CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

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Appendix 4B Stormwater Pollution Prevention Plan (SWPPP)

Chapter 4 Environmental Consequences

4.1 Impact Assessment

The Proposed Action and action alternatives outlined in Chapter 2 may cause, directly or indirectly, changes in the human environment. This Environmental Impact Statement (EIS) assesses and analyzes these potential changes and discloses the effects to the decision-makers and public. This process of disclosure is one of the fundamental objectives of the National Environmental Policy Act of 1969 (NEPA). There are concepts and terms used when discussing impacts assessment that may not be familiar to the reader. The following sections attempt to clarify some of these concepts.

4.1.1 Impacts/Effects

The terms "effect" and "impact" are synonymous under NEPA. Effects may refer to adverse or beneficial ecological, aesthetic, historical, cultural, economic, social, or health-related phenomena that may be caused by the Proposed Action or action alternative (40 Code of Federal Regulations [CFR] 1508.8). Effects may be direct, indirect, or cumulative in nature. Cumulative effects are analyzed in Chapter 5.

4.1.2 Direct Effects

A direct effect, caused by the action, occurs at the same time and place as the action (40 CFR 1508.8(a)). Direct effects are discussed under each affected resource.

4.1.3 Indirect Effects

Indirect effects are reasonably foreseeable effects, also caused by the action, that occur later in time or are removed in distance from the action (40 CFR 1508.8(b)). Indirect effects are discussed under each affected resource.

4.1.4 Significance

The word "significant" has a very particular meaning when used in a NEPA document (40 CFR 1508.27). Significance is defined by the Council on Environmental Quality (CEQ) as a measure of the *intensity* and *context* of the effects of a major federal action on, or the importance of that action to, the human environment. Significance is a function of the beneficial and adverse effects of an action on the environment.

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining intensity of effect. This EIS uses the terms Major, Moderate, Minor, or Negligible in describing the intensity of effects.

Context means that the effect(s) of an action must be analyzed within a framework, or within physical or conceptual limits. Resource disciplines, location, type, or size of area affected (e.g.,

local, regional, national), and affected interests are all elements of context that ultimately determine significance. Both long- and short-term effects are relevant.

4.1.5 Indicators

Impact indicators are the consistent currency used to determine change (and the intensity of change) in a resource. Working from an established existing condition (i.e., baseline conditions described in Chapter 3) this indicator would be used to predict or detect change in a resource related to causal effects of proposed actions.

4.1.6 Environmental Effect Categories

The following environmental effect categories (Table 4.1-1) are presented to define relative levels of effect intensity and context for each resource that is analyzed in this chapter, and to provide a common language when describing effects.

Table 4.1-1 Summary of Terms used to Describe Effects in the EIS

Attribute of Effect		Description
Magnitude (Intensity)	Negligible	A change in current conditions that is too small to be physically measured using normal methods or perceptible to a trained human observer. There is no noticeable effect on the natural or baseline setting. There are no required changes in management or utilization of the resource.
	Minor	A change in current conditions that is just measurable with normal methods or barely perceptible to a trained human observer. The change may affect individuals of a population or a small (<15 percent) portion of a resource but does not result in a modification in the overall population, or the value or productivity of the resource. There are no required changes in management or utilization of the resource.
	Moderate	An easily measurable change in current conditions that is readily noticeable to a trained human observer. The change affects 15 to 75 percent of individuals of a population or similar portion of a resource, which may lead to modification or loss in viability in the overall population, or the value or productivity of the resource. There are some required changes in management or utilization of the resource.
	Major	Significant, a large, measurable change in current conditions that is easily recognized by all human observers. The change affects more than 75 percent of individuals of a population or similar portion of a resource, which leads to significant modification in the overall population, or the value or productivity of the resource. There are profound or complete changes in management or utilization of the resource. An impact that is not in compliance with applicable regulatory standards or thresholds.
Duration	Transient/Temporary	Short-lived (i.e., during construction)
	Short-term	10 years or less
	Long-term	More than 10 years

4.1.7 Mitigation

Where potential impacts to a resource are identified, potential mitigation measures are evaluated in this document. Mitigation measures are means to address environmental impacts that are applied in the impact analysis to reduce intensity of or eliminate the impacts. To be adequate and effective, CEQ rules (40 CFR 1508.20) require that mitigation measures fit into one of five categories:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- Compensating for the impact by replacing or providing substitute resources or environments.

4.2 Water Resources

Impacts to water resources can include impacts to surface water, springs, and/or groundwater. These are described separately below, with surface water limited to streams, given the absence of any lakes in the area of analysis (Section 3.2). Springs and groundwater follow surface water in this section. Impacts to wetlands and riparian resources are discussed in Section 4.3. Because of their interconnection, impacts to groundwater may result in impacts to streams, springs, and/or wetlands; similarly, impacts to surface water may produce impacts to groundwater and/or wetlands.

4.2.1 Indicators and Methods

Surface Water

Issues that have been identified for surface waters include potential changes to water quantity (including water rights) and water quality (e.g., suspended sediment concentration, turbidity, pH, and contaminants of concern). Thus, the appropriate surface water indicators to assess these issues are:

- Changes in volume and/or timing of surface water flows that may affect availability of surface water, water rights and/or other resources; and
- Contributions of suspended sediment, turbidity, pH, and/or contaminants of concern in downgradient surface water.

Springs and Groundwater

Project-related activities have the potential to affect springs and groundwater resources through short- and long-term surface disturbance, as well as groundwater withdrawals for mine use or

municipal use that is altered to accommodate mine use. The following indicators have been identified to evaluate potential project impacts on springs and groundwater resources:

- Changes in volume and timing of discharge from springs;
- Potential changes in availability of groundwater to water rights holders and other water users; and
- Changes in groundwater or spring water quality.

In order to compare effects associated with the Proposed Action, North Facilities Alternative, and the No Action Alternative, these indicators were considered both independently and in conjunction with one another.

4.2.2 Proposed Action

Potential impacts to water quantity and/or water quality are discussed below by project component. Because of the close interconnection between groundwater, springs, and surface water at this site, no discussion of surface water would be complete without a discussion of the springs, which are a primary source of water to wetlands (Section 4.3) and Hardy Creek. Consequently, discussion of these resources has been integrated in this section.

<u>Mining and Processing Facilities</u>

Surface Water

As indicated in Section 3.2.3, most of the stream channels that are present upstream, within, or downstream of the mining and processing facilities area do not flow year round. Instead, they flow primarily as a result of precipitation runoff, but are also influenced by discharge from the Johnson Springs system. Upgradient area runoff would be routed around the waste rock storage facility (WRSF); tailings storage facility (TSF); heap leach facility; mine administration, shop, and mill facility area; and, as practical, the mine pit area via several diversions and allowed to continue downstream (Newmont, 2012f).

Runoff produced within the mine facilities area would be retained within various sediment basins and collection sumps as shown on Figure 2.2-6 and Newmont Mining Corporation's (Newmont) Stormwater Pollution Prevention Plan (SWPPP) (Appendix 4B) (Newmont, 2012f). These diversions and impoundments would control runoff from several small, unnamed channels that drain surface water from the eastern front of the Pequop Mountains north of the Long Canyon drainage basin, as well as from the Long Canyon drainage area. Estimated peak runoff rates and total storm volumes would be used to design the runoff controls and ensure that sizes and configurations are adequate to handle the design storm, which is the 25-year, 24-hour event (Newmont, 2012f); stormwater controls are designed to protect both mine facility infrastructure and downgradient water quality. The sub-basin that would contain the mine pit is 881 acres, of which 736 acres would be part of the pit (84 percent) and captured by that facility. Storm runoff leaving Long Canyon would continue via the natural channel between the proposed TSF and a growth medium stockpile. Although extreme high runoff events from this area would be expected only rarely, there would be some potential for the natural Long Canyon flow channel to

migrate laterally across the alluvial fan surface between these two features (WRSF and TSF), perhaps eroding materials and carrying them downstream towards Hardy Creek. The downstream reaches of Sixmile Creek would be diverted around the proposed WRSF. A stormwater diversion channel would also be constructed around the WRSF, as described in Newmont's SWPPP (Newmont, 2012f), which is in Appendix 4B.

None of these tributary channel flow alterations would have more than a negligible effect on either the overall timing or volume of stream flow in Hardy Creek. Although it is the only stream channel within the mining and processing facilities area categorized as perennial by the United States Geological Survey (USGS), it appears to depend upon the Johnson Springs system and other influent groundwater to sustain flows in its upper reaches; runoff from the tributary channels typically infiltrates before reaching Hardy Creek. There could be other mechanisms whereby Hardy Creek flows could potentially be altered, as discussed below.

It is important to note that Hardy Creek's stream flow is already reduced (rate, distance of flow downstream, and seasonal duration) due to current municipal and Big Springs Ranch (owned by Newmont) use of water from Big Springs and the Johnson Springs system that would otherwise support the creek's natural flow regime. Surplus Big Springs flow not currently diverted for use by the Cities is primarily used for operations at Big Springs Ranch or allowed to flow to the wetland areas which are owned by Newmont. Wendover, Utah and West Wendover, Nevada (Cities) currently use, at a fairly constant rate, 450 gallons per minute (gpm) from Big Springs (Golder, 2014). Newmont controls and would continue to control the majority of Hardy Creek water rights that currently allow for these water uses, as well as controlling the other rights to surface water in the area that are held by Fronteer Development (USA), Inc. Because of this, it is not feasible to quantitatively separate them. Should there be further reduction of surface flows in the Hardy Creek reach due to Newmont's water use. the only water rights that would be impacted are those that are controlled by Newmont. Any resultant impacts to wetland areas are described in Section 4.3.

Because Hardy Creek becomes a losing stream as it progresses down the valley, eventually losing all flow and channel definition before reaching the closed basin that is its terminus, its importance as a surface water resource is primarily due to its functional support of wetlands and other biological resources where flow is sustained, as described further in Section 4.3. Indirect effects on Hardy Creek stream flow could occur if the mine operations include any removal of groundwater that would otherwise contribute to Hardy Creek's flow, or if the smaller borrow pits excavated adjacent to the perennial stream reach drain water from the alluvium. These borrow pits would be reclaimed as wetlands.

Newmont conducted aquifer pump tests and groundwater flow modeling to determine potential impacts their operations and associated activities may have on springs, wetlands, groundwater, and surface water resources. Results of the tests and modeling were reviewed by the Bureau of Land Management (BLM) and accepted for use in this EIS. A brief summary of the results of the numerical modeling is presented in this (surface water) section because of the potential

impact of groundwater withdrawals to surface water, but much greater detail is provided in the springs and groundwater section below.

Aquifer pump test results indicate that pumping of the mine supply well(s) is not expected to have a direct or indirect impact on flows in Hardy Creek because no drawdown was observed at Big Springs during the tests. However, groundwater modeling predictions for long-term pumping and environmental isotope data indicate that the bedrock aquifer and basin fill/alluvial aquifer are interconnected, and that combined pumping of the mine supply well and new municipal wells would likely reduce the flow in Big Springs and in other (combined) springs in the Johnson Springs system (Golder, 2013a). Table 4.2-1 shows the results of the model for three pumping scenarios: the Proposed Action expected case, an extreme case, and the North Facilities Alternative expected case. The extreme case assumes the Cities would abandon their wells on the east side of the basin and pump all of their municipal demand from wells and springs on the west side of the basin, nearer Big Springs. Under this unlikely scenario, Big Springs flow could be reduced by as much as 460 gpm, but not until after the mine had stopped operating or pumping any water. The greatest flow reduction at Big Springs during mining would be 280 gpm under the Proposed Action expected case. Note that the model assumes a constant flow rate of 990 gpm from Big Springs, which is a conservative average for the period from November 2006 to January 2012. Flow rates have decreased recently due to drought from 648 gpm in August 2013 to 400 gpm in December 2013.

Table 4.2.1 MODFLOW Predicted Change in Flow at Big Springs and Central Springs

Stress Period	Predicted Flow Rate, Big Springs (gpm)	Predicted reduction in Flow Rate, Big Springs (gpm)	Predicted Flow Rate, Central Springs (gpm)	Predicted Reduction in Flow Rate, Central Springs (gpm)
Case 2: Expected Case – Proposed Action				
Pre-mining	990	0	300	0
Mine Startup	710	280	290	10
Mine Operations	710	280	290	10
Mine Closure & Reclamation	790	200	290	10
25-years Post-Reclamation	720	270	290	10
Case 4: Extreme Case – No Pumping at Shafter Post-Reclamation				
Pre-mining	990	0	300	0
Mine Startup	720	270	290	10
Mine Operations	720	270	290	10
Mine Closure & Reclamation	800	190	290	10
25-years Post-Reclamation	530	460	280	20
Case 6: Expected Case – North Facilities Alternative				
Pre-mining	990	0	300	0

Stress Period	Predicted Flow Rate, Big Springs (gpm)	Predicted reduction in Flow Rate, Big Springs (gpm)	Predicted Flow Rate, Central Springs (gpm)	Predicted Reduction in Flow Rate, Central Springs (gpm)
Mine Startup	890	100	290	10
Mine Operations	770	220	290	10
Mine Closure & Reclamation	800	190	290	10
25-years Post-Reclamation	710	280	290	10

Source: Golder, 2014

The model's predicted reduction in flow includes effects of pumping that would occur under the No Action Alternative (Section 4.2.4). Of the predicted 280 gpm of predicted long term flow reduction from Big Springs, approximately 110 gpm would be the result of the Proposed Action and the rest would occur under the No Action Alternative, assuming the Cities' pumping would increase.

The model's predicted reduction in flow for the Proposed Action expected case is within the range of observed natural variation in Big Springs flow, consequently, any reduction due to pumping may be difficult to distinguish from natural variability in flow rates. If the predicted flow reduction (approximately 280 gpm) occurs, then year to year it might be difficult to distinguish the exact cause of a particular flow condition, but over the long term, the elimination of high flow/wet years and prevalence of low flow/dry years (as compared to pre-mining conditions) would likely be evident.

Newmont has stated that it would use the Cities' water rights for Big Springs during construction and thereafter only as a secondary or backup water supply (Anderson, 2014b). Newmont's water supply infrastructure and expected water requirements would allow for limited use of the spring source; however, there is no guarantee that Newmont would not use additional Big Springs or additional surface waters in connection with its mining operation. Newmont's water use would be highest during the startup period primarily because of increased dust suppression from road-building; removal of vegetation and topsoil; and excavation of borrow pits. Newmont's primary water supply production wells will have a capacity of 4.5 cubic feet per second (cfs) (2,020 gpm). As described in Chapter 2, the peak water use would be during the 18 to 30 months of construction and start-up, and is estimated to be 2,104 to 2,885 gpm. These peak conditions would require use of the production well plus Big Springs water for which Newmont has acquired the water rights through the Surplus Water Service Agreement with the Cities. However, after construction and during operations, water use would drop to 1,224 to 1,623 gpm, which is within the capacity of the production wells. During operations, Big Springs water would typically not be used by Newmont or the Cities. Total water use by Newmont would drop to approximately 332 gpm during closure and reclamation.

When Newmont does not use any of the allocated flow, Big Springs contributions to flow in Hardy Creek would more closely approximate pre-mining conditions. Unused water from Big Springs could be used for agriculture by the ranch or allowed to flow in a controlled manner to the wetlands. Should flow from Big Springs and the Johnson Springs system be substantially reduced over an extended period, the extent, health, and function of the wetland complex and Hardy Creek would likely be reduced. Overall, the project would be considered to have a minor to moderate impact on quantity of surface water resources.

As the proposed open pit would not be deep enough to reach the water table of the bedrock aquifer, Newmont does not anticipate that the pit would intercept either the alluvial or the bedrock groundwater aquifer. Current mining plans do not include any pit dewatering or pumping of any bedrock aquifer wells. Thus, the proposed open pit mine operations should not reduce groundwater availability that supports flow in Big Springs or the other springs in the Johnson Springs system that contribute to surface flow in the wetlands and Hardy Creek. Should conditions change during mining and pit dewatering from the bedrock aquifer is required, there could be a reduction in flow at the springs.

The proposed clay borrow pits in T35N (Figure 2.2-1) may intercept shallow groundwater contained in the alluvium adjacent to an ephemeral reach of Hardy Creek; however, no dewatering of these pits would occur (see Section 2.2.17, Reclamation) and flows in Hardy Creek should not be affected by this activity, making this a negligible impact. A nearby well, LCMW-10, has a minimum depth to water of 58 feet below ground surface (bgs) (Figure 3.2-2).

Surface Water Quality

During construction of the mining and processing facilities, there would be some potential to increase erosion and transport sediments to surface waters, as with almost any type of ground-disturbing activity. However, this would be reduced or minimized due to the nature of surface flows, the channel substrate, and the Best Management Practices (BMPs) that would be implemented through Newmont's compliance with its SWPPP (Appendix 4B) (Newmont, 2012f). Further, as mentioned in Section 3.2.3, Hardy Creek is within a closed basin that is itself a depositional feature. As a result, any short-term increase in sediment transport would have a minor impact to this surface water resource.

There would be some potential for accidental release of hydrocarbons during construction, primarily from vehicles and equipment. If this occurred, impacts to stream channels would likely be minor because of the lack of perennial surface flow and the prompt control and countermeasures that would occur per the Spill Prevention Control and Countermeasures (SPCC) Plan (Newmont, 2012f). In addition, due to other BMPs in the Plan of Operations (Plan) such as employee training, the potential for these accidents to occur would be reduced. During construction of the mining and processing facilities, impacts to surface water quality would be minor and short-term.

Newmont would operate a production well (or wells) less than a mile northwest of Hardy Creek. This well would draw from the basin fill/alluvial aquifer. Newmont expanded its groundwater-

modeling program to better understand how its production wells would affect the alluvial and bedrock aquifers, as described in the following subsection titled “Springs and Groundwater”.

In addition to the potential effects to water quantity from the operations of mining and processing, there would also be some potential to affect water quality during operations. First, there would be a potential for sediment movement and hydrocarbon spills at the facilities areas due to the same general types of activities (vehicles, equipment, disturbed areas, etc.) that would occur during construction. The planned BMPs and compliance with the SPCC Plan (Appendix 4A) and SWPPP, coupled with the typical lack of surface flows, would reduce this impact to minor.

Additional sources of pollutants would be present during operations that were not present during construction. Normal procedures would prevent their release, so potential surface water quality impacts would be restricted to unforeseen, unplanned events such as upsets, bypasses, spills, leaks, or other releases of fuels, process water, and reagents. Newmont would further reduce the potential for these types of events by implementing various control measures to minimize, confine, and/or control these types of exposure. With these measures, as well as the typical lack of surface flows in the area, this impact would be minor. Similarly, Newmont would practice careful storage and application of dust control chemicals, thereby reducing the potential for introducing sources of dissolved solids into surface waters to minor.

The larger material areas (pit, WRSF, TSF, and heap leach facility) would have some potential to release pollutants during or after mining and processing. Materials in the pit wall, the pit bottom, and the WRSF that would be exposed to precipitation may, over time, leach trace elements and, in turn, this precipitation may infiltrate and reach groundwater (see Geochemistry under Section 3.2.2). Groundwater flow and geochemical modeling conducted for the purpose of estimating the potential for degradation of water resources to occur are discussed in the groundwater section. While Hardy Creek does not have designated beneficial use or numeric water quality criteria under State Water Quality Standards given at Nevada Administrative Code (NAC) 445A.118 – 445A.225, there could be consequences to biological resources if stream water quality became degraded, as discussed in those resource sections. Reduction in stream flow as a consequence of groundwater pumping would also be considered a potential source of water quality degradation.

The TSF and the heap leach facility would both be synthetically lined, permitted facilities designed to prevent discharge to either surface water or groundwater. The heap leach would be outfitted with monitoring and leak detection as well as the collection pond downgradient of the TSF. Any release of these materials or related processing fluids would be due to accidental, unlikely occurrences that would not be expected to reach surface water channels. Assuming rapid discovery via the operational monitoring process and rapid remediation, any impact to runoff or surface water quality would be short-term and minor.

Upon closure, reclamation activities would further reduce the potential for surface water impacts. As described in Chapter 2 and below, draindown within the WRSF, TSF, and heap leach facilities would be contained without discharge to surface waters.

Springs and Groundwater

Potential environmental impacts to groundwater resources during construction and mining operations include changes in availability of groundwater to water rights holders, such as the Cities, and other water users, such as groundwater for irrigation and stock; changes in volume and timing of discharge from springs that are fed by groundwater, such as the Johnson Springs system; and changes in groundwater quality resulting from mining activities.

Potential Impacts to Groundwater Availability/Spring Discharge

Water for mining (dust control), fire suppression and protection, ore processing activities (milling and heap leach activities), tailings disposal, and potable (drinking and sanitary) uses would be obtained from a new production well or wells installed in the basin fill/alluvial aquifer and dedicated to the project, as discussed in Section 3.2 and shown on Figure 2.2-1 and Figure 2.2-6. Water from the wells would be delivered to the 600,000-gallon capacity fresh/fire water storage tank facility located near the office, shop, and mill complex. The tank facilities would have the potential to supply water trucks used for exploration drilling, development drilling, and road dust control. Capacity would be made available in the total system for adequate water storage in the case of a fire. Water from a separate well would be used for potable and sanitary use at the mine office and support facilities, as shown on Figures 2.2-1 and 2.2-6. Newmont would establish a non-transient, non-community drinking water system that complies with the regulations of the Nevada Division of Environmental Protection (NDEP) Bureau of Safe Drinking Water. Newmont would dispose of sewage through either a conventional septic tank and leach field system or a rotating biological contractor (RBC) discharging treated effluent to a leach field, as described in Section 2.2.12.

