

# ENVIRONMENTAL ASSESSMENT

DOI-BLM-NV-B010-2012-0047-EA

## Ruby Hill Project



**August 2012**

**U.S. Bureau of Land Management  
Mount Lewis Field Office  
Battle Mountain District  
50 Bastian Road  
Battle Mountain, Nevada 89820-2332**



It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

DOI-BLM-NV-B010-2012-0047-EA

**HOMESTAKE MINING COMPANY OF CALIFORNIA  
RUBY HILL PROJECT  
EUREKA COUNTY, NEVADA**

Environmental Assessment  
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ENVIRONMENTAL ASSESSMENT**

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**Appendix A: Emissions Inventory**

## LIST OF ACRONYMS AND ABBREVIATIONS

°	degree
AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
amsl	above mean sea level
ARPA	Archaeological Resources Protection Act of 1990
BAPC	Bureau of Air Pollution Control
Barrick	Barrick Gold Corporation
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
BMRR	Bureau of Mining Regulation and Reclamation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CO	carbon monoxide
DETR	Department of Employment, Training, and Rehabilitation
DOAS	Division of Assessment Standards
EA	Environmental Assessment
ECMP	Eureka County Master Plan
ECSD	Eureka County School District
ECSO	Eureka County Sheriff's Office
E/ET	evaporation/evapotranspiration
EIS	Environmental Impact Statement
EMS	Emergency Medical Service
EO	Executive Order
ESA	Endangered Species Act of 1973, as amended
F	Fahrenheit
FLPMA	Federal Land Policy and Management Act of 1976
GHG	greenhouse gas
GID	General Improvement District
Goldstrike	Barrick Goldstrike Mine
gpm	gallons per minute
H	Horizontal
HDPE	high density polyethylene
HFRA	Healthy Forest Restoration Act
HLDE	Heap Leach Drawdown Estimator
Homestake	Homestake Mining Company of California
IM	Instruction Memorandum
Kautz	Kautz Environmental Consultants, Inc.
MBTA	Migratory Bird Treaty Act
MDB&M	Mount Diablo Base and Meridian
mg/L	milligrams per liter
mil	unit of length equal to one thousandth ( $10^{-3}$ ) of an inch
MLFO	Mount Lewis Field Office
MLRA	Major Land Resource Area
NAC	Nevada Administrative Code
NAGPRA	Native American Graves Protection and Repatriation Act
NDE	Nevada Department of Education
NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOW	Nevada Department of Wildlife
NDOT	Nevada Department of Transportation

NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NNHP	Nevada Natural Heritage Program
NO <sub>x</sub>	nitrogen oxide
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSAAQS	Nevada State Ambient Air Quality Standards
PA	Programmatic Agreement
PAA	pit activity area
PAG	potentially acid generating
PM <sub>2.5</sub>	particulate matter with an aerodynamic diameter less than 2.5 microns
PM <sub>10</sub>	particulate matter with an aerodynamic diameter of ten microns or less
PMU	Population Management Unit
Project	Ruby Hill Project
PFS	process fluid stabilization
PGH	Preliminary General Habitat
PPH	Preliminary Priority Habitat
RDA	rock disposal area
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
Ruby Hill	Ruby Hill Mine
RV	recreational vehicle
SEIS	Supplemental Environmental Impact Statement
Schafer	Schafer Limited LLC
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO <sub>2</sub>	sulfur dioxide
SRK	SRK Consulting
SWPPP	Storm Water Pollution Prevention Plan
TCP	Traditional Cultural Property
TDS	total dissolved solids
tpy	tons per year
USFWS	United States Fish and Wildlife Service
V	Vertical
VFD	volunteer fire department
VOCs	volatile organic compounds
WSA	Wilderness Study Area
WPCP	Water Pollution Control Permit
WWTF	Wastewater Treatment Facility

**HOMESTAKE MINING COMPANY OF CALIFORNIA  
RUBY HILL PROJECT  
ENVIRONMENTAL ASSESSMENT**

## **1 INTRODUCTION / PURPOSE OF AND NEED FOR ACTION**

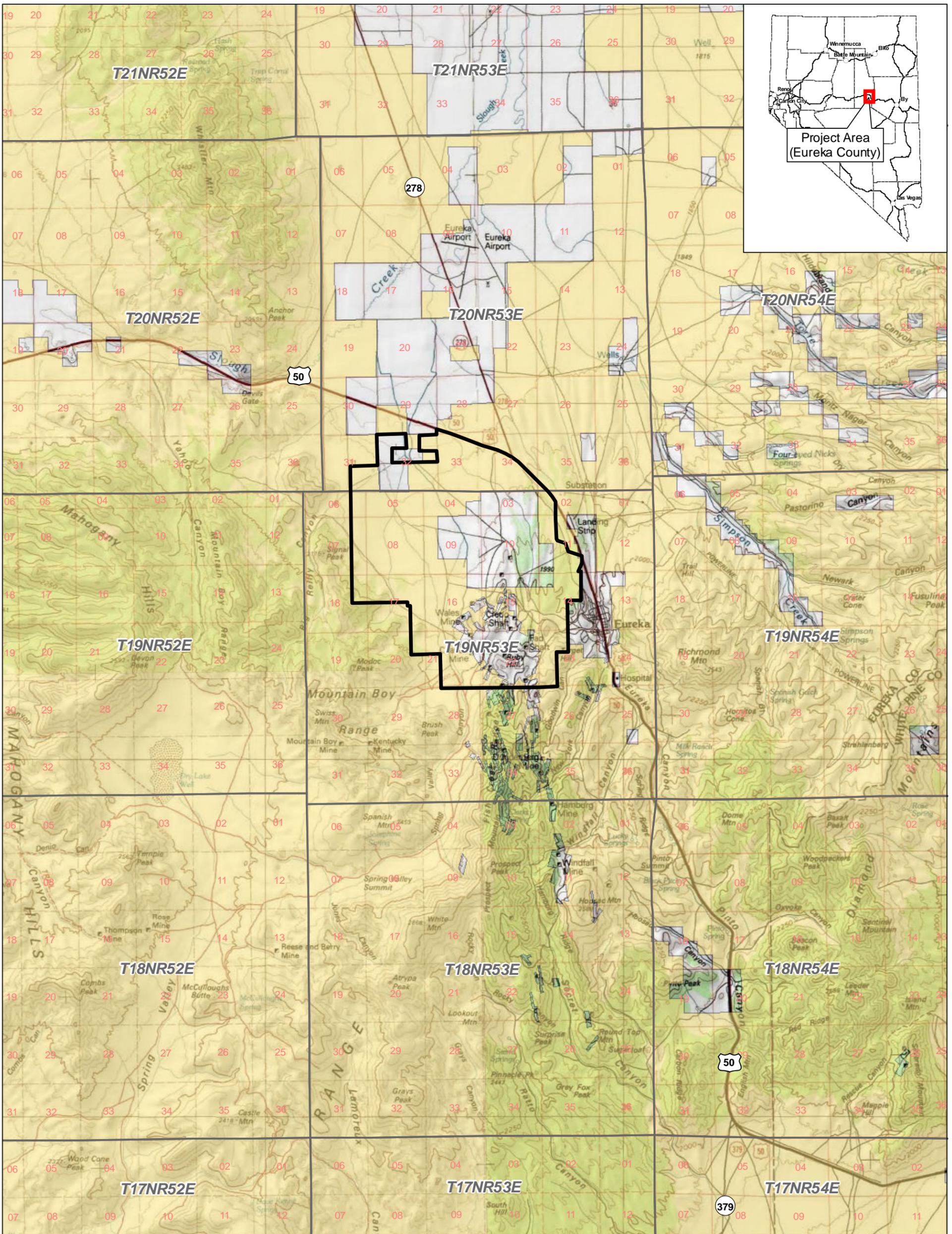
### **1.1 Introduction**

The Ruby Hill Project (Project) is an existing mining operation located approximately 0.7 mile northwest of the town of Eureka, Nevada, at elevations ranging between approximately 6,200 feet to 6,500 feet above mean sea level (amsl). The Project boundary encompasses all or portions of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, and 23 of Township 19 North, Range 53 East (T19N, R53E), and portions of Sections 31, 32, 33, and 34 of T20N, R53E, Mount Diablo Base and Meridian (MDB&M), Eureka County, Nevada (Project Area). The Project Area includes approximately 8,411 acres that consist of approximately 3,015 acres of private land owned by Barrick Gold Corporation (Barrick) and operated by Homestake Mining Company of California (Homestake), a wholly owned subsidiary of Barrick, and approximately 5,396 acres of public land administered by the Bureau of Land Management (BLM) Battle Mountain District, Mount Lewis Field Office (MLFO). Figure 1.1.1 shows the Project Area, access roads, and land status.

Homestake submitted to the BLM and the Nevada Division of Environmental Protection (NDEP) Bureau of Mining Regulation and Reclamation (BMRR) an Amended Plan of Operations and Nevada Reclamation Permit (Record Number NVN-0677621/Reclamation Permit No. 0107) (Plan) to expand an existing open pit gold and silver mining and processing operation. The proposed expansion would utilize the existing primary and secondary crushers, solution processing plant, and ancillary support facilities. The Plan includes the following activities: expansion of the existing open pit and pit activity area (PAA); lowering of the final pit bottom by 240 feet to 5,100 feet amsl; inclusion of a conceptual process pond for future fluid management of heap drain down flows during closure; realignment of portions of the existing perimeter fence associated with the open pit expansion; increasing the authorized acreage of surface exploration related disturbance; expansion of the Class III landfill; and the establishment of a flexible mining and ore hauling timeline based on mining rates and economic conditions (Proposed Action).

Expansion activities would disturb approximately 34.3 acres of additional BLM-administered public land and approximately 72.3 acres of additional private land for a proposed surface disturbance total of 106.6 acres. The total of the existing and proposed surface disturbance for the Project would be 1,742.4 acres within the existing Project Area.

The BLM examined whether the Proposed Action could be approved through a Determination of National Environmental Policy Act of 1969 (NEPA) Adequacy tiered off of the *2005 Ruby Hill Mine Expansion – East Archimedes Project Supplemental Environmental Impact Statement* (SEIS) #NV063-EIS04-34; however, the BLM has determined that the expansion operations would require an Environmental Assessment (EA) under the NEPA in order to examine the effects of the Proposed Action because the 1997 EIS and 2005 SEIS did not analyze impacts associated with the Proposed Action. Additional baseline studies and surveys associated with the Proposed Action have been completed and deemed adequate by the BLM.



**Explanation**

Project Area

**Land Status**

Bureau of Land Management

Private

BATTLE MOUNTAIN DISTRICT OFFICE  
 Mount Lewis Field Office  
 50 Bastian Road  
 Battle Mountain, Nevada 89820



**BUREAU OF LAND MANAGEMENT**

**RUBY HILL PROJECT**

**Project Location, Access, and Land Status**

Figure 1.1.1

07/26/2012

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

0 1 2 3 Miles

Projection: UTM Zone 11 North, NAD83



## **1.2 Existing Operations**

A complete description of the existing Ruby Hill Project, including the construction, operations, and reclamation is presented in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a) and the *Ruby Hill Mine Expansion - East Archimedes Project Final Supplemental Environmental Impact Statement* (BLM 2005).

Existing and authorized activities within Project Area total approximately 1,635.8 acres of surface disturbance. Authorized surface disturbance consists of 1,430.9 acres of BLM lands and 204.9 acres of private lands. Current operations at Ruby Hill include the following: one open pit; two rock disposal areas (RDAs); a two-stage crushing facility; a solution processing facility; heap leach facilities; an arsenic treatment facility; and ancillary facilities that consist of an office building and parking lot, warehouse/shop, fuel storage area, access and haul roads, growth media stockpiles, a soil borrow source, an authorized landfill for mine operations, diversion ditches, solution and event ponds, and power line and water pipeline corridors. Existing facilities that are not currently operating include a tertiary crusher, a ball mill, and belt filters. Homestake continues to implement the applicant-committed environmental protection measures outlined in the previous Plans of Operation and as stipulated in the associated RODs.

## **1.3 Purpose of and Need for Action**

The purpose of the Proposed Action is to provide Homestake the opportunity to explore, locate, and delineate precious metals (gold and silver) deposits, and to extract additional economically recoverable gold and other minerals determined to exist in the Project Area, on its mining claims on public lands as provided under the General Mining Law of 1872 as amended (Mining Law).

The need for the action is established by the BLM's responsibility under Section 302 of the Federal Land Policy and Management Act of 1976 (FLPMA) and the BLM Surface Management Regulations at 43 Code of Federal Regulations (CFR) 3809, to respond to a mining and exploration plan of operations and to take any action necessary to prevent unnecessary or undue degradation of the public lands, as a result of actions taken to prospect, explore, assess, develop, and process locatable mineral resources on public lands.

## **1.4 Decision to Be Made**

The decision the BLM would make based on this EA includes the following: (1) approval of the proposed Plan to authorize the mining and exploration activities without modifications or additional mitigation measures; (2) approval of the Plan with additional mitigation measures that are deemed necessary by BLM; or (3) deny approval of the Plan and not authorize the mining and exploration activities if it is found that the proposal does not comply with the 3809 regulations and the FLPMA mandate to prevent unnecessary or undue degradation.

## **1.5 BLM Responsibilities and Relationship to Planning**

The BLM is responsible for the preparation of this EA, which was prepared in conformance with the policy guidance provided in the updated BLM NEPA Handbook H-1790-1 (BLM 2008) and Council on Environmental Quality (CEQ) regulations (40 CFR 1500) and guidance on the analysis of cumulative impacts.

### **1.5.1 Land Use Conformance Statement**

The Proposed Action is in conformance with the BLM’s Shoshone-Eureka Resource Management Plan, as amended (RMP) dated February 26, 1986 (BLM 1986). Specifically, on page 29 in the RMP Record of Decision (ROD), under the heading “Minerals” subtitled “Objectives” number 1:

“Make available and encourage development of mineral resources to meet national, regional, and local needs consistent with national objectives for an adequate supply of minerals.”

Under “Management Decisions,” “Locatable Materials,” page 29, number 1:

“All public lands in the planning areas will be open for mining and prospecting unless withdrawn or restricted from mineral entry.”

Under “Management Decisions,” number 5, Current Mineral Production Areas:

“Recognize these areas as having a highest and best use for mineral production and encourage mining with minimum environmental disturbance...”

### **1.5.2 Local Land Use Planning and Policy**

The Eureka County 1973 Master Plan, updated in 2000 and again in 2010, contains a description of land uses, restrictions on development, and recommendations for future land use planning. The 2010 Eureka County Master Plan (ECMP) includes an Economic Development Element, which incorporates recommendations for increased land use planning that expands and diversifies Eureka County’s economy. The Natural Resources and Federal or State Land Use Element was developed and included into the ECMP in response to Nevada Senate Bill 40, which was passed in 1983 and directs counties to develop plans and strategies for resources that occur within lands managed by federal and state agencies. Policies within the Eureka County Master Plan promote the expansion of mining operations/areas.

The Natural Resources and Federal or State Land Use Element is an executable policy for natural resource management and land use on federal and state administered lands in Eureka County. This element is designed to accomplish the following goals: 1) protect the human and natural environment of Eureka County; 2) facilitate federal agency efforts to resolve inconsistencies between federal land use decisions and County policy; 3) enable federal and state agency officials to coordinate their efforts with Eureka County; and 4) provide strategies, procedures, and policies for progressive land and resource management (Eureka County 2010).

Based on the applicant-committed environmental protection measures identified below in Section 2.1.12, the proposed expansion would be in conformance with the first goal of the Natural Resources and Federal or State Land Use Element, by reducing any potential impacts to the human and natural environment from implementation of the Proposed Action.

## **1.6     Issues**

The Project was internally scoped by the BLM Interdisciplinary team at a meeting held on February 23, 2012, at the BLM office in Battle Mountain. During this meeting, BLM personnel identified the elements associated with supplemental authorities and other resources and uses to be addressed in this document as outlined in Chapter 3.

The following specific issues related to the Proposed Action that were identified include:

- Air Quality;
- Bald and Golden Eagles;
- Cultural Resources;
- Geology and Mineral Resources;
- Migratory Birds;
- Native American Traditional Values;
- Noxious Weeds, Invasive and Nonnative Species;
- Socioeconomic Values;
- Soils;
- Special Status Species;
- Vegetation;
- Wastes, Hazardous or Solid;
- Water Resources; and
- Wildlife.

## 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

### 2.1 Proposed Action

Under the Proposed Action, Homestake would conduct mining and exploration related activities that would result in a maximum of 106.6 acres of additional surface disturbance subject to reclamation. Proposed expansion activities from the Plan would consist of the expansion of the existing open pit (17.3 acres); expansion of the PAA (3.9 acres); lowering of the final pit bottom by 240 feet to 5,100 feet amsl; inclusion of a conceptual process pond for future fluid management of heap drain down flows during closure (11.5 acres); realignment of portions of the existing perimeter fence associated with the open pit expansion within the acreage of the open pit expansion; increasing exploration related disturbance (70 acres); expansion of the Class III landfill (15 acres); and the establishment of a flexible mining and ore hauling timeline based on mining rates and economic conditions. In addition, a reduction of disturbance has occurred to the PAA Private Land as a result of a reclassification to Open Pit Private Land (one acre); a reclassification of the East RDA Private Land to Open Pit and PAA Private Land (5.1 acres); and East RDA Public Land as Open Pit Public Land (six acres). The existing authorized and proposed disturbance is outlined by each type of activity in Table 2.1-1 and on Figure 2.1.1.

**Table 2.1-1: Acreage of Existing Authorized and Proposed Project Disturbance**

Facility	Existing Authorized Disturbance			Proposed Disturbance			Total Disturbance		
	Private Lands (acres)	Public Lands (acres)	Total (acres)	Private Lands (acres)	Public Lands (acres)	Total Land (acres)	Private Land (acres)	Public Land (acres)	Total (acres)
Open Pit	174.7	13.2	187.9	6.9	10.4	17.3	181.6	23.6	205.2
Pit Activity Area (pit modification, haul roads, dewatering, etc.)	63.4	9.2	72.6	-1	4.9	3.9	62.4	14.1	76.5
East RDA	245.9	100.7	346.6	-5.1	-6	-11.1	240.8	94.7	335.5
West RDA	552.2	46.1	598.3	0	0	0	552.2	46.1	598.3
Heap Leach Pad/Solution Ponds	144.7	0	144.7	0	0	0	144.7	0	144.7
Conceptual Process Pond and E/ET cell	0	0	0	11.5	0	11.5	11.5	0	11.5
Haul Roads with Lime Silo	10.4	0	10.4	0	0	0	10.4	0	10.4
Access Roads	8.9	2.7	11.6	0	0	0	8.9	2.7	11.6
Miscellaneous Roads	3	0	3	0	0	0	3	0	3
Utility	1.4	0	1.4	0	0	0	1.4	0	1.4
Freshwater Pipeline	3	6	9	0	0	0	3	6	9

Facility	Existing Authorized Disturbance			Proposed Disturbance			Total Disturbance		
	Private Lands (acres)	Public Lands (acres)	Total (acres)	Private Lands (acres)	Public Lands (acres)	Total Land (acres)	Private Land (acres)	Public Land (acres)	Total (acres)
Growth Media Stockpiles	67.4	0	67.4	0	0	0	67.4	0	67.4
Diversion Channels	3	1	4	0	0	0	3	1	4
Soil Borrow Area	42.6	0	42.6	0	0	0	42.6	0	42.6
Buildings/Fuel Areas (Class III Landfill)	57	0	57	15.0	0	15.0	72	0	72
Exploration	53.3	26	79.3	45	25	70	98.3	51	149.3
<b>Total</b>	<b>1,430.9</b>	<b>204.9</b>	<b>1,635.8</b>	<b>72.3</b>	<b>34.3</b>	<b>106.6</b>	<b>1,503.2</b>	<b>239.2</b>	<b>1,742.4</b>

### 2.1.1 Location and Access

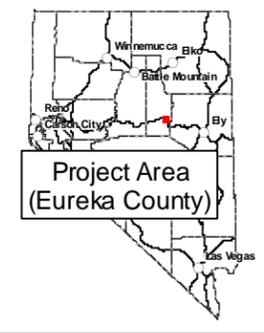
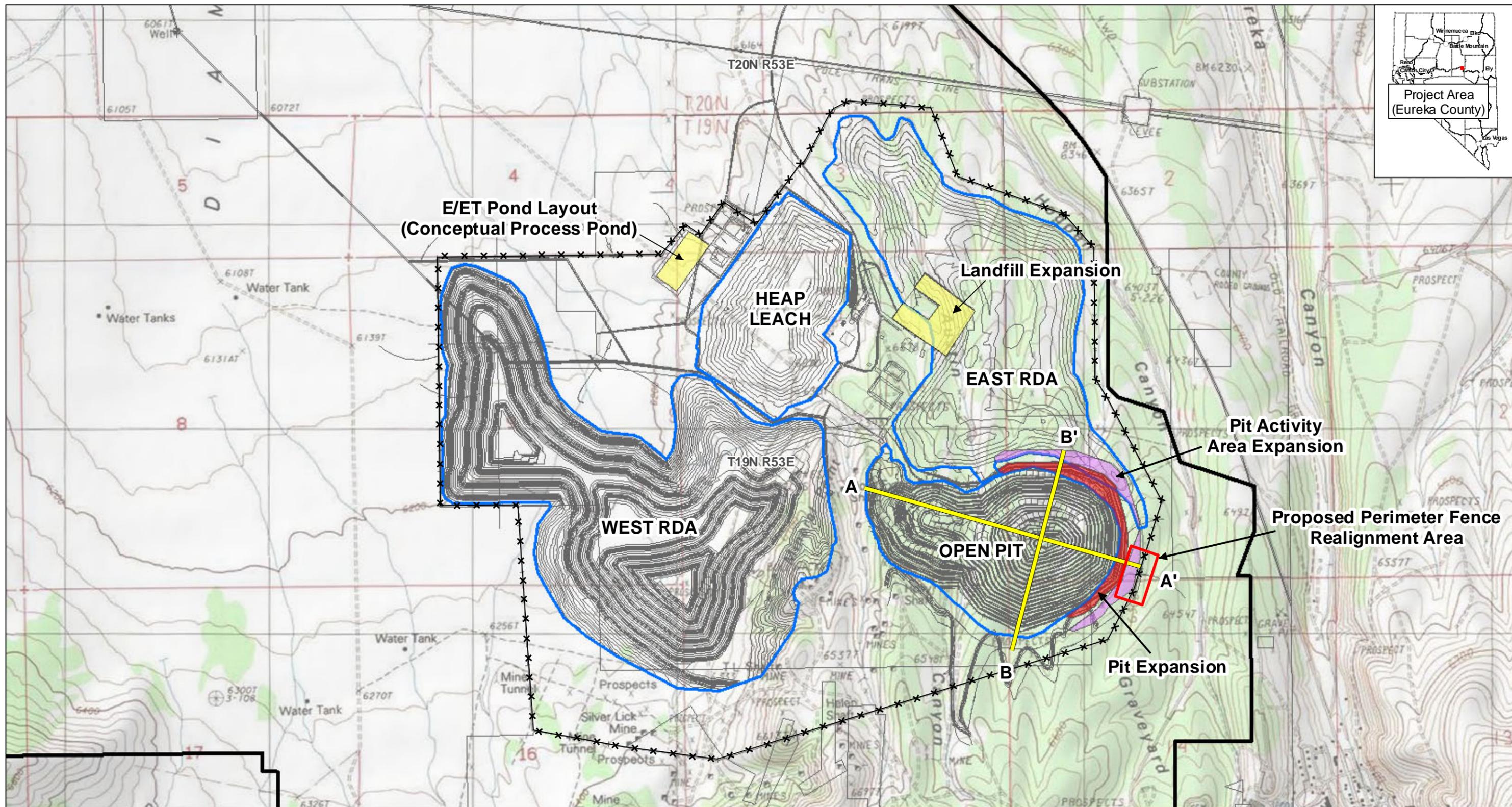
The Project is located on public lands administered by the BLM and private lands in Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, and 23 of T19N, R53E, and portions of Sections 31, 32, 33, and 34 of T20N, R53E, MDB&M, in east central Nevada, approximately 0.7 mile northwest of the town of Eureka in Eureka County. Access to the Project Area is provided by an existing road off U.S. Highway 50 (Figure 1.1.1).

### 2.1.2 Mining Operations/Open Pit

The proposed Project would include the expansion of the existing open pit. This would involve a layback of the northern and eastern walls of the existing open pit and deepening the open pit by approximately 240 feet. The open pit would extend approximately 810 feet below the pre-mining ground water table, which had an elevation of approximately 5,910 feet amsl. The open pit disturbance would increase by approximately 17.3 acres and the PAA disturbance would increase by approximately 3.9 acres. Of the increased area for the open pit and PAA, 11.1 acres were previously authorized for disturbance as the East RDA. The expanded open pit would be approximately 1,350 feet in depth from the pit crest (6,450 feet amsl) to the pit bottom (approximately 5,100 feet amsl). Based on preliminary designs, open pit slopes would range from 1.3 horizontal (H):1 vertical (V) to 0.6H:1V. A 200-foot-wide safety berm setback area would surround the open pit. Cross sections of the open pit are shown on Figure 2.1.2.

The expanded open pit would be accessed from existing pit haul roads, thereby reducing the amount of disturbance and waste material removal associated with haul road excavation for the expanded open pit.

The mining methods utilized for the open pit in the existing operations would continue with the amended Plan, which include conventional open pit drill/blast and load/haul methods. These methods are described in detail in the *Final Plan of Operations, Ruby Hill Project*



- Explanation**
- Project Area
  - Proposed Pit Expansion
  - Proposed Pit Activity Area Expansion
  - Proposed Facilities
  - Pit/Dump/Leach Outlines
  - Existing Perimeter Fence
  - Cross Section Lines

BATTLE MOUNTAIN DISTRICT OFFICE  
 Mount Lewis Field Office  
 50 Bastian Road  
 Battle Mountain, Nevada 89820



**BUREAU OF LAND MANAGEMENT**  
 RUBY HILL PROJECT  
 Proposed Expansion and Facilities

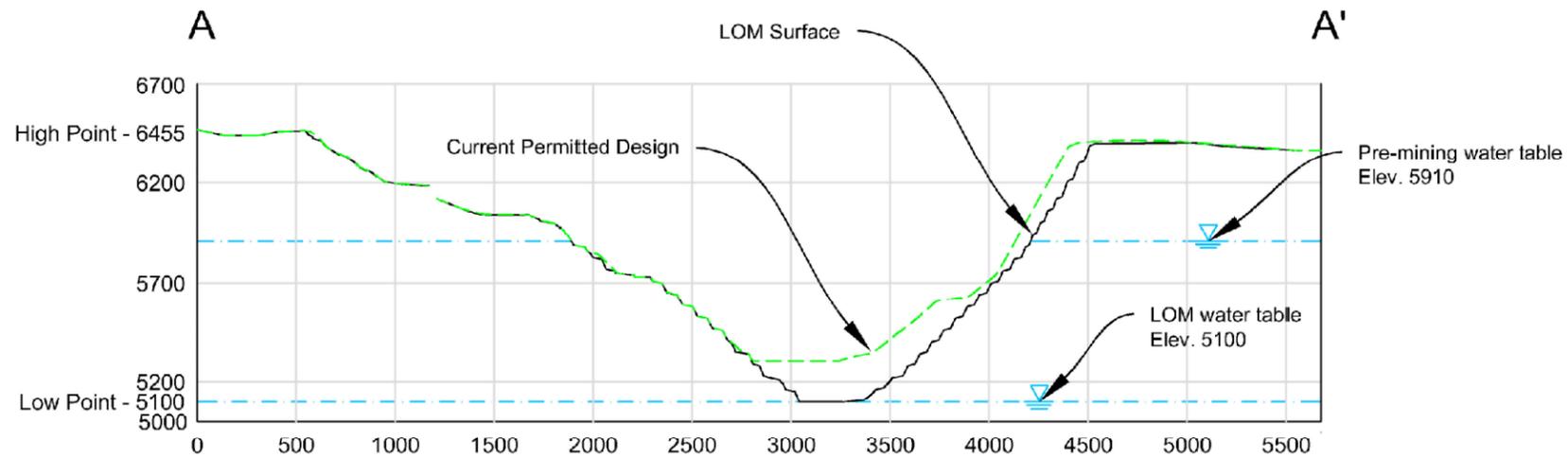
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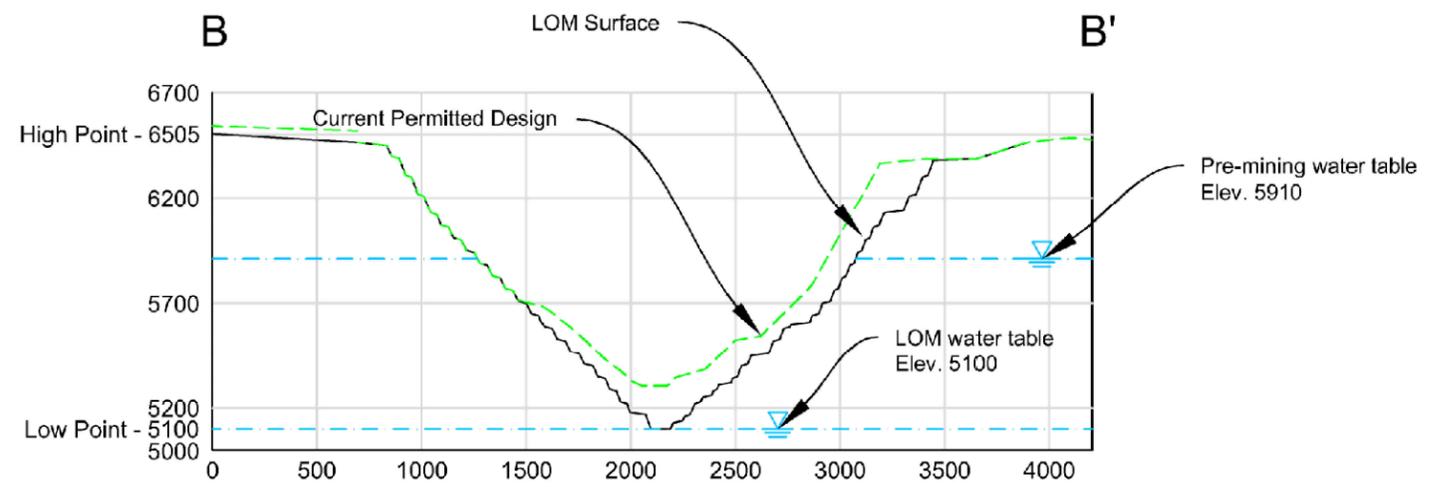
Projection: UTM Zone 11 North, NAD83

Figure 2.1.1

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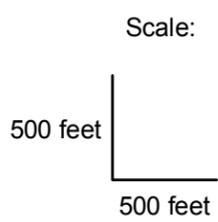


A  
5-1  
Open Pit Section A-A'



B  
5-1  
Open Pit Section B-B'

Notes: LOM = Life of Mine



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Open Pit Cross Sections

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Figure 2.1.2

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(Homestake 1996a; Section 3.2). The overall strip ratio of overburden to ore for the open pit is estimated to be approximately 6:1.

Homestake would continue to mine the expanded open pit at an average rate of approximately 100,000 tons per day, the same as the currently authorized rate; however, this could change based on economic conditions. Homestake would continue to utilize the existing ore stockpiles adjacent to the primary crusher.

Continued dewatering with wells, at approximately the same rate currently authorized of 1,000 gallons per minute (gpm), would be required to draw down the ground water level below the proposed pit bottom. Portable pumping equipment would be used to pump accumulated water from pit sumps. Water from dewatering operations would be used as make-up water for heap leach operations or used as a roadway dust suppressant. Water from the dewatering wells that would not be consumed during mining activities would be treated to NDEP Profile I standards through an arsenic treatment facility prior to being pumped to the existing rapid infiltration basin where it would infiltrate into the local aquifer. Dewatering rates are anticipated to continue at a rate comparable to existing operations and are not anticipated to exceed the authorized 1,000 gpm.

An estimated eight million tons of ore in the expanded open pit is amenable to open pit gold mining methods and heap leach processing. The ore is anticipated to be 90 percent oxide material and ten percent sulfide-bearing material. There are no major differences in the amount of potentially acid generating (PAG) material present in the mined material above the proposed pit bottom elevation, as the estimated 1.6 million tons of additional PAG would essentially exhibit the same characteristics of the material mined under the current authorization. PAG would continue to be managed per the requirements of the ROD for the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NVN-067782, NV063-EIS04-34, signed October 2005; page 5), and the requirements of Water Pollution Control Permit NEV0096103 (signed November 30, 2011; page 5). Most of the ore would be processed at the Ruby Hill Mine (Ruby Hill) site, but approximately 300,000 tons of ore annually would be shipped off site to the Barrick Goldstrike Mine (Goldstrike) for processing.

Approximately 30 million tons of alluvium and rock overburden, and approximately eight million tons of ore would be associated with the open pit expansion. The waste rock (including both alluvium and rock overburden) is anticipated to be approximately 96 percent oxide material and four percent sulfide material (Schafer 2010).

### **2.1.3 East Diversion Ditch**

The expansion of the open pit and PAA would require rerouting of the East Diversion Ditch along the southeast pit highwall in Section 14, T19N, R53E, MDB&M. The outlet of this diversion ditch is not expected to change from its current configuration and location. Design parameters of the rerouted segments of the ditch would be similar to the existing ditch. The rerouting of the East Diversion Ditch would occur within the PAA and would not result in any additional disturbance.

#### **2.1.4 Pit Activity Area**

The existing 72.6-acre PAA consists of an approximately 200-foot wide safety berm setback area. The area also provides for open pit modifications, haul and access roads, exclusion berm and fence, and dewatering facilities. The open PAA provides operational flexibility for these facilities. Under the Proposed Action, the PAA would be expanded to coincide with the proposed open pit expansion. The PAA would be expanded 3.9 acres from its current area and 15.5 acres of the previous PAA would become part of the open pit, leaving a total PAA of 76.5 acres as shown on Figure 2.1.1.

