CHAPTER 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

This chapter describes Graymont's existing operations at the Indian Creek Mine, Graymont's proposed amendment to its existing permit for a life-of-mine expansion of operations (Proposed Action), and reasonable alternatives to the Proposed Action. The proposal to amend MMRA Operating Permit No. 00105 and BLM Plan of Operations MTM 78300 for a life-of-mine expansion of operations is referred to as the Proposed Action in this document. The primary source of information for this Chapter is Graymont's Plan of Operations, which includes the Reclamation Plan (Graymont 2007a).

The Indian Creek Mine (Mine) is located in the Limestone Hills along the eastern flank of the Elkhorn Mountains. The area contains rugged terrain, characterized by a series of massive limestone and dolomite outcrops forming spur ridges interspersed with terraces, fans, and foothill slopes. Indian Creek bisects the north end of the Limestone Hills as it flows east toward the Missouri River. The Crow Creek drainage lies at the south end of the Limestone Hills and flows southeast into the Radersburg Valley where it joins the Missouri River near Toston.

EXISTING OPERATIONS

Graymont (formerly Continental Lime, Inc.) has operated a limestone mine and processing plant at Indian Creek since 1981 (Graymont 1981). The Mine is currently permitted for 757 acres of disturbance including mine pits, overburden disposal areas, a reject rock pile, crusher site, haul roads, plant facility, and a load-out area. As shown on **Figure 2-1,** the existing mine disturbance is within the 1,735-acre operating permit area. Actual surface disturbance is 288 acres. The disturbance boundary is smaller than the permitted disturbance area to allow flexibility for mine planning and response to market conditions.

The legal description of existing permitted operations includes portions of Sections 28, 29, 32, and 33 Township 7 North, Range 1 East and portions of Sections 4, 5, 8, 9, 16, and 17 Township 6 North, Range 1 East, Montana Principal Meridian, Broadwater County, Montana. Included in the mine disturbance is a 3.8-acre rail terminal and load-out facility located in Section 25, Township 7 North, Range 1 East, near the intersection of Indian Creek Road and U.S. Highway 287 approximately 3 miles east of the Plant site (**Figure 2-1**). The existing Plant is located on private land owned by Graymont in Section 28, Township 7 North, Range 1 East.

Graymont has developed a series of mine pits along the north-south strike of the high-calcium limestone ore body in the North Claims Area. Faulting has displaced the limestone bed vertically into numerous blocks along its length resulting in varying thickness of overburden (geologic material considered waste that overlies ore) on either side of the fault zone. Many of the fault blocks have little or no overburden covering the high-calcium bed, while other blocks have in excess of 100 feet. High-calcium limestone ore beds outcrop with variable steepness along the east and west sides of a north-south trending ridge with thicknesses varying from 100 to 160 feet.

Existing surface disturbance for mine pits, reject rock, overburden disposal areas, and ancillary facilities placed outside mine pits in the North Claims Area is shown in **Table 2-1**.

TABLE 2-1
Existing Disturbance – North Claims Area
Indian Creek Mine

Facility	Existing Disturbance (acres)
Mine Pits	91.7
Overburden Disposal Areas	15.3
Reject Rock	63.4
Soil Stockpiles	11.6
Plant and Facilities	23.9
Haul/Access Roads	20.5
Areas undergoing Reclamation	61.6
TOTAL	**288**

Source: Graymont 2007a.

MINE OPERATIONS

A total of approximately 1 million tons of ore, in-seam waste rock, and overburden are mined annually at the Indian Creek Mine. Finished lime product ranges from 37 to 45 percent of the total rock and overburden removed (1 million tons). Reject rock (less than ½ inch in diameter) accounts for up to 35 percent; in-seam or overburden waste ranges from 0 to 20 percent; and lime kiln dust averages 5 to 8 percent of the finished product. Exploration drilling conducted in advance of mine operations defines pit layout and disturbance boundaries. Pits are not contiguous but are developed in sequence from north to south along a north-south trending ridge. Clearance of UXO is followed by clearing and grubbing of vegetation and removal and salvage of available soil materials from areas to be disturbed.

Trees larger than 6 inches in diameter removed in advance of mining operations are generally cut for fire wood. Trees and shrubs less than 6 inches in diameter are slashed or machine mulched and mixed into salvaged soil material. Stumps, dead trees, and limbs are placed on reclaimed sites. Timber removed for commercial purposes from public land is coordinated with BLM.

Mining is conducted using standard open pit and quarry practices. Haul roads are constructed to access the highest elevation of the quarry, and mining begins at the top of the ore body and progresses downward. Limestone is removed in layers or "benches" approximately 20 feet thick. The thickness of each bench is dictated by the depth of the blast holes. As mining progresses downward on the deposit, safety rock catch benches are constructed on the mine face at a minimum width of 20 feet. These catch benches are established at vertical intervals ranging from 20 to 60 feet in height. Safety rock catch benches are constructed down slope and outside active mining areas to prevent rocks from rolling beyond the permit area. Highwalls constructed between rock benches are sloped back approximately 5 to 15 degrees. Rock and debris that accumulate along the edge of quarry benches are periodically removed to prevent movement down slope. Ramp roads within the pit connect adjacent benches to provide truck and loader access.

To Highway 12/287
And Railroad Load-out
Facility

Indian Creek Road

Plant
Site

Conveyor

Crusher

Kiln
Dust
Storage

T7N/R1E

T6N/R1E

Indian Creek

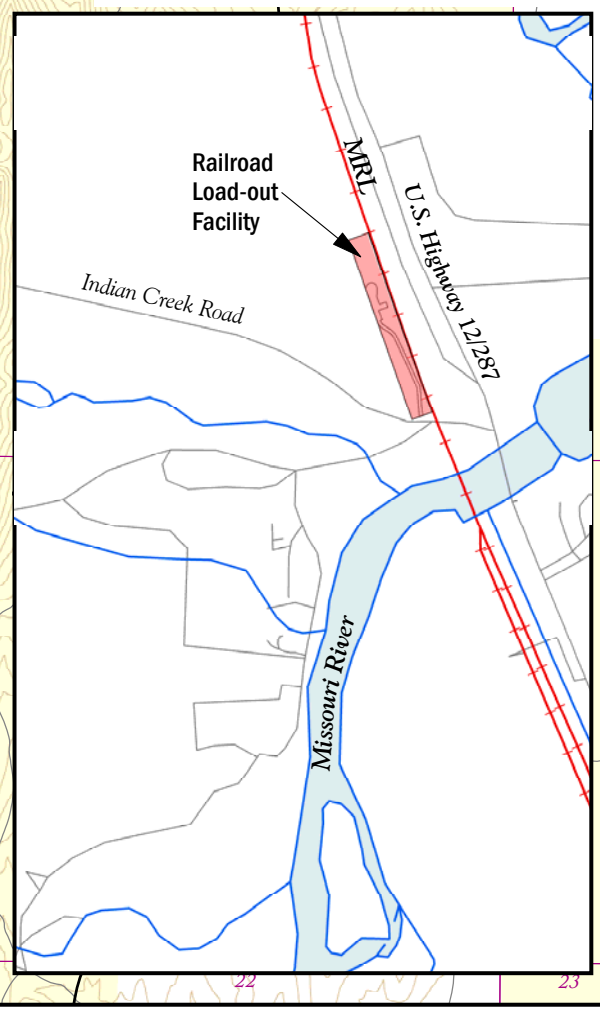
MONTANA ARMY NATIONAL GUARD
LIMESTONE HILLS TRAINING AREA

Old Woman's Grave Road

Mud Springs Road

30 29 28 27 26
31 32 33 34 35
6 5 4 3 2
7 8 9
18 17 16
19 20 21 22 23

RAIL TERMINAL LOCATION MAP



Base Data Source: Montana NRIS GIS Data

N

0 Feet 2,000

County Roads
Other Roads
Streams
Township/Range
Sections
Existing Operating Permit Boundary
2.75 Rocket Fan Line

Existing Mine Disturbance

Mine Pits
Overburden
Mine Facilities
Reclaimed Areas
Reject Rock
Haul Roads
Soil Stockpiles

Land Ownership

State of Montana
Bureau of Land Management

U.S. Department of the Interior
Bureau of Land Management
Butte Field Office
Butte, Montana

EXISTING OPERATIONS - NORTH CLAIMS AREA
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE
2-1

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Blasted limestone is loaded into trucks using a front-end loader and transported to the crusher facility. Limestone is placed in a hopper then crushed and screened. Screened limestone is transported on a conveyor to storage piles at the plant facility located north of Indian Creek.

Overburden is placed in either designated overburden disposal areas along the perimeter of the mine pit or in portions of mine pits depleted of economically recoverable limestone. Up to an estimated 50 percent of overburden can be placed in certain areas depleted of reserves at various times during the mine life. This is contingent on the availability of overburden and accessibility of these areas.

Prior to placement of overburden in disposal areas, soil and/or growth media are removed. Growth media is earthen material that is desirable and suitable to support growth of vegetation. Temporary haul roads are constructed to overburden disposal areas as mining progresses. Current permitted overburden disposal sites are shown on **Figure 2-1**. Overburden in the North Claims Area averages approximately 4 million tons per 1,000 linear feet of mine development.

Overburden is placed in a configuration so as not to obstruct any major drainage. Final grading re-establishes drainage systems near the toe of re-graded overburden piles. Final contoured slopes in terms of horizontal (H) to vertical (V) ratios would be established ranging from 2.0H:1.0V to 3.0H:1.0V to provide landscape diversity. The natural ground slope angle under and adjacent to some overburden disposal sites may dictate a steeper slope in some areas.

