United States Department of the Interior

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TAKE PRIDE IN AMERICA

JUN 18 2010

In Reply Refer To:
DOI-BLM-NV-B020-2009-0135-EA
NVN-87759

Dear Reader:

The Bureau of Land Management, Tonopah Field Office (TFO), has prepared an Environmental Assessment (EA), to analyze the impacts from a proposed mining Plan of Operations application from A.U. Mines, Inc., for placer mining operations in Manhattan Gulch, Nye County, Nevada. The Proposed Action is to operate a placer mining operation, re-mining the old dredge tailings in Manhattan Gulch. The dredge tailings were created from a historic floating mine dredge which operated from the late 1930's-1940's. Ultimately, two (2) mine processing plants using gravity separation processes to segregate out valuable minerals such as gold and silver will operate in the Gulch. Approximately 554 acres of Public Lands and 5.6 acres of private (patented) lands will be disturbed and reclaimed over an estimated 10 year time frame. In addition, A.U. Mines proposes to perform additional mining exploration across the Gulch's dredge deposits.

Pursuant to the National Environmental Policy Act (NEPA), and the Council on Environmental Quality regulations on implementing NEPA, the EA identifies, describes, and evaluates resource impacts from the proposed project.

Copies of the EA, including a CD copy, titled "Manhattan Gulch Mine Environmental Assessment", DOI-BLM-NV-B020-2009-0135-EA, may be obtained by notifying the TFO at the letterhead address above or downloaded from the Nevada State Clearinghouse at, http://budget.state.nv.us/clearinghouse/.

Written comments on the EA will be accepted at the above letterhead address, until 4:30 p.m., July 19, 2010. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

If you have any questions or comments regarding this proposed action, please contact Mr. Duane Bays, Environmental Protection Specialist and the Manhattan Gulch Project Lead at (775) 482-7800.

Sincerely,

Alan P Bachler, For

Thomas J. Seley
Field Manager

U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NV-B020-2009-0135-EA
DATE: June 2010

Manhattan Gulch Mine
ENVIRONMENTAL ASSESSMENT

File Number: NVN-87759

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BLM

Tonopah Field Office

NATIONAL SYSTEM OF PUBLIC LANDS

Table of Contents

1 INTRODUCTION 5
1.1 Background Information 5
1.2 History 5
Figure 1. General Area 7
1.3 Purpose and Need for the Action (40 CFR 1502.13) 8
1.3.1 BLM Purpose 8
1.3.2 BLM Need 8
1.3.3 Decision to be Made 8
1.3.4 A.U. Mines Inc. Purpose and Need 8
1.4 Land Use Plan Conformance Statement 8
1.5 NEPA 9
2 THE PROPOSED ACTION AND OTHER ALTERNATIVES (40 CFR 1502.12, 1502.14) 9
2.1 Overview of Proposed Action 9
2.2 Location and Access 10
2.3 Mining 10
Figure 2. Land Status & Mining Claims 12
Figure 3. General Project Area & Facilities 13
2.3.1 Starter Pit 14
2.3.2 In-pit Mining 14
Figure 4. Conceptual Layout Starter Pit, Plants, Residual Alluvium Storage Area (RASA) 15
2.3.3 Haul Roads 16
2.3.4 Removal of the Vegetation 16
2.3.5 Removal of the Overburden or Mine Rock 16
2.3.6 Residual Alluvium Storage Area (RASA) 17
2.3.7 Residual Alluvium Backfill 17
2.3.8 Drilling and Blasting 17
2.3.9 Equipment 17
2.4 Plant Facilities 18
2.4.1 Processing 18
2.4.2 Phase 1 Plant Site 19
2.4.3 In-Pit Plant Facilities 19
2.4.4 Water Storage Basins (WSB's) (Phase 1 Plant) 20
2.4.5 Water Storage Basins (WSB's) (In-Pit Mining & Processing) 20
2.4.6 Process Water 20
2.4.7 Process Chemicals and Reagent Storage 21
2.4.8 Electrical Lines and Portable Substation 21
2.4.9 Bedrock Drain 21
2.5 Maintenance Shop, Warehouse & Gold Room 22
2.5.1 Administration Building and Parking 22
2.5.2 Maintenance Shop Warehouse Facility 23
2.5.3 Fuel Storage and Handling 23
2.6 Workforce 23
Figure 5. Administrative/Shop Facilities & Alternate Gold Room Sites 24
2.7 Reclamation 25
2.8 Exploration 26
2.9 No Action Alternative 26
2.10 Alternatives to the Proposed Action (40 CFR 1502.14) 26
3 Affected Environment (40 CFR 1502.15) Environmental Consequences (40 CFR 1502.16) and Proposed Mitigation or Avoidance Measures 26
3.1 Supplemental Authorities 27
3.2 Description of the Affected Environment and Environmental Consequences (40 CFR 1502.16) 30
3.2.1 Air Quality 30
3.2.2 Cultural, Historical and Paleontological Resources 32

Figure 6. 2007 & 2009 Cultural Survey Areas 34
3.2.3 Native American Religious Concerns 35
3.2.4 Waste – Hazardous/Solid/Sanitary 36
3.2.5 Surface Water 37
3.2.6 Groundwater Quality and Quantity 38
3.2.7 Rangeland Management 40
3.2.8 Public Health and Safety 41
3.2.9 Geology and Minerals 42
3.2.10 Recreation 43
3.2.11 Socio-Economic Values 44
3.2.12 Soils 45
Table 4. Site Soil Characteristics. 46
Table 5. Proposed Action Area Soil Disturbance Acreages 47
3.2.13 Vegetation 47
3.2.14 Invasive Non-native Species 48
Table 6. Battle Mountain District Invasive Plants 49
3.2.15 Visual Resources 50
3.2.16 Wildlife including Sensitive Species and Migratory Birds 51
4 CUMULATIVE EFFECTS ANALYSIS 52
4.1 Past Actions 53
4.2 Present Actions, including the Proposed Action 53
4.3 Reasonably Foreseeable Future Actions (RFFA's) 53
4.4 Evaluation of the Potential Proposed Action, Cumulative Effects and Mitigation 54
4.4.1 Air Quality 54
4.4.2 Cultural and Historical Resources 54
4.4.3 Native American Religious Concerns 55
4.4.4 Waste – Hazardous/Solid 55
4.4.5 Surface Water 55
4.4.6 Groundwater 55
4.4.7 Rangeland 56
4.4.8 Public Health and Safety 56
4.4.9 Geology and Minerals 57
4.4.10 Recreation 57
4.4.11 Socio-Economic Values 57
4.4.12 Soils 58
4.4.13 Vegetation 58
4.4.14 Invasive Non-native Species 58
4.4.15 Visual Resources 59
4.4.16 Wildlife and Migratory Birds 59
Figure 7. Manhattan Gulch Mine Cumulative Effect Study Areas 61
Figure 8. Manhattan Gulch Mine Cumulative Effect Study Areas 62
5 PERSONS OR AGENCIES CONSULTED 63
5.1 List of Preparers and Consulted 63
Team Realty Specialist 63
5.2 Persons, Groups, and Agencies Consulted 64
5.2.1 Individuals/Organizations Receiving EA 64
6 REFERENCES 64

Referenced Documents

The documents listed below provide a detailed description of the proposed action and the environmental protections measures incorporated into the project that are part of the official record and referenced and/or summarized in this Environmental Assessment (EA):

The Mines Group, Inc. 2009. Integrated Plan of Operations, Water Pollution Control Permit (WPCP) Application & Reclamation Plan for the Manhattan Gulch Mine, A. U. Mines Inc. May 2009. 212 pp., including the Attachments listed below.

Attachment A - Project Figures and Maps (41 drawings)
Attachment B - Mining Claims
Attachment C - Reclamation Cost Estimate
Attachment D - Nye County Board of Commissioners Letter
Attachment E - Water Wells in Project Area
Attachment F - Groundwater Quality Data
Attachment G - Meteoric Water Mobility Procedure Test Results
Attachment H - Acid Base Accounting Results
Attachment I - Spill Prevention, Control and Countermeasures Plan (SPCC)
Attachment J - Stormwater Pollution Prevention Plan (SWPPP)
Attachment K - Emergency Response Plan
Attachment L - MSDS Sheets Flocculants
Attachment M - Stability Analysis
Attachment N - Site Photos (Electronic Only)
Attachment O - Vegetation Survey
Attachment P - Wildlife Survey

AquA Hydrogeologic Consultants, LLC. 2010. Manhattan Gulch Groundwater Evaluation and Modeling Report. April 2010. 53 pp.

The following document provides the primary basis for description of the affected environment and environmental consequences. Other references are included in Section 6, References.

Bureau of Land Management. 1997. Tonopah Area Resource Management Plan and Record of Decision. October 6, 1997. 193 pp.

List of Acronyms

AUM	Animal Unit Months
BAPC	Bureau of Air Pollution Control (Nevada Division of Environmental Protection)
BMP	Best Management Practice(s)
BLM	Bureau of Land Management
B.P.	Before present
BGS	Below Ground Surface
CESA	Cumulative effects study area
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
FLPMA	Federal Land Policy and Management Act
GPM	Gallons per Minute
HMA	Herd Management Area
HPTP	Historical Preservation Treatment Plan
MBTA	Migratory Bird Treaty Act

MDB&M	Mount Diablo Base and Meridian
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
mya	million years ago
N	Prefix for BLM case file number for “Nevada”
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
BAPC	Bureau of Air Pollution Control
BMRR	Bureau of Mining Regulation and Reclamation
	Regulation Branch
	Reclamation Branch
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NNHP	Nevada National Heritage Program
NSAAQS	Nevada State Ambient Air Quality Standards
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWDR	Nevada Division of Water Resources
O_3	Ozone
PoO, Plan	Plan of Operations
$PM_{2.5}$	Particulate matter measuring less than 2.5 microns
PM_{10}	Particulate matter measuring less than 10 microns
RASA	Residual Alluvium Storage Area
RFFA	Reasonably foreseeable future actions
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-way
SAD	Surface Area Disturbance
SHPO	State Historic Preservation Office
USFWS	United States Fish and Wildlife Service
U.S.C.	United States Code (federal statutes)
VRM	Visual Resource Management
WPCP	Water Pollution Control Permit

1 INTRODUCTION

1.1 Background Information

On April 17, 2009, A. U. Mines, Inc. (A.U. Mines) submitted a Plan of Operations to the Bureau of Land Management (BLM) to mine gold and other valuable heavy minerals from placer gravels within a 3.5 mile segment of Manhattan Gulch. Manhattan Gulch is located west of the town of Manhattan in northern Nye County, Nevada. The placer gravels consist of previously mined dredge tailings and unmined gravels adjacent to the dredge deposits. A floating dredge recovered placer gold from Manhattan Gulch during the period 1938-1946.

The Manhattan Gulch property is located on patented and unpatented placer and mill site claims owned by or leased to A. U. Mines, Inc. (Figure 1). These include ninety-five (95) unpatented 20-acre placer mining claims located on BLM-administered public lands. There is one unpatented lode claim (Silverbell) and one patented mining claim (Monday Fraction) within the Project Area. The patented claim is owned by Peavine Ranches, LLC and leased to A.U. Mines, Inc.

A. U. Mines has been acquiring mining claims, patented lands, water rights and other assets and evaluating advanced extractive technology with the intent to develop and mine the alluvial placer deposits in Manhattan Gulch for more than 15 years. Drill exploration is being done by A.U. Mines under a notice filed with the BLM (NVN-82995) to sample the placer deposits and determine the depth to bedrock across the Gulch. Drilling started in 2008 and is continuing.

1.2 History

The history of the Manhattan Gulch area is described in both the Plan of Operations (Mines Group, 2010) and cultural resources reports (Kautz, 2007, 2010) prepared for the project. The Manhattan, Nevada area has a long mining history that began in 1866 when silver was discovered. The Manhattan Mining District was organized in 1867. Mining was abandoned by 1869 with limited exploration and tunnel mining. The district's boom began when gold was discovered in 1909 (Kautz, 2010). Both hardrock and placer gold deposits have been mined in the District.

Historically, wherever free and placer gold has been mined, it has been recovered by amalgamation with mercury; not only in Nevada, but also throughout the American West (Ferguson, 1924; Vanderberg, 1936). It has been reported that mercury was used in the recovery of gold in the Manhattan Mining District (Ferguson, 1924). It has also been reported in trade journals that mercury was used in gold recovery on the Natomas Dredge (Clark, 1946). The use of mercury was done to facilitate and improve the recovery of gold. Some accidental losses of mercury where it has been used may have occurred. With modern recovery techniques, lost mercury would be recovered if present and removed from the environment.

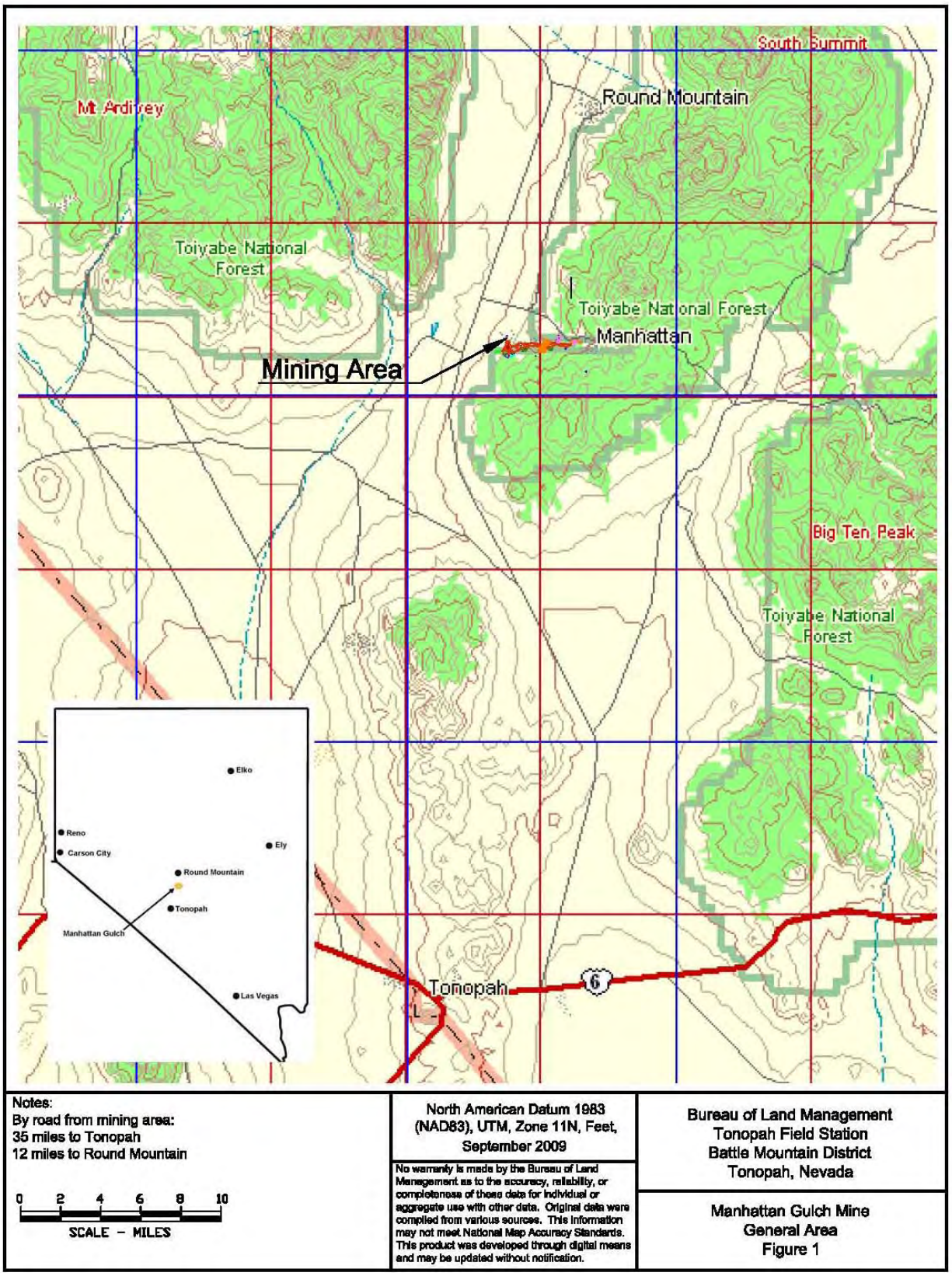
The Manhattan Gold Dredge was the most significant placer operation in the Gulch. The dredge was operated from 1938 to 1946 by the Manhattan Gold Dredging Company, a subsidiary of Natomas Company of Sacramento, California. Water for the operation was piped from Peavine Creek, a distance of 12 miles to create the pond to float the dredge. The bucket line was largely submerged and could dig gravels up to 75 feet below the surface of the pond. Dredged materials were washed in the onboard processing plant with all washed waste material directed over the twin tailing stackers at the rear of the dredge or discharged over the stern. The tailing stackers swung horizontally depositing the tails piles that are still visible on the landscape today (Kautz, 2010).

The dredging operation began about one-half mile west of the mouth of Manhattan Gulch. Over its eight-year life, the dredge progressed five miles up the gulch. The dredge worked in both the deep gulch gravels and the bench gravels pushed into the path of the dredge by dozers or other heavy equipment. Dredging operations ceased in 1946 and the Dredge was shipped to Copper Canyon in Lander County. Approximately $10.3 million of gold were produced from the District by 1949 (Kral, 1951).

The dredging operation was inefficient in its recovery of placer gold. The processing equipment did not capture all the gold, but instead only stirred it up and re-deposited a substantial proportion of the gold. The dredge also made only one of three planned passes. In addition, alluvium at the bedrock interface and gold along the banks and edges of the gulch were not mined by the dredging operation. A significant portion of the larger gold nuggets were discarded over the small mesh screens of the dredge. Due to these inefficiencies, significant quantities of gold remain in the Gulch.

There was little mining production in the District from 1950 to 1975. Modern mining was initiated in the late 1970s when a testing program to collect samples and expose placer gravels was initiated by Manhattan Gold Corporation, the Big 5 Mining Company, and other private operators.

Figure 1. General Area



Hardrock gold mining operations began at the Manhattan Mine, located at the eastern end of the Gulch, under Houston Oil and Minerals, Inc. Unlike prior operations, modern mining focused on open pit mining. In 1985, Echo Bay Mines bought the Manhattan Mine site and added a cyanide heap leach facility and operated it until 1990 when Round Mountain Gold Corporation took over and ceased production. From 1991 to 1993, remnant ore stockpiles and mill reject dumps were placed on the lined heap leach pad and subsequently leached for the residual gold content after which reclamation of the area began.

The Manhattan Mining District has produced silver, antimony, arsenic, tungsten, mercury, nickel, turquoise, fluorspar, and gold. The economic activity generated by mining in Manhattan and around Nevada was critical to early population growth and development in the state and Nevada's eventual statehood.

1.3 Purpose and Need for the Action (40 CFR 1502.13)

1.3.1 BLM Purpose

The BLM Tonopah Field Office purpose is to respond to a Plan of Operations filed by A.U. Mines, Inc. to develop the Manhattan Gulch Mine.

1.3.2 BLM Need

The BLM's need is to review A.U. Mines, Inc. Manhattan Gulch Mine Plan of Operations (PoO) submitted under the Mining Law of 1872 and the BLM's Surface Management regulations (43 CFR 3809).

1.3.3 Decision to be Made

The BLM Tonopah Field Manager will decide whether to permit A.U. Mines, Inc. PoO as submitted or modify the decision based on the impact analysis and associated mitigation as indentified in this Environmental Assessment (EA).

1.3.4 A.U. Mines Inc. Purpose and Need

The purpose for the Proposed Action is for A.U. Mines to economically recover precious metals and possibly other minerals from their unpatented mining claims in Manhattan Gulch. The project need is to meet market demand for gold and other valuable minerals.

1.4 Land Use Plan Conformance Statement

The Proposed Action is in conformance with the Tonopah Resource Management Plan (RMP) and Record of Decision (ROD), approved on October 2, 1997 (BLM 1997b). "A total of 6,028,948 acres (99 percent of the Tonopah Planning Area) will be open to the operation of the mining laws," (page 23). The "BLM provides for mineral entry, exploration, location and operations pursuant to the mining laws in a manner that 1) will not unduly hinder the mining activities, and 2) assures that these activities are conducted in a manner which will prevent undue or unnecessary degradation of the public land," (page 35). "A Plan of Operations and a Reclamation Plan are required in situations in which there will be more than five acres of cumulative un-reclaimed surface disturbance in a project area," (page 35). "All operations shall comply with all Federal and State laws, including those relating to air quality, water quality, solid waste, fisheries, wildlife and plant habitat, and archeological and paleontological resources," (page 36).

The BLM is responsible for administering access to mineral rights on certain federal lands as authorized by the General Mining Laws. Under the laws, qualified prospectors are entitled to reasonable access to mineral deposits on public domain lands, which have not been withdrawn from mineral entry. The BLM is also responsible to review and approve exploration and mining activities on BLM-administered lands to protect surface resources pursuant to the Federal Land Policy Management Act of 1976 (FLPMA) (43 U.S.C. 1701 et seq.) and the attendant regulations for surface management of lands on mining claims under the general mining laws (43 CFR 3809). The surface management regulations require the BLM to comply with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq.) and insure that the operator "conduct all operations in a manner that complies with all pertinent Federal

and state laws (43 CFR 3809.420) and will not cause undue and unnecessary degradation of the public lands".

1.5 NEPA

The BLM has prepared an Environmental Assessment (EA) for this project that is in conformance with the Council on Environmental Quality regulations for implementing NEPA (40 CFR 1500-1508) and the BLM NEPA Handbook H-1790-1 (BLM 1988). This EA describes the Proposed Action and No Action Alternatives and the Affected Environment; analyzes the environmental consequences of implementing the Proposed and No Action Alternatives, and includes mitigation measures to eliminate or reduce the expected consequences. The purpose of the EA is to determine whether the proposed project with mitigation measures would result in significant impacts to the environment and require an Environmental Impact Statement (EIS), or would not cause significant impacts and could be approved with a Finding of No Significant Impact (FONSI). This determination would be made by the BLM authorizing officer after review of the EA and documented in the Decision Record. Internal scoping was conducted by the BLM between April 20, 2009 and July 1, 2009, and included a joint site visit with the BLM staff, representatives of the Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation (NDEP) and the project proponent on May 28, 2009.

