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Kugaaruk

Richard Dwyer

Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, Nunavut
X0B 1J0

July 5th, 2022

**Re: Review of Sabina Gold & Silver 2021 Annual report for Back River Project.**

Dear Richard Dwyer, the KIA has reviewed Sabina's 2021 Annual Report for the Back River project to the NWB.

## 1) Compliance Monitoring:

The KIA's Framework Agreement (FA) and Inuit Impact and Benefits Agreement (IIBA) with Sabina Gold & Silver Corp. the cover terms and conditions of NIRB Project Certificate 007 and the NWB Type A water license.

The Framework Agreement is a confidential agreement between KIA and Sabina that supersedes and replaces all previous contractual arrangements between both parties. Section 3.1 of the FA covers Terms and conditions of land use license and reporting.

Appendix A of Section 3.1 of the Framework Agreement specifies the details of annual reporting by Sabina to the KIA, which is summarized as follows:

Sabina is to provide an annual report to KIA providing details of its operations under any land use License, Advanced Exploration Lease and/or Commercial Lease covering the location and operations area of lands affected, and the nature of facilities and equipment at these sites. In addition, Sabina is to provide details of progressive reclamation or closure activities undertaken during the year and details of all permits, licenses, and authorizations from other regulatory bodies or agencies that are required for operations.

This annual report is to provide information on:

- Ground disturbances including land use activities for camps, infrastructure, equipment, winter roads and trails.
- Fuel and Chemical storage including Chemicals of Potential Concern inventory (COPC), fuel and chemical usage, and spill records.

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- Drilling programs, methods, locations, spills of fluids or muds and the amount of water discharge.
- Water use and effects on water.
- Wildlife interaction, data logs, and summaries.
- Waste disposal, waste management practices, inventory of waste on site, and inventory of hazardous materials or non-combustible waste removed from site.
- Closure and reclamation progress associated with waste management, drilling, and ground disturbance along with associated costs.
- General information on annual inspection activities by staff and other agencies and their results, community consultations, future exploration work plans, submissions to NIRB, NWB, or NPC or other regulators related to mining activity, archaeological sites and burial grounds, and any incidents of storage or possession of alcohol and drugs on site.

Sabina has provided the KIA with the **Back River Project 2021 Annual Report for KIA Framework Agreement** in accordance with Appendix A to Schedule 3.1 of the Framework Agreement. This report is separate from the **Back River 2021 Annual Report to the NWB**.

**Compliance Status**

**2) Effects of Monitoring:**

a) **Whether the conclusions reached by Sabina in the Back River 2021 Annual Report to the NWB are Valid.**

KIA's consultants in the areas of aquatic sciences, and geotechnical engineering reviewed the Back River 2021 Annual Report to the NWB and the following documents:

- Back River Project 2021 Nunavut Water Board Annual Report,
- 2021 Geotechnical Inspection,
- Back River Project Waste Rock Management Plan, April 2022,
- Back River Water Management Plan, April 2022, and
- Back River Tailings Management Plan.

In 2021, Sabina completed several initial construction activities at the site that focused on advancing and de-risking future development. However, no mine waste and water management infrastructure has yet been developed at the Goose site nor at the MLA site. Therefore, only limited activities fell under the reporting requirements listed under Schedule B of the NWB Water Licence.

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The 2021 annual geotechnical inspection indicated that the Back River site is performing in reasonable accordance with geotechnical expectations.

Sabina currently has one Type A water licence (2AM-BRP1831) for the Back River Project and provides a summary of their compliance with the Project Certificate Terms and Conditions under numerous categories. Sabina is currently updating the Aquatic Effects Monitoring Plan (AEMP) based on commitments made with respect to submissions received during the Technical and Public Hearing process for the Type A Water Licence Application and according to the terms and conditions of the Type A Water Licence. Updates were also made to re-align the AEMP with recent changes to the Metal and Diamond Mining Effluent Regulations (MDMER). Additionally, the NWB requested updates to the Water Management Plan, Tailings Management Plan, Waste Rock Management Plan to address comments received during the amendment process, and Sabina is currently updating these plans.