REJECT ROCK

Reject rock resulting from the ore crushing operation consists of limestone fines that pass a ½-inch screen. Screened rejects from the crusher are placed in lifts between mine pits as shown on **Figure 2-1**. Approximately 5 million tons of reject rock have been placed in this area and is periodically sold for various purposes including land reclamation where acidic conditions exist. The area is maintained at two percent slope toward the north to optimize infiltration of storm water and limit run-off. Final slopes along the north and west sides will be graded to attain slopes ranging from 2.0H:1.0V to 3.0H:1.0V to provide topographic diversity. Flatter slopes are used where necessary to ensure stability.

Analysis of reject rock has shown that it can absorb a 100-year, 24-hour storm event (Chen-Northern 1991). Data from the National Oceanic and Atmospheric Administration indicate that a 100-year, 24-hour storm event for this area would be 2.8 inches of precipitation (NOAA 1973). A value of 3 inches was used in conducting the analysis. To date, run-off or discharge from the reject rock disposal area has not been observed. Past observations indicate that this material does not discharge water with rainfall amounts encountered at the Mine site. A lysimeter (device that measures the moisture content of soil) has been placed at the base of the reject pile to monitor water conditions within the reject pile. The lysimeter indicates an unsaturated pore space environment.

ORE PROCESSING

Limestone ore is hauled to the crusher located south of Indian Creek (**Figure 2-1**). Reject rock is separated from crushed ore, stored (as discussed above – Reject Rock), and sold as a product. Crushed ore is transported via a 1,500-foot conveyor across Indian Creek to stockpiles located at the plant facility (**Figure 2-1**). From the storage piles, limestone is conveyed into rotary kiln heaters.

Limestone ore is initially heated to a temperature of about 1,800° F and fed to one of two rotary kilns where it is subsequently heated to a temperature between 2,200° and 2,500° F for a period of 2½ to 3 hours. As the limestone travels through the slightly sloping, rotating kiln, the temperature of the limestone increases as it moves closer to the flame. The heating action converts the limestone (calcium carbonate - $CaCO_3$) to lime (calcium oxide - CaO) as the product. After the lime reaches the discharge end of the kiln, it is cooled and conveyed to one of several storage silos. Product lime is then loaded into trucks for transport to the rail terminal or directly to consumers. Each kiln can produce about 500 tons of lime (also known as quicklime) per day.

Approximately 40,000 tons of coal and 30,000 tons of petroleum coke are used annually to fuel the kilns at the processing plant or about 320 tons of fuel per day. A stockpile of approximately 15,000 tons of coal and petroleum coke is maintained on-site. A berm has been constructed around the stockpile to divert surface water away from the stockpile.

KILN DUST

Kiln dust is produced during the ore processing circuit. Each kiln circuit is equipped with a baghouse to capture particulates from kiln emission exhaust, lime handling, and unloading. Lime kiln dust collected in the baghouse is sold for various applications. Kiln dust is produced at an approximate rate of 7 percent of production (currently 50 tons per day/18,250 tons per year). Kiln dust is stored on-site in a 150-ton silo. At the present time, all kiln dust is sold out of the silo as it is produced. Kiln dust produced in excess of silo storage capacity is transported using a covered 10-ton truck to a storage area located west of the existing haul road as shown on **Figure 2-1**. A dike of overburden and soil was constructed along the southwest side of the storage site to contain the kiln dust and prevent storm water run-off from entering the area. Storm water run-on is diverted around the kiln dust storage facility.

Kiln dust, used as a neutralizing agent for acidic soil, is generally 20 to 40 percent calcium oxide, 5 percent magnesium oxide, and 40 to 50 percent calcium carbonate with minor amounts of silicon, iron, or aluminum oxides. Laboratory analysis has been performed in accordance with Extraction Procedure Toxicity Test (Federal Register, Vol. 45, No. 98, pp. 33127-33128) on kiln dust to determine leachable concentrations of trace elements. Results showed non-detectable concentrations for arsenic, cadmium, lead, mercury, selenium, and silver. Results for barium and chromium were below the maximum allowable concentration levels (Graymont 2007a).

SOIL SALVAGE

Soil material and growth media (including weathered Amsden Formation) with less than 40 percent coarse fragments are salvaged prior to mining activities. Coarse fragments are defined by Graymont as rocks greater than ½ inch in diameter. Soil volumes salvaged, stockpiled, or used for reclamation are reported each year in Graymont's annual report. To date, approximately 294,000 cubic yards of soil material have been salvaged and placed in stockpiles as shown on **Figure 2-1**. Approximately 64,000 cubic yards have been placed on 61 acres undergoing reclamation. Soil material is replaced to depths ranging from 2 to 9 inches.

HAUL ROADS

Existing haul roads have been constructed using a balanced cut and fill configuration (cutting material from above the slope and using it to fill in the lower slope to construct the width of the roadbed) or a full bench method (full width of road cut from above slope so no fill is used to

make roadbed). Mine roads are constructed to a width of 60 feet with a 4-foot-high berm on the downgradient side in compliance with Mine Safety and Health Administration (MSHA) standards. The wear surface is constructed using reject rock to a maximum grade of 8 percent or less. Temporary haul roads are constructed along the deposit as mining progresses. These roads are ultimately removed or reclaimed as each pit is mined out.

SURFACE WATER CONTROLS

Surface water control structures have been constructed in accordance with an approved Storm Water Pollution Prevention Plan (Graymont 2006). Various storm water control structure designs and calculations are contained in the Storm Water Pollution Prevention Plan.

Surface water detention basins and drainage ditches are constructed as needed as mining progresses. Berms have been constructed along haul roads and around the plant and crusher site in accordance with applicable Mining Safety and Health Administration regulations. When used as a Best Management Practice for storm water control, berms are designed, constructed, and maintained to withstand a 10-year storm event.

UNEXPLODED ORDNANCE (UXO) CLEARANCE

Most of the Project area lies within the Montana Army National Guard (MTARNG) LHTA designated as live fire Surface Danger Zones and may have been contaminated with unexploded ordnance (UXO). Ordnance that fails to detonate fully upon impact is considered UXO. Site preparation by Graymont includes clearing and grubbing vegetation from proposed disturbance areas. Because the Department of Defense prohibits exploration, drilling, and mining on the surface of UXO-contaminated land, MTARNG initiated UXO clearing activity to remove ordnance and explosives hazards on mining claims considered to be high priority by Graymont. The high priority UXO clearance area is within a BLM-instituted closure area, west of Old Woman's Grave Road, and is currently under the safety control of MTARNG.

The MTARNG, Department of the Army, ACOE, and Department of Defense are jointly responsible for identifying and clearing UXO in the LHTA. Site-specific information on the amount of UXO and ordnance fragmentation contamination in the Project area is unknown. The Army has previously been able to clear about 25 acres per year. However, that rate of clearance has increased with an additional 84 acres released in early 2008. MTARNG currently estimates that UXO clearance in the existing mine permit area (North Claims Area) will be completed by 2010, if funding remains available at current levels. The Right-of-Way and the Memorandum of Agreement between BLM, Graymont, and MTARNG requires remediation of UXO in the proposed joint use area. Any mining that would occur in this area depends upon successful completion of UXO clearance as determined by the Department of Defense Explosive Safety Board.

ANCILLARY FACILITIES

Potable Water

Graymont maintains two water supply wells at the plant site for operations and potable use. Plant Site Well No. 1 was completed in 1981 to a depth of 805 feet and is screened from 440 to 700 feet below ground surface. Plant Site Well No. 2 was drilled in 1995 to a depth of 685 feet and is screened from 420 to 620 feet below ground surface. Plant Site Well No. 2 serves as the primary water supply well for the facility and provides 100 gallons per minute (Hydrometrics, Inc. 2007).

Dust Suppression

A dust suppressant (magnesium chloride) is regularly applied to haul roads in cooperation with Broadwater County with follow up applications of water to help control dust. Dust suppression water systems are used at the crusher hopper and screening plants. Water pumped from the plant site (Well No. 2) is also used for dust suppression. Approximately 5 million gallons of water per year are used for dust suppression (Graymont 2007a).

Explosives

Ammonium nitrate and fuel oil (ANFO) are used as blasting agents at the Indian Creek Mine. Down hole placement of blasting agents is performed by contract suppliers. Drill patterns and detonation are controlled by Graymont licensed blasters.

Electrical Power

Electrical power to the lime plant is provided by NorthWestern Energy Company's 100 kilovolt (kV) system through an outdoor substation. The plant secondary distribution voltage level is 4,160 volts and the utilization voltage levels are 480, 240, and 120 volts.

Sewage Treatment

Portable toilets are maintained at two sites and serviced regularly by a contractor. The existing plant and rail terminal load-out sites have septic systems.

Solid Waste Disposal

Solid waste is disposed of in accordance with regulatory guidelines. No solid waste is buried on-site unless approved by the regulatory agencies. Scrap metal is salvaged and recycled. Refuse and other undefined solid waste are disposed in the Broadwater County public landfill. No hazardous waste is generated or disposed of on-site.

Public Safety

Graymont is authorized to restrict unaccompanied public access to land within the operating permit boundary (**Figure 1-2**) to provide protection of public health and safety. The right-of-way for the Indian Creek Road is excluded from this restriction. Signs, fences, or other markings that identify the restricted area and alert the public to hazardous sites or conditions are posted, maintained, moved and adjusted periodically to meet current conditions and comply with applicable federal and state regulations.

