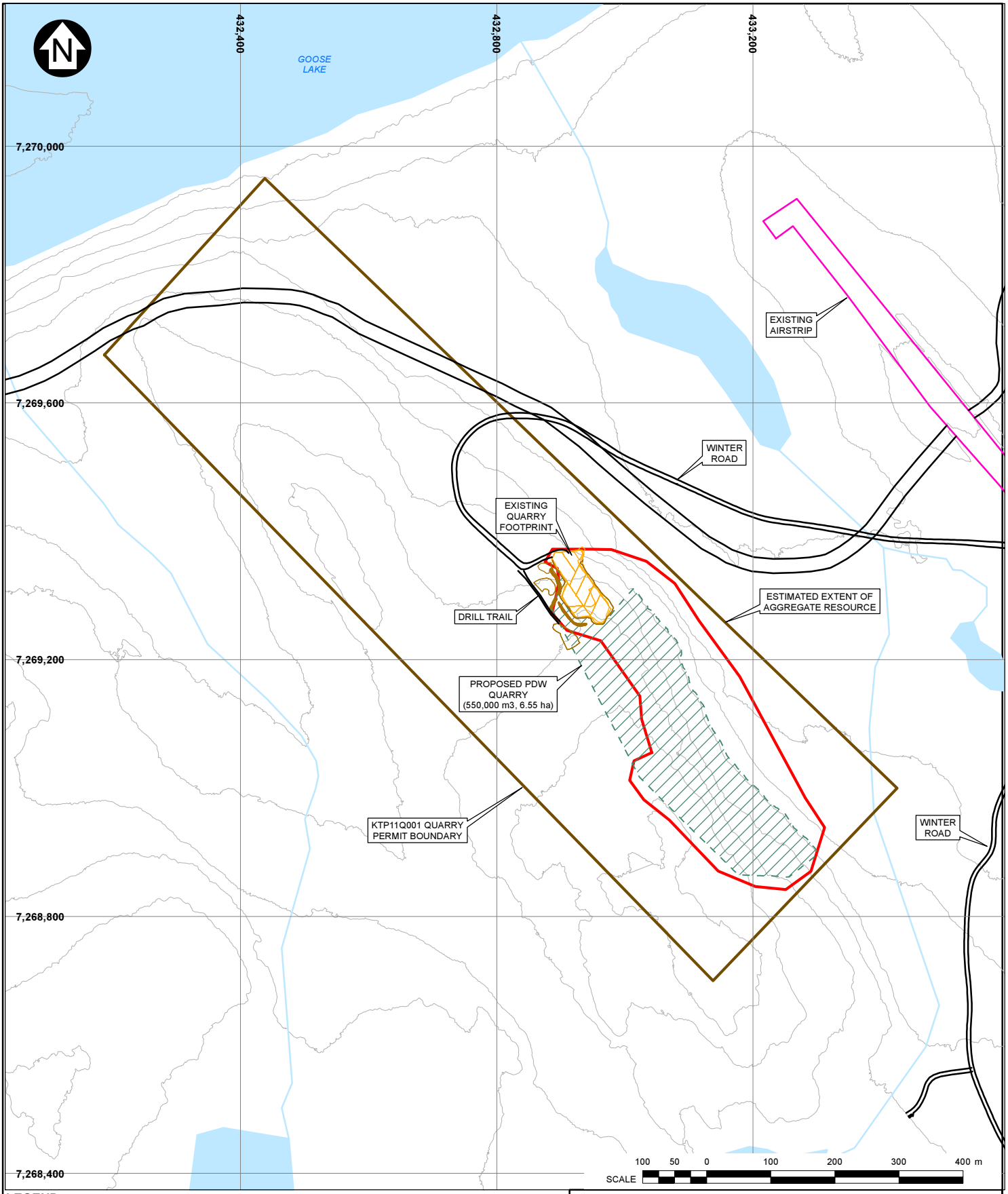


LEGEND:

- INFRASTRUCTURE
- CONTOUR
- RIVER/STREAM/DRAINAGE
- WATER
- KTP11Q001 QUARRY PERMIT BOUNDARY
- ESTIMATED EXTENT OF AGGREGATE RESOURCE
- EXISTING AIRSTRIP
- 2013 QUARRY FOOTPRINT
- PROPOSED PRE-DEVELOPMENT QUARRY

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 13.
2. LIDAR / TOPOGRAPHY BASED ON INFORMATION PROVIDED BY SABINA GOLD AND SILVER CORP., DATED NOVEMBER 9, 2012.
3. CONTOUR INTERVAL IS 5 METRES.
4. APPROXIMATE WATERBODIES FROM NTS MAPPING (TO BE UPDATED).