Newmont's projected water supply requirements for the Long Canyon Mine site for each phase of operation includes the following from Table 2.2-3 (Golder, 2014):

- Construction and start-up – 1,913 to 2,623 gpm (or 2,104 to 2,885 gpm with a 10% contingency);
- Operational phase – 1,113 to 1,475 gpm (or 1,224 to 1,623 gpm with a 10% contingency); and
- Closure and reclamation phase – 302 gpm (or 332 gpm with a 10% contingency).

A range of flow rates is provided because water use is higher during seasonal periods of higher evaporation (i.e., higher temperatures and lower humidity).

Several aquifer tests were performed in or near the project area in the basin fill/alluvial aquifer at the Big Springs Ranch irrigation well, BSR-1, and in the carbonate bedrock aquifer at production well LCPW-1 (GHS, 2010; Barnett et al., 2011a and 2011b; Golder, 2012 and 2013a). The

most recent test was conducted in the fall of 2012 at well BSR-1. The well was pumped for approximately 10 days at an average pumping rate of approximately 2,930 gpm. Four basin fill monitoring wells (LCMW-10, LCMW-18, LCMW-19, and LCMW-20) and the pumped well, BSR-1, showed discernible water level responses to pumping. The maximum drawdown observed in BSR-1 during the 10-day constant-rate test was approximately 108 feet. Drawdown in the four nearby monitoring wells ranged between approximately 1.1 feet at LCMW-10 (4,300 feet from BSR-1) and 8.7 feet at LCMW-18 (225 feet from BSR-1) (Golder, 2013a). No drawdown was observed in any of the carbonate bedrock wells or at Big Springs.

Using drawdown estimates determined from the aquifer tests, analyses of the projected mine water supply requirements were performed by Newmont to evaluate the potential effects of pumping on regional groundwater flow within the northern Goshute Valley (Golder, 2012, 2013a, and 2014). Two methods were used: 1) Analytic element model simulations were conducted using the Wellhead Analytic Element Model (WhAEM), and 2) numerical three-dimensional model simulations were conducted using the USGS software package, MODFLOW, finite-difference groundwater flow model. The objectives of these analyses were to estimate drawdown from expected groundwater withdrawals associated with the Long Canyon Project and municipal water supply pumping; evaluate potential influences of the range front fault system on drawdown associated with pumping for mine and municipal water supply; estimate impacts from recharge at the Johnson Springs system; and to evaluate the suitability of the selected location for a mine water supply well and new municipal wells.

WhAEM is a public domain, groundwater flow model developed by and available from the Environmental Protection Agency (EPA) (Kraemer et al., 2007). The WhAEM model is an analytic element model designed to facilitate capture zone delineation or the area of a groundwater aquifer that would be drawn down by pumping a specific well or wells. Separate simulations were performed with a water supply well placed at BSR-1. Projected mine water demand in the model was 2,000 gpm continuously pumped from the proposed water supply well for 20 years. In addition to pumping at a new water supply well, the WhAEM simulations took into account recharge at the Johnson Springs system, pumping at the six supply wells at the Shafter well field with pumping rates equal to the water right at each well (approximately 148.5 acre-feet annually (AFA) to 1,445 AFA, which is conservatively high), and a low-flow hydraulic barrier along the range front fault system.

The WhAEM model results for the Proposed Action show that the influence of a water supply well located at or near BSR-1 on groundwater levels was less than 2.5 feet at the Johnson Springs system and less than 0.6 feet at the Shafter well field (Shafter #6) (Golder, 2013a). Figure 4.2-1 shows the simulated capture zone that includes pumping of the water supply well at BSR-1 for 20 years at 2,000 gpm.

The WhAEM simulations are considered to be conservative because the model does not include aerial recharge from precipitation. Additionally, the model assumes that there is a flow path from the pumping well to the Shafter well field, which does not appear to be realistic based on contoured water levels and the flow field in the basin. Also, the simulated long-term pumping

rate applied in the model simulations (2,000 gpm) overestimate the expected water demand during the operational phase (by 1.5 times) and closure and reclamation phase (by 6.5 times) of the project.

The second groundwater model was conducted using MODFLOW, which is a numerical three-dimensional finite-difference groundwater flow model that was developed and originally released by the USGS in 1988 (McDonald and Harbaugh, 1988) followed by several subsequent updates (Harbaugh and McDonald, 1996; Harbaugh et al., 2000; Harbaugh, 2005). This groundwater model was used as a quantitative, predictive tool to assess the potential impacts of different mine and municipal pumping scenarios throughout the mine life and over a 25-year post-mining period. MODFLOW takes into account varying hydraulic properties of the different geologic units/aquifers; the influence of the range front faults on groundwater, springs, and wetlands; and recharge and evapotranspiration rates across the study area. The model calibration was based on simulation of: 1) steady-state, non-pumping, and 2) transient, pumping conditions. Steady-state and transient flow rates at the springs were also evaluated. A detailed description of the modeling effort is provided in Golder (2014).

To predict the potential impacts to groundwater availability or flow in the Johnson Springs system under the Proposed Action, Golder (2014) evaluated six pumping scenarios for four periods of time: mine startup, mine operations, mine reclamation/closure, and 25 years after the end of mining. The different pumping scenarios and pumping rates for each time period are shown in Table 8 in Appendix 3A. The discussion in this section focuses on the Case 2 pumping scenario (Table 4.2-1), which is the expected scenario for the Proposed Action. Under this scenario, the model simulated the following:

- A mine supply well located near BSR-1 is pumped at varying rates depending on need during the mine startup, mine operation, and mine closure/reclamation time periods;
- Municipal water supply for the Cities is provided by the Shafter well field and diversion of Big Springs during the mine startup period, as is currently the case;
- Municipal water supply for the Cities is provided by the Shafter well field and the addition of the two new municipal wells to be installed by Newmont in T35N, R66E, Section 21 during the mine operation period;
- Municipal water supply for the Cities is provided by the Shafter well field, new municipal wells, and diversion of Big Springs during mine closure and the 25-year post-mining period;
- Big Springs is diverted for use by the Cities during each time period, except during mine operations when Big Springs is diverted by Newmont for mine use; and
- The model uses conservative assumptions, such as using the maximum estimated flow rate for each phase and increasing municipal use annually to simulate population growth.

Figure 4.2-1 WhAEM Simulated 20-Year Capture Zone for BSR Irrigation Well

Golder's (2014) predicted drawdowns for the expected pumping scenario (Case 2) for the Proposed Action at the four time periods are presented in Table 4.2-1, shown on Figures 4.2-2 through 4.2-5, and described below. All of the pumping scenarios and drawdown predictions are discussed in detail in Golder (2014).

Predicted drawdown at the end of mine startup is shown on Figure 4.2-2. This is the period of highest pumping rates at the mine. In order to supply adequate water for mining operations, the mine supply well was simulated with a well screen depth of 800 feet bgs within the basin fill/alluvial aquifer and pump approximately 2,800 gpm for mine operations. Municipal water supply is provided by the Shafter well field and diversion of Big Springs only. During this period, a drawdown of greater than 16 feet is predicted at the mine supply well and four feet of drawdown is predicted about 13,000 feet to the east and about 8,000 feet to the north toward Big Springs. In areas distant from the pumping well, quantification of drawdown is difficult to predict precisely using the model, including at Big Springs and the Shafter well field, because of the precision in the model and the inability to differentiate between seasonal variability and drawdown. Model results in Table 4.2-1 (Golder 2014) show a reduction in flow at Big Springs of 270 gpm during mine startup and operations, and 10 gpm at Central Springs.

It is noteworthy that the assumptions on which the model was based (i.e., pumping rates and locations) were conservative and accurate at the time the model was run. However since then some changes have been made which would affect the model's appropriateness to a minor degree. They include the following:

- Big Springs would be used only as a backup water source during operations and reclamation rather than as a primary source. While this has negligible if any affect on model outcomes, the model was run under the assumption that the mine would be diverting 449 gpm during mine life. Newmont has committed verbally to leaving much of this flow in the channel during this period.
- The preliminary agreement between Newmont and the Cities included transfer of Newmont's production well whereas the final agreement did not include this well. As a result, initial modeling assumed the cities might be pumping from this well in the long term and included a case where pumping rates on the west side of the valley were very high (8.5cfs). This pumping rate is no longer possible because the agreement between Newmont and the cities does not include transfer of this well.
- The model used 990 gpm as the flow rate from Big Springs; since then a flow rate of 648 gpm was recorded in August 2013; 445 gpm in October; 420 gpm in November; and 400 gpm in December, all of which reflect the drought conditions experienced in 2013.

It is also noteworthy that, for the 25 years post-closure, the model used a uniform pumping rate for the Cities based on the expected average pumping rate for this period (6.3 cfs) rather than incrementally increasing the pumping rate annually; this would have the effect of dampening the impacts of the maximum pumping periods or stress periods. In other words, in Figure 4.2-6, for the period from 2029 to 2054 (after the mine is no longer pumping water), the expected flow rate from Big Springs would be expected to start higher and end lower than what is shown as pumping is gradually increased to keep pace with project population growth.

Predicted drawdown at the end of mine operations is provided in Table 4.2-1 and shown on Figure 4.2-3. During this time period, mine pumping rates have approximately halved, but the Cities' water supply demand increased, as shown by the increased drawdown associated with the Shafter well field. Under the expected pumping scenario for the Proposed Action (Case 2 on Figure 4.2-3), additional drawdown is shown associated with the addition of pumping of the two new municipal wells (resulting from the replacement of the Big Springs diversion) and the mine supply well, but the drawdowns are predicted to be limited in extent. For the new municipal wells, well screen depths of 800 feet bgs within the basin fill/alluvial aquifer were simulated. Several wells used for livestock and possibly irrigation (locations provided by the BLM) are located to the south and west of the proposed municipal wells, as shown on Figure 3.2-2. These wells are outside of the predicted drawdown area and are not expected to be impacted from pumping of the municipal wells at these locations.

Predicted drawdown at the end of mine reclamation/closure is shown on Figure 4.2-4. During this time period, mine water supply needs drop substantially but municipal water supply demands increase with the Cities' water supplied by a combination of the Shafter well field, new municipal wells, and diversion of Big Springs. Under this scenario, drawdown predicted around the mine supply well is negligible and the drawdown associated with the new municipal wells is limited in extent. Shafter well field drawdown is similar to the previous time period.

Predicted drawdown 25 years after mine closure is shown on Figure 4.2-5. During this time period, mine water supply is no longer needed, but municipal water supply demand incrementally increased and is supplied by a combination of the Shafter well field, new municipal wells, diversion of Big Springs, and use of the mine supply well (after mine closure). Based on the Cities' predictions, an average water use of 6.3 cfs was applied in the model for the Cities throughout the 25-year post-mining period. Drawdown of groundwater levels near the mine is expected to be limited in extent, but the capacity of the Shafter well field is not expected to meet the municipal water demands under the predicted configuration. For the expected scenario for the Proposed Action (Case 2), the drawdowns associated with the Shafter well field and new municipal wells increase in size but are not predicted to intersect.

Based on other groundwater model pumping scenarios for the Proposed Action, the scenario with the greatest impact on the springs, Case 4, predicted a reduction of 460 gpm from Big Springs at the end of the 25-year post-mining period. Under this scenario, it was assumed that the Shafter well field would not be used by the Cities during the 25-year post-mining period to supply any of the Cities' water use demand (8.5 cfs). In other words, Case 4 abandoned use of the Shafter well field on the east side of the basin following mining and assumed all pumping would be from the west side wells; this scenario would consequently increase modeled impacts to Johnson Springs system (including Big Springs) on the west side of the basin beyond what would be reasonably expected. Therefore, the persistence of predicted drawdown during the post-mining periods appears to be related to impacts from municipal demand rather than from mining activities.

Figure 4.2-2 Predicted Drawdown at End of Mine Startup

Figure 4.2-3 Predicted Drawdown at End of Mine Operations

Figure 4.2-4 Predicted Drawdown at End of Mine Closure

Figure 4.2-5 Predicted Drawdown 25 Years after Mine Closure

Big Springs flow was predicted by the model to be able to continue to provide the current demand by the Cities (450 gpm) for the pumping scenarios considered for the Proposed Action, as shown on Figure 4.2-6 and in Table 4.2-1. However, depending on the pumping scenario, Big Springs flow is predicted to be reduced by as much as 300 gpm or less than one foot of drawdown during mining and as much as 480 gpm during the 25 years after mine closure (under the extreme case of abandonment of Shafter wells) (Golder, 2014). As shown on Figure 4.2-6, while the expected case for the Proposed Action (Case 2) shows drawdown at Big Springs increasing over time even after mine closure, the increase after mining is related to increased municipal water use rather than impacts by mining activities. The scenario based solely on water use for mining operations (Case 0) shows that Big Springs flow would return to pre-mining conditions within about five to 10 years after mine closure.

For the pumping scenario with the greatest predicted impact at Big Springs (Case 4) (Table 4.2-1), the predicted reduction in flow at the North and Central springs is 10 gpm (four percent of flow, less than one foot of predicted drawdown) during mining and about 20 gpm (six percent of flow, about one foot of predicted drawdown) 25 years after mine closure. Even though spring flows were not observed to be affected by the aquifer tests conducted at BSR-1 in the alluvial aquifer, the model predicted a small (20 gpm) reduction at Big Springs when calibrating the model using these aquifer test results, indicating that the model may overestimate the impacts to the springs when pumping occurs in the alluvial aquifer. Also, the predicted flow reduction can be compared to the 50 percent seasonal variation in spring flow rate observed at Big Springs, suggesting that the predicted reduction in flow will be difficult to distinguish from the natural variation in flow rates. At Big Springs, a natural variation of more than 1,400 gpm was observed between November 1, 2006 and August 31, 2013 (high of 2,053 gpm November 14, 2006 and low of 648 gpm August 24, 2013) (Golder, 2014); with a predicted reduction of 300 to 500 gpm at Big Springs during mine operations, this amount of reduction may not be distinguishable from natural variability on a year to year basis (Figure 3.2-6). If the low-flow condition determines the extent of certain aquatic or wetland species within the Johnson Springs system wetlands, as is often the case where perennial water occurs in an arid region, an additional reduction of flow during the driest time of year could potentially result in adverse effects and/or changes in ecosystem composition. These effects to wildlife, including migratory birds and special status species, are analyzed in detail in Section 4.8.

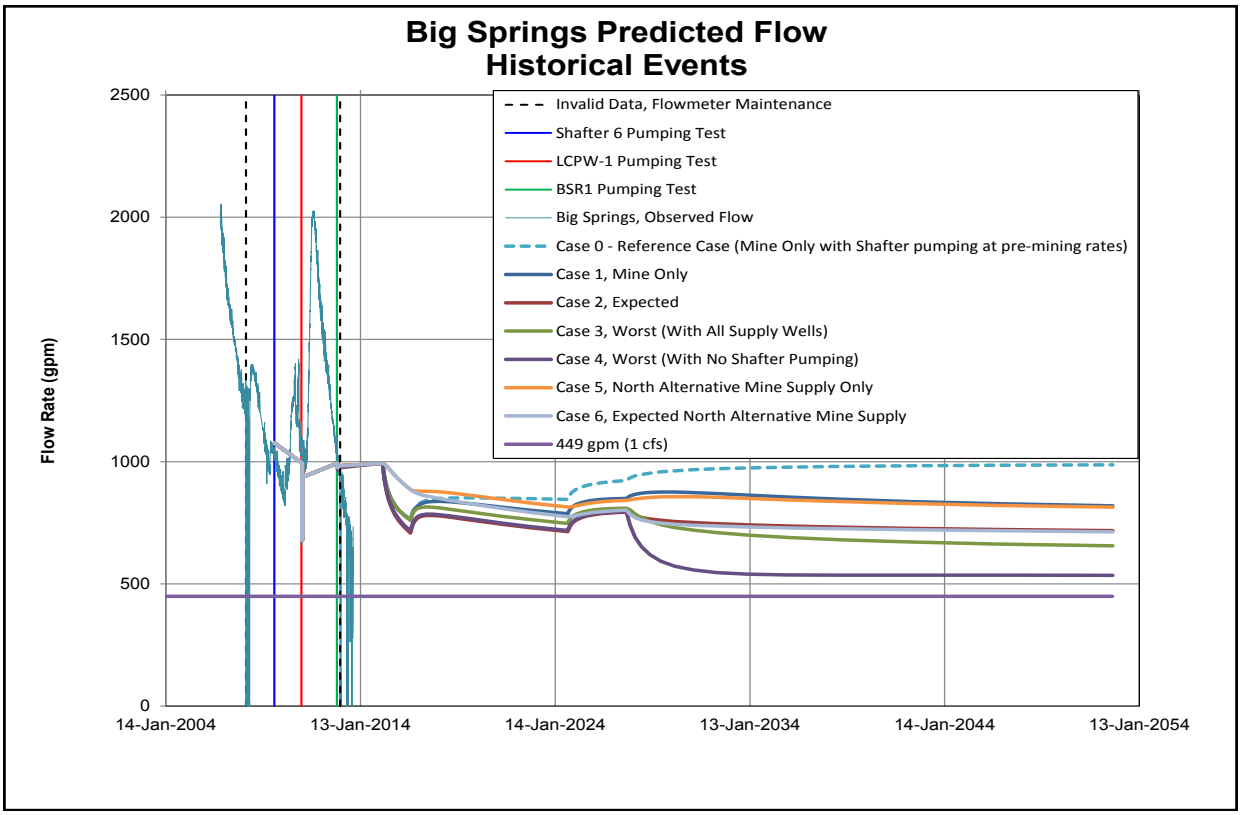

Figure 4.2-6 Predicted Spring Flows

As described above and in Table 4.2-1, flows at Big Springs and other springs in the Johnson Springs system would likely be reduced under the Proposed Action. It is projected that long term (25 years after mining) reduction in flow from Big Springs would be about 280 gpm under the most likely pumping scenario. This is a 28 percent reduction in average flow from Big Springs. It is projected that flow from the North and Central spring complexes could be reduced by as much as 20 gpm, which is five percent of their average flow. Combined reduction in flow rates in the Johnson Springs system would be about 22 percent of average flow. Some of these reductions in flow would also occur under the No Action Alternative (Section 4.2.4). When compared to the No Action Alternative, the projected reduction in flow from the Johnson Springs system under the Proposed Action would be about 11 percent. This indicates that the use of groundwater associated with the Proposed Action mining operations would produce a long-term, minor to moderate impact on surface water flow based on the projected flow reduction.

Potential Impacts to Groundwater Quality

The final pit floor would be excavated to an elevation of approximately 5,700 feet above mean sea level (AMSL), which is approximately 14 feet above the local water table of the carbonate bedrock aquifer (the basin fill/alluvial aquifer is not present in this area) and Big Springs, as verified by observation (Golder, 2012). Therefore, the basin fill/alluvial aquifer would not be encountered by the proposed construction or mining activities. Based on data collected from monitoring wells between 2009 and 2012, the pre-mining depth to groundwater in the basin fill/alluvial aquifer beneath the central portion of the project area ranges from about 13 feet bgs to the east of the former BSR-1 irrigation well near Hardy Creek to about 176 feet bgs near the

eastern boundary of the proposed pit area (Figure 3.2-2). Pre-mining depths to groundwater in the carbonate bedrock aquifer in the proposed mine pit area ranged from about 496 to 781 feet bgs in 2011. The larger material areas (pit, WRSF, TSF, and heap leach) would have some potential to release pollutants to groundwater during or after mining and processing from exposure to precipitation and leaching of trace elements over time. The potential for hazardous materials or other wastes to spill and subsequently affect groundwater quality would be negligible through Newmont's implementation of Environmental Protection Measures (EPMs) required by applicable state and federal regulations (Section 4.18). Geochemical modeling supports this finding (SRK, 2013a). More information on the leaching potential through the various geological materials expected to be encountered is discussed below.

Assessments of Drainage and Leaching to Groundwater

In order to assess potential impacts to groundwater quality during the operations, maintenance, and reclamation phase of the Proposed Action, drainage estimates were conducted using the UNSAT-H model (Fayer, 2000) to estimate the long-term average and annual drainage rates through both the uncovered and covered WRSF, heap leach facility, and TSF Golder (2012). UNSAT-H is a one-dimensional soil, water, and heat flux model that simulates the dynamic processes of infiltration, drainage, redistribution, evaporation, and transpiration. UNSAT-H uses soil, meteorological, and vegetation input data to simulate fluxes of moisture and energy. For this exercise, drainage was defined as water that infiltrates the soil surface and is not subsequently lost through evaporation or transpiration Golder (2012). Other parameters defined for the model are provided in Golder (2012). For the covered scenarios, three cover thicknesses (1.5, 2.0, and 3.0 feet) and two potential borrow materials available at the site were evaluated. The model results indicated the following:

- The draindown period occurs in the first six years following operations at the TSF, and within the first year at the heap leach facility.
- The estimated average drainage rate for the TSF following the draindown period ranges between approximately 0.51 and 1.22 inches per year (in/yr) under uncovered/non-vegetated conditions, and between 0.24 and 0.63 in/yr for the covered/vegetated scenarios. Assuming a surface area of 647 acres and draindown of 0.63 in/yr, this would be a flow rate of 21 gpm.
- The estimated average drainage rate for the heap leach facility following the draindown period is approximately 6.65 in/yr under uncovered/non-vegetated conditions, and between less than 0.1 and 1.5 in/yr for the covered/vegetated scenarios. Assuming a surface area of 266 acres and draindown of 1.5 in/yr, this would be a flow rate of 20.6 gpm.
- The estimated average drainage rate for the WRSF is approximately 6.42 in/yr under uncovered/non-vegetated conditions, and between less than 0.1 and 1.14 in/yr for the covered/vegetated scenarios. Assuming a surface area of 1,097 acres and a draindown rate of 1.14 in/yr, this would be a flow rate of 64.6 gpm.
- The higher drainage rates for the covered scenarios are all associated with a sandy loam textured cover material (NRCS, 2007).