2 THE PROPOSED ACTION AND OTHER ALTERNATIVES (40 CFR 1502.12, 1502.14)

NEPA requires that environmental document(s) analyze the impacts of the Proposed Action and No Action Alternatives. Other alternatives may be considered if they can feasibly meet the objectives of the Proposed Action as defined in the purpose and need for the Project. The range of alternatives required is governed by a "rule of reason" (i.e., only those feasible alternatives necessary to permit a reasoned choice need be considered). Reasonable alternatives are those that are practical or feasible based on technical and economic considerations [46 Federal Register 18026 (March 23, 1981), as amended; 51 Federal Register 15618 (April 25, 1986)]. Reasonable alternatives to the Proposed Action must be considered and assessed whenever there are unresolved conflicts involving alternative uses of available resources [BLM NEPA Handbook H-1790-1, page IV-3 (BLM, 1988)].

2.1 Overview of Proposed Action

A.U. Mines submitted a Plan of Operations on April 14, 2009 for the proposed Manhattan Gulch Mine (Mines Group, 2010). A detailed description of the Proposed Action is provided in the Plan of Operations. Section 2 provides a summary of the proposed action as described in the plan.

The Manhattan Gulch Mine would extract placer gold and possibly other minerals from historic dredge tails and alluvial placer deposits in Manhattan Gulch. Mining would use mechanized earthmoving equipment, including loaders, scrapers, trucks and conveyors to move placer gravels and residual alluvium to and from the processing plant. Recovery of those minerals from the placer gravels would be by wet (slurry) physical gravity separation methods. Water would be obtained from one or more wells located in the project area. Water would be recovered during processing and recycled. No chemicals would be used to separate minerals from the placer gravels. Wet gravity processing would produce a gold-bearing concentrate to be sold and a residual material (residual alluvium). Mining would be conducted initially in a Starter Pit within the Gulch. Processing would be conducted at the Phase 1 Plant Site located southeast of the Starter Pit and outside of the Gulch. Residual alluvium, from which the gold and other minerals have been removed, would be placed in a Residual Alluvium Storage Area (RASA) located near the Phase I plant. Once the placer alluvium from the Starter Pit has been processed at the Phase I plant and residual alluvium placed in the RASA, processing operations would be moved into the Starter Pit area and processing would be conducted using two parallel plants operating simultaneously. Mining would continue eastward up the Gulch and conducted in a sequence of panels comprised of blocks approximately 150 feet by 150 feet. As each block is mined out, the plants would be moved into the most recent mined out block. Placer alluvium from the block would be processed and the residual alluvium deposited at the far (west) end of the Starter Pit and, as mining progresses eastward up the Gulch, into previously mined (mined-out) blocks. The mining blocks would be mined progressively, and

therefore the "pit" would move up the Gulch continuously until mining of the entire proposed mining area is completed.

The Proposed Action would affect a total of 554 acres of public, BLM-administered lands and 5.6 acres of private lands. Of the public lands, 295 acres of existing unreclaimed dredge tails would be re-mined; 59 acres of new disturbance would occur from construction of the RASA and Phase 1 Plant site; and 12.3 acres of new and existing disturbance would occur for the Phase 1 Plant Site Water Storage Basins. The Proposed Action includes relocation of the Phase 1 Water Storage Basins on two occasions during the entire duration of mining, onto dredge tailings backfilled during mining or on alternative areas adjacent to the Gulch. In the event that both of the alternative Water Storage Basin areas (Figure 3, Drawings AUM-004 and AUM-102-103 which detail WSB-09-11 and WSB-13-15), with three basins in each area, are used, the new surface disturbance would be a total of 31.3 acres. This total (31.3 acres) is included in the total surface disturbance calculations.

The Proposed Action includes a possible expansion of mining into previously un-mined areas. The area that would be mined is subject to continued exploration in those areas after the Proposed Action has initiated operations. It is possible that only a portion of these areas would actually be mined, but the entire area has been included for purposes of the environmental analysis to evaluate the maximum disturbance and associated potential environmental consequences. The total area of potential expanded mining would be 131 acres, which has been included in the total surface disturbance calculation.

There would be approximately 24.4 acres of existing and new disturbance affected by Phase 1 Plant Site roads, access roads; and 1 acre for the alternative Gold Room location on the Silver Bell claim (Section 2.5).

The Starter Pit would be fully excavated within 2-3 years of commencement of operations. At that time, the Phase 1 Plant and a second wet gravity separation plant would be moved into the Starter Pit. Reclamation of the Phase 1 plant site and RASA would commence. With the two placer plants in place, placer gravels would be mined on the east side of the Starter Pit, processed through the plants and the residual alluvium deposited on the west side of the Starter Pit. The Starter Pit would 'move' eastward up the Gulch by continuous mining at the forward edge of the pit and deposition of residual alluvium at the opposite end of the pit. The maximum active surface disturbance at any given time would be 130 acres in Year 2 or Year 3 of the Proposed Action. During subsequent years the active mining area would range from 30-70 acres.

A summary of land disturbances is provided in Table 1. Land Status is shown in Figure 2. Locations of all proposed facilities are shown on Figure 3.

2.2 Location and Access

The Project Area is located approximately 48 miles north of Tonopah via Nevada State Route 376 and 377. The Maintenance Shop Area is the primary access point to the project area. The Shop is located on State Route 377, five (5) miles east of Nevada State Route 376 and five (5) miles west of Manhattan, Nevada. The mining area is located in a 3.5-mile span of Manhattan Gulch. Manhattan Gulch begins in the Toiyabe Mountains near the Town of Manhattan and extends west into the Big Smoky Valley.

Access roads would connect the Maintenance Shop area on the Monday Fraction patented mining claim to the Manhattan Gulch mining area (See Figure 3).

2.3 Mining

The area in Manhattan Gulch that would be mined is approximately 295 acres and extends 3.5 miles from the west end where mining would commence to the east end where mining would be completed (Figure 1). Mining would utilize earthmoving equipment to excavate the ore. Subsequent to excavation, the gold and other valuable minerals would be physically separated from the ore as describe in Section 2.4.

The dredge tails and placer alluvium in the Gulch range from less than ten (10) feet up to 100 feet thick. Bedrock that underlies the dredge tails and alluvium would not be mined to any significant depths. Some incidental quantities of bedrock would be excavated at the interface with the alluvium. Only enough

bedrock (generally 0 to one (1) foot, but up to five (5) feet) would be excavated to facilitate recovery of any gold captured in bedrock cracks and fissures

Figure 2. Land Status & Mining Claims

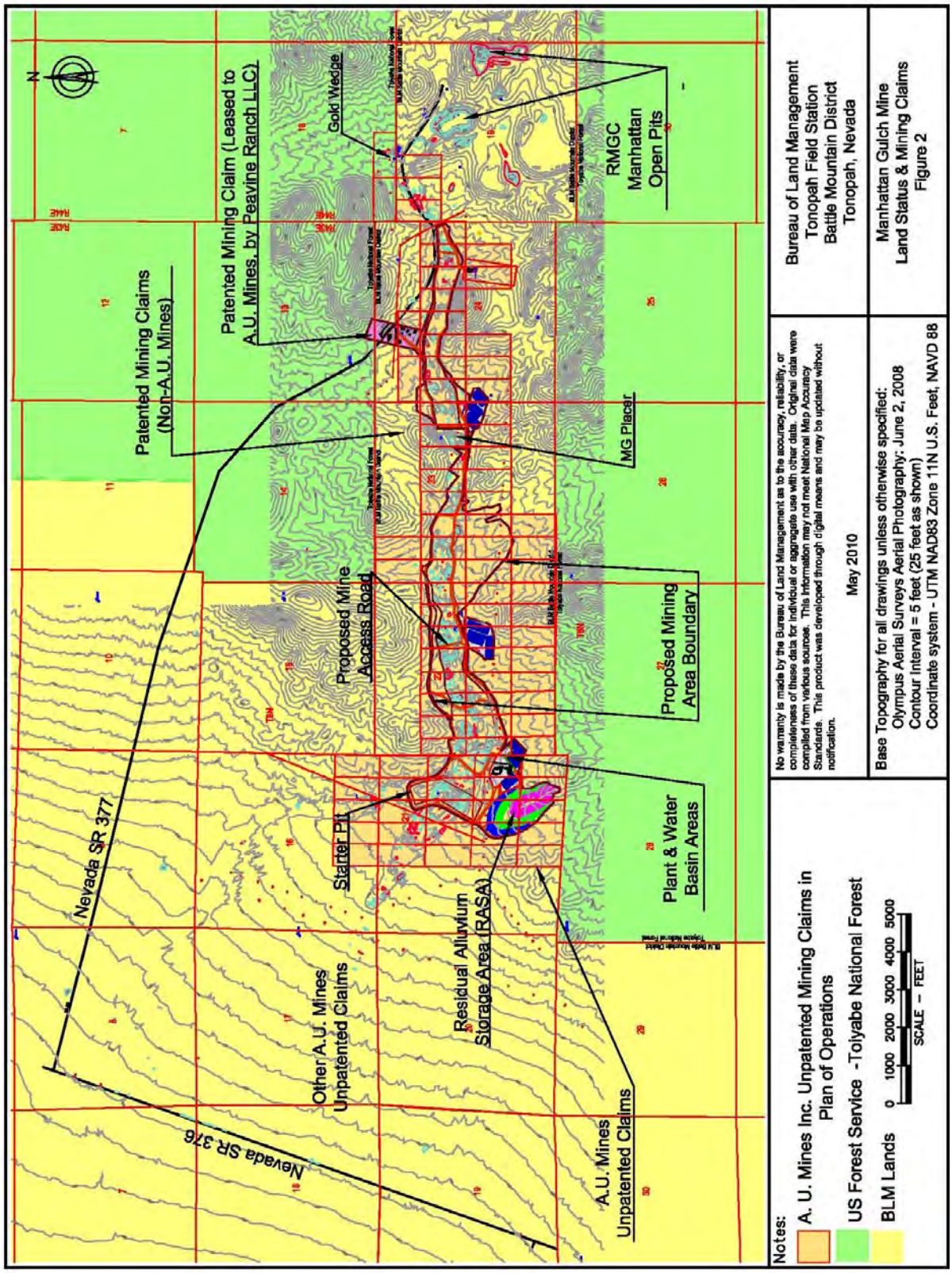


Figure 3. General Project Area & Facilities

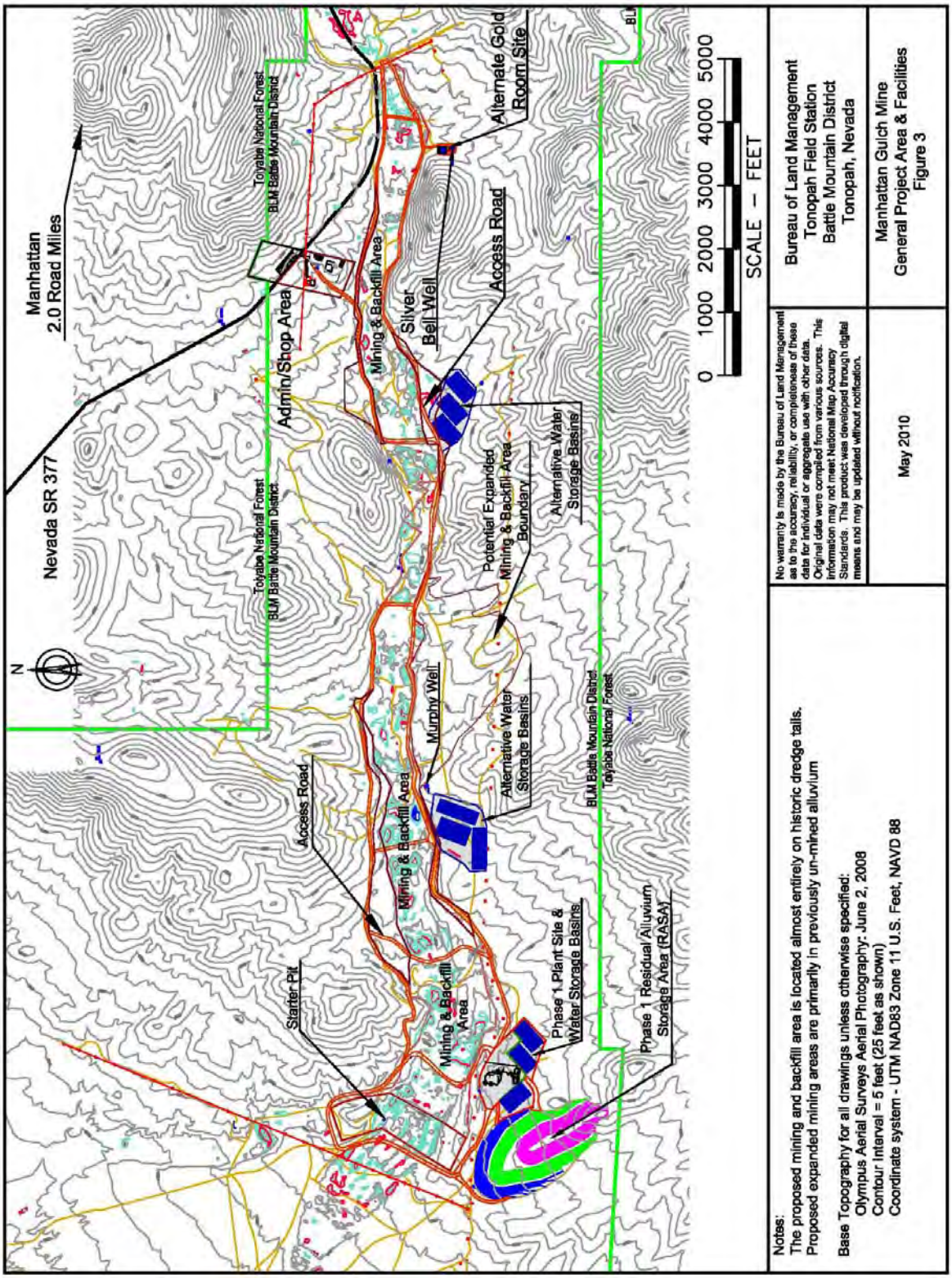


Table 1. Surface Disturbance

Proposed Action Surface Disturbance Summary	Private Land	New Public	Existing Public	Total New & Existing
Subtotal - Total Historic Dredge Tails Area (to be mined)			295	295
Phase 1 Plant Site		11.2		
Residual Alluvium Storage Area (RASA) Zone 1		29.7		
Residual Alluvium Storage Area (RASA) Zone 2 and 3		18.1		
Subtotal - Phase 1 Plant Site & Residual Alluvium Storage (RASA)		59.0		59.0
Phase 1 Water Storage Basin Area (not including WSB's)		6.8		
Phase 1 Water Storage Basin - WSB-03		1.8		
Phase 1 Water Storage Basin - WSB-04		1.8		
Phase 1 Water Storage Basin - WSB-05		1.8		
Subtotal - Phase 1 WSBs		12.3		12.3
Subtotal - Phase 1 Plant Site Roads		4.9	2.2	7.1
Subtotal - Access Roads		14.5	1.1	15.6
Subtotal - Safety Berms		1.5	0.3	1.8
Total - Proposed Base Mine Area		**92**	**298**	**390**
Alternate Water Storage Basin Area 08		18.0		
Alternate Water Storage Basin Area 12 (incl. WSB-13 thru 15)		13.3		
Subtotal - Alternate WSB Disturbance		31.3		31.3
Subtotal - Proposed Silver Bell Alternative Gold Room & Access Road			1.0	1.0
Subtotal - Expanded Mining Areas		126	5.2	132
Proposed Base + Expanded Mine Area		**250**	**304**	**554**
Subtotal Administrative/Shop/Warehouse/Gold Room (Private Peavine Ranches LLC)	5.6			

2.3.1 Starter Pit

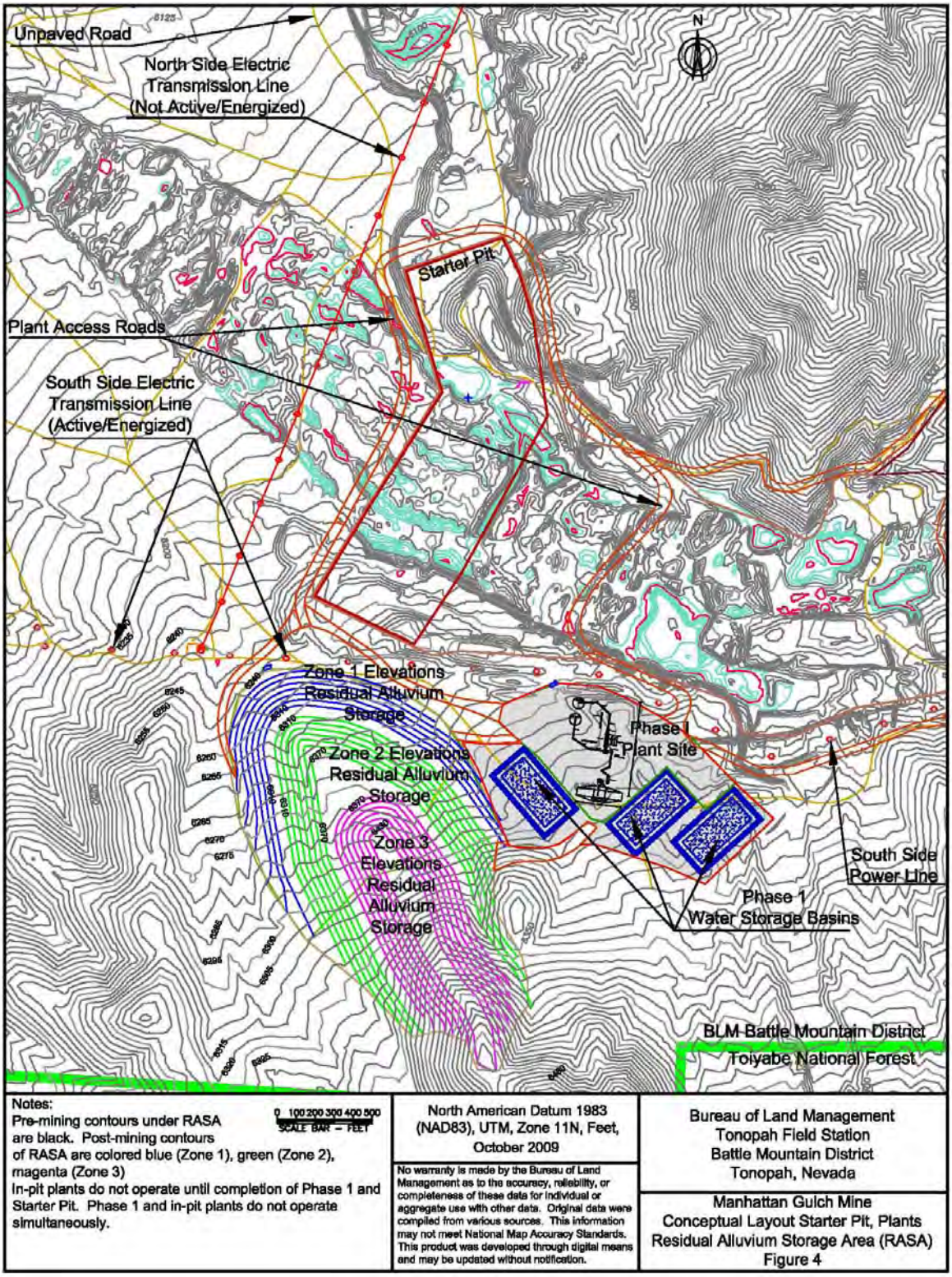
Mining would commence in the Starter Pit. The location and configuration of the Starter Pit is shown in Figures 3 & 4. The pit would be located in dredge tails and would be approximately 2200 feet long along a north-south axis and 600 feet wide along an east-west axis. The Starter Pit would encompass approximately 28 acres and range from 10-90 feet deep based upon the thickness of the dredge tails. The excavated volume would be approximately 2.9 million cubic yards.

Mining would use front shovels, track dozers, loaders, excavators, and scrapers or trucks. Excavation would use hydraulic front shovels and tracked excavators or loaders loading up to six (6), 40-cubic yard scrapers or trucks. Once loaded, the excavated material would be transported to a plant feed stockpile at the Phase 1 Plant Site. Once the Starter Pit is completed, the mining configuration and method would be modified as described in the following section. The Phase 1 Plant (Section 2.4.2) would be located on the south side of the Gulch and operate during the first 2-3 years that the Starter Pit is mined.

2.3.2 In-pit Mining

Upon completion of the Starter Pit, the process plant would be moved from the Phase 1 Plant Site into the pit, and shortly thereafter, a second plant would be also set up in the pit to operate in parallel and simultaneously with the first plant. Gold bearing gravels would be mined with tracked dozers, excavators, hydraulic front shovel, or loaders from a mining face. However, rather than hauling it out of the pit to at temporary stockpile at the plant site, ore would be loaded directly from the mining faces into the apron feeders of the plants.

Figure 4. Conceptual Layout Starter Pit, Plants, Residual Alluvium Storage Area (RASA)



Initially, the first plant moved into the pit and mining would commence by excavating a sequential series of blocks, each approximately 150 feet by 150 feet. The blocks would be set up in parallel panels (a linear sequence of blocks that run generally north-south perpendicular to the gulch). As each successive block is completed the plant would be moved into that block and the next block mined.

A second plant would be added to the relocated first plant once the first several mining blocks have been completed and sufficient space has been created in mined-out blocks to accommodate the second plant. Two plants allow a higher production rate, while allowing for the most efficient excavation and deposition of residual alluvium.

After the gold and other minerals have been recovered from the placer gravels, the residual alluvium would be backfilled into the mined out blocks by conveyors and a radial stacking conveyor. During the initial phase of mining and processing in the pit, some material may also be placed in the permanent RASA.

The objective of the mine design is to balance the cut (mining) with the fill (backfilling the Starter Pit or previous mining block) so that the mining and processing can be continuous.

Details on the in-pit mining configuration are shown in the Plan of Operations (Mines Group, 2010), Attachment A, AUM-111 and AUM-112).

2.3.3 Haul Roads

Haul roads from the Starter Pit to the Phase 1 Plant Site and from the temporary residual alluvium stockpiles on the Phase 1 Plant Site to the RASA would be constructed by grading the existing surfaces to provide a roadbed. Some coarse materials derived from the first stages of excavation from the pit may be used as roadbed material.

Haul roads would be 40-50 feet wide, to accommodate two-way traffic of scrapers or trucks that would be used to haul the ore from the pit to the plant and residual alluvium to the RASA. Haul roads would be constructed and bermed along slopes or cut banks for safety in accordance with MSHA regulations.

Upon completion of the Starter Pit, there would be only minor hauling, since almost all material handling would be accomplished in the mining panels by conveyors.

2.3.4 Removal of the Vegetation

Vegetation is very sparse on the historic dredge tails and therefore generally would not need to be removed prior to mining. The vegetation and surface soils would be removed from the Phase 1 Plant Site and placed in berms around the outer perimeter of the Plant Site to both divert stormwater run-on around the plant and to control stormwater run-off and direct it to sediment basins with oil water separators. Once operations at the Plant Site are complete, this soil material would be spread and graded back onto the area of the Plant Site.