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	03OCT'14	ISSUED WITH REPORT	RAC	SWK	RAC	RAC

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

PROPOSED EXPANSION OF QUARRY A

Knight Piésold CONSULTING

P/A NO. NB101-517/6

REF NO. 2

FIGURE 3.2

REV 0

SAVED: I:\1\101\00517\06\A\GIS\Figs\A02_r0.mxd: Oct 03, 2014 3:59 PM: skozmick

3.2 PROPOSED UMWELT QUARRY

3.2.1 Consideration of Potential Environmental Effects

The Umwelt quarry was selected upon consideration of the following:

- A setback of 31 m from watercourses and environmentally sensitive areas (the quarry is located more than 250 m from a watercourse)
- As a future open pit, the Umwelt deposit area has been assessed to confirm that there are no archaeological features
- The quarry contains suitable aggregate resources and is located in the location of a future open pit (minimizes cumulative surface disturbance)
- The quarry was low in ARD/ML potential (SRK, 2014; see Section 6.1.2)
- Extraction of rock from the quarry is not anticipated to meaningfully disrupt permafrost conditions.

3.2.2 Development Plan

The Umwelt quarry will be located within the footprint of the future Umwelt open pit. Quarry activities will target two large areas within the pit boundary where non-potentially acid-generating and metal leaching (nPAG) waste rock has been identified (see Section 6.1).

The Umwelt deposit is overlain by overburden consisting of a mix of silt, sand and gravel. The thickness of overburden ranges from about 2 m to 6 m. The targeted areas for quarrying have the thinner overburden thickness. The general area proposed for quarrying based on geochemical characterization work (see Section 6.1.2) is shown on Figure 3.2. The final location and configuration of the quarry will be determined by the contractor.

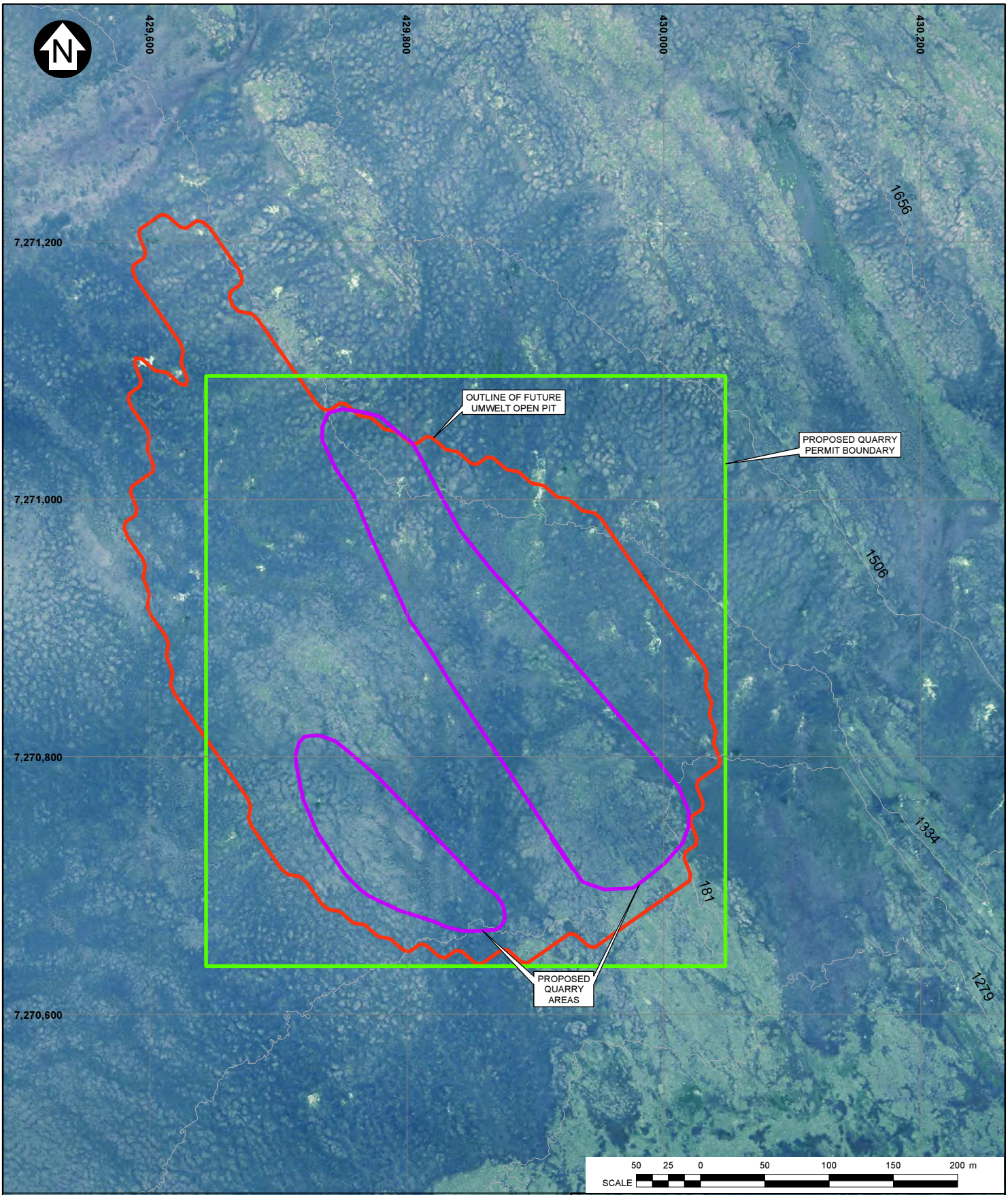
To develop the quarry, it will be necessary to strip and stockpile the overburden. Though the ground is relatively flat across the deposit, the stockpile will be positioned on the upgradient side of the quarry so that the finished quarry can serve to collect runoff from the stockpile. Since the overburden may be frozen and therefore blasted during removal, some slumping is expected as water is released from the soil. The overburden stockpile will likely be constructed in a windrow fashion to an approximate maximum height of 6 m and sloping outward. This configuration could be modified based on observations in the field.

