
# Back River Project

# Comprehensive Waste Management Plan

Revision 0

March 2012

# Table of Contents

# 1. Introduction

Sabina Gold & Silver Corp. (Sabina) is actively exploring the Back – Wishbone area under valid land use, mineral tenure and water permits. These include:

**Table 1. List of licenses and permits applicable to the Back River Project.**

| Permit No. | Permit Name | Type | Expiry | Agency |
|---|---|---|---|---|
| N2011F0029 | winter road Beechy Area | Class A | 2013-12-13 | AANDC |
| N2010F0017 | Winter road Bathurst Inlet to Back River | Class A | 2012-09-16 | AANDC |
| N2009F0015 | winter road Hackett to George | Class A | 2012-03-01 | AANDC |
| KTL304F049 - Amended | Winter road Bathurst Inlet to Goose Lake and George Lake | Level 3 | 2012-03-31 | KIA |
| KTL304F012 | winter road Hackett to George | Level 3 | 2012-03-31 | KIA |
| N2010C0016 | Back River Mineral Exploration | Class A | 2012-10-31 | AANDC |
| KTL304C017 -Amended | Goose Camp | Level 3 | 2012-12-13 | KIA |
| KTL204C012 - Amended | Boulder | Level 2 | 2012-12-13 | KIA |
| KTL304C018 - Amended | George Camp | Level 3 | 2012-12-13 | KIA |
| KTL204C020 - Amended | Boot | Level 2 | 2013-12-13 | KIA |
| 2BE-GEO1015 | George Water | Type B | 2015-06-15 | NWB |
| 2BE-GOO1015 | Goose Water | Type B | 2015-03-31 | NWB |

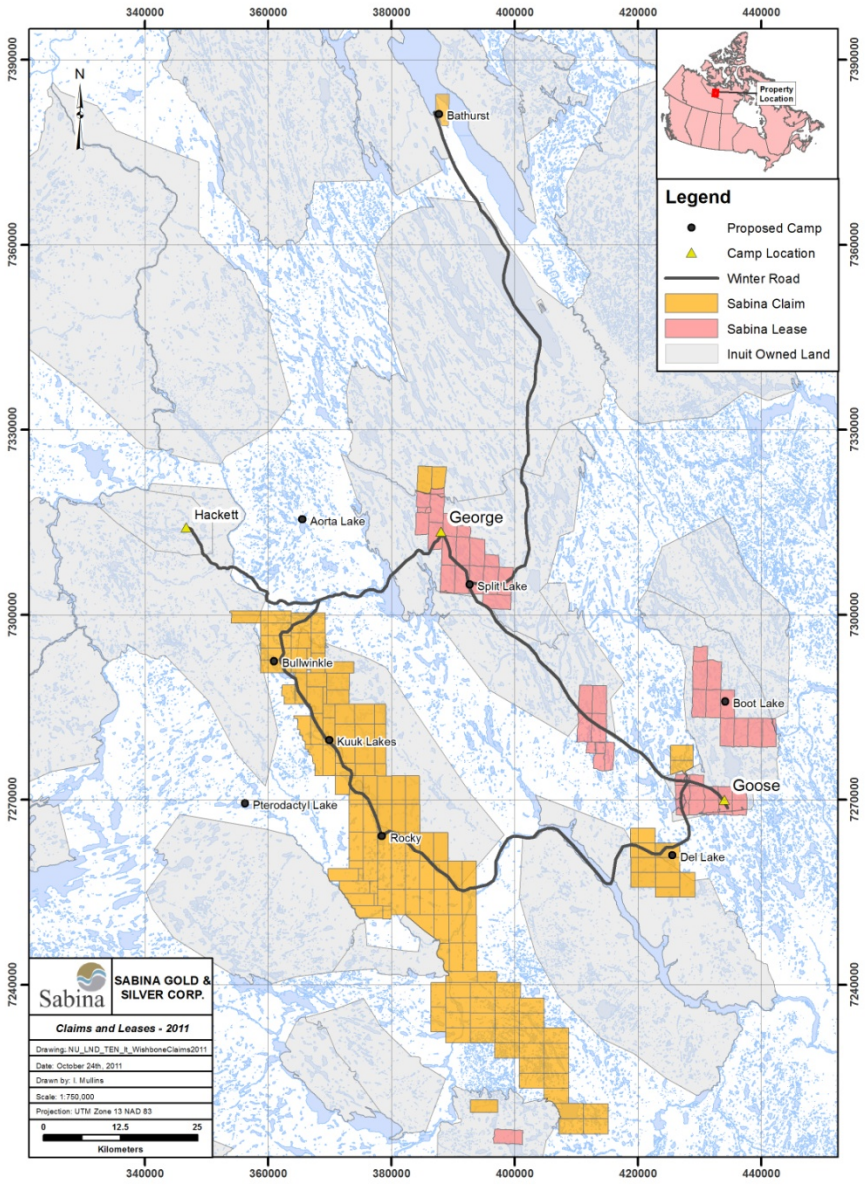
The Waste Management Plan has been developed to outline management and incineration operational practices. The purpose of this Plan is to ensure sound management of non-mineral waste management by minimizing the amount of waste generated and ensuring the safe handling and disposal of all generated wastes. NWB has also required a discussion of mineral waste management that is included in this Waste Management Plan.