A separate modeling study investigated the effectiveness of four potential cover materials over the heap leach and the WRSF. In addition to the relative effectiveness of the cover materials, the study also looked at how the thickness of the cover affected infiltration. The study concluded that alluvium comprised of silty sand with gravel, found on site, was the most effective of the four cover materials tested. For the WRSF, a three-foot thick cover was estimated to reduce the average infiltration from 22 percent of mean annual precipitation (MAP) to one percent of MAP (SRK, 2013b; SRK, 2014b). Increasing the thickness of the cover up to four feet decreased infiltration rates, beyond which no decrease in infiltration was observed. It was theorized that beyond four feet the infiltration water is no longer available for evapotranspiration and becomes recharge; this is also based on an observed maximum rooting depth of approximately three feet (Golder, 2012; SRK, 2013b). Using a geochemical model it was determined that reducing infiltration to two percent of MAP reduced all contaminants of concern below the NDEP reference standard and would thus be protective of groundwater quality (i.e., no constituents of concern would exceed NDEP Profile 1 reference values in groundwater) (SRK, 2013a). To achieve this a two-foot cover (upper foot comprised of growth medium) is proposed for the WRSF. This is doubly conservative, since the geochemical model assumed that groundwater beneath the WRSF was static when, in fact, it flows toward the center of the valley.

The same cover material was also the most effective for the heap leach but not as effective as for the WRSF due to the different hydraulic properties of the heap leach material. The maximum thickness of the cover material that reduced infiltration through the heap leach was three feet (SRK, 2013b), which reduced infiltration from five percent of MAP to four-percent (SRK, 2014b). A one-foot cover provided very similar reduction in infiltration, consequently a one-foot cover of growth medium would be used over the heap leach, primarily to promote revegetation (SRK, 2014b); this is considered adequate because the facility is zero-discharge by design (lined) and evaporation ponds (E-cells) would be used to dispose of the excess infiltration water (Section 2.2.17) (Newmont, 2014). The two evaporation ponds would include the process solution pond from the operations phase and a second evaporation pond of similar size to be constructed adjacent to the process pond (Newmont, 2014).

Another aspect of the assessment of the potential impacts to groundwater during the operations, maintenance, and reclamation phase of the Proposed Action is the geochemical characterization of mined materials that included acid-base accounting (ABA) and metals leaching potential tests performed on a representative set of rock samples collected from drill core within the proposed pit boundaries (SRK, 2013a). Geochemical testing was performed on 166 samples from exploration drilling cores that represent the major geological materials within the proposed mine pit area. A more detailed discussion of the geochemical results is provided in Section 3.2.2.

The ABA data for Long Canyon shows that the carbonate-rich sedimentary host rocks of the deposit contain substantial neutralization capacity and very limited sulfide minerals. The total sulfur content was found to be below analytical detection limits in 90 percent of samples tested and all waste rock samples were classified as non-acid generating according to BLM criteria for

ABA data. Net acid generation (NAG) results for all samples were characterized by a NAG pH value greater than four standard units (s.u.) and a NAG value of zero, indicating the samples would not generate acid. These results support the ABA prediction and confirm that no acid generation is predicted for any of the materials obtained from the Long Canyon deposit, even the few samples of waste rock containing minor amounts of sulfide sulfur (SRK, 2013a).

The Meteoric Water Mobility Procedure (MWMP) was run on 42 waste rock samples from the major geologic material types. The resulting concentrations were compared to NDEP Profile I reference values to determine if leachate has the potential to exceed Nevada limits (Table 3.2-2). Only arsenic and mercury exceeded the reference values in the MWMP leachates, which is expected given the high alkalinity (high pH value) and the mobility of these constituents under neutral to alkaline pH conditions (SRK, 2013a).

Kinetic tests (humidity cell tests or HCTs) were run on the waste rock samples to confirm the long-term leaching behavior of the Long Canyon materials. The HCT results are consistent with the static test results and predict there is no potential for acid generation with very limited metal leaching (Appendix 3A). At neutral to alkaline pH, several parameters were mobilized through the leaching process, notably arsenic, mercury, thallium, and antimony; however, mercury and thallium were quickly removed by progressive rinsing during HCT indicating they are likely controlled by the available metal mass. Although antimony and arsenic release rates did not decrease as rapidly as mercury and thallium, the constant release of these constituents from the HCTs throughout the duration of the test indicates mass driven release (SRK, 2013a).

Geochemical testing was performed on 25 spent ore samples from the metallurgical test program collected after the cyanide leach and final rinse. Four of these samples were submitted for kinetic testing. Results from the spent ore samples were similar to those for the waste rock samples. The ABA results indicated that all of the spent ore samples contained high neutralizing capacity with no measureable total sulfur (Table 3.2-5). Therefore, the spent ore samples were predicted to be non-acid producing, the same as the waste rock. MWMP tests on spent ore samples showed similar results to the waste rock samples with only average antimony and arsenic concentrations elevated above the NDEP reference values (Table 3.2-4). Additionally, HCT results were consistent with the static test results on spent ore and confirm that the spent ore material was not acid generating with some potential to leach arsenic and antimony under alkaline (pH above neutral) conditions (Appendix 3A). Mercury and thallium were also sporadically elevated above NDEP reference values at the beginning of the test for some of the cells. The reductions in the total concentrations of these metal(loid)s throughout the test indicates the controlling mechanism for solute release of these parameters is mass driven (SRK, 2013a).

During closure, the heap solution would be recirculated through the heap leach system after cyanide addition ceases in order to recover residual gold until recovery is no longer economically feasible. Recirculation for solution during this period would reduce the solution inventory in the heap system to a level that allows passive management of residual draindown. Recirculation of heap solutions without additional cyanide would also reduce the cyanide

concentrations in the solutions through oxidation and exposure to ultraviolet light. Therefore, the only constituents predicted to be elevated above NDEP reference values in the heap draindown at closure are arsenic and mercury.

To prevent impacts to groundwater associated with the Proposed Action, the heap leach facility, mill, and TSF would be designed as zero-discharge facilities to prevent release of process solutions and wastes to the environment, as described in detail in Section 2.2 and shown on Figures 2.2-1, 2.2-4, and 2.2-7. Process water would be recycled within the process system and not allowed to be discharged into the environment. About half of the total water used in the process would be recycled from uses within the mill and from the TSF. Similar to the mill, the heap leach facility would be operated as a closed-circuit, zero-discharge facility, and process water would be recycled within the process system with no discharge to the environment. To prevent any impacts to groundwater, the TSF and heap leach facility would be designed to include an 80-mil high density polyethylene (HDPE) geomembrane liner placed over a 12-inch low permeability clay subgrade layer. Additionally, a solution collection system would be installed on top of the liner to reduce hydraulic head on top of the liner, which would reduce potential leakage through any flaws in the liner. For the heap leach facility, leak detection systems would be installed at areas of concentrated flow, such as the solution collection headers, and potential seepage through the liner system would be monitored. For the TSF, a tailings under-drain system would be installed over the geomembrane liner to collect and transport water that infiltrates through the tailings. This would reduce the hydraulic head on top of the liner, which would reduce leakage through any flaws in the liner. Because the heap leach and TSF are designed, and would be operated, as zero discharge facilities, they would have negligible potential to impact groundwater or surface water quality. Based on the geochemical analyses conducted at the project area (Section 3.2), the waste rock is net neutralizing and presents a negligible risk for acid rock drainage and metal leaching (ARDML); therefore, no special handling or disposal procedures are necessary. Precipitation falling on the WRSF during operations would likely infiltrate the unreclaimed surfaces as predicted by the above-described UNSAT-H modeling.

SRK (2013b) performed geochemical modeling to evaluate the potential for the WRSF and open pit to degrade groundwater quality. Modeling was not conducted for the heap leach and TSF because these facilities are designed as zero-discharge facilities. Geochemical modeling was performed using the USGS-developed software, PH-REdox-EQuilibrium-Chemistry (PHREEQC; Parkhurst and Appelo, 1999) and the geochemical testing data described above. This software allows for assessment of changes to water quality resulting from mineral precipitation and attenuation of solutes through sorption reactions with specified mineral surface areas.

The conceptual model for the PHREEQC model associated with the WRSF is shown on Figure 4.2-7. Geochemical modeling of the WRSF assumed recharge from the facility would be three percent of the mean annual precipitation (MAP) (the WRSF cover is estimated to reduce infiltration to two percent of MAP). The model also assumes that if attenuation of constituents in the leachate occurs (adsorption, reaction), it is likely to take place in the upper 30 feet of the saturated zone of the alluvial aquifer; therefore, water quality was predicted based on this

assumption, which is conservative since the saturated zone is several times more extensive than 30 feet. Modeling results predict that none of the contaminants of concern (COC) would be elevated above the NDEP reference values in groundwater underlying the WRSF. The recharge rate estimate of three percent of MAP represents a reasonable rate, because the facility would be covered with a vegetated soil cover to reduce infiltration into the underlying material. Sensitivity analysis using recharge rates as great as 12 percent of MAP predict that mercury would slightly exceed the NDEP reference standard at the higher recharge rates. However, because the modeling assumes that the volume of water beneath the WRSF is static on an annual basis and does not take into account the flux of groundwater beneath the WRSF, the actual concentration of mercury at the higher recharge rates would likely be less than those predicted by the model. Based on the model, the WRSF would not degrade waters of the State as currently designed (SRK, 2013b). Although the geochemical modeling does not specifically address runoff from or infiltration through the stockpiled ore/waste rock outside containment, the PHREEQC modeling results for the WRSF can be used for comparison. The amount of attenuation in the WRSF was determined by inclusion of the site-specific K_d values for the alluvium and mass transfer coefficients into the PHREEQC model. For the Proposed Action and the North Facilities Alternative, the stockpile is underlain by thick alluvial deposits and depth to groundwater ranges from 20 to 80 feet bgs even though no wells specifically occur in these areas. Similar to the WRSF, attenuation of constituents in the alluvial material will occur before stockpile recharge water interacts with the underlying groundwater. The amount of attenuation in the WRSF was determined by inclusion of the site-specific K_d values for the alluvium and mass transfer coefficients into the PHREEQC model.

Geochemical PHREEQC modeling was also performed on the anticipated pit base and wall rock leachate chemistry. The conceptual model for geochemical modeling of the pit area is shown on Figure 4.2-8. Infiltration rates of 10, 30, 50, and 75 percent of MAP were used in the model with groundwater at depths of 15 and 30 feet below the pit base. Similar to the WRSF model, it is assumed that if attenuation of metals in the leachate occurs (adsorption, reaction), it is likely to take place in the upper 30 feet of the saturated zone of the aquifer underlying the pit base. Groundwater flux beneath the pit is estimated at 0.2 foot per day based on calculations by Golder (2013a). Resulting predicted concentrations of all COCs were below the NDEP reference standards, and there were only minor increases in concentrations with increased recharge rates and thickness of the groundwater interface. Detailed results and analyses for the geochemical modeling are provided in SRK 2013a.

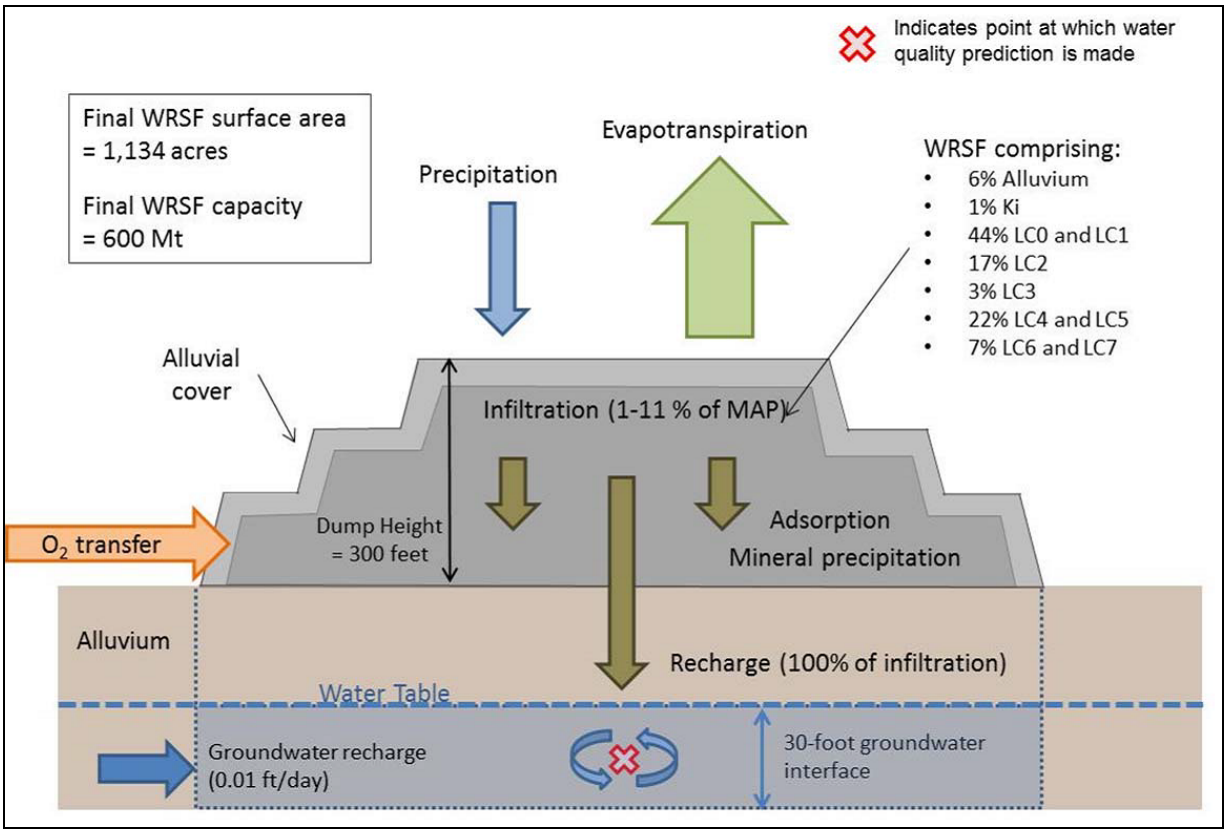

Figure 4.2-7 Waste Rock Storage Facility Conceptual Model

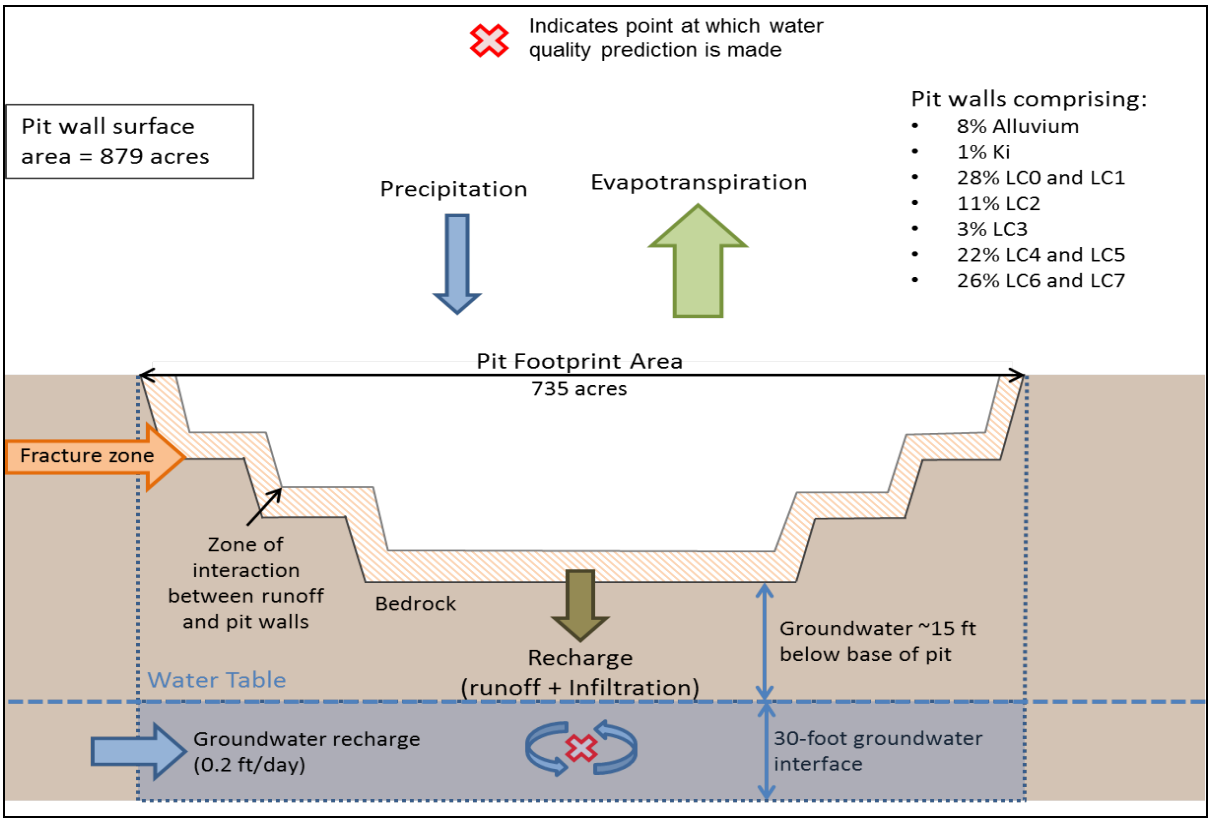

Figure 4.2-8 Open Pit Conceptual Model

Nitrate leaching from the pit was also evaluated. Nitrate is a byproduct of using Ammonium Nitrate Fuel Oil (ANFO) for blasting. The calculated NO_3-N in groundwater underlying the pit is 0.52 milligrams per liter (mg/L) compared to the baseline concentration of 0.44 mg/L, both of which are less than the NDEP reference standard for groundwater (10 mg/L).

Monitoring

As part of the baseline and background hydrologic study work, Newmont conducts monitoring at both surface water (spring) sample points and groundwater monitoring wells at the Long Canyon Project, as shown on Figure 2.7-1. These sites have been monitored for several years and helped in evaluating the background groundwater chemistry conditions of the site. Monitoring of some of these sample points and wells would continue as part of mine development and operations as required by the NDEP Bureau of Mining Regulation and Reclamation (BMRR)-issued water pollution control permit (WPCP). The parameters, locations and frequency of monitoring surface water, groundwater, and springs during construction, operations, reclamation, and post-reclamation would be developed and detailed in state permits and during the development of the closure plan. Newmont submitted a Draft Fluid Management System Operating Plan to NDEP in March 2014 (Newmont, 2014a). The document contains a Tentative Plan for Permanent Closure, which describes water quality during all phases of the project including post-closure (Section 2.7.1.2).

As part of construction and development work, Newmont would install additional groundwater wells downgradient of the WRSF, the heap leach facility, and the TSF as required by the WPCP to further characterize and monitor groundwater conditions around these sites.

During mining the elevation of the pit floor would be monitored using surveyor grade GPS to ensure that the buffer between the pit floor and groundwater is not decreased (Newmont, 2014b); static water level beneath the pit would be monitored quarterly (Newmont, 2014b). Following closure of the facility, monitoring of both groundwater and surface water would continue for approximately 22 years (Newmont, 2014a).

With implementation of the proposed design features and EPMs outlined in Chapter 2, the impacts to groundwater resources resulting from operation and maintenance of the Proposed Action are expected to be long-term and negligible to minor.

Water Rights

Newmont's water use during implementation of the Proposed Action could potentially cause reduced availability of groundwater in the Goshute Basin through drawdown of the groundwater table. Newmont estimates that it would use water for the Proposed Action at an average rate of about 300 to 2,600 gpm depending on the project phase. This equates to approximately 580 to 5,040 AFA, which represents a range of five to 43.6 percent of current appropriated water rights and 5.3 to 45.8 percent of the Nevada Division of Water Resources (NDWR) perennial yield in the Goshute Valley. There are no published pumpage reports on actual water use in the Goshute Valley Basin, which would show water use for all permitted uses (i.e., irrigation, mining, domestic, quasi-municipal, and commercial). However, NDWR has published crop and

irrigation inventories for the basin annually for years 2007 through 2012. The crop inventories show two owners of record with permitted irrigation water rights in the Goshute Valley Basin for this time period:

- Wendover Project and Star Living Trust with 2,249.6 AFA; and
- Big Springs Land and Resource Co., LLC with 640 AFA.