The final quarry design including size and depth will be determined by Sabina in consultation with its contractor, but it is likely not to exceed 30 m into the rock.

Quarry operations will drill and blast the quarry following the same process described for the existing quarry in Section 3.1.3.

3.2.3 Water Management

To minimize the amount of water interacting with the overburden stockpile and the quarry, an earthen berm or ditching will be constructed to divert runoff away from both the stockpile and quarry using overburden stripped from the quarry area.



LEGEND:

- CONTOUR
- RIVER/STREAM/DRAINAGE
- WATER
- UMWELT PIT EXTENT
- UMWELT QUARRY EXTENT
- PROPOSED QUARRY PERMIT BOUNDARY

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 13.
2. LIDAR / TOPOGRAPHY BASED ON INFORMATION PROVIDED BY SABINA GOLD AND SILVER CORP., DATED NOVEMBER 9, 2012.
3. CONTOUR INTERVAL IS 5 METRES.
4. APPROXIMATE WATERBODIES FROM NTS MAPPING (TO BE UPDATED).

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	03OCT'14	ISSUED WITH REPORT	RAC	SWK	RAC	RAC

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

PROPOSED UMWELT QUARRY LOCATION

Knight Piésold CONSULTING

P/A NO. NB101-517/6

REF NO. 2

FIGURE 3.3

REV 0

SAVED: I:\1\101\00517\06\A\GIS\Figs\A06_r0.mxd; Oct 03, 2014 3:55 PM; skozmick

While the quarry is being operated, runoff from the stockpile will be directed to one or more excavated earthen sumps located away from the quarry. The sumps will be shallow excavations intended to settle out solids before releasing the runoff overland. The nearest water body is a tributary of Goose Lake located more than 250 m from the quarry area. The quality of the water in the sump(s) will be monitored and compared to applicable criteria (see Section 7.1).

Quarry operations through the winter are not expected to require the management of water. The quarry will be within frozen ground (permafrost) with groundwater inflows that are limited to seepage through the active layer. Snowfall will be managed within the quarry by snow clearing as necessary to facilitate quarry operations, with a portion of snow being removed with the quarried rock. Any cleared snow will be deposited next to overburden stockpile so that snowmelt reports to the same water management features. At the onset of spring, minor volumes of water will report to the quarry from residual snow, direct rainfall into the quarry, and minor seepage through the active layer on the upgradient side of the quarry. Sumps will be constructed within the quarry as necessary to collect the water and to pump the water to surface. Any pumped water will be discharged to an excavated sump that will seep and overflow over the tundra. This may or may not be the same sump used to trap sediment in runoff from the overburden stockpile. As mentioned above, the nearest water body is distant from the quarry area. The quality of the water in the sump will be monitored and compared to applicable criteria (see Section 7.1).

