the United States (WOTUS). in the study area ultimately flow into the Tanana River, a traditional navigable river. The 2021 study area wetland mapping is based on the criteria in the U.S. Army Corps of Engineers Wetland Delineation Manual, the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0), and the 2020 National Wetland Plant List. The results of the field verified mapping show the majority of the area is uplands; wetlands and waters account for 197.8 acres (3.3 percent) of the study area (Figure 1 and Attachment 6). Table 3 provides the wetlands impact to the Project and wetlands fill quantity.

Table 3. Project Wetlands Impact

Project Component	WOTUS Acres Impacted	Cubic Yards Fill in WOTUS	Fill Type
Manh Choh Twin Road	3.8	6,103	Clean Fill
Manh Choh Site Road	0.01	16	Clean Fill
North Pit	0.3	N/A	Excavation
South Pit	0.5	N/A	Excavation
Waste Rock Dump	0.05	81	Clean Waste Rock
Ditch/Spoils/Fill	0.6	968	Excavation/Spoils
Totals	**5.2**	**7,195**	

Figure 1. Wetlands Study Area



3.3 Manh Choh Noise Impact Study

A noise analysis was conducted by Michael Minor & Associates (*Manh Choh Project Noise Technical Report, December 2021).* The *Manh Choh Project Noise Technical Report, December 2021* was submitted separately.

The noise analysis provides a worst-case scenario for four main components of the Project; general noise from mining operations, highway haul trucks travelling to and from Fort Knox, blasting noise, and occasional noise from helicopters used for exploration and surveys. The most notable noise source from Mine operations at nearby noise sensitive land uses in the corridor, which includes residences, hotels, churches, schools, and parks, is material haulage from the Mine to Fort Knox via the Alaska Highway from Tok to Fairbanks, the Steese Expressway to the intersection of the Steese and Elliott Highways, and the final leg along the Steese Highway to Fort Knox. The noise study area is presented on Figure 2.

Overall, noise from actual mining operations is simply too far from most noise sensitive land uses, including residential areas, hotel/motels, schools, and churches, to cause a notable increase in the overall noise levels. However, due to being located away from the Alaska Highway, and thereby having lower background noise levels, when the noise levels at the five cabins along Tetlin Access Road are predicted to have nighttime increase of 10 to 19 (decibals) dB over the background ambient the hourly noise levels remain below 43 dBA Leq (equivalent continuous level).

At all other areas evaluated, noise levels from the Mine are predicted to remain below 28 dBA Lmax (maximum sound level) at all nearby noise sensitive properties. Noise from blasting, which typically will not occur more than once per day, is not predicted to exceed 31.5 dBA at any noise sensitive properties near the Mine.

Noise from the haul trucks along the highway haul routes could increase noise levels by up to 7 to 8 dB over existing conditions during late night hours. However, even with the increase noise levels at sensitive properties during the same time are all predicted to remain below 58 dBA, which is 8 dB below the FHWA and ADOT&PF traffic noise criteria. Finally, a cumulative analysis of all Mine related noise sources predicted worst case cumulative noise levels increases of 7 dB at the Tok River Recreational Site and along the Alaska Highway in Tok. North of Tok the cumulative noise level is the noise level from the haul trucks, with increase of 7 to 8 dB.

Figure 2. Noise Study Area

<u>3.4 Manh Choh Visual Simulation Assessment</u>

A visual simulation was conducted by SRK Consulting (U.S.), Inc (*Manh Choh Project Visual Simulation Report, December 2021).* The *Manh Choh Project Visual Simulation Report, December* 2021 was submitted separately. The visual simulation location figure is presented in Attachment 8.

Potential visual impacts associated with the Project were analyzed using the procedures outlined in the Bureau of Land Management Manual 8431 – Visual Contrast Rating. Contrast ratings compare the Existing Viewshed to the Full-Buildout Scenario. However, because neither the Project nor the KOPs are located within a land management system with established VRM classes, the contrast rating system used by the BLM has been used for descriptive purposes only.

Visual simulations were prepared for the Full-Buildout Scenario, as seen from KOP-1, KOP-2, and KOP-4. No Mine components would be visible from KOP-3. These realistic visual portrayals (*Manh Choh Project Visual Simulation Report, December 2021*) were used to perceive the landscape as it would appear under each scenario, and to compare the perceive changes in the landscape resulting from the Project to the existing environment. Visual simulations were used to complete contrast rating worksheets, comparing the Existing Viewshed to the Full-Buildout Scenario.

Visual simulations were also prepared for the Post-Reclamation Scenario, illustrating how the Mine components may look 10 to 15 years post-reclamation. While these simulations were not used for contrast rating purposes, the comparative changes are discussed in the report.

In general, most contrasts between the Existing Viewshed and the Full-Buildout Scenario would result from the construction of larger Mine components, such as the waste rock dumps. These components generally add trapezoidal forms to a landscape dominated by gentle, rolling, and subangular forms. The lines created by these new forms would be horizontal and diagonal, usually seen in silhouette, as opposed to the smooth to undulating lines seen in the Existing Viewshed. Mine component colors would generally be warmer (soil colors) and would generally have a higher range of values (lightness to darkness) as compared to the vegetated surroundings. The Post-Reclamation Scenarios show the Mine component forms and lines returned to qualities closer to those found in the existing landscape, with post-reclamation vegetation effectively reducing contrasts on each feature.

3.5 Manh Choh Nesting Raptor Survey

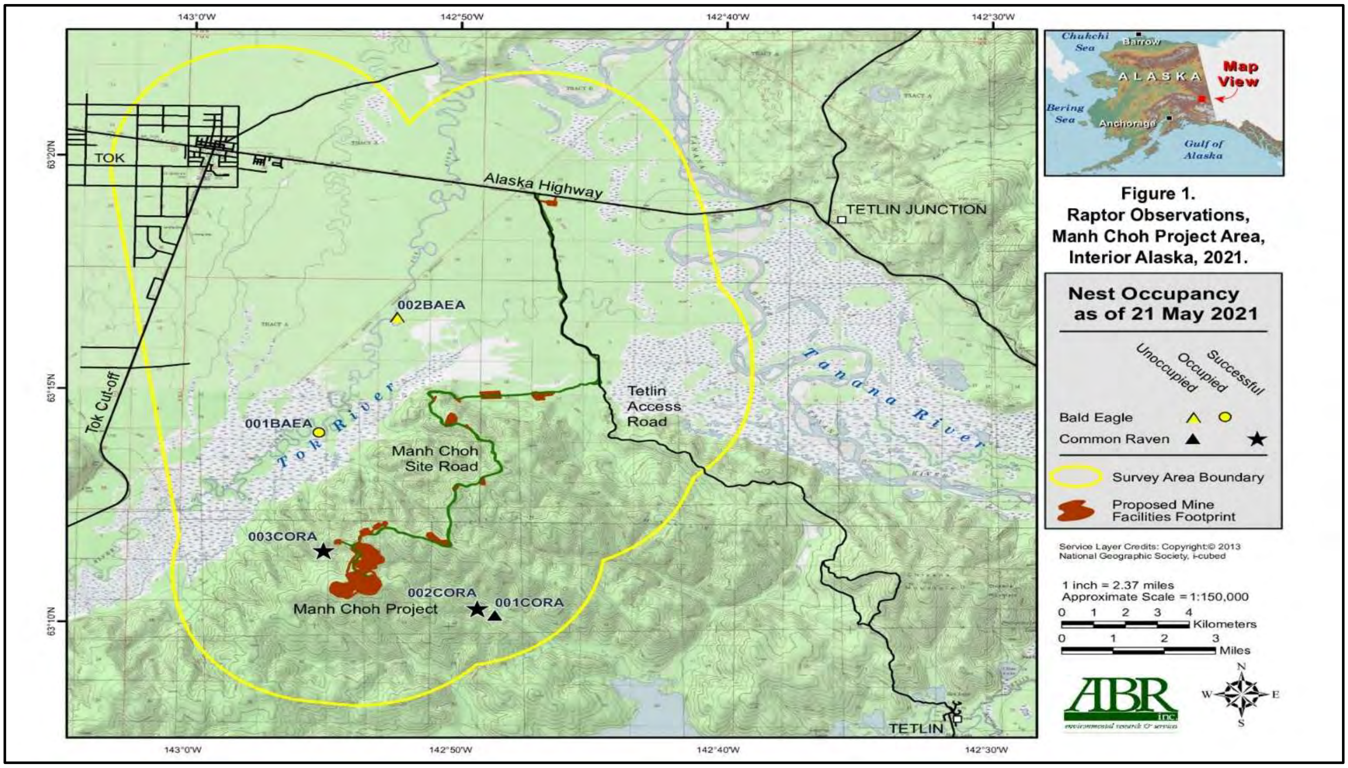
A nesting raptor survey was conducted by ABR, Inc. (*Manh Choh Project Nesting Raptor Survey, December 2021)*. The *Manh Choh Project Nesting Raptor Survey, December 2021* was submitted separately.

The overall goal of the raptor survey for the Project is to compile and collect data on nesting raptors and raptor habitat use in the Project area and surrounding terrain in the Tetlin Hills in Interior Alaska. The survey area was defined as a larger (3 mi [4.8 km) buffer surrounding the Mine infrastructure, the Mine access road (Site Road) and portions of the Tetlin Village Road used by Project vehicles, and a straight-line flight path from the Tok airport to the Mine site to account for possible Project-related helicopter disturbance of nesting raptors (Figure 3).

Two Bald Eagle nests were located during the survey. Both Bald Eagle nests were in cottonwood trees in riparian areas along the Tok River; these likely represent two different breeding territories based on the large inter-nest distance of 3.2 mi (5.2 km). One Bald Eagle nest was occupied by a pair of adult Bald Eagles with one adult perched on the edge of the nest and one perched nearby in a tree overlooking the Tok River. No eggs were observed in the nest. The other nest was not occupied at the time of the survey.

Three Common Raven nests were located on rocky outcrops within the survey area in the Tetlin Hills. Two of the raven nests were successful (at least one young in the nest), and the third nest was unoccupied.

Figure 3. Raptor Nest Location



3.6 Manh Choh Breeding Bird Survey

A breeding bird survey was conducted by ABR, Inc. (*Manh Choh Project Breeding Bird Survey, December 2021)*. The *Manh Choh Project Breeding Bird Survey, December 2021* was submitted separately.

During 2–9 June 2021, a total of 74 point-count plots were surveyed in the Project area, 55 in the Mine area (Figure 4) and 19 in the access road corridor (Figure 5). Two ABR biologists conducted point-count surveys for breeding birds in the Project area according to standard protocols for Alaska. These survey dates were timed to match the phenology of breeding bird activity in Interior Alaska and were within the window for North American Breeding Bird Surveys conducted since 1989 at nearby Northway, Alaska (1 June–8 July).

Across all survey dates, a total of 38 bird species were observed, including three species that were only detected incidentally while walking between plots. All but two of the observed species were landbirds (i.e., songbirds, raptors, and other tree-dwelling or ground-feeding birds). Observations of shorebirds were limited to one Wilson's Snipe and observations of waterbirds to one Trumpeter Swan (in flight over the study area). Of the 38 observed species, 18 occurred in both the Mine and access road corridor areas, 19 occurred only in the Mine area, and one occurred only in the road corridor. Dead remains of one additional species were also observed in the Mine area (Ruffed Grouse).