#### **2.1.5 Ore Processing Facilities**

A simplified schematic of the ore processing circuit can be found in the *Plan of Operations, Ruby Hill Mine Expansion – East Archimedes Project* (Homestake 2005). No changes to the ore processing facilities are proposed under this Project. The heap leach pad currently receives two ore types: uncrushed (run of mine) ore placed by trucks from the mine and crushed ore placed by the stacker conveyor.

##### 2.1.5.1 Crushing and Grinding Facilities

No changes are currently proposed to the crushing and grinding facilities for the Project. Currently operating at Ruby Hill are two crushing stages and stacking facilities. Several facilities listed in the *Plan of Operations, Ruby Hill Mine Expansion – East Archimedes Project* (Homestake 2005) are still on site but are no longer operating, including a tertiary crusher, ball mill, belt filters, and thickener. These systems will remain and may be recommissioned in the future. The thickener system has been repurposed and permitted as an arsenic treatment system for water. The agglomeration system has since been removed.

##### 2.1.5.2 Heap Leach Facilities

The ore associated with the Project would be processed on the heap leach pad. Ore would be placed on the heap at an approximate rate of 300,000 tons per month. The authorized heap leach pad is approximately 3,140 feet by 2,008 feet (144.7 acres), and is designed to contain approximately 35 million tons of ore. No changes are proposed to the heap leach pad, as currently authorized in Section 5.E.2 of the *Plan of Operations, Ruby Hill Mine Expansion – East Archimedes Project* (Homestake 2005). The currently authorized heap leach facilities would be used to process additional ore mined from the expanded open pit and consist of the following components:

- Conveyor stacking system;
- Geomembrane/composite-lined process and event ponds;
- Solution application system;
- Solution collection system placed above the liner system;
- Leak detection/collection systems; and
- High-density polyethylene lean and pregnant solution pipelines and associated containment ditches.

These facilities are described in detail in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Section 3.7.2). The heap leach pad is designed as a zero-discharge facility with an overall capacity of approximately 35 million tons of ore. Design criteria for the facility; construction of the pad foundation and liner, solution collection system, additional storm event ponds, and leak detection system; installation of the solution collection system; and the heap development and operation for the expanded facility would be consistent with that described in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Section 3.7.2).

### 2.1.5.3 Conceptual Process Pond

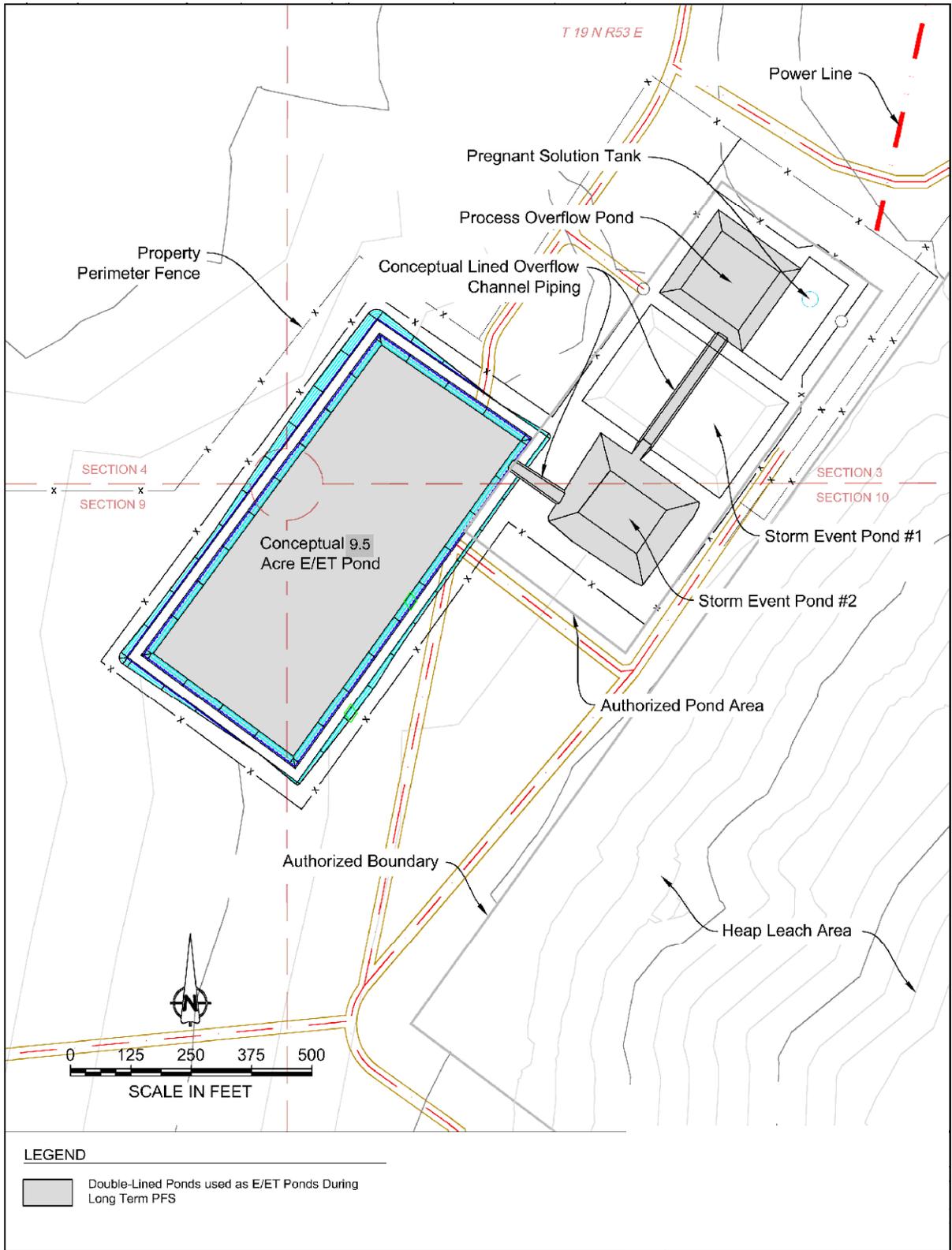
The BMRR has required that a conceptual process pond (evaporation/evapotranspiration [E/ET]) cell be proposed to accommodate process fluids during closure. A lined pond has been included in the Plan that would be used as a future E/ET cell to manage drain-down fluids emanating from the heap leach pad during long-term process fluid stabilization (PFS). This conceptual E/ET cell would be located west and downgradient of the existing process pond and event ponds as shown on Figure 2.1.1.

The disturbance footprint of the conceptual process pond area would be 11.5 acres, of which 9.5 acres would be the constructed lined pond (Figure 2.1.3). The additional two acres includes ancillary facilities, access roads, and fencing. This E/ET cell would be constructed after mining operations have ceased and during final reclamation and closure activities. The E/ET cell would be constructed as a lined facility similar to an emergency/storm event pond associated with heap leach processing. The E/ET cell would be equipped with a double-liner system consisting of a primary single 80 mil high density polyethylene (HDPE) geomembrane liner placed on compacted soil liner. The 80-mil HDPE would be used due to its sufficient strength and durability, and would be resistant to ultraviolet light. A Quality Assurance Plan, which would describe the technical specifications, testing methods, and testing frequencies associated with construction materials, would be developed prior to construction of the E/ET cell.

The pond would be sized based on the Heap Leach Drawdown Estimator (HLDE) Version 1.2 Model calculations for solution management at heap leach pad closure to allow for active and passive management of heap draindown in combination with the capacity available at the existing process and event ponds. The combined system would have the capacity to receive stormwater runoff from the 100-year, 24-hour storm event, while maintaining two feet of freeboard in each pond.

The conceptual process pond would function as an E/ET cell during the periods of active evaporation, and during the solution management phase of reclamation. Based on HLDE model results, evaporation activities would potentially be finished by approximately 27 months after the closure of the mine. At closure, the E/ET cell would be used primarily as overflow capacity (from the existing process ponds) during the anticipated 27 month period of active water management. The E/ET cell would then be converted to an ET cell to facilitate the passive ET of heap leach drain down. This conversion would entail 100 percent backfill of the pond from the local alluvium source, placement of a two-foot protective overliner above the backfill, and installation of plumbing necessary to monitor water levels within the E/ET cell.

Facilities associated with the proposed E/ET cell would consist of lined conveyance structures and equipment (i.e. channels, piping, pumps) and lined solution channels for additional surface



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**RUBY HILL PROJECT  
 Conceptual Process Pond  
 and E/ET Cell Layout**

**Figure 2.1.3**

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area. The total disturbance area required for the construction of the E/ET cell would be approximately 11.5 acres. A Screening Level Ecological Risk Assessment would be conducted prior to the design and construction of the E/ET cell if necessary. Final engineered construction drawings would be submitted for review and approval with the Final Permanent Closure Plan. The E/ET cell would be fenced to protect wildlife and would be netted or similarly protected if the design would include exposed process solutions. The Final Permanent Closure Plan would be submitted two years before final closure of the Project is anticipated. The BLM would be notified upon beginning construction of the E/ET cell for documentation purposes. Closure and backfill information are provided in Appendix A of the Plan. The growth media stock pile located at the top of the East Waste Rock Dump would be utilized for backfill and cover material.

#### 2.1.5.4 Hazardous Wastes and Materials, Spill Prevention, and Emergency Response

Procedures for reagent transportation and storage, waste management, and the spill prevention and emergency response programs for the Project are currently implemented based on the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Appendices 5 and 6).

#### 2.1.5.5 Ancillary Facilities

Existing ancillary facilities at the mine site would continue to be used during construction, operation, and reclamation of the proposed expansion. These facilities include a truck shop, administrative building, laboratory, and storage buildings (BLM 1996a; Section 3.11).

#### 2.1.5.6 Security and Fencing

The range control fence (four-strand barb wire) around the existing facilities would be extended around the conceptual E/ET cell as shown on Figure 2.1.1. The extension of the fencing around the proposed E/ET cell would be completed within the 11.5 acres proposed for the cell itself. The chain-link security fence around the existing open pit would be extended to encompass the expanded open pit following cessation of mining activities. The fence disturbance around the existing open pit would be included within the new PAA disturbance acreage.

#### 2.1.5.7 Water Supply

Mine dewatering activities may provide an additional source of fresh or potable water. Existing water tanks would be used for fresh water storage. Homestake's water rights are presented in Appendix 7 of the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a). Water consumption estimates shown in the *Ruby Hill Mine Expansion – East Archimedes Project Draft Supplemental Environmental Impact Statement* (BLM 2005; Section 2.3.8) are presented in Table 2.1-2 below. The proposed expansion would not increase the water consumption identified for the Project.

**Table 2.1-2: Water Consumption Estimates**

Use	Quantity (acre-feet per year)
Process	350
Domestic	15
Dust Control and Reclamation	300
<b>Total</b>	<b>665</b>

**2.1.6 Expansion of the Class III Landfill**

The Plan proposes to expand the existing Class III landfill used to dispose of nontoxic and non-hazardous solid waste (15 acres). A Class III landfill permit was previously obtained from the NDEP Bureau of Waste Management. To facilitate final closure, Homestake would explore the possibility of utilizing the lined process solution pond or the storm-event ponds as a Class III landfill during closure. Homestake would evaluate these options with the applicable agencies prior to closure.

**2.1.7 Surface Exploration**

An additional 70 acres of surface exploration activities associated with the Project would occur in areas contained within the existing Project boundary primarily within areas adjacent to existing mine facilities. The proposed disturbance would include access drill roads, exploration drill pads, and sumps for water management installed at locations adjacent to the disturbance associated with existing facilities.

**2.1.8 Equipment**

Homestake proposes to use the existing mining equipment to continue mining through the proposed expansion. The following list summarizes the vehicles and equipment that are currently used and projected to be used for the proposed expansion:

- Two rotary drills;
- Five loaders (IT28, 980G, 992C, 992G, 994F);
- One Hitachi 3600 shovel;
- 13 100-200 ton haul trucks;
- Two graders;
- Three track dozers;
- One rubber tire dozer;
- One blasting truck;
- Two blast agent loading trucks;
- Three backhoes/excavators (416, 235, 285);
- Three water trucks (2K, 8K, 18K);
- Two maintenance trucks;
- One tire truck;
- Three service trucks;
- One crane flatbed;
- Three personnel carrier vans (9-passenger);
- Ten lighting plants;

- One process and one blast contractor skid steer loader;
- Three forklifts;
- One manlift;
- 22 pickups/light vehicles; and
- Approximately 20 other temporary support vehicles.

### **2.1.9 Schedule and Work Force**

Mining and ore processing would continue through approximately 2016, or longer depending on mining and economic conditions. Authorized mining rates of approximately 100,000 tons per day would continue at the Project, as authorized under the *Ruby Hill Mine Expansion - East Archimedes Project Final Supplemental Environmental Impact Statement* (BLM 2005; Section 2.3.2). Off-site ore shipments for processing at Goldstrike would continue through the life of the mine at a rate of 300,000 tons per year. Concurrent reclamation would occur throughout the operations (depending on economic conditions), followed by an estimated additional two years for final reclamation.

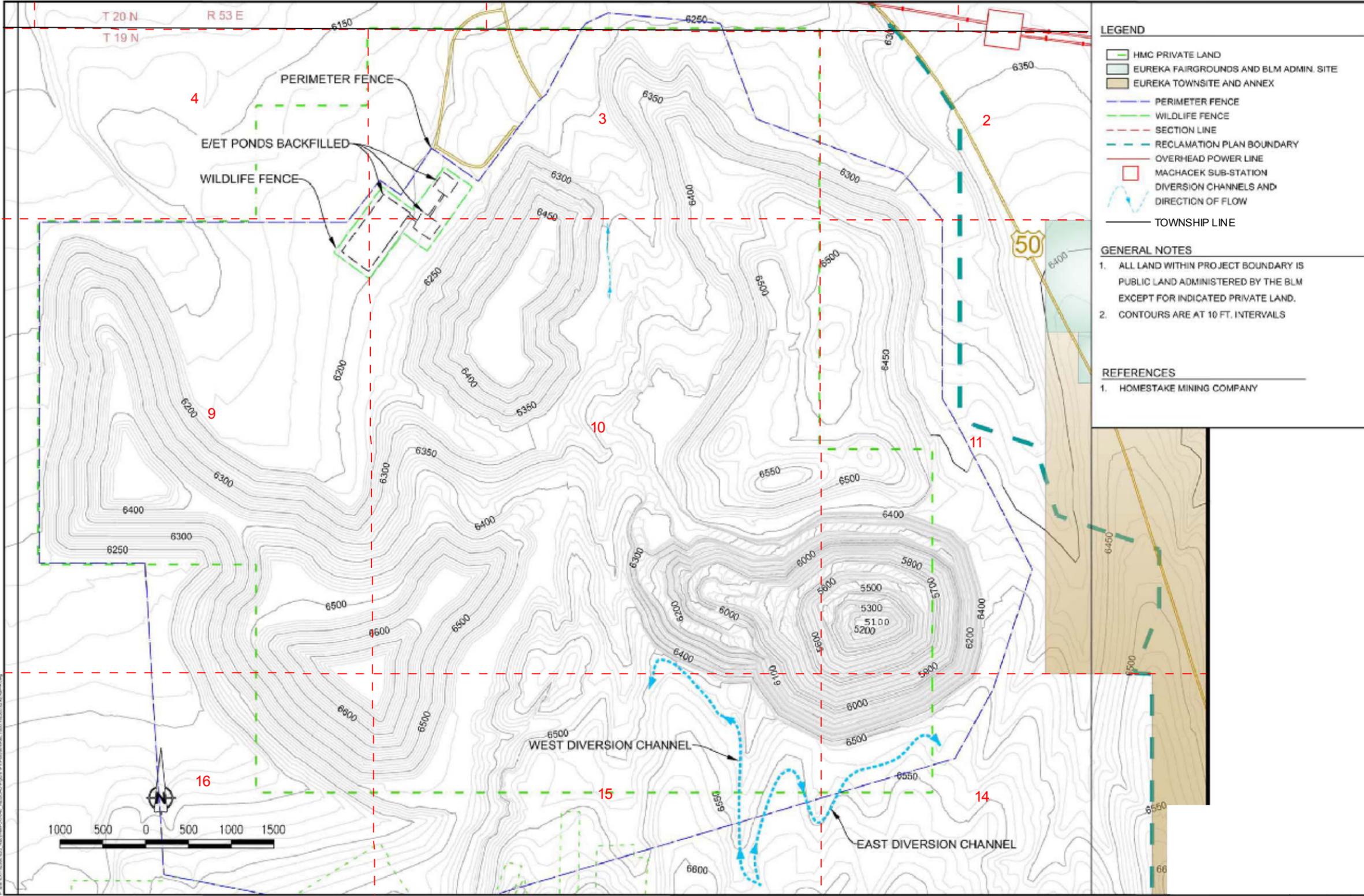
Homestake would maintain the current work force of approximately 147 employees for mining and processing operations and concurrent reclamation. The final two years of reclamation would require approximately 15 workers. The majority of the work force resides in the Eureka area.

### **2.1.10 Reclamation**

The design and construction associated with the Project would facilitate concurrent reclamation during mine operations and closure. The intent of the reclamation program for the Project is to restore the Project Area to a beneficial post-mining land use, prevent undue or unnecessary degradation of the environment, and reclaim disturbed areas such that they are visually and functionally compatible with the surrounding topography. Homestake may choose to retain some facilities for post-mining use. The BLM and NDEP BMRR are the primary federal and state agencies with regulations for the reclamation of surface mines in Nevada (43 CFR 3809, Nevada Revised Statutes [NRS] 519A, and Nevada Administrative Code [NAC] 519A, respectively). These reclamation regulations and results of Homestake's extensive and successful reclamation program were used in the development of the previously approved site-specific *Reclamation Plan and Permit Application, Ruby Hill Project* (Homestake 1996b; Appendix 4) and subsequent revisions of May 1998, October 2001, September 2005, and November 2009. Reclamation procedures from the previously approved reclamation plan would be applied to the proposed expansion. The procedures specific to the expansion are summarized below. Reclamation procedures for the remainder of the existing facilities are discussed in the final reclamation plan on file with the BLM. The proposed post-mining topography associated with the expansion is shown on Figure 2.1.4.

#### **2.1.10.1 Growth Media Stockpiling and Use**

Based on current practice, alluvial overburden would be used as growth media; therefore, proposed expansion and stockpile areas would not be stripped prior to use. Selected growth media would be placed in designated stockpile areas. The stockpiles would be constructed with a slope of 3H:1V, seeded with a BLM approved reclamation seed mix, to minimize water and wind erosion, and signed for future identification. Growth media removed from access and haul



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Post-Mining Topography

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Figure 2.1.4

road and diversion channel areas would be used to construct safety berms, which would also be seeded as necessary to stabilize soils.

Based on favorable previous results achieved in the Project Area, the proposed minimum growth media replacement depth is 12 inches for the RDAs and 12 inches for the heap leach pad.

2.1.10.2 Grading and Stabilization

Following construction activity, interim and concurrent reclamation of cut and fill slopes and borrow areas would be conducted. This may include placement of growth media and seeding in areas that would not be redisturbed in the future. Interim seeding would be conducted with a BLM-approved seed mix in areas that potentially would be redisturbed in the future. The RDAs and heap leach pad would be regraded to create land forms that are compatible with the reclamation objectives, prior to growth media placement and seeding.

2.1.10.3 Surface and Seedbed Preparation

Following final slope construction, the RDAs and heap leach pad would be inspected for slope stability, relief, topographic diversity, acceptable surface water drainage capabilities, and compaction, where appropriate. Prior to placement of growth media, and if conditions warrant, some surfaces may be ripped and scarified. Following placement of growth media, the final surface would be scarified along contours to maximize water retention, minimize erosion, and prepare the final seedbed.

2.1.10.4 Seeding Mixtures and Rates

Reclamation seeding would be accomplished by broadcast seed methods and harrowing or drilling. The BLM-approved seed mix presented in Table 2.1-3 was developed based on previous site-specific field testing and designed to optimize forage potential of reclaimed sites and improve their overall stability.

**Table 2.1-3: Final Reclamation Seed Mix**

Species	Scientific name	Seed <sup>1</sup> (pounds per live seed/acre)	Seedlings (each/acre)
<b>Seed Mix and Plantings for RDAs and Heap Leach Pad</b>			
Antelope bitterbrush	<i>Purshia tridentata</i>	2	--
Shadscale saltbush	<i>Atriplex confertifolia</i>	2	--
Fourwing saltbush	<i>Atriplex canescens</i>	3	--
Small burnet	<i>Sanguisorba minor</i>	3	--
Palmer's penstemon	<i>Penstemon palmeri</i>	2	--
Blue flax	<i>Linum perenne</i>	2	--
Cicer milkvetch	<i>Astragalus cicer</i>	2	--
Yellow sweetclover	<i>Melilotus officinalis</i>	4	--
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	4	--
Arriba western wheatgrass	<i>Pascopyrum smithii</i>	2	--
Sandberg bluegrass	<i>Poa secunda</i>	1	--
Canby's bluegrass	<i>Poa canbyi</i>	1	--

Species	Scientific name	Seed <sup>1</sup> (pounds per live seed/acre)	Seedlings (each/acre)
Basin wildrye	<i>Leymus cinereus</i>	2	--
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	2	--
Indian ricegrass	<i>Achnatherum hymenoides</i>	--	--
Basin Big sagebrush	<i>Artemisia tridentata</i>	--	~ 260
Mountain mahogany	<i>Cercocarpus</i> sp.	--	Small clumps
Utah serviceberry	<i>Amelanchier utahensis</i>	--	50
Antelope bitterbrush	<i>Purshia tridentata</i>	--	100
<b>Total</b>		<b>34</b>	--
<b>Seed Mix for Valley Floor</b>			
Indian ricegrass	<i>Achnatherum hymenoides</i>	2.5	--
Basin wildrye	<i>Leymus cinereus</i>	2.5	--
Bottlebrush squirreltail	<i>Elymus elymoides</i>	2.5	--
Shadscale saltbush	<i>Atriplex confertifolia</i>	2.5	--
<b>Total</b>		<b>10</b>	--

<sup>1</sup>Reduce broadcast application rate by one-half for drill seed application rate.

Acceptable substitutes may be incorporated into the mix as agreed to by the BLM. Planting of selected woody shrubs on the RDAs would continue during operation of the expansion Project. Woody species planting would be conducted on north and west-facing slopes and would be conducted in a manner to mimic woody vegetation patterns of the surrounding natural landscape.

#### 2.1.10.5 Weed Control

Weed control practices would be implemented in coordination with the BLM, NDEP, and Diamond Valley Weed District to limit the spread of noxious weeds in the Project Area and to ensure successful reclamation. The expansion would continue to comply with the treatment measures presented in the Noxious Weed Management Plan (SRK Consulting [SRK] 2010). These measures include the following: interim seeding of long-term disturbance; road maintenance; minimize disturbance to existing vegetation; effective reclamation; vehicle cleaning; certified weed-free materials; and apply seed to locations that have been treated for noxious weeds.

#### 2.1.10.6 Reclamation Scheduling

Reclamation activities would be scheduled as soon as possible after mining activities in a particular area are completed and to take advantage of optimal climatic conditions. In general, grading and drainage control work would be conducted in mid- to late-summer, seedbeds would be prepared in early fall just prior to seeding, and seeding would be completed between October and April to take advantage of winter and spring moisture.

### 2.1.11 Facility Reclamation

#### 2.1.11.1 Mine Area

Mine pit reclamation would be implemented to create a safe and stable topographic feature. The in-pit benches and highwalls would be left in place upon completion of mining. A chain-link fence would be installed around the open pit. Safety berms would be constructed inside of the fence and revegetated. After dewatering activities cease, a pit lake is anticipated to form in the bottom of the open pit.

### 2.1.11.2 Rock Disposal Areas

The RDAs would be constructed and reclaimed to blend into the surrounding topography to the extent practical. Slope angles would be reduced to approximately 3H:1V or less. Following placement of growth media, the facilities would be seeded using a BLM-approved seed mix. Drainages would be maintained on either side of the facilities as conditions warrant. Select woody shrub seedlings would be planted to increase ecologic diversity.

### 2.1.11.3 Crushing and Processing Facilities

Crushing and grinding facilities would be removed and disposed of in accordance with appropriate federal and state regulations. The area would be regraded for drainage and to blend with adjacent topography, and the area would be seeded using a BLM-approved seed mix.

### 2.1.11.4 Heap Leach Pad

Reclamation methods for the heap leach pad would recognize ore and solution characteristics, site conditions, and climatic conditions. Pursuant to the requirements of NDEP (NAC 445A.446 and NAC 445A.447), a summary of the principal heap leach closure steps follows.

#### 2.1.11.4.1 Heap Regrading, Resoiling, and Revegetation

The heap leach pad would be regraded to reduce slopes to an approximate 3H:1V grade, and round off the edges to mimic natural contours. Regrading of the leach pad slopes would commence shortly after the cessation of mining and processing activities. Growth media would be applied and the facility seeded as the solution management enters Phase II, as described below in Section 2.1.11.4.2.

#### 2.1.11.4.2 Solution Management

At the time of heap closure, the heap draindown would be managed by a regime of active and passive evaporation within downstream process ponds and E/ET cells and recirculation back to the heap. As the solution is removed from inventory, portions of the heap leach pad would be reclaimed and covered with growth media. Once draindown flows are low enough to handle through evaporation at the lined ponds below the heap, the remainder of the heap would be reclaimed as described above.

Effectively, four phases of solution management or PFS would be required throughout the closure process, with blending of strategies from each phase to the other. The solution management process would be implemented in the following phases:

- Phase I - active evaporation at the downstream process and evaporation ponds and recirculation and evaporation at the heap surfaces (with a duration of approximately five months);
- Phase II - active and passive evaporation at the process and evaporation ponds only. Latter stages of Phase II are characterized by intermittent active evaporation within the pond footprints. Pond inventories are eliminated at maximum in-pond active evaporation rates, and then active evaporation is halted and inventories allowed to accumulate to maximum

operating volumes prior to the next active evaporation event (with a duration of approximately 20 months);

- Phase III - passive evaporation at the process and evaporation ponds only and conversion of the ponds to E/ET cells (with a duration of approximately one month); and
- Phase IV – long-term passive evaporation using E/ET cells.

The phased solution management approach acknowledges the initially high drainage rates and the need to first prevent release from the system, while effectively eliminating inventory at maximum drainage rates from the heap. Also, as recirculation and evaporation at the heap surface would result in additional infiltration into the heap, the heap surface evaporation system would be eliminated first in preference for the downstream active evaporation within the lined ponds. Finally, the active management would be phased out by improving the heap cover and eliminating residual drain down to a level that can be handled by passive systems. The passive systems may then be partially reduced in size over time as flows reach steady state.

Long-term effluent discharge would be managed pursuant to the requirements of NDEP (NAC 445A.446 and 445A.447) which includes the construction of an E/ET cell as proposed or by other closure methods that arise from technological advances. As calculated in the HLDE model, approximately 9.5 acres of lined pond would be needed to provide ET of draindown fluids during Phase IV of PFS.

#### 2.1.11.5 Process and Event Pond Reclamation

At closure, the E/ET cell would be used primarily as overflow capacity (from the existing process ponds) during the anticipated 27 month period of active water management. The E/ET cell would then be converted to an ET cell to facilitate the passive ET of heap leach drain down. This conversion would entail 100 percent backfill of the pond from the local alluvium source, placement of a two-foot protective overliner above the backfill, and installation of plumbing necessary to monitor water levels within the E/ET cell.

As part of their design, the converted ET cells would be covered with 12 inches of growth media and seeded. Event Pond #1 would be reclaimed by more conventional closure methods involving testing pond sediments for hazardous constituents, folding the liner into the pond area, ripping the liner, backfilling with excavated soil material, grading the pond to provide free drainage and blending the event pond into the adjacent topography, including seeding.

#### 2.1.11.6 Roads

Once haul and access roads are not deemed necessary, they would be recontoured, culverts removed, and revegetated using a BLM-approved seed mix. Road surfaces at grade would be ripped to a depth of at least 12 inches to reduce compaction. Growth media previously stripped and stockpiled along the roadways during construction may be reapplied prior to seeding on heavier use roads.

#### 2.1.11.7 Borrow Areas and Monitoring Wells

Borrow areas would be reclaimed as described in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Section 4.2). Mine dewatering wells and monitoring wells would be closed in compliance with Nevada Division of Water Resources requirements.

#### 2.1.11.8 Surface Exploration

Reclamation of exploration surface disturbance would entail recontouring and regrading the area. Where exploration disturbance would be located on fill, the side slopes would be rounded and regraded to 2.5H:1V. Compacted road and pad surfaces would be ripped, covered with growth media, and revegetated using a BLM-approved seed mix.

### 2.1.12 **Applicant-Committed Environmental Protection Measures**

Homestake would commit to the following Environmental Protection Measures as part of the Proposed Action to prevent unnecessary or undue degradation during construction, operation, and reclamation of the Project. During construction and operation of the expansion Project, measures would be taken to minimize impacts to air, land, and water resources and to prevent undue or unnecessary degradation of the environment. Protection measures would be taken to comply with all appropriate federal and state air quality and water quality standards and solid waste disposal requirements. Pollution control measures and equipment would be used to reduce environmental impacts. The measures are derived from the general requirements established in the BLM's Surface Management Regulations at 43 CFR 3809 and the BMRR's mining reclamation regulations, as well as other water and air quality regulations.

Applicant-Committed Environmental Protection Measures specific to the Proposed Action have been adopted from the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a) and the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS* (BLM 2005). Expansion-specific monitoring and mitigation as described in the *1997 Ruby Hill Project ROD and Plan of Operations Approval* (BLM 1997a) also would be implemented. These measures are summarized below. Additional Applicant-Committed Environmental Protection Measures and monitoring and mitigation measures that were previously implemented for the Project would remain in place and effective during the life of the proposed operation (i.e., chain-link fence around solution ponds; tanks for containment of normal process flows; enclosures on crushers, screens, and transfer points; etc.).

#### *Water Resources, Surface Water Management, and Sediment Control*

- Current erosion control measures are outlined in the Storm Water Pollution Prevention Plan (SWPPP) for the Project. These measures include minimizing the size of soil disturbances, concurrent reclamation, installation of temporary diversion ditches, berms, and settling basins, as required. Similar measures would be implemented during construction, operation, and reclamation of the mine expansion Project.
- Storm water diversion systems, as outlined in the SWPPP, would be constructed around new disturbance areas, as needed. Design criteria for any permanent diversions would be based on a 100-year, 24-hour storm event. Appropriate measures, which may include the use of hay/straw bale barriers, silt fences, or other sediment control best management

practices, would be taken to ensure that the Eureka County waterline and Hogpen Canyon road would not be adversely affected by storm water drainage from site diversion systems.

- All Ruby Hill Mine roads have been constructed and maintained to provide adequate drainage and to minimize damage to soil and water resources. These goals have been met through the installation of ditches, settling basins, and culverts sized to meet BLM standards. These practices would continue during construction and maintenance of new expansion-related roads. Measures outlined in the SWPPP, such as hay or straw bale barriers and silt fences, and other measures not in the SWPPP, such as dispersion terraces, gabion sediment traps, or grass filter waterways would be implemented, as required.
- When mining ceases, a pit lake is anticipated to form in the bottom of the expanded open pit. Homestake prepared a pit lake study to address issues of water flow and water quality and it is included in the Plan as Appendix B (see Section 3.2.12.1 of this EA for a description of the pit lake water quality).

#### *Acid Rock Drainage*

- Geochemical testing has been conducted on representative samples of waste rock from the open pit expansion to determine the net acid neutralizing capacity (see Appendix D of the Plan). Testing of waste rock samples indicate approximately 98.5 percent of the waste rock generated ratios of acid neutralizing potential to acid generating potential (ANP:AGP) with a weighted average of 539, which indicates a significant excess neutralizing potential in the vast majority of the rock to be mined. The results would be verified through implementation of a waste rock and overburden testing program during the operational phase of the expansion Project, similar to the program in place during the previous mining regime. Specific testing procedures for this program are contained in the State of Nevada Water Pollution Control Permit for the Ruby Hill Project (NEV0096103; pages 6-7).

#### *Spill Prevention Planning*

- Spill prevention measures and contingency plans for containing accidental spills and for preventing uncontrolled discharges to the environment are currently in place. These spill prevention and containment measures would ensure that, during construction and operation of the mine expansion, spills of fuel or reagents are contained, collected, and reintroduced into the process stream or safely disposed of in accordance with all appropriate federal and state regulations.

#### *Stability of Facilities*

- Geotechnical investigations of the open pit would continue throughout operations to assist in optimizing the final open pit design. Pit stability has been, and would continue to be, monitored throughout the Project life to ensure safe and uninterrupted operations. Monitoring has and would continue to consist of visual inspections, pit wall monitoring, documentation and investigation of major failures, and mapping and analysis of open pit

geological features. If needed during the pit expansion, additional core drilling for stability studies or the installation of an additional permanent survey station or devices to monitor pit walls would be undertaken.

*Wildlife, Special Status Species, and Livestock Protection*

- During the construction and operations of the Project, Homestake constructed range fences compliant with BLM standards to exclude cattle and wild horses from the Project Area. These fences would be maintained, and expanded, during the construction, operations and reclamation of the expansion Project.
- The heap leach pregnant, barren, and leach solutions are currently collected in pipes to minimize bird and bat mortality from open process solutions. This procedure would continue. The two process solution tanks and the process solution overflow pond are netted. The nets would be maintained through operations and closure until no longer required.
- Homestake has and would continue to monitor wildlife mortality on the general mine site and to report all mortalities. As part of this process, the top of the heap leach pad is monitored daily for any extensive pooling of cyanide solutions. When necessary, appropriate measures to protect wildlife and eliminate pooling have been and would continue to be implemented.
- A raptor survey would be conducted between March 1 and July 31 prior to any surface disturbance activities and appropriate mitigation measures developed and implemented, if needed.
- Removal or disturbance to migratory bird habitat on currently undisturbed lands in the Project Area would be avoided, to the extent possible, between April 1 and August 1, to protect nesting birds, or appropriate mitigation would be implemented. Should removal of habitat be required during this period, Homestake would coordinate with the BLM and Nevada Department of Wildlife (NDOW) to conduct breeding bird surveys prior to surface disturbance activities and implement appropriate mitigation, if needed.
- The footprint of the expanded West RDA was modified to preserve the bat gates previously installed over two entrances to the historic Bullwhacker Mine. These bat gates would be inspected annually during operations to ensure their integrity.
- Underground openings and historic mine workings that were previously identified as supporting bats would continue to be monitored by an annual summer survey and a bi-annual winter hibernation survey, as described in the *1997 Ruby Hill Project ROD and Plan of Operations Approval* (BLM 1997a; page 14).