The residual alluvium that would be placed in the RASA is as good or better growth medium than the thin (6-12 inches deep) weathered shale that forms the native surface soils on the RASA. Therefore, no vegetation or soil would be stripped from the RASA and stockpiled prior to placement of residual alluvium. More discussion is provided in Section 2.7 on proposed reclamation of the project disturbances.

2.3.5 Removal of the Overburden or Mine Rock

Essentially all of the historic dredge tails and alluvium in the Gulch contain economic concentrations of gold. Therefore, there would be no overburden to be removed and stored in the RASA or in the backfill blocks in the Gulch. Bedrock is found beneath the placer alluvium in the Gulch or exposed in the hills adjacent to the Gulch. Bedrock consists primarily of shale, schist or weathered shale. Some of the bedrock would be mined and processed where gold is trapped in fractures and faults. Some bedrock would be removed to level the floor of the pit for accommodation of the processing plants. This rock would be hauled directly to the RASA or to the pit backfill area.

2.3.6 Residual Alluvium Storage Area (RASA)

During the first several years of the project, when material is mined from the Starter Pit and processed at the Phase 1 Plant Site, residual alluvium would be placed by conveyors in temporary stockpiles and then hauled by scraper or truck to the RASA. The residual alluvium from the Phase 1 Plant (the material remaining after gold has been removed from the placer gravels) would be produced by both mechanical screening and the hydraulic gravity separation processes as described in Section 2.4. Three primary size fractions of residual alluvium would be produced by processing: material greater than three-quarters of an inch (+ ¾ -inch) (coarse) in diameter, less than ¾-inch (- ¾ -inch to 200-mesh (sands and gravel)) and minus 200-mesh (fines). The approximate proportions of these three classes of material are 30% coarse, 65% sand and gravel and 5% fines.

The coarse material would be classified by the initial mechanical, wet-screening step. This material would be hauled from the temporary stockpile and placed within the RASA as it is produced. However, some of this would be placed so that it can be used for the final reclaimed surface to provide a coarse and durable layer that would provide an erosion-resistant final surface on the RASA.

The minus ¾-inch gravel, sand, and fines are classified as the undersize of the initial mechanical screening step and are the primary feed of the recovery process. After processing, the sand and gravel would be placed in temporary stockpiles by conveyors from the plant, and then hauled to the RASA.

The fines fraction would be separated from the process water through supplemental treatment (physical settling, flocculants and or ultrasonic separation). Some of the fines would report to and settle in the Water Storage Basins and thus need to be periodically removed. These would likely be pumped from the ponds in slurry, partially dewatered and pumped or hauled to the RASA. Small bermed paddocks would be constructed on the lifts of the RASA to contain and dry these semi-solid materials.

The processing is described in more detail in Section 2.4.

2.3.7 Residual Alluvium Backfill

After the Starter Pit is completed and processing moved from the Phase 1 Plant Site to the pit, residual alluvium would be placed by conveyors directly backfilling mined out blocks in the pit. Residual alluvium would be stacked in piles first, and then contoured, graded and reseeded. All backfilled mining areas would be reclaimed in this fashion. Residual suspended solids would be removed from the basins, mixed with residual alluvium and placed in the backfilled pit.

2.3.8 Drilling and Blasting

Under normal operations, drilling and blasting would not be involved as the material to be mined is an unconsolidated alluvial placer deposit. However, there would be occasions where the bedrock underlying the alluvium would need to be blasted to maintain a uniform pit floor elevation of the mining blocks. In these cases, the bedrock would be blasted, excavated and backfilled along with residual alluvium.

2.3.9 Equipment

Any or all of the following equipment could be utilized for this mining operation:

- Four Bulldozers 400+ horsepower
- Three Loaders 5-7 cubic yards
- Two Track excavators 5-7 cubic yards
- Two Hydraulic Front Shovels
- Graders
- Scrapers: 4 Caterpillar 651-657, 6 Caterpillar 641 and one Caterpillar 631 water wagon
- Haul Trucks: 50-75 Ton
- Water Truck
- Apron feeder
- Vibrating Screen

- Modular Feed conveyor
- Gravity plant - Jig sluice, slurry pumps, sand screws, magnetic separator, jigs, Nelson concentrator, spiral plant and tailings pump
- Modular stacking conveyors (grasshopper) would be used in the processing operation to convey separate size fractions of the residual alluvium to temporary stockpiles and also to transport the same material to backfill mining blocks in the pit.

2.4 Plant Facilities

2.4.1 Processing

Processing would only use physical gravity separation methods. Placer gravels would be fed by a wheel loader or excavator into a hopper with a grizzly mounted over the top. Oversize rock larger than +6 inches would not pass through the grizzly and would collect in a temporary pile before being taken to the RASA or to pit backfill. Placer gravels (-6 inch) would enter the hopper and be drawn by an apron feeder and be conveyed onto a vibrating screen where water is introduced to produce a slurry of approximately 70% water and 30% solids by weight to begin the washing and sizing process.

The oversized (+¾ inch) material would pass over the screen, and be dewatered by the screening, and conveyed via line conveyor and stacking conveyor to a stockpile and later hauled to the RASA; or, during in-pit processing, directly into (backfilling) a mined-out block. The oversized residual alluvium would be wetted (~10-20% water by weight) and generate no dust.

The slurried undersize material (- ¾ inch) would pass through the screen and continue on to the next stage of processing, the inclined jigging sluice box. Here, heavier particles of gold and other heavy minerals would be captured in the sluice bed while allowing the lighter residual alluvium to be carried away by the flow. The residual alluvium from the sluices would then proceed to the sand screw where the gravel and sand fraction, is separated from the process water. The dewatered sand fraction would be conveyed to a stacking conveyor for stockpiling and later removal to the RASA, or backfilled into a completed mining block during in-pit processing, or used in haul road maintenance.

The overflow water from the sand screw would be pumped to Water Storage Basins used to store and recycle water and to settle particles of clay and silt suspended in the recycled water. Upon entering the quiet water of the ponds, the contained clay particles and silts would begin settling out. Settling would be facilitated by the use of ultrasonic precipitation or flocculants. The proposed flocculant is Core Shell 71301 (Nalco Chemical Co.), a high performance polymer designed for dewatering and wastewater treatment and is widely used in the mineral industry for water clarification with accepted properties and composition with no environmental impact when used as prescribed. This flocculant is also used to settle fines in stormwater treatment applications and does not exhibit adverse environmental effects in those stormwater applications (Sojka, 2007; Weston, 2009). It is neither hazardous or highly reactive or volatile (MSDS in Plan of Operations, Attachment L).

Periodically, the settled material building up in the bottom of the Water Storage Basins would be pumped out onto an area of the RASA or into completed mining blocks being backfilled, allowing this material to be covered or mixed with more coarse materials for final reclamation. Mixing fines with coarse material in the RASA would enhance the water holding capacity of the material and improve its growth medium properties.

In the next step of the concentration process the undercurrent gold and heavy minerals from the jigging sluice box would be pumped to the magnetic separator. Some minerals occurring in the concentrate, mostly magnetite (iron oxide), are attracted to a magnet and can be extracted from the slurry stream. Other recoverable minerals might be found within the magnetic separates. Materials recovered in the magnetic separator of economic value are sold as a product. Magnetic materials without economic value will be mixed back into the residual alluvium and backfilled into the gulch.

Following the magnetic separation, the remaining concentrate would flow over placer jigs to further separate and concentrate gold and heavy minerals from the lighter waste fraction of alluvium. The residual waste alluvium would be carried off by the overflow and report to the sand screw. The product

from the jigs, a very concentrated gold and heavy mineral product would be drawn off and pumped to the spiral section for further concentration and product separation.

Additional water is added to the jig product and pumped to the spiral~~s~~ concentrators. The spirals create centrifugal forces which cause the heavy minerals to spread out into distinct bands distinguished by the specific gravity of the various heavy minerals. The heaviest and higher specific gravity minerals (gold) would migrate to the inside of the spiral and progressively lighter and lower specific gravity minerals to the outside edge.

The concentrate at this stage of the process is separated into three products of different specific gravities. Depending on the minerals of interest and its specific gravity, some or all of the products would be saved for further processing. All concentrates from the spirals would be sent to the Gold Room for further processing.

Each proposed mechanical and gravity separation process plant is rated at 300 cubic yard per hour or approximately 360 to 450 tons per hour, for each plant, depending on material. A schematic flow sheet for the plant is shown in Drawings AUM-108-109 (Mines Group, 2010, Attachment A).

2.4.2 Phase 1 Plant Site

The Phase 1 Plant Site would be constructed on the south side of Manhattan Gulch to process placer gravels excavated from the Starter Pit. The Phase 1 Plant site would operate for approximately 1-2 years until a sufficient area has been excavated in the mining area to accommodate the In-Pit Processing.

The Phase 1 Plant Site facilities would include the following:

- A run of mine stockpile of placer gravels that would be excavated from Manhattan Gulch;
- Wash and Recovery Plant (see below);
- A temporary stockpile for coarse, residual alluvium (+ ¾ -inch material);
- One or more temporary stockpiles of sand and gravel fraction of residual alluvium (- ¾-inch material to 200-mesh);
- Pumps and or dewatering equipment to remove fine solids from the recovered water;
- A designated parking area for up to twelve (12) vehicles;
- A small portable (modular) office-lunch building on blocks (maximum 14 feet x 60 feet);
- Up to two (2) portable storage buildings (maximum 8 x 20 feet);
- Two (2) portable toilets;
- A water storage head tank (maximum 2,000 gallons);
- A bermed fueling area approximately 60 feet by 20 feet to service and fuel equipment (see Section 2.5.3);
- Miscellaneous equipment and materials including waste receptacles, and other facilities.

2.4.3 In-Pit Plant Facilities

Once the Starter Pit has been completed, the entire Phase 1 Plant would be moved into the pit as described in Section 2.3.2. Two plants would operate simultaneously and independently in staggered panels to accommodate mining and backfilling of mined out blocks. As each active block is mined, a mined-out block would be backfilled. Backfilling would generally place sands and fines at the base of the backfill block and coarse material (+ ¾-inch) on top in arced piles using a radial stacking conveyor. Articulated, modular "grasshopper" conveyors would be configured in series either on the plant feed side or the backfill side. The configuration of equipment would vary based upon conditions in the particular mining block. Dozers would be used to level the residual alluvium stacked by the conveyors to blend with surrounding topography. As the working face of mining moves upstream (up the gulch) the plants would be moved with it.

2.4.4 Water Storage Basins (WSB's) (Phase 1 Plant)

Three Water Storage Basins (WSB's) would be constructed at the Phase 1 Plant Site. These basins would be approximately 400 feet long by 200 feet wide by 12 feet deep (operating depth). Basin wall slopes will be angled at 2H:1V. A two (2) foot high berm would be constructed around the sides to provide two (2) feet of freeboard. As there is no draindown feeding into the WSB's, this freeboard is more than adequate to contain the direct precipitation a 100-year 24-hour storm event of 2.44 inches. The total operating capacity of each basin would be approximately 18 acre-feet (5,940,355 gallons) and a total of 54.69 acre-feet or 17,821,064 gallons. The total area for the WSB's and adjacent work area would be approximately 6.8 acres.

The WSB's would be lined with a single plastic liner to prevent water loss through seepage. Since the native soils and residual alluvium is so porous, water losses from seepage would be excessive if they were not lined. Geogrid strips (plastic mesh) three to six (3-6) feet wide would be placed on top of the primary liner in several locations on each end and on the sides of the WSB's, extending below the water surface and anchored to the edge of the top of WSB's (in a similar manner as the impermeable plastic liner) to provide a rough surface that wildlife can use to escape the ponds in the event they slide into the ponds~~.~~

Water would be added to the basins at the beginning of the project to provide a sufficient operating balance of water. Once the plant is operational, the recycled water from the plant would be pumped into the basins. The basins would be set up to flow through in series to allow residual fines in the water to settle in the ponds prior to recycling into the plant. It is preferable that the recycled water be clean and free of fines before being reintroduced into the process circuit.

2.4.5 Water Storage Basins (WSB's) (In-Pit Mining & Processing)

It is anticipated that the Phase 1 WSB's would serve the project during the mining of the Starter Pit and up to 5-20 panels of subsequent mining and in pit processing. Once the two plants move up the gulch 2,000-4,000 feet, the WSB's would be moved to new locations in the gulch, downstream of the active mining panels, in completed, backfilled panels or alternatively the WSB's would be built on native ground along the south side of the gulch. In the event the WSB's are constructed on backfilled residual alluvium in the gulch, no new disturbance would occur. In the event that they are located on the side of the gulch the first set of post-Phase 1 WSB's (WSB-08, WSB-09 and WSB-10) would be in an area previously disturbed by the dredging operation. WSB-13, WSB-14 and WSB-15 would be located on previously undisturbed areas.

Three WSB'S would be constructed with the same approximate dimensions and volumes as they are moved upstream. However their exact dimensions may be altered to optimize the configuration in relation to topography and pumping needs.

Once a subsequent set of WSB's have been constructed and filled with water, the previous set of WSB's would be decommissioned. In the case of the Phase 1 Plant Site and alternate WSB's, liners would be perforated, folded in place, and the basins backfilled with residual alluvium from the pit or the RASA. The surface would be regraded to the approximate original contour and reseeded. In the case of WSB's constructed on the backfilled residual alluvium, the liners would be perforated, folded and buried in place, and the basins contoured to blend with the surrounding topography. More information on the final reclamation configuration is provided in Section 2.7.

2.4.6 Process Water

Process water would be obtained from A. U. Mines' well ("Murphy Well"), Permit # 53102 located on the PA # 47 placer mining claim (NMC 1008915), located in Section 22, T. 8 N, R. 43 E, MDB&M. (Mines Group, 2010), Attachment A: Drawing AUM-202).

Water would be pumped from the Murphy Well to the WSB's then from the WSB's to the process plant via pipelines laid on the ground surface alongside of or adjacent to the access roads. All pumps and pipelines are new construction.

The process water would be obtained from the Murphy Well and from recycled make-up water from the Water Storage Basins. Anticipated process water demand and usage is estimated to be 3,300 gallons per minute (gpm) per plant. Process water demand does not represent the pumping rate at the Murphy Well. Water from the Murphy Well will be pumped at an average of 390 gpm, up to the annual water right duty of 629 acre-feet, to fill the Water Storage Basins. Water from these basins will be used to meet process water demand (3,300 gpm). Over 90 percent of process water is anticipated to be recovered from plant operations and recycled back to the basins for reuse. The remaining 10 percent (approximately an annual average of 330 gpm) would need to be supplemented from the Murphy Well depending on plant operations specifics.

2.4.7 Process Chemicals and Reagent Storage

No mineral processing chemical or reagents would be used in the operation. To enhance settlement of suspended fines in the WSB's flocculant may used. Flocculants would be stored at the shop until needed in the WSB's.

2.4.8 Electrical Lines and Portable Substation

Commercially generated electricity is available from NV Energy (or its subsidiary Sierra Pacific Power Company) in the Manhattan Gulch area. Sufficient capacity is available to handle the requirement of the Manhattan Gulch Mine. Power would be obtained from the Manhattan substation; two available power lines pass through the mining area, one on the north side and the other on the south side of Manhattan Gulch. These power lines are within existing right of ways held by NV Energy.

The north side line (13,800 volts) would supply power to the Administration Building and the Shop Area. Power would be obtained from one or two drops feeding one or two pedestal type transformers. This would be on private land, the patented Monday Fraction mining claim.

Mine electrical power would be supplied from one of two existing NV Energy power lines (either the North Side or South Side power line, Figure 4). The South Side power line is the primary high voltage (60,000 volts) line supplying power to the Manhattan substation. There is currently an under-built line (where electrical wires are installed on existing power poles, usually below the existing wires) on this same pole line that carries a secondary voltage (13,800 volts). The under-built line is constructed about half the distance to the Starter Pit where mining would commence (near to the Murphy Well). Additional under-built lines would need to be installed on the existing power poles for the remainder of the distance to the Murphy Well. The North Side line feeds into an existing substation near the starter Pit (Figure 4). NV Energy plans to re-energize the North Side line to supply power to operations that occur west of the Murphy Well and supply power via the South Side line once the operations reach near to the Murphy Well.

Mine power would be obtained by tapping into the power lines at temporary locations along the lines and would be moved as operations progress up Manhattan Gulch. The 13,800-volt power would be stepped down to 4,160 volts by portable or temporary transformers. All transformers used by A.U. Mines will be certified PCB-free transformers. The typical normal transmission voltage for mine service trailing cables run on the ground is 4,160 volts. This voltage will be stepped down to 480 volts at the process plant motor control centers for mine service application.

Power lines from the portable transformers to the motor control centers would be on the ground with MSHA approved trailing cable designed for this type of application. Trailing cables are typically used for equipment that is moved often, and can be moved on the ground as equipment is moved. No new permanent power line construction is anticipated. All of these trailing cable lines would be within the proposed Plan of Operations area.

2.4.9 Bedrock Drain

A bedrock drain system would be installed in the Starter Pit to manage stormwater and subsurface interflows in the pit. It would consist of a system of perforated, horizontal collection pipes laid on the pit floor of mined out blocks that would feed into a concrete vertical manhole that would be constructed in the completed Starter Pit. As mining moves up the gulch additional manholes closer to the active pit area

would be installed. The manhole(s) would provide a means to collect and sample water in the Gulch at the lowest, downstream point in the mining area for the duration of the project.

The concrete manhole risers would be added as the depth of the backfill increases incrementally as the pit is backfilled. Perforated collection pipes would be installed along the bedrock surface into the open pit blocks as mining progresses east, up the gulch. These collection pipes would be extended into subsequent mining blocks once mining is complete in that block. Once the pipe is installed, it would be covered with residual alluvium backfill. Additional manholes, collection pipes and distribution pipes would be constructed at variable intervals to manage stormwater and subsurface interflow in the dredge tails and backfilled alluvium entering the active mining areas. Water that is collected would be used in the operation when possible, or allowed to re-infiltrate into downstream alluvium via the downstream distribution pipe network (Mines Group, 2010), Attachment A, Drawing AUM-114).

The Nevada Division of Environmental Protection, Bureau of Mining Regulation and Reclamation, Regulation Branch issued Water Pollution Control Permit NV2009103 that requires that the bedrock drain be sampled quarterly to demonstrate compliance with state water quality standards.

2.5 Maintenance Shop, Warehouse & Gold Room

Ancillary facilities would be constructed on the Monday Fraction patented mining claim owned in fee simple title by Peavine Ranches LLC and leased to A.U. Mines Inc. Because all of the facilities would be retained for future ranch use these would not be demolished upon completion of mining.

These include the following (Mines Group, 2010), as shown in Attachment A on Drawings AUM-150-152):

- An administration building and parking lot;
- Maintenance shop, warehouse and yard (work) area;
- Gold Room recovery building;
- Silverbell Gold Room alternative.

The Gold Room is a small secure building where final gravity processing of gravity concentrates from the Processing Plant(s) is further concentrated to produce a saleable, shippable product. The project proponent would locate this facility either on the Monday Fraction or the Silverbell Mining Claim. Location of the Gold Room would be subject to final design of facilities. Both locations are shown in Figure 5. The Silverbell location would involve an additional one (1) acre of disturbance on public lands.

2.5.1 Administration Building and Parking

This area would be approximately 1.4 acres and includes a parking area for approximately 50-60 vehicles and an administration building approximately 50 feet by 75 feet (3,790 square feet or smaller). The building would probably be a single story steel building on a permanent slab in order to facilitate use for the ranch operations once the mine operations are completed. It is planned that it would be used for both future mine and current and future ranch activities.

All vehicular traffic other than mine production and service vehicles and certain delivery vehicles would be restricted to this area. All employee transportation and parking would be in this parking lot and employees would either report to the administration building or the shop warehouse for work. Delivery vehicles would be required to report to the administration building and when needed authorized to deliver to the maintenance shop/warehouse or to the Gold Room Building. Ingress and egress permits would be obtained from the Nevada Department of Transportation and all of these access points would be constructed in compliance with NDOT requirements.

Electrical power would come from a new service connection and transformer from the existing power line that passes directly by this facility.

2.5.2 Maintenance Shop Warehouse Facility

This area would be approximately 3.9 acres and includes the Maintenance Shop/Warehouse building, yard area and fueling station. This entire area would be bounded by a berm and graded to manage stormwater (Mines Group, 2010; Attachment F and A; Drawings AUM-151 & 172).

The Maintenance Shop/Warehouse building would be a single story steel building with two (2) pass-through maintenance bays and oversize roll-up doors that would accommodate four to six (4-6) pieces of equipment for servicing and maintenance. There will also be a floor drains inside the maintenance shop that will drain to the oil and water separator shown on Drawing AUM-151. Washing of vehicles will be conducted inside the maintenance shop and drainage from washing will likewise enter the oil and water separator. The building would also accommodate a warehouse for parts and supplies, and small offices for maintenance and mine supervisory personnel.

The yard area would include areas for storing heavy equipment, conveyors, machinery and other mine equipment. It would also have a lined, temporary holding pad for petroleum contaminated soils (PCS) approximately 30 feet x 100 feet to manage any hydrocarbon (petroleum) spills and sediments associated with the project. The details for this facility are provided in Attachment G the Spill Prevention Control and Countermeasures (SPCC) Plan (Mines Group, 2010)).

2.5.3 Fuel Storage and Handling

The fuel tanks would be above ground storage tanks that meet requirements of the Uniform Fire Code with built-up secondary containment. The tanks would be secured and locked during all times that they are not being actively accessed or personnel are not on site. They would be placarded to identify the nature of fuel, emergency procedures and emergency phone numbers. There would be two 10,000-gallon tanks for off-road diesel, one (1) 1,000-gallon tank for service vehicles and one (1) 1,000-gallon tank for gasoline.

The tanks would be placed within a permanent reinforced concrete, secondary containment structure with a concrete curb with 11,000 gallons of secondary containment capacity (110% of the largest tank).

Fueling would be conducted immediately adjacent to the tank area on a lined and bermed service pad for outside fueling and fuel transfer.

Fueling and equipment servicing at the Shop/Maintenance facility would be performed on a reinforced concrete slab within the maintenance shop with a spill containment sump. All mining equipment would be operated and stored within the plant or pit areas. All fueling and servicing equipment in the mining area would be performed with mobile service vehicles and tank trucks on appropriate containment. These may either be double lined tanks on trailers or on pre-fabricated, portable containment structures. Routine fueling and servicing would be performed on designated lined containment areas (see SPCC, Section 3.9).