Figure 4. Breeding Bird Plots Project Area

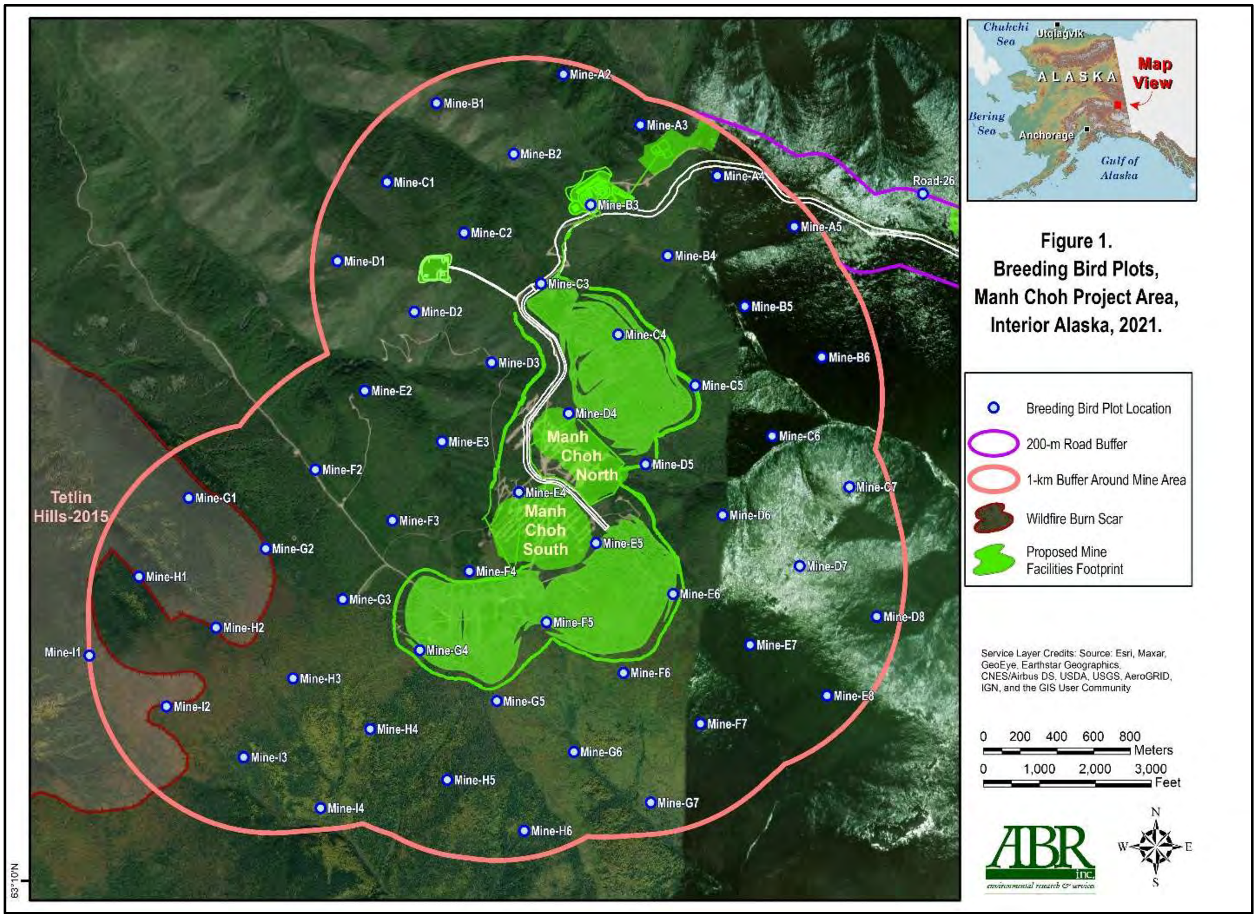
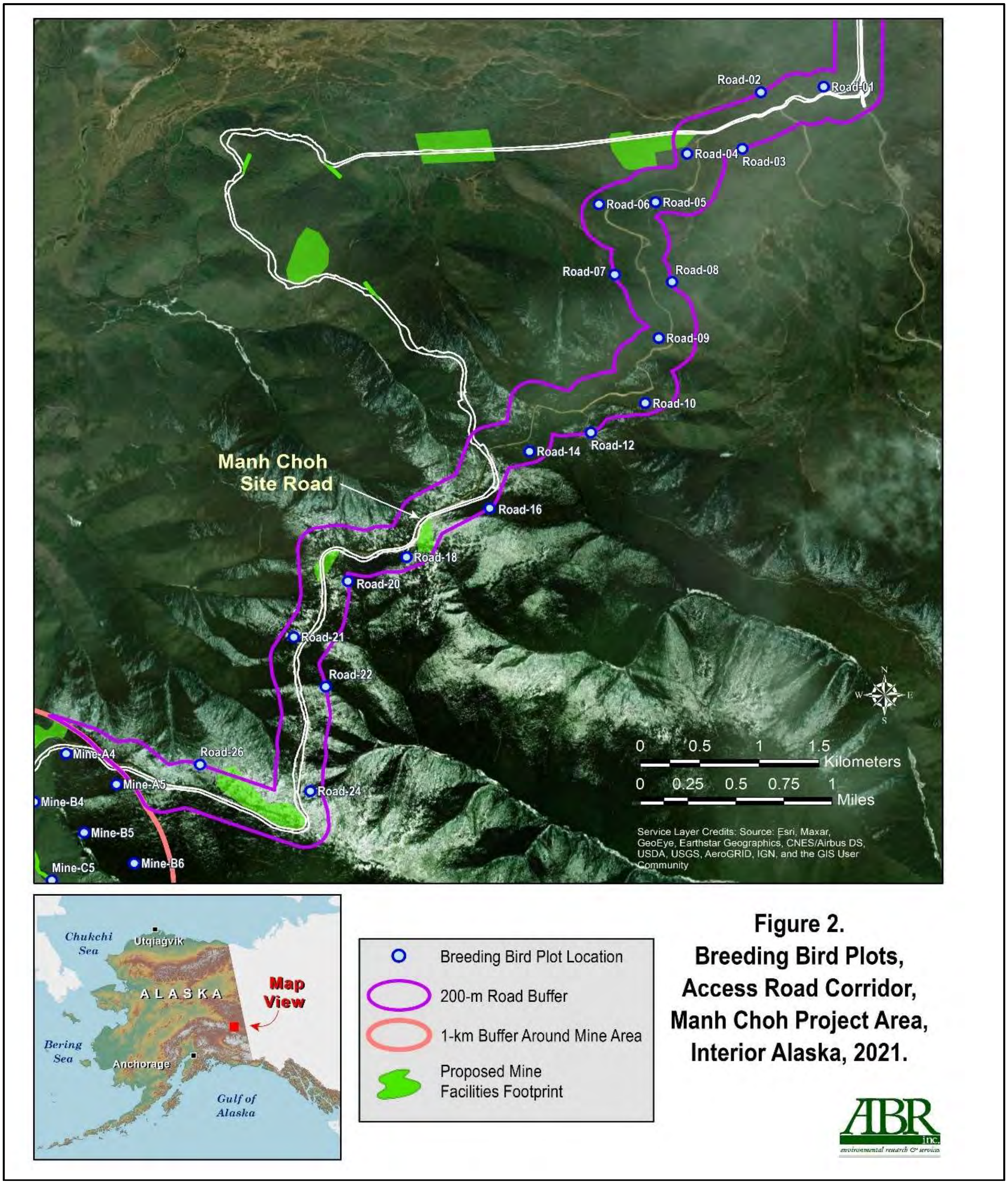


Figure 5. Breeding Bird Plots Access Road Corridor

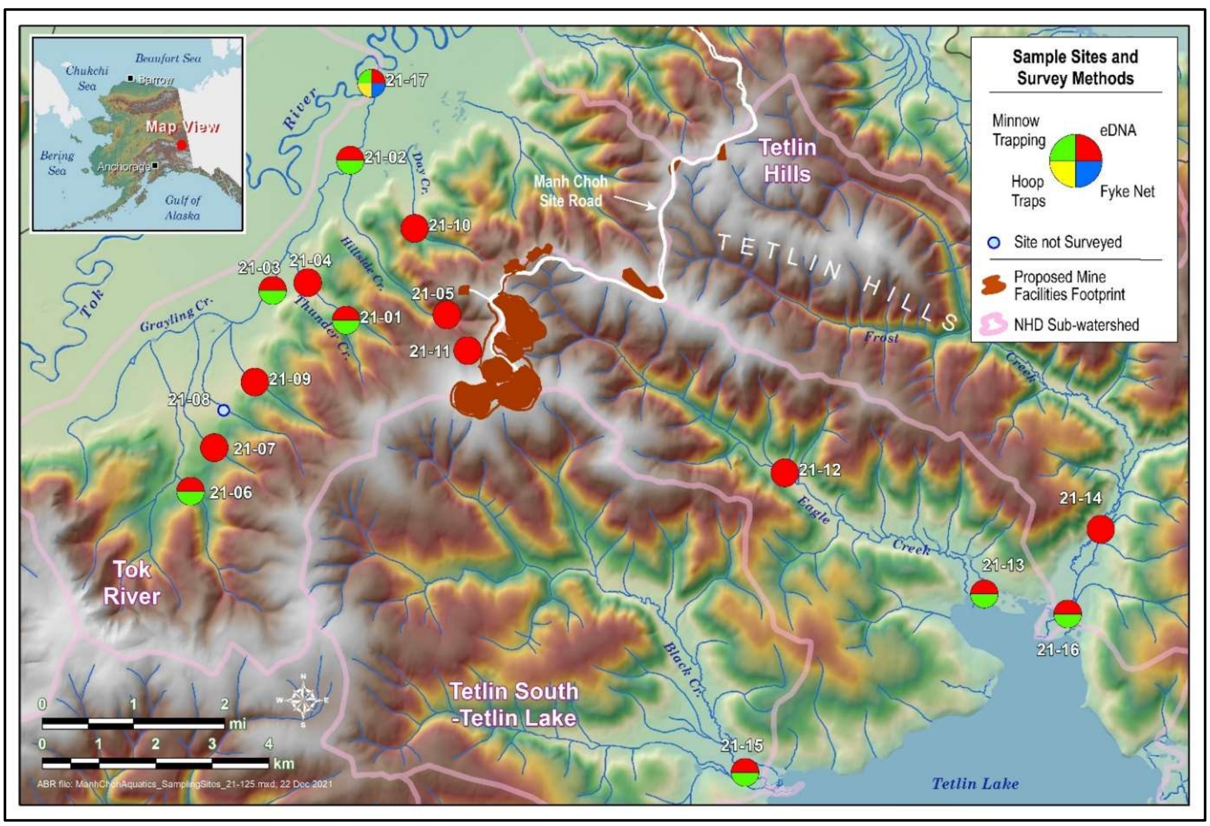


3.7 Manh Choh Fish Survey

A fish survey was conducted by ABR, Inc. (*Manh Choh Project Fish Surveys, December 2021)*. The *Manh Choh Project Fish Surveys, December 2021* was submitted separately.

ABR conducted fish surveys in the Project area (Figure 6) using a combination of eDNA and traditional fish trapping methods. Of the six species selected for eDNA analysis, four species were detected in two waterbodies. Trapping efforts yielded low returns of fish in 2021, possibly due to limited stream connectivity, lack of acceptable rearing and overwintering habitat, altered stream flow due to beaver activity, and predation by Northern Pike. Because surveys conducted across years are critical in assessing inter-annual variability of fish presence and distribution, the 2013 survey data were compared with the 2021 data. In the Project area's northward flowing streams, a variety of fish species such as Arctic Grayling, Coho Salmon, Slimy Sculpin, Lake Chub, and Longnose Sucker, have been detected using a combination of traditional trapping methods and newer eDNA techniques, though exclusively in Grayling Creek. In southward flowing streams, fish species such as Northern Pike, Humpback Whitefish, and Burbot, have been detected in low numbers in the lowest reaches of Black and Frost Creeks where they flow into Tetlin Lake. There was good agreement between fish eDNA detection and the results of traditional fish trapping results. The use of eDNA sampling in combination with traditional fish trapping methods is a useful tool to provide insights into fish presence and distribution.

Figure 6. Fish Study Sample Sites



3.8 Manh Choh Mammal Report

A terrestrial mammal occurrence study was conducted by ABR, Inc. (*Manh Choh Project Terrestrial Mammal Report, December 2021)*. The *Manh Choh Project Terrestrial Mammal Report, December 2021* was submitted separately.

Existing information on the occurrence of terrestrial mammals in the Project area was compiled to assess the presence and habitat use of mammals in the region of the Project and surrounding terrain in the Tetlin Hills in Interior Alaska.

The small mammal species (shrews, voles, lemmings, mice, weasels, porcupine, squirrels, pika, and hare) that may occur in the Project Area include two species of lemmings, six species of voles, and six species of shrews, as well as larger species such as porcupine, red squirrels, pika, and snowshoe hares. No specific information is not available on small mammal density or distribution in the Project area.

Both brown and black bears may occur in the Project area. Brown bears are typically referred to as grizzly bears in Interior Alaska and as brown bears in coastal parts of the state. No grizzly bear density studies are available for Game Management Unit (GMU) 12, but based on studies in similar and adjacent areas, the grizzly bear density is thought to be approximately 47 bears/1000 mi² (18 bears/1000 km² Wells 2015). Grizzly bears are found in a wide range of habitats and may use different areas with different food resources including sedges, berries, moose calves, and salmon, at different times of the year based on their availability (Fortin et al. 2007). The most recent wolf population estimate for GMU 12 is from 2008 when it was estimated to be 179–192 wolves (18.1–19.4 wolves/1,000 mi², 7–7.5 wolves/1,000 km²) in 31 packs (Bentzen 2012).

All of the adjacent GMU 20E and the portion of GMU 12 north of the Alaska Highway (not including the Project Area) are in the Upper Yukon–Tanana Predation Control area where the wolf population is actively being reduced to increase the density of moose and the population of the Fortymile Caribou Herd (Gross 2021).

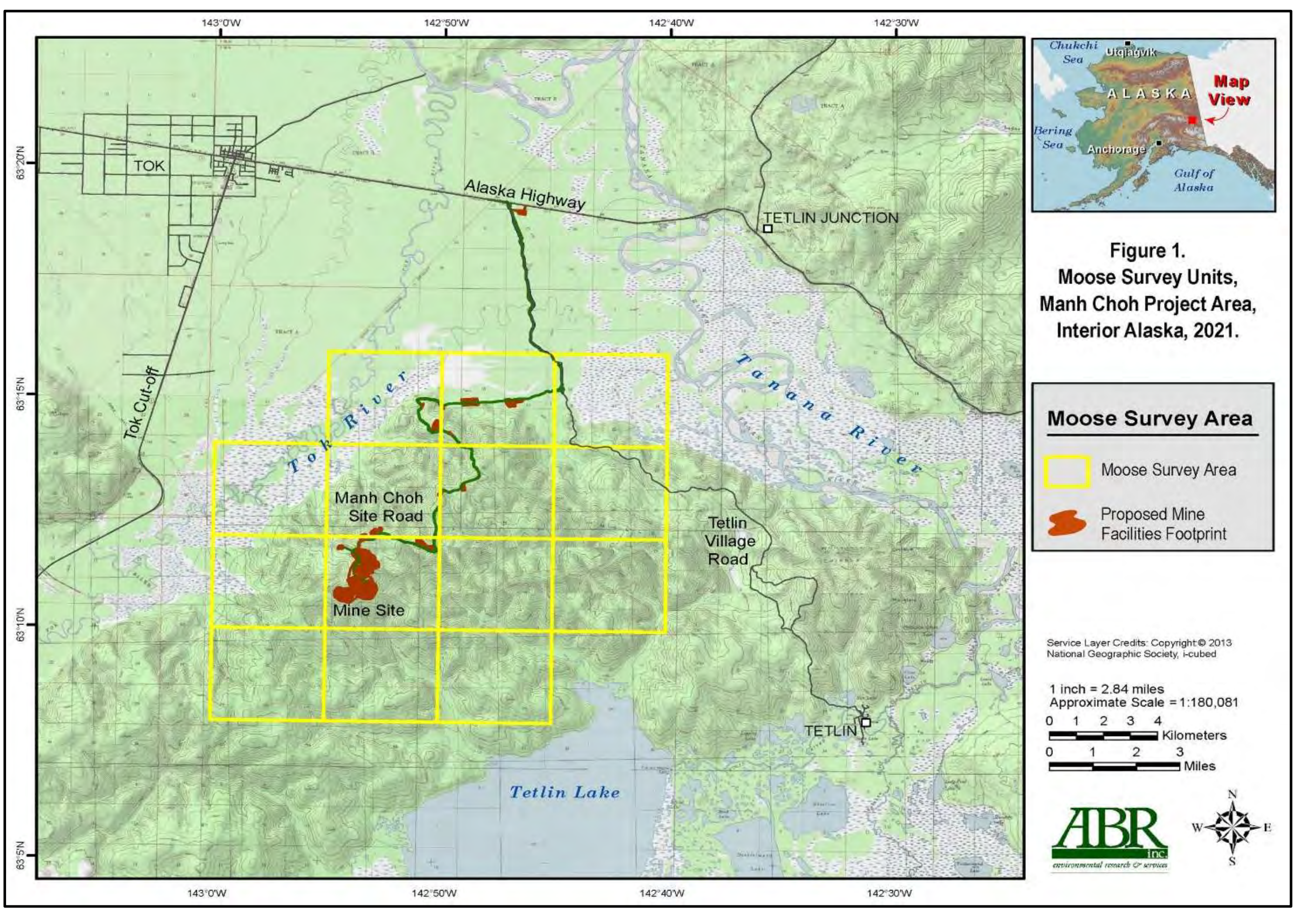
Five caribou herds occur in the general area around Tok, Alaska, based on the herd ranges, the Project Area is most likely to be used by caribou of the Nelchina Caribou Herd (NCH) or the Mentasta Caribou Herd (MECH). The MECH was estimated at 3,160 animals in 1987, but it has declined to be between 260 and 512 animals since 2005. The population is thought to be limited by low recruitment due to high calf predation (Jenkins and Barten 2005, Hatcher 2020). The MECH typically calves and spends the summer along the northern and western slopes of the Wrangell Mountains (Hatcher 2020). Maternal females of the Mentasta Herd will often calve in high elevation sites with limited forage where the predation risk is lower (Barten et al. 2001). The herd range extends across the Project Area and to the west and east of the Project Area including the western Yukon Territory (Hatcher 2020).