*Range*

- Certified weed-free mulch and BLM-approved seed mixtures have been used to reclaim areas disturbed by current operations and this practice would continue. If noxious weeds become established in Project-disturbed areas, a weed removal or spraying program

would be implemented, as described in the Noxious Weed Management Plan (SRK 2010). If needed, herbicide selection and use would be in accordance with appropriate State of Nevada and BLM requirements.

### *Visual*

- The East RDA was designed as a visual shield. The East waste rock expansion was also designed to visually shield, to the extent possible, the open pit expansion from U.S. Highway 50 and the Eureka County Fairgrounds.
- Final slopes on the expanded RDAs would be 3H:1V or less, and shaped to blend with the existing topography to the extent possible.
- To reduce the visual impact of the RDAs, rock placement on the top of the dumps would be conducted in a manner that would create an irregular surface, and slopes would be shaped to provide topographical variability.
- Water and dust inhibiting agents would continue to be used, as needed, to reduce the potential visual effects of fugitive dust during operations.
- Outdoor night lighting at the mine is currently shielded and directed downward whenever possible. This practice would continue during construction and operations of the Plan.
- The concurrent reclamation program in place at the Project would continue in accordance with the reclamation plan (Section 6.0 of the Plan).
- At the conclusion of operations, Homestake may choose to keep facilities on private land. Structures and buildings on public land would be removed, with BLM concurrence.

### *Air Quality*

- Access and haul roads within the site boundary are surfaced with gravel and are well maintained.
- Dust control measures, including chemical stabilization, water sprays, and other controls approved by the NDEP Bureau of Air Pollution Control (BAPC) are currently in place to reduce fugitive dust.
- Currently, speed restrictions are enforced on mine roads to minimize particulate emissions from the roadways. This practice would continue throughout the life of the expansion project.
- As has been the current practice during the Project, revegetation of inactive areas within the Project Area would continue throughout the new operational phase, rather than deferring reclamation until operations are completed.
- Ambient concentrations of particulates were monitored during the previous operational phase for the Project. This monitoring would resume during construction and operations

for the expansion, in accordance with state permit requirements. Currently ongoing meteorological monitoring would continue.

### *Cultural Resources*

- Section 3.2.2.1 describes the cultural resource surveys that have been conducted in the Project Area for the Project. These surveys cover the mine expansion area. If proposed exploration activities occur in areas not surveyed, cultural resource surveys would be completed, and the results submitted to the BLM prior to surface disturbance activities. If eligible sites are identified, they would be mitigated in accordance with the Programmatic Agreement (PA) that was developed by the BLM, Homestake, State Historic Preservation Office (SHPO), and Advisory Council on Historic Preservation for the Ruby Hill Project. The PA is on file at the BLM MLFO. Surface disturbance activities would not take place in unsurveyed areas until surveys are conducted and reports are submitted and approved by the BLM.
- During construction, a qualified archaeologist, in coordination with the BLM, would inspect and/or monitor surface disturbing activities in the vicinity of any identified, unmitigated or unevaluated significant cultural resources.
- Homestake currently limits employee access to known cultural resource sites, educates employees as to the significance of cultural resources and their vulnerability, and has implemented a strict management policy prohibiting casual collection of artifacts from lands within the Project boundary. These measures would continue through the expansion Project.
- Impacts of mining disturbance to archeological site CrNV-63-6546 were evaluated by BLM as part of the *2005 Ruby Hill Mine Expansion-East Archimedes Project Final SEIS* (Section 3.15.2.1), and a protection measure was adopted providing for complete avoidance of the site.

### *Land Use Authorizations and Access*

- Prior to disturbing any bench mark, section, or corner monument on public land, Homestake would advise the BLM and describe plans to protect or reference them. Witness corner surveys would be provided by Homestake to protect existing monuments as required by State surveying procedures.
- The existing access road, located at the intersection of U.S. Highway 50 and State Route 278, would continue to be the access route to the Project. This location minimizes heavy truck and vehicular traffic through the town of Eureka, as most mine deliveries arrive from the west on U.S. Highway 50 or from the north on State Route 278.
- The publicly maintained road that traverses Hogpen Canyon would remain open to the public.

- A chain-link security fence would be installed around the ultimate perimeter of the expanded open pit after mining is complete. A safety berm would be constructed inside the chain-link fence.

#### *Vibration Monitoring Program*

- Blasting would only be conducted during daylight hours.
- Previous surveys of selected historic buildings in Eureka, noise/vibration studies as previously conducted, and the blast monitoring program are described in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Chapter 5) and the *Ruby Hill Project Final Environmental Impact Statement* (BLM 1996; Section 3.16.4). If blasting-related vibrations greater than 0.25 inch per second are detected by the vibration monitors in Eureka, Homestake would notify appropriate federal, state, and local agencies and review and modify blasting practices immediately to avoid further ground vibration in excess of 0.25 inch per second.

#### *Noise*

- Homestake would continue to cooperate with Eureka County and the Eureka County School District (ECSD) to minimize mine-related noise when noise-sensitive activities are scheduled to take place at the Eureka County Fairgrounds.
- During previous operations, blasting procedures were designed and executed to ensure that threshold noise and vibration levels were not exceeded, and to avoid times of greater sensitivity for potential receptors (generally between 7:00 p.m. and 7:00 a.m.). This practice would continue during construction and operations of the Plan.

#### *General*

- An advisory group including Homestake representatives, local agencies and citizens was established in 1997 to address issues of concern to the public. This group remains active and would continue to meet throughout the life of the amended Plan to discuss and resolve public concerns.

#### *Environmental Monitoring Plan*

- The goal of the environmental monitoring plan presented in the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a; Appendix 3) is to ensure that the Project is conducted in a manner that would prevent unnecessary and undue degradation of the environment. A key objective of this plan is currently in place and would continue during the construction and operations of the expansion Project. The plan outlines routine monitoring of the process fluid management system, as well as periodic monitoring of ground water, overburden and waste rock, and revegetation success. Revisions to the plan may be made following completion of detailed operational designs and would incorporate any additional monitoring requirements per the NEPA process and other state and federal permit requirements.

### *Employee Environmental Education Program*

- In an attempt to help reduce potential impacts to the environment, Homestake would continue with the established employee orientation training in environmental awareness. The objectives of this program are to familiarize employees with state and federal environmental laws specific to the mining operations, with the safe use of reagents and chemicals utilized on the property, and with employee obligations regarding the cultural resources of the Project Area.

### *Quality Assurance Plan*

- Quality assurance/control plans would be prepared according to NDEP requirements for the water pollution control permit; these plans would be submitted to the BLM prior to construction. Quality assurance/control plans for the RDAs would include specifications for construction, operation, and reclamation. For the E/ET pond, a quality assurance plan would be developed in conjunction with the Project construction contracts, and an independent quality assurance contractor would be used. Placement of the liner would be performed under supervision; the qualifications of the technician, material specifications, and testing frequency would be described in the quality assurance plan. Upon final engineering design and prior to construction, other quality assurance/control plans would also be developed and submitted to the BLM for activities, such as pipeline and access road realignment, power line installation, process pond construction, and reclamation.

## **2.2 No Action Alternative**

In accordance with BLM NEPA guidelines H-1790-1, Chapter V (BLM 2008), this EA evaluates the No Action Alternative which is a reasonable alternative to the Proposed Action. The objective of the No Action Alternative is to describe the environmental consequences that would result if the Proposed Action were not implemented. The No Action Alternative forms the baseline from which the impacts of all other alternatives can be measured.

Under the No Action Alternative, the Proposed Action would not be approved by the BLM, and the existing open pit and related operations would not be expanded. Homestake would continue authorized mining and exploration operations in the Project Area. Homestake would be able to continue operations on approximately 1,430.9 acres of private land and 204.9 acres of public land. In addition, Homestake would continue to increase the heights and potentially change the configurations of the RDAs and heap leach pad and deepen the open pit within the authorized parameters. This disturbance would take place in time frames established by the annual mine plans developed by Homestake and approved by the BLM and NDEP. Under this alternative, Homestake would continue to recover gold and silver as currently authorized by the BLM and State of Nevada for the existing Ruby Hill Project. Under the No Action Alternative, reclamation and closure of the existing mine would continue, uninterrupted, on schedule with existing authorizations.

### 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

#### 3.1 Introduction

The purpose of this section of the EA is to describe the existing environment of the Project Area. Supplemental Authorities that are subject to requirements specified by statute or Executive Order (EO) must be considered in all BLM environmental documents. The elements associated with the supplemental authorities listed in Appendix 1 of the NEPA Handbook (BLM 2008) and in the Nevada Instruction Memorandum (IM) 2009-030, Change 1, are listed in Table 3.1-1. The table lists the elements and the determination of whether the element is present in the Project Area and if the element would be affected by the Proposed Action.

Supplemental Authorities that may be affected by the Proposed Action are analyzed in Section 3.2. Those elements listed under the supplemental authorities that do not occur in the Project Area and would not be affected are not discussed further in this EA, based on the rationale provided in the following table. The elimination of non-relevant issues follows the Council on Environmental Quality (CEQ) policy, as stated in 40 CFR 1500.4. The potential effects of the No Action Alternative are discussed in Section 3.3.

**Table 3.1-1: Elements Associated with Supplemental Authorities and Rationale for Detailed Analysis for the Proposed Action**

Supplemental Authority Element	Not Present	Present/ Not Affected	Present/ May be Affected	Rationale/Reference Section
Air Quality			X	See Section 3.2.1.
Area of Critical Environmental Concern (ACEC)	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Bald and Golden Eagles			X	See Section 3.2.9 (Special Status Species).
Cultural Resources			X	See Section 3.2.2.
Environmental Justice	X			Environmental Justice was analyzed in the 2005 SEIS in which it was determined that the Project would not disproportionately affect any particular population; therefore, the NEPA analysis from the 2005 SEIS is adequate and Environmental Justice is not analyzed in this EA.
Farmlands (Prime or Unique)	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Fish Habitat	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Floodplains	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Forests and Rangelands (Healthy Forest Restoration Act [HFRA] HFRA Projects only)	X			This Project does not meet the requirements to qualify as an HFRA project.

<b>Supplemental Authority Element</b>	<b>Not Present</b>	<b>Present/ Not Affected</b>	<b>Present/ May be Affected</b>	<b>Rationale/Reference Section</b>
Human Health and Safety (Herbicide Projects)	X			This Project may use herbicides to eradicate noxious weeds as stated in the Noxious Weed Management Plan for the Project; however, EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks", would not apply to this Project as there would be no children on the mine site.
Migratory Birds			X	See Section 3.2.4.
Native American Traditional Values		TBD		See Section 3.2.5.
Noxious Weeds, Invasive Nonnative Species			X	See Section 3.2.6.
Threatened or Endangered Species	X			This element is not present, but further discussed in Section 3.2.9 (Special Status Species).
Wastes-Hazardous/Solid		X		See Section 3.2.11.
Water Resources			X	See Section 3.2.12.
Wetlands and Riparian Zones	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Wild and Scenic Rivers	X			This element is not present within the Project Area or vicinity and is not further analyzed in this EA.
Wilderness/Wilderness Study Areas (WSAs)/Lands with Wilderness Characteristics	X			Wilderness or WSAs are not present within the Project Area or vicinity. The Project Area is substantially affected by human imprints, does not have opportunities for solitude or primitive recreation, and does not have an adequate size to contain land with wilderness characteristics. These elements are not further analyzed in this EA.

In addition to the elements listed under supplemental authorities, the BLM considers other resources and uses that occur on public lands and the issues that may result from the implementation of the Proposed Action or any alternative to the Proposed Action. Other resources or uses of the human environment that have been considered for this EA are listed in Table 3.1-2 below. Resources or uses that may be affected by the Proposed Action are analyzed in Chapter 3.

The BLM has used environmental data collected in the Project Area to predict environmental effects that could result from the Proposed Action and alternatives. A level of uncertainty is associated with any set of data in terms of predicting outcomes, especially when natural systems are involved. The predictions described in this analysis are intended to allow comparison of the No Action Alternative to the Proposed Action, as well as provide a method to determine whether activities proposed by the applicant would be expected to comply with applicable regulations.

**Table 3.1-2: Resources or Uses Other Than Elements Associated with Supplemental Authorities**

Other Resources or Uses	Not Present	Present/ Not Affected	Present/ May be Affected	Reference Section
Forestry and Woodland Resources		X		Impacts to forestry and woodland resources were analyzed in the 2005 SEIS. No change in the Project Area would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and forestry and woodland resources are not further analyzed in this EA.
Geology and Mineral Resources			X	See Section 3.2.3.
Land Use and Realty		X		No new land use authorizations are proposed and no existing land use authorizations would be impacted by the Proposed Action; therefore, Land Use Authorization is not further analyzed in this EA.
Noise and Blasting Vibrations		X		Noise and blasting vibrations from the Project were analyzed in the 2005 SEIS and no net increase in auditory impacts would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and Noise and Blasting vibrations are not further analyzed in this EA.
Paleontological Resources		X		Based on the 2005 SEIS analysis and the classification system described in IM 2008-009, no scientifically significant paleontological resources have been identified in the Project Area. Therefore, this resource is not further analyzed in this EA.
Grazing Management		X		Impacts to rangeland and grazing management were analyzed in the 2005 SEIS. No change in Project Area would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and grazing and rangeland management are not further analyzed in this EA.
Recreation		X		Impacts to recreation were analyzed in the 2005 SEIS. No change in the Project Area would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and recreation is not further analyzed in this EA.
Socioeconomic Values			X	See Section 3.2.7.
Soils			X	See Section 3.2.8.
Special Status Species (Plants and Wildlife)			X	See Section 3.2.9.

Other Resources or Uses	Not Present	Present/ Not Affected	Present/ May be Affected	Reference Section
Transportation and Access		X		Transportation and access was analyzed in the 2005 SEIS and no changes in Project access or a net increase in transportation-related impacts would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and Transportation and Access are not further analyzed in this EA.
Vegetation			X	See Section 3.2.10.
Visual Resources		X		Impacts to visual resources were analyzed in the 2005 SEIS. Based on the existing mine, no change in line, form, or color of the setting would result from the Proposed Action; therefore, the NEPA analysis from the 2005 SEIS is adequate and visual resources is not further analyzed in this EA.
Wild Horse and Burros	X			The southwest portion of the Project Area is located within Fish Creek Herd Management Area; however, the existing and proposed expansion activities would be blocked by the perimeter fence.
Wildlife (General)			X	See Section 3.2.13.

### 3.2 Effects of the Proposed Action

#### 3.2.1 Air Quality

The analysis of air quality includes the potential impacts within the Project Area and off-site ore processing. Impacts within the Project Area include ambient air pollutants, factors influenced by climate and meteorology, and climate change. Off-site impacts to air quality pertain to mercury emissions from processing some of the ore mined at Ruby Hill.

##### 3.2.1.1 Affected Environment

###### *Air Quality*

###### Project Area

The BAPC is the agency in the State of Nevada that has been delegated the responsibility for implementing a State Implementation Plan (SIP) (excluding Washoe and Clark Counties, which have their own SIP). Included in a SIP are the State of Nevada air quality permit programs (NAC 445B.001 through 445B.3791, inclusive). Also part of a SIP is the Nevada State Ambient Air Quality Standards (NSAAQS). The NSAAQS are generally identical to the National Ambient Air Quality Standards, with the exception of the following: (a) an additional standard for carbon monoxide (CO) in areas with an elevation in excess of 5,000 feet amsl; (b) a hydrogen sulfide standard; and (c) a violation of state standard occurs with the first annual exceedance of an ambient standard, while federal standards are generally not violated until the second annual

exceedance. In addition to establishing the NSAAQS, the BAPC is responsible for permit and enforcement activities throughout the State of Nevada (except Clark and Washoe Counties).

Attainment status within the Project Area is determined by monitoring ambient levels of criteria pollutants. The attainment or unclassified designation means that no violations of NSAAQS have been documented in the region. The Project Area is located in the Newark Valley Air Basin, which is considered in attainment relative to the federal air quality standards. Goldstrike, where the ore would be transported to and processed, is located in the Boulder Flat Air Basin, which is also considered in attainment relative to the federal air quality standards. The existing air quality is typical of largely undeveloped regions of the western United States with limited sources of pollutants.

Off-Site Ore Transport

A quantification of truck emissions associated with the off-site transport of 380,250 tons per year (tpy) of ore from Ruby Hill to Goldstrike was performed by Enviroscientists in May 2011 to accommodate for the following potential emissions: particulate matter of aerodynamic diameter less than 2.5 microns (PM<sub>2.5</sub>); particulate matter with an aerodynamic diameter of ten microns or less (PM<sub>10</sub>); nitrogen oxides (NO<sub>x</sub>); CO; and sulfur dioxide (SO<sub>2</sub>). Table 3.2-1 below shows the total estimated yearly emissions for the listed pollutants.

**Table 3.2-1: Total Potential Truck Traffic Emissions**

PM <sub>10</sub>	PM <sub>2.5</sub>	CO	NO <sub>x</sub>	SO <sub>2</sub>
3.72 tpy	0.86 tpy	6.15 tpy	16.90 tpy	0.49 tpy

Source: Enviroscientists 2011

Off-Site Ore Processing

Some ore from Ruby Hill would be processed at Goldstrike, approximately 115 miles away. The annual projected shipping rate of ore to Goldstrike is approximately 300,000 tons per year. The ore transported to Goldstrike would be processed through either roasters or autoclaves. To address potential mercury emissions from the Proposed Action, a technical memorandum was prepared for a 2015 operating scenario for the processing of ore at Goldstrike (AirSciences Inc. 2011). Potential mercury emission estimates for processing ore at Goldstrike were based on recent mercury stack test results and hours of operation data, and were also made based on the amount of ore processed at the Goldstrike from Ruby Hill and its mercury concentration compared to the total ore processed at Goldstrike and its mercury concentration.

The total annual emissions from total ore processing at Goldstrike are projected to be 378 pounds per year. Goldstrike processed a total of approximately 8,388,000 tons of ore in 2010, which is the current maximum projected annual production through the end of the mine life. The Ruby Hill ore shipped to Goldstrike is projected to represent 3.6 percent of the total ore processed at Goldstrike. To estimate the possible range in mercury emissions from processing Ruby Hill ore at Goldstrike, Airsciences, Inc. examined three potential processing scenarios: 100 percent of Ruby Hill ore is processed in the roasters; 100 percent of Ruby Hill ore is processed in the autoclaves under acidic mode of operations; and 100 percent of Ruby Hill ore is processed in the autoclaves under the alkaline mode of operations. In each scenario, the retorts are estimated to

have a total of 12.6 pounds per year of mercury emissions of which 0.45 pounds per year are attributed to the Ruby Hill ore and 12.1 pounds per year are attributed to the Goldstrike ore (Airsocieties, Inc. 2011).

### *Climate and Meteorology*

The climate in the Project Area is classified as semi-arid to arid. An arid climate is characterized by hot to very hot summers, and mild or cold winters, depending if the area is located within a subtropical or midlatitude region. Midlatitude deserts are found at the interior of continents and have hot summers with scarce precipitation. The winters are cold with erratic precipitation, sometimes in the form of light snow. Semi-arid climates are more moderate, experiencing less of the extreme high to low temperatures. These areas typically surround desert areas, with rainfall totals slightly higher than in the arid climates (National Science Teachers Association [NSTA] 2012). The average annual precipitation is 12 inches for the Town of Eureka, and 13 inches at the Project Area. Temperatures during the winters are cool with periods of very cold weather with the average minimum temperature in January of 17.6 degrees (°) Fahrenheit (F). The summers are hot and dry with the highest average monthly temperature in July of 85.7 °F. The average annual maximum and minimum temperatures in Eureka, which is less than one mile from the Project Area, are 60.5 and 33 °F (Western Regional Climate Center [WRCC] 2010), respectively. Elevation in the Project Area ranges between 6,200 to 6,500 feet amsl.

### *Climate Change*

According to the BLM's IM No. 2008-171, "Guidance on Incorporating Climate Change into Planning and NEPA Documents," dated August 19, 2008, climate change considerations should be acknowledged in EA documents. The IM states that ongoing scientific research has identified the potential impacts of anthropogenic (man-made) greenhouse gas (GHG) emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide equivalent concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very potentially due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007).

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs would have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years. Current emissions within the vicinity of the Project Area include vehicle combustion emissions, ranch activities, and wildland fires. Emissions of all pollutants are generally expected to be low due to the extremely limited number of sources in the vicinity of the Project Area.

Existing climate prediction models are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts of climate change within the Newark Valley Hydrographic Basin in which the Project is located. Due to the nature and scale of the Project, effects on climate change are not further analyzed in this EA.

### 3.2.1.2 Environmental Consequences

#### *Air Quality*

##### Project Area

The Proposed Action has the potential to emit air pollution as a result of several different Project activities. Air pollution sources relating to the Project include process emission points (material handling, crushing, conveying, leaching, etc.), auxiliary sources (emergency generators, etc.), and fugitive emission sources (drilling, blasting, loading, unloading, hauling, wind erosion, etc.). The primary pollutant as a result of these activities would be fugitive dust particulates (total suspended particulates and PM<sub>10</sub>). Other pollutants would include nitrogen dioxide, CO, sulfur dioxide, and volatile organic compounds (VOCs). These pollutants would be sustained through the life of the mine (BLM 2005; Section 3.1.2.1). An emissions inventory for the Project was conducted in February 2012 and has been included for reference as Appendix A in this EA.

In addition, travel on dirt access roads as a result of exploration activities within the Project Area has the potential to create fugitive dust and vehicle emissions, causing a minor impact to air resources. All air quality impacts would be consistent with authorized air pollution control standards specified in air quality permits and the Dust Control Plan established for the Project. In addition, the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 would reduce impacts to air quality.

##### Off-Site Ore Transport and Processing

Some of the existing and future ore generated from the Project would continue to be transported to Goldstrike at a rate of approximately 300,000 tpy and processed through either roasters or autoclaves. There would be no additional truck trips or additional tons hauled to Goldstrike with the Proposed Action over existing truck trips and haul tonnage; however, the extension of the mine life would result in having the same number of annual trips and haul tonnage and additional ore processing over an additional amount of time. Off-site ore transport and processing associated with the Proposed Action would not result in additional air quality impacts when compared to the existing conditions, as the number of annual trips and haul tonnage would not change nor would the amount of ore processed at Goldstrike.

### **3.2.2 Cultural Resources**

#### 3.2.2.1 Affected Environment

In 2011, Kautz Environmental Consultants, Inc. (Kautz) conducted a Class III cultural resource inventory within a 3,437-acre block entirely contained within the boundary of the Baseline Study Area (Kautz 2012), as defined in the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS* (BLM 2005), which incorporated several previous surveys within the Project Area. For this

survey, a total of 252 archaeological sites, both historic and prehistoric, were identified and recorded during this inventory, including 171 newly identified sites and 81 previously recorded sites (50 previously recorded sites were not relocated). The entire block was identified as being located within the Eureka Historic District. All of these sites are currently unevaluated.

Two of the unevaluated sites are within the currently proposed expansion area. Only one of the sites is recommended as eligible for listing in the National Register of Historic Places (NRHP) under criteria A (sites that are associated with events that have made a significant contribution to the broad patterns of our history) and D (sites that have yielded or may be likely to yield, information important in history or prehistory) (NPS 1990). The BLM has reviewed these recommendations and has referred them to the SHPO for concurrence. Once concurrence has been made by SHPO, the BLM can make a formal determination of NRHP eligibility for the site and determine Project effects per Section 106 of the National Historic Preservation Act of 1966 (NHPA). It is not critical that this formal determination is made prior to a decision on the Proposed Action as all eligible and unevaluated sites would be avoided as described in Section 2.1.12.

Homestake entered into a PA in 1995 with the BLM, SHPO, and the Advisory Council on Historic Preservation (ACHP) regarding the management of cultural resources during mineral development and exploration activities at Ruby Hill. The PA identifies measures on how to implement Section 106 of the NHPA for sites eligible for listing in the NRHP and unevaluated sites that may be eligible for listing. Stipulations are included in the PA for the following: identification; resolving eligibility; treatment; discovery situations; other considerations; reporting and monitoring; notices to proceed; time frames; surety bonds; dispute resolution; amendment; termination; and execution.

### 3.2.2.2 Environmental Consequences

Based on the results of the Class III cultural survey conducted by Kautz, there are cultural resources within the Project Area (Kautz 2012). There would be no impacts to cultural resources because any eligible or unevaluated site would be avoided. In addition, if any eligible sites were identified, they would be mitigated in accordance with the PA that was developed by the BLM, Homestake, SHPO, and the ACHP for the Ruby Hill Project. Avoidance would be implemented through the Applicant-Committed Environmental Protection Measures identified in Section 2.1.12. This resource is not further analyzed in this EA.

## 3.2.3 **Geology and Mineral Resources**

### 3.2.3.1 Affected Environment

#### *General Site Geology*

The Project Area is located at the northern end of Prospect Ridge, which forms the northern end of the Fish Creek Range, in the Basin and Range Province of Nevada. The Basin and Range Province is characterized by a series of generally north-trending mountain ranges separated by broad basins. The physiography of the region developed from extension-related faulting that was initiated approximately 20 to 45 million years ago and is ongoing. The ranges are uplifted fault blocks that consist primarily of sedimentary rocks and volcanic rocks. The basins contain sedimentary deposits that primarily were derived from the erosion of adjacent bounding

mountain ranges. These valley fill deposits can be thousands of feet thick in the centers of the basins and consist of alluvial fans, dunes, and lakebed deposits (BLM 2005).

The rock types in the area include the following: Cambrian to Cretaceous clastic and carbonate sedimentary rocks; Cretaceous and Tertiary granitic rocks; Tertiary volcanic rocks; and Quaternary alluvial and playa deposits (BLM 2005) (Figure 3.2.3). The majority of the previously permitted activities occurred on alluvial fan deposits on the margins of the Fish Creek Range (BLM 2005).

The Project Area lies within the Prospect Ridge fault block. Major faults in the Project Area include the Jackson, Holly, Bowman-150, and Austin Canyon faults. Fault traces are not well exposed in the area. These faults appear to include both Basin and Range and older (Cretaceous) offsets. The majority of these faults strike north-northwest or north-northeast and represent several hundred or more feet of offset. The offset is believed to have occurred prior to the mineralizing events and may be related to thrust faulting that preceded Basin and Range faulting (BLM 2005).

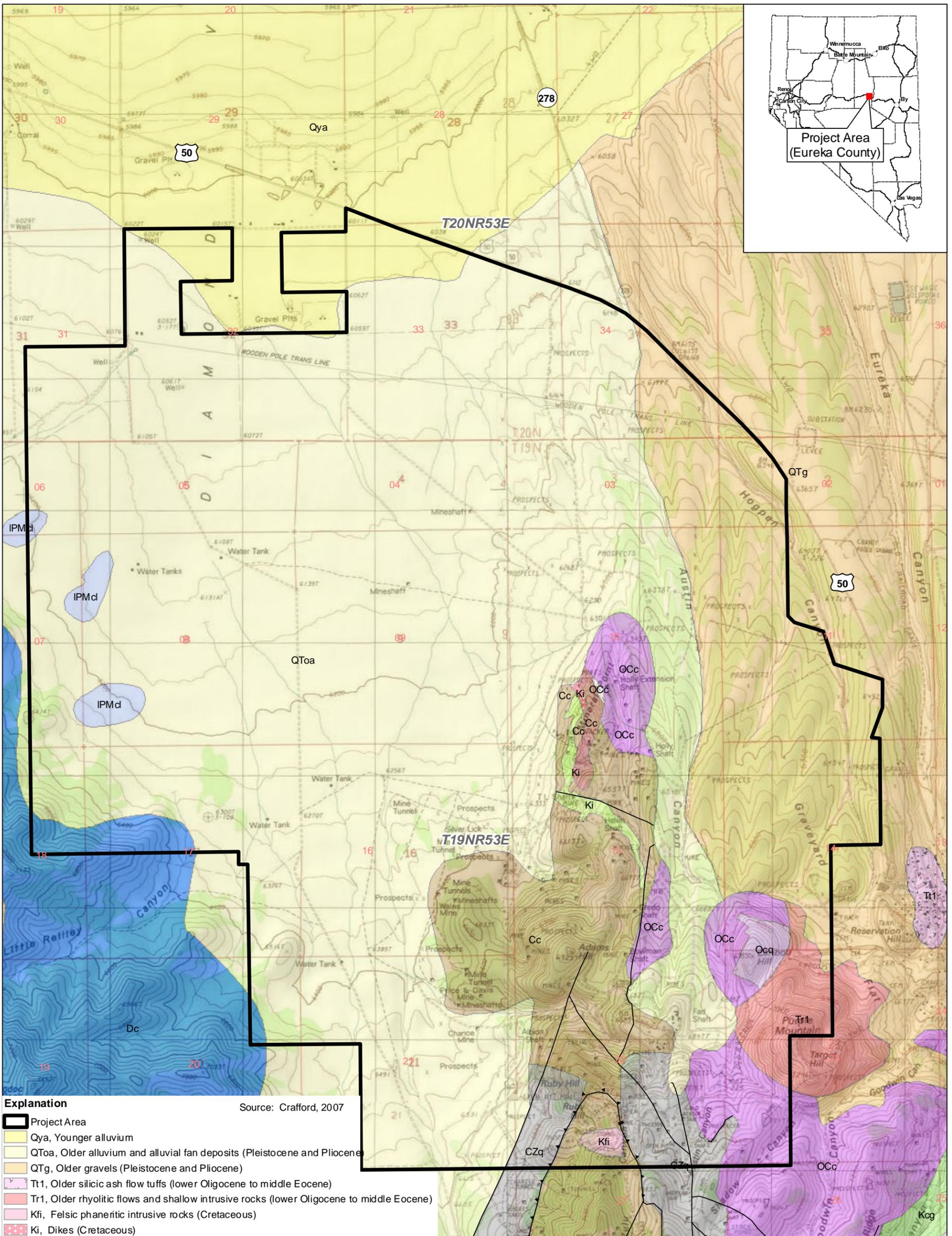
#### *Mineralization and Pit Geology*

The Archimedes deposit within the Project Area is a disseminated gold and silver deposit hosted by Ordovician carbonate rocks. Primary hosts include the upper portion of the Goodwin Limestone and the lower Ninemile Formation. Beds in the Project Area strike northwest and dip gently northeast. Economic gold concentrations appear to correlate with minor faults lying between the Holly and Jackson faults, on the west and east sides of the deposit (BLM 2005).

Ore zones are primarily confined to tabular, elongated jasperoid bodies and lenses of stained, decalcified limestone. Gold is present as finely disseminated particles originally deposited with various sulfide species from hydrothermal solutions that circulated through permeable horizons and along fault zones. Oxidation of mineralized bodies extends more than 700 feet in the Project Area, and virtually all of the ore in the pit area is oxidized. Cross sections of the pit are shown on Figure 2.1.2.

#### *Faulting and Seismicity*

The Project is located in an area of less seismic risk than other parts of Nevada. Seismic activity in the area is common, but the recorded events in the region are not generally of strong magnitude. The Western Diamond Mountains fault zone is located north to south along the western edge of the Diamond Mountains. This fault zone is a Quaternary fault and is capable of potential activity; however, it is not classified as an active fault. At the south end of the Diamond Mountains, the fault zone splays into two branches. One branch of this fault zone turns to the southwest and end approximately 4.5 miles northwest of the Town of Eureka. The other branch runs due south along the edge of the mountains through the Town of Eureka (BLM 2005).

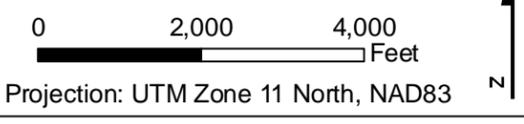


**Explanation** Source: Crafford, 2007

- Project Area
- Qya, Younger alluvium
- QToa, Older alluvium and alluvial fan deposits (Pleistocene and Pliocene)
- QTg, Older gravels (Pleistocene and Pliocene)
- Tt1, Older silicic ash flow tuffs (lower Oligocene to middle Eocene)
- Tr1, Older rhyolitic flows and shallow intrusive rocks (lower Oligocene to middle Eocene)
- Kfi, Felsic phaneritic intrusive rocks (Cretaceous)
- Ki, Dikes (Cretaceous)
- Ki, Sedimentary rocks, undivided
- Kcg, Newark Canyon Formation
- IPMcI, Shale, siltstone, sandstone, and conglomerate (Middle Pennsylvanian to Lower Mississippian)
- Dc, Devils Gate Limestone
- Dc, Limestone and minor dolomite (Upper and Middle Devonian)
- Ocq, Quartzite (Middle Ordovician)
- OCC, Limestone, dolomite, and quartzite (Middle Ordovician to Upper Cambrian)
- OCC, Intrusive rocks
- Cc, Intrusive rocks
- Cc, Dolomite, limestone, and shale (Cambrian)
- CZq, Dolomite, limestone, and shale (Cambrian)

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BATTLE MOUNTAIN DISTRICT OFFICE  
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 50 Bastian Road  
 Battle Mountain, Nevada 89820



**BUREAU OF LAND MANAGEMENT**

**RUBY HILL PROJECT**

**Geologic Resources in the Project Area**

Figure 3.2.3

07/26/2012

### 3.2.3.2 Environmental Consequences

The Proposed Action would include mining at an average rate of approximately 100,000 tons per day. Considering both permitted reserves and the anticipated reserves associated with the Project, an estimated 14 million tons of ore would be available for expanded open pit mining and heap leach processing. The removal of approximately 30 million tons of alluvium and rock overburden, and approximately eight million tons of ore would be associated with the implementation of the Proposed Action.