The inventories show that there were no crops (i.e., no irrigation water used) for the years 2009 through 2012. For 2008, a total of 504 acre-feet was pumped (126 acre-feet for Big Springs Land and Resource Co.) and for 2007 a total of 3,024 acre-feet was pumped for irrigation (1,008 acre-feet for Big Springs Land and Resource Co.) (NDWR, 2014). These inventories provide insight into what percentage of water rights are physically in use (often called “wet rights”) and those water rights that are legal but have not been exercised in recent years (often called “paper rights”). In this case, given the low use and high inter-annual variability, it seems unlikely that Newmont’s use would interfere with any existing water right users or water right holders. The water rights that Newmont is planning to use for the project are associated with a development that was planned for the town of Oasis and never occurred; therefore, this water would be a new diversion of water within the basin.

The amount of water consumption necessary for the Proposed Action can be explained in terms of water consumption correlating to a certain phase of the project (i.e. construction/startup, operations, and closure/reclamation). The construction stage water usage is dependent on weather conditions during construction. The construction stage would require water consumption for dust control for vegetation removal, excavation of borrow pits, topsoil removal, and road use caused by the increased traffic and construction activities. Water would also be necessary for mixing concrete, soil conditioning and compaction purposes for construction of the heap leach facility base, building sites, and roads. During late construction/startup operations, water usage would potentially reach the highest level due to the need to build the solution inventory to wet the heap and then bring the heap leach process up to operating capacity as well as the necessary dust control and construction uses. Once the initial start-up is completed, mining operations and water consumption would stabilize at general operating levels, which would be lower than construction/start-up operations (approximately 2,870 gpm to 1,606 gpm). Water use during reclamation/closure operations is significantly lower.

Alternative water supply and associated facilities for the Cities would be provided by Newmont to replace that portion of their current water supply, which comes from the Johnson Springs system (primarily Big Springs). Under the Surplus Water Service Agreement (Agreement) (Appendix 2A) between Newmont and the Cities, dated October 11, 2013, Newmont would install two supply wells and associated infrastructure for the Cities in exchange for use of the Johnson Springs system surplus water. According to the Agreement, each well would be capable of supplying a minimum of two cfs of groundwater, and be equipped with a pump capable of delivering one cfs. The associated infrastructure would have the capacity to meet the minimum sustainable diversion rate of four cfs for both wells. These new water supply wells and distribution system would be incorporated into the Cities' water supply system before the

Long Canyon Mine operations commence. After these are operational, Newmont would lease from the Cities the surplus water supply of 1.0 cfs (or approximately 723.95 AFA) discharged from the Johnson Springs system under the Cities water right (Johnson Springs system surplus water), including Big Springs, as described in NDWR Permit No. 28527 and Certificate 12918. Newmont also has the right to purchase the use of additional permitted surplus groundwater located in the northern portion of the Goshute Valley, equivalent to 0.8 cfs (approximately 360 gpm or 579 AFA) through the Cities as part of the Agreement. The initial term of the Agreement is 10 years, with an option to extend it for an additional three successive 10-year periods.

Power Supply Pipeline

Surface Water

The natural gas power supply pipeline would cross intermittent or ephemeral stream channels in approximately 40 locations. Crossings would include Sixmile Creek, Loray Wash (which would be crossed several times), and Thousand Springs Creek. Most of these crossings likely already have culverts in place, and the pipeline would likely be bored underneath the existing culverts and streambeds using standard practices to protect water quality during construction and leave a streambed that is stable, resulting in a negligible impact.

As with any ground-disturbing project, there would be the potential for increased erosion of disturbed surfaces during and immediately after construction of the pipeline. This in turn could cause sediment loading to the streams crossed by the line. Similarly, construction-related hydrocarbon spills could occur due to accidents involving handling and use of these materials that could reach the channels. However, the potential for either of these to occur to a degree that would result in surface water impact in the channels is small due to the intermittent or ephemeral nature of the drainages and the fact that the majority of the disturbance would be within a road corridor outside of these channels. BMPs implemented during construction, either through coverage under NDEP's *General Permit for Stormwater Discharge Associated with Large Construction Activity* (if not waived due to the 2005 Energy Act) or otherwise voluntarily by Newmont, would likely reduce this impact to minor and short-term.

Once built, the pipeline would be hydrostatically tested for integrity by forcing water through it in a pressurized manner. This water would be obtained and discharged via approved sources and permits in a manner that would not cause impacts to surface waters, representing a negligible effect.

Operation of the natural gas power supply pipeline would not likely result in any surface water impacts.

Springs and Groundwater

Known groundwater conditions are limited to the southernmost area where the route intersects the Plan boundary and directly adjacent to the project area to the northeast. The remainder of the route is located in the Thousand Springs/Malmott Basin to the northeast of the Goshute Basin. In the project area, groundwater depths near the excavation area required for pipeline placement are at least 75 feet bgs and not expected to be encountered during construction

activities. Information on the NDEP website for water use in the Thousand Springs/Malmott Basin indicate that well depths range from 30 to 800 feet bgs and are not expected to be encountered during construction and operation activities. Therefore, environmental impacts to groundwater based on construction of the power supply pipeline are not expected.

Cities' Water Supply

Surface Water

The Cities' new water supply wells would be drilled immediately south of the Plan boundary. They and their associated new water line, would not be expected to directly affect surface water resources, although there is the potential for sediment/hydrocarbon release during construction, as described above, and, indirectly, reduction in flow to surface water bodies from springs, as shown in groundwater modeling (Golder, 2014). Minor to moderate direct or indirect impacts to flows in Hardy Creek due to pumping of the mine supply or municipal supply wells may occur because Hardy Creek is fed by groundwater discharge from the Johnson Springs system, including Big Springs. As described above and in Section 3.2, groundwater modeling and environmental isotope results indicate that groundwater from the basin fill/alluvial aquifer and the carbonate bedrock aquifer are interconnected. The groundwater model predicted a 280 gpm reduction at Big Springs, which could indicate potential indirect impacts to Hardy Creek. Long-term pumping modeling simulations indicate that Big Springs flow could be reduced by 300 to 500 gpm, or less than one foot of drawdown, and other Johnson Springs system discharge could be reduced by approximately 20 gpm. However, since no impacts to the Johnson Springs system (including Big Springs) were observed in the actual aquifer test data, the model may overestimate the impacts to the springs when pumping occurs in the alluvial aquifer, or the results could be related to pumping duration (i.e. 10-day aquifer test versus up to 25 years for modeling simulations). Also, because the natural variability at Big Springs can be as much as 1,000 gpm seasonally, the predicted reduction in flow could be difficult to distinguish from the natural variation in flow rates. During mining operations, Newmont may not use all the water from Big Springs that had previously been used by the Cities and this excess water could be used for irrigation or allowed to naturally flow in a controlled manner to the wetlands.

Springs and Groundwater

As described in Section 3.2.3, the Cities would lease the water rights for the Johnson Springs system to Newmont for the period of mine operation. Consequently, Newmont would install two new water supply wells for the Cities to replace the water currently used by the Cities from the springs. Based on the groundwater model simulations described under the Proposed Action, pumping of the mine water supply well is expected to have a negligible effect on the groundwater availability to the new water supply wells for the Cities during mining operations.

Mitigation

There are no specific mitigation measures for water resources. To mitigate for the expected flow reductions from Big Springs the BLM suggested that Newmont commit to a riparian conservation plan in the areas adjacent to Big Springs and Hardy Creek. This plan would have included a conservation easement with detailed measures and commitments, such as limiting livestock use in riparian areas and changes in manner of use of some water rights. A quitclaim

of a portion of Newmont's irrigation water rights would be used for maintenance of instream flow in the Big Springs waterway and Hardy Creek. A commitment to instream flow would have reduced the probability that future combined reductions in flow from surface and groundwater diversions would dry up waterways supported by Big Springs. Limitations on livestock use would also have beneficial impacts to riparian areas. Newmont did not agree to this measure and therefore potential impacts to water resources remain as discussed above.

Unavoidable Adverse Impacts on Water Resources

Unavoidable adverse impacts on surface water resources would be unlikely to occur as a result of surface disturbance associated with the Proposed Action. The implementation of EPMs would minimize potential degradation of surface water and groundwater quality and water use would be limited.

Unavoidable adverse impacts on groundwater resources and groundwater discharge to the Johnson Springs system due to groundwater withdrawals for mine water supply would likely occur as a result of activities associated with the Proposed Action. These impacts are mainly related to increases in drawdown in the alluvial and carbonate aquifers resulting from pumping and impacts to flow in the Johnson Springs system, as described above.

Newmont would also utilize water from the Johnson Springs system, but this is unlikely to change the current impact from withdrawal of this water, as Newmont would lease the usage and water rights from the Cities for this water source. The implementation of EPMs would minimize potential degradation of surface water and groundwater quality.

Irreversible and Irretrievable Commitments of Resources

Irreversible and/or irretrievable commitments of surface water resources as a result of the Proposed Action might occur as a consequence of the mine pit and loss of overland flow or interflow from the mine pit footprint and upgradient.

There would be no irreversible commitments of groundwater resources as a result of mining activities for the Proposed Action; however, use of groundwater and diversion of Big Springs for water supply during mining operations would be an irretrievable commitment of groundwater resources. Groundwater modeling predictions indicate that flow rates are predicted to return to pre-mining conditions five to 25 years following cessation of mining activities based solely on water use for mining operations (Case 0 on Figure 4.2-6). Return to pre-mining conditions would not occur if predicted municipal water use by the Cities continues to increase by the predicted rate of 6.3 cfs (expected case for the Proposed Action; Case 2) or 8.5 cfs (worst case scenarios for the Proposed Action; Cases 3 and 4). Following mine closure, use of groundwater for mining operations would be considered a minor (for the first five years) to negligible impact to water resources.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of surface water resources would be affected during the life of the project, but impacts to long-term productivity of water resources would be negligible to minor.

Groundwater resources would be affected during the life of the project. In the long-term, during the period of mining operations, impacts to long-term productivity of water resources would be minor to moderate due to mining operations. Moderate to major impacts to Big Springs and other springs located further from the mine water supply well are indicated during mine operations based on capture zone and numerical groundwater modeling simulations, but are expected to recover following cessation of mine operations. More significant impacts would occur based on planned future municipal water usage; the degree of these impacts will depend on the magnitude of pumping requirements during mining; water use for municipal needs; and seasonal variability in discharge rates.

4.2.3 North Facilities Alternative

Surface Water

Impacts to surface water resources resulting from this alternative would be similar in nature as under the Proposed Action. However, the facilities would be located further north closer to the lower reaches of Sixmile Creek than to the perennial reach of Hardy Creek. This would reduce the chance that an inadvertent release of process chemicals, hydrocarbons, or other contaminants would contact the water in Hardy Creek. One of the northernmost smaller springs in the Johnson Springs system may be located approximately 90 to 160 feet from the footprint of the WRSF with an access road located between the spring and the WRSF. Newmont plans on positioning the WRSF to avoid the springs/wetlands. Therefore, Newmont would avoid impacts to these water resources from the WRSF or the potential for introduction of water into the base of the WRSF from these resources resulting in potential long-term negligible to minor impacts.

Springs and Groundwater

Under the North Facilities Alternative, most of the mine facilities would be moved to the northeastern quadrant of the project area (Figure 2.3-1). This alternative responds to requests from the Cities related to potential impacts to their water supply. The North Facilities Alternative includes the following components and considerations:

- All mine facilities, except the mine pit and borrow pits, would be located farther from Big Springs and other surface water features, such as the wetlands;
- No facilities other than the mine pit would be positioned directly over the bedrock aquifer; all other facilities would be situated over the basin fill/alluvial aquifer;
- Ground surface at the north location is approximately 30 to 50 feet higher above the alluvial aquifer water table than where facilities would be located for the Proposed Action, providing a thicker vadose zone and an increase in attenuation potential for any leachate that might otherwise reach groundwater; and
- Municipal water supply wells for the Cities would be located in Section 21, T35N, R66E, same as for the Proposed Action.

Golder (2013a) added two scenarios to simulate pumping at the new location of the mine production well for the North Facilities Alternative. One of the scenarios (Case 6, referred to as the "expected case" for the North Facilities Alternative) includes the same assumptions for pumping rates as the "expected case" (Case 2) for the Proposed Action; only the location of the mine production well was changed. For the North Facilities Alternative expected case, drawdowns of at least four feet were predicted in an approximate radial pattern extending to a maximum of about 8,000 feet around the pumping well. The greatest drawdown is predicted at the end of the mine startup period. Predicted drawdowns for this period and for the mine operations period extend outside the project area to the north of Interstate 80 (I-80) and east of the Nevada Northern railroad line. As shown on Figure 3.2-2, several Goshute Basin wells (locations provided by NDWR) are located within and just outside of drawdown area that are designated for industrial, irrigation, or stock use; however, there is no information on the NDWR website (http://water.nv.gov/waterrights/) that indicates that these wells are currently in use. The full extent of drawdown (less than four feet) was not predicted because of the difficulty in distinguishing between drawdown and natural variability.

Table 4.2-1 shows the results of the MODFLOW model for both the Proposed Action and the North Facilities Alternative expected cases. The model predicted the North Facilities Alternative would have less than half the impact of the Proposed Action on Big Springs during startup and 21 percent less impact during operations. As shown on Figure 4.2-6, the North Facilities Alternative pumping scenarios predict flow reductions similar to those predicted for the Proposed Action at Big Springs and Central Springs due to pumping.

Mitigation

There are no specific mitigation measures for water resources. To mitigate for the expected flow reductions from Big Springs the BLM suggested that Newmont commit to a riparian conservation plan in the areas adjacent to Big Springs and Hardy Creek. This plan would have included a conservation easement with detailed measures and commitments, such as limiting livestock use in riparian areas and changes in manner of use of some water rights. A quitclaim of a portion of Newmont's irrigation water rights would be used for maintenance of instream flow in the Big Springs waterway and Hardy Creek. A commitment to instream flow would have reduced the probability that future combined reductions in flow from surface and groundwater diversions would dry up waterways supported by Big Springs. Limitations on livestock use would also have beneficial impacts to riparian areas. Newmont did not agree to this measure and therefore potential impacts to water resources remain as discussed above.

Unavoidable Adverse Impacts on Water Resources

Unavoidable adverse impacts on surface water resources would be unlikely to occur as a result of surface disturbance associated with the North Facilities Alternative. The implementation of EPMs would minimize potential degradation of surface water and groundwater quality and water use would be limited.

Unavoidable adverse impacts on groundwater resources and groundwater discharge to the Johnson Springs system are similar to the Proposed Action, but because the location of the mine water supply well would be farther north than for the Proposed Action, the impacts would be more focused in the northern area of the Johnson Springs system.

Irreversible and Irretrievable Commitments of Resources

There would be no irreversible and/or irretrievable commitments of surface water resources as a result of the North Facilities Alternative other than those described for the Proposed Action.

Groundwater modeling predictions indicate that irreversible commitments of groundwater resources may occur as a result of the North Facilities Alternative because flow rates are not predicted to return to pre-mining conditions until approximately five to 25 years following cessation of mining activities. Also, use of groundwater and diversion of Big Springs for water supply during mining operations would be an irretrievable commitment of groundwater resources, based solely on water use for mining operations (Case 0 on Figure 4.2-6). Return to pre-mining conditions would not occur if predicted municipal water use by the Cities continues to increase by the predicted rate of 6.3 cfs (expected case for the North Facilities Alternative; Case 6). Coupled with the results of the aquifer tests showing that maximum drawdown from the water supply wells would be less than 10 feet for any actively used well within the Goshute Basin, similar to Proposed Action, use of groundwater for mining operations under the North Facilities Alternative would be considered a long-term, minor to moderate impact to water resources. Following mine closure, use of groundwater for mining operations would be considered a minor (for the first five years) to negligible impact to water resources.

Relationship of Short-Term Uses and Long-Term Productivity

Similar to the Proposed Action, groundwater resources would be affected during the life of the project under the North Facilities Alternative. In the long-term, during the period of mining operations, impacts to long-term productivity of water resources would be minor to moderate due to mining operations. Minor to moderate impacts to Big Springs and other springs located further from the mine water supply well are indicated during mine operations based on numerical groundwater modeling simulations, but are expected to recover following cessation of mine operations. More significant impacts would occur based on predicted future municipal water usage. The degree of the impacts will depend on the magnitude of pumping requirements during mining; water use for municipal needs; and seasonal variability in discharge rates.

4.2.4 No Action Alternative

Under the No Action Alternative, the same uses that are present currently (i.e., irrigation, stockwater, and municipal) would continue to consume surface water that would otherwise supply Hardy Creek's perennial reaches. The potential for water quality impacts would be related to current land uses. These could include approved exploration drilling, whereby construction-related disturbances could load sediments and there would be some potential for an inadvertent release of drilling fluids. Other potential contaminant sources are limited by much of the area being within a Drinking Water Source Protection zone (Aqua Engineering, 2001).

The No Action Alternative was not modeled as one of the groundwater pumping scenarios; however, the impact of continuing use of groundwater and Big Springs water to supply the Cities can be approximated by subtracting the Case Zero scenario (projected mine use pumping only) from the Case Two scenario (expected case for mine and Cities groundwater pumping) as described in Section 4.2.2. Since flow reductions were never calculated for the zero case, they were approximated from Figure 4.2-6. It should be noted that if the mine were not developed, it would likely affect the projected population growth of the Cities which would reduce water demands and impacts; nevertheless, the same assumptions about population growth for the Cities has been incorporated into this scenario. Another difficulty with this approximation is the assumption that new municipal wells would be developed in or near T35N, R66E, Section 21. This exercise showed no flow reduction from Big Springs at the end of the construction period suggesting that the impacts described in Section 4.2.2 were exclusively from the mine. The No Action Alternative flow reduction was 95 gpm at the end of operations; 119 gpm at the end of reclamation (which is the last use of water by the mine); and 232 gpm 12.5 years after the mine stops using water. Twelve-and-a-half years was used because the flow rate used in the model was the mean rate for the 25 year period.

4.3 Wetland and Riparian Resources

4.3.1 Indicators and Methods

Potential impacts to wetlands and riparian resources are described below. Potential impacts to surface water, springs, and groundwater are discussed in Section 4.2. Note that because of their interconnection, impacts to groundwater may result in impacts to wetlands and riparian areas; similarly, impacts to surface water, including wetlands and riparian areas, may in turn produce impacts to shallow groundwater. Issues identified include potential impacts to wetland and riparian resources from alteration of wetland and riparian features. Project-related activities causing potential effects to wetland and riparian resources include permanent and temporary surface disturbance.

Indicators used to assess the potential impacts to wetland and riparian resources include the following:

- Changes in acres of wetland and wetland boundaries;
- Changes in volume and timing of flow produced by wetlands;
- Degradation of a wetland as a result of sediment discharged into receiving waters;
- Degradation of aquatic or riparian habitat in such a manner that it no longer supports sensitive resources;
- Changes to the biotic community;
- Substantial alteration to the existing drainage pattern and runoff from the site or area;
- Changes in width and length of riparian corridors; and
- Changes to projected frequency, extent, and duration of flooding for riparian areas.

4.3.2 Proposed Action

Mining and Processing Facilities

Potential effects to wetlands and riparian resources can be categorized as direct and indirect, as well as short-term and long-term. Direct effects could include removal or disturbance of wetland and riparian communities. Indirect effects could result from water table drawdown as a result of well field pumping for mine water supply and process water. The effects are determined based on the summary of terms used to describe effects in Table 4.1-1.

Direct long-term impacts as a result of the Proposed Action to wetlands and riparian resources may include direct removal of delineated wetlands and riparian acreage. This would occur if these resources were filled or if mine facilities were constructed upon them. Construction within the delineated wetland boundary or riparian corridor would not meet the BLM's objective of no net loss of wetland and riparian areas.

A number of mine-related facilities associated with the Proposed Action would be located adjacent to a wetland boundary including the WRSF, miscellaneous site access and service roads, the mine office shop, the power mill facility, parking areas, and borrow sites (Figure 3.3-1). The Proposed Action would disturb 11 intermittent/ephemeral drainages. It should be noted that the delineated wetlands are located on private land and that these drainages are not considered federally jurisdictional or regulated by Section 404 of the Clean Water Act (CWA). These areas would not be regulated by the United States Army Corps of Engineers (ACOE); however, they would be considered waters of the State regulated by NDEP.

Other areas adjacent to or that overlap the delineated wetland boundary include a transmission line, existing roads, and irrigation ditches. The transmission line would not result in direct surface disturbance to the wetlands because this feature would span the wetlands. Existing roads that appear to intersect the delineated wetland boundary actually parallel the wetland boundary.

All process facilities would be self-contained with spill prevention measures in place to prevent any unwanted discharge into wetlands and riparian areas as described in Newmont's SPCC Plan (Appendix 4A). Newmont would avoid surface disturbance to all other wetland and riparian areas to avoid any adverse impacts to these resources. Avoidance and EPMs that would be implemented and uniformly followed would reduce these potential impacts to negligible or minor. These EPMs are provided in Section 2.2.18.14 and in Newmont's SWPPP. These measures would include avoiding direct impacts by locating facilities associated with the Proposed Action at least 100 feet from delineated wetland and riparian boundaries. This also includes directing storm water away from wetland and riparian areas. Additionally, Newmont would not put materials in the landfill that meet the definition of a hazardous waste or waste that could produce pollutants or contaminants that may degrade the wetlands.