Moose are widespread and abundant throughout Interior Alaska and use most forested and shrub habitats, at least seasonally. Moose densities in GMU 12 are estimated periodically by ADF&G using

Geospatial Population Estimation (GSPE) surveys. During these surveys, the area is divided into a series of sample units (Figure 7), all sample units are designated as high density or low density based on prior knowledge or stratification flights, and a subset of sample units is surveyed using a small fixed-wing aircraft (Kellie and Delong 2006). The results are used to fit a spatial model of moose density. This survey and analysis method makes it possible to estimate the moose density for any subset of sample units. GSPE moose surveys were conducted in northwestern GMU 12, an area including the Project Area, by ADF&G six times between 2003 and 2017.

Moose density in GMU 12 has fluctuated over the last 70 years. It was high during the 1950s through the mid-1960s, declined rapidly during the mid-1960s through mid-1970s, and increased in during the 1980s and 1990s (Wells 2014, 2018b). Moose densities in the northwestern survey area of GMU 12 have ranged from 0.75–1.47 moose/mi² (0.29–0.57 moose/km²) between 2003 and 2017. Estimated moose densities in the smaller 84 mi² (218 km²) area encompassing the Project Area (Figure 1) were consistently higher than average for the larger survey area during all 6 surveys and ranged from 1.27–2.02 moose/mi² (0.49–0.78 moose/km²). There was a significant increase in estimated moose numbers of 4.0 moose/year (SE=1.23; $p = 0.032$) in the area encompassing the Project Area between 2003 and 2017.

Figure 7. Moose Survey Units



3.9 Manh Choh Geochemical Characterization Report

A geochemical baseline analysis was conducted by SRK Consulting (U.S.), Inc. (*Manh Choh Project Geochemical Characterization Report Revision 1, November 2022)*. The *Manh Choh Project Geochemical Characterization Report Revision 1, November 2022 was submitted separately.* The aims of the geochemical characterization study are to define waste segregation criteria to inform mine planning, predict contact water chemistry (referred to as "source terms") for input into water quality assessments for the project and predict what influence processing Manh Choh ore will have on the Fort Knox tailings and associated water chemistry.

Source terms were developed in consultation with Piteau who are responsible for the site-wide water quality model. The sources are:

- Runoff from waste rock dump surfaces during snowmelt
- Runoff from waste rock dump surfaces during summer rainstorms
- Waste rock dump porewaters
- Pit backfill pore waters
- Pit wall runoff
- Infrastructure fill pore waters.

The source term concentrations should be viewed as "screening level" to evaluate Project water quality effects against water quality standards. The results are not geochemical predictions (i.e., they are not ion balanced).

The characterization study used conventional procedures including acid-base accounting, trace element analysis, mineralogy, leach tests, and humidity cell tests. Some testwork is currently ongoing and this work is highly iterative with modifications expected to optimize the waste management approach and source term development. Onsite kinetic barrel tests were established in July 2022 on eight composite samples to assess the effects of site conditions and scale on mine waste leaching behavior. Leachate sampling and analyses will be undertaken monthly when there is sufficient leachate available for collection.

Gold-sulfide mineralization is preferentially hosted in calcareous schist units which are interbedded with the quartz muscovite ± biotite schist unit (QMS) altered to amphibole – chlorite skarn. Calcite, dolomite, and minor siderite have been documented in Peak Zone and carbonates, in general, was noted to range from 2% to 25%. Sulfides are reported as predominantly comprised of pyrrhotite with lesser pyrite, chalcopyrite, sphalerite, arsenopyrite, bornite and trace covellite. Total sulfide abundance was estimated to range from 15% to 70%, depending on the degree of mineralization. Natural oxidation has occurred due to weathering processes and has been preserved as a result of the lack of regional glaciation in this part of Alaska. A significant portion of the North Pit area is oxidized to depths in excess of 164 ft below surface.

Analysis of 96 waste rock samples showed that 83% of all oxide materials are classified as PAG and there is a potential for rapid onset of acidification of PAG in 35% of the QMS oxides and 68% of the skarn oxides. The transition and sulfide materials are not likely to generate rapid onset PAG but there is still potential for acid generation in the longer term; 44% of the QMS sulfides and 74% of the skarn sulfides are classified as PAG. All types of waste rock showed some degree of elevated arsenic relative to a reference value of 10 times average global abundance for shale; highest concentrations occur in the skarn oxides and sulfides. Other parameters which were elevated in at least some of the waste rock samples were: silver, cadmium, cobalt, copper, lead, selenium. Highest concentrations were typically reported in the skarns. Some of the oxide materials demonstrated acidic conditions in the initial stages of humidity cell testing. The leachates from the majority of sulfide materials were circum-neutral for 117 weeks but one of the QMS sulfides is trending towards acidic conditions. Arsenic was consistently mobilized in all humidity cells.

The geochemical characterization test work available to date was used to develop recommendations for block model parameters used to predict the domains for waste rock management. The Manh Choh geochemical waste rock classification system consists of four waste rock management domains for four domains for transition/sulfide and four oxide domain materials (Tables 4 and 5, respectively) according to acid generating and/or metal leaching potential. The material classifications inform mine planning waste segregation and development of the Mine waste rock management plan. Management of waste rock is detailed in the *Manh Choh Project Waste Rock Management Plan Revision 1, November 2022.* The *Manh Choh Project Waste Rock Management Plan Revision 1, November 2022* was submitted separately.

Table 4. Domains for Waste Rock Management – Oxide

<table>
<tr><th colspan="2">Domain</th><th>Criteria</th><th>Potential Refinement</th><th>Additional Geochemical Data</th></tr>
<tr><td rowspan="2">PAG</td><td>PAG</td><td>NP*/AP* ≤2</td><td>Refine site specific NP/AP ratio</td><td>Mineralogy of HCTs, initiate additional HCTs</td></tr>
<tr><td>Rapid Onset PAG</td><td>NP*/AP* <0.03</td><td>Field observations of acidic leachate</td><td>On-site barrel testing</td></tr>
<tr><td rowspan="2">NAG</td><td>Metal Leaching NAG (ML-NAG)</td><td>NP*/AP*>2 and As/S ≥1 mol/mol</td><td rowspan="2">Mineralogy (microprobe and SEM) to determine mineralogical host of arsenic, additional HCTs to test range of ratios and arsenic content</td><td rowspan="2">Mineralogy of HCTs, initiate additional HCTs</td></tr>
<tr><td>NAG</td><td>NP*/AP*>2 and As/S <1 mol/mol</td></tr>
</table>

Table 5. Domains for Waste Rock Management – Sulfide and Transitional

Domain		Criteria	Potential Refinement	Additional Geochemical Data
PAG	PAG	NP*/AP* ≤2 and S≥0.1%	Refine site specific NP/AP ratio	Mineralogy of HCTs, initiate additional HCTs
	Rapid Onset PAG	NP*/AP* <0.03 and S≥0.1%	Field observations of acidic leachate	On-site barrel testing
NAG	Metal Leaching NAG (ML-NAG)	NP*/AP*>2 or S<0.1%, and As/S≥0.1 mol/mol	Mineralogy (microprobe and SEM) to determine mineralogical host of arsenic, additional HCTs to test range of ratios and arsenic content	Mineralogy of HCTs, initiate additional HCTs
	NAG	NP*/AP*>2 or S<0.1%, and As/S<0.1 mol/mol		

Site specific neutralization potential / acid generating potential (NP*/AP*) ratios were developed for oxide and sulfide materials and identified in the above tables. Unlike ARD potential classification with a narrow well-defined “hard line” between lower pHs (usually accelerated ML) and high pH (slower ML) indicated by NP*/AP*, classification of ML potential for NAG waste rock in continuum from low to high ML. Oxide materials may generate acidity at low sulfur content and should therefore be classified using NP*/AP* only but sulfide and transition waste should be classified on NP*/AP* and sulfide content because at low sulfur concentrations, oxidation of small concentrations of sulfide produces low amounts of acid that can be readily neutralized by silicate minerals in addition to carbonate.

Thresholds for high and low metal leaching were developed for oxide and sulfide materials based upon As/S molar ratios. Arsenic is identified as a parameter of concern and the expectation is that arsenic mobility will be different for sulfide and oxide materials due to a difference in mineralogical hosts. The molar ratios were developed using the relationship between As/S in solids and the rate of arsenic leaching indicated by humidity cell tests.

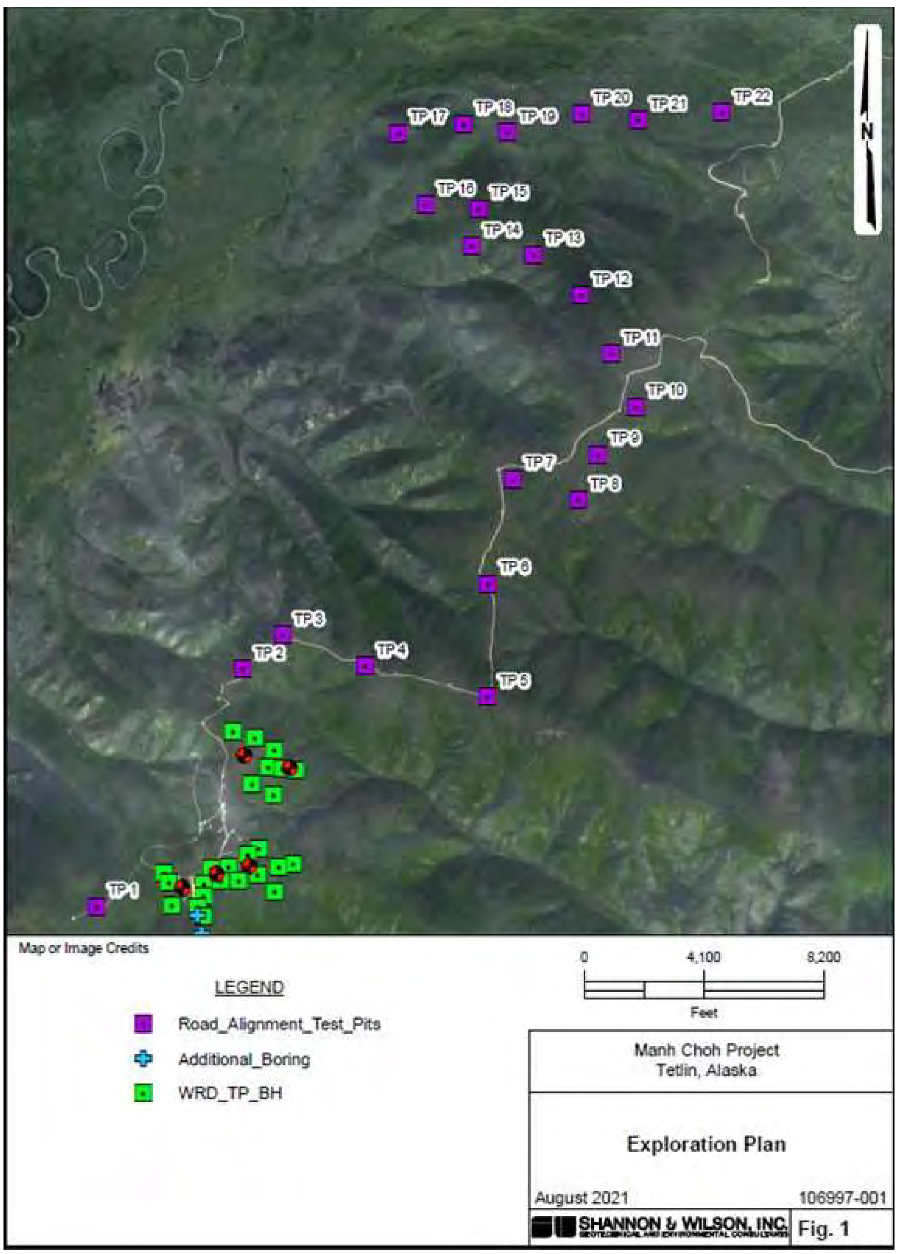
Mineralogy was undertaken on the humidity cell waste rock samples to determine the mineralogical controls on acid generation and metal/metalloid release. Attachment 9 provides a summary of the results.