Overall, our consultants find Sabina's conclusions in the 2021 Annual Report to the NWB are valid. Sabina has presented adequate information to demonstrate that the Back River Project has complied with the conditions of its Type A water license.

b) **Any areas of significance requiring further supporting information or changes to the monitoring program, which may be required.**

## Back River Project 2021 Annual Report to NWB

### KIA-NWB-01

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| **Review Comment Number** | KIA-NWB-01 |
| **Subject/Topic** | Comparisons to previously collected baselines. |
| **References** | Back River Project 2021 Annual Report for Water Licence 2AM-BRP1831<br>Section 2.6: Geochemical Monitoring Results<br>Section 2.14: Results of Monitoring related to the General and Aquatic Effects Monitoring Program<br>Back River Project Water Management Plan<br>Section 10: Monitoring Program |
| **Summary** | There is a lack of comparison to previous baselines for geochemical, water quality, and AEMP monitoring. |
| **Detailed Review Comment** | Section 2.6 of the report states that *"Geochemical outcomes and observations were as anticipated based on the geochemical* |

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| | *characterization baseline studies completed during the Project assessment."*<br><br>In Section 2.14, it states that *"Aquatic effects monitoring has not yet commenced at the Back River Project. However, baseline data continues to be collected in support of the AEMP program and once complied this information will be submitted to the NWB."*<br><br>Water Management Plan; Section 10: *"Sabina has completed the commitment to collect additional baseline water quality data to characterize the lakes and streams within the freshwater aquatic environment prior to Construction, and Sabina has used this data to update the Water and Load Balance model to account for potential seasonal variation"*<br><br>Additional information should be given regarding what comparisons were made between previously collected baseline data and 2021 data, as well as any differences (if any) that were observed between previous baseline data and 2021 data. It is not clear from the Annual Report whether there has been sufficient discussion of these results. |
| **Recommendation/Request** | The proponent should include comparisons between previously collected baseline data and data collected in 2021. Any differences observed between 2021 data and site conditions prior to Sabina's presence should be described to better determine whether ongoing activities at site are influencing the aquatic environment. This will ensure an appropriate determination of the baseline and associated natural variation when further project development occurs. |
| **Importance** | High |

## KIA-NWB-02

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| **Review Comment Number** | KIA-NWB-02 |
| **Subject/Topic** | Water Quality Results for Marine Laydown Area (MLA) discharge to marine environment. |
| **References** | Back River Project 2021 Annual Report for Water Licence 2AM-BRP1831<br>Appendix D: Water Quality Analytical Results |
| **Summary** | There is a lack of interpretation of data presented for water quality results found in the Analytical Summary Tables. |
| **Detailed Review Comment** | Water quality results for the MLA discharge are provided in |

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| | Appendix D, but water quality objectives/guidelines for comparison have not been provided.<br><br>Additionally, samples collected for MLA discharge are labeled "DESAL IN" and "DESAL OUT", however, no interpretations of the data are provided. A summary of results and implications in the annual report in conjunction with the Analytical Summary Tables would be useful, rather than just the summary tables. |
| **Recommendation/Request** | While discharges into the marine environment are outside the Water Board's jurisdiction, applicable water quality objectives/guidelines should be included in Appendix D to assist reviewers in identifying exceedances.<br><br>Similarly, a results summary / discussion for water quality monitoring around the MLA could be included in future annual reporting to provide clarity and ease of review as there exists the potential for interactions with the local freshwater receiving environment. |
| **Importance** | Moderate |