3.2.4 Abandonment and Restoration

Once the desired volume of rock has been extracted from the quarry, it will be allowed to passively flood. Runoff from the stockpile located upgradient the quarry will be directed to the quarry. The overburden stockpile will be re-contoured as necessary so that water runs off the pile. If necessary, a spillway on the low side of the quarry will be armoured with rip rap to reduce potential erosion. It is expected that the access ramp into the quarry will provide a suitable means of egress for any wildlife that may inadvertently enter the quarry.

The earthen diversion berm used to divert clean runoff away from the quarry and stockpile during operation will remain at closure to provide the necessary barrier to physical entry. This will be supplemented by a safety berm constructed around the perimeter of the quarry.

4. Applicable Legislation and Guidelines

Borrow pits and rock quarries within IOL require a land use licence or commercial lease and Quarry Permit Agreements issued by the KIA. Quarry permits from the KIA include terms and conditions specifying how operations are to be conducted. The use of explosives will comply with Nunavut`s Explosives Use Act and Regulations and Mine Health and Safety Act and Regulations. A Type B water licence will be needed to operate quarries.

Other applicable legislation from the Government of Nunavut includes the permitting of archaeological surveys completed in advance of operations and compliance with the Nunavut “Wildlife Act” with respect to impacts to raptors and terrestrial animals.

5. Roles and Responsibilities

The Sabina General Manager in charge of the Project will be ultimately responsible for the success of the QMP and will approve all relevant policies and documents, auditing, action planning and the verification process.

The Site Superintendent, along with his direct reports will be responsible for the implementation of the QMP, including overall management of the plan and internal reporting.

6. Environmental Protection Measures

The proper implementation of best management practices will ensure sound management of rock quarry material, explosives, and freshwater which will help to minimize potential impacts to the environment during the life of a quarry.

Table 6.1 presents the best management practices and mitigation measures that will be considered in the design, operation and closure of the quarries.

6.1 GEOCHEMICAL CHARACTERIZATION OF QUARRY ROCK

6.1.1 Quarry A

Geochemical and physical characterization for the Goose property quarry was conducted by Rescan Environmental Services Ltd. (Rescan) in 2011. The results of the 2011 ARD/ML characterization program indicated that the gabbro material is predominately non-potentially acid generating (nPAG) and can be used as construction material. The greywacke unit had two samples (out of 22 samples) that indicated nPAG potential with the mean SNPR for all the samples being 15.8. The greywacke would be suitable to use as construction material in conjunction with the gabbro as incidental ARD generated by the greywacke could be neutralized by the gabbro.

Material extracted during the 2013 quarry operations were predominantly sedimentary greywacke and intrusive gabbro with minor amounts of felsic dykes and iron formation.

6.1.2 Umwelt Quarry

A geochemistry evaluation was conducted by SRK Consulting (Canada) Inc. (SRK) to identify waste rock within the Umwelt deposit with minimal ARD/ML potential that would be suitable to quarry and use as construction material (SRK, 2014; see Appendix J).

Drawing from previous and recent geochemical work, SRK utilized geological modelling and visualization software to identify areas within the footprint of the future open pit that were predominantly greywacke and gabbro and set back from the banded iron formation (BIF) which hosts the gold within sulphide mineralization (including arsenopyrite, pyrite and pyrrhotite). The greywacke material removed from the gold mineralization is expected to have the lowest ARD/ML potential. Two areas were identified, geochemical samples from or representative of these areas were reviewed (Figure 3.3).