Attachment 10 provides a statistic summary of the acid based accounting (ABA) results.

A number of input values were used; specific values were provided by Piteau and Peak Gold and generic values were based on professional experience. Average rates from humidity cell tests were used to calculate a range of non-acidic weathering rates based on the assumption that wastes will be managed to prevent the onset of acidification, or that mining will result in locally acid generating materials becoming mixed. Selected analog concentrations are used for certain parameters and it is intended that these values will be replaced with site specific knowledge as leach tests and on-site kinetic tests are monitored.

Project construction materials were analyzed according to the same analysis suite as the waste rock samples including analysis of total carbon, total inorganic carbon, total sulfur, and elemental analysis. The results of the construction materials was performed to determine acceptability of the materials for construction purposes. A number of test pits were excavated as part of the geotechnical investigations for the Project. Samples were collected from test pits in the region of the waste rock dumps, road alignment and borrow pit sources. SRK selected a subset of 24 samples for initial static geochemical tests. The sample selection focused on the area of the road alignment and borrow pit sources because the waste rock dump areas will be covered. The samples were selected with the aim of maintaining good spatial representivity across the different test pits and ensuring that all material types were represented. Figure 8 provides the locations of the test pits.

Figure 8 Construction Materials Test Pit Locations



The Mine plan will produce a total of approximately 49.7 Mt of waste rock. The amount of each type of waste rock to be mined is summarized in Table 6. A summary of the Project's mining and reclamation schedule is presented in Attachment 11.

Table 6. Waste Rock Tonnage Estimate

Waste Rock Classification	**Tons**	**Percent of Total**
PAG	15,668,464	32%
Rapid Onset PAG	6,556,658	13%
Metal Leaching NAG	4,166,036	8%
NAG	22,328,281	45%
Overburden	989,588	2%

3.10 Manh Choh Hydrogeological Characterization and Groundwater Modeling Report

A hydrogeological characterization study was conducted by Piteau Associates USA Ltd. (*Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary Revision 1, November 2022*). *Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary Revision 1, November 2022 was submitted separately.* Groundwater flow at the site is extremely low because of the dry conditions and limited recharge area. Any groundwater flow that does occur is localized and will percolate mostly through fractures, faults, and related small-scale structures. The limited overburden thickness and low bedrock hydraulic conductivity further reduces recharge; most precipitation runs off the site.

Although there is no active permafrost at the site, zones of discontinuous relic bedrock permafrost do occur, and act to further interrupt the movement of groundwater. The small amount of recharge that does occur is related to spring snowmelt. This causes seasonal increases in piezometric levels of 5 to 30 ft. The relatively large seasonal fluctuation of groundwater levels is indicative of a low storage groundwater system.

Seasonal intermittent stream flow occurs in the catchment headwaters on both sides of the drainage divide. Perennial stream segments start downgradient of the Project area, at locations of year-round groundwater discharge which are delineated by ice buildup (aufeis) in winter.

Water quality in the headwater streams that drain the Project area is mostly good. Constituent concentrations downgradient of the site are generally low, but higher concentrations are reported in samples taken from the Tok River and Tetlin Lake. Baseline iron, arsenic and manganese concentrations in Tors Creek exceed Alaska Water Quality Standards due to the proximity of the mineralized orebody. Baseline sulfate, metals, and total dissolved solids (TDS) concentrations are consistently higher in groundwater than surface water, particularly in the vicinity of the orebody.

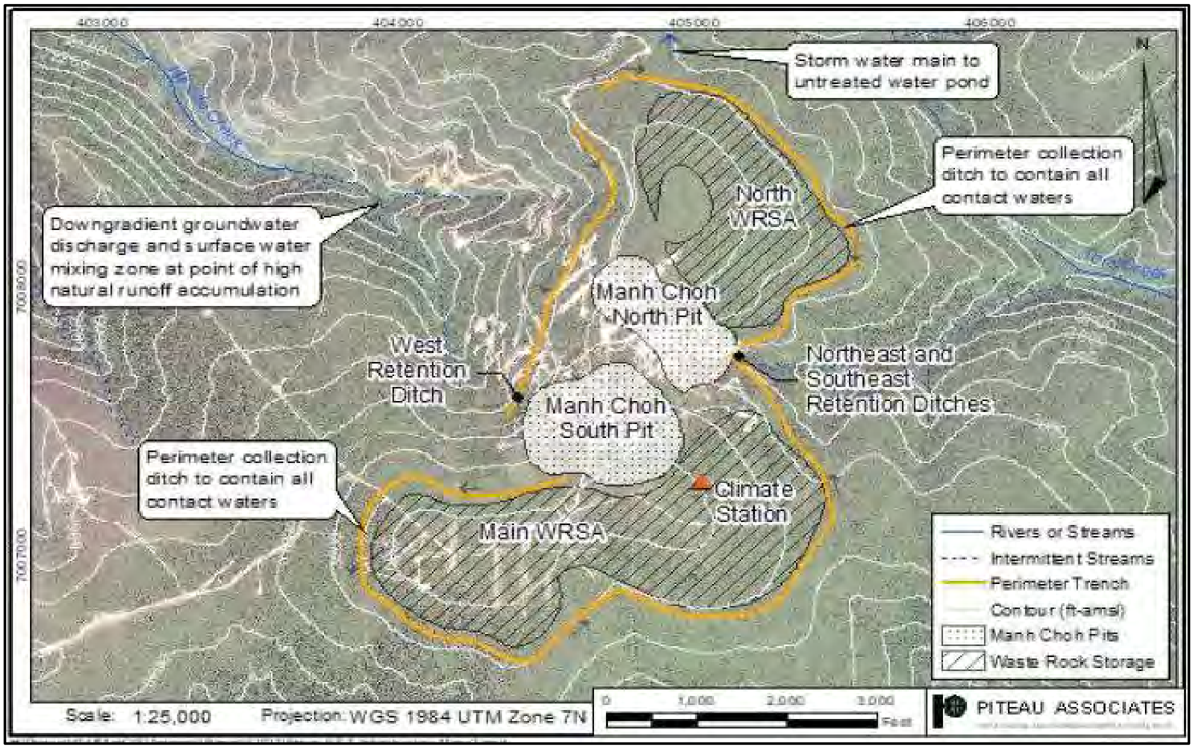
Downgradient of the Project, water quality of streams reflects the mixing of the mineralized groundwater discharge with runoff from the stream headwaters.

The Project orebody will be mined with two pits: the North Pit and the South Pit. Waste rock will be stored on surface to the north and east of the North Pit, and south and east of the South Pit. Most of the geochemically reactive waste rock will eventually be used as pit backfill. Mineral processing will occur off site.

The principal component of the water management system is a perimeter collection trench that encircles the site area and is designed to intercept all contact water within the active area (Figure 9). The perimeter collection ditch is designed to allow gravity flow to retention ditches located near the outlet of each pit (West Retention Ditch beside South Pit, Northeast and Southeast Retention Ditches beside North Pit). The collection ditches are designed to accommodate a 1 in 100-year, 24-hour runoff event. The retention ditches are designed to store a 1 in 10-year, 24-hour runoff event. The retention ditches will allow temporary storage of water either for use in operations (primarily dust control on roads), or treatment.

Groundwater inflow is expected to be low about 2 gallons per minute (gpm) for the North Pit and about 6 gpm for the South Pit once mining advances below the water table, and all in-pit groundwater and surface water will be managed using sumps. The sumps will be maintained in the base of the pits during excavation and will be designed to collect all pit-wall runoff and groundwater seepage. The pit water from the sumps will be pumped to the retention ditches or used as Mine site dust suppression. Month-by-month management of water has been assessed using a site-wide Goldsim water balance model which indicates that water will accumulate during and after the period of spring snowmelt and potentially for shorter periods following rainfall events in the summer and fall.

Figure 9. Water Management Infrastructure

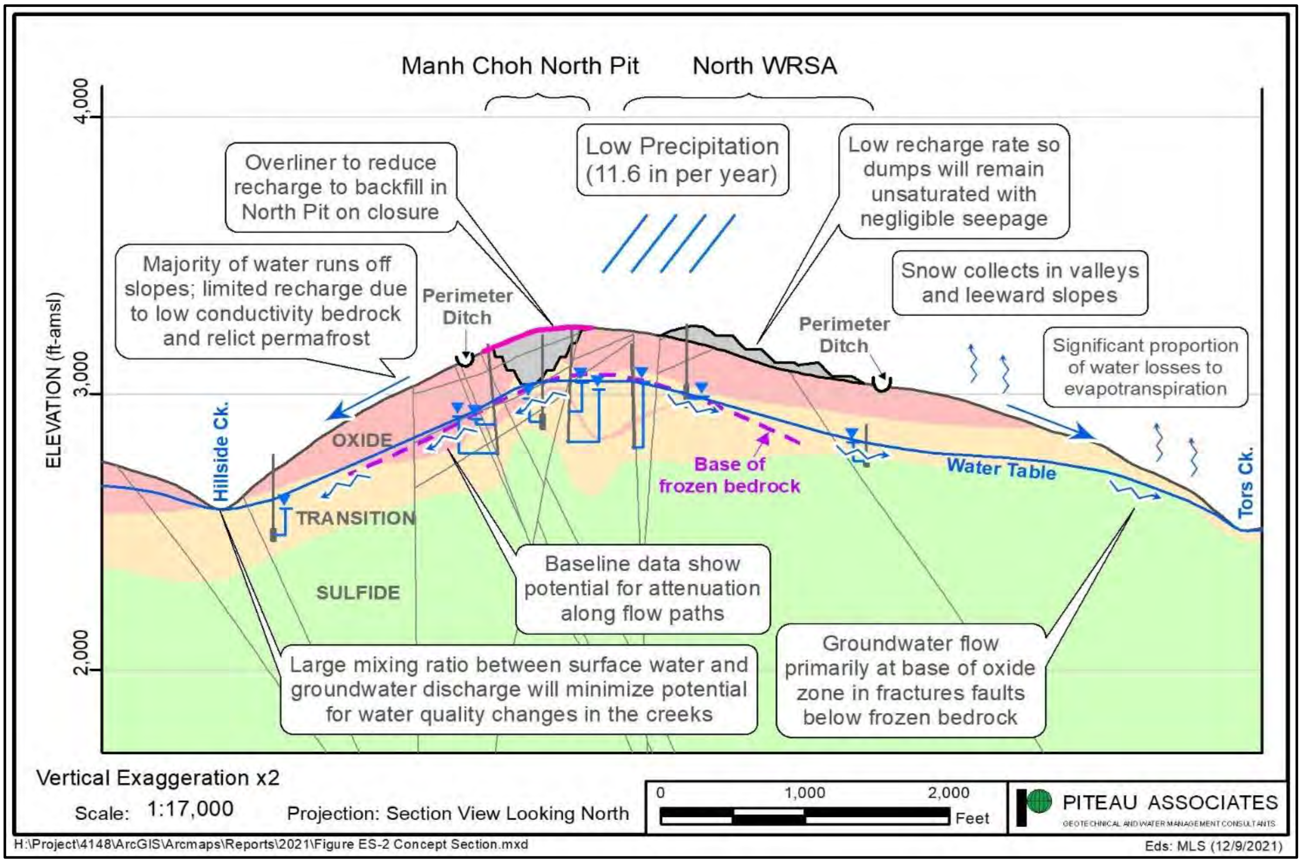


Infiltration testing in shallow test pits around the Project has indicated that the shallow soils have low permeability and will form a good foundation for perimeter trenching to capture and convey water around site. The underlying weathered bedrock is seen to be permeable and would readily accept water from infiltration basins excavated to a deeper level, after removal of the fine-grained soil cover.

Accumulating water in the retention ditches will be used for dust suppression. Excess water will be infiltrated in designated rapid infiltration basins below the pits or may be treated by reverse osmosis (RO), depending on the quality. Water quality during the high flow periods is predicted to be good, particularly during the spring when a high proportion of the runoff will occur over frozen ground with limited contact. Sizing of the perimeter ditch and management of the contact water has used conservative assumptions to handle extreme precipitation events.

The low rates of groundwater inflow to the pits, low bedrock hydraulic conductivity and deep water table mean that drawdown is expected to be limited to the local areas of the pit walls. The conceptual groundwater model is presented in Figure 10.

Figure 10. Hydrogeology Model Cross Section of Manh Choh North Pit and North Waste Rock Storage Area (WRSA)



The perimeter collection trench constructed for operations will be retained during early closure. It will be progressively reclaimed as the waste rock is covered and the amount of contact water reduces. The natural pre-mining drainage pattern will be re-established with reclamation. Both pits will be backfilled with geochemically reactive waste rock to minimize mobilization of constituents and potential changes in downgradient water quality.

The goal for Mine closure is to keep potentially metal leaching waste rock in North Pit dry and to keep potentially acid generating waste rock in South Pit submerged. Backfill in North Pit will be placed above the predicted post-closure water table. The plan is to place an over-liner above the North Pit backfill such that post closure infiltration is negligible.

A groundwater and solute transport model has been constructed to help optimize the closure plan. The model predicts post-closure water elevations in North Pit can be maintained below about 2,940 ft above mean sea level (ft-amsl), so most of the backfill material will remain above the water table, and any downgradient seepage will be negligible.