Fire Protection

Graymont has adopted measures to avoid range and forest fires through implementation of the Indian Creek Plant Fire Protection Plan (Graymont 2007a). Equipment and facilities are equipped with fire safety systems and inspected regularly to ensure that MSHA or other applicable standards are met.

Hazardous Materials

Hazardous materials currently used and/or stored at the Indian Creek Mine include ethylene glycol (antifreeze), diesel fuel, unleaded gasoline, motor oil, hydraulic and transmission fluids, and various types of cleaners and fluids (*e.g.*, brake fluid, battery acid, fuel additives) in small containers. Petroleum products used at the Mine are stored in aboveground storage tanks with secondary containment designed to hold 110 percent of the volume of the largest container. Used motor oil and antifreeze are recycled. A Spill Prevention, Control, and Countermeasure Plan has been implemented at the Mine describing cleanup procedures should a spill of hazardous materials occur on the site (Graymont 2007a).

Rail Terminal and Load-Out Facility

A rail terminal load-out facility (3.8 acres) is located within an 8-acre parcel adjacent to U.S. Highway 287 near the intersection with Indian Creek road (**Figure 2-1**). The facility consists of an office and a single 150-ton fuel (coal/coke) storage silo used to off-load coal and coke shipped via rail for use at the Plant site. Two 800-ton lime storage silos are used to fill rail cars for shipment.

EMPLOYMENT

Graymont currently employs 48 persons and operates the plant on a 24-hour, 7-days per week schedule. Graymont's annual payroll was approximately $1.65 million in 2007. The quarry contractor employs 15 persons with an annual payroll of about $800,000.

MONITORING PROGRAMS

AIR QUALITY

Particulate emissions from mining, processing, and wind erosion are regulated under the Montana Clean Air Act. Permits authorized under this act are issued by DEQ. Graymont operates the Indian Creek Mine in accordance with Air Quality Permit No. 1554-16. Quarterly and annual reports are submitted to DEQ. No violations of emission standards have occurred at the Indian Creek Mine (DEQ 2006a).

WATER QUALITY

Graymont regularly monitors water resources in and peripheral to the Indian Creek Mine to further develop the water resources database generated over the past several years and to detect possible changes in the hydrologic system that may be related to mining activities. The Operational Monitoring Program includes monitoring of surface water and groundwater, including springs and seeps, and infiltrating pore water using a lysimeter installed in the reject rock pile (Graymont 2006).

Surface Water

The existing Operational Monitoring Program includes six surface water sites (four on Indian Creek and two on Crow Creek) and five spring/seep sites (Graymont 2006). Surface water sampling locations and laboratory results are discussed in Chapter 3 – *Water Quantity and Quality*. Surface water samples are analyzed for total suspended solids, total dissolved solids, pH, total nitrogen, nitrite plus nitrate nitrogen, total Kjeldahl nitrogen (organic nitrogen), and total phosphorus. Surface water sampling occurs annually.

Graymont maintains a Montana Pollutant Discharge Elimination System (MPDES) permit for industrial storm water point source discharges from the facility. Sampling requirements are outlined in the Storm Water Pollution Prevention Plan if a discharge occurs.

Groundwater

Plant site well(s) are sampled semi-annually by Graymont under the DEQ Public Water Supply program. Water supply monitoring includes sample collection and analysis for oil and grease, total suspended solids, total dissolved solids, pH, total nitrogen, nitrite plus nitrate nitrogen, total Kjeldahl nitrogen, and total phosphorus. Metals analysis has been reduced to aluminum (dissolved) and total recoverable arsenic, cadmium, copper, iron, lead, and zinc. Sampling results are contained in annual reports submitted to DEQ and BLM.

The lysimeter located in the reject rock pile monitors quantity and quality of pore moisture (long-term seepage) through the material at the reject rock/bedrock interface monitoring indicates the reject rock material is not

saturated (Graymont 2007a). The lysimeter is monitored annually under Graymont's Operational Monitoring Program (Graymont 2006).

All Operational Monitoring sites are monitored annually in late spring (May or June) when stream and spring flows are relatively high but snowmelt effects have subsided.

RECLAMATION PLAN

Graymont updates its reclamation plan annually and submits the revised plan to DEQ and BLM for approval. All areas disturbed by mining activities will be reclaimed in accordance with approved plans. Some pit highwalls will be reclaimed as cliff or talus rock features. Final grading will blend with surrounding topography wherever possible. Sloped areas will have soil and/or growth media placed to a depth ranging from 2 to 9 inches during final grading. Soil thickness varies based on the revegetation plan for a given area. Areas revegetated with mountain mahogany receive 2 inches of growth media, whereas areas seeded with grass-dominated plant communities have up to 9 inches of growth media.

Public access to highwalls, benches, or cliff sites will be controlled at final reclamation with gates, signs, and berms. Prior to final reclamation, Graymont will consult with BLM and DEQ to ensure closure plans meet the approved reclamation plan (Graymont 1981).

Plant Site

During final closure, all processing equipment at the plant and the office building will be dismantled and removed from the property. Concrete structures and foundations will be demolished and buried in graded fill areas or covered with a minimum of 12 inches of reject fines prior to placement of soil material. Slopes along the north side of Indian Creek will be graded to their approximate original contour whenever possible. The fill area east of the Plant site will be graded to a 2.0H:1.0V or 3.0H:1.0V slope. The bridge and conveyor across Indian Creek will be removed. All power lines and poles will be removed from the property. A portion of the access road from Indian Creek Road to the Plant site will be removed and reclaimed unless a subsequent owner applies to the agencies to retain it.

Rail Terminal and Load-Out Facility

The rail terminal, located near U.S. Highway 287 will remain an industrial facility. All residual lime and coal will be removed from storage bins and transported to the Plant site or sold. The rail terminal will be secured for future use by limiting unauthorized access through maintenance of fences and gates.

Crusher

The crusher and overland conveyer system will be dismantled and removed from the site after all mining is completed. Foundations will be demolished and either buried in the reject pile or covered with reject fines. The site will be graded to blend with surrounding topography. Cut embankments will be back-filled with reject fines to establish a smooth transition between original contours and flat areas. Soil material will be placed over the area and revegetated with the seed mix contained in the approved Reclamation Plan (Graymont 1981).

Haul Roads

Haul roads and other access roads no longer needed for mining operations will be reclaimed using an excavator or dozer to place fill material removed from the down slope side of the road into the road cut. Where possible, the cut bank side of the road will be pulled down to make a smooth transition with the backfilled material.

The main access and haul road from the Plant site to the various mining sites will be partially reclaimed. This system of roads will be reclaimed using the same methods as described above but a small corridor, approximately 8 to 16 feet wide, will be left at road grade to provide long-term access from the Indian Creek Road to the south limit of mining within the permit boundary. This access is necessary for monitoring and maintenance of reclaimed and re-vegetated areas throughout the mine site. This road will be scarified or covered with fines, covered with 2 to 9 inches of soil material, and reseeded to grass.

Reject Rock

Final contours of the reject rock pile will be established as reject fines are placed during day-to-day operations. Final grading will blend temporary haul roads with surrounding topography. Slopes will be established at less than 3.0H:1.0V. Soil material will be placed at a thickness ranging from 2 to 9 inches and seeded with the approved mixture.

Revegetation

All seed purchased for reclamation will be standard grade adapted to Montana conditions and certified noxious weed free. The seed mix may be changed with agency approval. Seed will be broadcast on prepared soil material, soil stockpiles, or reclaimed sites within 48 hours of soil preparation and dragged, raked, or tracked into the seedbed. The tracked vehicle or implement will have grousers at least ½ inch high. The grooves formed by the tracked vehicle will be oriented perpendicular to the slope, and tracking will cover 100 percent of the slope. The seeding period will be October 15 through April 30 unless revised by the regulatory agencies.

The BLM and DEQ approved seed mix (25 pounds per acre of pure live seed [PLS]) includes the following species and rates for broadcast seeding:

- 2 lbs. PLS Western Wheatgrass
- 2 lbs. PLS Streambank Wheatgrass
- 6 lbs. PLS Slender Wheatgrass
- 6 lbs. PLS Bluebunch Wheatgrass
- 1 lb. PLS Indian Ricegrass
- 2 lbs. PLS Idaho Fescue
- 2 lbs. PLS Wheat or Barley
- 2 lbs. PLS Winterfat
- 1 lb. PLS Lewis Flax
- 1 lb. PLS Western Yarrow

In addition to the grass and forb species listed above, tree and shrub seedlings will be planted at rates of 50 to 400 plants per acre on reclaimed areas. Species include curl-leaf mountain mahogany, Douglas-fir, Rocky Mountain juniper, common juniper, golden currant, small soapweed yucca, rose species, black sagebrush, skunkbush sumac, and limber pine. Seedlings, raised from seed sources collected on the mine property, will be used. Seedlings in selected mountain mahogany/juniper reclaimed areas will be planted at a rate up to 400 plants per acre. Seedlings will be planted during optimum planting periods of October 15 through April 30. Shrub planting from seed was completed during spring of 2007. Species planted included black sagebrush (0.5 lb. PLS/acre), yucca (2 lbs PLS/acre), skunkbush sumac (4 lbs PLS/acre), and rubber rabbitbrush (1 lb. PLS/acre). Two additional species, mountain mahogany and golden currant, will be included in the seed mix in 2008.

Fencing of newly seeded areas will not be necessary as livestock grazing is restricted within the mine area by steep terrain, cattle

guards, and existing fences. Livestock grazing will not be allowed on reclaimed areas until DEQ releases the reclamation bond. If a problem with livestock occurs, Graymont would provide fencing or other measures to prevent damage to reclamation plantings.