Table 6.1 Environmental Protection Measures for Quarries

Development Phase	Activities	Environmental Concerns	Mitigation Techniques
Site design and development	• Locating adequate quantities of potential rock • Vegetation clearing • Overburden removal	• Potential ARD/ML • Potential effects to cultural heritage resources • Habitat loss • Soil erosion • Sediment deposition	• Minimize project footprint • Identify suitable rock with low ARD/ML potential • Identify and avoid environmentally sensitive areas, including potential archaeological sites • Minimize the quantity of overburden to be removed, if possible • Identify suitable storage location for overburden considering sediment runoff • Maintain natural drainage patterns • Identify water management features necessary to protect local watercourses • Retain vegetation buffer zones to maintain slope stability and protect waterbodies
Operation	• Storage and handling of explosives • Blasting • Excavating • Crushing • Piling material • Access road maintenance • Equipment operation and refuelling	• Soil erosion • Sediment deposition	• Implement Explosives Management Plan • Limit sediment movement using sediment and erosion control measures appropriate to the conditions • Proper handling of explosives to minimize spillage • Use rip-rap to reinforce drainage channel corners and water discharge points, if necessary • Use sumps or settling ponds before discharging water • Create stable side slopes • Stockpile overburden and other materials with stable slopes • Stabilize slopes as necessary with armouring or revegetation
		• Fuel spills • Blasting residue	• Use proper fuel containment and explosives-handling techniques • Clean-up any spills that may occur (Spill Contingency Plan)
		• Permafrost degradation	• Minimize the ponding of water, if possible • Avoid thaw-sensitive soils (applicable to borrow pits) • Use berms as a preference to ditches where practical for diverting and controlling runoff
		• Dust generation	• Locate crushers in-quarry or behind other natural or man-made barriers to reduce exposure to wind • When practical, use water and dust skirts on conveyors to minimize dust
Closure	Implementing restoration measures and long-term stability	• Physical safety • Soil erosion • Sediment deposition • Permafrost degradation	• Implement closure measures specified in the QMP and Abandonment & Restoration Plan • Remove all equipment, fuel and waste materials • Position safety berms or fencing around high walls • Confirm side slopes and stockpiles will be physically stable and will not erode and cause significant sediment deposition

Review of the representative geochemical testing results indicated that material from the upper greywacke in the Umwelt pit was classified as nPAG, as having an uncertain potential for ARD, or as low sulphur material with a limited potential for ARD. Based on the relatively low sulphide content, it was determined unlikely that any of these materials would generate appreciable amounts of acidity. Based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, these materials were considered suitable for use in construction. Sabina will limit quarrying operations within the two areas identified on Figure 3.3.

6.2 WATER MANAGEMENT MEASURES

Water management measures are identified in Table 6.1. Generally, the following measures will be followed or applied to appropriate manage surface drainage and minimize effects on aquatic habitat and resources:

- Locate quarries and stockpiles removed from watercourses as much as possible;
- Minimize grubbing of the organic vegetation and/or the upper soil horizons;
- Divert clean runoff away from the quarry and associated stockpiles;
- Implement arctic-appropriate sediment and erosion control measures, including berms, ditching (to be minimized in favour of berms); sumps, sediment basins, rock flow check dams and rock armouring;
- Stockpile cleared snow where existing water management controls are in place; and
- Establishing stable slopes, and armouring or revegetating as necessary.

6.3 DUST MANAGEMENT MEASURES

Crushers may be located near high obstacles to facilitate shielding from the prevailing winds and thereby reducing and restricting the quantity of dust migrating past the quarry boundary. ROQ will be transported from the quarries within speed restrictions to help reduce dust along the road corridors. Consideration will be given to using dust skirts or watering if necessary.

6.4 GROUND ICE AND PERMAFROST PROTECTION

Quarry sites are expected to be free of ground ice and will not extend below the bottom limits of the continuous permafrost. There will be some localized impacts to the surrounding active zone of the quarry locations and any water seeps originating in the quarries as a result of permafrost melting or precipitation events will be monitored as part of surface water monitoring programs.

Borrow pits at the Project are generally comprised of glaciofluvial deposits and weathered bedrock located in well-drained areas with relatively higher topography. Granular glaciofluvial deposits are selected as they can be relatively free of ground ice. Less ground ice reduces the potential for thaw settlement, melt water causing erosion, and slumping. In the event that ground ice is prevalent, the area will be monitored and may be stabilized by covering the affected land with granular material. This would allow the permafrost to aggrade into the covering material and restrict the remaining ground ice from melting.

7. Monitoring

7.1 WATER QUALITY MONITORING

During periods of high runoff, water may flow from rock quarry areas. Runoff may contain suspended solids due to erosion of ground surfaces, oils and grease from heavy equipment, ammonia from blasting residues, and metals. Runoff from the quarries will meet the quarry runoff discharge criteria presented in Table 7.1 (derived from Schedule 4 of the Metal Mining Effluent Regulations).