A program of enhanced filling with water is planned for the South Pit to minimize the time the backfill remains unsaturated. Water for the enhanced filling program will be derived from the on-going water management infrastructure, supplemented by pumping from the existing water supply wells, as required. The model predicts that post-closure water levels in South Pit can be maintained above 2,965 ft-amsl, so the reclaimed backfill will remain submerged. Mass transport model simulations indicate that dissolved constituents that could percolate from the South Pit backfill will undergo downgradient mixing with other groundwater local to the pit. Concentrations of constituents such as arsenic will reduce along the groundwater flow paths due to sorption and other natural attenuation processes identified in baseline water quality data. The model indicates that virtually all parameters in the downgradient headwaters will be below the Alaska Water Quality Standards. Manganese could exceed its guideline value in the Hillside Creek headwaters after 180 years during dry months when creek flows are fed by minor groundwater discharge, but much of this is likely to be lost to evapotranspiration around the margins of the creek during the summer months. Since groundwater flows at the headwaters make up a very small proportion (2%) of annual stream flows, changes in water quality are likely to be undetectable in streams, except possibly in late summer when less runoff is available for mixing.

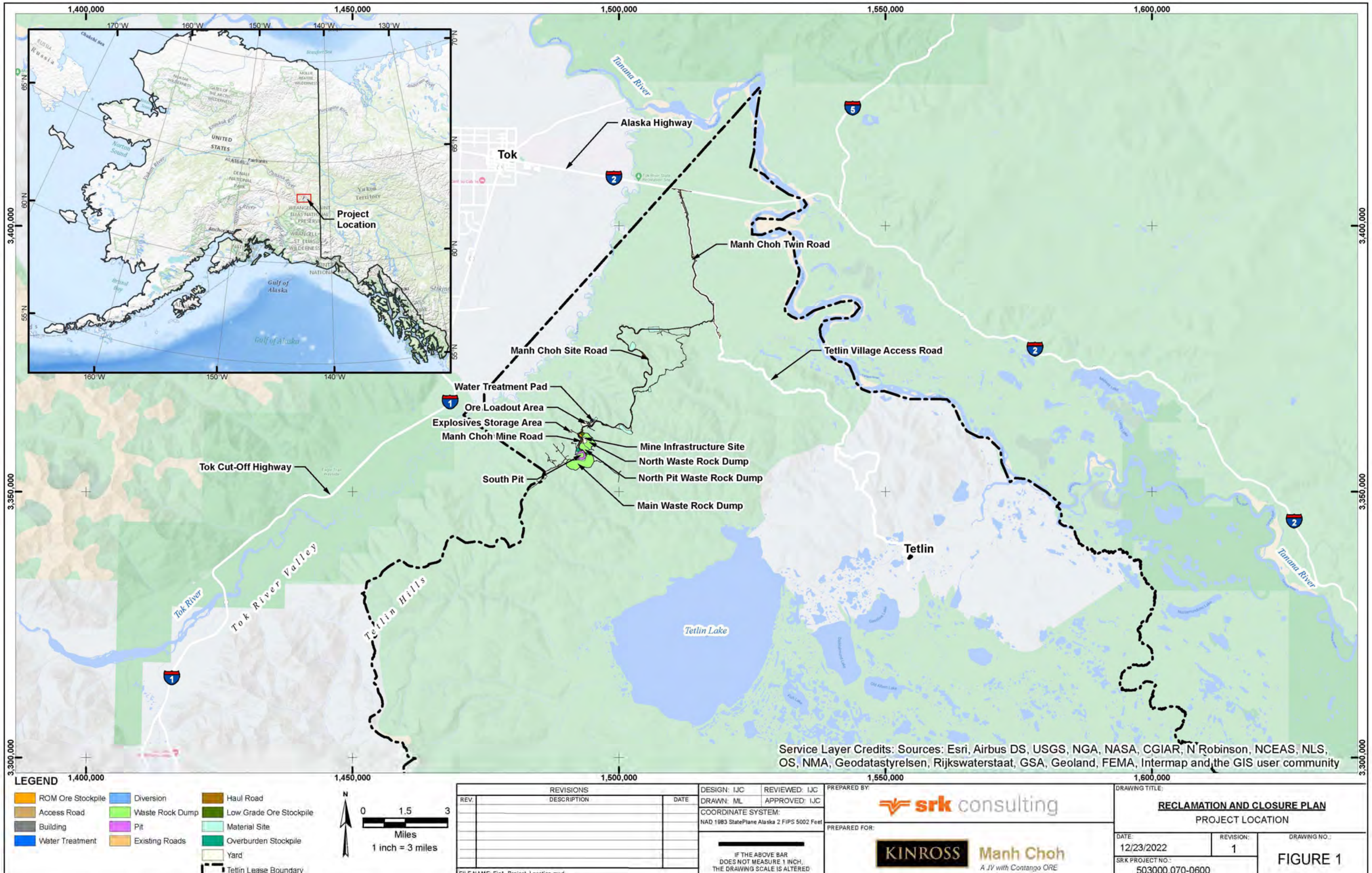
During Mine operations, bedrock groundwater levels will be monitored by an array of grouted-in vibrating wire piezometers and monitoring wells completed around the perimeter of the facility. Surface water monitoring will use the baseline stations, with roughly the same monitoring and sampling schedule. Monitoring objectives during operations are to assess: (i) downgradient water quality in the Project area streams, (ii) whether groundwater drawdown remains local, as predicted, (iii) pore pressures for slope stability monitoring, (iv) the overall performance of the water management plan, including any water that is infiltrated, and (v) continued refinement of the conceptual hydrology and water quality models.

Management of water at the Project is detailed in the *Manh Choh Project Water Management Plan Revision 1, November 2022.* The *Manh Choh Project Water Management Plan Revision 1, November 2022* was submitted separately. The Water Management Plan aims to minimize the potential for long-term effects from Mine operations and closure, based on cumulative effects study. The specific goals of the Water Management plan are to:

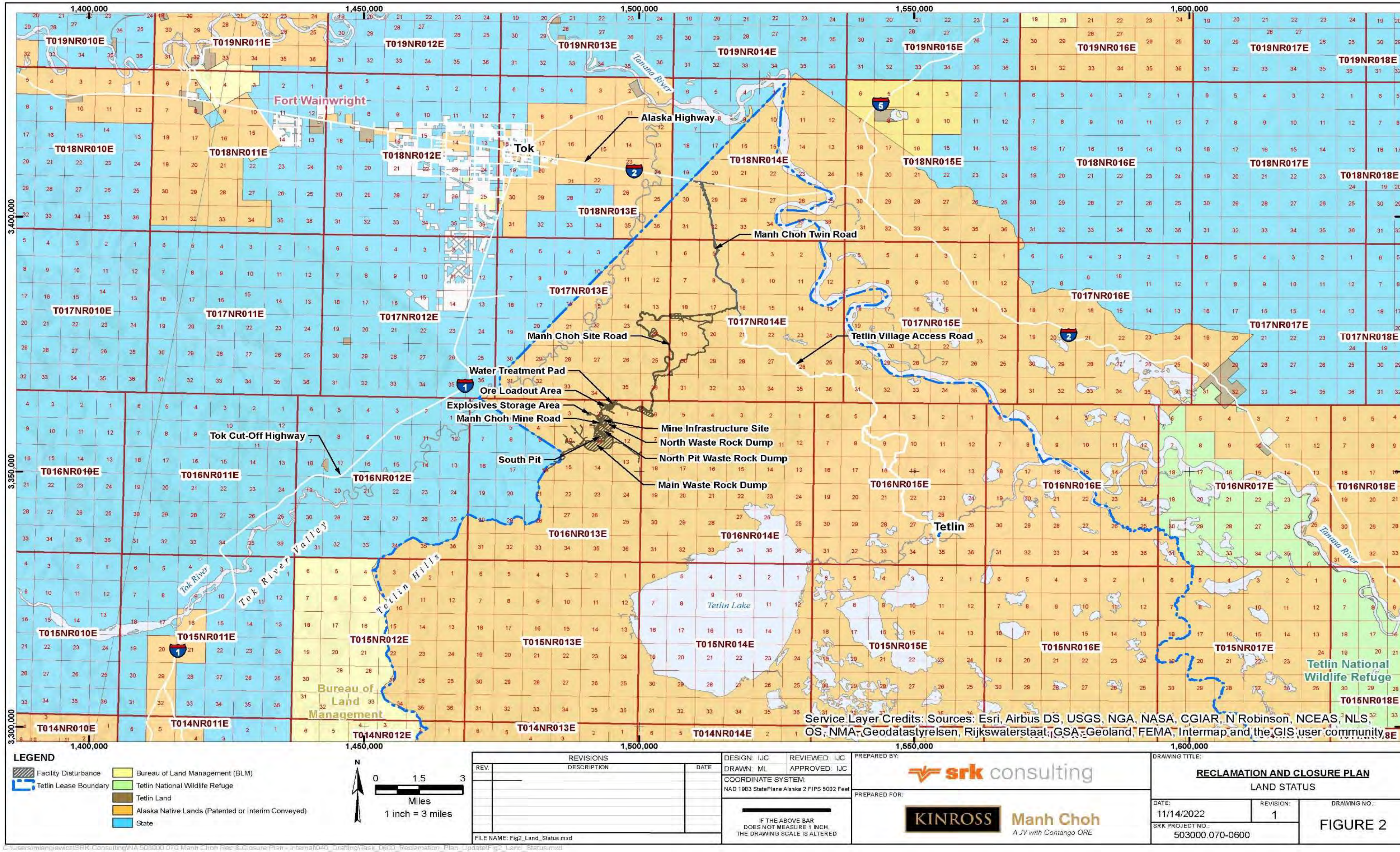
- Contain contact surface water during operations and into early closure;
- Retain water within its natural catchments wherever possible;
- Return the site to conditions consistent with its natural state after closure; and
- Minimizing the long-term exposure of waste rock to the local surface environment.

Attachment 12 presents the layout of the water management infrastructure.