Newmont does not anticipate that the proposed pit would intercept the bedrock groundwater aquifer, and current mining plans do not include pit dewatering or pumping of any bedrock aquifer wells. However, should pit dewatering be required due to precipitation or another reason, the water would be used for dust control or other purposes.

The predicted reduction in surface flow of Big Springs as a result of the Proposed Action is 280 gpm and is not expected to result in a net loss of flow to the wetlands during mine life because 450 gpm of the spring flow is currently captured and used for municipal water supply by the Cities. As described in Section 4.2, the predicted reduction in flow for the Proposed Action is within the range of observed natural variation in Big Springs flow, and, consequently, any reduction due to pumping may be difficult to distinguish from natural variability in flow rates. If needed, Newmont would use the Cities' water rights for Big Springs during construction and thereafter as a secondary or backup water supply when Newmont's water use would be highest during the startup period primarily because of increased dust suppression from road construction; removal of vegetation and topsoil; and excavation of borrow pits.

The predicted reduction in flow in the North and Central springs is 10 gpm, which is less than natural variation in flow, and in the long term, there may be a minor net loss of wetland area. Newmont would control all of the available water from Big Springs and could change management at any time either to support the mine or its ranching operation. Additionally, as described in Section 4.2, flows at Big Springs (and possibly other springs in the Johnson Springs system) would likely be reduced as a result of groundwater drawdowns. Use of groundwater for mining operations could produce a long-term, moderate or major impact on water resources based on the combined magnitude of pumping for mining and municipal pumping and natural variability in groundwater discharge at the springs. Potential impacts associated with water quality and quantity and water resources associated with production well withdrawals are assessed in Section 4.2.

Predicted decrease in flow would result in less available water for wetlands and some soils would dry out. This would cause a decline in plants associated with wetland communities, which would reduce availability of wetland/riparian habitat. Conversely, surplus Big Springs flow not currently diverted for use by the Cities is primarily used for operations at Big Springs Ranch or allowed to flow to the wetland areas which are owned by Newmont. Additional water discharged into Hardy Creek or adjacent areas as a result of the life-of-mine agreement with the Cities has the potential to create new wetlands and riparian areas, which may provide similar habitat as the affected wetlands and riparian areas. Periodic drying and wetting of riparian/wetland areas is common in the area due to variability of spring flow. This is currently occurring in the area due to a natural variation of three to five feet drawdown that has been observed over the last two years, which is not associated with mining activities in the area (Golder, 2013d). Potential drying as a result of new groundwater diversions provided by Newmont could lead to long-term moderate to major impacts to riparian/wetland areas within the project area. A 200 gpm loss in flow from Big Springs following mine closure represents about 20 percent of the water, which would remain following diversion by the Cities. It would be reasonable to expect a commensurate decrease in riparian area downstream if this were to

occur. These impacts or complete diversion of waters that support the riparian area supported by Big Springs could occur at any time whether or not the mining occurs at Long Canyon. Big Springs Ranch controls all of the water rights, which currently support the riparian area and could divert all available water.

A reduction in wetlands would also result in a loss of wildlife habitat (i.e., cover and forage) for those species that depend on a wetland ecosystem. Additional information regarding potential for a reduction in wetlands associated with wildlife habitat is included in Section 4.8.

Indirect short-term impacts would include removing vegetation from upland areas, which would result in an increase of runoff into wetland and riparian areas. Runoff has the potential to move sediment and hydrocarbon spills from the facilities areas and general types of activities (vehicle and equipment use, machinery, etc.) that would occur during construction and the mining process. Additional sources of pollutants would be present during mining operations that were not previously present. Impacts would be restricted to unforeseen, unplanned events such as upsets, bypasses, spills, leaks, or other releases of fuels, process water, and reagents. The planned EPMs and compliance with the SPCC Plan and SWPPP would reduce impacts to wetlands and riparian areas associated with sediment and spills to negligible.

The proposed clay borrow pits in Section 3, 10, and 15, T35N, R66E, and Section 13, T36N, R66E, may intercept shallow groundwater contained in the alluvium adjacent to reaches of Hardy Creek. Although not predicted, indirect long-term impacts may occur if the borrow sites reduce the flow that supports nearby wetlands, change flows within Hardy Creek, or degrade the riparian habitat in Hardy Creek such that it no longer supports sensitive resources.

Direct disturbance to wetlands is not anticipated from mining and processing facilities. Newmont would avoid direct and indirect impacts to wetland and riparian resources to the extent possible.

Power Supply Pipeline

The pipeline would cross through the outflow from Gamble Spring where it is caught behind an earthen dam pond. This outflow channel is not a mapped wetland according to the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (USFWS, 2013a). A portion of the pipeline also crosses an irrigation channel inventoried as wetland within the Plan boundary. The pipeline would be located approximately five feet bgs. Construction of the pipeline would result in a minor, short-term impact to wetland vegetation present at the outflow of Gamble Spring and at the irrigation channel.

The proposed power supply pipeline corridor crosses approximately 70 ephemeral and intermittent drainages including Thousand Springs Creek and Hardy Creek. Riparian habitat is limited to the corridor associated with these drainages, and would be temporarily impacted by construction of the pipeline. The pipeline would bore under these drainages; therefore, this direct impact would result in a minor, short-term disturbance to riparian vegetation in the area.

Potential impacts to surface water quality associated with the power supply pipeline are described in Section 4.2. BMPs implemented during construction, either through coverage under NDEP's *General Permit for Stormwater Discharge Associated with Large Construction Activity* (if not waived due to the 2005 Energy Act) or otherwise voluntarily by Newmont, would likely reduce this impact to negligible and short-term.

Areas disturbed as a result of construction associated with the power supply pipeline would be subject to reclamation including revegetation. To minimize impacts to wetland and riparian resources during construction of the pipeline, Newmont would follow the same EPMs for surface water that would be used in development of the Proposed Action. Those EPMs are discussed in Section 2.2.18.14 and in Newmont's SWPPP.

Cities' Water Supply

The Cities' water supply wells would be drilled immediately south of the Plan boundary. The connectivity of the spring system to the overall wetland and stream system would remain the same, and the Cities would retain their municipal water rights throughout operation of the mine. A pipeline carrying the Cities' water supply would run north from Section 21, T35N, R66E, where it would connect to the existing water supply pipeline in Section 34, T36N, R66E. The existing conditions in the Cities' water supply area are the same as those for the Proposed Action area for mining and process facilities. The water pipeline would cross eight ephemeral/intermittent channels, none of which is considered jurisdictional or regulated under Section 404 of the CWA; however, these drainages are considered to be waters of the State and regulated by NDEP. The water pipeline would not cross any areas that would be considered wetlands by the ACOE (JBR, 2013b).

As described in Section 4.2.2, the proposal to develop the Cities' water supply would result in long term impacts to flow in the Johnson Springs system. Reductions in flow are projected and it would be reasonable to expect a commensurate decrease in riparian area downstream if this were to occur. These impacts or complete diversion of waters that support riparian areas supported by Big Springs could occur at any time whether or not the mining occurs at Long Canyon. Big Springs Ranch controls all of the water rights, which currently support the riparian area and could divert all available water for irrigation. As described in Section 4.2, minor to moderate direct or indirect impacts to flows in Hardy Creek due to pumping of the mine supply or municipal supply wells may occur because Hardy Creek is fed by groundwater discharge from the Johnson Springs system, including Big Springs. This could result in a reduction of wetland and riparian habitat associated with the Johnson Springs system and Hardy Creek.

Newmont has coordinated with the Cities hydrologic consultants in developing a general hydrologic study of the northern part of the Goshute Valley with a goal of assessing the adequacy of the valley aquifer to supply water to the Cities Shafter well field and potential effects from continual mine production pumping. Newmont would continue to work with the Cities to expand and refine this study and to develop contingency plans for assuring that adequate water is available to the Cities.

Mitigation

There are no specific mitigation measures for Riparian and Wetland resources. To mitigate for the expected flow reductions from Big Springs the BLM suggested that Newmont commit to a riparian conservation plan in the areas adjacent to Big Springs and Hardy Creek. This plan would have included a conservation easement with detailed measures and commitments, such as limiting livestock use in riparian areas and changes in manner of use of some water rights. A quitclaim of a portion of Newmont's irrigation water rights would be used for maintenance of instream flow in the Big Springs waterway and Hardy Creek. A commitment to instream flow would have reduced the probability that future combined reductions in flow from surface and groundwater diversions would dry up waterways supported by Big Springs. Limitations on livestock use would also have beneficial impacts to riparian areas. Newmont did not agree to this measure and therefore potential impacts to water resources remain as discussed above.

Unavoidable Adverse Impacts on Wetland and Riparian Resources

For the Proposed Action, the implementation of EPMs and location of facilities to avoid wetlands would minimize potential degradation of wetlands and riparian resources. Reductions in wetland area commensurate with reduction in flow within the Johnson Springs system would be expected.

Irreversible and Irretrievable Commitments of Resources

Reductions in wetland area commensurate with reduction in flow within the Johnson Springs system would be expected.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of surface water resources would be affected during the life of the project, but impacts to long-term productivity of water resources for wetlands and riparian areas would be negligible to minor.

There would be moderate to major impacts to Big Springs and other springs during mine operations based on capture zone and numerical groundwater modeling simulations, but these springs are expected to recover following cessation of mine operations. Short-term impacts could occur to wetland and riparian resources prior to recovery of the springs.

4.3.3 North Facilities Alternative

The North Facilities Alternative would relocate all the mine facilities except the pit and borrow pits to the northeastern quadrant of the Plan boundary. This would result in no facilities being positioned on the bedrock aquifer from which Big Springs emanates. Indirect impacts from water use would be the same as the Proposed Action.

The North Facilities Alternative would disturb seven ephemeral/intermittent drainages that would not be considered jurisdictional or regulated under the CWA. However, these drainages would be considered waters of the State regulated by NDEP. Construction of the North Facilities Alternative is not anticipated to have direct impacts to wetlands or riparian areas; therefore, it is not anticipated to reduce the delineated wetland acreage and riparian resources. This meets

the BLM's no net loss of wetland and riparian areas objective. Although the wetlands and riparian areas are located on private land, they are still regulated by the State of Nevada.

Under the North Facilities Alternative, there is a predicted loss of approximately 110 gpm from Big Springs that would result in an approximately nine percent reduction in flows to the spring (Golder, 2013d); however, less water would be used during mine startup, mine operations, and mine closure and reclamation than for the Proposed Action. Impacts as a result of this predicted reduction in flow are the same as for the Proposed Action.

Under the North Facilities Alternative, the boundary of the WRSF would be located, at a minimum, 300 feet from the edge of the delineated wetland boundary. The power supply pipeline would not cross the irrigation channel inventoried as wetlands. There would be no direct removal of wetlands under this alternative.

The WRSF would be located adjacent to the Johnson Springs system. Newmont would avoid any surface disturbance to wetlands or riparian areas to avoid any adverse impacts to these resources. The proximity of the WRSF allows for potential stormwater and waste water to flow into the springs associated with the Johnson Springs system as well as Hardy Creek. As described in Newmont's SWPPP, all process facilities would be self-contained with spill prevention measures in place to prevent any unwanted discharge into wetlands and riparian areas. Additionally, to minimize the potential impacts that could occur, Newmont has established EPMs that would be implemented and uniformly followed. These EPMs are provided in Section 2.2.18.14 and in Newmont's SWPPP.

No adverse impacts to wetland and riparian areas are anticipated since all proposed disturbance associated with the North Facilities Alternative would occur outside of these areas, and EPMs would be implemented and uniformly followed.

Mitigation

There are no specific mitigation measures for Riparian and Wetland resources. To mitigate for the expected flow reductions from Big Springs the BLM suggested that Newmont commit to a riparian conservation plan in the areas adjacent to Big Springs and Hardy Creek. This plan would have included a conservation easement with detailed measures and commitments, such as limiting livestock use in riparian areas and changes in manner of use of some water rights. A quitclaim of a portion of Newmont's irrigation water rights would be used for maintenance of instream flow in the Big Springs waterway and Hardy Creek. A commitment to instream flow would have reduced the probability that future combined reductions in flow from surface and groundwater diversions would dry up waterways supported by Big Springs. Limitations on livestock use would also have beneficial impacts to riparian areas. Newmont did not agree to this measure and therefore potential impacts to water resources remain as discussed above.

Unavoidable Adverse Impacts on Wetland and Riparian Resources

For the North Facilities Alternative, the implementation of EPMs and location of facilities to avoid wetlands would minimize potential degradation of wetlands and riparian resources. Reductions

in wetland area commensurate with reduction in flow within the Johnson Springs system would be expected.

Irreversible and Irretrievable Commitments of Resources

Reductions in wetland area commensurate with reduction in flow within the Johnson Springs system would be expected.

Relationship of Short-Term Uses and Long-Term Productivity

Wetland and riparian resources have the potential to be affected during the life of the project, but impacts to long-term productivity of wetland and riparian resources would be negligible.

There would be minor to moderate impacts to Big Springs and other springs during mine operations based on capture zone and numerical groundwater modeling simulations as described in Section 4.2.2. Long-term flow reductions are expected at these springs which may affect wetland and riparian resources as described above.

4.3.4 No Action Alternative

Under the No Action Alternative, potential impacts to wetland and riparian resources associated with this project would not occur.

4.4 Geology and Minerals

4.4.1 Indicators and Methods

The primary indicators for the geology and minerals resources are the number and type of mining claims, geothermal nominations, and oil and gas leases in the project area disturbance footprint, as well as mineral removal, loss of access to other mineral resources, and material redistribution.

4.4.2 Proposed Action

Mining and Processing Facilities

Under the Proposed Action, local bedrock geology and mineral resources would be directly affected by the removal of 29 million tons (MT) of ore and 460 MT of waste rock from the proposed open pit. Certain unconsolidated construction materials would be removed from the proposed on-site borrow pits. The construction of the TSF, WRSF, and heap leach facility would effectively prevent future utilization of bedrock or unconsolidated mineral resources located under these permanent facilities. The construction of the open pit, TSF, heap leach facility, and WRSF would produce permanent changes to the existing topography of these sites. These would be long-term, major, local impacts on these resources but a negligible to minor impact in the context of the geology and mineral resources in Nevada. There are presently no authorized geothermal leases, coal authorizations, solar energy and wind rights-of-ways (ROWs), or oil shale leases within two miles of the Proposed Action facilities that could be impacted. There are 66 active mining claim lead files located within two miles of the Proposed Action project facilities.

The summary of the basic design parameters and dimensions of the proposed pit is shown in Table 4.4-1.

Table 4.4-1 Pit Design Parameters and Dimensions

Open Pit	Length (feet)	Width (feet)	Acres	Maximum Depth (feet)	Pit Bottom Elevation (feet AMSL)
Open Pit	10,934	3,943	736	1,325	5,700

Mining in this open pit would disrupt the natural geology and mineral resource within the pit boundaries but would not impact the geology and mineral resources outside of the pit limits.

During operations, the anticipated level of impacts to geology and minerals under the Proposed Action would be long-term and major to the local geology and mineral resources but negligible to minor in the context of these resources elsewhere in Nevada.

Power Supply Pipeline

Impacts are the same as discussed under the Mining and Processing Facilities above with respect to geothermal leases, coal authorizations, oil shale leases, and solar energy and wind ROWs. There are no active mining claims within the power supply pipeline corridor of 200 feet and none of the other impacts that would be associated with the Proposed Action. Therefore, impacts would be negligible.

Cities' Water Supply

Impacts are the same as discussed under the Mining and Processing Facilities above with respect to geothermal leases, coal authorizations, oil shale leases, and solar energy and wind ROWs. There are no active mining claims within the Cities' water supply area and none of the other impacts that would be associated with the Proposed Action. Therefore, impacts would be negligible.

Mitigation

Mitigation Measure WWR-1

During the operation Newmont would conduct monitoring of water resources in accordance with the monitoring program developed for the state permits. If there is a significant change noted during this monitoring Newmont would inform the BLM of the changing conditions and the BLM would then determine if a working group is necessary to develop a management strategy for sensitive species using the wetland and riparian resources.

At the end of the operation the BLM would look at the conditions and available information on the spring system and determine if it is necessary to develop a working group and management strategy for the system to protect sensitive species using the wetland and riparian resources.

Unavoidable Adverse Impacts on Mineral and Geologic Resources

The local impacts to geology and mineral resources would be unavoidable.

Irreversible and Irretrievable Commitments of Resources

Mineral resources would be removed from the project area and would be an irreversible and irretrievable commitment of mineral resources. This would be a relatively minor loss compared to total gold reserves available for future mining in Nevada.

Impacts to the local natural topographic conditions under the Proposed Action and the alternative would also be irreversible and irretrievable. Reclamation activities would restore disturbed sites to topographic contours that mimic pre-mining conditions and permanently reduce the impacts to local topography. Disturbed areas that are not regraded during reclamation would have permanent impacts to topography.

Relationship of Short-Term Uses and Long-Term Productivity

The removal and utilization of the local mineral resources during the construction and operation of the Proposed Action would support increased economic activity in the region for the duration of the project. Reclamation of the disturbed sites would restore the long-term productivity of these areas for wildlife and grazing uses. This would not be the case for the open pit area. The short-term uses would also support the long-term viability of the mining industry in the region, businesses supporting the industry, and contribute to the better understanding of the geology of similar gold deposits, which could lead to future mine developments.

4.4.3 North Facilities Alternative

Under the North Facilities Alternative, the impacts to geology and minerals would be the same as the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Mineral and Geologic Resources

Under the North Facilities Alternative, the unavoidable impacts would be the same as the Proposed Action.

Irreversible and Irretrievable Commitments of Resources

Under the North Facilities Alternative, the irreversible and irretrievable commitments of resources would be the same as the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

Under the North Facilities Alternative, the relationship of short-term uses and long-term productivity would be the same as the Proposed Action.

4.4.4 No Action Alternative

Under the No Action Alternative, authorized exploration activities would continue as discussed in Section 2.2. Impacts under the No Action Alternative would be minor topographic changes to existing geology due to road building and drill pad construction and minimal mineral removal due to exploratory drilling and trenching for bulk metallurgical samples and soil samples.

4.5 Soils

4.5.1 Indicators and Methods

Indicators used to assess the potential impacts to soil resources include the following:

- Acres of soil disturbance and acres to be reclaimed;
- Suitability of topsoil resources (growth medium) for reclamation; and
- Changes in soil quality.

4.5.2 Proposed Action

Anticipated direct environmental impacts to soil resources from the Long Canyon Project include: changes in the physical and chemical properties of the soil resources that would lead to a potential decrease in the quality of the topsoil in disturbed areas; a potential increase in water and wind erosion; and the potential contamination of soils from spills or leaks of chemicals during transportation, storage, and use.

Potential indirect effects of the Proposed Action on soil resources in the area include dust generation and off-site deposition of dust particles. Wind erosion of disturbed soils could impact air quality and/or increase deposition of dust particles off-site. Dust generated by vehicular traffic would be reduced through the use of dust abatement techniques such as the use of wetting and binding agents on project roads. Off-site sediment deposition due to water erosion is not anticipated due to the erosion control measures and EPMs outlined in Section 2.2.18.

Mining and Processing Facilities

Construction of the mining and processing facilities would directly impact 4,290 acres of soil resources (excluding the Cities' water supply and power supply pipeline, which are discussed below) within the project boundary (Figure 3.5-1; Table 4.5-1). Upon mine closure, 3,554 of the disturbed acres would be reclaimed. The 736 acres of disturbance associated with the mine pit would not be reclaimed. Elko County will have the option of reclaiming roads or keeping them as improved.

Eleven of the 28 soil units present in the Plan boundary would be impacted by construction of mining and processing facilities (not including the power supply pipeline route). Impacts to soil resources would result from removal and stockpiling of topsoil resources for use during reclamation, and would include a potential decrease in the quality of the topsoil, a potential increase in water and wind erosion, and potential contamination of soils from spills or leaks of chemicals during transportation, storage, and use.

Table 4.5-1 Third-Order Soil Units Disturbed by Construction of the Mining and Processing Facilities

Third-Order Soil Unit Name	Map Unit	Acres Disturbed
Dewar-Chiara-Hunnton association	260	5
Pookaloo-Cavehill-Rock outcrop association	**575**	32 + **593**

Third-Order Soil Unit Name	Map Unit	Acres Disturbed
Palinor-Pyrat-Shabliss association	852	6
Palinor-Automal-Shabliss association	854	429
Duffer-Kunzler association	881	514
Pyrat-Automal, very stony-Automal association	**1172**	601 + **142**
*Blimo-Threesee association	1213	405
Blimo-Idway-Mazuma association	1216	437
Heist-Blimo association	1290	5
Haunchee-Halacan-Wardbay association	1181	3
Threesee-Tosser association	1410	724

*Farmland of Statewide Importance
Bold entries would not be reclaimed
Exploration disturbance was not included in the above calculations because exploration drill locations would depend on exploration results.

Soil Quality

Physical and chemical changes to soil resources due to construction of mining and processing facilities would occur as a result of removal, stockpiling, and distribution of topsoil for growth medium during reclamation. These changes would result in a change in soil quality due to compaction and a decrease in soil microorganisms.