Table 7.1 Quarry Runoff Criteria

Parameter	Grab Sample Maximum Concentration (mg/L)
Total Arsenic	0.50
Total Copper	0.30
Total Lead	0.20
Total Nickel	0.50
Total Zinc	0.50
Total Suspended Solids	50.0
Ammonia (NH3-N)	4.0
Oil and Grease	No visible sheen
pH	Between 6.0 and 9.5

Any water accumulating in sumps will be sampled as part of ongoing monitoring and allowed to discharge to the environment if it meets water licence criteria. The results of sampling will be submitted to appropriate regulatory parties in accordance with permit requirements.

Water quality results will be tracked on site, made available during inspections, and included in annual reports.

7.2 PHYSICAL STABILITY MONITORING

Physical stability monitoring includes inspection of quarry walls as well as permafrost features within the quarries.

Routine visual monitoring of quarry wall stability and any relevant permafrost features within active rock quarrying areas will be completed and recorded. Inactive, open areas will also be visually monitored (typically monthly) between July and September and will also be recorded. Closed areas will be visually monitored annually (during the July to September period) and these observations will be recorded.

7.3 WILDLIFE MONITORING

Wildlife monitoring will include maintaining a written log of species and frequency of sightings near the workings. Data will be maintained by the Environmental Department and presented during inspections and in accordance with permit conditions.

8. Adaptive Management

Checking and corrective action will occur through regular inspections and the evaluation of monitoring data.

Corrective action will be undertaken if inspections identify inconsistencies with this management plan or with applicable legislation. Work will be stopped if necessary to implement corrective action.

Results of water quality monitoring will be reviewed by an environmental specialist. Field water quality data and visual observations will trigger immediate corrective action if appropriate, and water quality results will be reviewed upon receipt from the laboratory. Adaptive management with respect to water quality monitoring at the quarries may include maintenance, repair or replacement of water management features, ceasing discharge of quarry water, or modifications to the handling of explosives to minimize spillage.

9. Record Keeping and Environmental Reporting

Record keeping will be conducted by the site environmental compliance supervisor. Field and laboratory data will be entered into suitable electronic databases and checked for quality control. Monitoring results will be made available to inspectors upon request, and in monthly or annual reports as prescribed in Sabina's permits.

The following information will be presented in the annual report under the applicable water licence:

- A description of quarry activities during the year;
- Monitoring data obtained during the year;
- Results from formal inspections by land or water inspectors;
- Evaluation of the effectiveness mitigation measures; and
- Discussion of the need for any additional corrective action or modification to the mitigation measures identified in this plan.

An updated QMP will also be filed with the water licence annual report if changes to the scope of the plan or mitigation measures are required.

All formalized documents and reports will follow a version control procedure to ensure they are approved before use and the internal and external users are accessing the most current information.

10. Plan Effectiveness

The effectiveness and relevance of this management plan will be reviewed internally on an annual basis and will be updated as appropriate to meet the plan's objectives.

11. QA/QC

Quality Assurance and Quality Control (QA/QC) measures will be applied to water quality and other monitoring programs based on current best current approach.

12. Glossary of Terms, Acronyms, or Abbreviations

12.1 GLOSSARY OF TERMS

Abandonment: The permanent dismantlement of a facility so it is permanently incapable of its intended use. This includes the removal of associated equipment and structures.

Active layer: The layer of ground above the permafrost which thaws and freezes annually.

Berm: A mound or wall, usually of earth, used to retain substances or to prevent substances from entering an area.

Closure: When a mine ceases operations without the intent to resume mining activities in the future.

Contaminant: Any physical, chemical, biological or radiological substance in the air, soil or water that has an adverse effect. Any chemical substance with a concentration that exceeds background levels or which is not naturally occurring in the environment.

Contouring: The process of shaping the land surface to fit the form of the surrounding land.

Drainage: The removal of excess surface water or groundwater from land by natural runoff and permeation, or by surface or subsurface drains.

Erosion: The wearing away of rock, soil or other surface material by water, rain, waves, wind or ice; the process may be accelerated by human activities.

Groundwater: All subsurface water that occurs beneath the water table in rocks and geologic formations that are fully saturated.

Hydrology: The science that deals with water, its properties, distribution and circulation over the Earth's surface.