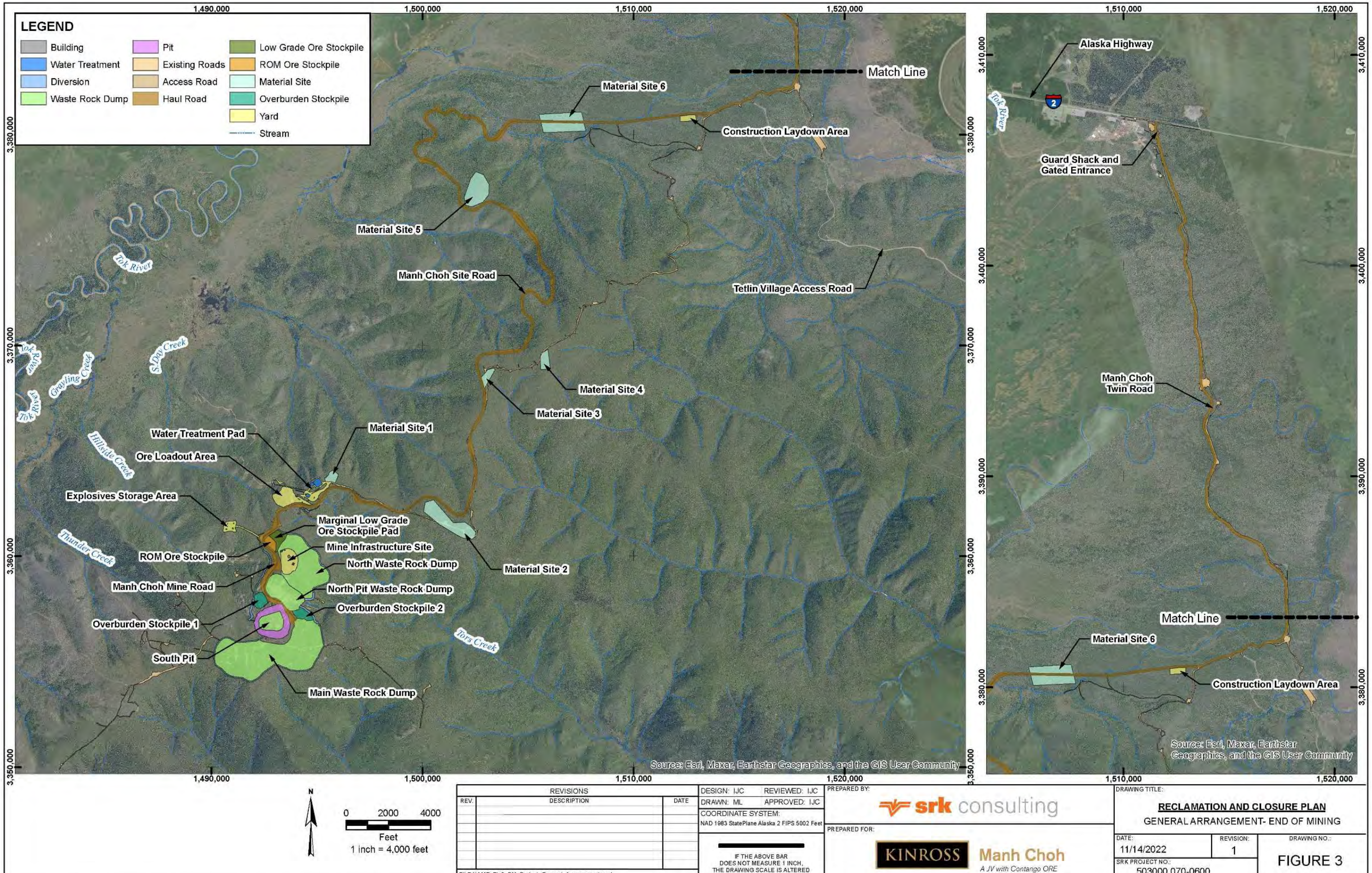
Attachment 1 – Project Location



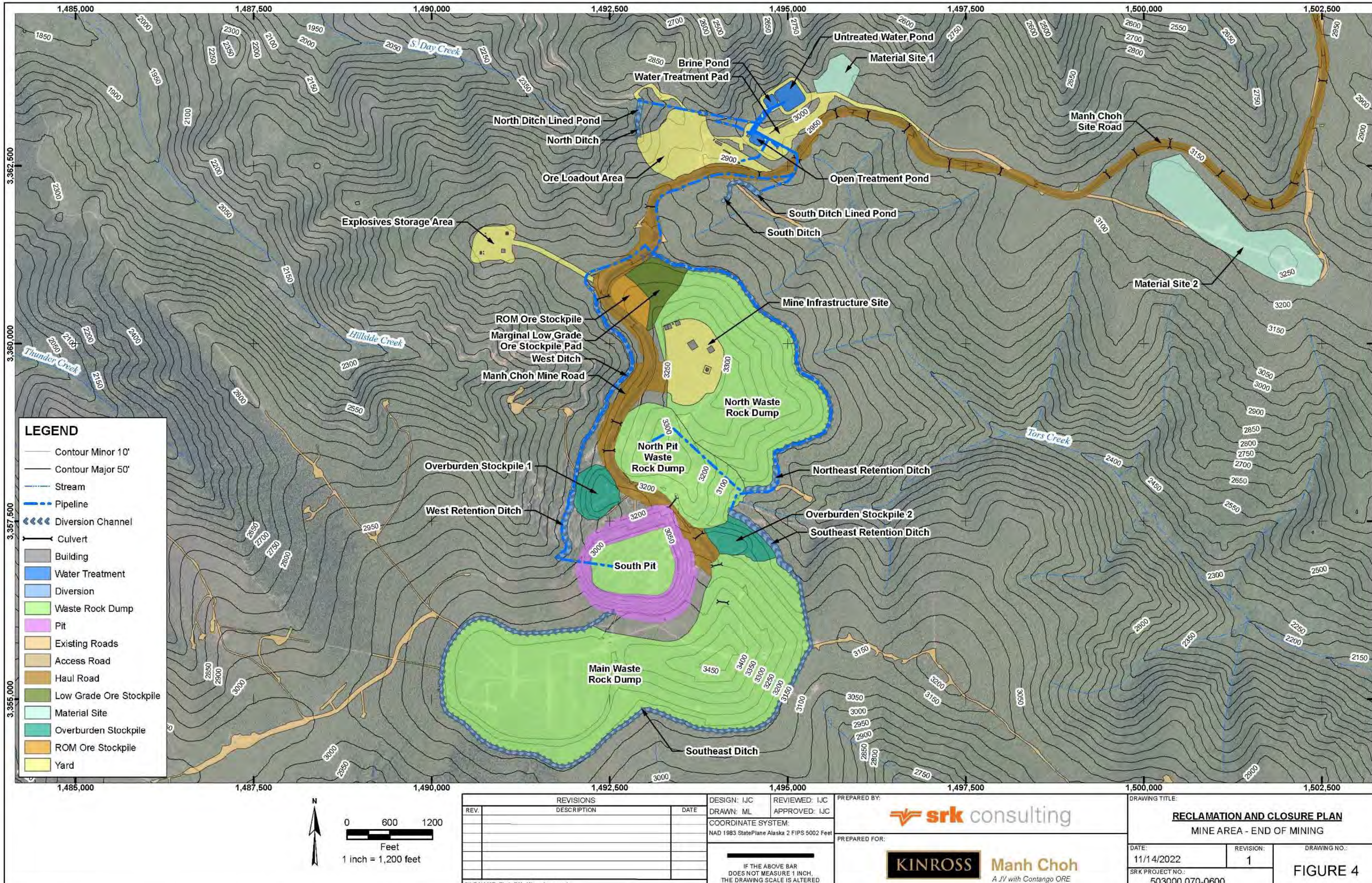
Attachment 2 – Project Land Status



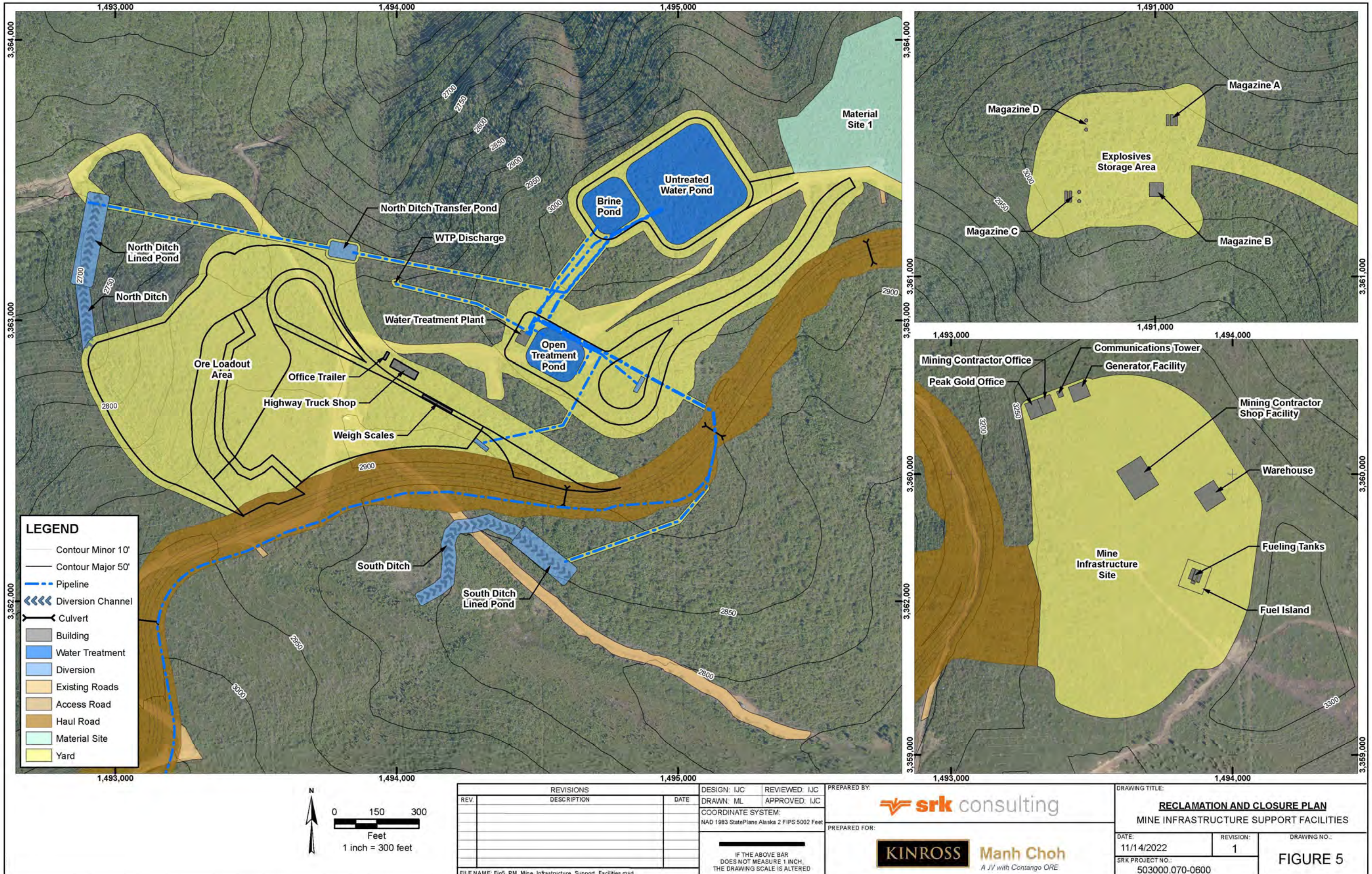
Attachment 3 – Project General Arrangement



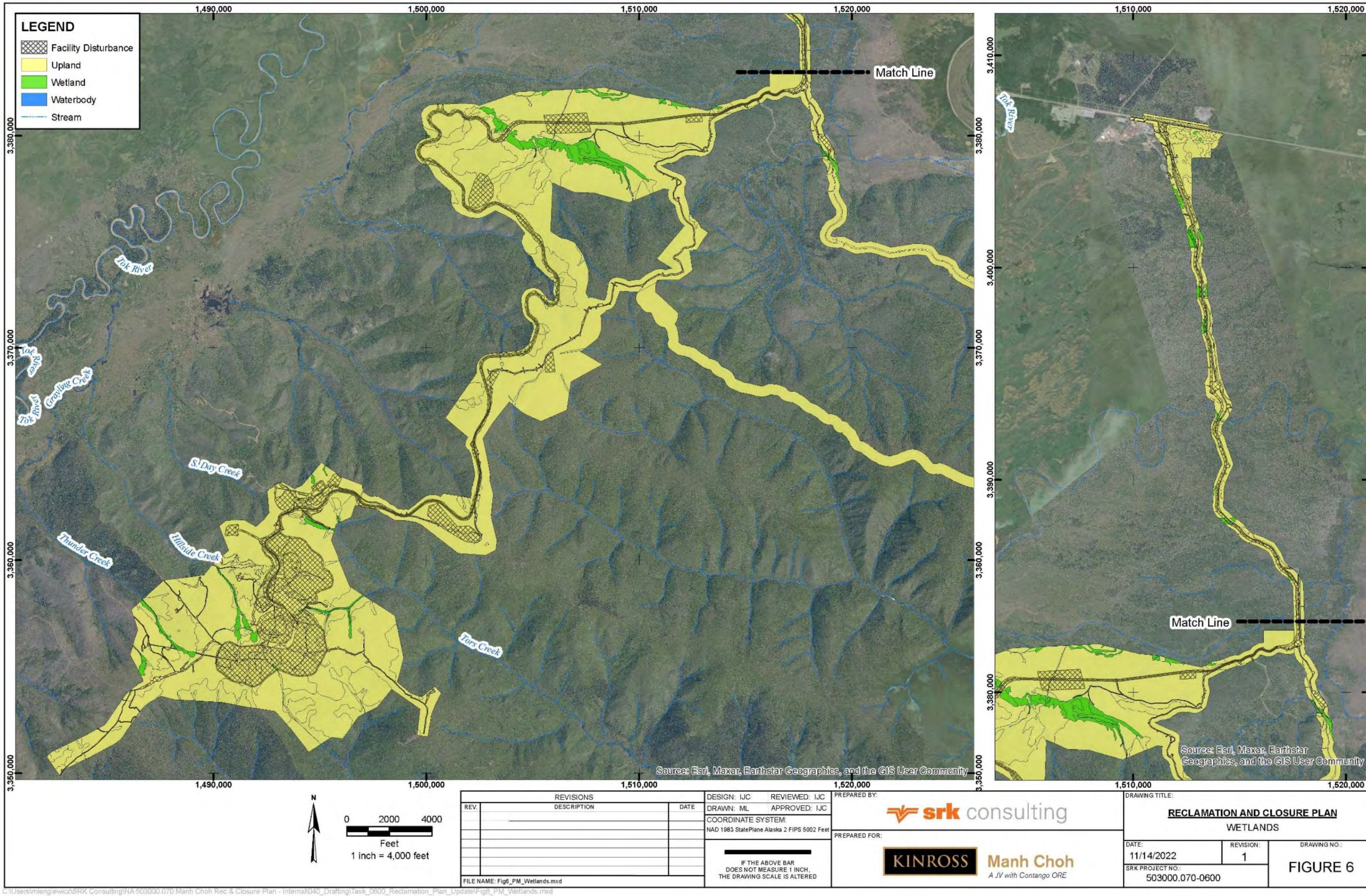
Attachment 4 – Mine Area



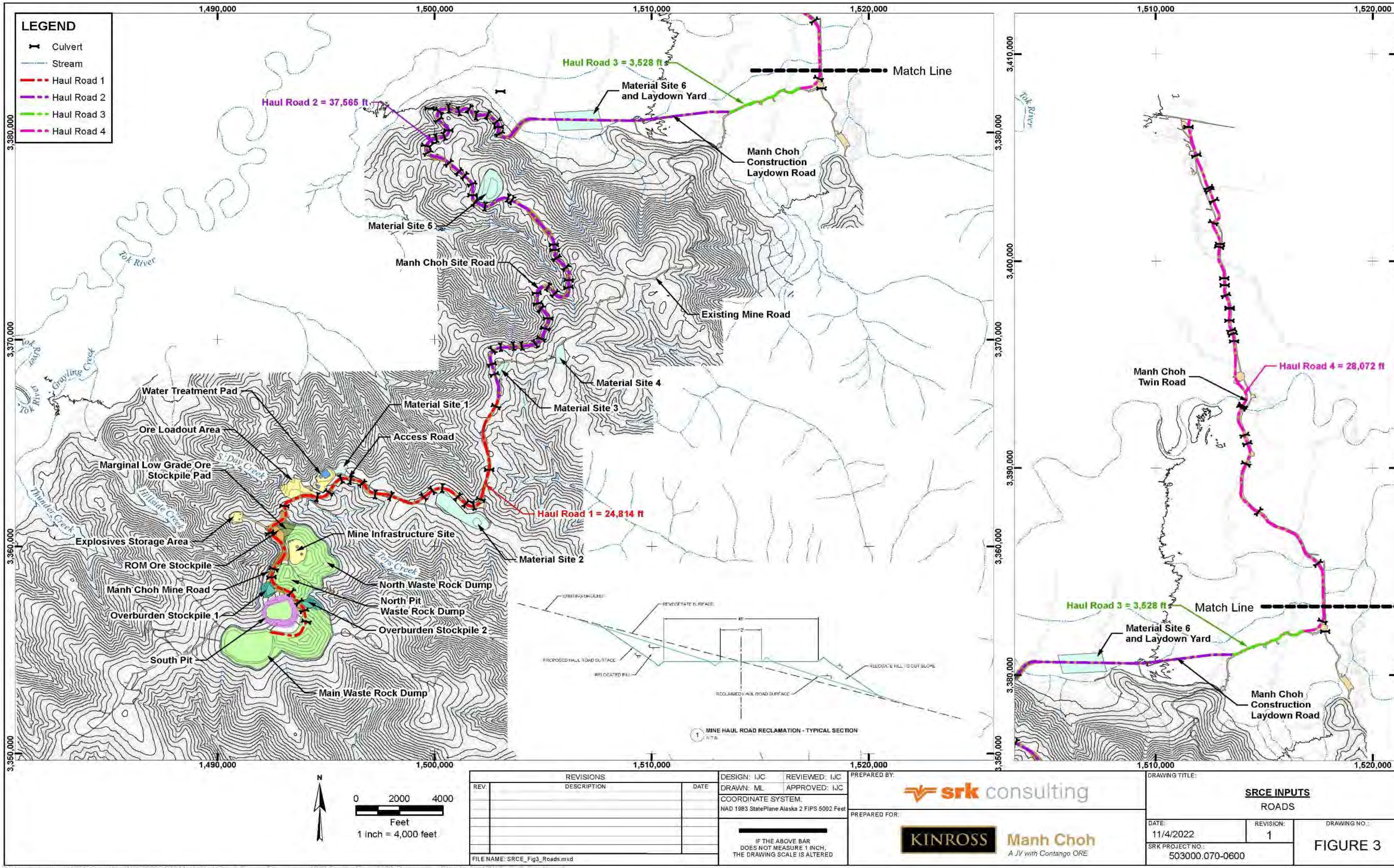
Attachment 5 – Mine Infrastructure Support Facilities