Managing wastes and working responsibly will ensure the protection of the environment and personnel safety. Sabina will implement this Waste Management Plan and will continue to look for opportunities to minimize or eliminate negative impacts to the environment as a result of its activities, products and services at Sabina's Projects.

## 1.1. Existing Facilities

The Back River exploration project is located in western Nunavut, south of Bathurst Inlet within the Slave Structural Province. It lies approximately 525 kilometres northeast of Yellowknife, NWT and 400 kilometres south of Cambridge Bay, NU. The project area is within the zone of continuous permafrost, and is represented on National Topographic System 1:250,000 scale map sheets 76F, 76G, 76J, and 76K.

**Figure 1. Location map of the Sabina's exploration properties within western Nunavut.**



### 1.1.1. Goose Camp

The Goose camp is the primary camp for the Back River Project and is located on the slope of the western shore of Goose Lake (Figure 2). It has the capacity to support up to 120 people. The lakeshore is approximately 50 m toward the north and the regional topographical gradient surrounding the camp ranges from 2% to 6% towards the north. The camp is approximately 300 m in length from east to west and 100 m wide from north to south, covering an area of 30,000 m2. A small creek runs east northeast, east of the camp. The camp facilities are located on natural tundra underlain by a 10 cm organic layer overlying silt-sand parent material.

- Latitude: 65º 32'N, Longitude: 106º 25'W
- UTM Coordinates 569405 E, 7265007N on NTS Map Sheet 76G/09

**Figure 2. Areal imagery of Goose Camp (Sept 2011)**

### 1.1.2. George Camp

The George camp is located on the western shore of George Lake (Figure 3) and consists of an approximate 30 people camp. These facilities are located on the eastern side of an esker which has been partially leveled for use as an airstrip. The lakeshore is approximately 60 m to the east of the camp buildings. A lined, bermed bulk fuel storage area is located approximately 100 m off the northwest end of the airstrip.

- Latitude: 65º 55'N, Longitude: 107º 25'W
- UTM coordinates: 613886 E, 7311032N on NTS Map Sheet 76 G/14

**Figure 3. Aerial imagery of George Camp (Sept 2011)**

### 1.1.3. Temporary Camps for Resupply and Exploration

Temporary camps for up to 20 people are established for a season in target areas located 20 km or more from the main camps and would be established for safety, environmental and economic reasons. Possible locations are included in Figure 1. The intent is not to establish a network of camps across the exploration area, but to have the opportunity and flexibility to establish these temporary camps as needed. All solid waste will be carried to the existing camps (Goose and/or George) and disposed as outlined in the approved waste management plan.