Direct impacts of the Proposed Action on geologic and mineral resources would include the permanent continued removal of ore-grade material. There are no identified geologic conditions that would be exacerbated by Project activities that would result in geological hazards. All of the facilities associated with the Project and proposed expansion would be constructed to conform to regulatory standards to minimize instability.

### 3.2.4 **Migratory Birds**

#### 3.2.4.1 Affected Environment

"Migratory bird" means any bird listed in 50 CFR 10.13. All native birds found commonly in the United States, with the exception of native resident game birds, are protected under the Migratory Bird Treaty Act of 1918 (MBTA). The MBTA prohibits taking of migratory birds, their parts, nests, eggs, and nestlings. EO 13186, signed January 10, 2001, directs federal agencies to protect migratory birds by integrating bird conservation principles, measures, and practices. Table 3.2-2 lists the bird species that were observed within the Project Area during previous surveys conducted for Ruby Hill (BLM 2005).

**Table 3.2-2: Migratory Bird Species Detected in the Project Area**

Common Name	Scientific Name
Turkey vulture	<i>Cathartes aura</i>
Northern harrier <sup>1</sup>	<i>Circus cyaneus</i>
Red-tailed hawk <sup>1</sup>	<i>Buteo jamaicensis</i>
Ferruginous hawk <sup>1</sup>	<i>Buteo regalis</i>
American kestrel <sup>1</sup>	<i>Falco sparverius</i>
Prairie falcon <sup>1</sup>	<i>Falco mexicanus</i>
California quail <sup>1</sup>	<i>Callipepla californica</i>
Common nighthawk <sup>1</sup>	<i>Chordeiles minor</i>
Northern flicker <sup>1</sup>	<i>Colaptes auratus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Gray flycatcher	<i>Empidonax wrightii</i>
Mourning dove	<i>Zenaida macroura</i>
Horned lark <sup>1</sup>	<i>Eremophila alpestris</i>
Western scrub jay <sup>1</sup>	<i>Aphelocoma californica</i>

Common Name	Scientific Name
Piñon jay <sup>1</sup>	<i>Gymnorhinus cyanocephalus</i>
Common raven <sup>1</sup>	<i>Corvus corax</i>
Mountain chickadee <sup>1</sup>	<i>Parus gambeli</i>
Rock wren	<i>Salpinctes obsoletus</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Mountain bluebird	<i>Sialia currucoides</i>
Loggerhead shrike <sup>1</sup>	<i>Lanius ludovicianus</i>
Sage thrasher	<i>Oreoscoptes montanus</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Black-throated gray warbler	<i>Dendroica nigrescens</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Green-tailed towhee	<i>Pipilo chlorurus</i>
Rufous-sided towhee <sup>1</sup>	<i>Pipilo erythrophthalmus</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Sage sparrow	<i>Amphispiza belli</i>
Chipping sparrow	<i>Spizella passerina</i>
Brewer's sparrow	<i>Spizella breweri</i>
Western meadowlark <sup>1</sup>	<i>Sturnella neglecta</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Western tanager	<i>Piranga ludoviciana</i>
Cassin's finch <sup>1</sup>	<i>Carpodacus cassinii</i>

<sup>1</sup> Species that occur in the Project Area or project vicinity year-round  
Source: BLM 2005

In addition, SRK contacted the Nevada Natural Heritage Program (NNHP), NDOW, and United States Fish and Wildlife Service (USFWS) to obtain updated species lists that have the potential to occur in the Project Area (SRK 2011a). In addition to the species listed in Table 3.2-2, the following additional migratory bird species have the potential to occur in the vicinity of the Project Area: bald eagle (*Haliaeetus leucocephalus*); merlin (*Falco columbarius*); osprey (*Pandion haliaetus*); barn owl (*Tyto alba*); northern saw-whet owl (*Aegolius acadicus*); long-eared owl (*Asio otus*); short-eared owl (*Asio flammeus*); great horned owl (*Bubo virginianus*); sharp-shinned hawk (*Accipiter striatus*); Cooper's hawk (*Accipiter cooperii*); rough-legged hawk (*Buteo lagopus*); Say's phoebe (*Sayornis saya*); common poorwill (*Phalaenoptilus nuttallii*); black-billed magpie (*Pica hudsonia*); juniper titmouse (*Baeolophus ridgwayi*); blue-gray gnatcatcher (*Polioptila caerulea*); and bushtit (*Psaltriparus minimus*). Details on special status bird species are discussed in greater detail in Section 3.2.9. Additional species that were not observed may also utilize the area on a regular or seasonal basis.

### 3.2.4.2 Environmental Consequences

Implementation of the Proposed Action would result in up to approximately 106.6 acres of surface disturbance, which could potentially result in the destruction of active nests or disturb the breeding behavior of migratory bird species. The impacts of Ruby Hill were analyzed in depth in the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS* (BLM 2005; Section 3.10.2.1). As outlined in the Applicant-Committed Environmental Protection Measures in Section 2.1.12, Homestake would avoid removing migratory bird habitat when feasible during breeding season. Homestake would coordinate with the BLM and NDOW regarding the removal of habitat during migratory bird breeding season and nesting season to conduct appropriate breeding and nesting bird surveys in areas subject to disturbance prior to surface disturbance activities. In addition, reclamation of the surface disturbance associated with the Proposed Action outside of the open pit would reduce any permanent loss of habitat.

### 3.2.5 **Native American Traditional Values**

#### 3.2.5.1 Affected Environment

In accordance with the NHPA (P.L. 89-665), the NEPA (P.L. 91-190) of 1969, the FLMPA (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341) of 1978, the Native American Graves Protection and Repatriation Act (NAGPRA) (P.L. 101-601) of 1990 (as amended), Archaeological Resources Protection Act (ARPA) (P.L. 96-95) of 1979, EO 13007 (Indian Sacred Sites, 1996), and EO 13175 (Consultation and Coordination With Indian Tribal Governments, 2000), the BLM must provide affected Tribes, organizations, and/or individuals an opportunity to participate in, comment, and consult on proposed actions that might impact resources, sites, or activities of concern. Through consultation initiation with area tribes, BLM must attempt to identify specific traditional/cultural/spiritual sites, activities, and resources and limit, reduce, or possibly eliminate any negative impacts. BLM also utilizes H-8120-1, *General Procedural Guidance for Native American Consultation* and National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (TCPs).

The NEPA requires the preparation of applicable environmental analysis (EA or Environmental Impact Statement [EIS]) for major federal land management actions that may significantly impact the quality of the human environment. CEQ regulations and guidance, specific to NEPA, require agencies to contact Native American Tribes and provide participation/comment opportunities for planning and decision making purposes. Section 40 CFR 1501.2(d)(2) states that federal agencies must consult with tribes early in the NEPA process.

Consultation efforts with tribes under the auspices of NHPA seek to identify and evaluate these types of historic properties that contain traditional religious and cultural importance to their communities. In 1990, the National Park Service commissioned a publication to assist federal agencies in evaluating these types of historic properties for inclusion in the National Register. The ensuing National Register Bulletin 15 described these types of properties as TCPs, terms that are commonly used to categorize these historic properties.

By definition, a TCP is “one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that are (a) rooted in that community’s history, and are (b) important in maintaining the continuing cultural identity of the community”

(BLM 2005). TCP types can be, but are not limited to, ceremonial sites, habitation sites, traditional origin locations, resource collection areas for subsistence or ceremonial use (includes mineral, plant, and water sources), burial sites, trails, and ethnohistorical locations. To qualify for nomination to the National Register as a Historic Property, a TCP must be more than 50 years old, must be a place with definable boundaries, must retain integrity (condition, relationship to culture group), and must meet certain criteria as outlined in National Register Bulletin 15 (NPS 1990). Consultation with tribes should be conducted by federal agencies when identification, evaluation, and management of TCPs are being considered. TCPs, designated by the tribes, are not known to exist within the vicinity of the Project Area.

Various tribes and bands of the Western Shoshone have stated that federal projects and land action can have widespread effects to their cultural and religion as they consider the landscape as sacred as a provider. Various locations throughout the BLM MLFO administrative area host certain traditional, spiritual, and cultural use activities today, as in the past.

On March 14, 2012, consultation initiation/invitation letters were mailed from the BLM MLFO to the following: Ely Shoshone Tribe; Te-Moak Tribe of Western Shoshone; Duckwater Shoshone Tribe; and Yomba Shoshone Tribe. The BLM continues to provide opportunities for participation and input.

#### 3.2.5.2 Environmental Consequences

For the Proposed Action, Homestake has committed to avoiding those eligible and unevaluated archaeological sites discovered and documented during cultural resources inventories. The BLM is currently in the process of attempting to identify (with the local tribes) any other sites, artifacts, or cultural, traditional, and spiritual use resources and activities that might experience an impact.

If any TCPs, tribal resources, sacred sites, etc. are identified within or in close proximity to the Project boundary, a protective “buffer zone” may be acceptable, if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any “buffer zone” would be determined through coordination and communication between all participating entities as outlined in the PA.

The BLM Cultural Resource Specialists, accompanied by designated tribal observers, may periodically visit identified cultural resources sites within or near the mining activity boundary. Native American Consultation and monitoring by the BLM and Tribal Cultural Resource Specialists can occur throughout the life of a project to ensure that any identified TCPs are not deteriorating.

During the Project's activities, if any cultural properties, items, or artifacts (i.e., stone tools, projectile points, etc.) are encountered, it must be stressed to those involved in the proposed Project activities that such items are not to be collected. Cultural and archaeological resources are protected under the ARPA (16 United States Code [U.S.C.] 470ii) and the FLPMA.

Though the possibility of disturbing Native American gravesites within most of the Project Area is extremely low, inadvertent discovery procedures must be noted. Under the NAGPRA, Section (3)(d)(1), it states that the discovering individual must notify the land manager in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity,

which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

There have not been any Native American concerns identified for this Project, and this resource is not analyzed further in this EA.

### 3.2.6 Noxious Weeds, Invasive and Nonnative Species

#### 3.2.6.1 Affected Environment

The BLM defines a noxious weed as, “a plant that interferes with management objectives for a given area of land at a given point in time.” The BLM MLFO recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture (NDOA) statute, found at [http://agri.nv.gov/nwac/PLANT\\_No WeedList.htm](http://agri.nv.gov/nwac/PLANT_No WeedList.htm). An invasive species is defined as a nonnative or alien plant or animal that has entered into an ecosystem. Invasive species could potentially cause economic harm or harm to human health (EO 13112). Noxious weeds, invasive and nonnative species are highly competitive, aggressive, and easily spread. The BLM MLFO has developed an Integrated Weed Management Plan for its area of jurisdiction. In addition, the BLM follows all federal noxious and invasive weed laws, EO 11312 (Prevention and Control of Invasive Species) and various BLM Manuals and NRS and NAC Chapter 555. A Noxious Weed Management Plan has also been prepared for the Project (SRK 2010).

Surveys were conducted in 1995, 2003, and 2004 in the Project Area. Table 3.2-3 shows the noxious weeds observed in the Project Area, their NDOA categories, and the year they were observed.

**Table 3.2-3: Noxious Weeds in the Project Area**

Noxious Weed	NDOA Category	NDOA Category Description	Year(s) Observed
Hoary cress	C	Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.	1995
Musk thistle	B	Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.	2003, 2004

Source: NDOA 2010; BLM 2005

Noxious and invasive plant species that were observed in the Project Area and vicinity in 1995 included cheatgrass (*Bromus tectorum*), spotted knapweed (*Centaurea stoebe*), and hoary cress (*Cardaria draba*). Noxious and invasive plant species identified within the Project Area in the

2003 survey included: elongated mustard (*Brassica elongata*); cheatgrass, halogeton (*Halogeton glomeratus*), musk thistle (*Carduus nutans*), and Russian thistle (*Salsola kali*). Only one noxious weed species, musk thistle, was observed in the Project Area during the 2004 survey. Three invasive species in 2004 were identified, including: cheatgrass, halogeton, and a mustard (*Brassica* sp.).

Cheatgrass was observed in openings within sagebrush and piñon-juniper woodland communities and along roadsides and previously disturbed soil borrow areas. Halogeton and Russian thistle were only observed within previously disturbed areas, either in or along roads or in materials borrow sites. The mustard species observed in the Project Area was located along roadsides and other previously disturbed areas. No other noxious weed populations were identified within the Project Area or along the access roads.

### 3.2.6.2 Environmental Consequences

The strategy for noxious weed management is to, “prevent and control the spread of noxious weeds through local and regional cooperative efforts to ensure maintenance and restoration of healthy ecosystems on BLM managed lands”. Noxious weed and invasive species control would be based on a program of “prevention, education, detection, and rapid response and control of small infestations.” New surface disturbance from the Proposed Action would increase the potential for and promote the spread and establishment of noxious weeds and invasive and nonnative species. These impacts would be temporary and minimal based on implementation of the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12, as well as the continued implementation of the Project’s Noxious Weed Management Plan (SRK 2010).

### 3.2.7 **Socioeconomic Values**

#### 3.2.7.1 Affected Environment

The Project Area is located in Eureka County approximately 0.7 mile northwest of the town of Eureka, Nevada. Eureka County is located in central Nevada and encompasses 4,176 square miles. Approximately 81 percent of the land in the County is administered by the federal government. Interstate 80 traverses the county in an east-west direction on the northern end, as does Highway 50 on the southern end. The Project Area is accessed off of Highway 50 near the Town of Eureka.

Mining and ore processing activities associated with the Proposed Action would continue until at least 2016 or longer depending upon mining and economic conditions. Although the Proposed Action is not expected to increase the number of employees at the mine, the extended life of the mine could impact the local community in the following ways: impacts to the labor force and unemployment rates; impacts to personal income; impacts to population; impacts to housing; impacts to community facilities and services, including public safety, schools, health care and social services, utilities, recreational facilities, and county administrative functions; and Eureka County fiscal conditions. The existing conditions within Eureka County are discussed below.

3.2.7.1.1 Population and Demography

Population in Eureka County has fluctuated between 2001 and 2010, decreasing by 243 persons or 15 percent between 2001 and 2005, then increasing from 1,373 persons in 2005 to 1,987 persons in 2010, or by 614 persons (45 percent) (Table 3.2-4).

**Table 3.2-4: Eureka County Population, 2001-2010**

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1,616	1,585	1,447	1,395	1,373	1,460	1,536	1,599	1,707	1,987

Source: U.S. Census Bureau 2010a; U.S. Census Bureau 2012

At the time of the 2010 decennial census, approximately 82 percent of Eureka County’s residents (1,638) lived in the southern portion of Eureka County, with 610 residents in Eureka, 392 in Crescent Valley, and 636 in Beowawe. The median age of Eureka County’s residents was 42.4 compared to 36.3 for the State of Nevada. Residents 45 to 49 years of age comprised the single largest group reported by the Census Bureau, with 186 residents, but only made up approximately one percent of Eureka County’s population (U.S. Census Bureau 2010b). Children under 18 years of age represented approximately 24.2 percent of Eureka County’s population, similar to the State of Nevada with 24.6 percent. Seniors aged 65 and over comprised approximately 12.9 percent of the County’s population, similar to 12 percent of the State of Nevada’s overall population. The average household size in Eureka County was 2.38, slightly below the statewide average of 2.65.

The racial composition of Eureka County’s population is more predominately white than that of the State of Nevada as a whole. In 2010, 91.5 percent of Eureka County residents identified themselves as white, alone or in combination with one or more other races, which compares to 70 percent at the statewide level.

3.2.7.1.2 Economy and Employment

The majority of employment in Eureka County is related to farming, mining, construction, retail, and government jobs. Between 1990 and 2009, the total employment remained relatively constant in Eureka County (Table 3.2-5). Most private companies did not disclose the number of employees in 2005, 2006, and 2008, so it is difficult to determine the employment trends in Eureka County during that time period. However, the increase in total jobs of approximately 739 between 2006 and 2007 was most likely due previous expansion activities at the Project site.

**Table 3.2-5: Eureka County Employment Trends**

Year	Farm	Mining	Other Private	Government	Total
1990	142	3,695	290	170	4,297
1995	129	4,040	560	228	4,957
2000	133	3,826	371	229	4,559
2005	143	D	D	184	4,222
2006	155	D	D	198	4,782
2007	157	3,962	1,199	203	5,521
2008	162	D	D	212	4,932
2009	159	4,077	523	216	4,975

Source: Bureau of Economic Analysis (BEA) 2012a; BEA 2012b Notes: D – Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Labor force and employment statistics for 2005 to 2011 for Eureka County and the State of Nevada are presented in Table 3.2-6. The resident labor force in Eureka County is limited based on the small population base. However, as the economic downturn occurred in the rest of nation in 2008, the total labor force and employment in Eureka County increased. Between 2008 and 2011, total employment in Eureka County grew by approximately 32 percent. The unemployment rates did increase in 2009 and 2010, but reduced back down to 2008 levels. This pattern did not reflect the pattern in the entire State of Nevada, as the unemployment rate in the State of Nevada increased in 2009 and 2010, then only reduced 0.2 percent in 2011. In addition, total employment in the State of Nevada decreased by approximately four percent between 2008 and 2011.

**Table 3.2-6: Eureka County Labor Force and Unemployment Rates, 2005 to 2011**

<b>Labor Force</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Eureka County</b>							
Total Labor Force	674	706	795	836	893	1,082	1,115
Employment	650	678	761	793	827	1,000	1,048
Unemployment	24	28	34	43	66	82	67
Unemployment Rate (percent)	4.3	5.2	4.9	5.6	7.4	7.6	6.0
<b>State of Nevada</b>							
Total Labor Force	1,228,339	1,276,387	1,307,321	1,336,309	1,354,126	1,385,729	1,385,872
Employment	1,173,425	1,222,277	1,247,491	1,246,696	1,184,431	1,195,309	1,198,140
Unemployment	54,914	54,110	59,830	89,613	169,695	190,420	187,732
Unemployment Rate	4.5	4.2	4.6	6.7	12.5	13.7	13.5

Source: Department of Employment, Training, and Rehabilitation (DETR) 2012

Local personal income trends in Eureka County are shown in Table 3.2-7. Personal earnings showed increases from 2005 to 2008, in line with the expansion of Ruby Hill, and other mining activities throughout Eureka County. The drop in total personal income between 2008 and 2009 reflected the increases in unemployment during that time period. The adjustment for residence value is reflected as negative numbers, as most of the labor earnings flow out of Eureka County and local economy, as a majority of workers commute into Eureka County for work from other areas. In 2009, a net outflow of \$360,849 occurred, equivalent to 79 percent of the total wages and salaries paid in Eureka County.

**Table 3.2-7: Eureka County Personal Income and Place of Residence, 2005-2009**

<b>Description</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Earnings by Place of Work	\$311,689	\$387,593	\$455,042	\$429,049	\$456,232
Less: contributions for government social insurance	\$32,474	\$41,248	\$49,387	\$43,642	\$48,608
Plus: adjustment for residence	-\$247,258	-\$310,122	-\$364,966	-\$335,960	-\$360,849
Equals: net earnings by place of residence	\$31,957	\$36,223	\$40,689	\$49,447	\$46,775

Description	2005	2006	2007	2008	2009
Plus: dividends, interest, and rent	\$8,222	\$6,948	\$7,856	\$8,756	\$8,796
Plus: personal current transfer receipts	\$5,457	\$6,387	\$6,795	\$7,157	\$8,229

Source: BEA 2012c

Eureka County’s per capita personal income was less than the State of Nevada and the nationwide income between 2005 and 2007 (Table 3.2-8). In the economic downturn of 2008 and in 2009, the per capita income in Eureka County was greater than the State of Nevada as a whole, which reflected the higher than average wages and salaries paid by the mining industry. Eureka County’s per capita income was relatively similar to the nationwide per capita income for 2008 and 2009.

**Table 3.2-8: Per Capita Personal Income, 2005-2009**

Jurisdiction	2005	2006	2007	2008	2009
Eureka County	\$33,238	\$33,944	\$36,029	\$40,876	\$37,376
Nevada	\$37,760	\$38,786	\$39,872	\$39,824	\$36,519
United States	\$35,452	\$37,725	\$39,506	\$40,947	\$38,846

Source: BEA 2012c; BEA 2012d

### 3.2.7.1.3 Housing

According to the Eureka County Master Plan 2010 (page 8-2), there were only 36 housing units added to the housing unit total between 2000 and 2009 (Table 3.2-9). The additional housing units primarily were constructed in Crescent Valley, Diamond Valley, and within the Devil’s Gate General Improvement District (GID) boundary. There were 13 units added in Eureka between 2005 and 2009, which was most likely in response to previous expansion activities at the Project site.

**Table 3.2-9: Eureka County Housing Inventory, 2000 to 2009**

Type	2000	2005	2009
Single Family Detached	239	242	268
Single Family Attached	30	20	28
Multi-Family	16	16	25
Mobile Homes	660	610	660
<b>Total</b>	<b>945</b>	<b>888</b>	<b>981</b>

Source: Eureka County 2010

In addition to the permanent residences, there are temporary residences throughout the County which include motels, recreational vehicle (RV) parks, and campgrounds. There are four hotels in Eureka County with a combined 89 total rooms, but all are located in the Town of Eureka. There is also one bed and breakfast and two RV parks in the Town of Eureka, and a trailer park in Crescent Valley (Eureka County 2012a).

### 3.2.7.1.4 Community Facilities and Services

#### Public Safety

The Eureka County Sheriff’s Office (ECSO) provides law enforcement services for Eureka County. There are two patrol areas within Eureka County including the northern patrol area which serves out of the Crescent Valley substation, and the southern patrol area which serves out of the Eureka station. The ECSO provides administration, patrol, jail, investigations, and animal control, and search and rescue services in the county. The ECSO has 20 staff members, including the following: one sheriff; one undersheriff; one sergeant; six patrol officers; five dispatchers; four jailers; and two administrative personnel. The current staffing level does not allow for continuous, around-the-clock services, but officers are on-call during non-patrolled hours. The jail facility in the Criminal Justice Center includes 20 beds, with an average occupancy of two to three prisoners on a daily basis (Eureka County 2010).

Fire protection services in Eureka County are provided by six local volunteer fire departments (VFDs). The VFDs are located in the following communities: Dunphy; Beowawe; Crescent Valley; Pine Valley; Diamond Valley; and the Town of Eureka. There are approximately ten fire fighters in Dunphy, approximately ten in Beowawe, approximately 13 in Crescent Valley, approximately 17 in Pine Valley, approximately 20 in Diamond Valley, and approximately 24 in the Town of Eureka. Each VFD is equipped with at least three pieces of rolling equipment (Eureka County 2010).

Emergency medical care and transportation are provided by Eureka County. The Eureka County Emergency Medical Service (EMS) provides services from Crescent Valley in the northern portion of the county, and Eureka in the southern portion of the county. Both EMS operations have two ground ambulances and are licensed at the Intermediate Life Support level. The Eureka EMS has 11 active volunteers and one paid coordinator, and the Crescent Valley EMS has 13 volunteers and one paid attendant (Eureka County EMS 2005).

#### Public Education

Public education in Eureka County is provided by the Eureka County School District (ECSD). There are three schools in Eureka County. Crescent Valley Elementary School is located in Crescent Valley and has a current enrollment of approximately 30 students for the 2011/2012 school year. Eureka Elementary School located in the Town of Eureka has a current enrollment of approximately 107 students, and Eureka County High School located in the Town of Eureka has a current enrollment of approximately 116 students (Nevada Department of Education [NDE] 2012). Student enrollment remained relatively constant in Eureka County between fall 2003 and spring 2009 (Table 3.2-10). The ECSD saw an increase in students between the 2008/2009 and 2009/2010 school years, a decline to 239 students for the 2010/2011 school year, then an increase for the 2011/2012 school year.

**Table 3.2-10: Eureka County School District Enrollment**

Grade	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Pre- Kindergarten - 6	129	127	117	123	114	114	135	121	137
7-12	91	109	107	112	122	125	125	118	117
<b>Total</b>	<b>220</b>	<b>236</b>	<b>224</b>	<b>235</b>	<b>236</b>	<b>239</b>	<b>260</b>	<b>239</b>	<b>254</b>

Source: NDE 2011; NDE 2012

## Health Care and Social Services

Health care in Eureka County is provided by Eureka County in two medical clinics. The medical clinic located in the Town of Eureka is staffed by one physician, one physician's assistant, one medical assistant, and one office manager. The Town of Eureka clinic provides limited emergency capabilities, so is able to request assistance from two main air medical agencies based in Elko, Nevada. Ground transport generally occurs to more stable patients to either the William Bee Ririe Hospital in Ely, Nevada, or to the Northeastern Nevada Regional Hospital in Elko, Nevada. The second medical clinic in Eureka County is located in Crescent Valley. This clinic generally is not equipped to handle emergencies, so patients are transported via helicopter to Elko, Nevada, or ground transported to either the Battle Mountain Hospital in Battle Mountain, Nevada, or to the Northeastern Nevada Regional Hospital in Elko, Nevada. This clinic is staffed on a part-time basis by one physician, one medical assistant, and one office manager (Eureka County EMS 2005; Eureka County 2010).

## Utilities

### *Water Service*

Public water service in Eureka County is provided by the Eureka County Public Works Department in three water systems including the Town of Eureka, Devil's Gate (GID #1 and GID #2), and Crescent Valley. The Town of Eureka's water system serves 280 residential and commercial customers. This system includes two wells located in Diamond Valley, with one well pumping at 950 gpm and the other at 500 gpm. Water is pumped into three storage tanks with a combined storage capacity of 2.35 million gallons. Water is delivered to the customers by a gravity fed system.

The Devil's Gate water system serves 78 customers, and is made up of two wells, a 250,000-gallon water storage tank, a booster pump station, and the Devil's Gate Water Transmission Inter-tie Project pipeline. One of the wells pumps at a rate of 70 gpm, while the other pumps at a rate of 60 gpm. Water is delivered to the customers via a pressurized system.

The Crescent Valley water system originates from two wells that pump 250 and 300 gpm, respectively. Water is delivered to the customers via a gravity fed system, from three storage tanks that hold a total of 672,000 gallons of water (155,000 gallons, 200,000 gallons, and 322,000 gallons) (Eureka County 2010).

### *Wastewater Service*

Municipal wastewater service is provided only in the Town of Eureka. The remaining rural areas in Eureka County are served by septic systems. The domestic wastewater at the Eureka Wastewater Treatment Facility (WWTF) is treated in two clay-lined evaporation/percolation ponds, and is permitted for a maximum daily discharge rate of 100,000 gallons per day. The WWTF serves approximately 280 connections (Eureka County 2010).

### *Electricity*

There are three electric companies that provide electricity within Eureka County: Mt. Wheeler Power Company; Wells Rural Electric Company; and NV Energy. Mt. Wheeler Power Company provides service to the town of Eureka and Diamond Valley. Wells Rural Electric Company supplies power to the communities of Pine Valley, Grass Valley, Emigrant Pass, and Palisade. NV Energy supplies power to the communities of Beowawe and Crescent Valley, although not all the residents have power in Crescent Valley due to the cost of extending power to specific individual sites (Eureka County 2010).

### Library

Eureka County is part of the Elko-Lander-Eureka County library system. There are three libraries in Eureka County located in Beowawe, Crescent Valley, and the Town of Eureka. The libraries in Beowawe and Crescent Valley are open two days per week, four and a half hours each day, and only provide limited library services. The library in the Town of Eureka is open five days a week, and offers resources such as books, video tapes, audio tapes, Internet access, and magazines and newspapers (Elko County Library 2012; Eureka County 2012b).

### Recreation Facilities

Eureka County provides many recreational opportunities for its residents. Within the town of Eureka, there is an indoor swimming pool, ball fields, a shooting range, and the Eureka County Rodeo Grounds and Fair Building, as well as community recreation opportunities at the ECSD-maintained indoor gymnasium, running track, and football field complex. There is one park facility in Crescent Valley, which includes the following amenities: a baseball diamond; barbecue areas; a pavilion; horseshoe pits; and a play area with playground equipment. There is also a fairgrounds area in Crescent Valley with an arena, announcer's booth, and concession building (Eureka County 2010; Eureka County 2012c).

### County Government Administrative Facilities

Administrative services for Eureka County are located in the Eureka County Administration Facility and the Eureka County Courthouse in the Town of Eureka. The Eureka County Administration Facility houses the Public Works Department, the Natural Resource Department, the District Attorney's Office, the Justice Court, the Juvenile Probation Office, and the University of Nevada Cooperative Extension Office. The Assessor's office, the Recorder/Auditor's office, and the Clerk and Treasurer's office are located in the Eureka County Courthouse. The Department of Motor Vehicles is also located in the Eureka County Courthouse (Eureka County 2010).

#### 3.2.7.1.5 Public Finance

The primary governing bodies in Eureka County are the Board of County Commissioners and the ECSD. The three-member Board of County Commissioners is each elected to an overlapping four-year term. The County Commissioners oversee County operations, including administration, law enforcement, judicial, public works, and economic development. The ECSD serves Eureka County and is governed by an elected board, with the superintendant and administration responsible for day-to-day operations (BLM 2005).

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Local government and school finances in Nevada involved locally derived and state-shared revenues. Locally derived finances consist primarily of ad valorem property taxes on real and personal property and the net proceeds of mines located within Eureka County. The state-shared revenues include sales, motor vehicle, fuel, and gaming tax revenues. Current fiscal conditions of the two primary entities, Eureka County and the ECSD, are summarized below (BLM 2005).

Eureka County

Eureka County’s fiscal structure reflects a heavy dependence on ad valorem taxes and necessary responses to the combined influences of a small population base, large physical service territory, and substantial year-to-year variances in mining-related tax base and tax revenues (BLM 2005). For example, Eureka County’s assessed valuation, which also applies to the school district, declined by approximately \$189 million (58 percent) between fiscal years 2001/2002 to 2002/2003, then increased by approximately \$92 million (28 percent) the following year (Table 3.2-11). There was a slight drop in valuation between fiscal years 2004/2005 and 2005/2006, but a steady increase through fiscal years 2010/2011 with the increasing value of gold prices.

**Table 3.2-11: Trends in Net Proceeds and Property Assessments**

Fiscal Year	Net Proceeds from Mining	Real and Personal Property Assessments	Total Taxable Value
2001/2002	\$90,000,000	\$422,753,802	\$512,753,802
2002/2003	\$70,000,000	\$253,421,803	\$323,421,803
2003/2004	\$85,000,000	\$330,127,400	\$415,127,400
2004/2005	\$225,000,000	\$353,937,046	\$578,937,046
2005/2006	\$250,000,000	\$289,002,607	\$539,002,607
2006/2007	\$249,500,000	\$382,608,227	\$632,108,227
2007/2008	\$300,000,000	\$427,781,488	\$727,781,488
2008/2009	\$370,000,000	\$559,568,154	\$929,568,154
2009/2010	\$463,176,620	\$677,479,257	\$1,140,655,877
2010/2011	\$758,185,606	\$658,235,103	\$1,416,420,709

Source: Division of Assessment Standards (DOAS) 2001; DOAS 2002; DOAS 2003; DOAS 2004; DOAS 2005; DOAS 2006; DOAS 2007; DOAS 2008; DOAS 2009; DOAS 2010

The volatility in taxable value carries over to ad valorem tax revenues, influencing local government and school district fiscal budgeting and policies (BLM 2005). Ad valorem taxes levied on that tax base by Eureka County declined by approximately \$2.7 million between fiscal years 2008/2009 and 2009/2010, then increased by approximately \$4.5 million for fiscal year 2010/2011 (Table 3.2-12). Other locally derived revenues declined between fiscal years 2008/2009 and 2009/2010 by approximately 22 percent, then increased for fiscal year 2010/2011 by approximately 33 percent.

Intergovernmental revenues account for most of Eureka County’s remaining revenues. Such revenues totaled approximately \$6.4 million for fiscal years 2008/2009 and 2009/2010, then increased to approximately seven million dollars for fiscal year 2010/2011 (Table 3.2-12). Intergovernmental revenues include the Basic County-City Relief Tax, the Supplemental County-City Relief Tax, motor vehicle property taxes, and fuel taxes. The Basic County-City Relief Tax and Supplemental County-City Relief Tax are statewide sales and use taxes enacted to provide property tax relief. The Basic County-City Relief Tax is a state-mandated,

county-imposed sales and use tax returned to the county of origin, while revenues derived from the Supplemental County-City Relief Tax sales and use tax are pooled and distributed according to a specific formula (BLM 2005).

**Table 3.2-12: Eureka County Revenues for Fiscal Years 2008/2009 to 2010/2011**

Types of Revenue	Fiscal Years		
	2008/2009	2009/2010	2010/2011
Taxes (property and other)	\$10,805,701	\$8,089,592	\$12,602,578
Licenses and Permits	\$9,465	\$12,866	\$9,603
Intergovernmental	\$6,437,913	\$6,471,971	\$7,014,532
Charges for Services	\$1,308,579	\$1,054,391	\$1,375,435
Fines and Forfeits	\$123,652	\$93,025	\$93,226
Miscellaneous	\$353,356	\$244,641	\$393,905
<b>Total Revenue</b>	<b>\$19,038,666</b>	<b>\$15,966,486</b>	<b>\$21,489,279</b>

Source: Eureka County Recorder/Auditor's Office 2009, 2010, 2011

The overlapping ad valorem tax rates of all entities imposed on property in the town of Eureka is \$2.153 per \$100 of assessed valuation (Table 3.2-13). This is approximately 59 percent lower than the state-mandated maximum of \$3.64. Eureka County's levy is \$0.8458, approximately 46 percent of the total. ECSD's levy is \$0.75, a uniform statewide levy for public education. Other levies include the following: \$0.2153 for the town of Crescent Valley; \$0.2153 for the town of Eureka; \$0.04 for the Diamond Valley Rodent Control District; \$0.0781 for the Diamond Valley Weed Control District; and \$0.0085 for the Eureka County Television District.