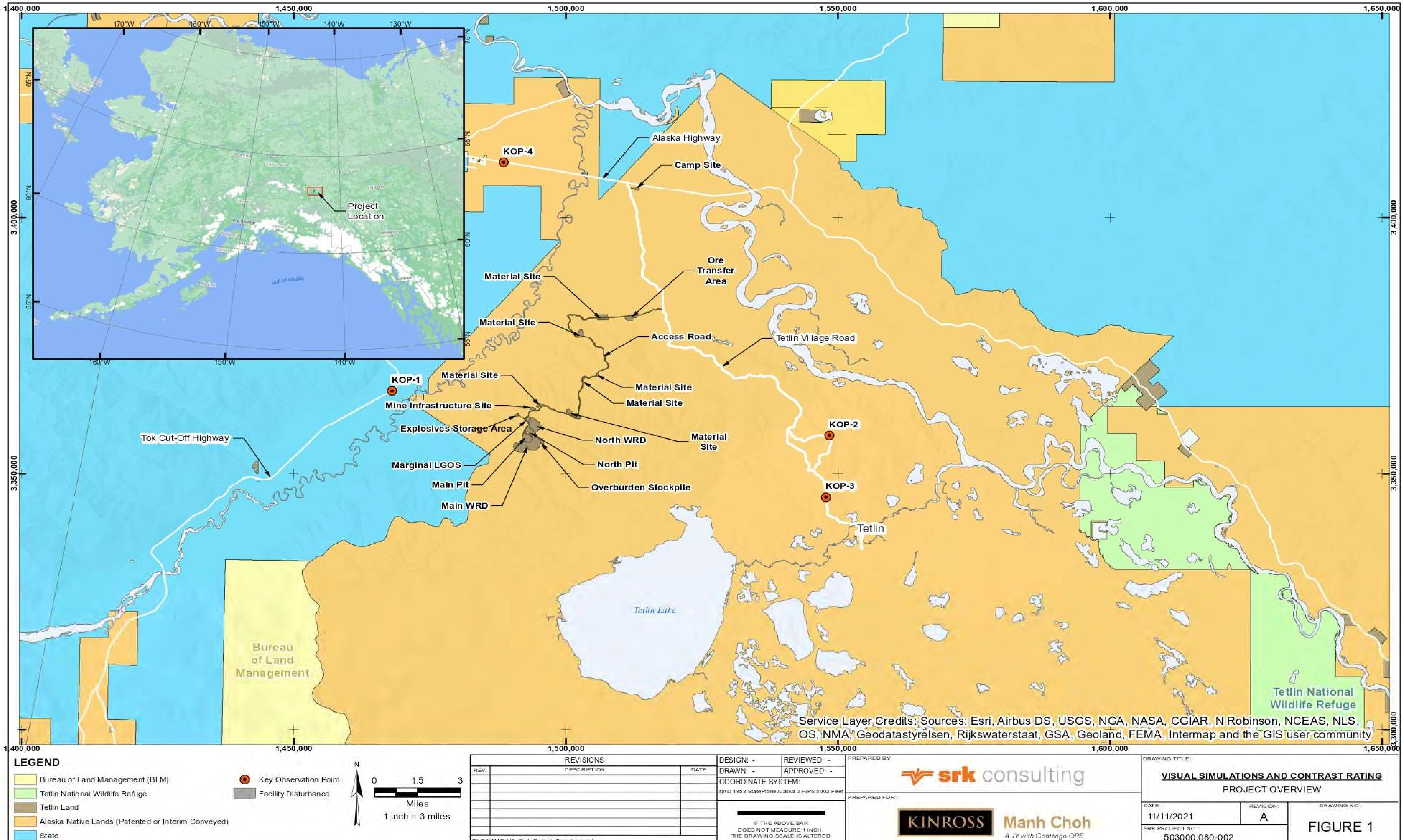
Attachment 6 – Project Wetlands



Attachment 7 – Project SRCE Inputs for Road Reclamation



Attachment 8 – Project Visualization Simulation



Attachment 9 – Summary of Mineralogy Results for Samples in Waste Rock Humidity Cells

Table 5-1: Summary of Mineralogy Results for Samples in Waste Rock Humidity Cells

Mineral Group	Minerals (wt. %)	HC-01	HC-02	HC-03	HC-04	HC-05	HC-06	HC-07	HC-08	HC-09	Manh Choh HC-1	Manh Choh HC-2	Manh Choh HC-3	Manh Choh HC-4	Manh Choh HC-5	Manh Choh HC-6	Manh Choh HC-7
		Skarn Sulfide North Pit	Skarn Sulfide South Pit	Skarn Sulfide South Pit	Skarn Sulfide South Pit	QMS Oxide South Pit	QMS Sulfide South Pit	QMS Sulfide South Pit	QMS Sulfide South Pit	QMS Oxide North Pit	Skarn Oxide North Pit	Skarn Oxide North Pit	Skarn Oxide South Pit	Calc-Schist Oxide North Pit	QMS Oxide South Pit	Calc-Schist Sulfide North Pit	Skarn Sulfide South Pit
		TA7642	PK19001	PK19002	TA7158	PK19004	PK19005	TA7638	TA7632	TA7154	ZS8665	ZS8666	ZS8667	ZS8668	ZS8669	ZS8670	ZS8671
Sulfide Minerals	Chalcopyrite	0.05	0.4	0.05	0.01	0.02	0.02	0.01	0.01	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.61
	Sphalerite/Galena	0.01	0.01	0.01	-	0.01	-	-	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Pyrite/Marcasite	1.2	2.6	0.7	0.2	0.8	0.2	0.2	0.09	2.0	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	1.18
	Pyrrhotite	0.3	0.41	1.0	0.1	0.3	-	0.2	0.05	0.6	<0.1	<0.1	<0.1	<0.1	0.27	0.03	14.01
	Arsenopyrite	0.05	-	-	-	-	-	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.38
	Total Sulfides	**1.6**	**3.4**	**1.7**	**0.4**	**1.1**	**0.2**	**0.5**	**0.2**	**2.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.2**	**16**
Bulk Silicate Minerals	Quartz	24	46	42	52	43	23	32	28	24	27	28	38	32	45	36	27
	K-Feldspars	18	18	15	3.2	8.5	38	8.8	2.9	23	27	7.0	19	25	8.4	6.9	24
	Plagioclase Feldspar	20	4.6	17	12	15	12	27	16	13	6.3	4.1	16	3.2	7.2	3.8	5.0
	Amphibole (Actinolite / Ferro-Actinolite)	3.3	1.1	3.0	1.3	3.4	4.7	2.7	0.2	5.4	0.8	1.7	2.4	0.2	0.3	0.4	2.7
	Pyroxene (Diopside)	0.2	0.3	0.2	0.3	0.3	0.6	0.4	0.1	0.5	-	-	-	-	-	-	-
	Epidote	-	-	-	-	-	-	-	-	-	0.5	0.5	1.0	0.0	0.1	0.1	2.6
Clay/Mica Minerals	Chlorite / Clinochlore / Chamosite	8.8	6.6	4.8	5.9	4.7	4.5	7.1	12	7.8	9.6	23	6.5	8.3	11	9.8	7.6
	Kaolinite' (clay)	0.6	0.9	0.1	0.3	0.2	0.3	0.2	0.6	0.1	3.6	0.6	2.4	4.3	0.6	0.7	0.2
	Muscovite/Illite	11	10	4.0	19	18	7.5	11	34	11	19	13	10	23	23	31	7.1
	Biotite/Phlogopite	2.2	0.3	0.4	1.9	2.2	2.7	1.9	1.6	1.6	3.1	2.6	2.0	1.1	1.1	0.9	1.7
Phosphate Minerals	Apatite	-	-	-	-	-	-	-	-	-	0.2	0.4	0.2	0.03	0.2	0.1	0.1
Carbonate Minerals	Calcite/Dolomite	1.2	4.8	1.6	1.0	0.4	2.7	2.6	-	3.7	0.03	0.02	-	0.01	0.01	6.6	2.6
Others	Iron Oxides	1.9	1.0	0.2	0.3	0.4	0.7	0.5	0.2	1.5	1.7	18	0.9	2.1	2.3	3.4	1.4
	Almandine	2.9	1.6	1.9	1.4	1.5	1.2	2.6	1.7	2.5	-	-	-	-	-	-	-
	Sphene/Titanite	1.4	0.7	7.4	0.8	1.1	1.5	1.5	0.9	1.7	1.0	0.3	1.0	0.3	0.8	0.2	1.1
	Others	1.4	0.6	0.5	0.3	0.6	0.5	0.5	0.5	1.2	0.1	0.5	0.2	0.1	0.1	0.3	1.0

Source: https://srk.sharepoint.com/sites/NA503000.040/Internal/050_Databases/[Tetlin_StaticDatabase_481900.030_ld_je_ab_rev10.xlsx]

Attachment 10 – Summary of ABA Results and Milti-Element Analysis of Key Parameters for Waste Rock

Table 5-2: Statistical Summary of ABA Results and Multi-Element Analysis of Key Parameters for Waste Rock

Material Type		No. of Samples	Paste pH	Sulfide Sulfur (%)	Sulfate Sulfur (%)	TIC (%)	AP* (kg $CaCO_3$/t)	NP* (kg $CaCO_3$/t)	NP*/AP*	Ag (ppb)	As (ppm)	Cd (ppm)	Co (ppm)	Cu (ppm)	Mn (ppm)	Pb (ppm)	Se (ppm)	Sb (ppm)	Zn (ppm)
10 x Average Crustal Abundance>>										700	130	3	190	450	8,500	200	6	15	950
Calc-Schist Oxide	TET16268	--	7.1	0.11	0.03	0.08	3.4	0.0	0.0	354	255	0.67	66	701	176	12.5	0.30	0.17	54
	TET17348	--	7.0	0.02	0.02	0.08	0.63	0.0	0.0	394	856	0.29	31	140	414	9.7	0.20	5.8	74
Calc-Schist Transition & Sulfide	P05	4	7.3	0.02	0.02	0.08	0.63	0.0	0.0	670	92	0.36	14	130	190	6.4	0.13	0.37	49
	P50		7.7	0.03	0.04	1.5	0.94	32	1.5	1,900	350	1.2	38	220	470	60	0.30	2.3	96
	P95		8.4	0.60	0.06	3.3	19	74	52	5,000	1,200	3.8	52	360	530	220	0.39	6.8	210
QMS Oxide	P05	17	6.2	0.02	0.01	0.04	0.63	0.0	0.0	71	11	0.09	10	28	150	3.0	0.10	0.1	35
	P50		7.9	0.02	0.01	0.08	0.63	1.1	0.5	210	35	0.20	20	87	250	5.0	0.30	0.45	48
	P95		8.7	0.23	0.05	0.46	7.1	10	17	1,000	310	2.6	77	370	770	22	1.0	2.3	220
QMS Transition & Sulfide	P05	32	6.6	0.02	0.01	0.05	0.63	0.0	0.0	82	6.2	0.10	11	24	140	2.6	0.10	0.10	29
	P50		8.1	0.16	0.02	0.20	4.8	4.5	0.7	180	31	0.20	18	70	270	5.3	0.20	0.25	47
	P95		9.3	1.2	0.08	1.9	36	43	12	1,400	330	2.1	41	320	420	12	1.2	1.0	230
Skarn Oxide	P05	22	5.0	0.02	0.01	0.02	0.63	0.0	0.0	160	15	0.06	9.9	55	78	3.2	0.10	0.2	33
	P50		7.2	0.02	0.05	0.08	0.63	0.0	0.0	1,500	330	0.42	28	230	250	15	0.55	2.0	53
	P95		8.4	0.70	0.32	2.7	22	62	4.7	12,000	4,200	3.1	220	1,200	1,100	700	2.1	12	370
Skarn Transition & Sulfide	P05	19	6.4	0.08	0.01	0.07	2.6	0.0	0.0	140	16	0.06	11	40	200	3.4	0.19	0.23	30
	P50		7.7	0.85	0.02	1.2	27	27	0.7	720	52	0.30	27	190	340	12	0.60	0.60	55
	P95		8.7	9.0	0.11	3.5	280	79	3.2	8,100	4,800	4.5	590	2,700	850	81	7.1	4.1	370