### 1.1.4. Overland Corridors

A winter road links the two camps (Goose and George) and extends to Bathurst Inlet. Temporary camp facilities and fuel and chemical storage areas may also be accessed as needed to support exploration activities. Overland corridors are included in Figure 1.

Overland transportation occurs during mid-February to mid-May depending on environmental conditions and operational requirements. Environmental conditions that will determine the route include:

- Ice thickness of a sufficient thickness to support heavy equipment so that pumping and using water to build up will be unnecessary.
- Snow thickness will be a minimum of 15 cm on land to prevent damage to soil and vegetation.
- Weather conditions permit safe transport of equipment and materials.

Any waste generated during the operation of the winter road corridor will be transported to either Goose or George camp and included in the appropriate waste management.

## 1.2. Scope

This Waste Management Plan has been written to meet requirements under the NWB license and applies to all Sabina Projects in the Kitikmeot Region. Subject to annual internal review and revision, it will remain applicable throughout the duration of the NWB license, or until a material change in the scope of the Project occurs.

The goal of any waste management plan is to reduce and prevent impacts to the environment. Managing wastes and working responsibly will also ensure personnel safety while involved in mineral exploration activities.

Sabina conducts waste management under the following guidance:

- Wherever and whenever possible, Sabina and its employees will work toward the 3Rs – reduce, reuse and recycle;
- Sabina is committed to considering additional best management practices and alternatives to hazardous products; and if an appropriate method and/or substitute is identified then it will be incorporated into exploration activities;
- Every effort will be made to purchase products from suppliers with programs and policies of return for used containers and/or unused product where available and economically feasible to do so; and
- Compliance with company policies, legislation and terms and conditions of water licenses and land use permits.

With this guidance, Sabina understands the steps of waste management to include:

- Understand waste streams
- Reduce amount generated
- Separate
- Safe handling/transportation and disposal
- Incineration

# 2. ROLES AND RESPONSABILITIES

## 2.1. All Employees

- Place all waste in properly marked containers.
- Encourage and participate in general good housekeeping within camp boundaries and buildings.

## 2.2. Environmental Coordinator/Manager

- Periodically ensure waste management containers and methods are followed.
- Co-ordinate any inspections by applicable agencies.
- Update and distribute the Comprehensive Waste Management Plan as needed.

## 2.3. Site Superintendent

- Responsible for the overall management of waste as per the Comprehensive Waste management Plan.
- Ensures all staff are instructed on the Comprehensive Waste Management Plan.
- Ensures all legal requirements, including the completion of waste manifests, are filed prior to any shipment.
- Record backhaul volumes for non-hazardous waste.
- Conduct ongoing monitoring as required as per terms and conditions of permits and licenses.
- Summarizes and reports waste management as per terms and conditions of permits and licenses, or as required by Sabina Senior Management.

# 3. Understanding Waste and Wastewater Streams

This Plan covers wastes generated as a result of exploration operations. Wastes considered include, but not limited to, waste generated through the operation and maintenance of exploration facilities such as:

- Drill sites – used oil, antifreeze, used absorbent pads, greases, lubricants, batteries, scrap metal, empty fuel drums, timber/lumber scraps, drill rods, drilling fluids and additives, and drill cuttings with a potential for acid generation/metal leaching.
- Generators and Heavy Equipment - used oil, antifreeze, used absorbent pads, greases, lubricants, batteries, scrap metal, empty fuel drums

- Camp (kitchen, offices and sleeping quarters) – recyclables, food, wood, cardboard, plastic, rubber, glass, batteries, solvents, scrap metal, empty fuel drums, sewage, greywater, construction debris, paint.