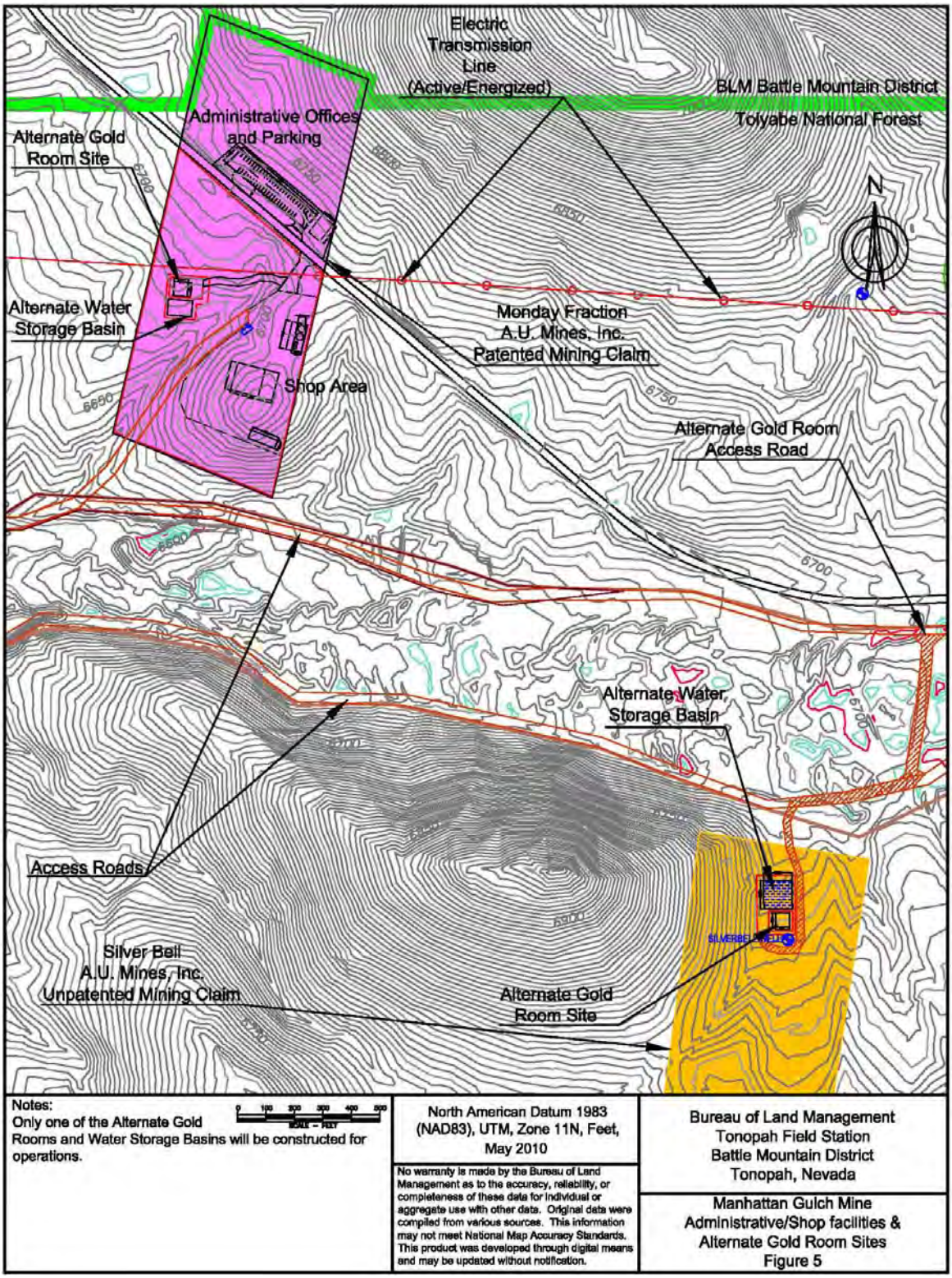
Spill contingency plans are described in Attachment G, Spill Prevention Control and Countermeasures Plan and Drawing AUM-151 (Mines Group, 2010), Attachments G and A).

2.6 Workforce

At full operating capacity, the Project Proponent would employ a total of about fifty to seventy-five (50-75) people. A.U. Mines Inc. would ensure that each employee is MSHA-certified, with new-hires receiving the prescribed training and certified miners receiving the prescribed annual refresher course.

The Manhattan Gulch Mine would normally operate 20 hours a day, 270-300 days a year. However, it may operate up to 24 hours per day, up to 365 days per year if weather and other factors are favorable. There would normally be a planned seasonal closure of the operation during winter months when weather conditions are unfavorable to the wet recovery processes (Mines Group, 2010); see Section 9, Plan for Seasonal Closure of Process Components). During these seasonal closures, reclamation activities would normally be performed with available equipment, primarily dozers.

Figure 5. Administrative/Shop Facilities & Alternate Gold Room Sites



2.7 Reclamation

The residual alluvium backfilled into the gulch will be contoured and graded to a gently sloped or rolling surface to blend into the surrounding terrain. It would be graded and reseeded with native perennial plants compatible with the existing native plant communities.

The RASA would be built using scrapers or trucks that would deposit the residual alluvium in lifts. This would allow for construction of the slopes to the final grade during placement, between approximately 2.5H:1V and 3H:1V on the out slopes on the west and north sides. It would be built up in the three elevation phases as shown in Drawing AUM-115 (Mines Group, 2010)).

The RASA has been designed to blend with the existing ridge, extending the current ridge top to the northwest. The final height of the RASA will be between elevation 6310 and 6430 feet amsl, depending upon the actual amount of alluvium placed there. The design of the RASA ties it into of the ridge on the south end so that the ultimate height of the RASA is the same as the exiting elevation of that ridgeline design extends the current ridge out approximately 550 feet to the northwest and a maximum of 145 feet above the existing elevation at the deepest point of the RASA.

The final surface on the Residual Alluvium Storage Area and the Phase 1 Plant Site would be prepared and constructed with the alluvial gravels mixed with fines to produce a suitable growth medium. The blending of fines on this final surface will enhance the water holding capacity of the growth medium. The blended medium will provide a physically and erosionally stable land surface.

WSB's would be backfilled to approximately original grade where they are located at the Phase 1 Plant Site and at both of the proposed alternate WSB areas. Should WSB's be constructed in the Gulch they would be backfilled and regraded to the approximate original contour.

Once areas have been graded and contoured, each area would be ripped to provide a rough and furrowed surface to hold seed and moisture. In the arid west, rough surfaces on slopes enhance water capture, infiltration and retention of meteoric water. It also mitigates erosion from surface water run-off and creates microhabitats for different types of seeds.

Most seeding will be accomplished with broadcast seeding. The RASA, Phase 1 Plant Site, WSB's and reclaimed mining areas would be revegetated with the same seed mix. Seed mixes may be adjusted in consultation with BLM and NDEP personnel. Seed will be purchased from commercial seed suppliers.

Seeding would be conducted in the late fall to benefit from winter and spring precipitation. Spring seeding may also be conducted if fall seeding is not possible.

Seeding rates would generally vary between 5-8 pounds of weed-free, pure live seed (PLS) per acre, depending on the mix. The critical factor is to have sufficient number of seeds per square foot to achieve a satisfactory density of seedlings, but not too dense as to cause excessive seedling competition.

An appropriate seed mix will be developed in consultation with BLM resource specialists. Since the native vegetation here is a shrub dominated plant community, native species consistent with this vegetation zone will be determined. The project proponent would need to make every effort to prevent introduction of noxious weeds, primarily through the use of certified, weed-free seed. Practices as identified in the Integrated Weed Management Practices for the Tonopah Resource Management Area will be employed as appropriate.

The proposed mine would operate for approximately ten (10) years. Reclamation would be performed concurrently with mining, as soon as surface facilities and backfilled blocks are completed. Final reclamation, maintenance and vegetation monitoring would be performed for approximately 3-5 years after completion of mining, until reclamation success has been demonstrated and financial assurance released.

Reclamation costs have been calculated (Mines Group, 2010) and a reclamation bond would be required by the BLM prior to approval of the plan. Reclamation costs include regrading and revegetation of the RASA, backfilled mining areas, and Phase 1 Plant site, and WSB's; regrading of the pit walls, regrading and contouring of roads, demolition and removal of structures and fences on BLM-administered public lands, removal of potential solid and hazardous wastes; post-reclamation reclamation monitoring and

maintenance, ground and surface water monitoring, construction management and support, engineering design and construction, contingency, insurance, performance bond, contractor profit, contract administration, BLM indirect cost.

2.8 Exploration

Large areas primarily along the south side of Manhattan Gulch and into the flats and washes coming in to the Gulch from the south were never mined by the Natomas Dredge and would be explored as part of the Proposed Action. Exploration drilling, sampling and placer processing would provide definitive information to determine the extent and configuration of mining in these areas. Bulk sampling may occur in advance of mining in these potentially mineralized zones. A total area of up to 10 acres for bulk sampling has been accounted for in the Reclamation Cost Estimate.

These areas potentially contain resources that can be mined in conjunction with the mining and processing of the Natomas dredge tails. They are identified as potential expanded mining areas that cover up to 163 acres included in the Plan of Operations. Of these 163 acres, 32 acres are for alternative Water Storage Basin Areas and 131 are potential expanded mining areas. In the event the exploration does not prove these areas to be mineralized, they would not be disturbed by mining. Both exploration and mining would be conducted as part of the Proposed Action. These potential expanded mining areas are shown in Drawings AUM-101-104 (Mines Group, 2010), Attachment A).

Exploration drilling would be conducted concurrently with the early stages of mining with a Becker hammer drill. The Becker hammer drill is a track-mounted, reverse circulation (RC) drill. All of the exploration areas can be accessed via existing roads or overland from existing roads. No roads need be constructed, no drill fluids would be used or mud pits needed. The drill holes are classified as “borehole[s]” (NAC 534.047) and would be drilled to bedrock or less. Since “the elevation of the bottom of the borehole is higher than the natural elevation of the uppermost saturated groundwater stratum”, the holes can be plugged by “backfilling from the bottom of the borehole to within 10 feet of the surface with uncontaminated soil; and placing concrete grout, cement grout or neat cement from 10 feet below the surface to the surface” (NAC 534.4371 4 (a) & (b)). Drill holes would usually be plugged immediately upon completion of drilling, but in no event more than sixty (60) days after it is drilled. (NAC 534.4371 1.).

All of the exploration areas have been included in the Proposed Action, although it is most likely that only some of these areas would have economic concentrations of gold or other placer minerals.

2.9 No Action Alternative

The No Action Alternative provides a useful baseline for comparison of the environmental effects of the proposed action and demonstrates the consequences of not meeting the purpose and need for the action. Under the No Action Alternative the Proposed Action would not be undertaken. Exploration drilling by A.U. Mines could continue under their existing notice. The mining landscape of Manhattan Gulch would remain as it is. The historic dredge tailings would remain poorly vegetated and as degraded habitat.

2.10 Alternatives to the Proposed Action (40 CFR 1502.14)

There is no placer mining technology or methods which would provide a less impacting alternative. There are no unresolved environmental conflicts in the proposed action which would drive the creation of any alternatives which would still meet A.U. Mines’ purpose for the project to mine the placer gravels in Manhattan Gulch. Therefore, only the Proposed Action and No Action Alternatives will be further analyzed in this EA.

3 AFFECTED ENVIRONMENT (40 CFR 1502.15) ENVIRONMENTAL CONSEQUENCES (40 CFR 1502.16) AND PROPOSED MITIGATION OR AVOIDANCE MEASURES

This section describes the existing environment of the proposed project area, and how the area would be affected by the Proposed Action. It includes descriptions of physical, biological, and human resources in the project area. Data for the discussion was gathered during field investigations, taken from the Tonopah

Resource Management Plan (RMP), excerpted from contacts with BLM and other federal, state and local resources personnel, and consolidated from a review of related literature.

3.1 Supplemental Authorities

To comply with the National Environmental Policy Act (NEPA), the Bureau of Land Management is required to address specific elements of the environment that are subject to requirements specified in statute or regulation or by executive order (BLM 1988, BLM 1997, BLM 2008). The following table outlines the elements that must be addressed in all environmental analyses, as well as other resources deemed appropriate for evaluation by the BLM, and denotes if the Proposed Action or No Action Alternative affects those elements.

Table 2. Supplemental Authorities – Elements that Must be Addressed

Supplemental Authority[1]	Not Present[2]	Present/Not Affected	Present/May be Affected[3]	Rationale
Air Quality			X	Mining activities, including traffic on dirt roads would create fugitive dust.
Area of Critical Environmental Concern (ACEC)	X			There are no ACEC's present in or near the project site.
Cultural/ Historical			X	Cultural and historical resources within the project area have been or would be identified and any significant resources that might be adversely affected would be mitigated.
Environmental Justice	X			There are no minorities in vicinity of project area.
Farmlands Prime or Unique	X			None in or near the project area.
Invasive Non-native Species			X	Hoary Cress, Russian Knap Weed, Puncture Vine, Salt Cedar may be present.
Native American Religious Concerns			X	Tribes, one group and individuals visited the Project Area. Would be consulted.
Floodplains	X			None in region around project area.
Riparian/ Wetlands/	X			Riparian plants are found within the project area but are due to previous mining activities. No native riparian/wetland habitats are found within the project area.

[1] See H-1790-1 (January 2008) Appendix 1 Supplemental Authorities to be Considered.
[2] Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward for analysis or discussed further in the document.
[3] Supplemental Authorities determined to be present/May be Affected *must* be carried forward for analysis in the document.

Supplemental Authority[1]	Not Present[2]	Present/Not Affected	Present/May be Affected[3]	Rationale
Threatened, Endangered Species.	X			There are no threatened or endangered species in or near the project area.
Migratory Birds		X		Disturbance during the nesting season (March 1-July 31) would require survey and avoidance if a nest is found.
Waste – Hazardous/Solid			X	Solid wastes would be legally disposed offsite. Operator has contingency plan for potential spills of hydrocarbons.
Water Quality		X		Testing of placer gravels indicates no potential for adverse effects to surface or groundwater quality.
Wild & Scenic Rivers	X			There are no Wild and Scenic Rivers in or near the project area.
Wilderness	X			There are no designated wilderness areas in or near the project site. Alta Toquima Wilderness is a minimum of 16 miles northeast of project area
Forests and Rangelands (HFRA only)	X			There are no forests or rangelands defined by HFRA in or near project area.
Human Health and Safety.		X		Placer mining would have no effect on public health or safety.

In addition to the critical elements of human environment, there are other biological, physical and human resources the BLM considers in the NEPA process. Other resources that have been identified that may be present in the project area, and are analyzed in this EA are shown in Table 2.

Table 3. Other Resources Considered

Other Resources	Not Present[4]	Present/Not Affected	Present/May be Affected	Rationale
Grazing Management			X	Temporary reduction of 8 AUM's to San Antone allotment. Reclamation would enhance rangeland.
Land Use Authorization			X	Powerline rights-of-ways in project area would not be affected. SPPCO/NV Energy would need to amend their ROW to address the changes in configuration of power service lines and transformers. Access to patented land and mining claims would not be cut off.
Minerals			X	Placer gold resource in Manhattan Gulch would be mined.
Paleontological Resources			X	Pleistocene vertebrate fossils have been found in Pleistocene gravels located on low terraces and at the base of the gulch. Any significant resources that might be adversely affected would be mitigated.
Recreation			X	Project area would be off-limits to recreational traffic. Recreational traffic would be able to navigate around project.
Socio-Economic Values			X	Peak of 50-75 employees. Positive local economic impact. Potential effect on local housing market and schools.
Soils			X	Reclamation of Manhattan Gulch would allow soil regeneration. Mining of peripheral areas would disturb soils.
Special Status Animals			X	Special Status Species may exist (burrowing owls and possibly bats). Need survey for burrowing owls.
Special Status Plants			X	Vegetation survey was performed, including for Eastwood Milkweed, Paiute Gr. Gentian, Toquima Milkvetch. None found.
Vegetation			X	Manhattan Gulch would support vegetation after mining. Mining of peripheral areas would disturb vegetation.
Visual Resources			X	Mining would not be visible except for proximal viewers. New buildings and equipment on adjacent to State Route 377.
Water Quantity			X	Modeling of groundwater cone of depression indicates no impacts to

[4] Other Resources determined to be Not Present or Present/Not Affected need not be carried forward for analysis or discussed further in the document based on the rational provided.

Other Resources	Not Present[4]	Present/Not Affected	Present/May be Affected	Rationale
				resources or other users.
Wild Horses and Burros	X			None in or near project area
Wildlife			X	Potential effect on small or burrowing species

3.2 Description of the Affected Environment and Environmental Consequences (40 CFR 1502.16)

For purposes of quantifying the relative impact of the Proposed Action and alternatives, an impact analysis area has been defined for soils, vegetation and wildlife. This also is used for the Cumulative Effects Study Area for these resources. This Impact Analysis Area is based on the following criteria:

- Within the same watershed (hydrographic sub-basin 137A);
- Location (east side of the Big Smoky Valley in the low, west-facing foothills of the Toquima Range);
- Along the boundary of the valley floor of the Big Smoky Valley and the foothills (approximately 6000 feet amsl), and the higher elevations characterized by thinner soils, more alpine climate and higher annual precipitation zone (approximately 6750 feet amsl); these are the approximate bottom and top elevations where the subsequent characteristics change;
- Slopes ranging from 5-10%;
- Similar soil types;
- Similar vegetation (black sage/grassland).

Figure 7. Impacts related to other resources are identified in the respective sections.

3.2.1 Air Quality

Affected Environment

Mean annual temperature in the Smoky Valley is approximately 50 degrees Fahrenheit. Winters are short and moderately cold with temperatures slightly below freezing. Summers are short and hot with the highest temperatures around 90 degrees. Precipitation is 6.5 inches per year in Smoky Valley (Western Regional Climate Center, 2009). Maximum average monthly precipitation occurs during the month of August, but the majority of annual precipitation falls during the winter months with heavy snowfall in the mountains.

Air quality is defined by the concentration of various pollutants and their interactions in the atmosphere. The baseline air quality in rural central Nevada is typically moderate to good. Air quality at the Manhattan Gulch Mine Project area is good, and currently meets state and federal air quality criteria for particulate, gaseous and trace metal contaminants except during unusual conditions.

The project area is located in a basin that is “un-classified” area for air pollutants. There are no non-attainment areas in the vicinity of the project. Total suspended particulate (TSP) and particulate matter less than 10 microns in diameter (PM-10) in the study area are currently generated by vehicle traffic on dirt roads, wind events, and livestock handling. The mining operation would not be located adjacent to any other industrial sources.

Although air quality throughout rural northern Nevada typically meets federal and state ambient air quality criteria, the region is subject to infrequent, short-duration wind-blown dust storms. These storms can create particulate levels above the 24-hour standard. However, federal and state “exceptional event criteria” for strong wind gusts and elevated wind speeds exempt excursions due to storm and wind events from regulatory enforcement action.

Environmental Consequences of the Proposed Action

Project activities such as mining, loading and haulage, project traffic on dirt roads and exploration drilling, would generate fugitive dust. Placer processing with the use of water would generate only small quantities of dust. Residual alluvium would have approximately 8% moisture content and release negligible amounts of dust during haulage to the RASA or to backfill.

The operation of engines in earthmoving and processing equipment would emit sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC) and would have a localized effect on air quality during the life of the mine. Engine exhaust emissions are restricted by the Mine Safety and Health Administration (MSHA), the State of Nevada and the National Ambient Air Quality Standards.

Point source emissions from processing would consist of a maximum of seven (7) tons per year (tpy) of particulate matter (PM_{10}) from the Phase I processing plant transfer points and a total of 5.5 tons per year PM_{10} from both in-pit processing plant transfer points. These emissions are less than the 100 tpy Class I permit threshold and therefore constitute a Class II "Minor Sources" Air Permit (BAPC, 2010). At the Phase I Plant Site, the maximum 24-hour PM_{10} concentration above background was predicted at 29.9 µg m^{-3}, and the annual average was 2.19 µg m^{-3} (JBR, 2009). Due to the continuous movement of the In-Pit Plants I and II, the location chosen to model represented the situation where impacts along the property boundary are likely to be highest, due to the location of the pits and in-pit plants as well as the predominate wind directions at the site. At the In-Pit Plant site, maximum 24-hour PM_{10} concentration above background was predicted at 0.025 µg m^{-3}. Annual average was predicted at 0.006 µg m^{-3}. When added to generic rural PM_{10} background levels considered representative of the Manhattan Gulch site (10.2 and 9.0 µg m^{-3} for 24-hour and annual, respectively), these predictions are less than the Nevada and National Ambient Air Quality Standards (NAAQS) for PM_{10} (150 and 50 µg m^{-3} for 24-hour and annual, respectively) and less than Class II Particulate Matter Prevention of Significant Deterioration (PSD) Increments (17 and 30 µg m^{-3} for 24-hour and annual, respectively). A.U. Mines has received from NDEP-Bureau of Air Pollution Control (BAPC) a Class II Operating Permit for the plant and a Surface Area Disturbance Permit (SAD) for the remainder of the operations (Permit Number: AP1041-2631; FIN: A1076). The availability of line power to the plant and administrative facilities reduces the emission of gaseous pollutants such as sulfur dioxide (SO_2), oxides of nitrogen (NO_x), carbon monoxide (CO), and volatile organic compounds (VOC). The only gaseous pollutants emitted will be from a single emergency electrical generator which will operate no more than 500 hours per year. Modeling has shown none of the gaseous emissions to exceed NAAQS for CO, SO_2, and NO_x. The locations and description of modeling for the Phase I and In-Pit Plants are shown in detail in Manhattan Gulch Mine Application for Class II Air Quality Operating Permit (Mines Group, 2010).

Exploration drilling would produce relatively small quantities of particulate emissions. Exploration for this project does not require any additional road construction (other than those required for mining). Drilling would be done with a Becker hammer drill that may have only minor quantities of dust when samples are removed and bagged. Some trenching would be conducted to collect larger samples for extractive tests in advance of full-scale mining, primarily in the proposed expanded mining areas. Excavation would occur for durations of 1-10 days over a period of up to two weeks. Some fugitive dust may be generated at these times.

The Proposed Action would not have a significant impact on air quality because of the wet processing of placer gravels and environmental mitigation measures that would be employed,

Environmental Consequences of the No Action Alternative

The No-Action alternative would also result in a short-term increase in dust during travel to and from the site for the purpose of exploration drilling already permitted under BLM Notice of Intent NVN-82995. Some limited short-term generation of dust associated with completion of the remaining reclamation at the site would also occur.

Mitigation Measures for Air Quality

Fugitive dust on the haul roads from surface ore haulage and from the plant site to the RASA would be controlled by watering. Also, Phase 1 of the project would only be conducted during the first 1-2 years of operation. Subsequently, all placer gravels and residual alluvium handling would be by conveyor during in-pit processing. Wet processing of the placer gravels would eliminate dust emissions during processing and transport and disposal of the residual alluvium. Once reclamation was completed, air pollution concentrations would return to near pre-mining levels.