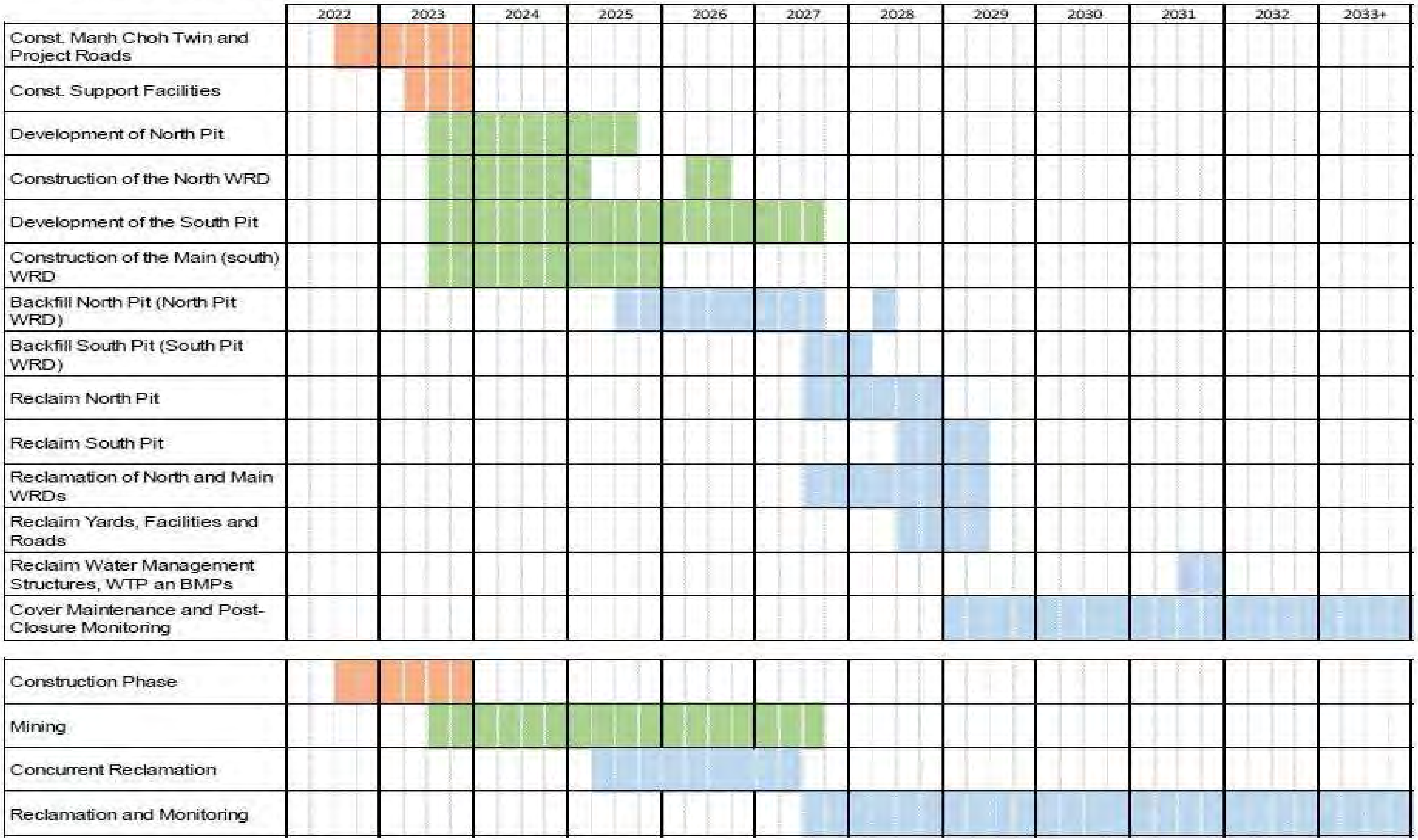
Source: https://srk.sharepoint.com/sites/NA503000.040/Internal/050_Databases/[Tetlin_StaticDatabase_481900.030_ld_je_ab_rev10.xlsx]

Notes: Results rounded to 2 significant figures
Gray shading indicated that the result exceeds 10 average crustal abundance for sedimentary shale rocks from Price (1997).

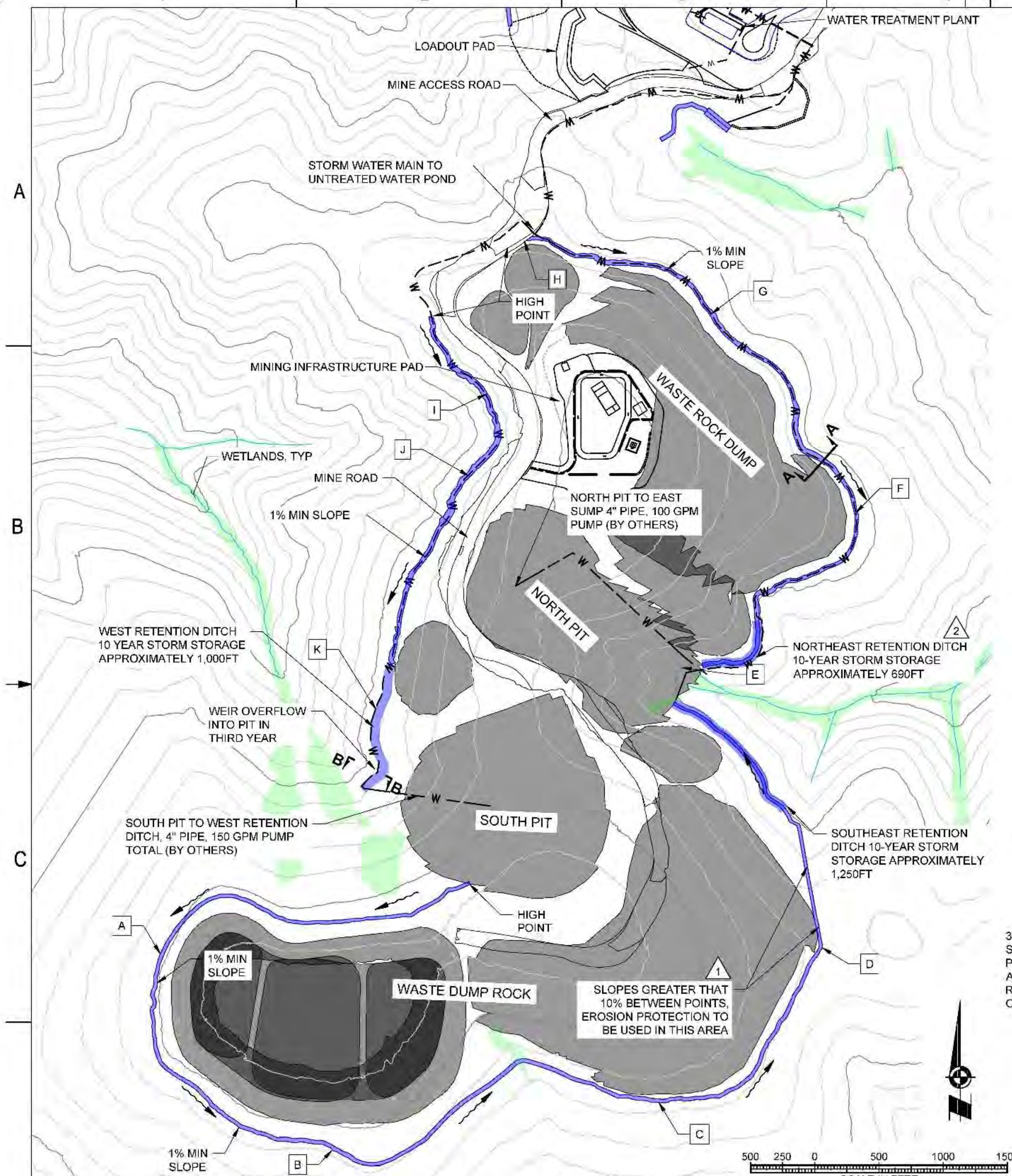
AP*: Site specific acid potential from sulfide calculated as the difference between total sulfur and sulfate sulfur
NP*: Site specific neutralization potential
TIC: Total Inorganic Carbon (reported as CO_2%)

Attachment 11 – Mining and Reclamation Schedule

Table 5.1: Reclamation Schedule

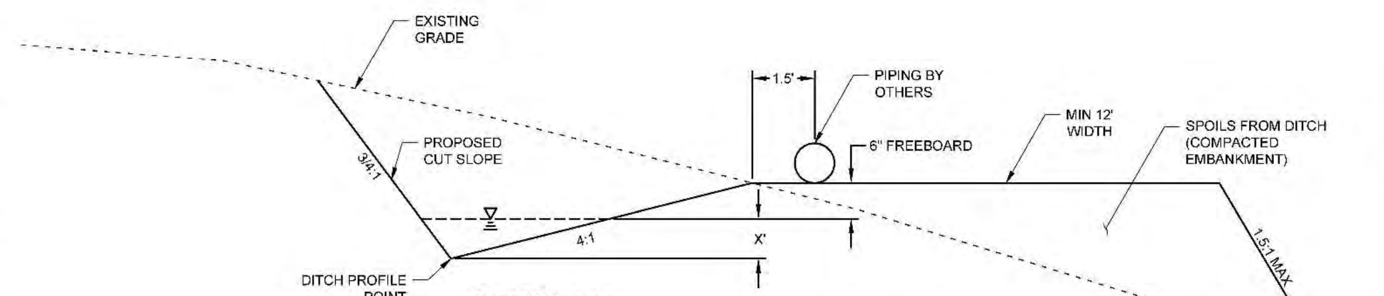


Attachment 12 – Facilities and Water Management Infrastructure



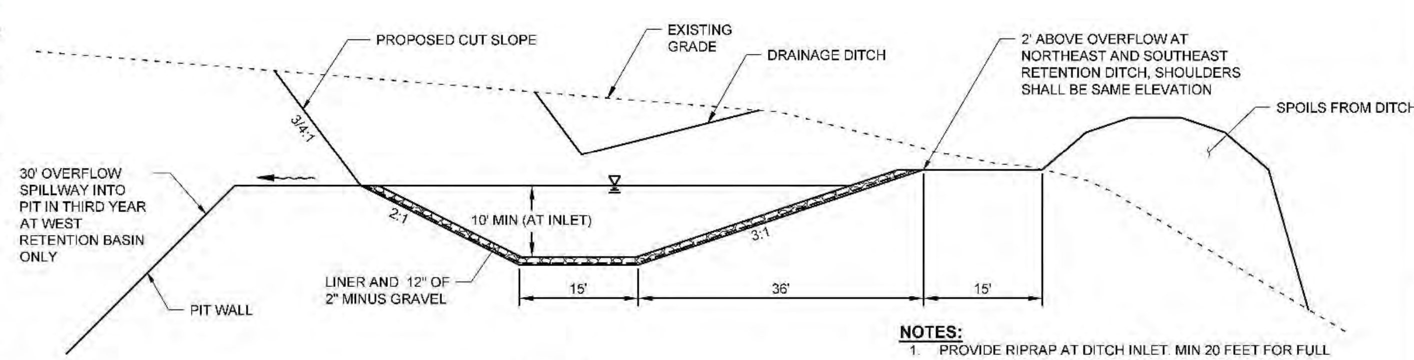
REQUIRED DITCH DEPTH - 100 YEAR STORM				
POINT	FLOW (CFS)	FLOW DEPTH X (FT)	MIN FREEBOARD (FT)	MIN DITCH DEPTH (FT)
A	11.3	0.96	0.50	1.46
B	18.9	1.17	0.50	1.67
C	34.3	1.46	0.50	1.96
D	39.1	1.53	0.50	2.03
E	29.1	1.37	0.50	1.87
F	15.3	1.08	0.50	1.58
G	9.3	0.85	0.50	1.35
H	3.2	0.57	0.50	1.07
I	7.8	0.84	0.50	1.34
J	16.9	1.12	0.50	1.62
K	33.4	1.44	0.50	1.94

DITCH NOTES:
1. DITCH ALIGNMENT MAY VARY BASED ON THE EXISTING TERRAIN. IT MUST HAVE A MINIMUM SLOPE OF 1.0% AND STAY OUTSIDE OF THE MINE PIT / WASTE DUMP AREA LIMITS. A DXF FILE WILL BE PROVIDED FOR INITIAL STAKING.



SECTION: A-A DRAINAGE DITCH
SCALE: 1"=1'

NOTE:
LINER WILL ONLY BE INSTALLED WITHIN DITCHES WHERE THEY ARE WITHIN 500' OF WETLANDS.



SECTION: B-B 10 YEAR STORM RETENTION DITCH
SCALE: 1"=10'

NOTES:
1. PROVIDE RIPRAP AT DITCH INLET. MIN 20 FEET FOR FULL WIDTH OF RETENTION DITCH WITH "RAMP" TO DITCH BOTTOM.
2. PROVIDE MINIMUM OF 12 INCHES OF FINE GRAINED GRANULAR SOIL BENEATH GEOTEXTILE FABRIC BENEATH LINER.

NO.	DESCRIPTION	DATE	BY	CH.	SUPV
0	ISSUED FOR CONSTRUCTION	9/8/22	HRB	KLH	KAB
B	ISSUED FOR CLIENT REVIEW	7/26/22	HRB	KLH	KAB
A	INTERNAL REVIEW	7/25/22	HRB	KLH	KAB

REVISIONS — REFERENCE DWGS

RESPEC
Fairbanks, AK
1028 Aurora Drive
Fairbanks, AK 99709
Phone: 907.452.1414
Fax: 907.456.2707
AECC163270

ENGINEER'S SEAL — 2022.09.15 08:06:49-08'00'

ISSUED FOR CONSTRUCTION

	DRAWN	CHECKED	APPROVED	DESIGN
BY	H. BRESSLER	K. HANNEMAN	K. BRADY	N. JAFFE
DATE	9/8/22	9/8/22	9/8/22	9/8/22

SCALE — UNITS: US UNITS — CAD DRAWING FILE NO.: N:\Projects\20267FB-Tetlin\Civ\c2002cnat20267fb_a19.dwg — PROJ. NO.: PG0094

CLIENT/PROJECT: KINROSS — Manh Choh
MANH CHOH
MINING CONTRACTOR CIVIL EARTHWORKS

TITLE: SITE PLAN, DRAINAGE DITCH AND RETENTION DITCH STORM WATER MANAGEMENT C401

DRAWING NUMBER: PG0094-31400-03-DWG-0002 — REV: 0

9/14/2022 3:27 PM