Crushing and compaction of soil during salvage and stockpiling, as well as by heavy equipment movement on top of the soil, can decrease the quality of soil. The decrease in quality results from a reduction in porosity and permeability, which decreases water-holding capacity and increases bulk density. The high percentage of coarse fragments present in many of the soil units in the Plan boundary may decrease the amount of compaction of those soils unless the coarse fragments are crushed.

Microbiotic soil crusts are an important aspect of maintaining surface soil stability and nutrient cycling (Rosentreter et al., 2007). Removal of topsoil during salvage operations would damage any existing crusts, which would change the soil structure and reduce soil quality. However, natural processes such as wind and water transport of soil particles from surrounding areas would also serve to reintroduce microorganisms to the soil. The Proposed Action would result in mixing of fine-grained soils with the more prevalent coarse-grained soils would result in a finer overall texture of soils in the disturbed area. This finer texture could increase the quality of the soils in the project area.

Slash and other vegetative material would be incorporated into the stockpiles, which would incorporate more organic material potentially enhancing soil quality over time as the newly incorporated material breaks down or composts. Soils that are stored for extended periods would be more affected by compaction, lack of aeration, decreased porosity and permeability, and reduced water-holding capacity. Stockpiled soils that are used for concurrent reclamation could return to their natural, pre-disturbance conditions relatively quickly.

Mining and processing facilities in the Proposed Action would result in moderate short-term impacts to soil quality and minor to moderate long-term impacts to soil quality when considering the project area as a whole. Major long-term impacts would occur within the large area disturbed by the open pit mine and other permanently disturbed areas. These areas represent about three percent of the project area. An additional 14 percent of the project area would experience major short-term impacts as soil surfaces are stripped, moved, or otherwise altered. These soils would be reclaimed, but a large portion of these surfaces would be permanently altered because they would overlie waste rock, tailings, and heap leach facilities. Surfaces of these facilities are designed to minimize deep infiltration of surface water and do not necessarily facilitate soil development and productivity in the long term. Newmont has committed to general practices that would enhance productivity and development of soils in these areas. The long-term impacts to soils would be minor to moderate depending on Newmont's success in creating landforms that are stable and capable of facilitating successful soil development.

Wind and Water Erosion

The erosion potential of a soil is determined by internal characteristics of the soil as well as slope. Soil characteristics identified in Section 3.5, indicate that the majority of soil units within the project boundary are moderately susceptible to wind and water erosion. There are a small number of units that are considered resistant to erosion, and a small number that are considered more susceptible to erosion.

The increase in erosion potential would be moderate in the short term and minor to moderate in the long term when considering the project area as a whole. Stockpiled soils would be susceptible to an increase in water erosion during storm runoff and snow melt, if these events were to occur prior to planned reseeding efforts. An increase in wind erosion would occur as a result of salvage and reclamation operations, as stabilizing vegetation and the top layer of soil are removed, sediments are crushed by movement and heavy equipment, and more fine-grained sediments are exposed. The increase in susceptibility to wind erosion would occur during active salvage and reclamation operations, as soil is being removed and replaced. In areas where soil is removed, the increase in susceptibility to wind erosion would last until stabilizing vegetation is reestablished. Areas where new landforms are created could be subject to increased erosion in the long term if unstable landforms are created or if revegetation is unsuccessful.

Potential Contamination of Soils

Soil resources could potentially be impacted as a result of accidental spills or leaks of contaminants during their transportation, storage, and use. If such spills or leaks were to occur, Newmont would immediately employ the actions set forth in the SPCC Plan, and therefore the effects to soil resources would be short-term and minor.

Potential Contamination of Soils

Soil resources could potentially be impacted as a result of accidental spills or leaks of contaminants during their transportation, storage, and use. If such spills or leaks were to occur,

Newmont would immediately employ the actions set forth in the SPCC Plan, and therefore the effects to soil resources would be short-term and minor.

Power Supply Pipeline

A total of 275 acres of soil would be disturbed during construction of the gas supply pipeline (Figure 3.5-2; Table 4.5-2). All of these acres would be reclaimed as the pipeline is constructed and buried.

All 25 soil units present within the 50-foot pipeline disturbance width would be impacted. Impacts to soil resources would result from the removal and replacement of topsoil resources during reclamation, and would include a potential decrease in the quality of the topsoil, a potential increase in water and wind erosion, and potential contamination of soils from spills or leaks of chemicals. Impacts to soils would be minor because most disturbance would be reclaimed within 10 years of pipeline installation.

Table 4.5-2 Third-Order Soil Units Disturbed by Installation of the Power Supply Pipeline

Third-Order Soil Unit Name	Map unit	Acres Disturbed
*Sonoma-Sonoma, occasionally flooded association	183	3
Peeko-Chiara association	185	14
*Sondoa-Ixian-Ixian, strongly saline-sodic association	186	40
Dewar-Chiara-Hunnton association	260	25
Duffer-Kunzler association	881	7
Heist-Blimo association	1290	5
Kzin-Cobre-Jackpot association	331	3
Toano-Tulasse association	370	2
Cobre-Izar-Jackpot association	380	19
Valmy-Luap association	585	6
Palinor-Pyrat-Shabliss association	852	5
Izar-Holborn-Kzin association	994	10
Gravier-Luap association	1043	33
Pibler, bedrock substratum-Pibler association	1051	2
Piblo-Wiffo association	1054	11
Loray-Luap-Toano association	1070	12
Loray, loamy fine sand-Lray-Hardhat association	1072	11
Pyrat-Automal, very stony-Automal association	1172	1
*Blimo-Threesee association	1213	10
Blimo-Idway-Mazuma association	1216	14
Sodhouse-Loray association	2040	5
Sodhouse-Pibler association	2042	18
*Toano-Toano, occasionally flooded association	2080	3
Toano-Tulase association	2081	6
Threesee-Tosser association	1410	4
Amtoft-Tecomer-Kzin association	3020	6

*Farmland of Statewide Importance

Cities' Water Supply

A total of approximately 23 acres of soil would be disturbed during construction of the water supply wells and associated pipeline for the Cities (Figure 3.5-1; Table 4.5-3). All of these acres would be reclaimed as the wells and pipeline are constructed. The direct and indirect effects to soil resources would be the same as for the reclaimed areas of the mining and processing facilities portion of the Proposed Action.

Table 4.5-3 Third-Order Soil Units Disturbed by Installation of the Cities' Water Supply

Third-order Soil Unit Name	Map unit	Acres Disturbed
Duffer-Kunzler association	881	3
Threesee-Tosser association	1410	20

Growth Medium

Assuming an average salvage depth of six inches, and that all soils salvaged are suitable for use as growth medium (Table 3.5-1 and Appendix 3B), approximately 3.1 million cubic yards of primary and secondary growth medium would be available for salvage from the 3,896 acres of proposed disturbance (excluding the Cities' water supply and power supply pipeline route). Growth medium would be salvaged wherever possible and reused in the area from which it was salvaged. Where sufficient growth medium is available, a minimum of six inches would be replaced during reclamation. Where the amount of available growth medium is limited (shallow soils, excessive coarse material, etc.), available growth medium would be placed over the disturbance and the area would be ripped in order to achieve six inches of loosened aggregate for plant growth.

Prime Farmland

None of the soil units within the project boundary or proposed disturbance areas is classified as Prime Farmland. One of the soil units in the mining and processing facilities area and four soils along the gas supply pipeline 50-foot ROW are classified as Farmland of Statewide Importance. Acres of each of these five soil units are summarized in Table 4.5-4.

Table 4.5-4 Acres of Farmland of Statewide Importance Affected by the Proposed Action

Third-Order Soil Map Unit	Map Unit Number	Acres Disturbed for the Mining and Processing Facilities	Acres Disturbed for the Gas Supply Pipeline
Sonoma-Sonoma, occasionally flooded	183	--	3
Sondoa-Ixian-Ixian, strongly saline-sodic association	186	--	40
Blimo-Threesee association	1213	436	10
Toano-Toana occasionally flooded association	2080	--	3

Lands designated as Farmland of Statewide Importance are not Prime Farmland. In Nevada, Farmland of Statewide Importance includes all farmland with a full or partial irrigation water supply (NRCS, 2013c). All acres of Farmland of Statewide Importance would be reclaimed. The soils along the pipeline ROW would be reclaimed concurrent with construction. The soils affected by the mining and processing facilities would be reclaimed upon closure of the mine.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Soil Resources

The soils in areas of disturbance would be altered from their native state as a result of the proposed action. Changes would include the breakdown of soil structure, damage to microbiotic crust, increased compaction, and disruption of soil development processes.

Irreversible and Irretrievable Commitments of Resources

Permanent impacts associated with the Proposed Action would result in an irreversible commitment of soil resources in disturbed areas.

An irretrievable commitment of soils salvaged and used for reclamation purposes would result from the effects of increased compaction, including a decrease in porosity and permeability and a decrease in water holding capacity. These effects would diminish over time as natural soil development processes resume.

Relationship of Short-Term Uses and Long-Term Productivity

Stockpiled soils used as growth medium for reclamation could be of higher quality than the original top soil removed during construction, due to an increase in organic matter through the incorporation of slash, as well as mixing and redistribution of coarser material. As a part of reclamation, the growth medium stockpiles would be used to reclaim other facilities, returning the stockpile areas to pre-construction topography (Section 2.2.17). Soil quality generally decreases with increasing slope; however, reclamation of temporarily disturbed areas would return area soils to approximately their original productivity levels over the long-term.

4.5.3 North Facilities Alternative

Anticipated direct environmental impacts to soil resources from the North Facilities Alternative of the Long Canyon Project include changes in the physical and chemical properties of the soil resources that would lead to a potential decrease in the quality of the topsoil in disturbed areas, a potential increase in water and wind erosion, and the potential contamination of soils from spills or leaks of chemicals during transportation, storage, and use.

Potential indirect effects of the North Facilities Alternative on soil resources in the area include dust generation and off-site deposition of dust particles. Wind erosion of disturbed soils could impact air quality and/or increase deposition of dust particles off-site. Dust generated by vehicular traffic would be reduced through the use of dust abatement techniques such as the use of wetting and binding agents on project roads. Wind erosion and associated on- and off-

site dust generation and deposition is discussed further in Section 4.4 under air resources. Off-site sediment deposition due to water erosion is not anticipated due to the erosion control measures and EPMs outlined in Section 2.2.18.

Construction of the mining and processing facilities for the North Facilities Alternative would directly impact 3,615 acres of soil resources within the Plan boundary (does not include the Cities' water supply and power supply pipeline route)(Figure 3.5-1; Table 4.5-5). Upon mine closure, 2,879 of the disturbed acres would be reclaimed. The 736 acres of disturbance associated with the mine pit would not be reclaimed.

Table 4.5-5 Third-Order Soil Units Disturbed by Implementation of the North Facilities Alternative

Third-Order Soil Unit Name	Map Unit	Acres Disturbed
Dewar-Chiara-Hunnton association	260	5
Pookaloo-Cavehill-Rock outcrop association	**575**	16 + **593**
Palinor-Pyrat-Shabliss association	852	146
Palinor-Automal-Shabliss association	854	10
Duffer-Kunzler association	881	541
Pyrat-Automal, very stony-Automal association	**1172**	138 + **143**
Haunchee-Halacan-Wardbay association	1181	3
*Blimo-Threesee association	1213	1,135
Blimo-Idway-Mazuma association	1216	456
Heist-Blimo association	1290	2
Threesee-Tosser association	1410	33

*Farmland of Statewide Importance
Bold entries would not be reclaimed
Exploration disturbance was not included in the above calculations because exploration drill locations would depend on exploration results.

Eleven of the 283 soil units present in the Plan boundary would be impacted by construction of mining and processing facilities. Impacts to soil resources would result from removal and stockpiling of topsoil resources for use during reclamation, and would include a potential decrease in the quality of the topsoil, a potential increase in water and wind erosion, and potential contamination of soils from spills or leaks of chemicals during transportation, storage, and use.

Soil Quality

Impacts to soil quality in the vicinity resulting from the North Facilities Alternative would be the same as those for the Proposed Action.

Wind and Water Erosion

Impacts from wind and water erosion in the vicinity resulting from the North Facilities Alternative would be the same as those for the Proposed Action. In addition, the susceptibility of soils to

wind and water erosion would be the same for both the North Facilities Alternative and the Proposed Action.

Potential Contamination of Soils

The potential for soils to become contaminated by materials used in mining activities would be the same for the North Facilities Alternative as the Proposed Action.

Power Supply Pipeline

Because the mining and processing facilities for the North Facilities Alternative would be farther north than those under the Proposed Action, the gas supply pipeline for the North Facilities Alternative would be shorter. The gas supply pipeline for the North Facilities Alternative would impact approximately 37 fewer acres of soil resources than the Proposed Action. Soils that would be impacted by the gas supply pipeline for the North Facilities Alternative are shown in Table 4.5-6, along with the number of acres that would be disturbed.

Table 4.5-6 Third-Order Soil Units Disturbed by Installation of the Power Supply Pipeline for the North Facilities Alternative

Third-order Soil Unit Name	Map unit	Acres Disturbed
*Sonoma-Sonoma, occasionally flooded association	183	3
Peeko-Chiara association	185	14
*Sondoa-Ixian-Ixian, strongly saline-sodic association	186	40
Dewar-Chiara-Hunnton association	260	24
Kzin-Cobre-Jackpot association	331	3
Toano-Tulase association	370	8
Cobre-Izar-Jackpot association	380	19
Valmy-Luap association	585	6
Palinor-Pyrat-Shabliss association	852	10
Izar-Holborn-Kzin association	994	10
Gravier-Luap association	1043	33
Pibler, bedrock substratum-Pibler association	1051	2
Piblo-Wiffo association	1054	11
Loray-Luap-Toano association	1070	12
Loray, loamy fine sand-Loray-Hardhat association	1072	11
Sodhouse-Loray association	2040	5
Sodhouse-Pibler association	2042	18
*Toano-Toano, occasionally flooded association	2080	3
Amtoft-Tecomer-Kzin association	3020	6

*Farmland of Statewide Importance

Cities' Water Supply

The impact to soil resources in the area as a result of the Cities' water supply wells would be the same under the North Facilities Alternative as the Proposed Action.

Growth Medium

Assuming an average salvage depth of six inches, and that all soils salvaged are suitable for use as growth medium (Table 3.5-1 and Appendix 3B), approximately 2.6 million cubic yards of primary and secondary growth medium would be available for salvage from the 3,221 acres of proposed disturbance for the North Facilities Alternative (not including the power supply pipeline route and the Cities' water supply). Growth medium would be salvaged wherever possible and reused in the area from which it was salvaged. Where sufficient growth medium is available, a minimum of six inches would be replaced during reclamation. Where the amount of available growth medium is limited (shallow soils, excessive coarse material, etc.), available growth medium would be placed over the disturbance and the area would be ripped in order to achieve six inches of loosened aggregate for plant growth.

Prime Farmland

None of the soil units within proposed disturbance areas for the North Facilities Alternative are classified as prime farmland. One of the soil units in the area, map unit 1213, the Blimo-Threesee association, is classified as Farmland of Statewide Importance. Lands designated as Farmland of Statewide Importance are not Prime Farmland. In Nevada, Farmland of Statewide Importance includes all farmland with a full or partial irrigation water supply (NRCS, 2013c). Under the North Facilities Alternative, 1,135 acres of the Blimo-Threesee association would be disturbed. All 1,135 acres would be reclaimed upon closure of the mine.

The acres of soil classified as Farmland of Statewide Importance that would be disturbed as a result of the gas supply pipeline for the North Facilities Alternative are the same as those that would be disturbed by the gas supply pipeline for the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Soil Resources

Unavoidable adverse impacts on soil resources would be unlikely to occur as a result of surface disturbance associated with the Proposed Action. The implementation of EPMs would minimize potential degradation of soil resources.

Irreversible and Irretrievable Commitments of Resources

The irreversible and irretrievable commitments of soil resources that would result from the North Facilities Alternative are the same as those for the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

The relationship of short-term uses and long-term productivity of soil resources that would result from the North Facilities Alternative are the same as those for the Proposed Action.

4.5.4 No Action Alternative

Under the No Action Alternative, neither the Proposed Action nor any action alternative would be authorized by the BLM, and the activities described in the Proposed Action would not occur.

The only soils that would be disturbed in the project area would be those resulting from previously authorized activities. The direct and indirect impacts to soils within the project boundary would be the same as those for the previously authorized actions.

4.6 Air Resources

4.6.1 Indicators and Methods

Given the remote nature of the project area, the primary indicator of air quality impacts for Criteria pollutants would be the Nevada Ambient Air Quality Standards (AAQS) and EPA National Ambient Air Quality Standards (NAAQS). The EPA-defined increment would also be used as indicators for Class I and Class II airsheds (there are no Class I areas within 100 kilometers of the project area). Air quality, in the form of the NAAQS, is enforced through NDEP Bureau of Air Pollution Control (BAPC) to protect public health. The facility would require a Class II air quality permit to operate.

The Nevada AAQS and EPA NAAQS define air pollutant concentrations of criteria pollutants that are not to be exceeded in ambient air. Significant impact levels are quantitatively defined in EPA regulations. The use of significant impact levels for indicators is conservative since no air permitting action for the project nor the immediate area has triggered a prevention of significant deterioration minor source baseline date and would make the significant contribution levels enforceable at Class I areas or any other area near the project area. Table 4.6-1 lists the impact thresholds and impact limits for criteria air pollutants as defined by EPA and BAPC. For this analysis, ambient air quality impacts are considered minor when predicted impacts are below the Class I Significant Impact Levels (SILs), moderate when predicted impacts exceed the SILs but remain below the EPA NAAQS and Nevada AAQS, or major when predicted impacts exceed the EPA or Nevada AAQS.

In addition to the impact assessment for criteria pollutants, this EIS also assesses the potential emissions increase associated with Hazardous Air Pollutants (HAPs) and greenhouse gas (GHG). The Nevada air quality permitting rules require the assessment of potential HAPs emissions for permitting purposes for determining whether the facility is a major or area source of HAPs. GHG emissions are required for informational purposes only in Nevada.

Table 4.6-1 summarizes the Class II SILs, as well as Nevada and NAAQS, for all EPA-defined criteria air pollutants over the appropriate averaging periods.

The EPA has supported development of a set of air quality dispersion models to estimate ambient air quality impacts in areas surrounding air pollutant emission sources. The EPA recommends the use of the model most appropriate for the application based upon the nature and extent of the emission sources, the distance to potential off-site receptors, and the intervening terrain.

To assess ambient air quality impacts off-site as a result of the Proposed Action, the EPA-preferred model AERMOD was applied. The technical specification of this modeling effort is documented in the *Air Quality Assessment Report* (EMA, 2013). AERMOD is one of the most frequently used regulatory dispersion models in the United States and represents the EPA's preferred model for the assessment of the near-field [up to 50 kilometers (~31 miles)] pollutant dispersion impacts.

Table 4.6-1 Modeling Significance Levels and Ambient Air Quality Standards

Pollutant	Averaging Period	EPA-Defined Class II Increment ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	NEVADA AAQS ($\mu g/m^3$)
Nitrogen Oxide	Annual	25	100	100
	1-hr	NA	188	NS
Sulfur Dioxide	Annual	20	NA	80
	24-hr	91	NA	365
	3-hr	512	1,300	1,300
	1-hr	NA	196	NS
Carbon Monoxide	8-hr	N/A	10,000	10,000[1]
	1-hr	N/A	40,000	40,000
PM_{10}	Annual	17	NA	50
	24-Hr	30	150	150
$PM_{2.5}$	Annual	4	15	NA
	24-Hr	9	35	NA
Lead	Quarterly	N/A	1.5	1.5
Ozone	8-hr	N/A	146.9	NS
	1-hr	N/A	NA	235[2]

$\mu g/m^3$ = micrograms per cubic meter
N/A = Not applicable
NS = No state standard formally adopted
[1]6,670 $\mu g/m^3$ at areas equal to or greater than 5,000 feet AMSL
[2]195 $\mu g/m^3$ in Lake Tahoe Basin

4.6.2 Proposed Action

For the purposes of analyzing the air quality impacts, the Proposed Action included the maximum estimated emissions from operations occurring in Year 9 (2024). Year 9 was selected due to both the largest material throughput and largest total haul truck miles driven over the life of the mine. Emissions scale with increased material throughput at mining facilities. Haul trucks are known to be the largest substantial source of particulate emissions and truck usage scales with increased material throughput.

Under the Proposed Action, the mine would require a Class II operating permit from NDEP and would have emissions levels that fell below the Prevention of Significant Deterioration (PSD) major source threshold. Table 4.6-2 provides a summary of air pollutants from the Proposed Action. These emissions rates qualify the facility as a Nevada Class II minor source as defined under Nevada air quality regulations.

These are the emissions estimates that are expected to be requested as emission limits in an air permit application. The summary includes all on-site operational emissions from point sources (modeled as single point releases); combustion sources; and storage silos and process fugitives (modeled as 3-dimensional releases) including crushing and transferring, and conveying and stacking.

Commuter vehicles, on-site vehicular traffic, and equipment operation not related to production are not included in Table 4.6-2, as these sources are not regulated through an air permit from NDEP. These emission rates are based upon conservative assumptions that the site operates at full-load operations at the high end of the requested range of emission rates and all support systems operate sufficiently to support continuous operation. Actual operations do not typically reach the emission rates at potential maximum operation.