Landfill: An engineered waste management facility at which waste is disposed by placing it on or in land in a manner that minimizes adverse human health and environmental effects.

Mitigation: The process of rectifying an impact by repairing, rehabilitating or restoring the affected environment, or the process of compensating for the impact by replacing or providing substitute resources or environments.

Monitoring: Observing the change in geophysical, hydrogeological or geochemical measurements over time.

Objectives: Objectives describe what the reclamation activities are aiming to achieve. The goal of mine closure is to achieve the long-term objectives that are selected for the site.

Permafrost: Ground that remains at or below zero degrees Celsius for a minimum of two consecutive years.

Permeability: The ease with which gases, liquids, or plant toots penetrate or pass through soil or a layer of soil. The rate of permeability depends upon the composition of the soil.

Progressive Reclamation: Actions that can be taken during mining operations before permanent closure, to take advantage of cost and operating efficiencies by using the resources available from mine operations to reduce the overall reclamation costs incurred. It enhances environmental protection and shortens the timeframe for achieving the reclamation objectives and goals.

Reclamation: The process of returning a disturbed site to its natural state or one for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety

Rehabilitation: Activities to ensure that the land will be returned to a form and productivity in conformity with a prior land use plan, including a stable ecological state that does not contribute substantially to environmental deterioration and is consistent with surrounding aesthetic values.

Remediation: The removal, reduction, or neutralization of substances, wastes or hazardous material from a site in order to prevent or minimize any adverse effects on the environment and public safety now or in the future.

Restoration: The renewing, repairing, cleaning-up, remediation or other management of soil, groundwater or sediment so that its functions and qualities are comparable to those of its original, unaltered state.

Revegetation: Replacing vegetation as ground cover following a disturbance to the land.

Runoff: Water that is not absorbed by soil and drains off the land into bodies of water. Scarification: Seedbed preparation to make a site more amenable to plant growth. Security Deposit: Funds held by the Crown that can be used in the case of abandonment of an undertaking to reclaim the site, or carry out any ongoing measures that may remain to be taken after the abandonment of the undertaking.

Sediment: Solid material, both mineral and organic, that has been moved by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Surface Water: Natural water bodies such as river, streams, brooks, ponds and lakes, as well as artificial watercourses, such as irrigation, industrial and navigational canals, in direct contact with the atmosphere.

Watershed: A region or area bordered by ridges of higher ground that drains into a particular watercourse or body of water.

12.2 ACRONYMS AND ABBREVIATIONS

AANDC .....Aboriginal Affairs and Northern Development Canada
ARD.....Acid Rock Drainage

BIF ..... Banded Iron Formation
EHS ..... Environmental, Health and Safety
EIS ..... Environmental Impact Statement
INAC ..... Indian and Northern Affairs Canada
IOL ..... Inuit Owned Land
KIA ..... Kitikmeot Inuit Association
ML ..... Metal Leaching
MCRP ..... Mine Closure and Reclamation Plan
NLCA ..... Nunavut Land Claims Agreement
NIRB ..... Nunavut Impact Review Board
nPAG ..... Non-potentially Acid Generating
NWB ..... Nunavut Water Board
PAG ..... Potentially Acid Generating
Sabina ..... Sabina Gold & Silver Corp.
the Project ..... Back River Project
uPAG ..... Uncertain Potentially Acid Generating

13. References

Canada. (1985b). *Fisheries Act*. R.S.C., 1985, c. F-14.

Canada. (1985c). *Territorial Lands Act*. R.S.C., 1985, c. T-7.

Canada. n.d. *Territorial Lands Regulations*. C.R.C., c. 1525.

Nunavut. (1995). *Mine Health and Safety Regulations*. NWT Reg. (Nu) 125-95.

Nunavut. (1994). *Nunavut Mine Health and Safety Act*. SNWT (Nu) 1994, c 25.

Nunavut. (1988a). *Environmental Protection Act*. RSNWT (Nu) 1988, c E-7.

Nunavut. (1988b). *Environmental Rights Act*. RSNWT (Nu) 1988, c 83.

Rescan Environmental Services Ltd. (Rescan). 2011. *ML/ARD Characterization of Goose Lake Airstrip Material*. Prepared for Sabina Gold & Silver Corp. Technical Memorandum dated November 15, 2011.

SRK Consulting (Canada) Ltd. *Geochemical Characterization Results for the Umwelt Quarry*. Memo dated October 1, 2014.