3.2.2 Cultural, Historical and Paleontological Resources

Affected Environment

The Manhattan Gulch area has a long mining history whose surface features still persist to this day. Historical mining began within the Project Area in 1866 and continued intermittently until 1938. In 1938, the Natomas Company initiated a dredging operation, the most significant placer operation in the gulch. The Natomas dredge was an all steel bucket line dredge which began operation about one-half mile west of the gulch mouth and progressed five miles east, up the gulch. The Natomas dredge ceased operations in the gulch in 1946. Its processed waste materials were deposited in large piles, or boulder piles, that dominate the landscape to this day (Kautz, 2010).

Class III cultural resources surveys were performed (Kautz, 2007; Kautz, 2010) (Figure 6 - Cultural Survey Areas). All cultural sites and architectural components identified during the field inventory were recorded to the reporting standards required by the *State protocol agreement between the Bureau of Land Management, Nevada and the Nevada State Historic Preservation Office for implementing the National Historic Preservation Act dated October 26, 2009* (State Protocol Agreement). Isolated finds identified during the inventory were tabulated and summarized. Standing structures were recorded on the Nevada Historic Properties Inventory Form.

Fifty one cultural sites were identified during the surveys. Eleven of the 51 sites were determined to be eligible for the National Register of Historic Places (NRHP) as properties of local and regional significance. Of those 11 sites, six will be adversely impacted by the mining project. One of the 51 sites was a prehistoric lithic scatter determined to not be eligible for the NRHP. The remaining 50 sites were historical sites related to mining.

Recommendations regarding site eligibility to the NRHP were made for the retention of historic integrity and other required historic preservation. These recommendations were developed based on the field evaluation using experience and professional judgment. Sites that were found to not retain integrity and/or meet these criteria were recommended NOT eligible to the National Register of Historic Places (NRHP). Those sites which are found to retain integrity and meet one or more of the four criteria set forth in 36 CFR 60.4 were recommended eligible to the NRHP. These include six exclusively historical mining features within the area of the Proposed Action, and the historic dredge tails themselves (Kautz, 2010).

Throughout the area, Ordovician age beds of dark slate contain fossil remnants or numerous species of graptolites. Outcrops of these beds are associated with Salisbury Mountain, Mount Moriah, Gold Hill, Black Mammoth Hill, Palo Alto Hill, Timber Hill Gulch, Mayflower Gulch and the mouth of Old Manhattan Gulch. There are also isolated outcrops or Permian age sandstone with compressed poorly preserved fossils. Several species of brachiopods have been identified in these outcrops. The graptolites and brachiopods are common invertebrate fossil fragments with no scientific interest.

Of concern are vertebrate fossil fragments that have been found in the Pleistocene gravels of Manhattan Gulch. These gravels are found in the bottom of the gulch on low-lying terraces. They belong to animals in the genera Equus, Elepahs, Rangifer and Bison. There was also a fragment of tusk belonging to a mastodon or mammoth. Mining operations may disturb these gravels.

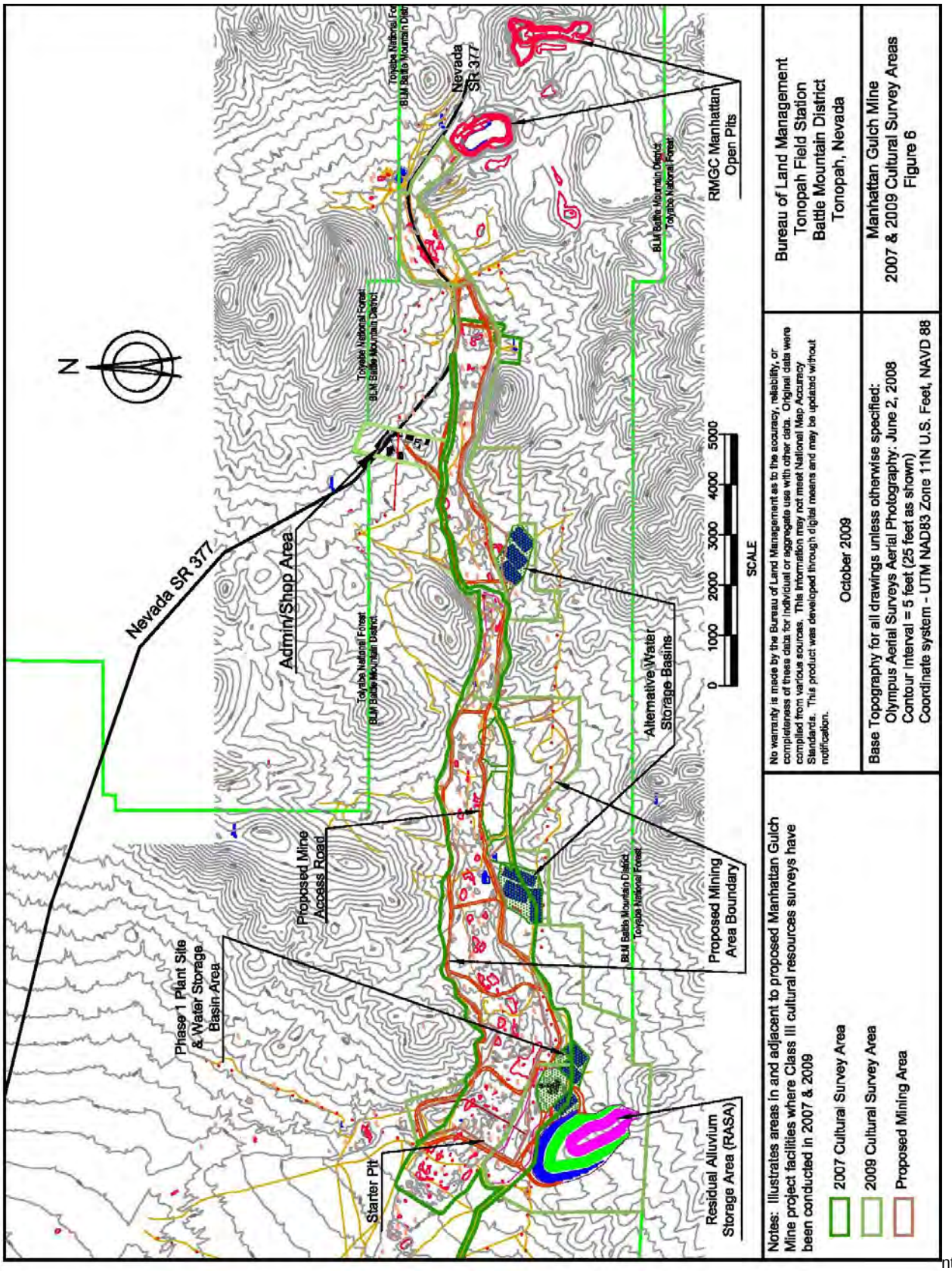
Environmental Consequences of the Proposed Action

Archaeological surveys were conducted on approximately 1,038 acres of land. The Proposed Action would affect approximately 550 acres of land; 545 acres managed by the BLM and five acres of patented fee lands.

Eleven of the 51 indentified sites were determined to be significant. Of those 11 sites in the area of the Proposed Action, six (6) would be adversely affected by the Proposed Action. A Historic Properties Treatment Plan (HPTP) will be developed to mitigate adverse effects to those sites. The remaining five (5) sites would be avoided by the Proposed Action.

Should vertebrate fossils or fragments be found during ground disturbing activities, the permit holder shall suspend all operations within 100 meters of such discovery, contact the BLM Authorized Officer by phone, and protect it until the BLM Authorized Officer issues a Notice to Proceed.

Figure 6. 2007 & 2009 Cultural Survey Areas



Environmental Consequences of the No Action Alternative

Under the No Action Alternative, no cultural resources would be affected. Exploration activities would avoid and not affect any cultural, historical and paleontological resources.

Mitigation Measures for Cultural Resources

A Historic Properties Treatment Plan (HPTP) will be developed and agreed to by BLM and SHPO. All adversely affected cultural and historical sites will be mitigated using the HPTP. Architectural structures and features will be documented to the standards of Appendix G of the State Protocol Agreement.

Any cultural or paleontological resource (historic or prehistoric site or object,or Native American human remains, funerary item, sacred object, or objects or cultural patrimony discovered by the permit holder during the course of the proposed action shall be immediately reported to the BLM Authorized Officer by telephone, with written confirmation. The permit holder shall suspend, operations within 100 meters of such a discovery and protect it until the BLM Authorized Officer issues a Notice to Proceed. Operations may resume only upon written authorization to proceed from the Authorized Officer. The BLM will, as appropriate, evaluate the significance of the find within 10 working days and determine the need for mitigation. A.U. Mines will bear the cost of investigations and any mitigation.

3.2.3 Native American Religious Concerns

Affected Environment

Manhattan Gulch lies within the traditional territory of the Western Shoshone. The project area has heavily disturbed by historic mining and grazing. Various tribes and bands of the Western Shoshone have stated that federal projects and land actions can have widespread effects to their culture and spiritual beliefs as they consider the landscape as sacred and provider. Sites and resources considered sacred or detrimental to the continuation of tribal traditions include, but are not limited to; prehistoric and historic village sites, sources of water (hot and cold springs), pine nut gathering locations, sites of ceremony and prayer, archaeological sites, burial locations, “rock art” sites, medicinal/edible plant gathering locations, areas associated with creation stories, or any other tribally designated Traditional Cultural Property. Specific locations in the vicinity of Manhattan Gulch were not identified or shared. However, this does not mean that they do not exist. Future Native American Consultation in the area may reveal such sites, activities or resources.

Environmental Consequences of the Proposed Action

The project is located in an area that has been heavily impacted by historic dredge and placer mining. Any significant traditional, sacred or historic sites that might have been present in the project area would most likely have been destroyed by these historic mining operations. The Proposed Action does not appear to have the ability to compromise the integrity of any traditional, spiritual, cultural or ceremonial use area.

The Yomba and Duckwater Shoshone Tribes, along with the descendents of Big Smoky, were notified of the proposed project on November 3, 2009. On November 17, 2009, BLM Tonopah Field Office staff and management participated in an onsite tour or the proposed disturbance with members of the Big Smoky Western Shoshone Descendents group. Maurice Frank Churchill from the Duckwater Shoshone Tribe was also in attendance. There were concerns about possible impacts to burials associated with Mt. Moriah Cemetery. The project boundary was found to be 75-100 meters form the cemetery. Burials are separated from mining activities by a hill and fencing. Results of the cultural surveys were discussed and participants concluded that the previous mining explained the lack of prehistoric artifacts and significant cultural sites. The EA will be sent to the Yomba and Duckwater Shoshone tribes and the group, *The Native American Descendents of Big Smoky Valley*.

Environmental Consequences of the No Action Alternative

The project would not occur under the No Action Alternative and there would be no impact to Native American resources or values.

Continued exploration drilling in the No Action Alternative would have no anticipated impact to Native American resources or values.

Mitigation Measures for Native American Religious Concerns

The Proposed Action would comply with 43 CFR 10.4(g), that requires the holder of a Federal authorization to carry out land use activities to notify the BLM authorized officer by telephone and with written confirmation immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the mining operator must stop activities in the immediate vicinity of the discovery and protect it from activities for 30 days or until notified to proceed by the BLM authorized officer.

3.2.4 Waste – Hazardous/Solid/Sanitary

Affected Environment

Only non-hazardous solid waste (domestic solid waste, cardboard, paper, scrap materials, lumber and metal) would be generated by the project. These would be hauled offsite to a regional landfill. Smoky Valley is serviced by a single Class 2 regional county landfill located near Round Mountain. The Round Mountain Landfill has capacity for at least 35 more years (Smoky Valley Services, 2009). Arrangements have been made by A.U. Mines with Smoky Valley Services to pick up and dispose of project-generated solid waste.

A.U. Mines would use the following types of chemicals and petroleum products in the placer mining operation:

• Flocculants (non-hazardous chemical use to settle of fines from gravity separation process in WSB's);

• Diesel fuel (mining and processing);

• Petroleum lubricants (mining and processing);

The only wastes that may be generated from use of the latter chemicals would be accidental spills. As part of the SPCC, all spilled material would be removed from the spill area and disposed of in offsite facilities (SPCC, Attachment I to Plan of Operations) according to its waste classification (hazardous or non-hazardous).

Currently, the nearest hazardous waste site is located south of Beatty, Nevada, and approximately 150 road miles south of Manhattan.

Environmental Consequences of the Proposed Action

Delivery of parts and supplies to the mine and use of materials would generate domestic solid waste, cardboard, paper, scrap lumber and metal. Sanitary wastes would need to be contained. Solid waste would need to be removed from the site and periodically disposed of. Petroleum products could be accidentally released during transport to the mine site or during use or storage onsite. A release would contaminate underlying soils or alluvium.

Environmental Consequences of the No Action Alternative

The continuation of exploration drilling under the No Action Alternative would produce small quantities of solid waste and have a much lower potential for spills of petroleum products as compared to the Proposed Action.

Mitigation Measures for the Control of Solid and Hazardous Waste

Domestic solid waste, cardboard, paper, scrap materials, lumber and metal would be disposed of at the Round Mountain landfill.

A.U. Mines has prepared a Spill Prevention Countermeasures and Control Plan and an Emergency Response Plan, which would govern the transport of chemicals and diesel fuel to the mine site (Mines Group, 2010), Attachment I) and the handling of contaminated materials on site. The effects of a potential release of hazardous materials at the plant site would depend on the substance, quantity, timing, and location of the release. Such an event could involve a spill of petroleum product, or a process solution (flocculant). Procedures would be in place accordance with the SPCC Plan (Mines Group, 2010), Attachment I) to manage, store, respond to spills, and dispose of all materials that would be on site.

Any spills resulting in petroleum-contaminated soils would be transferred from the spill area to the designated temporary holding area near the Maintenance Shop area. The soil would be characterized and then transported by a licensed hazardous waste hauler to a licensed hazardous waste site. Procedures would be in accordance with Federal and state regulations.

The liner material and berm around the fuel storage tank at the mine would be tested for petroleum residue at cessation of mining, and disposed of according to applicable regulations.

Sanitary wastes at the Administration/Maintenance areas would be managed in an onsite septic system located on private lands. The system would be designed and permitted in accordance with State of Nevada regulations. Portable toilets at the mining area would be maintained by a licensed contractor and wastes removed to an approved offsite wastewater treatment facility. Upon completion of operations, all portable toilets would be removed from the site.

Diesel fuel would be stored in designated areas: inside a bermed and lined containment area. The containment areas are designed to contain 110% of the fluids in the largest tank in a given containment area.

3.2.5 Surface Water

Affected Environment

There is no physical evidence of regular, intermittent surface flows in natural drainage channels in the proposed mining areas, indicating that except for 100-year frequency or greater run-off events that are in response to short-duration high-intensity thunderstorms and/or rapid melting of an unusually heavy, snowpack, surface water flows do not occur. The 100-year, 24-hour storm is estimated at 2.4 inches of rainfall. For example, dredge tails mined in the 1940's show no evidence of channel flow or channel formation.

Water quality data for the ephemeral drainages does not exist. Meteoric Water Mobility Tests done on placer alluvium from the Gulch had good water quality. By extrapolation, surface water quality is likely of good quality for dissolved constituents, and moderate to poor quality for physical parameters such as suspended sediment and turbidity based on the characteristics that are typical for areas in this climate and central Nevada. Since any flows would be associated with high intensity, low frequency events, and the area in the upgradient watersheds is generally steep, flows would be expected to have high sediment loads.

Environmental Consequences of the Proposed Action

The potential for the proposed placer mining operation to impact surface water resources is very limited due to the absence of perennial watercourses and any apparent intermittent surface flows in the project area. Dredge tailings and alluvium in Manhattan Gulch are very permeable and would absorb surface water runoff. Therefore, placer mining in the Gulch would not likely impact surface water resources. Surface disturbing activities outside the Gulch at the RASA and Phase 1 plant site could increase the sediment load of infrequent surface waters passing through or around these facilities.

Though the total amount of project disturbance would be 550 acres, the maximum active disturbed areas would be 130 acres in Year 2 of the operations. After Year 3, the project disturbance would range from 30-60 acres, and nearly all of that disturbance would either be mining areas in the Gulch or the Water Storage Basins, which would not generate any surface run-off. Any minor sediment loads from disturbance areas would be directed into the placer pit, the potential sediments retained there, and infiltrated surface water collected in the bedrock drain.

Any surface water runoff and contained sediment load would be diverted into mining areas within the Gulch. No surface water would run off from the reclaimed dredge tails, and none would be expected from the re-configured residual alluvium.

As a result of the above described conditions and proposed mitigation measures, the Proposed Action would have minimal impact on the local surface water hydrology and water quality.

Environmental Consequences of the No Action Alternative

Exploration drilling using the track-mounted Becker drill causes minimal surface disturbance and would affect perhaps only 1% of the acreage as compared to the Proposed Action. The continuation of exploration drilling under the No Action Alternative would have a negligible impact on surface water resources.

Mitigation Measures for the Protection of Surface Water

Environmental management activities and mitigation to limit and control sediments are described in detail in the Plan of Operations. These include: 1) implementation of a Stormwater Pollution Prevention Plan (SWPPP), including sediment catchment basins; all stormwater from project areas would be controlled within catchment basins or in the active pit area; 2) installation of an oil and grease separator to be located at the mobile truck wash facility, 3) project Best Management Practices (BMPs) to limit erosion and sedimentation, 4) concurrent and end-of-project reclamation to re-establish vegetation on the RASA and Phase 1 Plant Site and 5) monitoring as described in Section 3.2.6 .

3.2.6 Groundwater Quality and Quantity

Affected Environment

The location and groundwater depths in the Silverbell well, Murphy well. and Hot Water well are shown in Drawing AUM-203 of the Integrated Plan of Operations (Mines Group, 2010), Attachment A). The three wells are completed in and derive their groundwater from bedrock. The Silverbell penetrated 163 feet of bedrock; Murphy well (234 feet), and the Hot Water well (525 feet). Groundwater occurs in bedrock fractures below and adjacent to the Gulch. Recharge of the faults and fractures is likely regional, driven by infiltration in the Toquima Mountains to the east. Preliminary groundwater investigations to identify water sources indicate that sufficient quantities of water are primarily available in deep fracture zones (500-1000 feet bgs). Based upon pump tests in the Murphy Well, specific yields from shallow fracture-controlled zones nearer the surface are low. Static water level in the Silverbell well on the east end of the project is 54 feet bgs (6676 amsl); at Murphy Well in the central project area (170 feet bgs/6235 amsl), and at the Hot Water well at the western end of the project area (42 feet bgs/6113 AMSL).

There is little to no static groundwater in the dredge tails of the Gulch, though there are probably periods of interflow during high precipitation and/or snowmelt periods. The native gravels and dredge tails are both very porous, so both interflow from surface infiltration of meteoric water and inflows from adjacent drainages move down the gulch along the alluvium-bedrock interface relatively rapidly. There may be some infiltration of interflow into bedrock via bedrock fractures.

Sampling, Meteoric Water Mobility Test Procedure of dredge tails, and Profile 1 analyses of the lixiviant from those tests were performed to determine whether there are any constituents of concern in the ore to be mined. One sample (SP09-3) exceeded Drinking Water Standards for arsenic (0.07 mg/l DWS = 0.05 mg/l) and mercury (0.0089; DWS = 0.002 mg/l). There is some historical evidence that pre-1900 mining in the Gulch used mercury to recover gold, though these were small operations and it is likely present in only isolated locations in the Manhattan District. During the operation of the Natomas Dredge (1938-1946), mercury was used in gold recovery. Any mercury occurring in the ore would behave like other heavy minerals and be recovered in the gravity concentrates and be removed from the environment. Assaying and visual observations during operations on ore and concentrates would reveal the presence of mercury. Water, ore, and residual alluvium sampling (Section 3.2.6) would assure that mercury, if present in the Gulch now, would not potentially degrade surface or ground water.

Environmental Consequences of the Proposed Action

The plants would use a maximum of 629 acre-feet/year of water for processing (the maximum annual duty of the Murphy Well). The pumping rate would average approximately 390 gpm total, as dictated by the annual water duty of the Murphy Well, though actual pumping rates would vary depending on seasonal water demand, within the combined annual duty of the Murphy Well.

Most of the water used by operations would be recovered and recycled (~90%) and approximately 8% would be retained as moisture in the residual alluvium. The remainder would evaporate from the Water Storage Basins. Very little water would be expected to infiltrate into the alluvium due to the low precipitation and high evaporation rates at the site.

A groundwater flow model was developed to characterize the groundwater flow system and determine the potential impact of pumping the Murphy Well (Drawing AUM-203), the primary supply well, on a continuous basis (AquA Hydrogeologic, 2010). Model inputs were supported with review of USGS geological quadrangle maps, aerial photos, site review, step drawdown tests, and a 72-hour constant-discharge test performed on the Murphy Well in February 2010. The model was run for 10 years (current estimate of mine life) of continuous pumping at a rate of 390 gpm for 24 hours per day, 365 days per year. All sixteen permitted wells within the model domain were included in the model inputs, each assigned its maximum pumping rate to assure the model would assess maximum potential impact with maximum stress on the aquifer. The model showed the groundwater aquifer was capable of yielding 390 gpm to the Murphy Well. A five-foot drawdown contour extended to an approximate 4,000 foot radius of the Murphy Well and a one-foot of drawdown extended to an 6,000 to 7,000-foot radius of the Murphy well after 10 years of continuous pumping. No impacts were shown to existing water wells or the Palo Alto Spring, a seep 6,000 feet north-northwest of the Murphy Well. Additional detail on the groundwater flow model and supporting studies are discussed in the Manhattan Gulch Groundwater Evaluation Report (AquA Hydrogeologic, 2010).

The alluvium to be mined does not exhibit any leaching potential or reactivity (Mines Group, 2010), Attachments G & H). The flocculant used in the to settle fines in the WSB's (see section 2.4.1) is the organic polymer polyacrylamide which has been shown to exhibit very low toxicity and mobility in soils (Sojka, et al., 2007; CASQA, 2008; Weston, et al., 2009). Therefore, groundwater chemistry at the site would not be impacted from the alluvium-water interactions during mining.

The water storage basins have been designed in accordance with NDEP requirements as part of the Integrated Plan of Operations. These WSB facilities would be operated according to the provisions of an Operation and Maintenance Manual that addresses monitoring, reporting, and winter operations. This manual would be drafted by A.U. Mines, and submitted to NDEP-BMRR and BLM in advance of their use. Prior to reclamation, the WSB would be tested for hydrocarbons and any contaminated material would be placed in containment at the shop facility.