Noxious Weeds

Graymont conducts weed control activities under an approved Broadwater County Weed Management Plan. The Weed Management Plan (Graymont 2007b) is updated periodically in response to new infestations or expanded mine operations. Weed control activities are coordinated with Broadwater County, MTARNG, BLM, and USDA - Forest Service. Annual weed control activities are summarized in annual reports to the agencies.

ENVIRONMENTAL CONTROL MEASURES

Standard operational environmental control measures currently used by Graymont at the Indian Creek Mine include:

- All surface disturbances will be reclaimed in accordance with applicable BLM and DEQ regulations and the approved Reclamation Plan.

- Land clearing activities in advance of soil salvage and mining operations are limited to the extent practicable and conducted only on an as-needed basis. Trees larger than 6 inches in diameter removed in advance of mining operations are generally cut for fire wood. Trees and shrubs less than 6 inches in diameter are slashed or machine mulched and mixed into salvaged soil material. Stumps, dead trees, and limbs are placed on reclaimed sites.

- Concurrent reclamation is conducted during ongoing operations to the extent practicable to control sedimentation and erosion and return the land to post-mining use.

- Suitable growth media are salvaged from disturbance areas. Soil material is stockpiled and seeded for future use or direct-hauled to regraded areas and placed for final surface reclamation.

- Graymont's Weed Management Plan (Graymont 2007b) has been approved by Broadwater County. The Weed Management Plan has been implemented to ensure that reclaimed areas are protected from noxious weed invasion. Annual weed control activities are summarized in reports submitted to Broadwater County, BLM, and DEQ.

- Roads no longer needed for reclamation and access in mine areas are graded, covered with salvaged growth media, and contoured to blend with the surrounding terrain. The regraded surface is left in a roughened condition and seeded during the first appropriate season to promote vegetation success. Noxious weeds are monitored and controlled on reclaimed roads.

- Run-on control berms are constructed around active mine pits to prevent surface water from entering work areas. Sediment control basins are constructed to collect, settle, and infiltrate or evaporate run-on/run-off water from areas disturbed by mining operations.

- Storm water is controlled using material handling procedures that minimize exposure of material to storm water; spill prevention and response measures; sediment and erosion control; and physical storm water controls.

- Best Management Practices, including temporary sediment ponds, small check dams, and sediment fences, are placed around all potential sediment sources such as stockpiles, overburden disposal areas, and new construction areas as erosion control measures until vegetation is established to provide stable soil conditions.

- Fugitive dust emissions are controlled in accordance with Air Quality Permit No. 1554-16 through use of direct water application, chemical binders or wetting agents, and revegetation of disturbed areas concurrent with operations.

- Dust suppression sprays and dry dust collection systems (baghouses) have been installed on ore crushing circuits and all ore and coal transfer points at the Mine.

- Gaseous emissions are minimized through proper operation and maintenance of equipment.

- Surface water and groundwater monitoring is conducted during operation of the Mine to identify, quantify, and prompt implementation of corrective actions to reduce or eliminate potential adverse impacts that might result from mining activities.

- Short-term reclamation objectives for the overburden disposal areas are to minimize potential for erosion, slope failures, and sediment movement from disturbed areas and to facilitate final reclamation. Long-term objectives include preventing ponding, promoting controlled run-off of surface water, and preventing erosion of reclaimed surfaces.

- Recontoured surfaces would be covered with soil material to depths ranging from 2 to 9 inches depending on the type of plant community being restored.

- The Plant and crusher sites will be decommissioned prior to the demolition or salvage of any structures. Portable equipment of value including vehicles, furniture, and computers will be removed from the site for subsequent reuse or salvage. Decommissioning the crushing and screening plant will be initiated after the last ore has been processed.

PROPOSED ACTION (LIFE-OF-MINE EXPANSION)

Graymont is proposing to amend MMRA Operating Permit No. 00105 and BLM Plan of Operations MTM 78300 to include a life-of-mine expansion of mining operations at its Indian Creek Mine located approximately 4 miles west of Townsend, Montana (**Figure 1-1**). The proposed amendment (Proposed Action) would encompass approximately 1,940 acres of public land currently administered by BLM located in portions of Sections 27, 28, 33, and 34; Township 7 North, Range 1 East and portions of Sections 16, 17, 20, 21, 28, and 29; Township 6 North, Range 1 East, Montana Principal Meridian, Broadwater County, Montana (**Figures 2-2** and **2-3**). Graymont proposes to continue lime production at a rate of approximately 1 million tons annually. The life-of-mine expansion amendment represents approximately 50 years including 15 years of

currently permitted life-of-mine. Graymont would also mine dolomite as markets and products are developed.

As shown on **Figures 2-2** and **2-3**, a disturbance boundary would be established within the overall proposed operating permit area. Actual surface disturbance for mine activities within the disturbance boundary would be less than the permitted disturbance to allow flexibility for mine planning.

Proposed mining disturbance for the life-of-mine expansion would total 1,313 acres (968 acres in the South Claims Area and 345 acres in the Dolomite Claims Area) as shown in **Table 2-2**.

MINE PIT EXPANSION

Expansion of mine operations into the South Claims and Dolomite Claims areas would increase the area requiring UXO remediation by about 1,300 acres. At this time, MTARNG is unable to provide an estimate of the time and effort necessary to provide UXO clearance in these areas.

SOUTH CLAIMS AREA

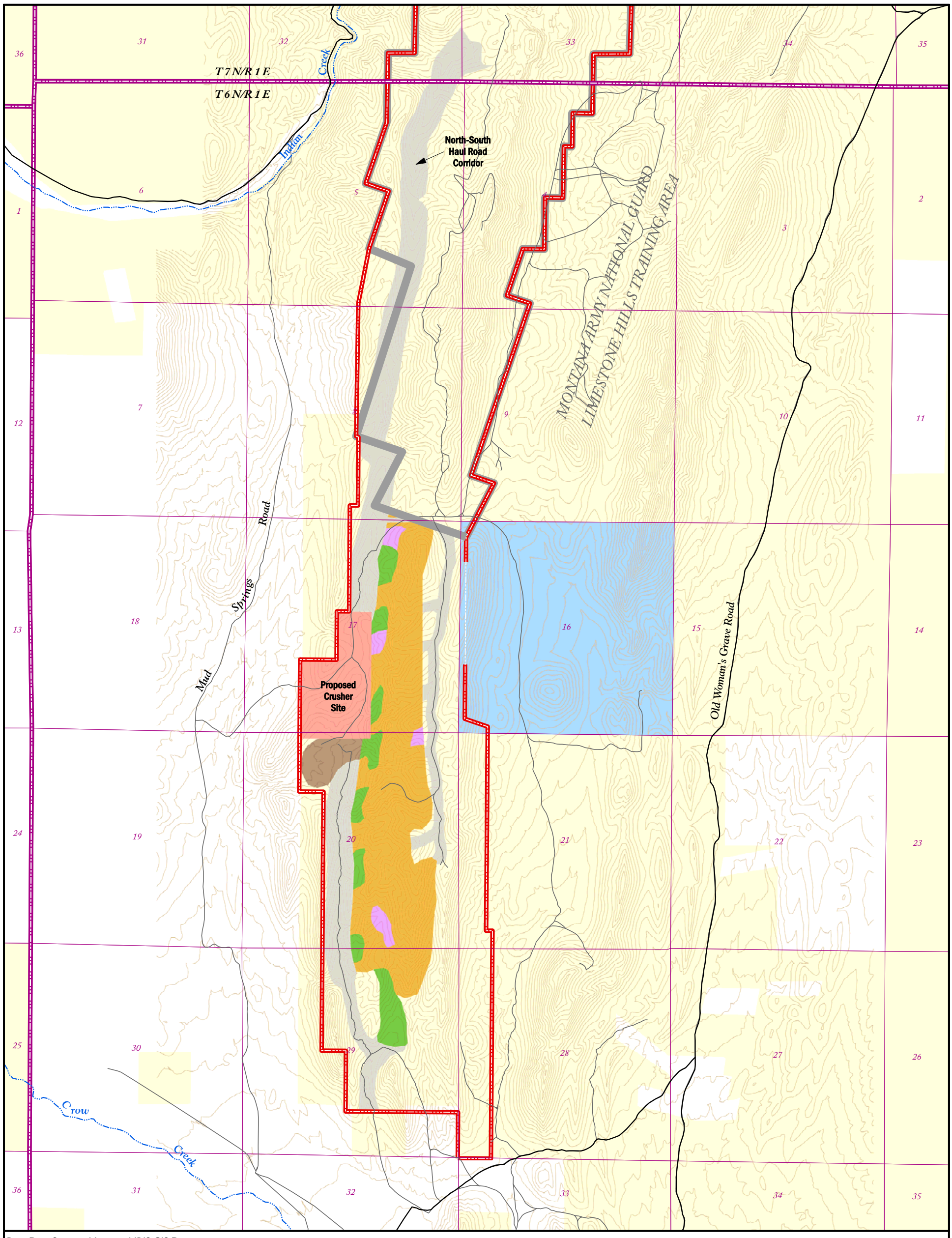
Graymont proposes to extend mine operations approximately 2.5 miles south beyond the existing operating permit boundary into the South Claims Area as shown on **Figure 2-2**. The South Claims Area contains unpatented claims on public land held by Graymont. Proposed mine operations would progress southward along a high-calcium limestone ore body on the north-south trending ridge currently being mined. Mine pit development in the South Claims Area would disturb approximately 343 acres (**Table 2-2**).