# 4. Waste Classification and Management

It is important that wastes are sorted and safely handled and disposed of. Whenever practical waste is sorted at the source and divided into the following categories:

1. Non-hazardous
    a. Combustible
    b. Non-combustible
        i. Recyclables
        ii. Reusables
        iii. For disposal
2. Hazardous

Non-hazardous waste includes food, sewage, wood, cardboard, plastic, rubber, glass scrap metal and empty fuel drums. Hazardous waste includes used oil, oil filters, used absorbent pads, paint, chemicals, batteries and used grease. The following outlines management of hazardous and non-hazardous materials on site.

## 4.1 Non-Hazardous Waste Management

Non-hazardous waste are identified below with a description of how they will be separated on site, sorted and disposed of:

- Combustible wastes – will be incinerated on site as per guidance from "Technical Document for Batch Waste Incineration", Environment Canada (March 2009) incorporated into this plan. This includes kitchen waste, pacto sewage waste, cardboard, wood. The waste ash will be stored and backhauled to Yellowknife for disposal.
- Recyclable and Reusable wastes – will be collected, sorted and stored until they can be backhauled to Yellowknife for inclusion in their recycling program. This includes plastic and aluminum drink containers, printer cartridges, metal containers, plastics (#1 thru #6).
- Non-combustible inert waste – will be sorted and stored on site until backhaul to Yellowknife for inclusion in recycling programs and/or disposal in municipal landfill as appropriate. This includes glass containers, paint cans and batteries
- Scrap metal – will be separated, sorted and stored until backhaul available to Yellowknife and included in scrap metal recycling program. This includes principally empty 205L fuel drums that will be stacked and stored in secondary containment; this also includes some construction waste and equipment parts.

Note that backhaul quantities will be tracked and recorded by camp management to include the type and volume of waste backhauled and note of final destination. Combustible material will be tracked as identified under "incineration management".

- Greywater from the camp kitchen and the drys is currently collected by drainage pipes and gathered in a 500-gallon (1893 litre) open tub and then pumped by a trash pump to a greywater disposal pit located further back (about 110m) from waterway with an automatic, float-controlled pump. Sewage is collected in the Pacto toilet system and included in the combustible waste management.

## 4.2 Hazardous Waste

### 4.2.1 Transportation

Hazardous material wastes will be stored and transported in an appropriate container clearly labeled, and backhaul to Yellowknife. The GN-DoE administers the Transportation of Dangerous Goods Act and Regulations and monitors the movement of hazardous wastes, classifies dangerous goods into nine classifications and sets requirements for the packaging and labeling of materials. The classifications of hazardous materials at Sabina's exploration projects are highlighted in bold below:

- Class 1: Explosives
- Class 2: Gases; compressed, deeply refrigerated, liquefied or dissolved under pressure
- Class 3: Flammable and combustible liquids
- Class 4: Flammable solids
- Class 5: Oxidizing substances; organic peroxides
- Class 6: Poisonous (toxic) and infectious substances
- Class 7: Radioactive materials
- Class 8: Corrosives
- Class 9: Miscellaneous

There are other legislation that applies to the storage, handling and transport of hazardous materials including, but not limited to:

- National Fire Code of Canada
- Fire Prevention Act
- Nunavut Guidelines for Waste Management
- The Mine, Health and Safety Act and Regulations (Nunavut)
- The NWT and Nunavut Safety Act, the Occupational Health and Safety Regulations
- The Workplace Hazardous Materials Information System (WHMIS)

The GN-DoE monitors the movement of hazardous waste from the producer to the final disposal location through the use of a tracking document, a waste manifest. A waste manifest form is filled out

and must accompany all hazardous waste while in transit. Camp management will complete these forms and keep copies on site.

### 4.2.2 Storage

All hazardous materials and wastes will be labeled accordingly to comply with regulations and to inform personnel/contractors of the contents. MSDS sheets will be available for all hazardous materials and will be located in a binder in the office, helicopter shack and drill foreman's tent. MSDS sheets are also included in the Spill Contingency Plan. All personnel/contractors who have to handle hazardous materials will be trained appropriately.