## KIA-NWB-03

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| **Review Comment Number** | KIA-NWB-03 |
| **Subject/Topic** | Implementation of Geotechnical inspection recommendations. |
| **References** | 2021 Annual Geotechnical Inspection |
| **Summary** | Adoption of geotechnical inspection recommendations will further limit potential impacts on the aquatic environment. |
| **Detailed Review Comment** | Recommendations provided by the 2021 Geotechnical Inspection include:<br><br>*"From a performance and geotechnical point, a closer review of what has been installed at the Echo Creek crossing, and the temporary measures at the Goose Neck crossing is suggested. Some tension cracking was seen near the shoulders of the road adjacent to, and that will ultimately become part of, the future Camp Pad Pond. Sabina should consider near-term widening and/or additional fill placement (increased thickness) at that camp pad pond road section. From a safety point of view, close monitoring of the Goose Airstrip remains a top priority."*<br><br>*"Water was observed to be ponding on the southwestern boundary of the airstrip. Water appears to be flowing northeast from the adjacent natural water bodies"* |

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| | *"Some attempt was made to dissipate the flow at the outlet of the culverts by placement of larger, approximately 0.3m to 0.5m, boulders at the outlets in areas. This may not be sufficient to prevent erosion of the tundra, an appropriate design should be considered. The outlet areas of the culverts should continue to be visually monitored and revisited as part of the 2022 AGI."*<br><br>*"The maximum active layer thickness occurs around August at the end of the summer season. All road and pad shoulders are at their most vulnerable during this period as the thermal protection at these shoulders are less than the minimum required (by standard geometry), resulting in localized deepening of the active layer. As a result, tension cracks and general softening are most prevalent at the shoulders (outer sides). Sabina should take special precautions to limit vehicle traffic within 1 m from all shoulders."*<br><br>Therefore, as advised in the 2021 Geotechnical Inspection, the following actions should be taken in 2022:<br><br>• Widening and/or additional fill placement at camp pad pond road section;<br><br>• Additional water management measures are implemented, given that current conditions may lead to permafrost degradation if not addressed (water pooling at southwest boundary);<br><br>• Ensure that boulders at the outlet of culverts are sufficient and working to prevent tundra erosion; and<br><br>• Ensure that vehicular traffic is limited within 1 m of all shoulders.<br><br>We note that adoption of these recommendations will further assist in limiting potential interactions with the aquatic environment by limiting erosion and the mobilization of road sediment. |
| **Recommendation/Request** | Provide an update on the status of implementing the recommendations made in the 2021 Annual Geotechnical Inspection in the next annual report. The 2021 Geotechnical Inspection advised that the following should be implemented in 2022: Increasing the thickness of camp pad and pond road section of concern; Implementation of additional water management measures to address concerns with water pooling at southwest boundary; Ensure the sufficiency of builders at culvert outlets in preventing erosion; and limiting of vehicle |

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| | traffic 1 m from shoulders. |
| **Importance** | Moderate |

## KIA-NWB-04

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| **Review Comment Number** | KIA-NWB-04 |
| **Subject/Topic** | Waste rock seepage and runoff |
| **References** | Back River Project Waste Rock Management Plan<br>Section 6: Environmental Protection Measures |
| **Summary** | The Waste Rock Management Plan is vague on measures to manage waste rock seepage and runoff . |
| **Detailed Review Comment** | *"Prior to closure of WRSAs, seepage and runoff are expected to contain elevated levels of some parameters, as such, all WRSA seepage and runoff will be collected in perimeter berms and directed to collection ponds."*<br><br>*"During Operations, runoff from the WRSAs at the Goose Property will be pumped to the active Tailings Facility and treated as necessary prior to discharge; any discharge locations will be located so as to limit the potential for erosion."*<br><br>This section of the Waste Rock Management Plan appears to be vague in its description of what considerations will be kept in mind when the Project is in operation. While we understand the project is somewhat in a state of flux with several details not yet finalized, the discharge location selected to limit erosion, parameters that will be monitored in seepage and runoff, and the approach to treatment if necessary do not appear to be well defined. |
| **Recommendation/Request** | Please include additional detail in future iterations of the Waste Rock Management Plan which should be appended to next year's annual report. Specific details should include parameters that will be monitored in seepage and runoff, response plans to exceedances/water treatment protocols, and the rationale behind the selection of discharge location(s). More specific actions that will be taken to ensure environmental protection (i.e., specific location of discharges, contaminants of concern that will be monitored in seepage and runoff, and treatment/removal of residuals and their eventual fate) should also be included. |
| **Importance** | High |