Mining activities in the South Claims Area would continue in the same manner as current operations in the North Claims Area. Limestone would be removed in layers or "benches" approximately 20 feet thick. As mining progresses downward on the deposit, safety rock catch benches would be constructed to a minimum width of 20 feet. These catch benches would be established at vertical intervals ranging from 20 to 60 feet in height. Ramp roads within the quarry would connect successive benches to provide truck and loader access.

TABLE 2-2
Proposed Disturbance for Life-of-Mine Expansion
Indian Creek Mine

Facility	Disturbance (acres)
South Claims Area	
Mine Pits	343.0
Overburden Disposal Areas (8)	64.5
Soil Material Stockpiles (4)	18.8
Haul & Access Roads	412.0
South Claims Area Crusher Site	101.0
Reject Rock	28.9
Subtotal	**968.2**
Dolomite Claims Area	
Mine Pits	214.1
Overburden Disposal Area (1)	33.0
Soil Stockpiles (1)	9.4
Haul and Access Roads	88.2
Subtotal	**344.7**
TOTAL	**1,312.9**

Source: Graymont 2007a.



Base Data Source: Montana NRIS GIS Data

N

0 Feet 3,000

- County Roads
- Other Roads
- Streams
- Township/Range
- Sections
- Proposed Operating Permit Boundary
- Existing Operating Permit Boundary

Proposed Mine Disturbance

- Mine Facilities
- Mine Pits
- Overburden
- Reject Rock
- Haul Roads
- Soil Stockpile

Land Ownership

- State of Montana
- Bureau of Land Management

U.S. Department of the Interior
Bureau of Land Management
Butte Field Office
Butte, Montana

PROPOSED OPERATIONS SOUTH CLAIMS AREA
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE
2-2

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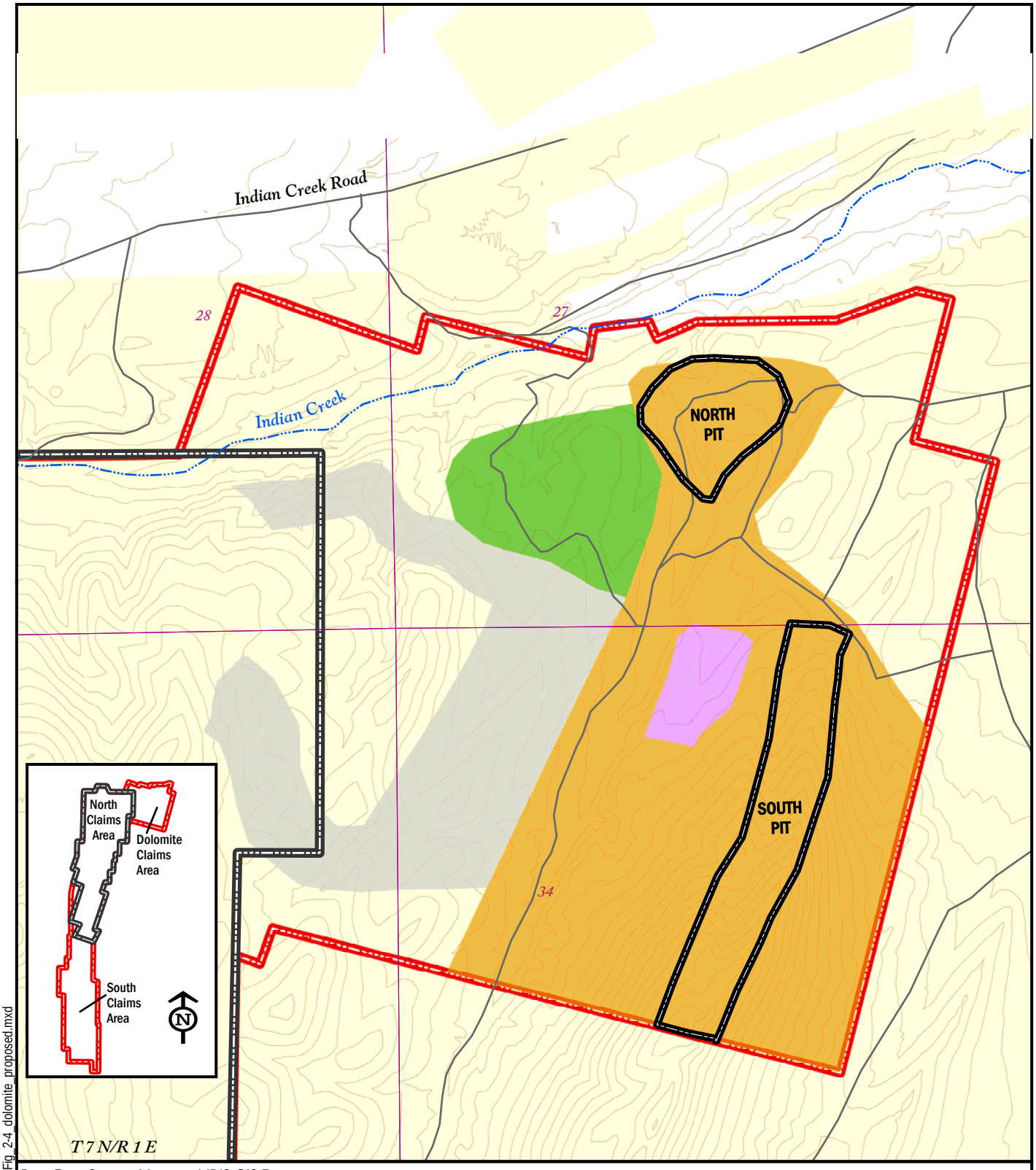


Base Data Souce: Montana NRIS GIS Data

0 Feet 1,000

Streams
Roads
Sections
Existing Operating Permit Boundary
Proposed Operating Permit Boundary
Bureau of Land Management

Proposed Mine Disturbance

Mine Pits
Overburden
Haul Roads
Soil Stockpiles

U.S. Department of the Interior
Bureau of Land Management
Butte Field Office
Butte, Montana

PROPOSED OPERATIONS DOLOMITE CLAIMS AREA
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE 2-3

H:\13532 Graymont EIS\5000 GIS\Projects\EIS\Fig_2-4_dolomite_proposed.mxd

Rock roll catch benches would be constructed down slope and outside active mining areas to help prevent rocks from rolling farther down slope off the permit area. Rocks and debris along the edge of the quarry benches would be evaluated and removed where necessary to prevent movement down slope.

Overburden would be removed by drilling, blasting, and loading into trucks for placement in overburden disposal areas located along the west boundary of the mine, or in portions of mine pits depleted of recoverable limestone. Overburden placed as backfill in mined-out pits could reduce the number of overburden disposal areas. Thirteen million tons of overburden would be excavated to recover approximately 55 million tons of ore along 11,500 linear feet of outcrop in the South Claims Area. Graymont proposes to construct up to eight overburden disposal sites in the South Claims Area as shown on **Figure 2-2**. Proposed overburden stockpiles in the South Claims Area have capacity for up to approximately 7 million tons assuming an average depth of 60 feet. Consistent with permitted mining operations in the North Claims Area, in-pit backfill of up to 50 percent of the overburden is included in the plan.

Overburden would be placed so as not to obstruct any major drainage outside the mine area. Final grading would re-establish contoured slopes ranging from 2.0H:1.0V to 3.0H:1.0V to provide landscape diversity. Natural ground slope angle under and adjacent to some overburden disposal sites may dictate steeper slopes in some areas.

Soil and/or growth media would be removed from areas outside existing mine pits designated for overburden disposal and either be spread over areas undergoing reclamation or placed in designated stockpile areas. Temporary haul roads would be constructed to overburden disposal areas as mining progresses.

DOLOMITE CLAIMS AREA

The Dolomite Claims Area adjoins the northeast corner of the North Claims Area as shown on **Figure 2-3**. The Dolomite Claims

This area includes unpatented claims on public land held by Graymont and would be developed as market demand increases. The Dolomite Claims Area deposit trends in a north and south direction. The northern-most dolomite deposit would be mined first with overburden placed along the west side of the pit. As mining proceeds, the northern pit would be mined to an ultimate depth approximately 262 feet below ground surface (4,067 feet in elevation). Excavation of the North Dolomite pit to an elevation of 4,067 feet would intercept groundwater (Hydrometrics 2007). Pumping and discharge of groundwater from the pit to keep mining operations dry would require an amendment to Graymont's existing MPDES permit. Graymont would meet effluent limitations set in the MPDES permit.

Mining and processing of dolomite would be similar to that of limestone. Multiple benches would be open at one time to allow production of dolomite ore. Multiple mine pits would be developed concurrently in response to product and market demands. Overburden would be placed in selected disposal areas or placed in mined-out portions of pits. Overburden from the South Dolomite pit would be used to backfill the North pit. The deepest portion of the South Dolomite pit would be partially backfilled with overburden. Approximately 20 million tons of overburden would be excavated to recover 20 million tons of dolomite ore.

Surface disturbance associated with development of the Dolomite Claims Area would be approximately 214 acres for mine pits, 88 acres for haul roads, and 33 acres for overburden disposal outside pit areas (**Table 2-2**). A 9-acre

soil stockpile would be located near the center of the Dolomite Claims Area in an area that would not be mined.

REJECT ROCK

Reject rock created during processing of limestone mined in the South Claims Area would be placed along the west side of the mine area south of a new crusher site or in portions of mined-out pits. Approximately 5 million tons of reject rock, produced over the life-of-mine expansion, may be placed in the proposed disposal area outside of mine pits. Reject rock created from processing dolomite would be placed in the existing limestone reject rock storage area located in the North Claims Area as shown on **Figure 2-1**.