The Project Proponent would use flocculant and/or use physical separation methods (ultrasonic separators, filters and/or settling) in the Water Storage Basins to settle, capture and reduce suspended solids (clay and silt-size sediments) prior to re-use in plant processes. Residual suspended solids would be removed from the basins, mixed with residual alluvium and placed in the RASA or backfilled pit. Therefore they would not be exposed to pathways that would transport them into the groundwater zone.

Potential incidental losses and accidental releases of petroleum products and other substances used for equipment operation and maintenance could potentially infiltrate into the ground and eventually reach the groundwater zone.

Based on the above-described conditions and proposed monitoring and mitigation measures, the Proposed Action would have low impacts on ground water consumption and water quality.

Environmental Consequences of the No Action Alternative

In the No Action Alternative, exploration drilling in the project area would continue as per the exploration notice. Shallow drilling in the unconsolidated dredge tails or surface alluvium would not intersect groundwater. Exploration does not use any hazardous chemicals. No short-term or long-term water quality impacts to groundwater would occur.

Mitigation Measures for the Protection of Ground Water

The Proposed Action includes environmental protection measures to manage and control hydrocarbons, and to respond to any spills. All petroleum products and other chemicals would be stored, transported and transferred pursuant to the Spill Prevention, Control and Countermeasures (SPCC) Plan, which also has provisions for immediate clean-up and offsite disposal of any spills. Petroleum contaminated soils would be removed immediately and placed in a lined, secure, temporary holding area until they could be properly transported and disposed offsite.

The following sampling and analysis would be performed to assure that mining does not degrade waters of the state (including surface water and groundwater):

- Quarterly Profile I for inorganic constituents and for hydrocarbons in the bedrock drain to assure that constituents of concern are not being introduced in the pit by mining or backfilling and potentially impacting surface water or groundwater.
- Quarterly sampling Profile I analysis of the water in the Water Storage Basins, including the initial set of basins at the Phase 1 Plant site and subsequent basins either in the Gulch or in the Alternate Water Storage Basin areas.
- Quarterly sampling, Meteoric Water Mobility Procedure (MWMP) and Profile I analysis of a representative composite sample of ore in the active mining area;
- Quarterly sampling, Meteoric Water Mobility Procedure (MWMP) and Profile I analysis of a representative composite sample of residual alluvium, either in the RASA or backfilled areas of the gulch.

Profile II Water quality analyses of water from the Hot, Murphy, and Silverbell Wells and any water in the bedrock drain would be performed quarterly during the project. Meteoric Water Mobility tests of the backfill material would also be performed to verify the chemistry of residual alluvium to assure that it would not adversely affect groundwater.

3.2.7 Rangeland Management

Affected Environment

The Proposed Action area is located in the San Antone grazing allotment (BLM, 1997). The San Antone allotment is designated mule deer winter range and pronghorn habitat in the Tonopah Resource Management Plan (BLM, 1997). The allotment size is 442,555 acres and is designated at a stocking level of 13,580 AUMs (animal unit months) with no AUMs for wild horses or burros (BLM, 1997). The Project Area consists of 295 acres of historic dredge tails that are nearly barren of vegetation and 255 acres of native shrub and grass vegetation for a total of 550 acres. The historic dredge tails are not easily accessible to grazing animals and do not have sufficient vegetation to support grazing. The 255 acres of native vegetation contain commonly grazed species such as Indian ricegrass (*Acnatherum hymenoides*) and winterfat (*Eurotia lanata*). The 255 acres of native vegetation represent approximately 8 AUMs. The project area shows little to no sign of grazing.

Environmental Consequences of the Proposed Action

The total area of the Proposed Action is approximately 550 acres. Of this area, 295 acres are heavily disturbed historical dredge tails and 255 acres are native vegetation capable of supporting 8 AUMs.

The Proposed Action would result in clearing and the potential temporary loss of approximately 255 acres of native vegetation, or 8 AUMs, by removal of black sagebrush community vegetation on public lands. The area of impact to native vegetation would be associated with the expanded mining areas, water storage basin areas, the RASA, and road improvements. The shop and gold room site on private land has cleared about five (5) acres of sparsely vegetated land on the Monday Fraction patented mining claim.

This temporary loss of 255 acres is 1.7 percent of the approximately 15,000 acres of similar vegetation within the Impact Analysis Area (see soils for the definition) and 0.06 percent of the San Antone grazing

allotment. This would represent a loss of 8 AUMs, less than 0.06% percent of the stocking level of 13,580 AUM. This loss will have no effect on cattle grazing in the San Antone allotment.

Reclamation would reestablish self-sustaining plant communities on the 295 acres of dredge tails and the 255 acres of disturbed land. Final reclamation and revegetation would improve the range. The project area would be expected to revegetate in 3 and 5 years.

Environmental Consequences of the No Action Alternative

Vegetation and grazing in the project area would not be altered under the No Action Alternative. Continued exploration drilling and sampling under the current notice would at most disturb only a few acres of vegetation and would not affect cattle grazing. The 295 acres of dredge tailings would not be revegetated and would remain unsuitable for grazing.

Mitigation Measures for the Rangeland Management

Block mining and concurrent reclamation reduce the average annual loss of grazing acreage. Reclamation of the dredge tails would restore vegetation and forage on 295 acres. The 255 acres of project disturbance outside the Gulch would be revegetated and forage restored.

3.2.8 Public Health and Safety

Affected Environment

The proposed project area is located in an isolated area four miles west of the town of Manhattan, population 140 (NDTax, 2009), and 6.1 miles east of the junction of Nevada State Routes 377 and 376. Mine and local traffic would both use State Routes 376 and 377.

The public would not be allowed in the operational areas of the mine. Groundwater wells would supply domestic and process water for the Proposed Action. Measures would be taken to control and treat sewage generated by the Proposed Action.

Nye County operates a Class 2 Regional County Landfill near Round Mountain.

Mining would be conducted near to Nevada 377 on the east end of the mining area during later stages of the project. The right of way for Nevada 377 here extends seventy-five (75) feet from the centerline of the road (Mines Group, 2010, Drawing AUM-139) and the depth of alluvium is less than 40 feet.

Environmental Consequences of the Proposed Action

There would be an increase in traffic on State Route 377, as this would be the primary route for employees traveling to work and for delivery vehicles. This highway is a paved two-lane road with current usage of only 130 vehicles per day (Nevada Department of Transportation, 2008). Project traffic would not create unsafe driving conditions on the road. Given the light vehicular use, left turns into the maintenance shop or administration building areas could generally be done without stopping on the highway to wait for cross traffic to pass.

Standard operations would require that when mining would be conducted near Highway 377, the top of the mining face would be outside of the 75-foot highway right of way. The mining face would be at approximately 1.3 horizontal to 1 vertical (37 degrees), the approximate angle of repose for this previously mined alluvial material. Based on the mine backfill plans, backfill would be place against this cut as soon as mining of the blocks adjacent to the right of way are completed. The Plan of Operations also specifies a boundary fence here to preclude public access. The fence located here would be four-strand wire fence constructed to BLM 4-strand wildlife standards. Therefore, public safety would not be compromised in this area.

The public would be prevented from entering the active mining area. A Safety Superintendent would enforce public and worker safety policies at the mine site. Public safety provisions for securing the site at closure are defined in NAC 513.330-513.360. The project would also be required to operate in full compliance with the Mine Safety and Health Act (MSHA). Provisions for transportation safety and hazardous waste management are described in the Integrated Plan of Operations.

With the proposed mitigation and safety measures, the Proposed Action would not impact public safety.

Environmental Consequences of the No Action Alternative

Continuation of exploration drilling in Manhattan Gulch would not have any effect on public health or safety. Exploration activities are remote from human habitation or presence. Drilling does not use any hazardous substances or generate any hazardous waste.

Mitigation Measures for Public Health and Safety

Wastewater would be treated in septic tanks at the maintenance shop and contained in commercial portable toilets in the mining areas.

Following commencement of operations, access to operating areas on unimproved dirt roads would be managed and controlled to prevent access by the public. Signs would be posted on State Route 376 at the mine shops and administration building and on existing dirt roads leading to the mining areas. Warning signs would be placed on dirt roads leading into the west end of the Project Area. A.U. Mines has proposed to fence and sign local "mine hazard areas", such as mine shafts, piles and steep embankments associated with active mining. A.U. Mines will not be closing or grating any mine adits or shafts. Portions of the project boundary fence would be a single strand fence to comply with air permit requirements to have a physical boundary around the defined project area, except in certain areas near roads where access will be controlled with a four-strand fence constructed to BLM wildlife fence standards.

Coordination with local emergency agencies and organizations would assure access for emergency vehicles and designated contact persons, routes and procedures as described in the Emergency Response Plan (Mines Group, 2010), Attachment K). Reclamation plans for the mining areas include regrading of existing highwalls in the dredge tailings.

3.2.9 Geology and Minerals

Affected Environment

The regional geology is characterized by valley fill alluvial fan and fluvial sediments in the Smoky Valley. Beneath the valley fill sediments and exposed in the adjacent Toquima Range are found limestone, slate, schist, and quartzite aggregating several thousand feet in thickness and ranging in age from lower Cambrian to Carboniferous. Since the deposition of the Paleozoic sediments, they have been extensively deformed, eroded, intruded by igneous bodies, and largely covered by younger sedimentary deposits and lavas.

Manhattan Gulch is composed of alluvial deposits (Quaternary alluvium). Some of the alluvium was mined by the Natomas Dredge. The dredge tailings and undisturbed alluvium contain recoverable quantities of placer gold. Some gold is also present in bedrock fractures near the alluvium-bedrock interface.

The gulch averages 300 feet wide with a rising grade of approximately four percent to the east. Depth of the gravels ranges from 10 to 100 feet with an average of about 30 feet. Approximately 60 percent of the gravel is smaller than ¾-inch in diameter comprised primarily of sand and smaller gravel. The remainder (36%) is composed of coarse gravels greater than ¾-inch in diameter and up to several feet in diameter.

The bedrock base of the gulch is composed predominantly of schist and shale (Vanderburg, 1936). Rimrock slopes around the Gulch range from 30 to 50 percent. Elevations range from about 5,800 feet above mean sea level (AMSL) at the west end of the project area to almost 7,000 feet AMSL at the east end of Manhattan Gulch.

The west half of the gulch is bounded and underlain by schist, siliceous argillite, limestone, siltstone and sandstone bedrock of the older Lower Cambrian Harkless Formation. The Phase 1 Plant would be located here on unmineralized alluvium adjacent to the gulch. The Residual Alluvium Storage Area would be located on shallow weathered schist and argillite of the Harkless formation.

The eastern half of the gulch is bounded and underlain by argillite, limestone, quartzite and schist of the Ordovician Zanzibar and Gold Hill formations. In the far eastern end of the gulch bedrock is composed of

volcanic breccias and tuffs which are Oligocene in age (30 my). The Shop/Warehouse and yard would be located well above the gulch on an argillite/schist ridge.

Seismic activity data for the region indicated recent low-magnitude earthquake activity in Smoky Valley.

Environmental Consequences of the Proposed Action

Mining would be conducted on 295 acres of previously mined, historic dredge tails and approximately 132 acres of native, in-place alluvium.

Approximately 3.5 million cubic yards of alluvium/historic dredge tails could be removed from the Starter Pit in the gulch, processed at the Phase 1 plant and placed in the RASA. The remainder of historic dredge tails would be mined, processed, and backfilled into the gulch.

Removal and relocation of alluvium from the Starter Pit would alter the topography of approximately 18 acres of land of the RASA. Backfilling and configuring the alluvium in the mined-out areas to blend with the surrounding topography would reclaim the topography of the existing 295 acres to an appearance similar to pre-dredging conditions in the gulch.

The placer deposit in Manhattan Gulch would be mined and gold and other precious metals would be recovered and sold.

Environmental Consequences of the No Action Alternative

Drilling and sampling under the current exploration notice would have no effect on geology or mineral resources.

Mitigation Measures for Geology and Minerals

None.

3.2.10 Recreation

Affected Environment

The project area does not have any developed recreational facilities. The existing, unmaintained dirt roads in and around Manhattan Gulch are used for casual off-road recreation and access to National Forest lands south of the Gulch. The Gulch is a popular area for metal detecting (gold nuggets). The area does not have any other distinct natural features, such as a water body, perennial stream, plant communities that would provide other recreational opportunities and distinguish it from the general area along the west face of the Toquima Range. Other dispersed recreation such as hunting and general recreation occurs in and around the project area.

Environmental Consequences of the Proposed Action

The Proposed Action would limit access to the project area for casual recreationist, hunters and other visitors. The casual recreationist or visitor would still be able to use existing dirt roads that pass around the active mining areas and access National Forest land. The historic dredge tails outside the Project Area would be approachable from Highway 377 about one mile west of Manhattan and on the west end of the tails where access would not be restricted. Historical dredge tails are currently visible from west of the project area on Highway 376.

Environmental Consequences of the No Action Alternative

Under the No-Action Alternative, continued drill exploration would not affect the recreational opportunities in the project area. The public would continue to have access via unmaintained dirt roads.

Mitigation Measures for Recreation

None

3.2.11 Socio-Economic Values

Affected Environment

The project area is located within Nye County, the largest of 17 counties within the State of Nevada. The county encompasses a total area of approximately 11.6 million acres (18,000 square miles) with a population of 44,375. The majority of people (38,882 or 82 percent of the total) live in Pahrump (NVTax, 2008).

In 2007, Tonopah, the county seat, had a population of 2,610 people; Round Mountain approximately 831 people; Manhattan was 140 (NVTax, 2008). The population of Tonopah peaked in 1998 at 3,280, and has since decreased by 670, a 20% decline; Round Mountain peaked in 1999 at 1,060 and has declined by 229, a 22% decrease; Manhattan has fluctuated between 122-140 since 1998, but is currently at its 1998 high of 140 (NVTax, 2008).

Approximately $721 million of earnings were generated within Nye County for 2006 (U.S. Department of Commerce, 2009). Total employment for Nye County was 10,700 jobs in 2009 (DETR, 2009). National Securities Technologies, followed by the Nye County School District and Round Mountain Gold Corp. are the largest employers followed by Nye County, retail trade, and service and hospitality industries. The largest employer in the area was mining (Kinross Gold). Other businesses have included lodging, food services, and fuel supply.

The unemployment rate in Nye County for February 2010 was 16.5% and was the second highest in Nevada in the first quarter of 2010 (DETR, 2010). The high rate is due to the concentration of the population in Pahrump, which is experiencing a much higher unemployment rate. Unemployment rates in mining sectors are generally lower and due to the Round Mountain Mine, the unemployment rate in Northern Nye County may be less. Statewide, employment in mining has increased 2.4% in the period from June 2008-June 2009, and 4.3% from 2008-2009 (DETR, 2009).

On average, workers in the mining industry earn more than other occupations. The average wage in Nye County for construction and extraction labor is $46,179, for maintenance and repair $50,606, and management $77,949. In other occupations, wages range from $17,923 for food preparation to $41,984. An average for all workers is $40,062 (DETR, 2009).

Mining operations and mining royalties paid in Nevada are subject to net proceeds of mines taxes. The tax rate applied to the net proceeds is based on a sliding scale between 2% and 5%, depending on the ratio of net proceeds to gross proceeds (NRS 362.140). Of the total tax rate, the local portion of the overall tax liability is based on the local rate where the mine is located, and the balance up to the constitutional limit of five percent, is the state portion of the tax.

Statewide in 2007, net proceeds of $1,531,548,125 were earned; net proceeds taxes of $37,441,967 were paid to counties (2.44% of net proceeds) and $38,252,414 (2.50% of net proceeds) was paid to the State. In 2007, mines located in Nye County earned $448,516,883 in gross proceeds and $159,826,574 in net proceeds. Taxes paid by mines on production and on mine royalties totaled $ 7,946,018. Nye County received $ 5,011,029 (63% of the total), $271,705 (3.4% of total) was paid on state debt and $2,663,283 was paid into the state general fund (33.5% of total) (NV Tax, 2008a).

Due to the population declines, housing is available in Tonopah and to a lesser extent in Round Mountain, Carvers and Manhattan.

Manhattan has a volunteer fire department with a fire station. They have developed response areas and boundaries and implemented a Fire Safe Council Plan which defines: 1) fire protection capability, 2) fire safety education, and 3) risk and hazard assessment standards. This planning and coordinating effort also addresses community preparedness and response, and related fiscal issues. Ambulance services are provided by a volunteer team for emergency transport to local hospitals. A Care Flight service can be called in from Reno to the mine site in the event of a serious emergency. The Nye County Sheriff's Office provides law enforcement for the project area, with resident deputies assigned to and stationed at the outlying areas of the county, including the Big Smoky Valley communities of Round Mountain, Manhattan and Carvers.

Environmental Consequences of the Proposed Action

The Proposed Action would employ a workforce of 50-75 people that would increase employment in the local area with a high unemployment rate. This in turn would generate other economic activity as the multiplier for these types of jobs. A standard multiplier of 1.57 is used to estimate the total earnings generated through mining activity in Nevada (Dobra, 1989). Therefore, the projected indirect employment would be 30-40 additional jobs, and the net employment impact would be approximately 80-115 jobs.

As currently planned, the majority of workers would likely be drawn from the existing local labor pool in Northern Nye County and commute from within a 50-mile radius of the project including Manhattan, Tonopah, Round Mountain and Carvers. However, it is not unusual in Nevada for mine workers to travel much further. In the context of a population of approximately 3,500 people in this socio-economic analysis area, 50-75 direct jobs and a total increase of 80-115 jobs would provide a meaningful increase in employment. Based upon an average annual wage for the workforce of $40,000-$50,000 per year, the total payroll for the Proposed Action would be $2,000,000 to $3,000,000 annually. Indirect payroll, based upon 30-40 indirect employees, and a lower average wage of $35,000-$40,000, would be $1,000,000 to $1,400,000. Local purchases of supplies, services, fuel and other operating needs and payment of property and sales tax would support the local economy. The operation would also pay net-proceeds-from-mines tax to Nye County.

This proposed small-scale operation would not significantly impact community and public services in the Manhattan-Round Mountain-Tonopah area. The size of the workforce and its dispersal among the communities of Manhattan, Round Mountain, Carvers, and Tonopah would not strain existing capacity for housing, schools, services and other infrastructure, but would probably help to sustain these services with the increased economic activity and attendant taxes that would be generated.

Nevada Power provides electric power to Nye County. The proposed action would not impact power supply or delivery in Nye County as Nevada Power states that there is currently adequate capacity. They have advised that they would provide electrical service to the site with minor modifications to existing power lines on existing right-of-ways service to meet project operating needs.

Environmental Consequences of the No Action Alternative

Under the No-Action Alternative, continued exploration drilling would sustain a limited amount of local employment, purchases, lodging and payment of property tax and Nevada and Nye County sales tax.

Mitigation Measures for Socio-Economic Values

None.

3.2.12 Soils

Affected Environment

Soil data for the Manhattan Gulch Project area were acquired from the Natural Resources Conservation Service Web Soil Survey Homepage (NRCS, 2009). All construction activity would occur on the Tomel-Laxal association, Penelas association, Penelas-Kyler association, Penelas-Laxal association and the Penelas-Rock outcrop complex soil types. The properties of these soils and the number of acres disturbed on each are described in Table 5.

Table 4. Site Soil Characteristics.

Soil Type Name	% Sand	% Silt	% Clay	% Organic Matter	PH	% $CaCO_3$
Tomel-Laxal association	44	31	25	0.25	8.8	11
Penelas association	45	41	14	1.21	7.6	3
Penelas-Kyler association	29	46	25	1.04	8.2	3
Penelas-Rock outcrop complex	29	46	25	1.04	8.2	3

Field tests of soils conducted at the project site also yielded similar results. Ocular and hand-texture analyses confirmed loamy textures, little or no structural development and very low organic matter content. The soil types apply to areas outside the Gulch. The dredge tails and dirt roads within the project area essentially have no developed soil horizon.

Environmental Consequences of the Proposed Action

Approximately 255 acres of ground outside of Manhattan Gulch would be disturbed by the proposed placer mine. If there is a sufficiently developed soil horizon, growth medium will be stripped, stockpiled and saved for reapplication to the disturbed ground during reclamation. No growth medium would be saved in areas where the soil overlying bedrock is too thin for stripping. Reclamation of the historic dredge tails (295 acres) would start the process of soil regeneration in an area with no current soil horizon. The relative percentages of each soil type temporarily disturbed by the operation are shown in Table 5.

Total acreages of each soil type disturbed represent only a small portion of these soils within the Impact Analysis Area. Less than 2% of the total native soils in the Impact Analysis Area would be disturbed.

Interim and long-term soil stabilization and revegetation programs are described in the Integrated Plan of Operations (Mines Group, 2010)). The residual alluvium storage area would be re-seeded at cessation of its use.

Table 5. Proposed Action Area Soil Disturbance Acreages

Soil Type Name	Total Acreage in Impact Analysis Area	Maximum Acreage Disturbed	Percent of Total Available Soil Disturbed
Tomel-Laxal association	2,439	157	6%
Penelas association	431	25	6%
Penelas-Kyler association	1,385	43	3%
Penelas-Rock outcrop complex	698	30	4%
Other uncategorized native soils	10,000	-	-
Total soils	15,000	255	1.7%

Environmental Consequences of the No Action Alternative

Continuation of exploration drilling under the current notice (the No Action Alternative) would have a minimal effect on soil resources. The track-mounted Becker drill rig has a small footprint and sets up and drills with no pad preparation.

Mitigation Measures for Soils

The historic dredge tails (295 acres) would be reconstituted during mining into a growth medium that would support vegetation and soil development. The reclaimed tails would be reseeded and revegetated concurrently as mining proceeds up the Gulch. The area of previously undisturbed ground (255 acres) would also be reclaimed after disturbance. Revegetation of the disturbed soils would begin the long process of soil regeneration.

3.2.13 Vegetation

Affected Environment

Two dominant plant species communities were identified in the project area. On the historical dredge tails, gray rabbitbrush (*Chrysothamnus nauseosus*) accounted for over 70 percent of species composition. In undisturbed areas outside the dredge tails, black sage (*Artemisia nova*) and grasses (particularly *Hilaria jamesii* and *Acnatherum hymenoides*) accounted for over 70% of species composition.