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## KIA-NWB-05

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| **Review Comment Number** | KIA-NWB-05 |
| **Subject/Topic** | Discharge of plant contact water to tundra |
| **References** | Back River Project Water Management Plan<br>Table 5.2-3 Mine Development Sequence |
| **Summary** | No water quality standards for tundra discharge are presented. |
| **Detailed Review Comment** | "Contact water from the Plant site is collected in the Plant site pond, then released to the tundra."<br><br>It is unclear where or how specifically this contact water will be discharged to the tundra. The water quality standards for the release of contact water directly to the tundra should be provided, as well as an evaluation of the environmental effects of discharging contact water to the tundra. |
| **Recommendation/Request** | As the environmental effects of tundra discharge did not appear to be evaluated in the Water Management Plan, future reporting should include more information on the safe and regulated release of contact water from the Plant site pond to the tundra to ensure that additional mitigation measures are not required. |
| **Importance** | High |

## KIA-NWB-06

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| **Review Comment Number** | KIA-NWB-06 |
| **Subject/Topic** | Adaptive management actions for breaching of infrastructure. |
| **References** | Back River Project Water Management Plan<br>Section 6: Water Modelling and Design Criteria |
| **Summary** | No adaptive management actions are provided for breaching of high-risk infrastructure. |
| **Detailed Review Comment** | *"Infrastructure which has the potential to overtop/breach and discharge to the downstream environment was assigned a "High Risk". At the Goose Property, this includes the Llama WRSA Pond, Ore Stockpile Pond, SWP, and Echo/Goose Main WRSA Pond."*<br><br>The actions that will be taken if these infrastructures are breached are not clearly defined in the Water Management Plan. |
| **Recommendation/Request** | Response plans/mitigation strategies for a potential overtop/breach of the Llama WRSA Pond, Ore Stockpile Pond, |

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| | Saline Water Pond (SWP), and Echo and Goose Main WRSA Pond should be provided in the Adaptive Management section of this document (Section 12). |
| **Importance** | High |

## KIA-NWB-07

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| **Review Comment Number** | KIA-NWB-07 |
| **Subject/Topic** | Discrepancies Between WRMP and ICRP |
| **References** | Waste Rock Management Plan |
| **Summary** | An updated waste rock management plan (WRMP) was presented in consideration of all applicable guidelines and requirements, including those of the Type A Water Licence, 2AM- BRP1831, and Project Certificate, No. 007. This revision specifically addresses commitments made by Sabina during the technical review of the amendment application for NWB Water Licence 2AM-BRP1831. |
| **Detailed Review Comment** | KIA noted discrepancies between waste rock and overburden volumes reported in the WRMP compared to those presented in the Interim Closure and Reclamation Plan (ICRP) presented by Sabina in July 2021. Table 4.3-2 of the ICRP reports a total of 6.5 Mt Overburden, 86.6 Mt Waste Rock and 12.4 Mt Tailings. These quantities differ from the 99.9 Mt Waste Rock and 6.5 Mt NPAG Overburden reported in Section 5.1 of the WRMP, which also do not add up to the reported total of 105.7 Mt.<br><br>Similarly, Section 5.4.1.1 of the WRMP reports that the Umwelt Waste Rock Storage Area (WRSA) occupies an area of approximately 33 ha, whereas the ICRP reports an area of 28.2 ha (Table 4.3-3). The area reported for the Llama WRSA are similar in both documents, but discrepancies are noted for Echo/Goose where the WRMP reports an area of 106.7 ha, even though the mine plan used for the ICRP has changed substantially. |
| **Recommendation/Request** | Sabina should clarify and update the volumes / areas of the waste rock and overburden as per the latest mine plan that was used in the development of the July 2021 ICRP. |
| **Importance** | Moderate |