ORE PROCESSING

Once mining operations in the South Claims Area reach a certain distance from the existing crusher facility, the haul distance and cost would become prohibitive. Graymont would construct a new crusher facility to process limestone ore as the mine continues development to the south **Figure 2-2**. Limestone rock processed at the new crusher would be transported via haul truck to the North Claims Area and conveyed over Indian Creek to the kilns located at the main plant facility. Processing limestone in the kilns would be the same as described under *Existing Operations* in this chapter.

The new crusher site would have an office building housing a change/lunch room, maintenance shop, and a septic system and well. An aboveground storage tank for diesel fuel would also be located on the site. The tank would have secondary containment for 110 percent of its capacity.

Dolomite mined from the Dolomite Claims Area would be transported by haul trucks to the existing crusher site in the North Claims Area. Ore from the Dolomite Claims Area would be processed using the existing kilns at the plant site.

KILN DUST

No increase in the daily rate of kiln dust production would result from processing ore mined in the South Claims or Dolomite Claims areas. Management and disposition of kiln dust would be as described under the *Processing* section of *Existing Operations* in this chapter.

SOIL SALVAGE

Site preparation in the South Claims AND Dolomite Claims areas would include UXO clearance and vegetation clearing and grubbing from proposed disturbance areas (see *Unexploded Ordnance Clearance* section in this chapter). Prior to commencing mining activities, soil and other identified growth media would be salvaged and either spread over areas undergoing reclamation or placed in designated stockpile areas. In addition, Amsden Formation material encountered during mining operations would be salvaged and used as a growth medium. This material has been successfully used as a growth media in ongoing reclamation activities in the North Claims Area.

Four soil material storage areas are proposed for the South Claims Area and one in the Dolomite Claims Area. Approximately 1.2 million cubic yards (cy) of soil material would be salvaged from the South Claims Area, 523,800 cy from the Dolomite Claims Area, and 670,000 cy from the North-South Haul Road.

HAUL ROADS

Expansion of mine operations into the South Claims Area would require construction of a North-South Haul Road extending from the existing haul road in the North Claims Area to the southern most mine pits in the South Claims Area. The new North-South Haul Road would extend approximately 5 miles along the west side of the existing North Claims Area operating permit boundary into the proposed South Claims Area as shown on **Figure 2-2**. The haul road would be constructed in similar fashion to existing roads and would use a balanced cut and fill configuration or use reject rock fill to a width of 60 feet with a 4-foot-high berm on the downgradient side in compliance with MSHA standards. The wear surface would be constructed using reject rock to a maximum grade of 8 percent or less. Temporary haul roads would be constructed along the deposit as mining progresses. These roads would be ultimately removed and reclaimed as each pit is mined out.

Fugitive dust emissions from haul roads would be controlled through use of direct water application, chemical binders, or wetting agents in accordance with Air Quality Permit No. 1554-16. Emission levels resulting from expansion of mine operations into the South Claims and Dolomite Claims areas would be similar to existing levels. A modification to the Air Quality Permit would not be required unless emissions exceed the existing permitted level.

SURFACE WATER CONTROLS

Surface water control structures would be constructed in accordance with the approved Storm Water Pollution Prevention Plan. Proposed storm water detention basins, rip-rap structures, diversions, and drainage ditches would be constructed as needed as mining progresses. Berms would be constructed along mine haul roads, soil stockpiles, overburden disposal areas, and the crusher site in accordance with applicable MSHA regulations. When used as a Best Management Practice for storm water control, berms would be designed, constructed, and maintained to control the volume of run-off associated with a 10-year, 24-hour storm event.

ANCILLARY FACILITIES

Construction of the new crusher in the South Claims Area would require installation of electrical service to the site along the North-South Haul Road corridor. Electrical service to the new crusher would be provided through extension of power lines from the north crusher site. Installation would include a new transformer at the site.

EMPLOYMENT

Employment associated with the proposed life-of-mine expansion would remain at current levels.

MONITORING PROGRAMS

Monitoring programs described under *Existing Operations* would continue over the life-of-mine. A new water supply well proposed in the South Claims Area would be included in the groundwater monitoring program. Air Quality Permit #1554-16 would be modified (if necessary) prior to operation of the South Claims Area crusher.

An aboveground diesel fuel tank would be located in the vicinity of the South Claims Area crusher. The existing Spill Prevention, Control, and Countermeasure (SPCC) plan would be updated to include this tank.

RECLAMATION

Reclamation of the South Claims Area and Dolomite Claims Area would be conducted in the same manner as ongoing reclamation in the North Claims Area. Upon completion of regrading to attain final slope configuration, soil material or growth media would be placed on the surface in depths ranging from 2 to 9 inches based upon the

revegetation plan for given areas. A tracked vehicle (dozer) would be used to create grooves to retain moisture. Grooves from tracking would be oriented perpendicular to the slope and would cover 100 percent of the slope.

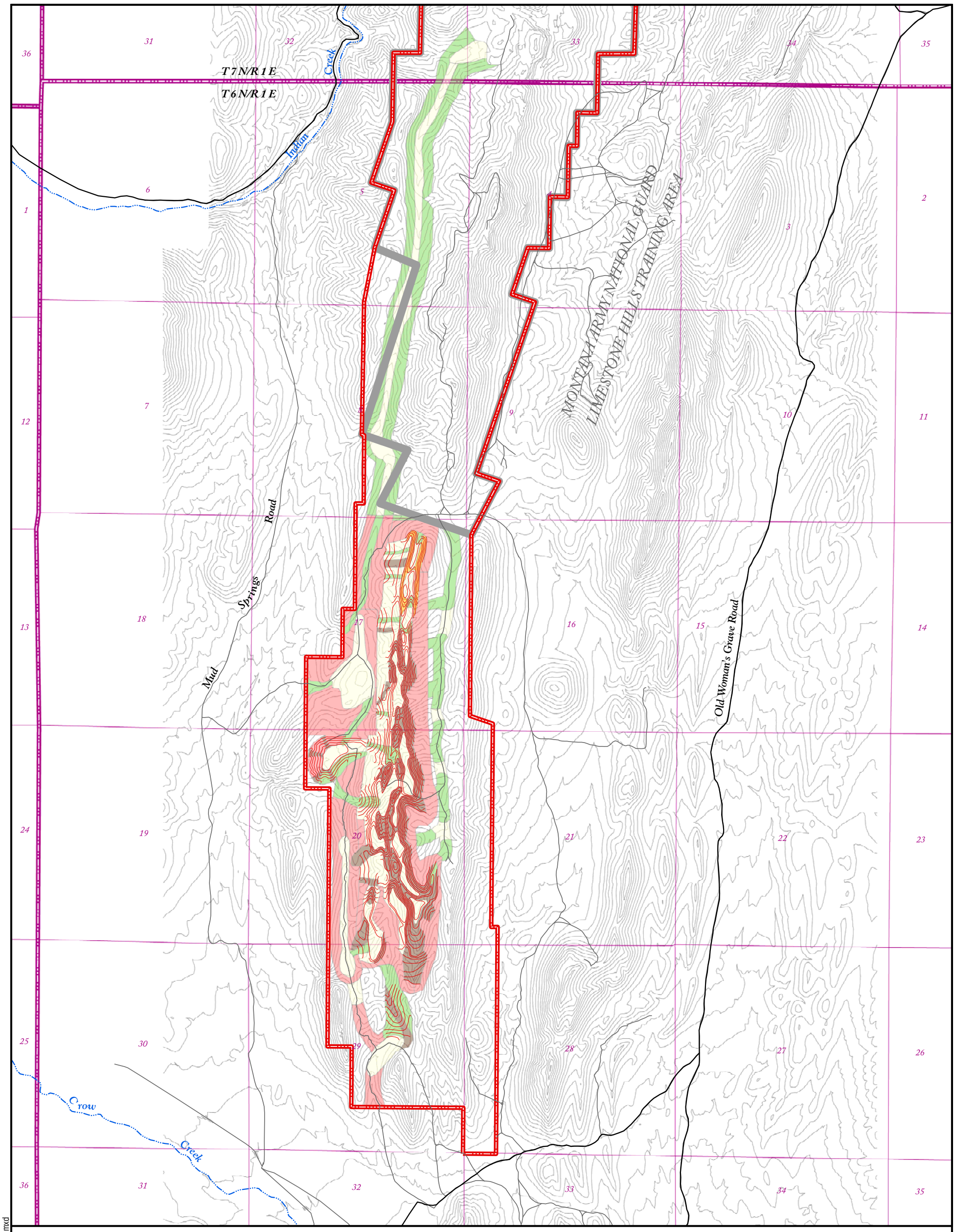
The approved seed mixture (contained in the *Reclamation* section of *Existing Operations* of this chapter) would be broadcast to all disturbed areas. Seed would be applied between October 15 and April 30. In addition to the approved seed mixture, various species of tree and shrub seedlings would also be planted. Tree and shrub species and rates of planting are shown in **Table 2-3.** Revegetation plans for the South Claims and Dolomite Claims areas are shown on **Figures 2-4** and **2-5**.

Measures to control surface water run-off after reclamation would be implemented in accordance with stipulations of the Storm Water Pollution Prevention Plan. Storm water control structures, retention ponds, and diversion ditches would be removed and reclaimed unless deemed necessary by the agencies for long-term reclamation of the land. Drainage channels would be re-established in the original channels where possible. Reclaimed use of the area would be for wildlife habitat and livestock grazing.