**Table 3.2-13: Tax Rates in Eureka County for 2010/2011**

Taxing Entity	Tax Rate
Eureka County	\$0.8458
Eureka County School District	\$0.7500
Crescent Valley Town	\$0.2153
Town of Eureka	\$0.2153
Diamond Valley Rodent Control District	\$0.0400
Diamond Valley Weed Control District	\$0.0781
Eureka County Television District	\$0.0085
<b>Total</b>	<b>\$2.1530</b>

Source: DOAS 2010

Eureka County expenditures fluctuated from the 2008/2009 fiscal year to the 2010/2011 fiscal year. Total expenditures rose by approximately \$3.7 million from 2008/2009 to 2009/2010, and then dropped by approximately \$2.3 million for 2010/2011 (Table 3.2-14). Expenditures for some of the specific government functions followed the same fluctuations; however, expenditures for public works' functions continuously decreased over the three-year time period, while culture and recreation and community support functions increased over the three-year period.

**Table 3.2-14: Eureka County Budgeted Expenditures for Fiscal Years 2008/2009 to 2010/2011**

Function/Department	Fiscal Years		
	2008/2009	2009/2010	2010/2011
General Government	\$3,097,775	\$3,593,927	\$3,348,704
Public Safety	\$2,039,818	\$2,935,694	\$2,426,056
Judicial	\$1,045,619	\$1,116,067	\$1,070,079
Public Works	\$603,963	\$509,319	\$504,621
Health and Sanitation	\$790,730	\$763,734	\$1,059,244
Culture and Recreation	\$1,035,924	\$1,135,938	\$1,199,034
Community Support	\$424,247	\$463,467	\$542,040
Intergovernmental	\$3,800,000	\$6,029,727	\$4,113,405
<b>Total Expenditures</b>	<b>\$12,838,076</b>	<b>\$16,547,873</b>	<b>\$14,263,183</b>

Source: Eureka County Recorder/Auditor's Office 2009, 2010, 2011

Eureka County School District

Similar to Eureka County, the general fund revenues of the ECSD are related to fluctuations in the mining industry. Historically, the ECSD has derived virtually all its revenue from locally generated ad valorem property taxes levied on real and personal property and the net proceeds of mining (BLM 2005). Total ECSD revenue declined from fiscal years 2008/2009 to 2009/2010 by \$2,169,495, or approximately 13 percent, which reflects the downturn in the nation's economy (Table 3.2-15). Revenue increased by fiscal year 2010/2011 by \$6,628,058, or approximately 31 percent. Ad valorem taxes were the highest source of revenue for the ECSD, providing approximately 84 percent of the 2008/2009 and 2009/2010 revenues, and approximately 80 percent of the 2010/2011 revenues.

**Table 3.2-15: Eureka County School District Revenues**

Revenue Source	Fiscal Years		
	2008/2009	2009/2010	2010/2011
Local – Ad valorem	\$13,901,984	\$12,162,570	\$16,876,391
Local – other	\$2,432,882	\$2,091,693	\$3,841,551
State and federal programs and grant	\$224,842	\$135,950	\$300,329
<b>Total Revenue</b>	<b>\$16,559,708</b>	<b>\$14,390,213</b>	<b>\$21,018,271</b>

Source: Jones, L. 2012

Total ECSD expenditures increased by \$2,161,224 or approximately 78 percent from fiscal years 2008/2009 to 2010/2011 (Table 3.2-16). Regular programs and undistributed and food service programs were the highest expenditure sources for the ECSD, resulting in approximately 31 percent, 36 percent, and 28 percent of regular program expenditures, and approximately 45 percent, 34 percent, and 32 percent of undistributed and food service program expenditures.

**Table 3.2-16: Eureka County School District Expenditures**

Type of Expenditure	Fiscal Years		
	2008/2009	2009/2010	2010/2011
General Fund:			
Regular Programs	\$2,327,334	\$3,311,024	\$2,689,694

Type of Expenditure	Fiscal Years		
	2008/2009	2009/2010	2010/2011
Vocational and other programs	\$511,550	\$609,930	\$597,953
Undistributed and food service	\$3,395,819	\$3,121,760	\$3,113,001
<b>Total General Fund Operating Expenditures</b>	<b>\$6,234,703</b>	<b>\$7,042,714</b>	<b>\$6,400,648</b>
Capital/Debt Service	\$1,331,528	\$2,087,700	\$3,326,807
<b>Total Expenditures</b>	<b>\$7,566,231</b>	<b>\$9,130,414</b>	<b>\$9,727,455</b>

Source: Jones, L. 2012

### 3.2.7.2 Environmental Consequences

Although the Proposed Action would result in the extension of the life of the existing Ruby Hill through 2016, or later dependent upon mining and economic conditions, Homestake would maintain the current work force of approximately 147 employees for mining and processing operations and concurrent reclamation, and would not add any additional employees under the Proposed Action. Most of the workforce resides in the Town of Eureka, but Homestake has provided housing within the area to off-set housing demands as a result of the mine. Due to the extension of the life of Ruby Hill, there would be continued impacts to public services and facilities from the existing employees that reside in the County. However, the extended mine operations would also lead to the continued purchase of goods and services within the community. Therefore, impacts to local businesses and the community, including public services, would be similar to impacts from the existing operations.

### 3.2.8 **Soils**

#### 3.2.8.1 Affected Environment

The soil types in the Project Area are typical of those found throughout this portion of central Nevada, and consist largely of gravelly, silty and stony loams. The Project Area is located within the Central Nevada Basin and Range Major Land Resource Area (MLRA) (Natural Resource Conservation Service [NRCS] 2010). The Central Nevada Basin and Range MLRA is located within the Great Basin Section of the Basin and Range geologic province. This area is dominated by nearly level, aggraded desert basins and valleys between series of north to south mountain ranges. Locally, the Project Area lies northwest of Ruby Hill in Eureka County, Nevada.

Six soil associations were identified within the Project Area from the NRCS database (Table 3.2-17). Physiographic features that occur in the Project Area include alluvial fans, terraces and an alluvial basin. Alluvial fans and terraces are located at higher elevations within the Project Area and are positioned between foothills to the south and Diamond Valley to the west, north and east. These fans and terraces typically include a mixture of coarse fragments (gravel and cobble) and several textures of soils (loam, sandy loam, silt loam) (BLM 2005).

Soils associated with the Project Area are gently sloping to steep, shallow to moderately steep, and highly permeable. A portion of the Project Area is located in the extreme southern portion of Diamond Valley, which is a large alluvial basin. Alluvial basins are characterized by nearly level to moderately sloping, well-drained soils that are moderately deep. Soil textures that predominantly occur in alluvial basins include silt loam, silty clay loam, and sandy loam.

**Table 3.2-17: Soil Series within the Project Area**

Association	Soil Series	Range in Depth to Hardpan	Landscape position/ % Slope	Profile Soil Texture	Permeability	Erosion Hazard by Water	Erosion Hazard by Wind
Umil Association	Umil	10 – 14 inches	Gently sloping; fan remnants 2 – 4 % Umil Loam and 15 – 50 % Cobbly loam	Loam	Moderate - High	Moderate - High	Moderate - High
Rubyhill Fine Sandy Loam	Rubyhill	20 – 30 inches	Old, dissected fans ;2 – 8 %	Fine sandy loam	High	Low	Low
Bartine-Overland Association	Bartine	N/A	North and South Facing Mountains; 15 – 50 %	Gravelly loam	High	High	Moderate - High
	Overland	N/A	North and South Facing mountains; 15 – 50 %	Gravelly loam	High	High	Moderate - High
Shipley Complex	Shipley	N/A	Gentle slopes of alluvial fans and lake terraces; 0 – 2 %	Silt loam	High	Low	Low
Kobeh	Kobeh	N/A	Medium & Large irregular alluvial fans; 2 – 4 %	Gravelly fine sandy loam	High	Low	Low
Shipley Silt Loam	Shipley silt loam	N/A	Irregular Shaped areas, small and medium floodplains; 0 – 2 %	Silt loam	High	Low	Low

Source: NRCS 2010.

### 3.2.8.2 Environmental Consequences

Surface disturbance associated with the Proposed Action would impact up to approximately 106.6 acres of soil from existing and new activities. Disturbance would be created incrementally and would be dispersed throughout the Project Area. Surface disturbing activities associated with the Proposed Action would increase the erosion potential by wind and water of disturbed soils until the completion of reclamation activities. The impacts of the Proposed Action include soil erosion and stability impacts, availability of growth media for use during reclamation, the mixing of existing soil horizons, and the loss of productivity.

The potential impacts to the disturbed and reclaimed soils would be reduced by the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12. Ongoing erosion control measures are included in the SWPPP that includes concurrent reclamation, installation of temporary diversion ditches, berms, and settling basins. Storm water diversion systems would be constructed around new disturbance areas. Additionally, all Ruby Hill roads have been constructed and maintained to provide adequate drainage and to minimize damage to soils through the installation of ditches, settling basins, and culverts sized to meet BLM standards. These practices would continue during construction and maintenance of new expansion-related roads. Other measures outlined in the SWPPP, such as certified weed-free straw bale barriers and silt fences, and other measures not in the SWPPP, such as dispersed terraces, gabion sediment traps, or grass filter waterways would be implemented as required. Therefore, the Project is not anticipated to result in substantial impacts to soils as a result of erosion.

### 3.2.9 **Special Status Species**

#### 3.2.9.1 Affected Environment

BLM policy for management of special status species is in the BLM Manual Section 6840. Special status species include the following:

- **Federally Threatened or Endangered Species:** Any species that the USFWS has listed as an endangered or threatened species under the Endangered Species Act (ESA) of 1973, as amended, throughout all or an extensive portion of its range;
- **Proposed Threatened or Endangered Species:** Any species that the USFWS has proposed for listing as a federally endangered or threatened species under the ESA;
- **Candidate Species:** Plant and animal taxa that are under consideration for possible listing as threatened or endangered under the ESA;
- **BLM Sensitive Species:** 1) Species that are currently under status review by the USFWS; 2) Species whose numbers are declining so rapidly that federal listing may become necessary; 3) Species with typically small and widely dispersed populations; or 4) Species that inhabit ecological refugia or other specialized or unique habitats; and
- **State of Nevada Listed Species:** State-protected animals that have been determined to meet BLM's Manual 6840 policy definition.

Nevada BLM policy is to provide State of Nevada listed species and Nevada BLM sensitive species with the same level of protection as is provided to candidate species in BLM Manual 6840.06C. Per wording in Table IIa in BLM Information Bulletin No. NV-2003-097, Nevada protected animals that meet BLM's 6840 policy definition are those species of animals occurring on BLM-managed lands in the State of Nevada that are: 1) 'protected' under authority of the NAC; 2) have been determined to meet BLM's policy definition of "listing by a state in a category implying potential endangerment or extinction;" and 3) are not already included as federally listed, proposed, or candidate species.

The USFWS, NNHP, and NDOW were contacted by SRK to obtain a list of threatened and endangered and sensitive species that have the potential to occur within the Project Area. In addition, the BLM Sensitive Species List and Special Status Species (threatened and endangered) lists for the Battle Mountain District were evaluated. The special status wildlife and plant species that have potential to occur within the Project Area are further discussed below.

#### Federally Threatened and Endangered Species

The NNHP response letter, dated September 1, 2011, reported in a five kilometer radius search surrounding the townships and ranges of the Project Area, there were no at risk or federally listed species occurrences recorded. The NDOW response letter, dated September 12, 2011, reported there were no federally listed species that are known to occur in the Project Area (NDOW 2011a). The USFWS response letter, dated September 8, 2011, reported there were no known listed species that occur in the Project Area (USFWS 2011).

#### BLM Sensitive Species

SRK, the NDOW, NNHP, and BLM have identified that various BLM sensitive mammal, raptor, bird, and bat species have the potential to occur within the Project Area. The NNHP has identified habitat for the Lahontan beardtongue (*Penstemon palmeri* var. *macranthus*), a BLM special status plant species. These species are described below.

The NNHP identified that habitat exists for the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), a candidate species (NNHP 2011) and BLM sensitive species.

#### *Greater sage-grouse*

Greater sage-grouse is a candidate for listing under the ESA and on March 23, 2010, the USFWS's 12-month status review of the species determined that the species warrants the protection under the ESA. The listing of the greater sage-grouse at this time is precluded by the need to address higher priority species and the state and BLM are responsible for management of the species.

Greater sage-grouse, an upland game bird, is largely dependent on sagebrush for nesting and brood rearing and feed almost exclusively on sagebrush leaves during the winter. Greater sage-grouse currently occupy about 670,000 km<sup>2</sup> in 11 western states and two Canadian provinces. The majority of the populations are located in Montana, southern Idaho, northeastern California, eastern Oregon, northwestern Colorado, and broader sections of Wyoming, Utah, and Nevada. They are known to occur in foothills, plains, and mountain slopes where sagebrush meadows and aspen are in close proximity. Dense sagebrush overstory and an herbaceous

understory of grasses are important to provide shade and security, and both new herbaceous growth and residual cover are important in the understory. Greater sage-grouse have specific habitat requirements to carry out their life cycle functions. Sage-grouse breeding habitats are defined as those where lek attendance, nesting, and early brood-rearing occur (Connelly et al 2004).

Early spring habitat or breeding sites called “leks,” are usually situated on ridge tops or grassy areas surrounded by a substantial brush and herbaceous component (Schroeder et al. 1999). In early spring males gather in leks where they strut to attract females. Leks are a traditional courtship display and mating areas attended by sage-grouse in or adjacent to sagebrush dominated nesting habitat (Connelly et al 2004). Leks have less herbaceous and shrub cover than surrounding areas. Spring is a period when birds are changing diets from sagebrush to forbs as forbs become available (Connelly et al 2004).

Sage-grouse nesting habitat is often a broad area within or adjacent to winter range or between winter and summer range (Connelly et al 2004). Late spring habitat or nesting sites are located in thick cover in sagebrush habitat beneath sagebrush or other shrubs. Nests are situated on the ground in a shallow depression with an average distance between nest sites and nearest leks of 0.7 mile to 3.9 miles; however, females may move greater than 12.4 miles from a lek to nest (NatureServe 2010). Selection of specific habitat features, such as sagebrush height and canopy cover within a landscape by nesting sage-grouse has been extensively documented. It is suggested that nesting habitat within sagebrush stands should contain between 15 and 25 percent canopy cover. Females preferentially selected areas with sagebrush 36 to 63.5 centimeters tall and with canopies 15 to 50 percent for nesting in Utah (Connelly et al 2004).

Early brood-rearing habitat is defined as sagebrush habitat within the vicinity of the nest used by sage-grouse hens with chicks up to three weeks following hatch. Early brood rearing habitat may be relatively open with approximately 14 percent canopy cover of sagebrush and abundant forbs, which attract insects to feed young chicks. Denser sagebrush is often on the periphery to provide shelter from predators. Early brood-rearing locations had less live sagebrush (15.8 vs. 20.2 percent) and total shrub (19.3 vs. 24.1 percent) canopy cover, more residual grass (2.9 vs. 2.0 percent), total forb (9.3 vs. 6.6 percent), and total herbaceous (37.3 vs. 29.4 percent) cover, relative to available habitats (Connelly et al 2004). Late brood-rearing habitats are those habitats used by sage-grouse following desiccation of herbaceous vegetation in sagebrush uplands (Connelly et al 2004). Late brood rearing habitat includes sagebrush vegetation with plants that are more succulent and have a perennial water source nearby such as meadows with streams (NatureServe 2010).

In fall and winter months the birds shelter under mature sagebrush. In the winter males and females separate into different groups. Winter habitats of sage-grouse generally are dominated by big sagebrush; however, low sagebrush and silver sagebrush communities also are used during winter (Schroeder et al. 1999). The canopy cover of sagebrush in both arid and mesic sites ranges from ten to 30 percent in wintering habitat and greater sage-grouse use shrub heights of 25-35 centimeters above the snow. They increase the proportion of sagebrush in their diet during the winter and rely on sagebrush exposure above the snow (Connelly et al 2004).

In response to a request for identification of federally-listed and candidate species in the Project Area, the USFWS memorandum on April 8, 2011, stated that the greater sage-grouse

(*Centrocercus urophasianus*) a candidate species, has the potential to occur in the Project Area (USFWS 2011). In addition to federally listed species (i.e., protected by the ESA) and candidate species discussed above, the BLM also protects special status species by policy (BLM 2008). The list includes certain species designated by the State of Nevada, as well as species designated as “sensitive” by the Nevada BLM State Director. The greater sage-grouse is a BLM Sensitive Species.

According to data provided by the NDOW for the baseline biology studies conducted for the Proposed Action, greater sage-grouse have the potential to use the Project Area and vicinity throughout the year. Core breeding habitat for greater sage-grouse exists in sagebrush communities northeast of the Project Area. The entire Project Area falls within greater sage-grouse summer and nesting habitat. The western half of the Project Area is considered suitable winter habitat (NDOW 2011a). However, the existing disturbance and active mining are likely to preclude the use by greater sage-grouse in the Project Area.

The closest known lek is located approximately five miles north of the Project Area. A winter survey of the Project Area was conducted in December 2011 by SRK. The field survey was conducted in accordance with the protocol provided by the NDOW. No greater sage-grouse or their sign were observed during the survey. The Project Area is located within the Diamond Population Management Unit (PMU) and the BLM’s Greater Sage-grouse South Central Local Planning Area, which covers Lander, Eureka and Nye counties (SRK 2011a).

The BLM has issued two IMs for the protection of greater sage-grouse. IM 2012-043, *Greater Sage-Grouse Interim Management Policies and Procedures*, provides interim policies and procedures to the BLM to be applied to ongoing and proposed authorizations that affect greater sage-grouse, while long-term permanent measures are being developed (BLM 2011a). IM 2012-044, *BLM National Greater Sage-Grouse Land Use Planning Strategy*, provides direction to the BLM for the consideration of conservation measures, identified in *A Report on National Greater Sage-Grouse Conservation Measures* prepared by the Sage-Grouse National Technical Team, to apply during the land use planning process (BLM 2011b). The NDOW has recently mapped greater sage-grouse habitat in Nevada to support these IMs and published a Habitat Characterization Map in March 2012. The BLM used this NDOW map to create a map identifying Preliminary Primary Habitat (PPH) and Preliminary General Habitat (PGH) on BLM administered lands. According to this map, there is no PPH located within the Project Area and approximately 2,402 acres of PGH located within the Project Area. None of the areas identified as PGH within the Project Area is subject to proposed disturbance from the expansion of the mine facilities; however, exploration drilling may occur in these areas.

#### *Western yellow-billed cuckoo*

Western yellow-billed cuckoos typically inhabit moist thickets, willows, overgrown pastures, and orchards near water. The western yellow-billed cuckoo has restrictive macro-habitat requirements. These habitat requirements are particular to type, size and configuration. During the breeding season, the western yellow-billed cuckoo is confined to cottonwood-willow riparian habitat. Home ranges are considerably large, often exceeding 50 acres and as much as 100 acres in extent. Suitable habitat for the western yellow-billed cuckoo was not identified within the Project Area in a survey conducted by SRK in December 2011 (SRK 2011a).

### *Pygmy Rabbit*

Pygmy rabbit (*Brachylagus idahoensis*) typical habitat consists of dense stands of big sagebrush growing in deep loose soils that are deeper than 20 inches, have at least 13 to 30 percent clay content, and are light colored and friable. Pygmy rabbit habitat is generally on flatter ground or moderate slopes in Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) uplands, basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) drainages, and in ephemeral drainages in between ridges of low sagebrush (*Artemisia arbuscula*) (Ulmschneider 2004).

The pygmy rabbit is believed to be one of only two rabbits in North America that digs its own burrows. Pygmy rabbits dig burrows three inches in diameter and a burrow may have three or more entrances (NatureServe 2010). Burrows are relatively simple and shallow, often no more than seven feet in length and less than four feet deep with no distinct chambers. The elevation range for this species is 4,500 to 7,450 feet amsl; however, they occur in elevations up to 8,000 feet amsl in the mountains in central Nevada. The winter diet of pygmy rabbits is composed of up to 99 percent sagebrush. During spring and summer, their diet may consist of roughly 51 percent sagebrush, 39 percent grasses, and ten percent forbs. During winter, pygmy rabbits use extensive snow burrows to access sagebrush forage, as travel corridors among their underground burrows, and possibly as thermal cover (USFWS 2003).

According to a letter from the NNHP dated September 1, 2011, pygmy rabbits have potential habitat within the Project Area (NNHP 2011). In surveys of the Project Area conducted in August 2011 and March 2012, pygmy rabbits were documented in suitable habitat within portions of the Project Area (SRK 2011a; SRK 2012).

### *Dark kangaroo mouse*

Dark kangaroo mouse (*Microdipodops megacephalus*) is found throughout North America and is located in scrubland and sagebrush habitat. This species has potential to exist within the Project Area due to extensive sagebrush habitat within the Project Area (SRK 2011a).

### *Pale kangaroo mouse*

This species is found throughout North America. Pale kangaroo mice (*Microdipodops pallidus*) habitat is located in high cold deserts associated with scrublands and desert vegetation. This species has the potential to occur within the Project Area (SRK 2011a).

### *American pika*

American pikas (*Ochotona princeps*) are found in the foothills and mountains. They eat a variety of plants, mainly grasses and sedges. This species has the potential to occur within the foothills of the Project Area (SRK 2011a).

### *Raptors (including Bald and Golden Eagles)*

The NDOW and BLM have noted that several sensitive raptor species may utilize habitat within the Project Area and include ferruginous hawk, northern goshawk (*Accipiter gentilis*), peregrine falcon (*Falco peregrinus*), Swainson's hawk (*Buteo swainsoni*), and golden eagle (*Aquila*

*chrysaetos*). The NDOW has indicated that habitat exists within the Project Area for the western burrowing owl (*Athene cunicularia hypugaea*) (NDOW 2011a).

In August 2011, a raptor survey was conducted for the Project Area to identify sensitive species utilizing the site and to assess potential nesting and foraging habitat for raptors. Raptor species that have the potential to forage or nest within the Project Area include, but are not limited to golden eagle, ferruginous hawk, Swainson's hawk, and peregrine falcon. Nesting habitat within the Project Area can be found on cliff/outcrops, piñon-juniper habitat, power distribution lines, inactive mine structures and artificial raptor nest structures installed by Homestake (SRK 2011b).

Golden eagles are protected by the MBTA and the Bald and Golden Eagle Protection Act, both of which prohibit take. The *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance* provides guidance to conduct informed impact analyses and mitigation during the NEPA process (USFWS 2010). The survey for golden eagles was conducted outside of the nesting season, and therefore only identified nest locations and not species for success of nests. The aerial survey of the Project Area and ten-mile buffer focused on areas with rock outcrops, ledges, and power lines as agreed upon with the NDOW (SRK 2011c). Golden eagles are known to build stick nests on cliffs and in trees and sometimes use the same nest every year or alternate among nest sites within their territory. Fourteen potential golden eagle nests were located within the survey area; ten were located on cliffs/rock outcrops, three were located in trees, and one was located on a power distribution line structure. During the 2011 nest survey, no golden eagle nests were identified within the Project Area (SRK 2011c). No potential nesting habitat was identified within the Project Area during the survey.

### *Birds*

According to SRK, other BLM sensitive bird species that have potential habitat within the Project Area include pinyon jay, loggerhead shrike, black rosy-finch (*Leucosticte atrata*), and Lewis' woodpecker (*Melanerpes lewis*).

### *Bats*

The NDOW identified that bat habitat may occur for the Townsend's big-eared bat (*Corynorhinus townsendii*) within the Project Area (NDOW 2011a). The NNHP identified the potential habitat within the Project Area for the western small-footed myotis (*Myotis ciliolabrum*) (NNHP 2011). Additional bat species that are known to exist based on previous surveys within the Project Area include big brown bats (*Eptesicus fuscus*) and long-legged myotis (*Myotis volans*).

### *Lahontan beardtongue*

In a letter dated September 1, 2011, the NNHP stated that habitat for Lahontan beardtongue, a BLM Sensitive Species, may exist within the Project Area. The Lahontan beardtongue is a tall perennial herb known to occur at elevations between 3,428 and 4,550 feet amsl along roadsides, washes, and on canyon floors, particularly on carbonate-containing substrates. Habitat consists of locations where subsurface moisture is available throughout most of the summer. The Lahontan

beardtongue flowers in late spring, between May and June. The elevation of the Project Area varies between 6,100 and 7,900 amsl. No Lahontan beardtongue has been observed during past surveys within the Project Area (SRK 2011a).

### 3.2.9.2 Environmental Consequences

Several BLM sensitive and special status bird, raptor, bat, and other mammal species have been observed or are likely to occur in the Project Area. Surface disturbance activities associated with the Proposed Action would temporarily remove up to 106.6 acres of special status species habitat, however; most of this disturbance is within previously cleared areas. No greater sage-grouse PGH would be removed as part of the proposed expansion of the open pit and development of the ET ponds, but exploration activities could occur in these areas. Therefore, up to 70 acres of PGH may be impacted by the Proposed Action. No PPH is located within the Project Area and, therefore, no PPH would be impacted by the Project. Short-term impacts to special status species would occur due to temporary loss of vegetation as a result of Project-related surface disturbance. Concurrent and subsequent reclamation activities would revegetate surface disturbance outside of the open pit area and restore habitat for special status species, including greater sage-grouse habitat, pygmy rabbit habitat, raptor foraging habitat, BLM sensitive bird species nesting and foraging habitat, pale kangaroo mouse and dark kangaroo mouse habitat, and American pika habitat. The reestablishment of native vegetation, including sagebrush and other important forage species, would create available habitat for the species listed above. Indirect impacts would result from the extension of the life of the mine prolonging the disturbance regime in the Project Area. In addition, Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and the current species protection measures in place for the Project would eliminate potential direct impacts to special status species and minimize impacts to habitat.

## 3.2.10 **Vegetation**

### 3.2.10.1 Affected Environment

The Project Area is located in the Central Great Basin floristic region of the intermountain physiographic region (Cronquist et al. 1972). This floristic region is characterized by mountain ranges trending north and south with a large, extensive valley located between ranges.

Based on the results of the biological surveys (BLM 2005) vegetation communities identified within the Project Area include: Juniper Woodland-Black Sagebrush; Juniper Woodland-Wyoming Big Sagebrush; Wyoming Big Sagebrush-Grassland; Basin Big Sagebrush-Great Basin Wildrye; and Winterfat-Grassland. These vegetation communities are interspersed within the Project Area, and the distribution of these communities is directly related to subtle differences in landscape position, soil texture and moisture, and aspect. A portion of the Project Area does not contain vegetation due to the existing and authorized surface disturbance totaling up to approximately 1,635.8 acres.

#### *Juniper Woodland-Black Sagebrush*

The Juniper Woodland-Black Sagebrush community is the most prevalent community in the Project Area. This community occurs on gently sloping, old alluvial fans that are dissected by intermittent drainages that have gentle to moderately steep side slopes. This community is

characterized by a dominant overstory consisting of Utah juniper (*Juniperus osteosperma*), singleleaf piñon pine (*Pinus monophylla*), and bitterbrush (*Purshia tridentata*) and a subdominant understory consisting of black sagebrush (*Artemisia nova*), king sandwort (*Arenaria kingii*), Hood's phlox (*Phlox hoodii*), desert elkweed (*Frasera albomarginata*), bottlebrush squirreltail, Sandberg bluegrass, and Indian ricegrass. The average foliar cover for this community is approximately 24 percent (range 18 to 35 percent), and the estimated annual forage production is 671 pounds per acre (BLM 2005).

#### *Juniper Woodland-Wyoming Big Sagebrush*

The Juniper Woodland-Wyoming Big Sagebrush community also occurs on gently sloping, old, alluvial fans that are dissected by intermittent drainages and have gentle to moderately steep side slopes. This community includes a dominant overstory consisting of Utah juniper and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and a subdominant understory consisting of Hood's phlox, Watson's cryptantha (*Cryptantha watsonii*), bottlebrush squirreltail, Sandberg bluegrass, and Great Basin wildrye. The average foliar cover for this community is approximately 20 percent (range: eight to 32 percent), and the estimated annual forage production is 367 pounds per acre (BLM 2005).

#### *Wyoming Big Sagebrush-Grassland*

The Wyoming Big Sagebrush-Grassland community also occurs on gently sloping, old alluvial fans that are dissected by intermittent drainages and have gentle to moderately steep side slopes. This community is characterized by a dominant overstory consisting of Wyoming big sagebrush and a subdominant understory consisting of Hood's phlox, Mojave prickly pear (*Opuntia phaeacantha*), Bottlebrush squirreltail and Sandberg bluegrass. The average foliar cover for this community is approximately 32 percent (range: 27 to 42), and the estimated annual forage production is 1,272 pounds per acre (BLM 2005).

#### *Basin Big Sagebrush-Great Basin Wildrye*

The Basin Big Sagebrush-Great Basin Wildrye community is located in intermittent drainage bottoms within the Project Area. This community experiences intermittent flooding during periods of runoff resulting from heavy precipitation events and snowmelt. This community includes a dominant overstory consisting of basin big sagebrush and green rabbitbrush (*Chrysothamnus viscidiflorus*) and a subdominant understory consisting of Great Basin wildrye and cheatgrass. The average foliar cover for this community is approximately 40 percent (range: 34 to 50), and the estimated annual forage production is 1,271 pounds per acre (BLM 2005).

#### *Winterfat-Grassland*

The Winterfat-Grassland community occurs on gently sloping, alluvial fans that are dissected by intermittent drainages. This community is characterized by a dominant overstory consisting of Wyoming big sagebrush and a subdominant understory consisting of Hood's phlox, Mojave prickly pear, Bottlebrush squirreltail, and Sandberg bluegrass. The average foliar cover for this community is approximately 32 percent (range: 27 to 42), and the estimated annual forage production is 1,272 pounds per acre (BLM 2005).

### 3.2.10.2 Environmental Consequences

The Project Area has been disturbed as a result of current and ongoing mining operations. Implementation of the Proposed Action would contribute to existing surface disturbance within the Project Area. A majority of the proposed surface disturbance is located in previously cleared areas and would not contribute to a loss of vegetation. However, up to 17.3 acres of permanent loss of vegetation would occur from the proposed open pit expansion, as the open pit would not be reclaimed. Exploration activities could occur anywhere in the Project Area temporarily disturbing up to 70 acres within the Project Area. However, concurrent reclamation would be conducted when feasible and exploration activities would use existing road and disturbed areas to the greatest extent to reduce impacts to vegetation. New surface disturbance would be revegetated using the BLM-approved seed mixture approved in the Plan.

### 3.2.11 **Wastes, Hazardous or Solid**

#### 3.2.11.1 Affected Environment

Federal hazardous material and waste laws and regulations would be applicable to hazardous substances or wastes used, stored, or generated by the Project. Applicable federal laws would include the following: the Resource Conservation and Recovery Act of 1976; Hazardous and Solid Waste Amendments; Occupational Safety and Health Association Hazard Communication Standard (29 CFR 1910.1200); Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; aka Superfund); Toxic Substances Control Act of 1976; Superfund Amendments and Reauthorization Act of 1986; and Safe Explosives Act of 2002. Pursuant to regulations promulgated under Section 102 of CERCLA, as amended, release of a reportable quantity of a hazardous substance to the environment in a 24-hour period must be reported to the National Response Center (40 CFR Part 302). A release of a reportable quantity on public land must also be reported to the BLM.

Similarly, Nevada hazardous material and waste laws and regulations would be applicable to hazardous substances used, stored, and generated by the Project. NAC 445A.240 requires immediate reporting of a release of a reportable quantity of a hazardous substance to the NDEP.

The release of hazardous wastes has the potential to affect water quality. The Clean Water Act of 1972 and Safe Drinking Water Act of 1974 (with amendments in 1986 and 1996) were enacted to protect the quality of surface water and ground water. The Clean Water Act of 1972 established the basic structures for regulating discharge of pollutants into “waters of the United States.” The Safe Drinking Water Act of 1974 protects the quality of drinking water from both above ground and underground sources. Section 3.2.12 discusses and evaluates the impacts to water resources.

Regulated petroleum products and hazardous materials currently used in the Project Area include diesel fuel, gasoline, oils, greases, anti-freeze, and solvents used for equipment operation and maintenance. Additionally, sodium cyanide, sodium hydroxide, acid, flocculants, lime, and antiscalants are used in mineral extraction processes. Ammonium nitrate and high explosives are utilized for blasting operations that involve pit expansion. Also, various by-products classified as hazardous waste and chemicals used in the assay laboratory are utilized in the Project Area as well. The Proposed Action would not change the quantities or types of these products or

materials, but would continue to utilize the same quantities and types of products during the extension of the mine life.

### 3.2.11.2 Environmental Consequences

The generation of wastes and the use of hazardous materials as a result of ongoing Project activities and the Proposed Action may result in the release of these wastes or materials. Vehicles traveling on public roads in the Project Area would result in the presence of hazardous materials and wastes (e.g., fuel, antifreeze, battery acid, lead tire weights, mercury switches, or catalytic converters) for the duration of travel. These impacts would be short-term and the risk posed from these activities would exist throughout the duration of the Project. Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and Homestake's Spill Contingency Plan, located in Appendix 5 of the *Final Plan of Operations, Ruby Hill Project* (Homestake 1996a), would minimize the impacts from the Proposed Action on the environment, by ensuring that any release of hazardous materials would be handled and reported in accordance with applicable federal and state laws and regulations. This resource is not analyzed further in this EA.