Of the 295 acres of historic dredge tails included in the Proposed Action, 260 acres (90 percent) of the area are almost barren with a maximum of 5 to 10 percent cover of gray rabbitbrush. Depressions between dredge piles contain slightly higher percent cover (< 20 percent) while tails slopes are virtually devoid of vegetation (< 5 percent). About five (5) acres (two percent) of the dredge tails consisted of black sage, with total foliar cover of up to 30 percent. The remaining 30 acres of dredge tails (eight percent) contain denser communities of rabbitbrush (20 to 30 percent cover) and small communities of trees. Small groups or individual tamarisk trees (*Tamarix ramosissima*) were found in eight (8) discrete locations on the dredge tails, in topographical depressions all of which were about one (1) acre in size. A single two-acre depression, a former dredge pond excavated by the historic dredging operations in the central region of the tails contained a small community of cattails (*Typha latifolia*) and willow trees (*Salix lasiandra* and *Salix exigua*). This vegetation has developed in a man-made processing pond from the

historic dredging operations and does not qualify as a "riparian area" area. Pinion pines (*Pinus monophylla*) were present above approximately 6600 feet AMSL at low rates (<5 percent cover) on the tails. Full detail on each of these communities is included in the Integrated Plan of Operations (Mines Group, 2010), Attachment O).

The remaining 255 acres within the area of the Proposed Action are occupied by native vegetation. Native vegetation is characterized by average foliar cover of 36 percent with values ranging from 28 to 50 percent. Black sage accounted for 24 percent of groundcover while other species such as gray and green rabbitbrush, Nevada ephedra, greasewood, budsage, shadscale, and grasses accounted for between one and five percent of groundcover. Undisturbed area data is described in detail in Attachment O, 2009 Vegetation Survey. A detailed account of species composition and distribution for the project area is found in the Integrated Plan of Operations (Mines Group, 2010), Attachment O).

Environmental Consequences of the Proposed Action

The Project Area would disturb approximately 550 acres. Of this area, 295 acres are heavily disturbed historical dredge tails and 255 acres are covered in native vegetation. The site shows little to no sign of grazing.

The Proposed Action would result in clearing and the potential temporary loss of approximately 255 acres of native vegetation by removal of sagebrush-dominated vegetation on public lands. The area of impact to native vegetation would be associated with the expanded mining areas, water storage basin areas, the RASA, and road improvements. The shop and gold room site on private land has cleared about five (5) acres of sparsely vegetated land on the Monday Fraction patented mining claim. The historic dredge tails (295 acres) would be revegetated with a self-sustaining native plant community. Revegetation would be expected to take between 3 and 5 years.

Environmental Consequences of the No Action Alternative

Vegetation in the project area would be minimally affected by continued exploration drilling and sampling under the current exploration notice (the No Action Alternative). The track-mounted Becker drill rig has a small footprint and tracks cross-country. The low ground pressure track minimizes crushing of vegetation.

Mitigation Measures for Vegetation

The historic dredge tails (295 acres) would be reconstituted during mining into a growth medium that would support vegetation. The reclaimed tails would be reseeded and revegetated concurrently as mining proceeds up the Gulch. The area of previously undisturbed ground (255 acres) would also be reclaimed and revegetated. A sagebrush community seed mix would likely be used in reclamation.

3.2.14 Invasive Non-native Species

Affected Environment

Invasive, non-native species are plant species designated by the Secretary of Agriculture, Secretary of Interior, or by State law or regulation. Nevada has listed 42 non-native invasive plant species that require control. A complete list of these weeds is attached. Of these 42 species, 13 are found in the BLM Battle Mountain District, and are listed below in Table 7, Battle Mountain District Invasive Plants.

When introduced to an area, these non-native invasive plant species can quickly dominate the landscape. Nevada Revised Statutes, Chapter 555.05 mandate that land owners and land management agencies control noxious weeds on lands they own and under their jurisdictions.

Salt cedar or tamarisk (*Tamarix ramosissima*) was observed in eight areas on the historic dredge tails. Clusters of cheatgrass (*Bromus tectorum*) were also noted. The locations of each of these invasive species are shown in Attachment O – Vegetation Surveys of the Integrated Plan of Operations.

Table 6. Battle Mountain District Invasive Plants

Common Name	Scientific Name	State Listing -----BMD Presence & Priority
Russian Knapweed	*Acroptilon repens*	Category B -----MLFO & TFO Medium
Spotted Knapweed	*Centaurea maculosa*	Category A ----- MLFO High
Perennial Pepperweed (Tall white- top)	*Lepidium latifolium*	Category C -----MLFO & TFO Medium
Hoary Cress (Short white-top)	*Cardaria draba*	Category C -----MLFO & TFO Medium
Musk thistle	*Carduus nutans*	Category B -----MLFO & TFO Medium
Scotch thistle	*Onopordum acanthium*	Category B -----MLFO & TFO Medium
Canada thistle	*Cirsium arvense*	Category C -----MLFO & TFO Medium
Bull thistle	*Cirsium vulgare*	Invasive bi-annual -----MLFO & TFO Low
Puncturevine	*Tribulus terrestris*	Category C -----MLFO & TFO Medium
Salt cedar/ Tamarisk	*Tamarix ramosissima*	Category C -----MLFO & TFO Medium
Cheatgrass (Downy brome)	*Bromus tectorum*	I Invasive annual grass ---- MLFO & TFO Medium
Halogeton	*Halogeton glomeratus*	Invasive annual ---- MLFO & TFO Low
Russian thistle (Tumbleweed)	*Salsola iberica*	Invasive annual ---- MLFO & TFO Low

Environmental Consequences of the Proposed Action

New surface disturbance and frequent vehicle traffic in the project area during mining would increase the possibility for importation of invasive weeds.

Environmental Consequences of the No Action Alternative

Under the No Action Alternative, the track-mounted drill rig would cause a minimal amount of surface disturbance during exploration drilling and the potential for the introduction of invasive weeds into the area of the dredge tails or in undisturbed ground adjacent to the Gulch would be low. The limited vehicle traffic during exploration drilling would minimize the possibility for importation of invasive weeds.

Mitigation Measures to Control Invasive Species

To minimize the introduction and spread of noxious weeds into the Project Area, A.U. Mines would implement the following preventative measures: 1) stay on existing or designated haul roads to and from the Project Area, 2) use a certified weed free seed mix during reclamation, 3) conduct concurrent reclamation when feasible, and 4) implement a weed monitoring and control program. The BLM would provide A.U. Mines with a color brochure, *Noxious Weeds of Central Nevada*. The operator would annually survey the Project Area for invasive weed species. If a limited amount of weeds were discovered, they would be pulled, placed in a plastic bag, sealed, and disposed of properly. For more intensive infestations, the operator would consult with the BLM on containment or eradication measures.

3.2.15 Visual Resources

Affected Environment

The BLM has designated visual resource management (VRM) classes in the RMP to manage the visual quality of the landscape (BLM, 1997). In determining VRM class designations, the inventory process considers the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of the viewer to the subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. Management classes are divided into four levels (Classes I to IV). Class I designated as most protective of the visual resources, where "any contrast created within the characteristic environment must not attract attention." Class IV is the least restrictive, where "contrasts may attract attention and be a dominant feature of the landscape."

The project site is located in a VRM Class IV area (BLM, 1997). The objective of Class IV management is to provide for management activities that cause major modifications of the existing character. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. Every attempt, however, should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements (BLM, 1986).

The landscape from SR376 in the Big Smoky Valley, looking east towards the mouth of Manhattan Gulch, consists of the relatively flat foreground of the valley floor dominated by vegetation consisting predominantly of grays with some yellows, tans, greens and browns. The vegetation is predominately a pale gray to dark green sagebrush community, which is smooth and continuous throughout the project area. The dominant feature of the landscape is the mountainous background of the north-south trending Toquima Range. Manhattan Gulch is an east-west drainage within the Range and only the west end of the Gulch and project area can be seen from SR 376. The historic dredge tails are visible as gray to brown piles immediately west of the foothills of the Toquima Range. The west end of the project area is coincident with the west foothills of the Toquima Range. The slopes of the mountain range have shallow diagonal features. Dark green pine trees increase in frequency with increasing elevation and cover the rounded peaks of the mountains.

SR377, from its intersection with SR376 east to Manhattan, parallels Manhattan Gulch and is in the Gulch near Manhattan.

Environmental Consequences of the Proposed Action

Portions of the project area can be seen from State Routes 377 and 376, notably the historic dredge tails. The plant facility and water storage basins would not be visible from the state highways. The administrative facility, gold house, and shop area would be adjacent to and visible from SR376.

The Proposed Action would mine 295 acres of historic dredge tails and up to 132 acres of expanded mining areas (total of 427 acres) that would be backfilled, recontoured and revegetated. The visual landscape would more closely resemble the pre-dredge mining topography and vegetation. Areas mined outside of the Gulch, would also be reclaimed. The revegetated areas would contrast with the surrounding vegetation until plant coverage and density approaches baseline conditions.

The RASA would alter the landscape and be visible, primarily from the west, during construction and operation. Upon completion, within 2-4 years after commencement of the proposed operations, the RASA would be graded, contoured and reseeded with native vegetation. The RASA has been designed to be constructed as an extension of the existing natural ridgeline and slope angles, and therefore will blend into the natural terrain upon reclamation and maturation of the reseeded plant community.

The visual impacts to the landscape by the Proposed Action are consistent with the current visual character of the area and with the Class IV Visual designation.

Environmental Consequences of the No Action Alternative

Under the No Action Alternative, continued exploration drilling would not alter the present visual landscape.

Mitigation Measures for Visual Resources

Impacts to the visual landscape would be mitigated by concurrent and final reclamation of project disturbance.

3.2.16 Wildlife including Sensitive Species and Migratory Birds

Affected Environment

Unreclaimed dredge tails comprise the majority of the area (295 acres) (that would be affected by the proposed action and have poor wildlife habitat quality due to a scarcity of vegetation. The remainder of the project area is in previously undisturbed sagebrush dominant habitat. Wildlife and vegetation baseline surveys were conducted by a consulting biologist in May, 2009 to assess wildlife baseline conditions within the study area (Attachment P, Wildlife Survey). Terrestrial wildlife and wildlife signs were observed and documented in field notes. Very few discrete wildlife observations were recorded and no signs or evidence of nesting or critical breeding habitats were observed. There are no fisheries/aquatic habitats in the proposed project area.

Wildlife species observed during the survey included: blacktail jack rabbit, spiny and long-nosed lizards, and desert horned lizard. Mule deer were also seen. Wildlife species and sign observed during the field investigation are listed in Attachment P, Wildlife Survey. Other wildlife species that occur in the project area are pronghorn, mourning dove, and California quail. Mule deer and pronghorn are the primary big game species in the study area (NDOW 2007a). Pronghorn have expanded their range throughout the Big Smoky Valley and now inhabit the study area year-round (NDOW 2003). There are no threatened, endangered or sensitive wildlife species in or near the Project Area.

Environmental Consequences of the Proposed Action

There are no highly sensitive or critical wildlife habitats or fisheries/aquatic habitat in or near the project area. Sequential placer mining would start at the west end of the project area and move eastward ultimately affecting 295 acres of poor quality wildlife habitat in the dredge tails and 255 acres of undisturbed habitat in areas adjacent to Manhattan Gulch. There could be some limited mortality of small mammals and reptiles that were in burrows or unable to disperse during construction or mining operations. Larger mammals, birds, and many reptiles would likely move away into adjacent habitat. Wildlife mortality may result from equipment and vehicle travel on the access and haul roads. Wildlife mortalities discovered within the Project Area would be reported to the Nevada Department of Wildlife on a quarterly basis. The smooth liner on the side of the water storage basins could pose a drowning hazard to some wildlife. Any wildlife mortalities in or near the ponds would be reported to the Nevada Department of Wildlife within 24 hours.

Removal of vegetation would degrade wildlife habitat and may destroy the nests or young of ground or shrub-nesting migratory birds. Increased human presence would cause wildlife to avoid the active mining areas.

No golden eagle nest sites were detected during field surveys in 2009 within the proposed project area. However, potential nesting habitat (e.g., exposed rocky outcrops) occurs in the vicinity of Manhattan Gulch in the foothills of the Toiyabe Mountains on the east side of the Big Smoky Valley. Potential direct impacts to breeding eagles as a result of mine-related activities could include abandonment of a breeding territory or nest site or the potential loss of eggs or young, which would reduce productivity for that breeding season, if present. However, since the project would affect only 2% of the impact analysis area over the life of the project and the extent of active mining is in a small area of less than 100 acres in any given breeding season, impacts to breeding eagles would be minimized. Those two factors and the lack of existing nest sites within the project boundary, and the existing level of activity at the mine site, potential impacts to golden eagles as a result of the proposed project would be considered low.

The Proposed Action would not be a barrier to movement, migration or breeding activity for other less sensitive species of wildlife due to its limited size and duration. There is no critical habitat in the project area or in the Impact Analysis Area defined in this EA. Large acreages of similar habitat to that being disturbed would be available in the area surrounding the project. The temporary loss of habitat would be considered minor in terms of the available habitat in the contiguous region. The Proposed Action would

affect less than 2% of the Impact Analysis Area. For comparison, it would also be less than 0.06% of Hydrographic Basin 137A, the area where the populations of larger and wider-ranging wildlife species would typically range. Impacts to wildlife species and populations by the Proposed Action would be expected to be low.

Environmental Consequences of the No Action Alternative

Under the No-Action Alternative, continued drill exploration would only minimally affect wildlife and migratory bird habitat. However, the 295 acres of dredge tails would not be reclaimed and restored to a higher quality wildlife habitat.

Mitigation Measures for Wildlife, Sensitive Species and Migratory Birds

Reclamation would reestablish self-sustaining native plant communities on disturbed land, which would provide wildlife habitat similar to the present habitats near the project area. Revegetation of the land currently covered in dredge tails would greatly improve wildlife habitat. Revegetation would take between 3 and 5 years and similar habitat conditions would take 5 to 10 years more for mature vegetation to be established.

The Water Storage Basins would be fenced with four-strand fence constructed to BLM standards for wildlife fence so as to preclude entrance by livestock. The WSB's would be built with geogrid strips (plastic mesh) 3-6 (three to six) feet wide that would be placed on top of the primary liner, extending to below the water surface and anchored to the edge of the top of WSB's (in a similar manner as the impermeable plastic liner) in several locations on each end and on the sides of the WSB's. These escape devices would provide a rough surface that wildlife can use to escape (climb out of) the ponds in the event they slide into the ponds.

A.U. Mines will require that all vehicles travel at a safe speed and the employee safety and training program would help to reduce risks from vehicle traffic.

To prevent violation of the Migratory Bird Treaty Act (MBTA), A.U. Mines would either conduct surface disturbing activities outside of the migratory bird nesting season (March 1 through July 31) or employ a qualified biologist to survey prospective work areas prior to surface disturbance during the nesting season.

4 CUMULATIVE EFFECTS ANALYSIS

This section will address the cumulative effects of the Proposed Action and No Action Alternative on the affected environment, past activities in and around the area, and any foreseeable future activities.

The Council on Environmental Quality (CEQ) regulations defines cumulative effects as:

"…[T]he impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or Non-Federal) or person undertakes such actions. Cumulative effects 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 the No Action; past actions; present actions; and reasonably foreseeable future actions (RFFA). The extent of the CESA varies with each resource, based on the geographic or biologic limits of that resource. As a result, the cumulative effects vary according to the resource being considered. In addition, the length of time for cumulative effects analysis varies according to the duration of impacts from the Proposed Action on the particular resource.

Environmental consequences of the Proposed Action and the No Action were evaluated in Chapter Three. Based upon the environmental effects on specific resources, the following resources would have the potential to be cumulatively impacted by the Proposed Action: air quality; cultural resources; solid and regulated wastes; surface water; groundwater; rangeland; human health and safety; geology and

minerals; recreation; socio-economic values; soils; vegetation; invasive non-native species; visual resources.

4.1 Past Actions

Past activities in the Manhattan Gulch area include mineral exploration, and mining, livestock grazing, dispersed recreation (e.g., rockhounding, off road vehicle use).

The Natomas dredge operated in Manhattan Gulch from 1938-1946. There are a total of 405 acres of unreclaimed dredge tails (deposited in stacks or piles and not regraded or revegetated) in the Gulch.

Round Mountain Gold Corporation and its predecessors operated the Manhattan Mine located approximately one (1) mile east of the Proposed Action and southwest of the Town of Manhattan. The mine had three open pits, a mill and a heap leach pad and disturbed a total of 289 acres (117 acres of private land, 156 acres of BLM-managed land, and 16 acres of USFS managed land). It ceased operations in 1991 and is currently closed and reclaimed (RMGC, 2004).

The Round Mountain Gold Corporation has done exploration drilling at Palo Alto Hill, one mile north of Manhattan Gulch and at Mustang Hill, one east of the east end of the Project Area.

Pre-existing roads affect approximately 3.3 acres within the Project Area. Pre-existing roads would not be reclaimed.

4.2 Present Actions, including the Proposed Action

Present actions include small-scale mining, casual outdoor recreation, livestock grazing and notice-level mineral exploration by A.U. Mines which has disturbed less than 5 acres in drill pads and roads.

The Gold Wedge Mine is an underground mine and mill located approximately 0.6 miles northeast of east boundary of the Proposed Action. The mine is currently not active but has recently proposed (Royal Standard Minerals, 2009) a 500 ton per day underground mine with a mill. The total surface area of this action is approximately 10-15 acres.

A small placer operation has been operated intermittently in Manhattan Gulch on the MG claims (MG Placer). The total area of this operation is approximately 4 acres near the central zone of the Proposed Action. It lies in the narrowest part of the Gulch.

The Proposed Action would disturb 550 acres of historic placer tailings and potentially other areas of the neighboring alluvium.

4.3 Reasonably Foreseeable Future Actions (RFFA's)

The RFFAs include mineral exploration, possible additional mining in or around Manhattan Gulch, continued livestock grazing, and dispersed recreation.

A.U. Mines also controls unpatented mining claims west of the proposed mining area, including the western extension of the dredge tails and valley alluvium that has not been previously mined. The valley alluvium here is believed to be much deeper than the dredge tails. A number of historic mine shafts explored these deposits. This area remains to be explored in the future and most likely at a larger scale. The method of mining would likely be much different than proposed for the relatively shallow deposits in the Gulch. This requires more planning in advance of exploratory drilling. Therefore no immediate exploration or mining is proposed for this area. Any exploration or mining activity not currently included in the Proposed Action by the Project Proponent would be presented in a new or amended Plan of Operations in the future.

There is also a current proposal to construct the Crescent Dunes Solar Energy Project (BLM, 2009). The proposed solar power generating plant will be located approximately 13 miles northwest of Tonopah, and will have a net generating capacity of up to 180 megawatts (MW) of electricity. Tonopah Solar Energy, LLC submitted a right-of-way application and a plan of development for the construction and operation of a solar power generation facility, associated transmission facilities, and access roads. The construction workforce is projected to be between 400-500 workers for two years. The permanent workforce is

projected to be between 40-50 workers. BLM expects that Tonopah would be able to support housing for these work forces through motels, RV spaces and surrounding communities such as Carvers, Hadley, Manhattan and Goldfields.

4.4 Evaluation of the Potential Proposed Action, Cumulative Effects and Mitigation

4.4.1 Air Quality

The CESA for air quality is the air basin (same as the hydrographic basin 137A) for the Big Smoky Valley (Figure 8).

There are minimal or no air emissions from current activities in Manhattan Gulch.

The Round Mountain Mine is located approximately nine (9) miles north of the Starter Pit/Phase 1 Plant of the Proposed Action. It currently generates gaseous and particulate emissions and the proposed expansion would generate 139 tons of total particulate matter and 71 tons per year as PM_{10} particulates (BLM, 2009). Due to the distance between these facilities and the emissions from the Proposed Action (maximum 68 tons total of PM_{10} particulates during the first year and 13.3 tpy once the Starter Pit is complete), no ambient air quality standards would be exceeded by the combined particulate emissions from Round Mountain and the Proposed Action.

Since the effects to air quality from the Proposed Action represent the largest PM_{10} and other described activities would not result in cumulative emissions that would exceed ambient air quality standards.

Under the No Action alternative, no PM_{10} emissions would be generated by the project and the cumulative effects would be as a result of the existing actions in the vicinity of the Proposed Action.

4.4.2 Cultural and Historical Resources

The CESA for cultural and historical resources is the Manhattan Mining District as defined in *A Cultural Context for the Manhattan Mining District, Nye County, Nevada* prepared by Kautz Environmental Consultants, November 6, 2007 (Figure 7).

The Proposed Action would adversely affect six (6) historic sites. Mitigation measures developed in the HPTP and agreed upon by the BLM, SHPO and A.U. Mines will be completed according to the HPTP. Mitigation measures will capture the historic qualities or the properties being adversely affected.

One other small surface placer operation (MG 8 claim) has disturbed less than 10 acres of historic mine tailings. Other historical resources that may have been affected by this operation are not known.

The Gold Wedge Mine is located in the CESA and may also have affected cultural and historical resources.

Cumulative effects to cultural resources in mining districts are difficult to evaluate because historic properties decay as they age. Changes to historic properties and landscapes often reflect the normal evolution of mining technology and processes. The Manhattan Mining District is a very good example of this evolutionary process. Each of the five (5) periods of mining identified in the historic context has impacted a previous historic period including some of the prehistoric cultural record that was present before mining began in the district. This process will continue until there is no mining potential left in the district.

Some of the archaeological sites impacted before the passage of the National Historic Preservation Act in 1966 and Archaeological Resources Protection Act in 1979 have been destroyed and data from them cannot be recovered. Sites that would have been destroyed before this act was implemented are now being avoided or recorded in detail, reducing some of the adverse effects to the mining district.

It is likely that mining exploration and operations will continue to take place in the mining district for many years. There may be some adverse cumulative effects from future projects on public lands. Improvements in mining and mitigation technology may reduce adverse effects of future project

Under the No Action alternative, this project would not cause any cumulative effects to historic resources if it did not occur.

4.4.3 Native American Religious Concerns

There are no known cumulative effects to Native American Religious resources.

4.4.4 Waste – Hazardous/Solid

The CESA for waste is the Manhattan Mining District (Figure 7).

Other present and reasonably foreseeable actions in the CESA that would generate waste would be the Gold Wedge Mine, the MG Placer operation in Manhattan Gulch, the project proponent's exploration activities, and other exploration activities.

Cumulative effects to the environment in the CESA would include potential spills of petroleum products or other minor quantities of hazardous materials are related to possible accidental releases during transport within the CESA or during use or storage on each respective site.

The management and disposal of hazardous and non-hazardous wastes would involve disposal of all domestic solid waste, scrap lumber and metal at the Round Mountain landfill. Hazardous materials would be disposed of in accordance with applicable State and Federal regulations. No hazardous materials are expected to be generated on site and no hazardous materials would be disposed of at the site.

Any spills resulting in petroleum-contaminated soils from other present and reasonably foreseeable actions would also need to be transported offsite by a licensed hazardous waste hauler to a licensed hazardous waste site. Procedures would need to be in accordance with federal and state regulations.

No sanitary wastes facilities are located at the Gulch for present and reasonably foreseeable actions so those would need to be managed by portable toilets The Gold Wedge operation probably uses an onsite septic system.