TABLE 2-3
Tree and Shrub Species Proposed for Use on Reclaimed Sites
Indian Creek Mine

Revegetation Type	Tree/Shrub Species	Soil Replacement Depth	Seedlings per Acre	Acres	
				South Claims Area	Dolomite Claims Area
Mountain Mahogany/Juniper	Mountain Mahogany	9"	200	297	192
	Rocky Mountain Juniper		50		
	Common Juniper		50		
	Soapweed Yucca		75		
	Limber Pine		25		
	Subtotal		**400**	**297**	**192**
Douglas-fir	Douglas-Fir	9"	130	122	30
	Rocky Mountain Juniper		20		
	Common Juniper		20		
	Mountain Mahogany		50		
	Limber Pine		30		
	Subtotal		**250**	**122**	**30**
Grassland	Skunkbush Sumac	9"	25	218	55
	Black Sagebrush		25		
	Subtotal		**50**	**218**	**55**
Rock Outcrop – Type 1	Mountain Mahogany	2"	200	127	68
	Rocky Mountain Juniper		50		
	Common Juniper		50		
	Soapweed Yucca		75		
	Limber Pine		25		
	Subtotal		**400**	**127**	**68**
Rock Outcrop – Type 2	Douglas-Fir	2"	130	11	-0-
	Rocky Mountain Juniper		20		
	Common Juniper		20		
	Mountain Mahogany		50		
	Limber Pine		30		
	Subtotal		**250**	**11**	**-0-**
TOTAL				**775**	**345**

Source: Graymont 2007a.



Base Data Source: Montana NRIS GIS Data

Reclamation Revegetation Types

- County Roads
- Other Roads
- Streams
- Township/Range
- Sections
- Existing Operating Permit Boundary
- Proposed Operating Permit Boundary
- Mountain mahogany/ juniper type
- Douglas fir type
- Grassland type
- Rock outcrop type 1 + Mountain mahogany/ juniper type
- Rock outcrop type 2 + Douglas fir type
- Conceptual Reclamation Contours

N

0 Feet 3,000

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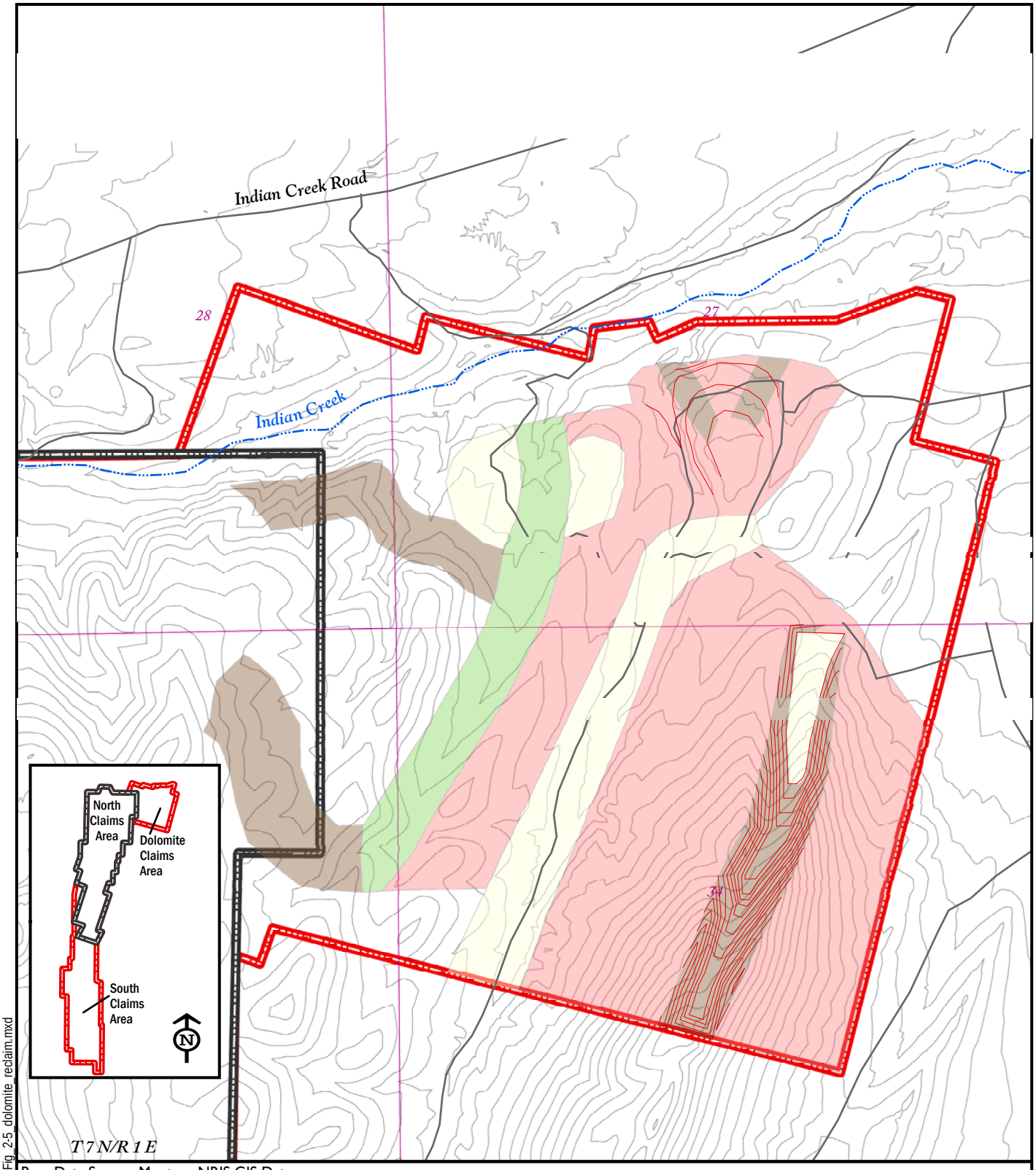
Butte, Montana

PROPOSED RECLAMATION/REVEGETATION - SOUTH CLAIMS AREA
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE
2-4

h:\13532 Graymont EIS\5000 GIS\Projects\EIS\Fig 2-4 South Reclamation.mxd



Base Data Souce: Montana NRIS GIS Data

N

0 Feet 1,000

Streams
Roads
Sections
Existing Operating Permit Boundary
Proposed Operating Permit Boundary

Reclamation Revegation Types

Mountain mahogany/ juniper type
Douglas fir type
Grassland type
Rock outcrop type I + Mountain mahogany/ juniper type
Conceptual Reclamation Contours

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PROPOSED RECLAMATION/REVEGETATION - DOLOMITE CLAIMS AREA
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE 2-5

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ENVIRONMENTAL CONTROL MEASURES

Environmental control measures described under *Existing Operations* would be continued over the mine life.

ALTERNATIVES

This section describes alternatives to the Proposed Action including Alternative A – Modified Pit Backfill, No Action Alternative, Alternatives Considered but Eliminated from Detailed Analysis, and the Agency Preferred Alternative. Alternatives selected by BLM and DEQ for consideration in this Draft EIS are based on potential impacts or issues associated with the Proposed Action.

BLM and DEQ are required to analyze environmental effects resulting from the Proposed Action and to identify reasonable alternatives that would mitigate or eliminate potential impacts from the Proposed Action. In addition, BLM and DEQ are required to describe the impacts associated with implementation of the No Action Alternative.

Major components of the proposed mine expansion, respective functions, and potential environmental effects resulting from implementation of these activities are considered in development of alternatives. Other alternatives were considered early in the review process but were eliminated because they were either technically infeasible or provided no environmental advantage over the Proposed Action.

ALTERNATIVE A – MODIFIED PIT BACKFILL

Issue: The reclamation plan for pit backfill proposed by Graymont would be similar to that approved for the current mine plan. Up to 50 percent of run-of-mine overburden would be used as backfill resulting in portions of selected mine pits being backfilled in various configurations including partial fill of the bottom of a pit; partial fill of a pit including some highwall areas; and/or fill being placed in a pit area resulting in a surface that approximates original grade of the area. The plan also includes placement of 2 to 9 inches of growth media to faciltitate establishment of vegetation on reclaimed areas. Placement of growth media in excess of 2 inches appears to limit establishment of mountain mahogany, an important browse species for mule deer and bighorn sheep.

The post-closure land use designated for the mine area is wildlife habitat. Configurations of pit backfill included in the Proposed Action would not result in treatment of highwalls to establish varied slope angles conducive to establishment of mountain mahogany and other browse species to support wildlife.

Some highwalls that would result from the Proposed Action would be visible to the public from various locations along public access roads in the vicinity of the Project. These highwalls exhibit bare rock and terraced benches that visually contrast with adjacent undisturbed areas. No specific treatment of highwalls to reduce the visual effect is included in the Proposed Action.

Description: Alternative A would include implementation of all components of the Proposed Action and require Graymont to include revegetation of shrub species using seed. In addition Graymont would place up to 50 percent of run-of-mine overburden mixed with limestone reject rock and minimal amounts (2 inches or less) of growth media in selected areas of mined-out pits in a configuration that would fill portions of pit highwalls and create steep overburden in-pit slopes. This would

result in a varied terrain with appropriate growth media depth to support establishment of mountain mahogany and other browse species.

Modified pit backfill would reduce the visual effect of highwalls and/or establish varied slope angles to create post-mining landscape areas more natural in appearance. Use of visually compatible growth media would be emphasized in reclaimed mine visible from public roads.