Table 4.6-2 Process and Ancillary Emissions (tons/year)

Source Category	PM	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC
Process Emissions	17.75	10.47	9.71	40.05	48.68	19.77	22.99

PM = Particulate Matter
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
SO_2 = sulfur dioxide
CO = carbon monoxide
NOx = nitrogen oxide
VOC = volatile organic compound

Operations at the mine site for the Proposed Action involves area source emissions (modeled as 2-dimensional releases). These include fugitive emissions from drilling, blasting, loading, unloading, heap leaching, wind erosion, haul roads, and dozing. Also included are tailpipe emissions from equipment and haul road vehicles. Table 4.6-3 shows the potential to emit for area source and pit source emissions. These emissions constitute the majority of the emissions associated with the project.

Table 4.6-3 Fugitive Area Source Potential to Emit (tons/year)

Source Category	PM	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC	HCN
Area Source Emissions	2,214.5	707.6	96.9	3.4	767.6	180.1	94.6	6.4

All vehicles within the project area emit tailpipe combustion emissions and fugitive emissions. Total emissions for travel were assessed using AP-42 emission factors and/or EPA Tier IV emission limits. The total emissions were then allocated throughout the roadways within the project. Table 4.6-4 summarizes the total potential emissions for vehicular travel resulting from the proposed operations.

Table 4.6-4 Support and Delivery Potential to Emit (tons/year)

Source Category	PM	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC
Vehicular Emissions	1,846.7	590.0	63.0	2.0	369.0	86.5	84.5

Ore would be transported to the Gold Quarry facility near Carlin, Nevada, as the mill facilities at Long Canyon are being built. Table 4.6-5 summarizes the potential yearly emissions for ore transportation to the Gold Quarry facility; both fugitive emissions from resuspension of loose material on paved roads during transportation and tailpipe emissions from diesel combustion of the haul trucks are included in the total potential to emit. These emissions are temporary and would be concluded prior to Year 9 operations.

Table 4.6-5 Ore Transportation Potential to Emit (tons/year)

Source Category	PM	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC
Ore Transportation Emissions	40.16	8.07	2.02	0.028	78.2	1.01	0.71

Year 9 operations would include loaded carbon delivered to the Gold Quarry facility for processing and a return shipment of reactivated carbon. Table 4.6-6 shows the expected emissions from the carbon delivery along I-80. Emissions include both fugitive and combustive potential to emit.

Table 4.6-6 Carbon Delivery Potential to Emit (tons/year)

Source Category	PM	PM_{10}	$PM_{2.5}$	SO_2	CO	NOx	VOC
Carbon Delivery Emissions	1.62	0.33	0.08	0.0016	4.46	0.058	0.040

The additional ore and carbon processed at the Gold Quarry facilities would replace the throughput of Gold Quarry material. The air quality impact for the processing of this material was evaluated in the *Final Supplemental Environmental Impact Statement, South Operations Area Project Amendment Cumulative Effects* (BLM, 2010c) for the Gold Quarry Mine. The impacts would not change due to the replacement of material and therefore a separate air impact analysis was not conducted for the Long Canyon ore processing.

Mercury is a naturally occurring element in many soils, volcanic rocks, and marine and geothermal water sources. It assumes many forms and can be found naturally in the environment as free metallic mercury, chemically combined with other elements in a number of soil or rock types, and in the form of methylmercury in the biosphere. Mercury is generally present in the atmosphere in one of three chemical forms: gaseous elemental mercury, gaseous reactive mercury, or particulate mercury. The fate of mercury emissions follows pathways from the emission source to transport, deposition, exposure, and potential human uptake risks.

Particulate mercury is present naturally in the soils, overburden, and ore at the mine; therefore, it would be present as a small fraction of all particulate emissions produced during the various mine processes. Material handling; primary, secondary, and tertiary crushing; conveying; and stacking are potential emission sources of particulate mercury. Controls would be applied to each of the processes to reduce overall particulate emissions. Particulate mercury can remain airborne for hours to days (depending on the presence or absence of precipitation and the particle size). It has low volatility and is easily taken up in precipitation or adsorbed on small particles, falling out relatively close to the emission source in the presence of precipitation, or as dry deposition that may be transported for longer distances if associated with very small particle sizes. Mercury emissions from fugitive dust at the mine were estimated using an average weight fraction of 0.0003 percent for all particulate emissions. These values were used to determine total mercury for fugitive dust sources.

Thermal sources of gaseous mercury emissions associated with the refining processes include the smelting furnace, carbon kiln, retort, and electro-winning cells. All refining for the Proposed Action would occur at the existing Gold Quarry refinery. Mercury emissions for these sources have been evaluated in BLM (2010c).

Gaseous mercury emissions may be partially deposited near the source while the remaining amount can be dispersed regionally. Elemental mercury is not readily absorbed when ingested and does not tend to bioaccumulate. The primary pathway for animal and human exposure to mercury is eating food that has become contaminated with methylmercury. Gaseous mercury must be transformed to particulate or oxidized mercury followed by subsequent entry into water bodies where further transformation to methylmercury can occur through natural processes to make the mercury available in the aquatic food chain (EPA, 1997).

Mercury emissions from hydrocarbon combustion were calculated for all on-site sources. The total mercury emissions from the project area for the Proposed Action are summarized in Table 4.6-7.

Table 4.6-7 Proposed Action Mercury Emissions

Source Category	Mercury
Total (lbs/year)	4.42

HAPs are those pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The EPA is working with state, local, and tribal governments to reduce air toxics releases of 187 pollutants to the environment. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and certain metals such as cadmium, mercury, chromium, and lead compounds.

People exposed to toxic air pollutants at sufficient concentrations and durations may have an increased chance of getting cancer or experiencing other health effects. These health effects can include damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. In addition to exposure from breathing air toxics, some toxic air pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and are eventually magnified up through the food chain. Like humans, animals may experience health problems if exposed to sufficient quantities of air toxics over time.

Sources of HAPs for the Proposed Action include hydrocarbon combustion, constituents found in fugitive dust from ore and waste rock (mercury), and process chemicals used on-site.

Emissions of HAPs for the Proposed Action were calculated using AP-42 emissions factors as well as proposed maximum fuel usage rates for the facility. The total HAPs emissions for the facility are summarized in Table 4.6-8.

Table 4.6-8 Proposed Action HAPs Emissions

Pollutant	Emissions (ton/year)
Formaldehyde	3.65E+01
Benzene	1.80E+00
Acetaldehyde	6.00E+00
Napthalene	2.77E-01
Xylene	5.16E-01
1,3-Butadiene	1.96E-01
Acrolein	3.55E+00
Toluene	8.45E-01
1,1,2,2-Tetrachloroethane	2.73E-02
1,1,2-Trichloroethane	2.17E-02
1,3-Dichloropropene	1.80E-02
2-Methylnaphthalene	2.26E-02
2,2,4-Trimethylpentane	1.71E-01
Acenaphthene	8.53E-04
Acenaphthylene	3.77E-03
Benzo(b)fluoranthene	1.13E-04
Benzo(e)pyrene	2.83E-04
Benzo(g,h,i)perylene	2.82E-04
Biphenyl	1.45E-01
Carbon Tetrachloride	2.50E-02
Chlorobenzene	2.07E-02
Chloroform	1.94E-02
Chrysene	4.73E-04
Ethylbenzene	2.71E-02
Ethylene Dibromide	3.02E-02
Fluoranthene	7.57E-04
Fluorene	3.87E-03
Mercury	2.21E-03
Methanol	1.71E+00

Pollutant	Emissions (ton/year)
Methylene Chloride	1.36E-02
n-Hexane	7.57E-01
PAH	1.83E-02
Phenanthrene	7.09E-03
Phenol	1.64E-02
Pyrene	9.28E-04
Styrene	1.61E-02
Tetrachloroethane	1.69E-03
Vinyl Chloride	1.02E-02
Total	**5.28E+01**

Ambient Air Quality Impacts

Dispersion modeling was conducted for the five non-photoreactive criteria air pollutants ($PM_{2.5}$, PM_{10}, carbon monoxide, nitrogen oxide, and sulfur dioxide) proposed to be emitted from the project. The EPA-approved model AERMOD was applied consistent with NDEP and EPA guidance to assess dispersion of those pollutants and potential impacts beyond the activity areas in the Proposed Action. Impacts were predicted at model receptors out to a distance of about 1.5 miles from the nearest project emission source (Table 4.6-9).

Model impacts were assessed for each averaging period for which a NAAQS exists; sources were modeled under a scenario consistent with maximum operations under the Proposed Action.

Ozone formation due to atmospheric transformation of project emissions is expected to be minimal because project emissions of ozone precursors are below the PSD major source thresholds. In order to assess ambient ozone impacts, a photochemical model must be used and regional emissions of precursor chemicals must be incorporated. This was not feasible for the EIS and as a result, ozone impacts are not included in the criteria impact analysis. For all other criteria pollutants, impacts were assessed for each NAAQS averaging period and were then compared to the appropriate ambient standard. For NAAQS comparison, the modeled impact value was added to a background concentration representative of the area to determine total impacts. The modeled impacts followed the design form for all criteria pollutants. For those pollutants for which no current NAAQS exists, modeling was not completed.

Table 4.6-9 Model-Predicted Maximum Impacts of Proposed Action

Pollutant	Averaging Period	Class II Increment ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Nevada AAQS ($\mu g/m^3$)	Modeled Impact ($\mu g/m^3$)	Back-ground ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)
Nitrogen Oxide	Annual	25	100	100	6.89	1.887	8.77
	1-hr	N/A	188	NS	82.04	15.094	91.67
Sulfur Dioxide	Annual	20	N/A	80	0.33	2.607	2.94
	24-hr	91	N/A	365	1.32	11.298	12.62
	3-hr	512	1,300	1,300	7.19	32.155	39.34
	1-hr	N/A	196	NS	17.73	56.488	74.22

Pollutant	Averaging Period	Class II Increment (µg/m^3)	NAAQS (µg/m^3)	Nevada AAQS (µg/m^3)	Modeled Impact (µg/m^3)	Back-ground (µg/m^3)	Total Impact (µg/m^3)
Carbon Monoxide	8-hr	N/A	10,000	10,000	95.93	800.00	895.93
	1-hr	N/A	40,000	40,000	355.05	1,942.86	2,297.91
PM_{10}	Annual	17	N/A	50	3.42	4.775	8.20
	24-Hr	30	150	150	9.00	19.628	28.63
$PM_{2.5}$	Annual	4	15	N/A	1.25	2.360	3.61
	24-Hr	9	35	N/A	5.24	6.726	11.96
Lead	Quarterly	N/A	1.5	1.5	NM	N/A	N/A
Ozone	8-hr	N/A	146.9	NS	NM	N/A	N/A
	1-hr	N/A	N/A	235	NM	N/A	N/A

N/A = Not Applicable
NM = Not Modeled
NS = No Standard

With the exception of 24-hour $PM_{2.5}$, all modeled pollutants were below the EPA Class II increment. This would indicate a minor impact on air quality resources for that pollutant. For 24-hour $PM_{2.5}$, the impact modeled remains well below the NAAQS so the impact would indicate limited, moderate effects. It should be noted that modeling was completed for two scenarios for the Proposed Action. The results above are for the Proposed Action with natural gas power generation units in operation. The results for the Proposed Action without natural gas power generation units are slightly less than seen in Table 4.6-9. Based on the current dispersion modeling results, the Proposed Action would result in long-term, minor to moderate air resource impacts. These impacts would be limited to the immediate area surrounding the Plan boundary and would not produce long-range impacts. The model used the public restricted access boundary, which may be different from the Plan boundary. The resulting impacts are depicted on the modeled boundary and most do not show how distant the impacts extend. The receptor grid would only give results up to 2.5 kilometers (1.6 miles) from the sources.

Mining and Processing Facilities

Emissions for the project described above were developed to assess conservative impacts from all the mining and processing activities and facilities for the Proposed Action.

Power Supply Pipeline

The construction of the power supply pipeline and the reclamation of the area disturbed would occur prior to the Year 9 (2024) maximum estimated emissions that was analyzed in the Proposed Action and so would not impact the maximum air quality impact assessment described above. The power supply pipeline occurs within the ROW corridor for the facility and there would be construction-related fugitive dust and equipment tailpipe emissions emitted during construction of the pipeline. These would be negligible and short-term impacts to air quality. There would be essentially no additional air quality impacts from operation of the pipeline.

Cities' Water Supply

The construction for the water supply and the reclamation of the area disturbed would occur prior to the Year 9 (2024) maximum estimated emissions that was analyzed in the Proposed Action and so would not impact the maximum air quality impact assessment described above. The water supply pipeline, wells, and service road occur within the project area and the ROW corridor for the facility. There would be construction-related fugitive dust and equipment tailpipe emissions emitted during construction of the Cities' water supply. These would be negligible and short-term impacts to air quality. There would be essentially no additional air quality impacts from operation of these facilities.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Air Resources

Unavoidable adverse impacts on air resources would occur as a result of operations associated with the Proposed Action. The implementations of EPMs would minimize the potential degradation of air resources and predicted maximum air quality impacts are considered to be local, long-term, and minor to moderate.

Irreversible and Irretrievable Commitments of Resources

Because environmental impacts from air emissions would essentially cease when the emissions cease, there would be no irreversible and/or irretrievable commitments of air resources as a result of the Proposed Action. Emissions of mercury and GHG from the Proposed Action would be long-term but negligible.

Relationship of Short-Term Uses and Long-Term Productivity

The analysis shows that a minor to moderate impact to air resources would occur during the life of the project. In the long-term, impacts to the long-term productivity of air resources would be negligible.

4.6.3 North Facilities Alternative

This alternative would reconfigure the locations of the milling area, heap leaching area, WRSF, and growth medium stockpiles. Emissions would be slightly decreased due to shorter haul roads while all other aspects remain the same as in the Proposed Action. The impact on air quality depends on the location of the sources with respect to the receptors and therefore do not necessarily decrease with the decrease in emissions. Although the mine facilities would be closer to I-80 under this alternative, the highest impacts would be located away from the freeway according to the model. Table 4.6-10 depicts the modeled impact concentrations of the upper case scenario (with natural gas power generation units in operation) for this alternative.

Similar to the Proposed Action, all modeled pollutants were below the EPA Class II increment With the exception of the 24-hour $PM_{2.5}$ and PM_{10}. The impacts modeled remain well below the NAAQS so their impacts would indicate limited, moderate effects. The results for the North Facilities Alternative without natural gas power generation units are slightly less than seen in

Table 4.6-10. Based on the current dispersion modeling results, the North Facilities Alternative would result in long-term minor to moderate air resource impacts. These impacts would be limited to the immediate region surrounding the Plan boundary and would not produce long-range impacts.

Table 4.6-10 Model-Predicted Maximum Impacts of the North Facilities Alternative

Pollutant	Averaging Period	Class II Increment (µg/m^3)	NAAQS (µg/m^3)	NEVADA AAQS (µg/m^3)	Modeled Impact (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)
Nitrogen Oxide	Annual	25	100	100	5.57	1.887	7.45
	1-hr	N/A	188	NS	82.86	15.094	92.48
Sulfur Dioxide	Annual	20	N/A	80	0.55	2.607	3.15
	24-hr	91	N/A	365	1.86	11.298	13.16
	3-hr	512	1,300	1,300	12.30	32.155	44.46
	1-hr	N/A	196	NS	26.44	56.488	82.93
Carbon Monoxide	8-hr	N/A	10,000	10,000	159.72	800.00	959.72
	1-hr	N/A	40,000	40,000	373.26	1,942.86	2,316.12
PM_{10}	Annual	17	N/A	50	4.86	4.775	9.64
	24-Hr	30	150	150	11.95	19.628	31.58
$PM_{2.5}$	Annual	4	15	N/A	1.59	2.360	3.95
	24-Hr	9	35	N/A	7.21	6.726	13.94
Lead	Quarterly	N/A	1.5	1.5	NM	N/A	N/A
Ozone	8-hr	N/A	146.9	NS	NM	N/A	N/A
	1-hr	N/A	N/A	235	NM	N/A	N/A

N/A = Not Applicable
NM = Not Modeled
NS = No Standard

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Air Resources

Unavoidable adverse impacts on air resources would be essentially the same as the Proposed Action.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of air resources would be essentially the same as the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

The relationship of short-term uses and long-term productivity for air resources would be essentially the same as the Proposed Action.

4.6.4 No Action Alternative

This alternative would not result in any increase in ambient pollutant emissions and would therefore provide no impact on air resources beyond the current baseline conditions.

4.6.5 Climate Change

Some scientific evidence suggests there is a direct correlation between global warming and emissions of GHGs. GHGs include carbon dioxide, methane, nitrogen oxide, and ozone. Although many of these gases occur naturally in the atmosphere, anthropogenic sources have substantially increased emissions of GHGs over the past several decades. Of the anthropogenic GHGs, the greatest contribution currently comes from carbon dioxide emissions. These GHG emissions and net losses of biological carbon sinks (i.e., vegetation) are thought to cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although recent studies have shown that carbon dioxide levels in the atmosphere have varied over time, recent industrialization and burning of fossil carbon sources have caused carbon dioxide (CO_2) concentrations to increase dramatically.

Combustion of fossil fuels results in emissions of GHGs. Proposed mining operations at the mine would involve combustion of diesel, propane, natural gas, and gasoline, all of which contribute CO_2 and other GHG to the atmosphere. The significant operations that would contribute to GHGs emissions would include:

- Fuel consumption (fugitive emissions from vehicles and machinery); and
- Electricity consumption (process emissions related to machinery, milling, heap leach water circulation, dewatering).

Explicit emissions calculations for direct emissions of GHG from on-site sources were completed. The results are included in Table 4.6-11.

Table 4.6-11 Direct Project Greenhouse Gas Emissions

Source Category	CO_2
Facility Wide (ton/year)	185,644
United States Total 2007 (ton/year)[1]	7,881,525,867

Source: USDS, 2010

The 2007 national annual emissions of CO_2 were approximately eight billion tons. In Nevada, the total CO_2 emissions from all combustion sources (diesel, gasoline, coal, propane, etc.) were approximately 62 million tons (NDEP, 2008). A total of 78 percent of Nevada statewide emissions of CO_2 are from electrical power generation and transportation (NDEP, 2008). Approximately 3.5 percent of Nevada CO_2 emissions, which is 2.2 million tons per year, are from mining activities (NDEP, 2008).

The proposed project represents approximately 0.2 percent of the GHG emissions from all sources in Nevada, and a tiny fraction of the emissions on a national or global basis. As a result, the proposed project would be expected to have a negligible effect on climate.

While emissions from the proposed mining activities may contribute to the effects of climate change to some extent, it is not currently possible to associate any particular actions with the creation of any specific climate effects. Consequently, impact assessments of specific effects of anthropogenic activities cannot be determined.

The Nevada Climate Change Advisory Committee researched information pertaining to climate change issues specific to Nevada. Their final report (NDEP, 2008) summarized the potential effects of climate change on Nevada as follows:

> *Higher overall temperatures in the Great Basin could result in direct public health concerns with heat sickness, increased troposphere ozone pollution, and increased dust and particulate matter concentrations. Some of the other issues addressed included: significant impacts to water resources for Nevada with increased drought conditions in the southern part of the state and less snowfall although more precipitation in the Sierra increasing the likelihood of area flooding and less summertime reserves. Decreasing water reserves could lead to more forest and wild land fires with potential greater intensity and devastating consequences; and the disappearance of some native species of fauna and increased invasive weed species. Agriculture practices and recreation opportunities in Nevada could also be negatively impacted.*

Because of the predicted increase in temperature and decrease in precipitation associated with global climate change, vegetation species currently adapted to the project area may change over time (BLM, 2013i). Therefore, by the time reclamation for the project is expected to occur, species included in the reclamation seed mixture may not be the best suited for the area. Newmont and the BLM may need to re-evaluate the seed mixture to ensure successful reclamation efforts when they do occur (Anne, 2013).

Higher temperatures and increased evaporation rates are also expected to reduce soil moisture (BLM, 2013i). Therefore, the project may result in an increase of PM_{10} and/or $PM_{2.5}$ emissions particularly during hot, dry, windy days (Anne, 2013). With implementation of the EPMs outlined in Chapter 2, including an enforced speed limit of 45 miles per hour (mph), this impact is expected to be negligible.

4.7 Vegetation, Including Noxious and Invasive Weeds, and Special Status Plants

4.7.1 Indicators and Methods

The construction and operation of the Proposed Action may have direct and indirect impacts to vegetation through disturbance.

Indicators for vegetation resources focus on acreage of vegetative community disturbance. For noxious and invasive weeds, indicators focus on the acreage of disturbed areas and the proximity of existing noxious and invasive weeds to the disturbance areas. For special status plants, indicators focus on the acreage of disturbance of species habitat, as well as the potential for individual take of special status species. The following factors were considered in determining an effect on vegetation resources, including communities, noxious and invasive weeds, and special status plants:

- Magnitude of disturbance or loss;
- Biological importance of the resource;
- Uniqueness or rarity of the resource;
- Federal, state, and/or local protection status of the resource; and
- Susceptibility of the resource to disturbance.

4.7.2 Proposed Action

Direct permanent impacts to vegetation resources would occur due to construction of mine facilities, access roads, pipelines, operation and interim activities, and final reclamation activities. Table 4.7-1 shows the approximate acres of permanent disturbance impacts to vegetative communities due to the Proposed Action (Figure 3.7-6).