Under the No Action alternative, the amount of waste generated that would need to be managed would not be generated and the potential for releases by the proposed action would not occur. Wastes and potential releases from Gold Wedge Mine, the MG Placer operation in Manhattan Gulch, the project proponent's exploration activities, and other exploration activities would continue to exist.

4.4.5 Surface Water

The CESA for surface water is the Manhattan Gulch watershed (Figure 8).

Cumulative effects to surface water would occur as a result of potential releases of water from the Proposed Action, the Gold Wedge Mine or the MG Placer. Neither of the latter two is currently operating.

All of these operations have water ponds to retain and store water and sediments generated by their activities. The Gold Wedge mine recently permitted rapid infiltration basins to reinfiltrate water into the ground from mine dewatering. There would be no regular, permitted discharges to surface water.

Surface water run-off from all of these operations flows or infiltrates into the sediments in the Gulch. Since most surface water run-off infiltrates into the porous gravels of the Gulch, any potential sediments would be retained and would not affect any surface water drainages outside the area of the Proposed Action.

No surface water runoff would leave the work areas during active operation on the site.

Under the No Action alternative, cumulative effects to surface water would be slightly lower as a result of the no activities associated with the Proposed Action.

4.4.6 Groundwater

The CESA for hydrographic sub basin is Hydrographic Basin 137A, Tonopah Flats (Figure 8).

There are 14 permitted and certificated water rights in the vicinity of the project that affect the CESA, including those of the Project Proponent and the town of Manhattan, in the five mile radius of the Proposed Action that combined duties are 2,887 acre-feet per annum of 19,638 acre-feet total allocated

(NDWR, 2009) in the CESA, or approximately 15% of the total. This includes the 614 acre-feet/year of water for the Proposed Action.

The cumulative effects would be from the combined actual withdrawals pursuant to those water rights, though it would not likely approach the maximum combined duty permitted.

The majority of this water pumped by present actions and RFFA's is drawn from the fractured bedrock system in the eastern foothills of the CESA. The portion of the CESA affected by present actions and RFFA's are approximately nine (9) square miles (5000-6000 acres) of the 1600 square miles in the entire CESA.

Under the No Action alternative 614 acre-feet/year of groundwater would not be pumped from a well or wells for the Proposed Action, though the permitted water rights would still allow for future use of up to 2,887 acre-feet per year currently permitted for RFFA's.

4.4.7 Rangeland

The CESA is the San Antone grazing allotment for rangeland resources (Figure 8). Some of the lands associated with past, present actions, and RFFA's are not wholly within the San Antone Allotment, or are private lands, but for purposes of this cumulative effects analysis, they are included here.

The combined disturbance to lands in the CESA, whether vegetated or not, would be the 550 acres associated with the Proposed Action (295 acres of historic dredge tails and 255 acres of native vegetation) and conservatively 50 acres for present actions (Gold Wedge and MG Placer) and 289 acres for past actions for the RMGC Manhattan Mine, for a total of approximately 900 acres. Applying the approximate AUM's per acre of 0.6, this equates to approximately 50-60 AUM's. Though the RMGC Manhattan Mine has been reclaimed, some portions' (primarily the pit) of it have been permanently removed from the allotment and other portions are still not fully revegetated

The cumulative effects then is 900 acres of 15,000 acres in the San Antone Allotment, (6%); 50 AUM's of the stocking level of 13,580 AUM (less than 0.3 %); or, to place this in further context, 900 acres of the approximately 15,000 acres of similar vegetation within the defined Impact Analysis Area (6% of the total).

Under the No Action alternative, the cumulative effect would be reduced by the 255 acres of native vegetation to be disturbed by the Proposed Action and by 295 acres of unreclaimed historic dredge tails that would be otherwise reclaimed as part of the Proposed Action would not be rehabilitated to a better quality rangeland.

4.4.8 Public Health and Safety

The CESA for public health and safety is the Manhattan Mining District (Figure 7).

Cumulative effects to health and safety would be the cumulative increase in traffic on Nevada Highway 377, a two-lane, paved rural highway, the primary route of access within the CESA. Traffic on this highway consists of local residents and delivery of services to the Town of Manhattan; employees traveling to work; and for delivery of fuel, equipment and supplies for present actions and RFFA's. Traffic would be associated with the two present actions, the Gold Wedge and the MG Placer, even though these are only operating intermittently.

Since RMGC Manhattan Mine is closed, only intermittent traffic would be expected from post closure activities. Nevada 377 did support much higher traffic loads for this action, with perhaps 200-500 employees, many more delivery activities than those associated with any of the present actions.

Light, intermittent traffic would be associated with exploration activities in the CESA

The cumulative effects to traffic are well below the capacity of the rural two-lane highway capacity of Nevada State 377.

Under the No Action alternative, additional traffic from the Proposed Action would not be incrementally added to traffic from present actions and RFFA's. Additionally, the risk of potential releases would include activities for the combined present actions and RFFA's.

4.4.9 Geology and Minerals

The CESA for Geology and Minerals is the Manhattan Mining District (Figure 7).

Past, present actions, and RFFA's associated with mineral exploration and extraction, include, in approximate chronological order, historic mining, hardrock, and placer mining beginning approximately in 1866 through 1938, the Natomas Dredge operation from 1938-46 in the area of the Proposed Action, the RMGC Manhattan Mine from the early 1980's to 1991, placer exploration and testing associated with the proposed project since the late 1980's, the Gold Wedge Mine, and the MG Placer.

The cumulative effects from these actions have been the removal of significant quantities of gold and silver form the district. As evidenced by recent and current exploration activity and the Proposed Action, considerable mineral potential remains to extract minerals in the future in the CESA.

4.4.10 Recreation

The CESA for Recreation is the Manhattan Mining District (Figure 7).

The primary recreational activities in the CESA consist of dispersed recreation as described in environmental consequences. Past, present actions, and RFFA's have reduced public access to those areas, such as the RMGC Manhattan Pit, but they still represent a small fraction of the total area in the district. Other areas that have been or would be disturbed, will be reclaimed and be available for dispersed recreation. In some cases, interest in mining history provides an additional interest for recreational visitors to view historic mining areas.

Except for areas where activities associated with active operations are being undertaken, public access to adjacent lands is retained. Again, this represents a majority of public lands in the district. The Proposed Action itself only precludes access to a maximum of 60 acres and those access roads in the Gulch that are used for operations at any given time. Otherwise, public lands continue to be operated under multiple use guidelines of the RMP

4.4.11 Socio-Economic Values

The CESA for Socio-Economic Values is Northern Nye County (Manhattan, Round Mountain, Carvers, Tonopah) (Figure 8).

Cumulative effects would be associated with present actions, and RFFA's and include the Proposed Action, Gold Wedge Mine, MG Placer, the current RMGC operation and RMGC Expansion, and the Crescent Dunes Solar Project. The primary effects include population, number of people in the workforce and attendant demand for housing, schools, and private and public services. Unless these exceed the present and planned capacity of the socio-economic CESA, these effects would be considered positive, since they sustain the local economy, add tax revenues at the local, state and national level, and utilize and contribute to the socio-economic capacity of the CESA. If they exceed the capacity, then there would be negative effects, such as housing shortages, inadequate capacity; in schools, for streets and highways, electrical power, and other elements.

These effects can be generally correlated to the number of people in the workforce and the attendant indirect employment and population effects associated with the workforce.

Cumulative effects from the present actions and RFFA's combined include:

- RMGC continued operations and expansion - approximately a maximum of 1,140 workers during construction, would range between 760 and 940 through completion of surface mining in 2016, when it would begin a gradual decline to approximately 340 for continued processing of ore and reclamation activities through 2017. (BLM, 2009);
- Proposed Action (A.U. Mines Manhattan Gulch Mine) – 50-75 workers during the life of the project;
- Gold Wedge – the number of workers there is not published, but would be expected to be 25-50;
- MG Placer – the expected number of workers would be less than 10;
- Crescent Dunes Solar Energy Project - construction workforce is projected to be between 400-500 workers for two years. The permanent workforce is projected to be between 40-50 workers.

The cumulative effects assuming all of the above are active, including the Proposed Action, would be a maximum workforce of approximately 1,300-1,800 workers and a possible sustained workforce of approximately 1,150 workers. The incremental contribution of the Proposed Action is approximately 2-3%. By far the largest incremental contribution is RMGC at 87-89%. It is expected that the other socioeconomic effects (positive effects to the general economy and potential negative effects to services and infrastructure) would generally correlate to the relative contribution of each action as calculated by workforce.

Under the No Action alternative and assuming the other actions occur, the cumulative effects would not decrease significantly as RMGC remains the most substantial incremental contribution to socio-economic values.

4.4.12 Soils

The CESA for soils is the same as the Impact Analysis Area defined in the beginning of Section 3.2. There are approximately 15,000 acres in this the Impact Analysis Area (Figure 7).

Only limited disturbance of native soils has occurred within this area by the MG Placer operation. This operation is in the Gulch and primarily within the historic dredge tailings. The total acreage is estimated at less than 10 acres. For purposes of this analysis, 10 acres is used for cumulative disturbance of vegetation.

The Gold Wedge Mine and the now closed Round Mountain Gold Corporation Manhattan Mine are located northeast of the Proposed Action above 6750 msl, so are not within the defined Impact analysis area. These two operations are located in a predominantly pinion-juniper zone above 6750 msl, so are not included in the cumulative effects for vegetation.

The cumulative effects to vegetation include the 255 acres of native soils by the Proposed Action, and 10 acres for the MG Placer operation, for a total of 265 acres. This represents 1.8% of the CESA.

The total Proposed Action would affect 553 acres of native soils and historic dredge tailings (with disturbed soils) and combined with the MG operation would affect a total of 563 acres, or 3.8% of the CESA.

Under the No Action alternative the effect to soils would be decreased by the 255 acres or 1.8% of the CESA.

4.4.13 Vegetation

The CESA for vegetation is the same as the Impact Analysis Area in the beginning of Section 3.2. There are approximately 15,000 acres in this the Impact Analysis Area (Figure 7).

The other activities are the same as for soils.

The cumulative effects to vegetation include the 255 acres of native vegetation by the Proposed Action, and 10 acres for the MG operation, for a total of 265 acres. This represents 1.8% of the CESA.

The total Proposed Action would affect 553 acres of native vegetation and historic dredge tailings (with little or no vegetation) and combined with the MG operation would affect a total of 563 acres, or 3.8% of the CESA.

Under the No Action alternative the effect to soils would be decreased by the 563 acres or 3.8% of the CESA.

4.4.14 Invasive Non-native Species

The CESA for Invasive Non-native Species is the Manhattan Mining District (Figure 7). For purposes of this CESA, there are approximately 6,500 acres within a defined area bounded by Nevada Highway 377 on the north, then to the BLM-USFS boundary along the north, east, and south side of Manhattan Gulch, and then along Nevada Highway 376 back to the intersection of Nevada Highway 377.

Cumulative disturbance for the past and present actions and RFFA's include 553 total acres for the Proposed Action, 10 acres for the MG Placer, 50 acres for the Gold Wedge, and 289 acres for the RMGC Manhattan Mine. Of the 553 acres associated with the Proposed Action, approximately 295 acres are disturbed, unreclaimed placer tails from the Natomas Dredge and are generally more susceptible to invasive non-native species. Past disturbance of dredge tails and native soils has occurred within this area and the MG Placer.

The cumulative effects of the past and present actions including the Proposed Action would be related to the potential increase for establishment of non-native species on a total of approximately 900 acres, or 14% of the area of the defined CESA.

Under state laws and BLM requirements all activities would be required to control invasive and non-native species. This would be the case for the present actions and RFFA's including the Proposed Action. The incremental portion of cumulative impacts from the Proposed Action is on 553 acres, or approximately 9% of the CESA and 61% of the 900 acres of cumulative disturbance, where controls would be instituted. There are also 295 acres of existing disturbance associated with historic dredge tails within the area of the Proposed Action that has very sparse vegetation and is more susceptible to invasive and non-native species. These would be graded and revegetated under the Proposed Action, reducing the susceptibility of these areas to establishment of invasive and non-native species.

Under the No Action alternative the potential for invasive and non-native species would be decreased by the 255 acres of native vegetation or 4% of the CESA. There are 295 acres of existing disturbance or 4.6% of the CESA associated with historic dredge tails within the area of the Proposed Action that have very sparse vegetation and are more susceptible to invasive and non-native species. These would remain susceptible to establishment of invasive and non-native species under the No Action alternative.

4.4.15 Visual Resources

The CESA for Visual Resources would be generally the portion of the Manhattan District, where any activities in the Gulch would be visible. This comprises approximately 5,000 acres in and around the Gulch ((Figure 7).

The past and present actions and RFFA's including the proposed actions are visible from only small portions of the CESA, depending upon the exact location of the activity and the observation point. There are no locations in the CESA where all of these activities are visible, due to the canyon-type terrain of the CESA. Generally viewsheds for respective activities are much smaller than the CESA and could range from less than 100 acres in the central area of the Gulch to more than 1000 acres from the west. Portions of the CESA can be seen from State Routes 377 and 376, notably the historic dredge tails.

Approximately 900 acres of cumulative land disturbance would be visible from different locations and at different times in the CESA. All of these are consistent with the current visual character of the area and with the Class IV Visual designation.

Under the No Action alternative, the area where visual resources would be affected would be reduced by 550 acres total. However, 295 acres of historic, unreclaimed dredge tails would not be reclaimed and would remain in stark contrast to the surrounding terrain.

4.4.16 Wildlife and Migratory Birds

The CESA for wildlife and migratory birds is the same as the Impact Analysis Area defined in Section 3.2.12 and extending up the Gulch to the RMGC Manhattan Mine (Figure 7).

Past, present actions and RFFA's associated with wildlife and migratory birds, historic mining hardrock and placer mining, the Natomas Dredge operation, the RMGC Manhattan Mine, placer exploration and testing associated with the proposed project since the late 1980's, the Gold Wedge Mine and the MG Placer.

The cumulative effects to wildlife and migratory birds totals 900 acres of habitat, of which approximately 650 acres (72% of the total disturbance; 4.3% of the CESA) is currently disturbed (295 acres of historic dredge tails, 289 acres for the RMGC Manhattan Mine, 50 acres for the Gold Wedge and 10 acres for the

MG Placer). The remaining 255 acres is native vegetation that would be affected by the Proposed Action (28%). This represents 1.8% of the CESA.

The total Proposed Action would affect 553 acres of native vegetation and historic dredge tailings (with little or no vegetation) and combined with the MG operation would affect a total of 563 acres, or 3.8% of the CESA.

Figure 7. Manhattan Gulch Mine Cumulative Effect Study Areas

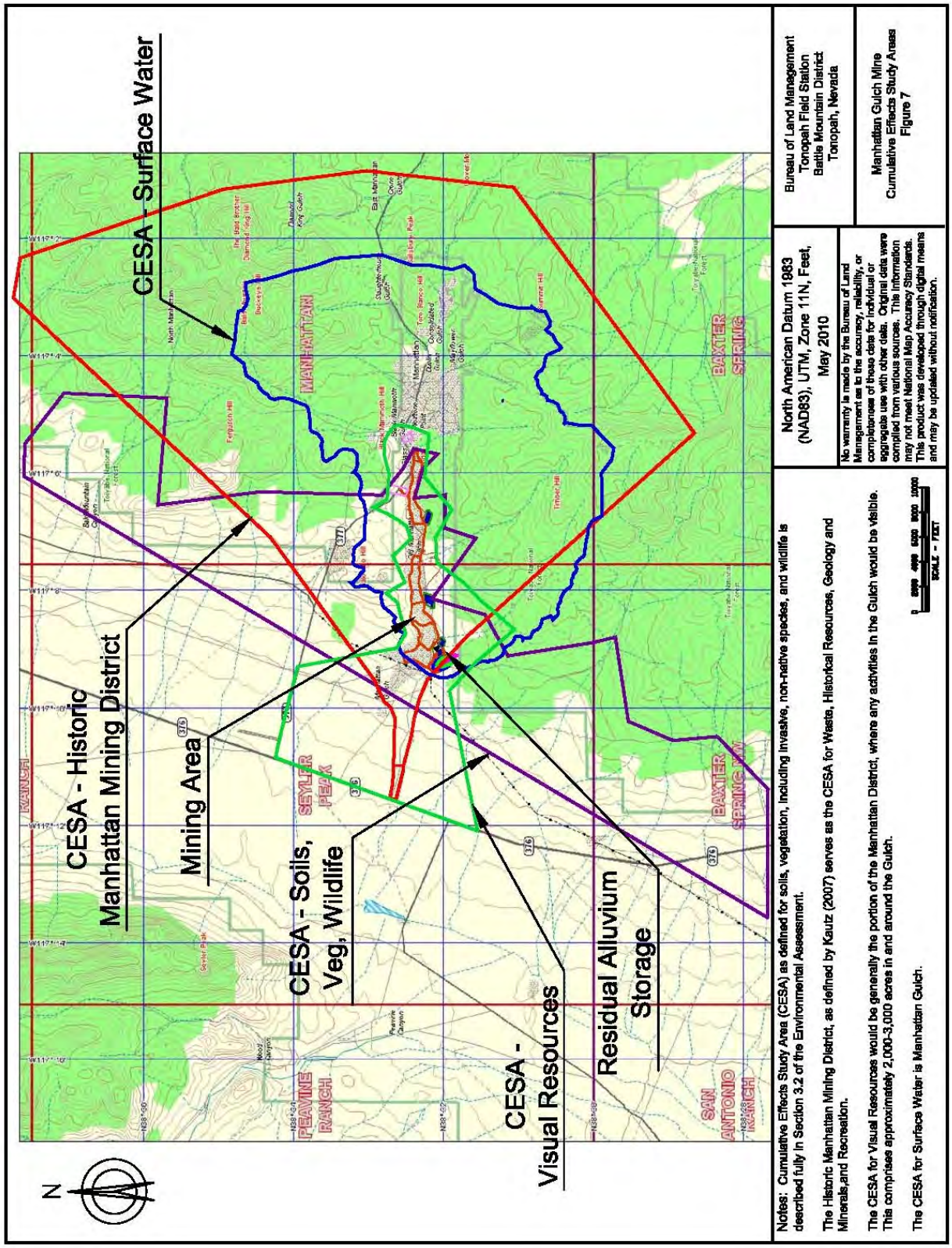
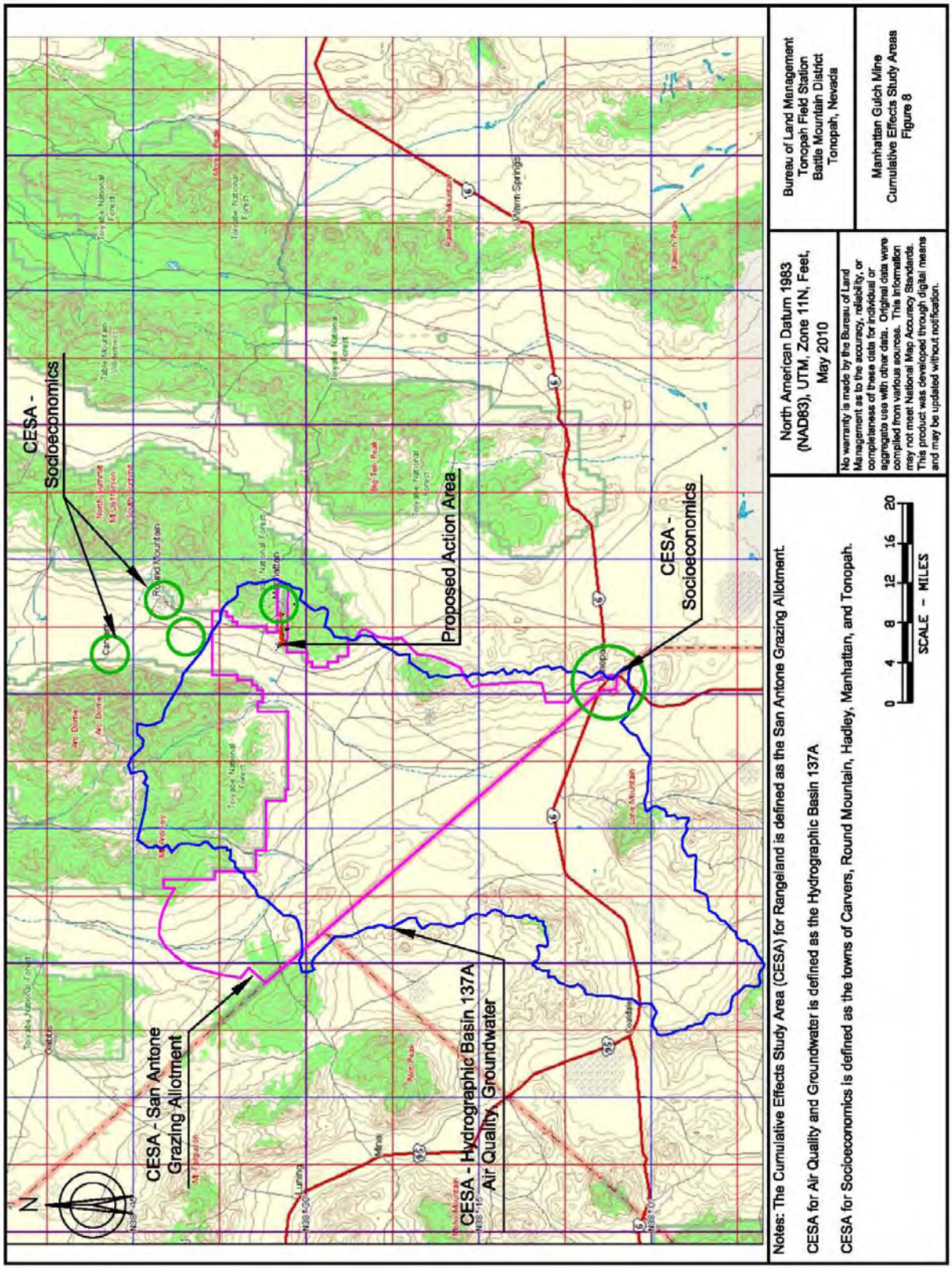


Figure 8. Manhattan Gulch Mine Cumulative Effect Study Areas



5 PERSONS OR AGENCIES CONSULTED

This EA was prepared at the direction of the BLM Tonopah Field Office, Tonopah, Nevada, by The MINES Group, Inc., under a contract with The Project Proponent. The following is a list of individuals responsible for preparation of the EA.

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5.2 Persons, Groups, and Agencies Consulted

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Residents of Manhattan

Duckwater Shoshone Tribe
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State Government

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State of Nevada, Governor's Office - Carson City, NV
State of Nevada, Division of Water Resources - Carson City, NV
Nevada Division of Wildlife - Reno, NV
Nevada Division of Wildlife - Winnemucca, NV
Nevada State Historic Preservation Office - Carson City, NV

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