Several methods would be used to place overburden in selected areas of mine pits and/or treat highwalls to create diverse terrain with varied slope steepness and convex slope configurations. Modified pit backfill methods include:

- Placing overburden, limestone rejects, and/or growth medium near the rim of selected mine pit highwalls, and dozing the material over the rim onto two to three benches to form a slope at angle of repose (approximately 1.25H:1.0V);
- Dozing highwall benches downward to create an angle of repose or shallower slope (1.25H:1.0V to 2.0H:1.0V or less);
- Haul, dump, and doze overburden into slope configurations ranging from 2.0H:1.0V to 3.0H:1.0V in pit bottoms and bench areas; and
- Cast blasting selected slopes and highwall benches where equipment operation would be limited to produce angle of repose slopes.

These methods would be used where access and conditions are safe for equipment and operators.

Two inches of soil or limestone rejects would be placed in selected areas of backfill to support seeding and/or planting browse species according to the approved reclamation plan. Run-of-mine overburden combined with reject rock fragments (sand- to boulder-size) would form a growth medium for plantings or seeding mountain mahogany and other browse shrubs. On steeper slopes, pods of soil or limestone rejects would be used to provide growth media and mask the man-made appearance of the slopes.

BLM and DEQ would review final designs during development of the mine expansion as mine pits are depleted to determine optimal locations for application of modified pit backfill methods. Representations in **Figures 2-6** and **2-7** are conceptual and meant to display the variety of locations and settings where this reclamation method could be used to create a diverse landscape suitable for the proposed post mining land use as wildlife habitat. Implementation of Alternative A is not expected to increase the amount of disturbance associated with the Proposed Action.

Alternative A addresses the requirements of the MMRA concerning pit backfill: highwall structural stability, utility to humans or the environment, visual contrasts between reclaimed land, and undesirable offsite environmental impacts. Relevant sections of the Draft EIS will describe how implementation of Alternative A would better address these requirements.

Mud Springs Road

Old Woman's Grave Road

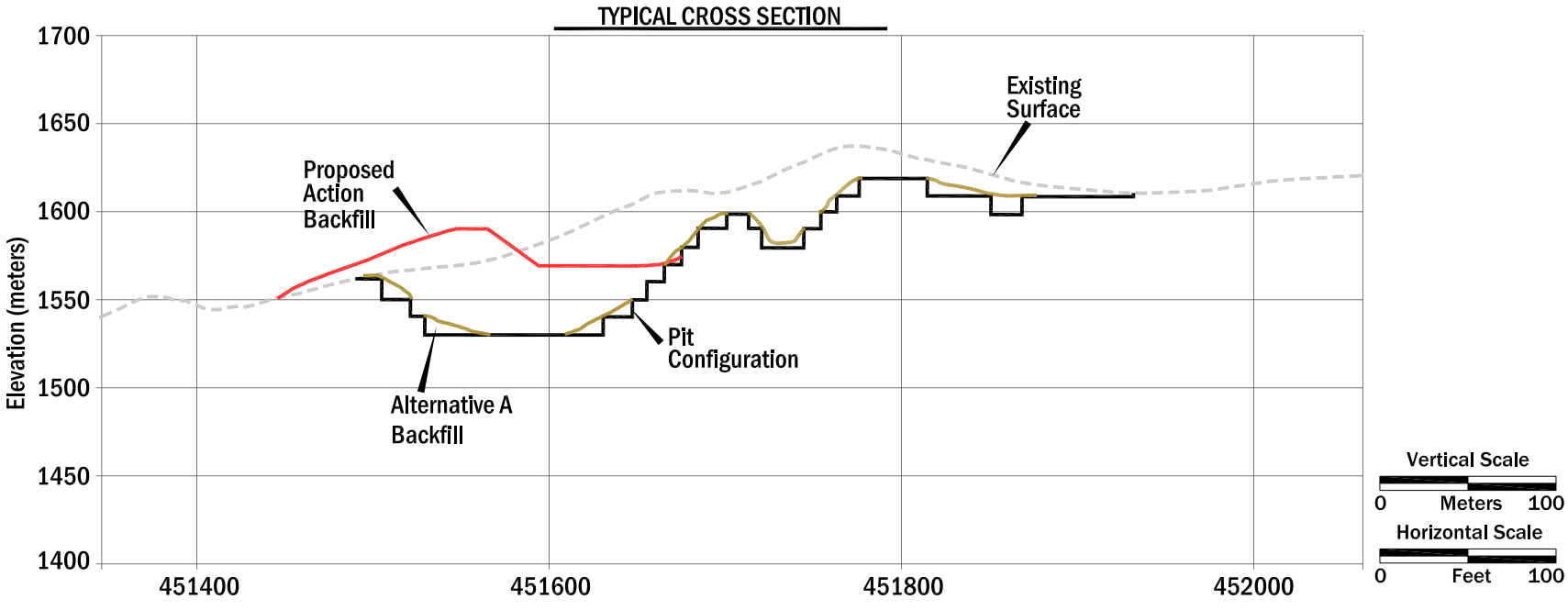
SOUTH
CLAIMS
AREA

Proposed Operating Permit Boundary
Streams
Roads
Sections
Conceptual Location of Alternative A Reclamation
Conceptual Reclamation Contours

N

0 Feet 1500

TYPICAL CROSS SECTION



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ALTERNATIVE A - SOUTH CLAIMS AREA
CONCEPTUAL BACKFILL CONFIGURATION
Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE
2-6

H:\13532 Graymont EIS\5000 GIS\cad\south_claims_xsec.dwg

Indian Creek Road

Indian Creek

28

27

34

33

4

3

1300

1350

1400

1450

1500

1450

NORTH CLAIMS AREA

DOLOMITE CLAIMS AREA

T7N/R1E

T6N/R1E

Proposed Operating Permit Boundary

Streams

Roads

Sections

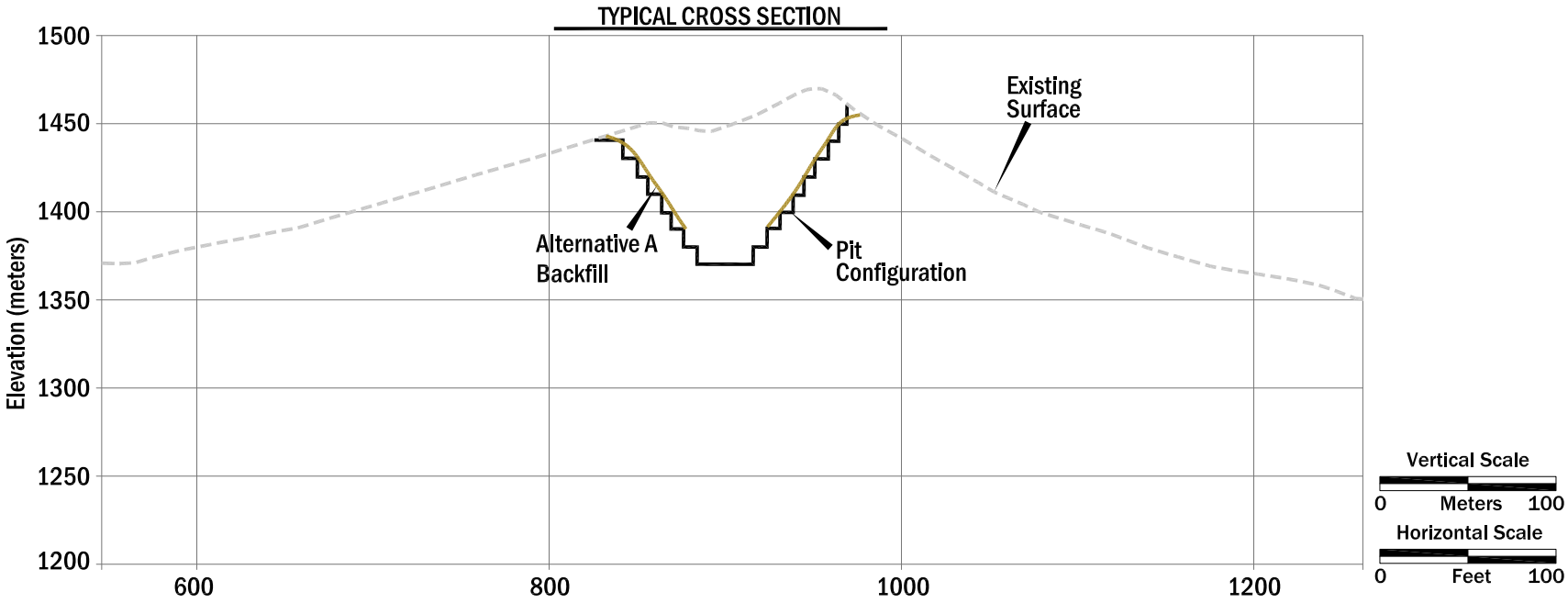
Conceptual Location of Alternative A Reclamation

Conceptual Reclamation Contours

N

0 Feet 1000

TYPICAL CROSS SECTION



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Butte, Montana

ALTERNATIVE A - DOLOMITE CLAIMS AREA CONCEPTUAL BACKFILL CONFIGURATION

Indian Creek Mine Expansion - Environmental Impact Statement
Broadwater County, Montana

FIGURE 2-7

H:\13532 Graymont EIS\5000 GIS\cad\dolomite_claims_xsec.dwg

NO ACTION ALTERNATIVE

Under the No Action Alternative, the life-of-mine expansion (Proposed Action) would not be approved. Graymont would not develop ore reserves in the South Claims Area or the Dolomite Claims Area. Potential impacts predicted to result from development in these areas would not be realized. Mining and reclamation operations within the existing permitted area, as described in the *Existing Conditions* section of this chapter, would continue for approximately 15 years at the current production rate.

AGENCY PREFERRED ALTERNATIVE

The agency preferred alternative is Alternative A – Modifed Pit Backfill.