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## KIA-NWB-08

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| **Review Comment Number** | KIA-NWB-08 |
| **Subject/Topic** | Frozen PAG Rock |
| **References** | Waste Rock Management Plan |
| **Summary** | No modeling shows the long-term stability of frozen PAG rock. |
| **Detailed Review Comment** | In Section 6.1 of the WRMP, Sabina reports that *"PAG rock will become fully frozen and inactive following closure".* The thermal modelling provided supports this design concept. However, no modelling is available that shows the long-term stability of the frozen PAG rock under most recent climate projections (CMIP6). |
| **Recommendation/Request** | Sabina should confirm the long-term (post closure) stability of the frozen PAG rock under conservative climate change projections, using the most recent climate models (CMIP6). It is further suggested that Sabina presents scenario-based evaluation that show under what climate conditions the PAG rock may no longer remain frozen. This evaluation would help identifying the resilience of the proposed solution against climate change. |
| **Importance** | Moderate |

## KIA-NWB-09

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| **Review Comment Number** | KIA-NWB-09 |
| **Subject/Topic** | Discrepancies Between WMP and ICRP |
| **References** | Water Management Plan |
| **Summary** | An updated water management plan (WMP), Version 4, was presented in April 2022 that reintegrates Llama Underground, Goose Main Underground, Echo Open Pit, and Echo Underground into the mine plan and omits the Tailing Storage Facility (TSF), the Umwelt Waste Rock Storage Area (WRSA) Containment Dam, and Umwelt WRSA Diversion Berm. |
| **Detailed Review Comment** | KIA noted discrepancies in mine waste (Table 5.2-4) and waste rock storage area (Table 5.2-5)<br>reported in the WMP compared to the ICRP from July 2021 and the WRMP. |
| **Recommendation/Request** | Sabina should clarify and update the volumes / areas of the mine waste and storage areas as per the latest mine plan that was used in the development of the July 2021 ICRP. |

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| **Importance** | Moderate |

## KIA-NWB-10

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| **Review Comment Number** | KIA-NWB-10 |
| **Subject/Topic** | Design Flow |
| **References** | Water Management Plan |
| **Summary** | Culvert design criteria needs to consider new climate change models and improved projection of rainfall. |
| **Detailed Review Comment** | Table 6.2-4. of the WMP provides culvert design criteria. It is understood that the event return period for culverts will be based on a location specific risk assessment and wherever practical, a 100-year design event will be adopted. Considering that new climate change models and improved projections are available it is unclear if the 24-hour total rainfall volumes selected are still representative for the specific return periods used in the original design. |
| **Recommendation/Request** | Sabina should confirm that the selected design values are still valid for the design return period considering better understanding of local hydrology and improved climate change models. |
| **Importance** | High |

## KIA-NWB-11

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| **Review Comment Number** | KIA-NWB-11 |
| **Subject/Topic** | Discrepancies Between TMP and ICRP |
| **References** | Tailings Management Plan |
| **Summary** | An updated tailings management plan (TMP) was presented in April 2022 that specifically addresses commitments made by Sabina during the technical review of the amendment application for Water Licence 2AM-BRP1831. |
| **Detailed Review Comment** | KIA noted discrepancies in the estimation of tailings volumes and deposition time presented in<br><br>Section 5.1 of the TMP compared to Section 4.3.2 of the approved ICRP. |
| **Recommendation/Request** | Sabina should clarify and update the tailings deposition approximation as per the latest mine plan that was used in the development of the July 2021 ICRP. |

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| **Importance** | Moderate |

Thank you.

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Cc Geoff Clark, Director, KIA, Department of Lands and Environment