## 3.2.12 **Water Resources**

### 3.2.12.1 Affected Environment

#### *Surface Water Quantity*

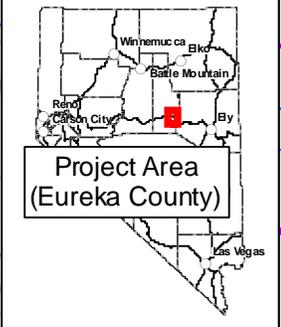
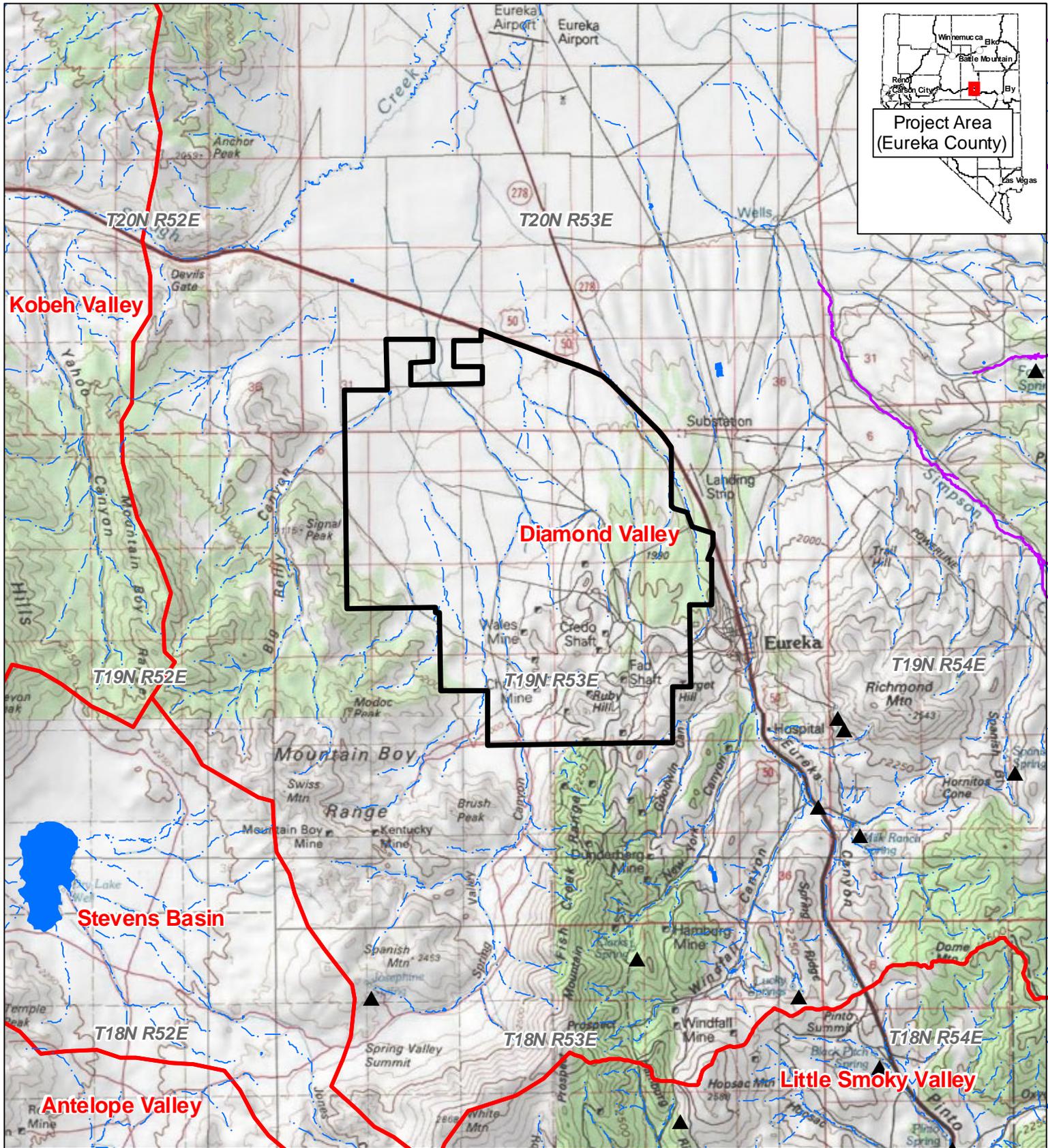
The Project Area is located within the southern portion of Diamond Valley. Diamond Valley is a closed hydrographic basin except for inflow through Devil's Gate. Devil's Gate is a topographic low point between Whistler Mountain and the Mountain Boy Range, and permits surface and subsurface inflow from Antelope, Kobeh, and Monitor valleys (BLM 2005). The majority of ephemeral and perennial streams flow radially inward from the mountains toward the playa in the north-central part of Diamond Valley, and have maximum flow near the base of the mountains. Stream flow diminishes downslope on the alluvial apron because of increased infiltration and evaporation.

Surface water within the Project Area is dependent on seasonal precipitation. The average annual precipitation in Eureka, Nevada is 12 inches (WRCC 2010) mainly as winter snow and locally intense summer thunderstorms.

Surface water features within the Project Area are limited to intermittent drainages. No perennial water sources or springs exist within the Project Area. There are a total of 16 intermittent drainages, trending south to north, located within the Project Area (BLM 2005) (Figure 3.2.12). Most of the surface flow is a result of storm runoff during precipitation events or as a result of seasonal snowmelt (BLM 2005).

#### *Surface Water Quality*

State water quality standards for Nevada are established in the NAC, Chapter 445, Section 445A.11704 through 445A.225 and are discussed in detail in the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS* (BLM 2005; Section 3.4.1.1).



**Explanation**

- Project Area
- Hydrobasin
- Lake/Pond/Reservoir
- Perennial Stream
- Intermittent Stream
- Spring

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**BUREAU OF LAND MANAGEMENT**

**RUBY HILL PROJECT**  
 Hydrologic Features in the Vicinity of the Project

Figure 3.2.12

07/26/2012

Springs within three miles of the existing pit were analyzed in 1996 and analyses found that all background concentrations met drinking water standards except for the selenium and iron concentrations in two of the springs sampled (BLM 2005; Section 3.4.1.1). Table 3.2-18 shows the state water quality standards and the results of the background concentrations tests for selenium and iron in springs within three miles of the existing pit.

**Table 3.2-18: Surface Water Quality in Diamond Valley**

Sample Location	Location	Date	Selenium (mg/L)	Iron (mg/L)
<b>Water Quality Standard (mg/L)</b>			<b>0.05<sup>2</sup></b>	<b>0.3<sup>1</sup></b>
Springs (d)	T19N, R53E, S25	5/7/58	n/a	0
Slough Creek	T20N, R52E, S26	4/10/54	n/a	0.06
Spring (db)	T23N, R54E, S3	5/17/66	n/a	0.01
Spring (ca)	T24N, R52E, S23	4/16/63	n/a	0
Spring #1	T19N, R53E, S13	12/5/84	0.006	0.10
Spring #2	T19N, R53E, S23	12/5/84	0.003	0
Spring #3	T19N, R53E, S25	12/5/84	0.053	0
Spring #3	T19N, R53E, S25	7/29/89	0.021	0
Spring #4	T20N, R53E, S25	12/5/84	0.014	0
Spring #5	T19N, R53E, S24	12/5/84	0.004	0
Spring #6	T19N, R54E, S19	12/5/84	<0.0025	0
Spring #7	T19N, R53E, S13	12/5/84	<0.0025	0.19
Spring #8	T19N, R53E, S13	12/5/84	<0.0025	0.47
Spring #9	T19N, R53E, S13	12/5/84	0.004	0
SPLE #8	T19N, R53E	1/13/72	n/a	0.01
Sheriff's office spring		10/18/80	0.021	0.01
Sheriff's office spring		10/24/80	0.023	0
Eureka Co. Mtn. spring		1/10/95	0.009	n/a

Source: BLM 2005

Notes: mg/L = milligrams per liter

<sup>1</sup> Federal secondary water quality standard

<sup>2</sup> Nevada primary water quality standard

### *Ground Water Quantity*

The Project Area lies within the southern portion of the Diamond Valley Hydrographic Basin. Ground water occurs in both alluvium and bedrock and generally flows toward the valley-fill reservoir located in the North Diamond Subarea. In the northern portion of Diamond Valley, ground water is considered to be deep-circulating and fault controlled. The Nevada Division of Water Resources (NDWR) provides ground water allotments and rights for each hydrographic basin. Table 3.2-19 shows the distribution of ground water allotments by manner of use within the Diamond Valley Hydrographic Basin. The Project would continue to use approximately 665 acre-feet of make-up water per year. Therefore, the Proposed Action would not require additional allocation of water rights or use within the basin.

**Table 3.2-19: Ground Water Allotments by Manner of Use**

<b>Manner of Use</b>	<b>Active Annual Duty (acre-feet)</b>
Commercial	2.79
Domestic	33.60
Irrigation (DLE)	12,279.49
Irrigation	114,595.85
Mining and Milling	2,464.29
Municipal	1,678.91
Quasi-municipal	483.34
Stock Water	854.54
Other underground	398.19
<b>Total</b>	<b>132,791</b>

Source: NDWR 2011

Ground water within the Project Area consists of flow through fractured bedrock and alluvial deposits. This type of flow is unpredictable and can often be found as perched water, particularly in the Vinini Formation to the west of the Wall Fault on the west side of the Red Canyon Creek. Within the eastern portion of the Project Area, ground water flows to the northwest. In the western portion, it flows to the northeast. In the center portion, it flows to the north. Ground water occurs in alluvium at the northwestern portion of the Project Area, and within the bedrock of the existing West Pit and mine facilities. Pre-mining ground water elevations beneath the Project Area range from approximately 5,900 to 6,200 feet amsl (BLM 2005).

Hydrological information available from exploration drilling performed in previous studies indicates that the water table in the Project Area is relatively shallow (BLM 2005). Based on previous drilling in the area, the depth to ground water is at approximately 280 to 300 feet below the ground surface; however, in the main Red Canyon drainage area water can occur in drill holes at approximately 140 feet below the ground surface. None of the shallow drill holes (e.g., holes less than 100 feet deep) encountered ground water (BLM 2005).

The existing open pit under the *Plan of Operations, Ruby Hill Mine Expansion – East Archimedes Project* authorized mining below the existing water table (Homestake 2005; Section 5.B, page 5-3) and the ground water flow model was presented in the 2005 SEIS. An update to the ground water flow model was conducted to support the Proposed Action and is included as an appendix in the Plan (Jones 2010). The proposed open pit expansion would involve lowering the base elevation of the open pit to approximately 5,100 feet amsl. At the conclusion of mining activities, a pit lake is anticipated to form in the Archimedes Pit. The post-recovery water level in the open pit is projected to be 5,859 feet amsl. The final lake is predicted to have an area of 64 acres and a volume of 17,200 acre-feet. Ground water levels at the Archimedes Pit area are predicted to be approximately 46 feet lower than pre-mining levels (Jones 2010).

Maximum drawdown in excess of ten feet is projected to extend less than two miles to the north and south of the pit. Post recovery drawdown in excess of ten feet would be confined to the immediate vicinity of the pit. The hydraulic connection between the Archimedes Block and the alluvial aquifer has been shown to be weak, and no measurable drawdown is anticipated in the alluvial aquifers of Diamond Valley. The final pit would be a hydrologic sink, with no ground water outflow (Jones 2010).

### *Ground Water Quality*

The ground water quality varies within the Diamond Valley as ground water migrates from recharge areas in the mountains to discharge areas in the northern part of the valley. Calcium, magnesium, and bicarbonate are the major ions near the recharge areas. In discharge areas, sodium, potassium, chloride, and sulfate are dominant, and ET causes concentrations of dissolved solids to increase (BLM 2005).

The water chemistry of the bedrock and alluvial aquifers underlying the Project Area are found to be of the same hydrologic system. Bicarbonate is the major anion and calcium tends to be the predominate cation (BLM 2005). Ground water quality within the carbonate bedrock of the mine site is considered to be within Nevada drinking water and stock water standards (BLM 2005).

Modeling was conducted to determine the water quality of the pit lake that would remain following mining and pit dewatering activities approved in the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS*. The modeling suggested that the pit lake water quality would not exceed stock water or irrigations standards (Schafer 2004 and BLM 2005).

To support the open pit expansion and Proposed Action, a revised Pit Lake Water Quality study was conducted by Schafer Limited LLC (Schafer 2010) and is included as Appendix B in the Plan. The water quality within the East Archimedes pit lake will change through time as the lake fills. The factors that affect water quality include the quantity and quality of each source of water that flows into the pit lake, the evaporation rate, and the geochemical conditions (e.g. dissolved oxygen and carbon dioxide levels) and mixing that occur within the pit. Overall, the predicted water quality in the Ruby Hill Expansion pit lake is good, meaning that solute concentrations meet all current Nevada ground water standards. Water is predicted to be alkaline with low levels of metals and will have total dissolved solids (TDS) values ranging from 200 to 500 mg/L for the first 400 years of lake development. The lake water pH, TDS and common ion levels fall into satisfactory ranges for all uses including wildlife use and irrigation (Schafer 2010).

The proposed expansion would utilize the existing infrastructure used for the current mining operation, and would continue to be managed per the requirements of the ROD for the *Ruby Hill Mine Expansion – East Archimedes Project Final SEIS* (NVN-067782, NV063-EIS04-34, signed October 2005), and the requirements of Water Pollution Control Permit (WPCP) NEV0096103 (signed March 17, 2008). Ongoing ground water monitoring is conducted for the Project in compliance with Homestake's WPCP. Eight wells in the Project Area are sampled on a quarterly basis and the results are reported to NDEP.

#### 3.2.12.2 Environmental Consequences

### *Surface Water Quantity*

All springs and seeps within three miles of the Project are located above the ground water table and are upgradient of the proposed expansion. Impacts to seeps and springs are not anticipated from the Project. Intermittent drainages may be impacted by the Proposed Action as a result of removal of intermittent stream segments within the Project Area. However, intermittent streams located in the Project Area are not considered to be jurisdictional waters of the United States (BLM 2005).

### *Surface Water Quality*

There are no receiving surface water bodies within the Project Area or immediate vicinity other than intermittent or ephemeral drainages. Runoff and sedimentation within the Project Area would be minimized by Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12, including the use of BMPs, and those measures established in prior authorizations within the Project Area. Consequently, impacts to surface water quality through sedimentation would be minimal.

### *Ground Water Quantity*

The proposed expansion would not increase the rate of water usage over the existing operations. There would be additional dewatering occurring with the Proposed Action; however, any post recovery drawdown in excess of ten feet would be confined to the immediate vicinity of the open pit. Based on the ground water flow model, the Proposed Action would not impact the alluvial aquifers in Diamond Valley. The Proposed Action does not include additional annual water consumption over existing use at the Project, but would continue for the additional mine life extension. Although the mine life would be extended, the Proposed Action would not have an impact on water rights or allocation within the Diamond Valley basin.

### *Ground Water Quality*

As permitted in the WPCP, the conceptual process pond and associated facilities proposed by the Project would be equipped with a liner system to prevent leaching into the ground water system. Therefore, contamination of ground water by leach solution is not anticipated. No major differences would exist in the amount of PAG material present in the mined material above the proposed pit bottom elevation, as the additional ore would essentially be the same material as mined under the current authorization. PAG would continue to be managed per the requirements of the ROD for the 2005 SEIS and requirements of WPCP. Therefore, no additional PAG issues are anticipated. The water quality associated with the pit lake is expected to meet all current Nevada ground water standards, and varies little when compared to the predicted water quality of the pit lake assessment under existing conditions (Schafer 2004 and Shafer 2010).

## **3.2.13 Wildlife (General)**

### **3.2.13.1 Affected Environment**

The Project Area occurs within the transitional zone between piñon-juniper woodlands along the foothills of the Diamond Mountains and the lower elevation sagebrush community located in Diamond Valley. Vegetation communities related to wildlife habitat are discussed in detail in Section 3.2.10, Vegetation. A variety of terrestrial wildlife species are associated with all of these upland communities, with greater species diversity occurring in areas exhibiting greater vegetative structure and soil moisture, such as the Basin big sagebrush-Great Basin wildrye community found along the intermittent drainages that bisect the Project Area (BLM 2005).

No water sources for wildlife occur in the Project Area and vicinity. No open water areas or riparian habitat occur within the immediate vicinity of the Project Area. Water sources in the larger vicinity of the Project Area, particularly those that maintain open water and a multi-story

canopy, support a greater diversity and population density of wildlife species than any other habitat types occurring in the region. Historical and current disturbance regimes have resulted in modification to the soils, topography, and vegetation structure in certain portions of the Project Area, which may impact wildlife use (BLM 2005).

SRK conducted wildlife surveys in the Project Area in October and December 2011 (SRK 2011b, 2011b, 2011c). In addition, the NDOW was contacted regarding the presence of wildlife species within and near the Project Area. The following discussion summarizes the results of the survey including which species were observed or detected utilizing the Project Area, as well as species with potential to be present or to utilize the Project Area based on the information provided by the NDOW and previous surveys of the Project Area (BLM 2005).

### *Mammals*

According to a letter dated September 12, 2011, from the NDOW, mule deer (*Odocoileus hemionus*) are distributed throughout the Project Area. Pronghorn antelope (*Antilocapra americana*) distribution exits in the northeastern portion of the Project Area. Bobcat (*Lynx rufus*) and mountain lion (*Puma concolor*) are also expected to occur (NDOW 2011a).

Nongame species include least chipmunk (*Neotamias minimus*), golden-mantled ground squirrel (*Spermophilus lateralis*), Belding's ground squirrel (*Spermophilus beldingi*), Townsend's ground squirrel (*Spermophilus townsendii*), and pocket gopher (*Geomys bursarius*) (BLM 2005).

### *Birds*

A list of migratory birds, including raptors that have the potential to occur within the Project Area is included in the discussion in Section 3.2.4. In addition to those species discussed, common nighthawk (*Chordeiles minor*) and the chukar partridge (*Alectoris chukar*) have been observed within the Project vicinity, and have the potential to occur within the Project Area (NDOW 2011a).

### *Amphibians and Reptiles*

According to past surveys, common reptiles such as the western fence lizard (*Sceloporus occidentalis*), Great Basin skink (*Plestiodon skiltonianus utahensis*), desert horned lizard (*Phrynosoma platyrhinos*), Great Basin rattlesnake (*Crotalus viridis lutosus*), and sagebrush lizard (*Sceloporus graciosus*) occur within the Project Area. Amphibian presence is limited due to the lack of water resources within the Project Area (BLM 2005). Based on a review of the 16 native amphibian species known by the NNHP to occur presently, historically, or temporarily, within the State of Nevada, the Project Area does not possess habitat features that would support any of these species due to the existing disturbance regime and lack of perennial water sources.

### *Fisheries*

No perennial streams or fish habitat occur in the Project Area.

### 3.2.13.2 Environmental Consequences

Direct impacts to wildlife would consist of habitat loss and disturbance from mining activities and noise. Up to 106.6 acres of existing wildlife habitat would be impacted in addition to current authorized surface disturbance associated with Project activities over the life of the mine; however, the majority of these activities are within disturbed areas. Although the current disturbance regime may deter wildlife usage in active areas, some opportunistic species utilize disturbed areas; therefore, wildlife utilizing these previously disturbed areas may be impacted by the expansion activities. Project activities under the Proposed Action, including exploration activities, would have indirect temporary and short-term impacts on wildlife foraging habitat and minimal temporary short-term loss of vegetation. Concurrent reclamation would occur throughout operations (depending on economic conditions), followed by an estimated additional two years for final reclamation. Approximately 17.3 acres related to the expansion of the open pit would not be recontoured or revegetated. Therefore, a Project total of 205.2 acres associated with the open pit would only serve as limited wildlife habitat following mine closure.

Disturbance from human activity, noise, and dust generated from Project activities would impact localized areas within the Project Area. Wildlife foraging activities within the Project Area would continue since the proposed and existing surface disturbance activities only cover approximately 20 percent of the Project Area (1,742.4 acres of 8,411 acres) and some wildlife species that use the area tolerate the disturbance regime. Applicant-Committed Environmental Protection Measures as outlined in Section 2.1.12 would further reduce impacts to wildlife species within the Project Area, with exclusion fences, pre-disturbance bird surveys, and monitoring of the existing bat gates.

## 3.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be approved by the BLM. Homestake would continue mining operations in the Project Area under the existing authorized Plans of Operation (N64-95-001P and NVN-067762). The existing open pit and related operations would not be expanded as outlined in the Proposed Action. Under this alternative, Homestake would continue to recover gold and silver as currently authorized by the BLM and NDEP for the existing Ruby Hill Project. Impacts described and analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34) would continue under the No Action Alternative.

### 3.3.1 Air Quality

Under the No Action Alternative, the existing and authorized mining and related activities within the Project Area would continue to operate under existing permitted air quality objectives. Air emissions, and thus ambient air quality from the existing Project operations, would not be expected to increase over current levels. Protection measures identified in the ROD for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34) would continue. These measures include dust control measures and speed restrictions. Therefore, impacts to air quality under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and

*Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar to impacts under the Proposed Action.

### **3.3.2 Cultural Resources**

Under the No Action Alternative, there would be no impacts to cultural resources. Current management of cultural resources, as identified in the RODs for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33; pages 9, 16-17) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34; pages 8-9) in addition to the PA for the Project (see Section 3.2.2.1), state that if any previously undocumented sites are discovered during construction activities, construction would be immediately halted, the BLM authorized officer would be contacted, and any potential impacts to sites would be properly mitigated. Therefore, impacts to cultural resources under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34) would be similar to impacts under the Proposed Action.

### **3.3.3 Geology and Mineral Resources**

Under the No Action Alternative, impacts associated to geology and mineral resources from the proposed expansion would not occur. Homestake would not extract the ore associated with the Proposed Action, which would leave valuable resources in the ground that would be available for future extraction. No additional removal of ore or overburden from the pit or any other alterations to the topography of the Project Area beyond what is currently authorized (approximately 18 million tons of ore; 190 million tons of overburden) would be permitted. Therefore, impacts to geology and minerals would be similar to but less under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), than under the Proposed Action.

### **3.3.4 Migratory Birds**

Under the No Action Alternative, Homestake would continue existing and authorized operations within the Project Area that may include the removal of migratory bird habitat which would result in indirect impacts. Protection and mitigation measures identified in the ROD for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33; pages 12 and 13) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34; page 6) would continue, which include nesting bird surveys during breeding season prior to surface disturbance of habitat. Direct impacts to migratory birds would be similar under the No Action Alternative and the Proposed Action. However, the introduction of an additional 106.6 acres of surface disturbance under the Proposed Action would result in additional potential habitat removal. Therefore, indirect impacts to migratory birds under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34) would be less than impacts under the Proposed Action.

### **3.3.5 Native American Traditional Values**

Under the No Action Alternative, the BLM MLFO would continue consultation with the local tribes with regards to ongoing Project activities. In May 1995, the following tribes were sent notification letters: Yomba Shoshone Tribal Council; Western Shoshone Defense Project; Duckwater Shoshone Tribe; Battle Mountain Band; Duck Valley Tribal Council; Elko Band; Ely Shoshone Tribe; South Fork Band; Te-Moak Tribe; Wells Band; Nevada Indian Environmental Coalition; Western Shoshone Historic Preservation Society; Western Shoshone National Council; and the Spiritual Leader of the Western Shoshone Nation. Two site visits occurred as a result of these letters. In August 2004, the following tribes were sent notification letters: Yomba Shoshone; South Fork Band; Elko Band; Duckwater Shoshone; Western Shoshone Defense Project; Battle Mountain Band; Wells Band; Te-Moak Tribe; and Ely Shoshone. No response was received by the BLM from the tribes as a result of these letters.

### **3.3.6 Noxious Weeds, Invasive and Nonnative Species**

Under the No Action Alternative, ongoing activities currently permitted in the Project Area would continue to occur and may result in impacts from noxious weeds, invasive and nonnative species. Protection measures identified in the ROD for the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34; page 7) would continue, which would help prevent the proliferation and spread of noxious weeds, invasive and nonnative species. In addition, Homestake would continue to implement their Weed Management Plan for the Project. These measures would continue to be implemented in consultation with the BLM. However, the introduction of an additional 106.6 acres of surface disturbance associated with the Proposed Action would result in additional potential for impacts from noxious weeds, invasive and nonnative species. Therefore, impacts under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar but less than impacts under the Proposed Action.

### **3.3.7 Socioeconomic Values**

Under the No Action Alternative, ongoing mining activities currently permitted in the Project Area would continue to impact socioeconomic values through 2012. The mine would go into closure, which would result in a reduction of approximately 134 employees. The remaining employees would conduct monitoring, reclamation, and closure activities. Fewer employees under the No Action Alternative would result in fewer impacts than the Proposed Action in terms of housing, public services, and government functions, but would result in greater impacts to the economics of the community without the continued purchase and use of goods and services under the Proposed Action, as the viability of these goods and services may be impacted by the reduction in continued purchase and use by the mine employees.

### **3.3.8 Soils**

Under the No Action Alternative, the Proposed Action would not take place; however, Homestake would continue existing and authorized operations. Under the No Action Alternative, impacts to soil resources caused by surface disturbance would be limited to those acres within

the Project Area that have not been previously disturbed, as the No Action Alternative would not redisturb any previously disturbed areas. The impacts of the No Action Alternative compared to the Proposed Action include decreased soil erosion impacts and increased soil stability, increased availability of growth media for use during reclamation, the mixing of existing soil horizons, and the loss of productivity. The Proposed Action would disturb an additional 106.6 acres; therefore, impacts to soils under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar but less than impacts under the Proposed Action.

### **3.3.9 Special Status Species**

The No Action Alternative would have unavoidable impacts to special status species habitat as part of surface disturbance associated with permitted mining operations. Revegetation and reclamation, in addition to protection measures identified in the ROD for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would minimize these impacts. Although similar resource protection measures are outlined in Section 2.1.12 for the Proposed Action, an additional 106.6 acres of potential habitat would be removed. Therefore, impacts under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar but less than the Proposed Action.

### **3.3.10 Vegetation**

Under the No Action Alternative, Homestake would continue to conduct mining and exploration within the approved Project Area through 2012 under this alternative. Ongoing reclamation would help to minimize long-term impacts to vegetation through continuation of current and ongoing activities. The Proposed Action would disturb up to 106.6 additional acres, most of which is in areas that have been previously cleared and disturbed by previous and ongoing mining activities. Therefore, impacts to the loss of vegetation under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), are similar to the impacts under the Proposed Action.

### **3.3.11 Wastes, Hazardous or Solid**

Under the No Action Alternative, Homestake would continue authorized mining operations within the Project Area. The Proposed Action would not change the quantities or types of hazardous materials used; therefore, impacts to wastes, hazardous or solid under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar to impacts under the Proposed Action.

### 3.3.12 Water Resources

#### Surface Water Quality

Under the No Action Alternative, Homestake would maintain or construct diversion channels around all disturbance areas, that would be designed to divert flows from a 100-year, 24-hour storm event. Erosion control measures, including applicable BMPs, would also be implemented as outlined in the SWPPP, and concurrent reclamation would minimize runoff and sedimentation. The Proposed Action would result in an additional 106.6 acres of surface disturbance within the Project Area; however, Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 provide similar protection for surface water quality impacts as the measures provided for the No Action Alternative. Therefore, surface water quality impacts under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), are anticipated to be similar to those under the Proposed Action.

#### Surface Water Quantity

Under the No Action Alternative, Homestake would continue authorized mining operations within the Project Area. According to the discussion in the *2005 Ruby Hill Mine Expansion – East Archimedes Project SEIS*, there would be no impacts to seeps or springs from the No Action Alternative, as the nearest seep is located 0.75 mile from the Project Area, and springs are located greater than one mile from the Project Area. All seeps and springs previously identified within three miles of the Project Area are above the ground water table and are upgradient of the Project Area (BLM 2005; Section 3.4.2.1). No impacts to surface water resources have been reported related to the existing operations. Therefore, no impacts to surface water quantity are expected under the No Action Alternative.

#### Ground Water Quality

Under the No Action Alternative, the water quality associated with the pit lake is expected to meet all Nevada ground water standards (see Section 3.2.12.1). Ground water quality monitored as part of the WPCP requirements would continue to meet permit water quality standards. Therefore, impacts to ground water from the No Action Alternative are as described in the *2005 Ruby Hill Mine Expansion – East Archimedes Project SEIS*. Impacts to ground water quantity under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar to impacts under the Proposed Action.

#### Ground Water Quantity

Under the No Action Alternative, the existing open pit and mine facilities would not be expanded, and ground water pumping would continue at rates of approximately 860 gpm authorized under the *2005 Ruby Hill Mine Expansion – East Archimedes Project SEIS*. Mining was authorized to occur below the existing ground water table under the 2005 ROD. Under the Proposed Action, the existing pit elevation would be lowered by approximately 240 feet;

however, ground water pumping rates are anticipated to be similar to current rates and would not exceed the authorized 1,000 gpm. Therefore, impacts to ground water quantity under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34) would be similar to impacts under the Proposed Action.

### **3.3.13 Wildlife (General)**

Under the No Action Alternative, impacts to wildlife would consist of the continued mining and exploration activities in the Project Area, which would create noise and disturbance to wildlife. Most of the surface disturbance associated with the existing permitted operations would be reclaimed. Surface disturbance subject to revegetation would be seeded with the BLM-approved seed mix that includes native seeds or plants that are compatible with native soils located in the Project Area and include forb and shrub species to provide forage for wildlife. Impacts to wildlife habitat removal under the No Action Alternative, as analyzed in the *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33) and *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34), would be similar to but less than the impacts under the Proposed Action due to the proposed extended life of the operations and additional proposed surface disturbance associated with the Proposed Action. In addition, protection measures identified in the ROD for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33; page 7) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34; pages 6 and 7) would help minimize any potential impacts to wildlife.

## 4 CUMULATIVE EFFECTS

For the purposes of this EA, the cumulative impacts are the sum of all past, present (including proposed actions), and reasonably foreseeable future actions (RFFAs) resulting primarily from mining, commercial activities, and public uses. The purpose of the cumulative analysis in the EA is to evaluate the significance of the Proposed Action's contributions to cumulative impacts. A cumulative impact is defined under federal regulations as follows:

"...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the regulations implementing NEPA, this chapter addresses those cumulative effects on the environmental resources in the Cumulative Effects Study Areas (CESAs), which could result from the implementation of the Proposed Action and No Action Alternative; past actions; present actions; and RFFAs. The extent of the CESA will vary with each resource, based on the geographic or biologic limits of that resource. As a result, the list of projects considered under the cumulative analysis may vary according to the resource being considered. In addition, the length of time for cumulative effects analysis will vary according to the duration of impacts from the Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, 'impacts' and 'effects' are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through the following three steps:

Step 1: Identify, describe and map the CESA for each resource to be evaluated in this chapter.

Step 2: Define time frames, scenarios, and acreage estimates for cumulative impact analysis.

Step 3: Identify and quantify the location of potential specific impacts from the Proposed Action and compare these contributions to the overall impacts.

### 4.1 Introduction

Environmental consequences of the Proposed Action were evaluated previously in Chapter 3 for the various land uses and resources. Discussed in the following sections are the resources that have the potential to be cumulatively impacted by the Proposed Action within the identified CESA. The discussions are based upon the previous analysis of each resource. Based on the preceding analysis, the Proposed Action would not impact or have cumulative impacts on the following resources greater than the current authorized activities in the Project Area: Native American Traditional Values; Wastes (hazardous or solid); and Water Resources (only surface water quantity and ground water quantity). These resources are not discussed further in the cumulative impacts section.

The geographical areas considered for the analysis of cumulative effects vary in size and shape to reflect each evaluated environmental resource and the potential area of impact to each from the Proposed Action as determined through the analysis in Chapter 3. The CESA for air quality is a 50 kilometer buffer around the Project Area and includes approximately 2,229,620 acres.

The CESA for cultural resources and geology and minerals is the Project Area boundary, which includes approximately 8,463 acres. The CESA for migratory birds, special status species, and wildlife consists of approximately 104,887 acres and is defined by a five-mile buffer around the Project Area. The Hydrologic Unit Code 10 (HUC10) watershed encompasses approximately 267,950 acres and is the CESA for noxious weeds, invasive and nonnative species, soils, vegetation, and water resources. The socioeconomic values CESA is Eureka County and includes approximately 2,673,373 acres. Table 4.1-1 outlines the CESA area for each resource analyzed in this section. Figures 4.1.1 and 4.1.2 show the CESA boundaries.

**Table 4.1-1: Cumulative Effects Study Areas**

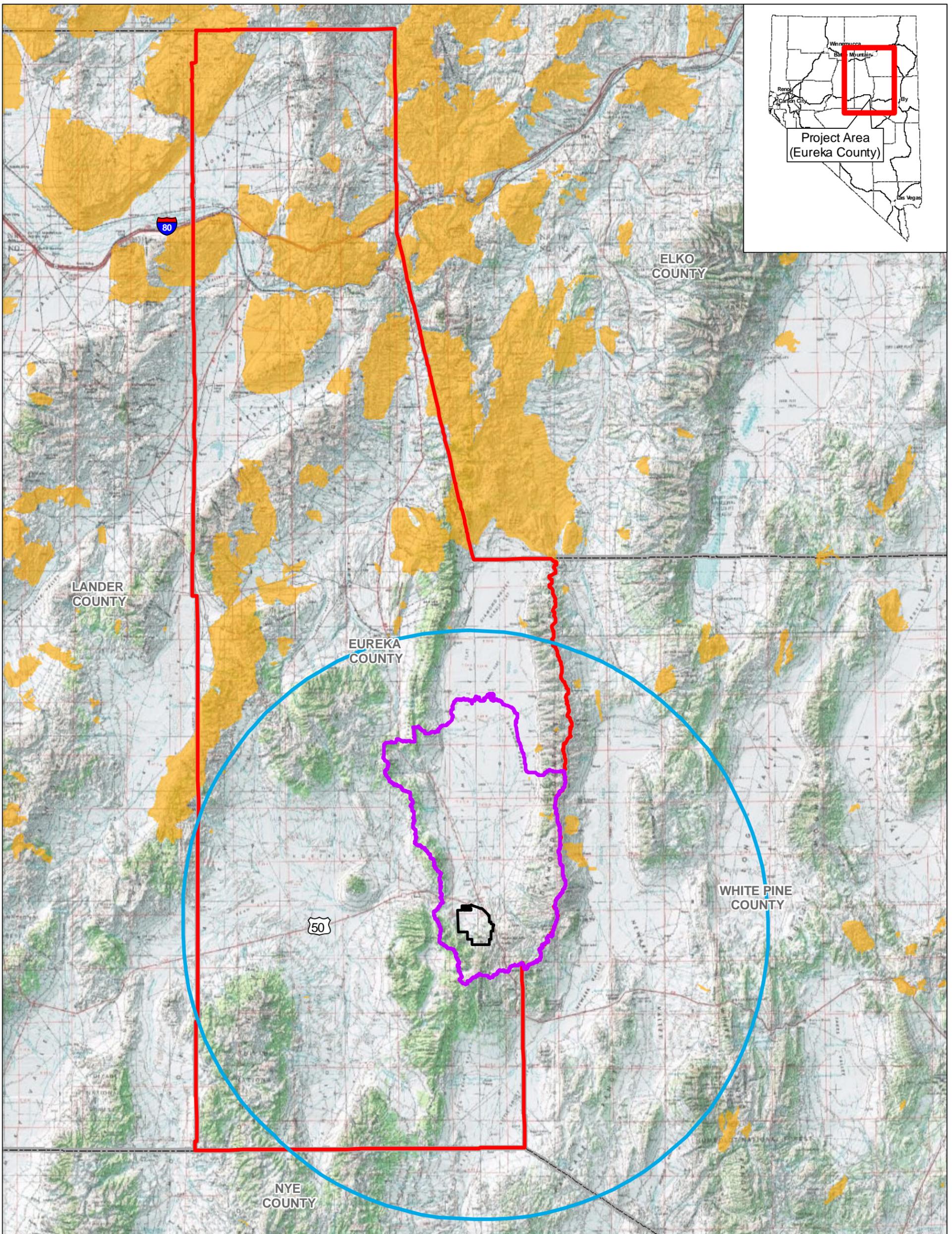
Resource	Cumulative Effects Study Area (CESA)	Description of CESA	Size of CESA (acres)
Air Quality	Air Quality CESA	50 kilometers around Project Area	2,229,620
Cultural Resources; Geology and Minerals	Geology and Cultural CESA	Project Area	8,463
Migratory Birds; Special Status Species; Wildlife (General)	Wildlife CESA	Five miles around Project Area	104,887
Noxious Weeds, Invasive and Nonnative Species; Soils; Vegetation; Water Resources	Watershed CESA	HUC 10 Lower Slough Creek-Frontal Diamond Valley Watershed	267,950
Socioeconomic Values	Socioeconomic Values CESA	Eureka County	2,673,373

**4.2 Past and Present Actions**

Past and present actions in the CESAs include the following: livestock grazing and range improvements; wildland fires; wildlife and game habitat management; fire treatments; dispersed recreation; agricultural activities; wood-cutting; utility and other rights-of-way (ROWs); mineral exploration; and mining.