Storage of these products and wastes will be in compliance with the legislation and the National Fire Code that ensures the hazardous materials are stored safely, in a dry manner with clear labeling and secondary containment. All storage areas will be clearly identified with proper labeling and signage. All storage areas will be regularly inspected as outlined in the Spill Contingency Plan. Petroleum products will be stored at least 100m from the high water mark of any waterbody and within secondary containment.

## 4.3 Mineral Waste Management

These are non-hazardous wastes associated with exploration activities. They are identified below with a description of how they will be separated on site, sorted and disposed:

- Where mineral exploration drilling occurs near, or on lakes, the drill return water containing drill cuttings will be pumped well back from the shore of the lake to a natural depression, or sump, the location of which is surveyed and recorded. Because drill cuttings are mechanically pulverized rock, they are geologically similar to the locally present glacial till. If the drill cuttings have a potential for acid rock drainage/metal leaching, it is anticipated that the distance from the water will minimize the impact if the potential is realized. It is expected that drill cuttings will, in time, be colonized by plants and lichen.
- Mineral waste is also associated with rock/core sampling that involves cutting using a rock saw. The rock saw is expected to produce approximately 1/2 m3 of sludge cleaned from the bottom of the settling container in the course of the season. The sludge will consist mostly of sulfides. The sludge will be cleaned from the settling container on an as needed basis, and either placed in emptied and cleaned 205L fuel drums, allowed to dry out, and eventually flown out to the Yellowknife for disposal at a hazardous waste materials handling facility or disposed of in exploration trench at Goose camp.

# 5. Waste Incineration

The incinerator system at Goose camp includes a Westland Environmental Services ltd. model CY-2020 units installed in 2010. It is a diesel-fired, two stage, dual chambered controlled air batch incinerator contained within its own building on site. The capacity of the incinerator, based on typical mixed camp waste, is about 200lbs indicating that 2 to 4 cycles can be processed on a daily basis to incinerate the camp waste.

Additional incinerator capacity will be added to George camp in the 2012 season to support additional exploration activities and personnel within the area. Any new installations will be diesel-fired, two stage, dual chambered controlled batch incinerator similar to the current units.

Adequate training is an important component of successful operation of the incinerator. Westland Services, the incinerator manufacturer, provides on-site training to Sabina personnel and incinerator maintenance. Camp management will track who completes this training and any refresher courses completed. They will also record all preventative maintenance activities undertaken on the equipment.

**Figure 4. Photo of Goose camp Incinerator being installed (July 2011)**

### 5.1 Incinerator Guidelines

- Be sure to wear gloves, goggles, dust mask and face shield before handling waste or incinerator ash.
- Separate waste into what can be burned, and what cannot be burned at the source (e.g. kitchen)
- Burn food wastes daily to avoid accumulation of garbage (minimizes wildlife attractant). The operation of the incinerator will be recorded on a daily basis.
- Make sure the ash is cleaned out prior to recharging for the next burn cycle
- Once cooled the incinerator can be opened and the ash placed in an empty drum which will be sealed, labeled and properly stored for backhaul and disposal in approved landfill. The weight of ash for backhaul will be recorded.
- Waste to be added to the incinerator should be monitored recording type of waste and weight. Note that Pacto toilet waste should make up 1/5 of each batch.
- When the incinerator is charged with the appropriate mix and quantity of waste, the door should be closed, ensure it is locked and the burn cycle started.
- When satisfied that the burn is proceeding in a controlled manned, the incinerator operator may leave the area while the equipment completes the burn cycle.
- Do not add waste to the burn cycle once started.
- Do not use waste oil or any hydrocarbon as an accelerant
- Keep the area around the incinerator tidy

Items that cannot be burned include:

- Styrofoam
- Wood treated with preservatives
- Metal

## 6. Review of Waste Management Plan

The activities and costing of waste management activities will be reviewed internally on an annual basis relative to the long-term exploration strategy for the Project and operational needs.