**Livestock Grazing and Range Improvements**

The Wildlife CESA encompasses the following grazing allotments: Arambel; Black Point; Fish Creek Ranch; Lucky C; Newark; Romano; Ruby Hill; Shannon Station; Spanish Gulch; and Willow Race Track. In addition to those allotments, the Watershed CESA encompasses the following additional allotments: Diamond Springs; North Diamond; Roberts Mountain; Strawberry; Three Mile; and Warm Springs.



**Explanation**

-  Project Boundary
-  Air Quality CESA
-  Socioeconomic Values CESA
-  Watershed CESA *(CESA for Noxious Weeds, Invasive and Nonnative Species, Soils, Vegetation, and Water Resources)*
-  Fire History (1981 - 2011)

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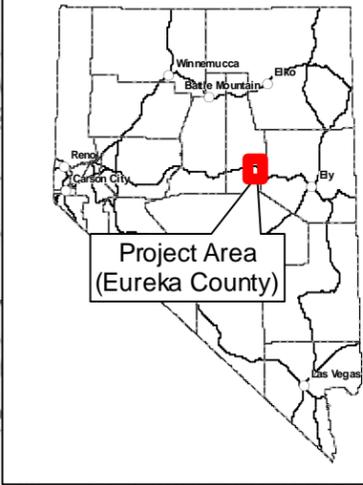
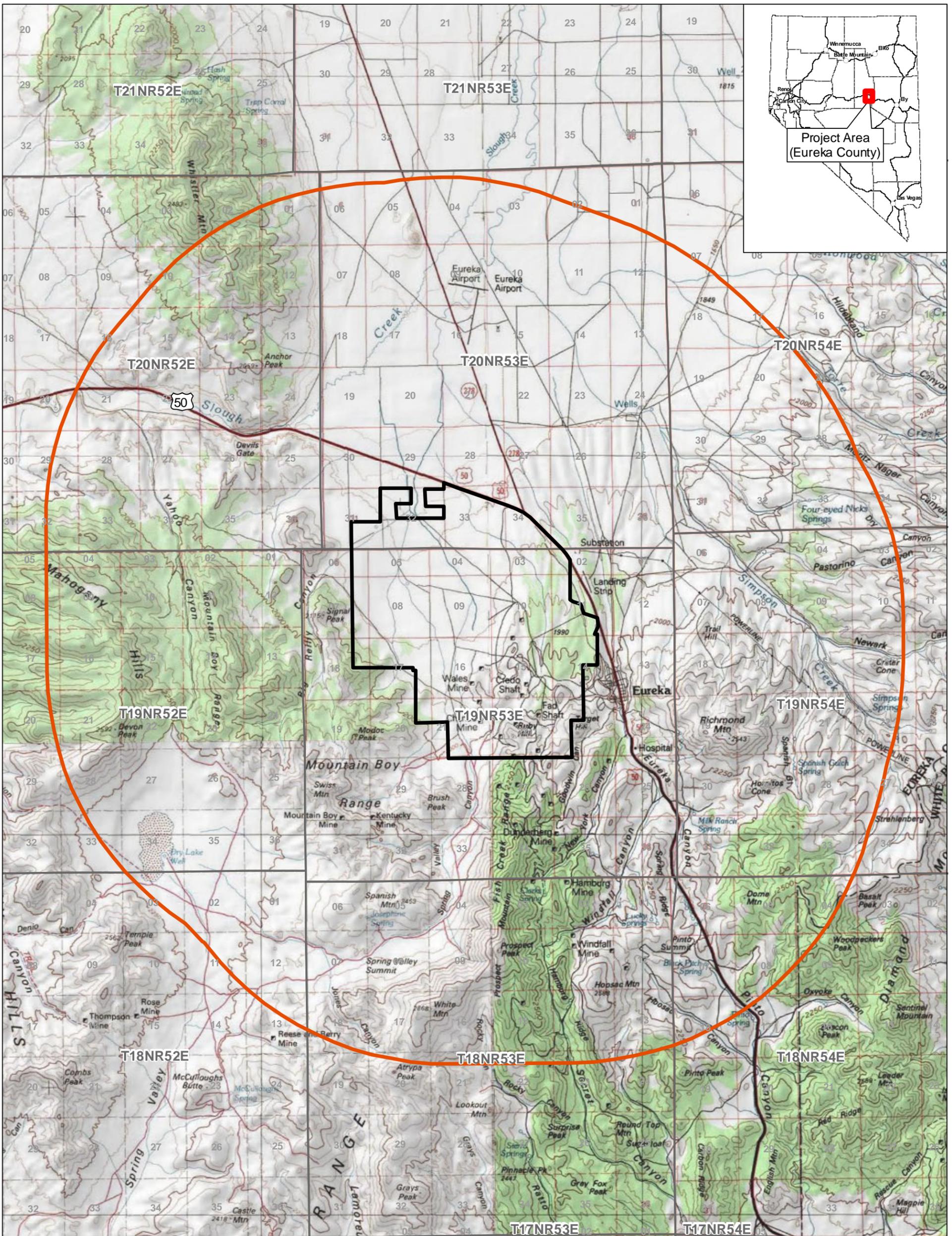
**BUREAU OF LAND MANAGEMENT**

**RUBY HILL PROJECT**

**Large Scale  
 Cumulative Effects Study Areas**

Figure 4.1.1

07/26/2012



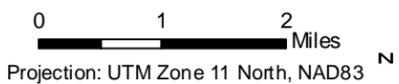
**Explanation**

- Geology and Cultural CESA / Project Boundary
- Wildlife CESA (CESA for Migratory Birds, Special Status Species, and Wildlife (General))

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Projection: UTM Zone 11 North, NAD83

**BUREAU OF LAND MANAGEMENT**

**RUBY HILL PROJECT**  
 Small Scale  
 Cumulative Effects Study Areas

Figure 4.1.2

07/26/2012

In addition to livestock grazing, there are a number of range improvement activities that occur within the Wildlife and Watershed CESAs. Within the Wildlife CESA, there are approximately nine cattle guards, 19 water development projects (mainly troughs), and over 405,000 linear feet of fence line. Within the Watershed CESA, there are approximately 25 cattle guards, 23 water development projects (mainly troughs), and 1,111,900 linear feet of permanent fence line.

### Wildland Fires

Portions of the Air Quality CESA and Watershed CESA have been affected by wildland fires as shown on Figure 4.1.1. Table 4.2-1 summarizes the disturbance acres from historic wildland fires (1981-2011) in these four CESAs. Although there have been no recorded wildland fires in the Geology and Cultural or Wildlife CESAs, fuel reduction projects have occurred, primarily consisting of mowing and thinning activities. Wildland fire disturbance would not impact socioeconomic values, so that CESA was not included in Table 4.2-1.

**Table 4.2-1: Wildland Fire Disturbance Acres in the CESAs**

CESA	Historic Fires (1981-2011) (Acres)
Air Quality CESA	5,780
Geology and Cultural CESA	0
Wildlife CESA	0
Watershed CESA	229

### Wildlife and Game Habitat Management

Research and management of big game and wildlife are undertaken by the NDOW and BLM, and may include modification to existing habitat and rangeland facilities. Hunt units 143, 144, and 145 are included in the Wildlife CESA and hunt units 142, 143, 144, and 145 are included in the Watershed CESA, which would both be impacted by wildlife and game habitat management activities. Mule deer and pronghorn antelope harvest data were supplied by NDOW for 2010 for the hunt units. Hunt Unit 142 had 20 mule deer harvested. Hunt Unit 143 had 30 mule deer and seven pronghorn antelope harvested. Hunt Unit 144 had 88 mule deer harvested. Hunt Unit 145 had 17 mule deer and seven pronghorn antelope harvested (NDOW 2011b).

The Three Bars Sage-Grouse PMU falls within small sections of the Wildlife CESA and the Watershed CESA. Approximately one quarter of the Air Quality CESA encompasses the southern portion of the PMU. Habitat improvement projects including invasive species removal and converting piñon-juniper woodlands to sagebrush habitat are ongoing within this area.

### Recreation

Historic recreational use in the CESAs includes hunting, Christmas tree cutting, pine nut collection, hiking, off-road vehicle usage, and other dispersed recreational activities.

Rights-of-Way

The LR2000 database was used to query the various types of ROWs that have been applied for or approved in the four CESAs (excluding the socioeconomic values CESA) by section, township, and range, and include the following: water and irrigation facilities; telephone; roads and highways; communication; power transmission; wind energy development projects; and other (undefined) ROWs. The acreage of surface disturbance associated with these ROWs cannot be *precisely* quantified; however, it is assumed that these types of ROWs and the construction and maintenance associated with these facilities would create a level of surface disturbance that would contribute to cumulative impacts to various resources. In addition, certain types of ROWs can fragment habitat or create barriers or hazards for wildlife passage. The LR2000 database was queried on March 7 and 8, 2012. Any newly approved ROWs that have been added to the LR2000 database after March 8, 2012, are not included in this analysis. The approximate acreage of each ROW within each CESA associated with these ROWs is listed in Table 4.2-2.

**Table 4.2-2: Past and Present Rights-of-Way Acres in the CESAs**

ROW Type	CESA			
	Air Quality CESA (acres)	Geology and Cultural CESA (acres)	Wildlife CESA (acres)	Watershed CESA
Water/Irrigation Facility	756	56	448	479
Telephone	3,361	1,132	1,423	1,515
Roads/Highway	14,642	3,716	4,025	7,366
Communication	211	17	208	208
Power Transmission	8,856	8,161	8,176	8,377
Wind Energy Development	15,652	0	9,329	14,344
Other	359	23	23	24
<b>TOTAL</b>	<b>43,837</b>	<b>13,105</b>	<b>23,632</b>	<b>32,313</b>

Mineral Exploration and Mining

The LR2000 database was used to query the past and present mineral exploration or mining activities (authorized Notices, closed Notices, authorized and closed plans of operation) that have been issued in the five CESAs by section, township, and range. Past and present mineral development and exploration activities within the four CESAs include the following: mining and exploration plans of operation; exploration Notices; and sand and gravel extraction operations. Table 4.2-3 is a summary of the past and present mineral activities within each CESA and is based on the LR2000 database used by the BLM. The LR2000 database was queried on March 7 and 8, 2012; therefore, any newly approved mineral exploration and mining activities that have been added to the LR2000 database after this date are not included in this analysis.

**Table 4.2-3: Past and Present Minerals Disturbance Acres in the CESAs**

<b>CESA</b>	<b>Authorization Status</b>	<b>Total Acres of Disturbance</b>
<b>Air Quality CESA</b>	Authorized Notices (41)	103
	Closed Notices (383)	670
	Authorized Plans of Operation (7)	2,533
	Closed Plans of Operation (23)	2,817
	Authorized Sand and Gravel Extraction Operations	3,143
	Closed Sand and Gravel Extraction Operations	568
	<b>Air Quality CESA Total</b>	<b>9,834</b>
<b>Geology and Cultural CESA</b>	Authorized Notices (1)	1
	Closed Notices (18)	38
	Authorized Plans of Operation (1)	745
	Closed Plans of Operation (2)	174
	Authorized Sand and Gravel Extraction Operations	81
	Closed Sand and Gravel Extraction Operations	0
	<b>Project Area CESA Total</b>	<b>1,039</b>
<b>Wildlife CESA</b>	Authorized Notices (5)	15
	Closed Notices (70)	152
	Authorized Plans of Operation (2)	801
	Closed Plans of Operation (6)	205
	Authorized Sand and Gravel Extraction Operations	1,135
	Closed Sand and Gravel Extraction Operations	120
	<b>Wildlife CESA Total</b>	<b>2,428</b>
<b>Watershed CESA</b>	Authorized Notices (7)	21
	Closed Notices (83)	160
	Authorized Plans of Operation (1)	745
	Closed Plans of Operation (6)	201
	Authorized Sand and Gravel Extraction Operations	1,665
	Closed Sand and Gravel Extraction Operations	180
	<b>Watershed CESA Total</b>	<b>2,972</b>

**Reasonably Foreseeable Future Actions**

RFFAs in the Air Quality CESA include livestock grazing, fire management, wildland fire, wildlife and game habitat management including the 3-Bars Ecosystem and Landscape Restoration Project, ROW maintenance, mineral exploration and mining, and dispersed recreation.

RFFAs in the Geology and Cultural CESA include fire management, mineral exploration and mining, and ROW maintenance.

RFFAs in the Wildlife CESA include livestock grazing, fire management, wildlife and game habitat management including the 3-Bars Ecosystem and Landscape Restoration Project, mineral exploration and mining, ROW maintenance, and dispersed recreation.

RFFAs in the Watershed CESA include livestock grazing, fire management, wildland fire, wildlife and game habitat management including the 3-Bars Ecosystem and Landscape

Restoration Project, mineral exploration and mining, ROW maintenance, and dispersed recreation.

RFFAs in the Socioeconomic CESA include livestock grazing, agriculture, utilities, roads, mining and mineral exploration, recreation, land development (including land sales), and oil, gas, and geothermal development. The extent of the impact from these actions would depend on the size and type of the projects. These actions would tend to increase the significant cumulative impact to socioeconomic values.

### **4.3 Cumulative Impact Analysis**

#### **4.3.1 Air Quality**

The CESA for air quality is the Air Quality CESA, which includes approximately 2,229,620 acres and is shown on Figure 4.1.1.

*Past and Present Actions:* Past and present actions that have the potential to impact air quality included livestock grazing, fire management, mineral exploration and mining, ROW construction and maintenance, and dispersed recreation that disturbed or impacted soils creating fugitive dust or that have the potential to generate emissions. Soil disturbance may also have been associated with wildland fires; however, fire rehabilitation and natural revegetation have potentially occurred, stabilizing soil. There are no specific data that quantify air quality impacts from grazing, roads, ROWs, or recreation.

Historic fires (1981-2011) have burned approximately 5,780 acres in the Air Quality CESA (0.3 percent of the CESA). Authorized and closed mineral exploration and mining Notices or plans of operation, as well as sand and gravel operations, total approximately 9,834 acres (0.4 percent of the CESA) of surface disturbance. There are no data on the number of acres reclaimed. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, have become naturally stabilized, and have naturally revegetated over time. Approximately 43,837 acres of ROWs were issued within the Air Quality CESA that had the potential to create fugitive dust or emissions. The CESA includes NDOW Hunt Units 106, 131, 142-145, 155, and 161-164. Portions of the Christmas tree cutting area and pine nut collection area are located within the CESA. The impacts associated with these activities have the potential to create surface disturbance and contribute to soil erosion and degradation of access roads leading to fugitive dust. However, most of these impacts are temporary in nature, ceasing when road travel and other activities stop.

*RFFAs:* Livestock grazing, fire management, wildland fire, wildlife and game habitat management, ROW construction and maintenance, mineral exploration and mining, and dispersed recreation have the potential to continue to occur within the Air Quality CESA and have the potential to impact air quality. There are approximately 16,114 acres of pending minerals projects, approximately ten acres of pending sand and gravel extraction projects, and approximately 424 acres of pending ROW projects reported in LR2000 in the Air Quality CESA.

#### 4.3.1.1 Proposed Action

Impacts to air quality from the Proposed Action would be limited to particulate and combustion emissions and fugitive dust. The incremental contribution of the Proposed Action's particulate and combustion emissions and fugitive dust to the cumulative air quality environment would be relatively small compared to the existing cumulative air environment and the cumulative emissions are generally dispersed. Stationary sources would be regulated by the NDEP BAPC under individual permits to ensure that impacts would be reduced to levels that are consistent with the ambient air quality standards. Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 help minimize the potential effects of fugitive dust on air quality.

#### 4.3.1.2 No Action Alternative

Under the No Action Alternative, incremental cumulative impacts to air quality within the CESA would result from past, present, and RFFAs; however, the incremental contribution of this alternative is less than the Proposed Action because there is less surface disturbance. The cumulative emissions are generally dispersed and the stationary sources would be regulated by the BAPC to ensure that impacts would be reduced to levels that are consistent with the ambient air quality standards.

### **4.3.2 Cultural Resources**

The CESA for cultural resources is the Geology and Cultural CESA, which includes approximately 8,463 acres and is shown in Figure 4.1.2.

*Past and Present Actions:* Most past actions did not consider potential effects to cultural resources. Projects and development disturbances conducted prior to 1966 (i.e., prior to NHPA) or those activities without a federal or state nexus generally did not identify or quantify cultural resource sites or impacts to them. Modern human activity tends to exacerbate the damage and consequently, cultural resources are being damaged and disappearing at an increasing rate. Many of the cultural resources in the CESA exhibit impacts resulting from modern use of the land.

Given that eligibility determinations are based primarily on sites' surface characteristics, there is room for error given that surface manifestations do not always accurately reflect the nature and density of subsurface deposits. Other factors at play are the differences of opinion among professional archaeologists as to what research (and therefore archaeological sites) is important, and the evolving nature of archaeological research. In some cases, sites now thought to be lacking the ability to answer important questions may become important as archaeological method and theory progress but may not be preserved. The courts have determined that cultural resource management standards such as those employed for the current project meet the objectives of the NHPA and other pertinent statutes, but this does not necessarily imply that there are not project-specific or cumulative losses of cultural resources or information important to understanding the past.

Past and present activities within the Geology and Cultural CESA that have the potential to create surface disturbance and contribute to degradation of cultural artifacts include the following: authorized and closed mineral exploration or mining disturbance; sand and gravel extraction activities; and ROWs. Quantification of these activities would be difficult, as the

CESA boundary encompasses just the Project Area and not any adjacent areas. Any activity occurring within Ruby Hill would continue and have the possibility of contributing to the degradation of cultural artifacts.

*RFFAs:* Mineral exploration and mining activities, including mine reclamation, are likely to continue within the Geology and Cultural CESA.

#### 4.3.2.1 Proposed Action

Any potential impacts to cultural resources from the Proposed Action would be localized to the Project Area and minimized through the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12. All known-eligible and unevaluated properties identified within the CESA would be mitigated in accordance with the PA prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no mitigation or monitoring is recommended outside of the indirect and direct effect area that is outside of the proposed Project Area boundary. Therefore, cumulative impacts important to cultural resources are expected to be minimal.

#### 4.3.2.2 No Action Alternative

All known-eligible and unevaluated properties identified within the CESA would be mitigated in accordance with the PA prepared for the Project. Therefore, cumulative impacts important to cultural resources are expected to be minimal as a result of the No Action Alternative as described in the 2005 SEIS.

### 4.3.3 **Geology and Minerals**

The CESA for geology and minerals is the Geology and Cultural CESA, which includes approximately 8,463 acres and is shown in Figure 4.1.2.

*Past and Present Actions:* Past and present actions that could have impacted geology and minerals include primarily mining-related actions. Most past mining operations within the CESA consisted of exploration and open pit mining. Present actions are surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources. Quantifiable past and present surface disturbance from mining-related actions within the Geology and Cultural CESA include approximately 1,636 acres.

*RFFAs:* Mineral exploration and mining activities are likely to continue within the Geology and Cultural CESA.

#### 4.3.3.1 Proposed Action

The Proposed Action would include mining at an average rate of approximately 100,000 tons per day. Considering both permitted reserves and the anticipated reserves associated with the Project, an estimated 14 million tons of ore would be available to open pit gold mining and heap leach processing associated with the expanded open pit. The removal of approximately 4.1 million tons of ore would be associated with the implementation of the Proposed Action. Cumulative impacts

of the Proposed Action on geologic and mineral resources would include the permanent continued removal of ore-grade material.

#### 4.3.3.2 No Action Alternative

Under the No Action Alternative, impacts associated to geology and mineral resources from the proposed expansion would not occur. Homestake would not extract the ore associated with the Proposed Action, which would leave valuable resources in the ground that would not be distributed to commerce. No additional removal of ore or overburden from the open pit or any other alterations to the topography of the Project Area beyond what is currently authorized (approximately 18 million tons of ore; 190 million tons of overburden) would be permitted. Therefore, cumulative impacts to geology and minerals would be similar to but less under the No Action Alternative than under the Proposed Action.

#### 4.3.4 **Migratory Birds**

The CESA for migratory birds is the Wildlife CESA, which includes approximately 104,887 acres and is shown on Figure 4.1.2.

*Past and Present Actions:* Past and present actions that could have impacted migratory birds include livestock grazing and range improvements, wildlife and game habitat management, fire treatments, dispersed recreation, utility and other ROWs, sand and gravel extraction activities, mineral exploration, and mining. Impacts to migratory birds have resulted from the following: 1) destruction of habitat associated with building roads and clearing vegetation; 2) disruption from human presence or noise from drill rigs, water trucks and four wheel drive pickups; or 3) direct impacts or harm to migratory birds that would result if trees and shrubs containing viable nests were cut down or ground nests destroyed by construction or ranching equipment. There are no specific data that quantify impacts to migratory birds as a result of grazing or recreation. However, impacts to migratory birds from recreation activities would include destruction of native vegetation or nesting areas from off road vehicles that traveled off of established roadways. Impacts to migratory birds from grazing include trampling of vegetation or nesting areas near streams, springs, or riparian areas within the Wildlife CESA.

Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,428 acres (approximately two percent of the CESA) of surface disturbance. Approximately 23,632 acres of ROWs were issued within the Wildlife CESA that had the potential to create surface disturbance and disturb migratory bird habitat and vegetation. Approximately 53,287 acres of the Christmas tree cutting area and 70,403 acres of the pine nut collection area are within the CESA. The CESA is also comprised of the NDOW Hunt Units 143, 144, and 145, which have the potential to create noise and disturbance to migratory birds, remove or alter habitat. The Wildlife CESA encompasses the following grazing allotments: Arambel; Black Point; Fish Creek Ranch; Lucky C; Newark; Romano; Ruby Hill; Shannon Station; Spanish Gulch; and Willow Race Track. Livestock grazing and associated management contributes to the spread of invasive species which can have an indirect effect on migratory birds. However, disturbance to migratory birds from past and present actions would have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species. The past and present actions that are quantifiable have disturbed a relatively large portion of the CESA, approximately 25 percent. There are no data on

the number of acres reclaimed. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized or have naturally revegetated over time.

*RFFAs*: Potential impacts to migratory birds from grazing, dispersed recreation, roads, ROWs, minerals activities, or loss of native vegetation associated with potential wildland fires could occur. There is no way to quantify acreage of the potential impacts to migratory birds or their habitat as a result of dispersed recreation, grazing, or potential wildland fires within the CESA. There are approximately 16 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Wildlife CESA. These pending minerals projects are all required to incorporate protection measures for migratory birds and, therefore are not expected to directly harm migratory birds, but may result in habitat removal or alteration. The 3-Bars Ecosystem and Landscape Restoration Project focuses on improving vegetation conditions and avian habitat, thereby creating a beneficial impact to migratory birds in the Wildlife CESA.

#### 4.3.4.1 Proposed Action

Impacts to migratory birds and their habitat from the Proposed Action would be limited to the removal of vegetation or habitat (up to 106.6 acres), and noise associated with mining activities. These impacts would be localized and minimized due to implementation of the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and mitigation measures required by the BLM (e.g., migratory bird survey during nesting season to comply with the MBTA). The Proposed Action would affect approximately 0.1 percent of migratory bird habitat within the Wildlife CESA.

Quantifiable past and present actions and RFFA disturbance for the Wildlife CESA is approximately 26,489 acres, which is an impact to approximately 25 percent of the total Wildlife CESA (104,887 acres). However, based on the above analysis and findings, incremental impacts to migratory birds as a result of the Proposed Action, when compared with the impacts from the past and present actions and RFFAs, are expected to be minimal (0.4 percent).

#### 4.3.4.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance within the Wildlife CESA is approximately 26,489 acres, which is an impact to approximately 25 percent of migratory bird habitat within the Wildlife CESA. However, the incremental impacts to migratory birds or their habitat from the No Action Alternative, when compared with the impacts from the past and present actions and RFFAs, would be minimal. In addition, protection measures identified in the ROD for the original *Ruby Hill Project Final Environmental Impact Statement* (NV64-EIS96-33; pages 12 and 13) and the *Ruby Hill Mine Expansion – East Archimedes Project Final Supplemental Environmental Impact Statement* (NV063-EIS04-34; page 6) would help minimize any potential impacts to migratory birds.

### 4.3.5 **Noxious Weeds, Invasive and Nonnative species**

The CESA for Noxious Weeds, Invasive and Nonnative Species is the Watershed CESA, which includes 267,950 acres and is shown on Figure 4.1.1.

*Past and Present Actions:* Past and present actions with impacts created from noxious weeds, invasive and nonnative species include mineral exploration, mining, sand and gravel extraction operations, wildland fires, ranching operations (grazing), ROW and road construction and maintenance, or dispersed recreation that could have disturbed vegetation and soils creating an opportunity for invasive plant colonization and introduced noxious weed seeds.

Historic fires (1981-2011) have burned approximately 229 acres in the Watershed CESA (0.1 percent of the CESA). Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,972 acres (approximately 1.1 percent of the CESA) of surface disturbance. There are no data on the number of acres reclaimed. State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed, become naturally stabilized or have naturally revegetated over time. Approximately 32,312 acres of ROWs were issued within the Watershed CESA. These ROWs have the potential to create surface disturbance and introduce noxious weeds and invasive species. The CESA includes NDOW Hunt Units 142-145 and approximately 56,867 acres of the Christmas tree cutting area and 117,542 acres of the pine nut collection area are located within the CESA. The activities associated with hunting, tree cutting, and pine nut collection have the potential to create surface disturbance and associated off road vehicular traffic, which can introduce noxious weeds and invasive species. The Watershed CESA encompasses the following grazing allotments: Arambel; Black Point; Diamond Springs; Fish Creek Ranch; Lucky C; Newark; North Diamond; Roberts Mountains; Romano; Ruby Hill; Shannon Station; Spanish Gulch; Strawberry; Three Mile; Warm Springs; and Willow Race Track. Livestock grazing and associated management contributes to the spread of noxious weeds and invasive species.

*RFFAs:* Potential impacts from noxious weeds, invasive and nonnative species as a result of grazing, dispersed recreation including Christmas tree cutting, roads, ROWs, minerals activities, or loss of native vegetation associated with potential wildland fire could occur. There are approximately 8,325 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Watershed CESA. There are no specific data on the potential impacts resulting from noxious weeds or invasive and nonnative species due to dispersed recreation, grazing, or potential wildland fires. The 3-Bars Ecosystem and Landscape Restoration Project which focuses on improving vegetation conditions may reduce the spread of noxious weeds and treat existing populations, thereby creating a beneficial impact in the Watershed CESA.

#### 4.3.5.1 Proposed Action

A total of the quantifiable past and present actions and RFFA disturbance that may contribute to the introduction or spread of invasive species within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA (267,950 acres). The Proposed Action (106.6 acres) would impact 0.04 percent of the CESA. The past and present actions and RFFAs in combination with the Proposed Action would result in potential impacts from noxious weeds or invasive and nonnative species that would be limited to infestations following removal or disturbance of vegetation. The potential incremental impacts from the Proposed Action would be minimized due to the implementation of Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and continued implementation of the Project's weed management plan. As a result, a minimal

incremental impact from noxious weeds or invasive and nonnative species in the Watershed CESA would be expected.

#### 4.3.5.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance that may contribute to the introduction or spread of invasive species within the Watershed CESA is approximately 44,252 acres, in which the No Action Alternative (1,635.8 acres) would equal approximately 3.7 percent of the total disturbance within the Watershed CESA. Potential impacts from noxious weeds, invasive and nonnative species result from limiting infestations to exposed soil following removal of vegetation. These impacts would be localized. Therefore, incremental impacts from noxious weeds, invasive and nonnative species as a result of the No Action Alternative, when combined with the disturbance activities of past and present actions and RFFAs, are not expected to be substantial. In addition, the continued implementation of the Project's Noxious Weed Management Plan (SRK 2010) would reduce any impacts from continued operations related to the No Action Alternative.

#### 4.3.6 **Socioeconomic Values**

The CESA for socioeconomic values is the Socioeconomic Values CESA, which includes 2,673,373 acres and is shown on Figure 4.1.1.

*Past and Present Actions:* Past and present actions within the Socioeconomics CESA include the following: grazing and agriculture; utilities and infrastructure; wildland fires; recreation; mineral development and exploration; and wind energy development. Impacts to socioeconomic from these activities include increased population, increased demand for public services, increased employment opportunities, increased revenues within the CESA, and increased expenditures by the communities within the CESA. The extent of these impacts vary with the type of activity and have not been quantified; however, the majority of the impacts from past and present activities do not have any ongoing impacts and are considered to be part of the existing social and economic climate within the CESA. Mining projects play an important role in the social and economic climate in the CESA. Some of the major existing mines and exploration projects in the CESA besides the existing Ruby Hill include the following: the Newmont South Operations Area Project; the Barrick Goldstrike Mine; the Genesis-Bluestar Mine; the Carlin Mine; the Mule Canyon Mine; the Bootstrap-Capstone-Tara Gold Mine; the Leeville Mine; and the Tonkin Springs Mine.

*RFFAs:* Socioeconomic impacts would result from the following RFFAs: grazing and agriculture; utilities and infrastructure; wildland fires; recreation; and mineral development and exploration. Specific projects that are planned include power generation facilities and mineral exploration plans of operation and notices. One of the major pending mining and exploration projects in the CESA, which would highly impact the cumulative environment, is the Mount Hope project proposed on both public and private lands in Eureka County. The Mount Hope Project would have approximately an 18-month construction phase, 44 years of mining and ore processing, 30 years of reclamation, and five years of post-closure monitoring. The Mount Hope Project would employ up to an estimated peak of 615 contracted personnel during the construction phase, and up to 455 employees through 2064. Most of the employees would reside in Eureka, as well as the surrounding communities of Elko and Carlin.

#### 4.3.6.1 Proposed Action

The identified projects within the CESA, including the Proposed Action, would have an impact on socioeconomic values. Although the Proposed Action would result in the extension of the life of the existing Ruby Hill through 2016, or later dependent upon mining and economic conditions, Homestake would maintain the current work force of approximately 147 employees for mining, processing operations, and concurrent reclamation, and would not add any additional employees under the Proposed Action. Therefore, the Proposed Action's contribution to the cumulative environment when added to past and present actions and RFFAs in the Socioeconomic Values CESA, including the cumulative impacts resulting from the Mount Hope Project, would be minimal.

#### 4.3.6.2 No Action Alternative

Under the No Action Alternative, the expansion of Ruby Hill would not be approved and ongoing mining activities currently permitted in the Project Area would continue to impact socioeconomic values through 2012. The mine would go into closure, which would result in a reduction of approximately 134 employees. Therefore, the No Action Alternative's contribution to the cumulative environment when added to past, present, and RFFAs in the Socioeconomic Values CESA, including the cumulative impacts resulting from the Mount Hope Project, would be minimal.

### 4.3.7 **Soils**

The CESA for soils is the Watershed CESA, which includes 267,950 acres and is shown on Figure 4.1.2.

*Past and Present Actions:* Past and present actions that could have impacted soils include livestock grazing, fire management, mineral exploration and mining, sand and gravel extraction operations, ROW construction and maintenance, and dispersed recreation that disturbed or impacted soils, or that increased erosion or sedimentation. Soil disturbance may also have been associated with wildland fires; however, fire rehabilitation and natural revegetation have potentially occurred, stabilizing soil loss. Impacts from these activities include loss of soils productivity due to changes in soil physical properties, soil fertility, soil movement in response to water and wind erosion, and loss of soil structure due to compaction.

Historic fires (1981-2011) have burned approximately 229 acres in the Watershed CESA (approximately 0.1 percent of the CESA). Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,972 acres (approximately 1.1 percent of the CESA) of surface disturbance. As required by state and federal regulations some of the closed areas have been reclaimed, become naturally stabilized or have naturally revegetated over time. There are also ongoing revegetation efforts within the CESA which total over 16,000 acres, including aerial seeding, chaining, chemical treatments, drill seeding, hand broadcast seeding, as well as prescribed burns and reseeding projects. Mowing, thinning, seeding, and prescribed fires are methods of fuel treatment that also occur in the CESA, totaling approximately 13,065 acres. Approximately 32,312 acres of ROWs were issued within the Watershed CESA that had the potential to create surface disturbance. The CESA includes NDOW Hunt Units 142-145 and approximately 56,867 acres of the Christmas tree cutting area and 117,542 acres of the pine nut collection area are located

within the CESA. The activities associated with these activities have the potential to create surface disturbance and contribute to soil erosion and degradation of access roads.

*RFFAs:* Potential impacts to soils could result from grazing, dispersed recreation, roads, wildfires, ROWs, and minerals activities. There are approximately 8,325 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Watershed CESA. The 3-Bars Ecosystem and Landscape Restoration Project may have temporary impacts or disturbance to soils as this project is primarily focused on improving vegetation conditions for native wildlife species and may involve removing undesirable plant species. There are no specific data on the potential impacts to soils from dispersed recreation, grazing, vegetation improvement activities, or potential wildfires. Impacts associated with RFFAs would be similar to the impacts described for past and present actions.

#### 4.3.7.1 Proposed Action

A total of the quantifiable past and present actions and RFFA disturbance within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA (267,950 acres). The Proposed Action (106.6 acres) would impact 0.04 percent of the CESA. Surface disturbance would increase the potential for erosion of soils. Impacts would be reduced with the implementation of Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and BMPs. Incremental impacts to soils from the Proposed Action, when combined with past and present actions and RFFAs, would be minimal.

#### 4.3.7.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA. The incremental impacts to soils as a result of the No Action Alternative in combination with past and present actions and RFFAs would be minimal.

### 4.3.8 **Special Status Species**

The CESA for Special Status Species is the Wildlife CESA, which includes 104,887 acres and is shown in Figure 4.1.2.

*Past and Present Actions:* Past and present actions that could have impacted special status species include livestock grazing, fire management, mineral exploration, mining, sand and gravel extraction operations, ROW construction and maintenance, dispersed recreation, agriculture, pine nut collecting, and Christmas tree cutting. These activities had the potential to have impacted water resources and wildlife habitat, or result in direct impacts to individuals in travel routes. Natural threats to greater sage-grouse habitat within the CESA include wildland fires and piñon-juniper encroachment. Impacts to special status species from these activities include loss of forage, cover, and habitat, as well as disturbance of mating and brood rearing practices.

Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,429 acres (approximately two percent of the CESA) of surface disturbance. As required by state and federal regulations some of the closed areas have been reclaimed, become naturally stabilized or have naturally revegetated over time. Approximately 23,631 acres of ROWs were issued within the Wildlife

CESA that had the potential to create surface disturbance and disturb habitat and vegetation. The CESA is comprised of the NDOW Hunt Units 143, 144, and 145, and approximately 53,287 acres of the Christmas tree cutting area and 70,403 acres of the pine nut collection area occur in the CESA, which have the potential to create noise and disturbance affecting special status wildlife species and remove or alter habitat affecting sensitive plants or wildlife. There are no specific data that quantify the acreage of impacts to special status species habitat that have resulted from grazing or dispersed recreation within the CESA. Disturbance to special status species habitat from past and present actions may have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species; however, reclamation activities did not necessarily always occur on old mine sites, resulting in continued impacts to special status species. The past and present actions that are quantifiable have disturbed approximately 25 percent of the CESA.

*RFFAs*: Potential impacts to special status species from grazing, dispersed recreation, roads, ROWs, minerals activities or loss of native vegetation associated with potential wildland fires could occur. There is no way to quantify the potential impacts to sensitive species or their habitat as a result of dispersed recreation, grazing, or potential wildland fires. There are approximately 16 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Wildlife CESA. These pending minerals projects all are required to incorporate protection measures and mitigation measures for special status species. The 3-Bars Ecosystem and Landscape Restoration Project focuses on improving vegetation conditions for sensitive wildlife species including the greater sage-grouse and would have a positive effect on particular sensitive species within the Wildlife CESA.

#### 4.3.8.1 Proposed Action

Quantifiable past and present actions and RFFA surface disturbance within the Wildlife CESA is approximately 26,489 acres, which is an impact to approximately 25 percent of the total Wildlife CESA (104,887 acres). The Proposed Action (106.6 acres) would impact 0.1 percent of the CESA. Due to the small impact within the Wildlife CESA from the Proposed Action, the incremental impacts to special status species' habitat from the Proposed Action in combination with past and present actions and RFFAs would be minimal. Impacts would also be reduced with the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12.

#### 4.3.8.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance within the Wildlife CESA is approximately 26,489 acres, which is an impact to approximately 25 percent of the Wildlife CESA. However, due to the small impact as a result of the No Action Alternative, the incremental impacts to special status species or their habitat from this alternative in combination with past and present actions and RFFAs, would be minimal.

### 4.3.9 **Vegetation**

The CESA for vegetation is the Watershed CESA, which includes 267,950 acres and is shown in Figure 4.1.1.

*Past and Present Actions:* Past actions that could impact vegetation would have included livestock grazing, fire management, mineral exploration and mining, sand and gravel extraction operations, ROW construction and maintenance, and dispersed recreation.

Historic fires (1981-2011) have burned approximately 229 acres in the Watershed CESA (0.1 percent of the CESA). Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,972 acres (approximately 1.1 percent of the CESA) of surface disturbance. As required by state and federal regulations some of the closed areas have been reclaimed, become naturally stabilized or have naturally revegetated over time. There are also ongoing revegetation efforts within the CESA which total over 16,000 acres, including aerial seeding, chaining, chemical treatments, drill seeding, hand broadcast seeding, as well as prescribed burns and reseeding projects. Mowing, thinning, seeding, and prescribed fires are methods of fuel treatment that also occur in the CESA, totaling approximately 13,065 acres. Approximately 32,312 acres of ROWs were issued within the Watershed CESA that had the potential to create surface disturbance. The CESA includes NDOW Hunt Units 142-145 and approximately 56,867 acres of the Christmas tree cutting area and 117,542 acres of the pine nut collection area are located within the CESA. The activities associated with hunting, tree cutting, and pine nut collection have the potential to create surface disturbance and vehicles can introduce invasive species and trample vegetation.

*RFFAs:* Potential impacts to vegetation could result from grazing, dispersed recreation, roads, wildfires, ROWs, and minerals activities. There are approximately 8,325 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Watershed CESA. There is no way to quantify the potential impacts to vegetation from dispersed recreation, grazing, or potential wildfires. Impacts associated with RFFAs would be similar to the impacts described for past and present actions. However, the 3-Bars Ecosystem and Landscape Restoration Project focuses on improving vegetation conditions and would have a positive effect on vegetation communities within the Watershed CESA.

#### 4.3.9.1 Proposed Action

A total of the quantifiable past and present actions and RFFA disturbance within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA (267,950 acres). The Proposed Action (106.6 acres) would impact 0.04 percent of the CESA. The impacts to vegetation from the Proposed Action in combination with past and present actions and RFFAs would be minimal. Impacts would also be reduced with the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12.

#### 4.3.9.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance within the Watershed CESA is 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA. Therefore, incremental impacts to vegetation within the Watershed CESA from this alternative, in combination with past and present actions and RFFAs, would be minimal.

#### 4.3.10 Water Resources

The CESA for water resources is the Watershed CESA, which includes 267,950 acres and is shown on Figure 4.1.1.

Cumulative impacts to surface water quality and ground water quality are discussed below.

##### *Surface Water Quality*

*Past and Present Actions:* Past actions that could have impacts to surface water quality would have included livestock grazing, fire management, mineral exploration and mining, sand and gravel extraction operations, ROW construction and maintenance, and dispersed recreation.

Historic fires (1981-2011) have burned approximately 229 acres in the Watershed CESA (0.1 percent of the CESA). Although wildland fires have burned in the Watershed CESA, there are no specific data that quantify the amount of sedimentation. Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,972 acres (approximately 1.1 percent of the CESA) of surface disturbance. As required by state and federal regulations some of the closed areas have been reclaimed, become naturally stabilized or have naturally revegetated over time decreasing the amount of sediment that reaches the waterways. Approximately 32,312 acres of ROWs were issued within the Watershed CESA that had the potential to create surface disturbance. The CESA includes NDOW Hunt Units 142-145 and approximately 56,867 acres of the Christmas tree cutting area and 117,542 acres of the pine nut collection area are located within the CESA. The activities have the potential to create soil erosion and sedimentation of surface water features.

*RFFAs:* Potential impacts to surface water quality could result from livestock grazing, fire management, wildland fires, minerals activities, ROW maintenance, and dispersed recreation. There are approximately 8,325 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Watershed CESA. There are no specific data on the amount of sedimentation that could result from these activities. However, the mining activities would be required to have spill prevention plans, handle hazardous substances in accordance with NDOT and MSHA, adhere to NAC 534.4369 and 534.4371, and utilize BMPs, thus minimizing impacts to surface water quality.

##### 4.3.10.1 Proposed Action

A total of the quantifiable past and present actions and RFFA disturbance within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA (267,950 acres). The Proposed Action (106.6 acres) would impact 0.04 percent of the CESA. Surface disturbance would increase the potential for erosion and sedimentation in the surface water system. Impacts would also be reduced with the implementation of Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12 and BMPs. Therefore, the incremental impacts to surface water quality from the Proposed Action when combined with past and present actions and RFFAs would be minimal.

#### 4.3.10.2 No Action Alternative

A total of quantifiable past and present actions and RFFA surface disturbance that may contribute to surface water quality impacts within the Watershed CESA is approximately 44,252 acres, which is an impact to approximately 16 percent of the Watershed CESA. The incremental impacts to surface water quality as a result of the No Action Alternative when combined with past and present actions and RFFAs would be minimal.

##### *Ground Water Quality*

*Past and Present Actions:* The past and present actions that would have had the potential to affect ground water quality include primarily mining operations in the Eureka Mining District and from previous mining activities at the existing Ruby Hill. Other past and present actions that could have affected ground water quality include activities associated with the Town of Eureka and agriculture and domestic related activities in the surrounding communities of Diamond Valley, Kobeh Valley, and Pine Valley. All these activities have had the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

*RFFAs:* The RFFAs that have the potential to affect ground water resources include the continued agriculture and domestic related activities in Diamond Valley, Kobeh Valley, and Pine Valley, as well as mining-related actions in the Eureka Mining District. All these activities have the potential to discharge chemicals or materials that could migrate into the ground water and decrease ground water quality.

#### 4.3.10.3 Proposed Action

Any potential cumulative impacts to ground water quality from the Proposed Action, combined with the past and present actions and the RFFAs, would be minimal, based on the above criteria. The only action that has a quantitative assessment of potential ground water quality impacts is the Proposed Action, and as discussed in this EA, those impacts are minimal. The impacts from the activities listed above are not easily quantified, but the Project's contribution to the cumulative environment is considered minimal.

#### 4.3.10.4 No Action Alternative

Based on the conclusions drawn in Chapter 3 of this EA, impacts to ground water quality from the No Action Alternative are minimal and discussed in the 2005 SEIS. The activities listed above are not easily quantified, but the contribution by the No Action Alternative to the cumulative environment is considered minimal.

### **4.3.11 Wildlife (General)**

The CESA for wildlife is the Wildlife CESA, which includes 104,887 acres and is shown in Figure 4.1.2.

*Past and Present Actions:* Past and present actions that could have impacted wildlife and wildlife habitat include livestock grazing, fire management, mineral exploration, mining, sand and gravel

extraction operations, ROW construction and maintenance, dispersed recreation, and wild horse use and wild horse gathers. These activities had the potential to have impacted water resources and wildlife habitat, or result in direct impacts to individuals in travel routes. Impacts to wildlife from these activities include loss of forage, cover, and habitat, as well as disturbance of mating and brood rearing practices.

Authorized or closed mineral exploration and mining Notices or plans of operations, as well as sand and gravel extraction operations, total approximately 2,429 acres (approximately two percent of the CESA) of surface disturbance. As required by state and federal regulations some of the closed areas have been reclaimed, become naturally stabilized or have naturally revegetated over time. Approximately 23,631 acres of ROWs were issued within the Wildlife CESA that had the potential to create surface disturbance and disturb habitat and vegetation. The CESA is comprised of the NDOW Hunt Units 143, 144, and 145, and approximately 53,287 acres of the Christmas tree cutting area and 70,403 acres of the pine nut collection area are in the CESA, which have the potential to create noise and disturbance to wildlife species, and remove or alter habitat. However, disturbance to wildlife from past and present actions would have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species. There are no specific data that quantify the acreage of impacts to wildlife habitat that have resulted from grazing, wild horse use and gathers, or dispersed recreation within the CESA.

*RFFAs:* Potential impacts to wildlife from grazing, dispersed recreation, roads, ROWs, minerals activities or loss of native vegetation associated with potential wildland fires could occur. There is no way to quantify the potential impacts to wildlife or their habitat as a result of dispersed recreation, grazing, or potential wildland fires. There are approximately 16 acres of pending minerals projects and approximately 413 acres of pending ROW projects reported in LR2000 in the Wildlife CESA. These pending minerals projects all are required to incorporate protection measures for wildlife. The 3-Bars Ecosystem and Landscape Restoration Project focuses on improving vegetation conditions for wildlife species and would have a positive effect on wildlife habitat within the Wildlife CESA.

#### 4.3.11.1 Proposed Action

Past and present actions and RFFA disturbance within the Wildlife CESA is approximately 26,489 acres, which is an impact to approximately 25 percent of the total Wildlife CESA (104,887 acres). The Proposed Action (106.6 acres) would impact 0.1 percent of the CESA. The incremental impacts to wildlife or their habitat from the Proposed Action in combination with past and present actions and RFFAs would be minimal. Impacts would also be reduced with the Applicant-Committed Environmental Protection Measures outlined in Section 2.1.12.

#### 4.3.11.2 No Action Alternative

A total of the quantifiable past and present actions and RFFA disturbance within the Wildlife CESA is approximately 26,489 acres, in which the No Action Alternative (1,635.8 acres) would impact approximately six percent of the Wildlife CESA. Therefore, incremental impacts to wildlife or their habitat as a result of the No Action Alternative in combination with past and present actions and RFFAs would not be substantial.

## 5 CONSULTATION AND PUBLIC INPUT

This EA was prepared at the direction of the BLM, MLFO, Battle Mountain District, by Enviroscientists, Inc., under a contract with Homestake. The following is a list of individuals responsible for preparation of this EA.

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## **APPENDIX A**

Table 4.1 - Emission Inventory - Particulates  
 Ruby Hill Renewal Application - Feb. 2012 Revision

Emission Unit ID	Description	Operating Parameters				Emission Control		Emission Factor				Emissions				Emission Factor Reference
		hrs/day	hrs/yr	tph	tpy	technology	efficiency	PM	units	PM10	units	PM	tpy	PM10	tpy	
<b>SYSTEMS 1-5: PRIMARY AND SECONDARY CRUSHING AND SCREENING - METALLIC ORE</b>																
<b>System 1 - Apron Feeder</b>																
PF1.001	Transfer to Apron Feeder	24	8,760	600	5,256,000	B,O,P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>System 2 - Primary Crushing</b>																
S2.001	Apron Feeder and discharge to Vibrating Grizzly or Primary Discharge Conveyor (dribble)	24	8,760	600	5,256,000	baghouse	(0%)*	0.06	lb/hr	0.06	lb/hr	0.06	0.26	0.06	0.26	November 2006 stack test result (0.02 lb/hr) with a 300% safety factor. See Nov. 27, 2007 Air Case 08AP00068.
S2.002	Vibrating Grizzly and discharge to Primary Crusher (oversize) or Primary Discharge Conveyor (undersize)															
S2.003	Primary Crusher and discharge to Primary Discharge Conveyor															
<b>System 3 - Secondary Crushing</b>																
S2.004	Primary Discharge Conveyor transfer to Secondary Screen	24	8,760	600	5,256,000	baghouse	(0%)*	0.049	lb/hr	0.049	lb/hr	0.049	0.21	0.049	0.21	January 2007 stack test result (0.016 lb/hr) with a 300% safety factor. See Nov. 27, 2007 Air Case 08AP00068.
S2.005	Secondary Screen and discharge to Secondary Discharge Conveyor (undersize) or Secondary Crusher (oversize)															
S2.006	Secondary Crusher and discharge to Secondary Crusher Discharge Conveyor															
<b>System 4 - Conveyor to Radial Stacker</b>																
PF1.002	Secondary Crusher Discharge Conveyor transfer to Radial Stacker	24	8,760	600	5,256,000	B,O,P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>System 5 - Radial Stacker</b>																
PF1.003	Radial Stacker transfer to Stockpile	24	8,760	600	5,256,000	B,O,P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>SYSTEMS 1A - 5A: PRIMARY AND SECONDARY CRUSHING AND SCREENING - AGGERGATE (ALTERNATE OPERATING SCENARIO)</b>																
<b>System 1A - Apron Feeder</b>																
PF1.001A	Transfer to Apron Feeder	24	8,760	600	5,256,000	B,O,P. <sup>1</sup>		0.003	lb/ton	0.0011	lb/ton	1.80	7.88	0.66	2.89	AP-42 Table 11-19.2-2, Conveyor Transfer Point
<b>System 2A - Primary Crushing</b>																
S2.001A	Apron Feeder and discharge to Vibrating Grizzly or Primary Discharge Conveyor (dribble)	24	8,760	600	5,256,000	baghouse	(0%)*	0.06	lb/hr	0.06	lb/hr	0.06	0.26	0.06	0.26	November 2006 stack test result (0.02 lb/hr) with a 300% safety factor. See Nov. 27, 2007 Air Case 08AP00068.
S2.002A	Vibrating Grizzly and discharge to Primary Crusher (oversize) or Primary Discharge Conveyor (undersize)															
S2.003A	Primary Crusher and discharge to Primary Discharge Conveyor															
<b>System 3A - Secondary Crushing</b>																
S2.004A	Primary Discharge Conveyor transfer to Secondary Screen	24	8,760	600	5,256,000	baghouse	(0%)*	0.049	lb/hr	0.049	lb/hr	0.049	0.21	0.049	0.21	January 2007 stack test result (0.016 lb/hr) with a 300% safety factor. See Nov. 27, 2007 Air Case 08AP00068.
S2.005A	Secondary Screen and discharge to Secondary Discharge Conveyor (undersize) or Secondary Crusher (oversize)															
S2.006A	Secondary Crusher and discharge to Secondary Crusher Discharge Conveyor															

Table 4.1 - Emission Inventory - Particulates  
 Ruby Hill Renewal Application - Feb. 2012 Revision

Emission Unit ID	Description	Operating Parameters				Emission Control		Emission Factor				Emissions				Emission Factor Reference
		hrs/day	hrs/yr	tph	tpy	technology	efficiency	PM	units	PM10	units	PM	tpy	PM10	tpy	
<b>System 4A - Conveyor to Radial Stacker</b>																
PF1.002A	Secondary Crusher Discharge Conveyor transfer to Radial Stacker	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.003	lb/ton	0.0011	lb/ton	1.80	7.88	0.66	2.89	AP-42 Table 11-19.2-2, Conveyor Transfer Point
<b>System 5A - Radial Stacker</b>																
PF1.003A	Radial Stacker transfer to Stockpile	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.003	lb/ton	0.0011	lb/ton	1.80	7.88	0.66	2.89	AP-42 Table 11-19.2-2, Conveyor Transfer Point
<b>System 6 - Ore Belt Feeders</b>																
PF1.004- PF1.005	Ore Belt Feeders 1 and 2 transfer to Ore Reclaim Conveyor	24	8,760	600, total	5,256,000	under-ground	(0%)*	0.00016	lb/ton	7.63E-05	lb/ton	0.10	0.42	0.05	0.20	AP-42 Section 13.2.4.3 Equation 1; 3.9% Moisture ** - sources are underground (1.3 mph)
<b>System 7 - Ore Reclaim Conveyor</b>																
PF1.006	Ore Reclaim Conveyor CV004 transfer to Conveyor-CV011 via chute	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>System 8 - Conveyor System to Leach Pad</b>																
PF1.007	Conveyor CV011 transfer to Conveyor CV012	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.008	Conveyor CV012 to Heap Leach Feed Conveyor CV006	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.009	Heap Leach Feed Conveyor transfer to Grasshopper Conveyors	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.010	Grasshopper Conveyor 1 to Grasshopper Conveyor 2	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.011	Grasshopper Conveyor 2 to Grasshopper Conveyor 3	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.012	Grasshopper Conveyor 3 to Grasshopper Conveyor 4	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.013	Grasshopper Conveyor 4 to Grasshopper Conveyor 5	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.014	Grasshopper Conveyor 5 to Grasshopper Conveyor 6	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.015	Grasshopper Conveyor 6 to Grasshopper Conveyor 7	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.016	Grasshopper Conveyor 7 to Grasshopper Conveyor 8	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.017	Grasshopper Conveyor 8 to Grasshopper Conveyor 9	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.018	Grasshopper Conveyor 9 to Grasshopper Conveyor 10	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.019	Grasshopper Conveyor 10 to Grasshopper Conveyor 11	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.020	Grasshopper Conveyor 11 to Grasshopper Conveyor 12	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.021	Grasshopper Conveyor 12 to Grasshopper Conveyor 13	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.022	Grasshopper Conveyor 13 to Grasshopper Conveyor 14	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.023	Grasshopper Conveyor 14 to Grasshopper Conveyor 15	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.024	Grasshopper Conveyor 15 to Grasshopper Conveyor 16	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.025	Grasshopper Conveyor 16 to Grasshopper Conveyor 17	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***

Table 4.1 - Emission Inventory - Particulates  
 Ruby Hill Renewal Application - Feb. 2012 Revision

Emission Unit ID	Description	Operating Parameters				Emission Control		Emission Factor				Emissions				Emission Factor Reference
		hrs/day	hrs/yr	tph	tpy	technology	efficiency	PM	units	PM10	units	PM	tpy	lb/hr	tpy	
PF1.026	Grasshopper Conveyor 17 to Grasshopper Conveyor 18	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.027	Grasshopper Conveyor 18 to Grasshopper Conveyor 19	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.028	Grasshopper Conveyor 19 to Grasshopper Conveyor 20	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.029	Grasshopper Conveyor 20 to Grasshopper Conveyor 21	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.030	Grasshopper Conveyor 21 to Grasshopper Conveyor 22	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.031	Grasshopper Conveyor 22 to Grasshopper Conveyor 23	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.032	Grasshopper Conveyors to Trough Feed Conveyor	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
PF1.033	Trough Feed Conveyor to Radial Stacker	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>System 9 - Radial Stacker</b>																
PF1.034	Radial Stacker to Heap Leach Pad	24	8,760	600	5,256,000	B.O.P. <sup>1</sup>		0.00182	lb/ton	0.000863	lb/ton	1.09	4.78	0.52	2.27	AP-42 Section 13.2.4.3 Equation 1; conveyor transfers - 3.9% moisture** uncontrolled (8.4 mph)***
<b>System 10 - Lime Silo</b>																
S2.007	Lime Silo Loading	5	1,825	60	23,000	bin vent	(0%)*	0.00099	lb/ton	0.00034	lb/ton	0.06	0.01	0.02	0.004	AP-42; Table 11.12-2 Cement unloading to elevated storage silo (pneumatic) - controlled; version 6/2006
PF1.035	Lime Silo discharge to Conveyor CV004	24	8,760	3	23,000	enclosure	(0%)*	0.098	lb/ton	0.0263	lb/ton	0.29	1.13	0.08	0.30	AP-42; Table 11.12-2 Truck loading (truck mix) - controlled; version 6/2006
<b>System 11 - Lime Silo</b>																
S2.008	Lime silo loading	5	1,825	60	6,800	bin vent	(0%)*	0.00099	lb/ton	0.00034	lb/ton	0.06	0.003	0.02	0.001	AP-42; Table 11.12-2 Cement unloading to elevated storage silo (pneumatic) - controlled; version 6/2006
PF1.036	Lime Silo discharge to Truck via Feed Conveyor	24	8,760	17	6,800	enclosure	(0%)*	0.098	lb/ton	0.0263	lb/ton	1.67	0.33	0.45	0.089	AP-42; Table 11.12-2 Truck loading (truck mix) - controlled; version 6/2006
<b>System 12 - Emergency Generator at the Preg. Ponds</b>																
S2.009	Emergency Generator (150 hp)	24	500	150	hp			0.0022	lb/hp-hr	0.0022	lb/hp-hr	0.33	0.083	0.33	0.083	AP-42 Table 3.3-1 Diesel fuel (Power output)
<b>System 13 - Emergency Generator at the Admin Building</b>																
S2.010	Emergency Generator (30 kW)	24	500	30	kW			0.30	g/kWh	0.30	g/kWh	0.02	0.005	0.02	4.96E-03	40 CFR 1039.102, Tier 4 interim - 19 to 37 kW
<b>System 14 - Gasoline Dispensing Facility</b>																
S2.011	Gasoline Tank	24	8,760	9,999	gal/mo	B.O.P. <sup>1</sup>		-		-						no PM/PM <sub>10</sub> emissions

Table 4.1 - Emission Inventory - Particulates  
 Ruby Hill Renewal Application - Feb. 2012 Revision

Emission Unit ID	Description	Operating Parameters				Emission Control		Emission Factor				Emissions				Emission Factor Reference
		hrs/day	hrs/yr	tph	tpy	technology	efficiency	PM	units	PM10	units	PM	tpy	PM10	tpy	
<b>Insignificant Activities</b>																
IA1.001	Waste Oil Air Heater (0.5 MMBtu/hr) - Truck Shop	24	8,760			none		1.82	lb/kgal	1.82	lb/kgal	6.5E-03	2.8E-02	6.5E-03	2.8E-02	AP-42; Table 1.11-1, Space heaters Vaporizing burner (A=0.65%)*
IA1.002	Waste Oil Air Heater (0.5 MMBtu/hr) - Process Plant	24	8,760			none		1.82	lb/kgal	1.82	lb/kgal	6.5E-03	2.8E-02	6.5E-03	2.8E-02	AP-42; Table 1.11-1, Space heaters Vaporizing burner (A=0.65%)*
IA1.004	Truck Shop Propane Heaters (8 - 1.637 MMBtu/hr, total)	24	8,760			none		0.7	lb/kgal	0.7	lb/kgal	0.013	0.055	0.013	0.055	AP-42; Table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.005	Assay Lab Crusher	24	8,760	0.02495	218.562	none		2.7	lb/ton	0.16	lb/ton	0.067	0.295	0.004	0.017	AP-42; Table 11-24.2 low moisture ore tertiary crushing ver. 8/1982
IA1.006	20,000 Gallon Diesel Tank	24	8,760			none										
IA1.007	10,000 Gallon Diesel Tank	24	8,760			none										
IA1.009	Mill Building Propane Heaters (11 - 2.47 MMBtu/hr, total)	24	8,760	0.027		none		0.7	lb/kgal	0.7	lb/kgal	0.019	0.083	0.019	0.083	AP-42; Table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.010	Admin Building Propane Heaters (3 - 0.27 MMBtu/hr, total)	24	8,760	3.0E-03		none		0.7	lb/kgal	0.7	lb/kgal	0.002	0.009	0.002	0.009	AP-42; Table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.011	Propane Heaters at the Crushers (2 - 0.507 MMBtu/hr, total)	24	8,760	5.5E-03		none		0.7	lb/kgal	0.7	lb/kgal	0.004	0.017	0.004	0.017	AP-42; Table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.012	Propane Heater at the Assay Lab (0.073 MMBtu/hr)	24	8,760	8.0E-04		none		0.7	lb/kgal	0.7	lb/kgal	0.001	0.002	0.001	0.002	AP-42; Table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.013	Assay Lab Primary Hotplate	24	8,760	2.85E-05	0.25	none		3.6	lb/ton	3.6	lb/ton	1.0E-04	4.5E-04	1.0E-04	4.5E-04	AP-42; Table 11.18-2 (Batt curing oven) ver. 7/93
IA1.014	Assay Lab Back-up Hotplate	24	8,760	2.85E-05	0.25	none		-	-	-	-	-	-	-	-	Emissions from the Back-up Hotplate are accounted for in the emissions from the Primary Hotplate
IA1.015	Assay Lab Fusing Furnace	24	8,760	3.65E-05	0.32	none		16	lb/ton	16	lb/ton	5.8E-04	2.6E-03	5.8E-04	2.6E-03	AP-42; Table 11.18-2 (Cupola) ver. 7/93
IA1.016	Assay Lab Cupelling Furnace	24	8,760	6.85E-07	0.006	none		16	lb/ton	16	lb/ton	1.1E-05	4.8E-05	1.1E-05	4.8E-05	AP-42; Table 11.18-2 (Cupola) ver. 7/93
											total - permitted	43.03	179.54	19.81	82.95	
											Alternate Operating Scenario	3.38	14.82	1.67	7.29	
											insignificant	0.118	0.518	0.055	0.240	
											total PTE	39.8	165.2	18.2	75.9	
* Control efficiency taken into account in emission factor.																
** The 2011 minimum ore moisture content was 4.1%. A conservative moisture content of 3.9% was used in the emission factor calculations.																
*** Maximum annual average wind speed from Ruby Hill's on-site meteorological data for 2006-2010.																
† Ash content is average value from AP-42 Section 11.1 background document, Table 2-1																
‡ Best Operating Practices																
^ Venturi Wet Scrubber																

Table 4.2 - Emission Inventory - Criteria Pollutants  
 Ruby Hill Renewal Application - Feb. 2012 Revision

Emission Unit ID	Description	Emission Factor				Emissions								Emission Factor Reference					
		hrs/yr	Unit/hr	Unit/yr	Units	NO <sub>x</sub>	CO	SO <sub>2</sub>	VOC	units	lb/hr	tpy	lb/hr		tpy	lb/hr	tpy	lb/hr	tpy
S2.009	Emergency Generator (150 hp)	500	150 hp	hp		0.031	0.0067	0.0021	0.0025	lb/hp-hr	4.7	1.2	1.0	0.25	0.31	0.08	0.37	0.09	AP-42 Table 3.3-1 Diesel fuel (Power output)
S2.010	Emergency Generator (30 kW)	500	30 kW	kW		7.5	5.5	0.0015%	7.5	g/kW-hr S Content	0.50	0.12	0.36	0.09	0.0006	1.5E-04	0.50	0.12	40 CFR 1039.102, Tier 4 interim - 19-37 kW ULS diesel mass balance
S2.011	Gasoline Tank	8,760	9,999	119,988	gallons											0.17	0.73	Tanks ver 4.0.9d Run 2/13/2012	
IA1.001	Waste Oil Air Heater (0.5 MMBtu/hr) - Truck Shop	8,760	0.5	4,380	MMBtu	11	1.7	100S	1.0	lb/kgal	0.037	0.16	0.006	0.025	0.067	0.29	0.003	0.015	AP-42; Table 1.11-2, Space heaters Vaporizing burner (S=0.5%) <sup>†</sup>
IA1.002	Waste Oil Air Heater (0.5 MMBtu/hr) - Process Plant	8,760	0.5	4,380	MMBtu	11	1.7	100S	1.0	lb/kgal	0.037	0.16	0.006	0.025	0.067	0.29	0.003	0.015	AP-42; Table 1.11-2, Space heaters Vaporizing burner (S=0.5%) <sup>†</sup>
IA1.004	Truck Shop Propane Heaters (8 - 1.637 MMBtu/hr, total)	8,760	1.637	14,340	MMBtu	13	7.5	10S	0.8	lb/kgal	0.233	1.019	0.134	0.588	0.026	0.116	0.014	0.063	AP-42; table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.005	Assay Lab Crusher	8,760									-	-	-	-	-	-	-	-	
IA1.006	20,000 Gallon Diesel Tank	8,760									-	-	-	-	-	-	0.002	0.010	Tanks ver 4.0.9d Run Oct. 2011 (Year 2010)
IA1.007	10,000 Gallon Diesel Tank	8,760									-	-	-	-	-	-	0.002	0.007	Tanks ver 4.0.9d Run Oct. 2011 (Year 2010)
IA1.009	Mill Building Propane Heaters (11 - 2.47 MMBtu/hr, total)	8,760	2.47	21,637	MMBtu	13	7.5	0.10S	0.8	lb/kgal	0.351	1.537	0.202	0.887	0.040	0.175	0.022	0.095	AP-42; table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.010	Admin Building Propane Heaters (3 - 0.27 MMBtu/hr, total)	8,760	0.27	2,365	MMBtu	13	7.5	0.10S	0.8	lb/kgal	0.038	0.168	0.022	0.097	0.004	0.019	0.002	0.010	AP-42; table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.011	Propane Heaters at the Crushers (2 - 0.507 MMBtu/hr, total)	8,760	0.507	4,441	MMBtu	13	7.5	0.10S	0.8	lb/kgal	0.072	0.316	0.042	0.182	0.008	0.036	0.004	0.019	AP-42; table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.012	Propane Heater at the Assay Lab (0.073 MMBtu/hr)	8,760	0.073	639	MMBtu	13	7.5	0.10S	0.8	lb/kgal	0.010	0.045	0.006	0.026	0.001	0.005	0.001	0.003	AP-42; table 1.5-1 (assuming 91.5 MMBtu/kgal); version 7/2008
IA1.013	Assay Lab Primary Hotplate	8,760	2.85E-05	0.25	tons						-	-	-	-	-	-	-	-	
IA1.014	Assay Lab Back-up Hotplate	8,760	2.85E-05	0.25	tons						-	-	-	-	-	-	-	-	
IA1.015	Assay Lab Fusing Furnace	8,760	3.65E-05	0.32	tons						-	-	-	-	-	-	-	-	
IA1.016	Assay Lab Cupelling Furnace	8,760	6.85E-07	0.006	tons						-	-	-	-	-	-	-	-	
total											NO <sub>x</sub>		CO		SO <sub>2</sub>		VOC		
											lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
											5.9	4.7	1.78	2.17	0.52	1.01	1.09	1.19	

<sup>†</sup>Sulfur content is average value from AP-42 Section 1.11 background document, Table 2-1