Permanent impacts would likely be long-term but minor, as the vegetation communities present within each of the project elements are common and widespread throughout the area. BMPs would be implemented to control and minimize the spread of noxious and invasive weeds. Site-specific surveys have been completed for special status plants showing that none exist within the Plan boundary.

<u>Mining and Processing Facilities</u>

The facilities associated with the Proposed Action would disturb four different vegetation communities including Big Sagebrush, Black Sagebrush, Woodland, and Greasewood Flat, as shown in Table 4.7-1. Together, these communities make up the majority of the project area. Further discussion of these vegetation communities can be found in Section 3.7.

Table 4.7-1 Proposed Action Acreage of Disturbance per Facility, including Power Supply Pipeline and Cities' Water Supply

	Big Sagebrush	Black Sagebrush	Greasewood	Salt Desert Scrub	Woodland	Riparian	Total
Bulk ANFO Storage Area	0	0.005	0	0	0.01	0	0.015
Construction Borrow Sites	91	0	324	0	0	0	415
Explosives Magazine	0	0	0	0	0.01	0	0.01
Facility Water Supply Well, Storage Tanks, and Pipelines	5	3	2	0	0	0	10
Growth Medium Stockpiles	107	86	0	0	1	0	194
Haul Roads	91	175	8	0	17	0	291
Heap Leach	123	143	0	0	0	0	266
Miscellaneous	37	18	9	3	1	0	68
Mine Pit	0	143	0	0	593	0	736
Mine Access and Service Roads	31	27	13	1	16	0	88
Mine Support and Mill Facilities	0	84	0	0	0	0	84
Tailings Storage Facilities	424	210	13	0	0	0	647
Waste Rock Storage Facility	659	293	145	0	0	0	1,097
Mining and Facilities Total	**1,568**	**1,182**	**514**	**4**	**628**	**0**	**3,896**
Power Supply Pipeline	72	50	47	101	3	2	275
Wendover Water Supply	20	0	3	0	0	0	23
Total	**1,660**	**1,232**	**564**	**105**	**631**	**2**	**4,194**

Exploration disturbance was not included in the above calculations because exploration drill locations would depend on exploration results.

Construction of the mining and processing facilities as described in the Proposed Action would disturb 4,290 acres of vegetation in the project area (including exploration disturbance). The majority of this disturbance would be created by construction of the WRSF, the mine pit, and the mine support and mill facilities.

Removal of vegetation and soil compaction would be considered long-term disturbance, lasting for the life of the project until reclamation occurs. The proposed pit is not subject to reclamation; therefore, permanent disturbance to the area affected by the pit would occur.

As indicated in Table 4.7-1, the vegetation communities most affected by mine facilities include Big Sagebrush, Black Sagebrush, Woodland, and Greasewood Flat. Effects are considered to be long-term but minor, as these vegetation communities are common and widespread throughout the project area. While wetland and riparian areas are present within the project area, these communities would be avoided and would not be impacted (Section 4.3).

Noxious and Invasive Weeds

Noxious and invasive weeds are documented throughout the project area during baseline surveys (Section 3.7.3). Following surface disturbance activities, noxious and weed species may readily colonize areas that typically lack or have minimal vegetation cover. Surface disturbance and increased vehicle travel along new routes may readily spread noxious and invasive weeds. It is anticipated that minor populations of weedy annual species, such as cheatgrass, Russian thistle, and halogeton may become established in localized areas for extended periods.

Noxious and invasive weeds such as yellow toadflax, Russian knapweed, thistle species, hoary cress, and black henbane could be affected by the Proposed Action. The spread of these species through new disturbance areas and new dispersal corridors is of significant concern. However, implementation of Newmont's Weed Management Plan would reduce the potential for noxious and invasive weed establishment in the project area (Newmont, 2012g). All surface disturbance would be reclaimed either concurrently during operations as areas become available, or once mining is complete. The Weed Management Plan includes management strategies and control techniques to prevent or minimize the establishment or spread of weed populations.

Special Status Plants

Special status plants have the potential to occur within the project area (Section 3.7.3). Barren Valley collomia, a BLM sensitive plant, may occur within the project area. However, no plants were located during field surveys, so impacts to special status plants will be negligible.

<u>Power Supply Pipeline</u>

Vegetation Communities

The power supply pipeline associated with the Proposed Action would disturb six different vegetation communities including Salt Desert Scrub, Black Sagebrush, Big Sagebrush, Greasewood Flat, Woodland, and Riparian. Further discussion of these vegetation communities

is in Section 3.7. As indicated in Table 4.7-2, vegetation communities most affected by mine facilities include Salt Desert Scrub, Black Sagebrush, Big Sagebrush, and Greasewood Flat. Effects are considered to be short-term and minor, as these vegetation communities are common and widespread, and disturbance would be reclaimed as soon as practicable after construction.

Table 4.7-2 Acreage of Disturbance from the Power Supply Pipeline

	Big Sagebrush	Black Sagebrush	Greasewood	Salt Desert Scrub	Woodland	Riparian	Total
Power Supply Pipeline	72	50	47	101	3	2	**275**

Noxious and Invasive, Weeds

Following surface disturbance activities, noxious and invasive weed species may readily colonize areas that typically lack or have minimal vegetation cover. Surface disturbance and increased vehicle travel along new routes may readily spread noxious and invasive weeds. Noxious weeds such as black henbane, Dalmatian toadflax, Russian knapweed, thistle species, and hoary cress could be affected by the Proposed Action. It is anticipated that minor populations of weedy annual species, such as cheatgrass, Russian thistle and halogeton, may become established in localized areas for extended periods. Surface disturbance would be reclaimed as soon as practicable after construction, thereby reducing the potential for the spread of noxious and invasive species.

Special Status Plants

Special status plants have the potential to occur within the project area (Section 3.7.3). Barren Valley collomia and Deeth buckwheat, BLM sensitive plants, and rayless tansy aster, a Nevada Natural Heritage Program (NNHP) at-risk species, may occur within the project area. However, no plants were located during field surveys, so impacts to special status plants would be negligible.

Cities' Water Supply

The Cities' water supply associated with the Proposed Action would disturb two different vegetation communities including Big Sagebrush and Greasewood Flat as indicated in Table 4.7-3. Further discussion of these vegetation communities is in Section 3.7. Effects are considered to be short-term and minor, as these vegetation communities are common and widespread, and disturbance would be reclaimed as soon as practicable after construction.

Table 4.7-3 Acreage of Disturbance from the Cities' Water Supply

	Big Sagebrush	Black Sagebrush	Greasewood	Salt Desert Scrub	Woodland	Riparian	Total
Cities' Water Supply	20	0	3	0	0	0	**23**

Mitigation
Mitigation measures are not required.

Unavoidable Adverse Impacts on Vegetation Resources
Unavoidable adverse impacts on vegetation resources would result from the development of the proposed mine pit. Impacts would be long-term and minor as the vegetation community types (593 acres of Woodland and 143 acres of Black Sagebrush) are common and widespread throughout the area. The implementation of EPMs would minimize potential degradation of vegetation resources.

Irreversible and Irretrievable Commitments of Resources
An irreversible commitment of vegetation resources would result from the development of the proposed pit. It would result in the permanent loss of 736 acres vegetation resources, namely 593 acres of Woodland, and 143 acres of Black Sagebrush community. Any facility buildings not torn down would also result in irreversible commitments of vegetation resources.

Relationship of Short-Term Uses and Long-Term Productivity
A minor amount of vegetation resources would be affected during the life of the project, but in the long-term, impacts to long-term productivity of vegetation resources would be negligible to minor.

4.7.3 North Facilities Alternative
The North Facilities Alternative would be similar to the Proposed Action, except that the WRSF, TSF, and heap leach facility would be located in the northern portion of the project area, and some support facilities would be relocated, resulting in different acreages of the same vegetation communities being disturbed. Differences in acres of disturbance from the power supply pipeline and the Cities' water supply occur within the project area and are a result of different placement of facilities.

Table 4-7.4 shows the approximate acres of permanent disturbance impacts to vegetative communities as a result of the North Facilities Alternative. Construction of the mining and processing facilities as described in the North Facilities Alternative would disturb 3,615 acres of vegetation in the project area, including the Cities' water supply and power supply pipeline area. Permanent impacts would likely be long-term but minor, as the vegetation communities present within each of the project elements are common and widespread throughout the area. BMPs would be implemented to control and minimize the spread of noxious and invasive weeds.

Mitigation
Mitigation measures are not required.

Table 4.7-4 North Facilities Alternative Acreage of Disturbance per Facility, including the Power Supply Pipeline and Cities' Water Supply

	Big Sagebrush	Black Sagebrush	Greasewood	Salt Desert Scrub	Woodland	Riparian	Total
Bulk ANFO Storage Area	0.01	0.003	0	0	0	0	**0.013**
Construction Borrow Sites	91	0	324	0	0	0	**415**
Explosives Magazine	0	1	0	0	0	0	**1**
Facility Water Supply Well, Storage Tanks, and Pipelines	11	6	1	0	0	0	**18**
Growth Medium Stockpiles	95	29	45	0	0	0	**169**
Haul Roads	39	32	0	0	0	0	**71**
Heap Leach	144	76	0	0	0	0	**220**
Mine Pit	0	143	0	0	593	0	**736**
Mine Access and Service Roads	27	22	36	0	16	0	**101**
Mine Support and Mill Facilities	126	58	0	0	0	0	**184**
Miscellaneous	46	49	6	2	2	0	**105**
Tailings Storage Facility	219	0	0	0	0	0	**219**
Waste Rock Storage Facility	832	21	129	0	0	0	**982**
Mining and Facilities Total	**1,630**	**437**	**541**	**2**	**611**	**0**	**3,221**
Power Supply Pipeline	43	53	40	97	3	2	**238**
Wendover Water Supply	21	0	5	0	0	0	**26**
Total	**1,694**	**490**	**586**	**99**	**614**	**2**	**3,485**

Exploration disturbance was not included in the above calculations because exploration drill locations would depend on exploration results.

Unavoidable Adverse Impacts on Vegetation Resources

Unavoidable adverse impacts on vegetation resources would result from the development of the proposed pit. Impacts would be long-term and minor as the vegetation community types (593 acres of Woodland and 143 acres of Black Sagebrush) are common and widespread throughout the area. The implementation of EPMs would minimize potential degradation of vegetation resources.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of vegetation resources would result from the development of the proposed pit. It would result in the permanent loss of 736 acres vegetation resources, namely 593 acres of Woodland, and 143 acres of Black Sagebrush community. Any facility buildings not torn down would also result in irreversible commitments of vegetation resources.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of vegetation resources would be affected during the life of the project, but in the long-term, impacts to long-term productivity of vegetation resources would be negligible to minor.

4.7.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and there would be no associated project impacts on vegetation resources excluding those impacts that are the result of actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011d). Impacts to vegetation resources from this approved action result from surface disturbance of 69 acres of vegetation over the life of the project. Disturbance would be created incrementally and be dispersed throughout the project area. Reclamation would begin upon completion of exploration activities. The nature of the disturbance (roads and drill pads) results in a higher likelihood that it will be re-colonized by surrounding vegetation (BLM, 2011d).

Following surface disturbance associated with the approved exploration activities, noxious and invasive weed species may readily colonize areas that typically lack or have minimal vegetation cover. Surface disturbance and increased vehicle travel along new routes may readily spread noxious and invasive weeds. Noxious weeds, such as black henbane, could be affected by exploration activities. It is anticipated that minor populations of weedy annual species, such as cheatgrass and halogeton, may become established in localized areas for extended periods. Surface disturbance would be reclaimed as soon as practicable after construction, thereby reducing the potential for the spread of noxious and invasive species associated with the No Action Alternative.

Barren Valley collomia, a BLM special status plant species, was identified as having the potential to occur in the exploration area. However, extensive surveys did not find the species present in the area. Therefore, there would be no impacts to special status plant species associated with the No Action Alternative.

4.8 Wildlife Resources, Including Migratory Birds and Special Status Wildlife

The following section identifies the significance thresholds (indicators) and methodology used to analyze potential impacts to wildlife as a result of implementation of the Proposed Action and alternatives including the EPMs outlined in Section 2.2.18.

4.8.1 Indicators and Methods

The construction and operation of the project would produce direct and indirect impacts to common wildlife, special status species, and their habitats. Direct effects include wildlife habitat disturbance and removal, big game or special status species disturbance, or direct mortality. Indirect impacts are those effects that may be associated with increased human presence or a slow alteration of a limited habitat resource.

The following indicators were considered when analyzing potential impacts to wildlife resources and special status species:

- Acres of disturbance and the proximity of the project area to high value habitat locations such as raptor nests and greater sage-grouse breeding, nesting, and brood-rearing habitat;
- Location of mine pit, facilities, or other areas of disturbance in relation to high value habitat such as greater sage-grouse breeding, nesting, and brood-rearing habitat;
- Ambient noise levels from vehicular traffic and proposed operations in relation to greater sage-grouse breeding habitat (leks);
- Disturbance to endemic species or their habitat which may pose a threat to population viability; and
- Substantial interference with the movement or migratory corridors for native species.

The analysis uses spatial data of known locations of wildlife and special status species, their habitat, the spatial extent of mine features, and current literature, as well as other resource sections within this document.

Effects are qualified by the definitions found within Table 4.1-1, including magnitude and duration.

4.8.2 Proposed Action

The categories of wildlife described below inhabit and/or forage within the project area. Impacts to these species would be similar for all of the project features regardless of the specific element with the exception of the locations of mine facilities relative to wildlife movement corridors and important wildlife habitats. Impacts to wildlife under the Proposed Action and North Facilities Alternative will be discussed under their specific headings.

Direct long-term impacts to wildlife habitat would occur due to mine facilities (e.g., pit, WRSF, borrow sites), new roads, and natural gas and water pipeline construction. Table 4.8-1 shows the approximate acres of disturbance to Ecoregional GAP Analysis of the Southwestern United States (SWReGAP) habitats as a result of the Proposed Action. The majority of the impacts would occur in areas that would be reclaimed post mine-life. Reclaimed habitats may provide suitable habitat immediately for some species but may take years to develop to their current function for other species (i.e., provide diverse assemblages of plants with structural diversity).

Table 4.8-1 Proposed Disturbance to Habitat for Mining and Processing Area – SWReGAP Data

Mine Facilities	Acres of Disturbance	Habitat/Landcover
Mine Pit	700	Great Basin Pinyon-Juniper Woodland
	36	Great Basin Xeric Mixed Sagebrush Shrubland
Waste Rock Storage Facility	548	Inter-Mountain Basins Big Sagebrush Shrubland
	413	Inter-Mountain Basins Mixed Salt Desert Scrub
	134	Great Basin Xeric Mixed Sagebrush Shrubland
	2	Inter-Mountain Basins Greasewood Flat
	<1	Great Basin Pinyon-Juniper Woodland
Mine Support and Mill Facilities	55	Great Basin Xeric Mixed Sagebrush Shrubland
	26	Inter-Mountain Basins Big Sagebrush Shrubland
	3	Great Basin Pinyon-Juniper Woodland
Heap Leach Facility	220	Inter-Mountain Basins Big Sagebrush Shrubland
	43	Great Basin Xeric Mixed Sagebrush Shrubland
	3	Inter-Mountain Basins Mixed Salt Desert Scrub
Tailings Storage Facility	542	Inter-Mountain Basins Big Sagebrush Shrubland
	105	Great Basin Xeric Mixed Sagebrush Shrubland
Mine Borrow Sites	147	Inter-Mountain Basins Greasewood Flat
	140	Inter-Mountain Basins Big Sagebrush Shrubland
	88	Inter-Mountain Basins Mixed Salt Desert Scrub
	27	Great Basin Xeric Mixed Sagebrush Shrubland
	9	Invasive Annual and Biennial Forbland
	4	Inter-Mountain Basins Semi-Desert Grassland
Growth Medium Stockpile	166	Inter-Mountain Basins Big Sagebrush Shrubland
	21	Great Basin Xeric Mixed Sagebrush Shrubland
	7	Great Basin Pinyon-Juniper Woodland
Facility Water Supply Well, Storage Tanks, and Pipelines	6	Inter-Mountain Basins Big Sagebrush Shrubland
	2	Great Basin Xeric Mixed Sagebrush Shrubland
	2	Inter-Mountain Basins Mixed Salt Desert Scrub
	<1	Great Basin Pinyon-Juniper Woodland

Mine Facilities	Acres of Disturbance	Habitat/Landcover
Haul Roads	183	Inter-Mountain Basins Big Sagebrush Shrubland
	59	Great Basin Xeric Mixed Sagebrush Shrubland
	36	Great Basin Pinyon-Juniper Woodland
	12	Inter-Mountain Basins Mixed Salt Desert Scrub
	1	Inter-Mountain Basins Semi-Desert Grassland
Service Roads (Includes Main Site Access Road and Miscellaneous Site Access and Service Roads)	34	Inter-Mountain Basins Big Sagebrush Shrubland
	16	Great Basin Pinyon-Juniper Woodland
	10	Inter-Mountain Basins Mixed Salt Desert Scrub
	7	Great Basin Xeric Mixed Sagebrush Shrubland
	1	Inter-Mountain Basins Montane Sagebrush Steppe
	1	Inter-Mountain Basins Greasewood Flat
	1	Inter-Mountain Basins Semi-Desert Grassland
	<1	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
Miscellaneous Site Access and Service Roads	12	Inter-Mountain Basins Big Sagebrush Shrubland
	3	Inter-Mountain Basins Montane Sagebrush Steppe
	2	Inter-Mountain Basins Greasewood Flat
	1	Great Basin Xeric Mixed Sagebrush Shrubland
	1	Inter-Mountain Basins Mixed Salt Desert Scrub
	<1	Great Basin Pinyon-Juniper Woodland
	<1	Invasive Annual Grassland
Miscellaneous	41	Inter-Mountain Basins Big Sagebrush Shrubland
	10	Inter-Mountain Basins Mixed Salt Desert Scrub
	6	Great Basin Xeric Mixed Sagebrush Shrubland
	3	Inter-Mountain Basins Greasewood Flat
	3	Developed, Medium-High Intensity
	3	Great Basin Pinyon-Juniper Woodland
	2	Developed, Open Space-Low Intensity
	<1	Inter-Mountain Basins Semi-Desert Grassland
	<1	Inter-Mountain Basins Montane Sagebrush Steppe
	<1	Invasive Annual and Biennial Forbland
Total Acres	**3,897**	

Exploration disturbance was not included in the above calculations because future exploration drill locations would depend on past exploration results.

Construction

Direct impacts to wildlife associated with construction of Proposed Action mining and processing facilities would disturb 10 types of wildlife habitat including two types of sagebrush shrublands, pinyon-juniper woodland, mixed salt desert scrub, and greasewood flat with a small amount of grassland. Together, these communities make up the majority of the available habitat within the project area. Land-clearing activities would remove habitat; result in mortality from trampling or

crushing; increase noise levels due to heavy equipment operation; and increase vehicular and human presence along roads and land clearing areas. Many of the wildlife species that inhabit the project area are mobile and would likely vacate the construction area and use other adjacent habitat. Species that are slow moving or that tend to retreat underground would be directly affected by construction. The increased human activity and noise associated with construction activities would likely cause wildlife to temporarily avoid the area and displace into adjacent, undisturbed suitable habitat causing increased competition for resources. This increased pressure on habitat and wildlife species could affect individuals of a population including survival, growth, and reproduction. The potential effects of noise depend on the spatial relationship between a noise source and noise-sensitive receptors. Noise-generating activities associated with the Proposed Action include earthmoving, equipment operation, blasting, and vehicular traffic. Increased vehicular traffic associated with construction activities has the potential to cause an increase in wildlife-vehicle collisions and result in direct mortality to wildlife.

Mining and Processing Facilities

As presented in Table 4.8-1, construction of mining and processing facilities as described in the Proposed Action would disturb approximately 3,897 acres of habitat not including the pipeline and Cities' water supply, which are discussed separately below. The bulk of the impacts would occur to sagebrush habitat mapped as Inter-Mountain Basins Big Sagebrush Shrubland and Great Basin Xeric Mixed Sagebrush Shrubland. The majority of this disturbance would be created by construction of the WRSF, the TSF, and the heap leach facility. Creation of the pit would remove approximately 700 acres of Great Basin Pinyon-Juniper Woodland habitat and 36 acres of Great Basin Xeric Mixed Sagebrush Shrubland. Approximately 692 acres of Intermountain Basins Mixed Salt Desert Scrub Habitat and Inter-Mountain Basins Greasewood Flat would be disturbed, primarily due to the creation of the WRSF and three borrow sites. The majority of the proposed disturbance would result from construction of the WRSF and the TSF.

The pit would not be reclaimed; therefore, long-term disturbance (habitat removal) of the 736-acre area affected by the pit would occur (Figure 2.3-11). Long-term acreage impacts to the wildlife habitats within the project area resulting from the Proposed Action are presented in Table 4.8-1. Long-term disturbance would occur in all other areas within the project area for the life of the project or until reclamation occurs. The WRSF and TSF would be re-contoured and seeded (Section 4.7).

The greatest habitat loss would be within sagebrush habitat types such as Inter-Mountain Basins Big Sagebrush Shrubland and Great Basin Xeric Mixed Sagebrush Shrubland (Table 4.8-2). The loss of 2,414 acres of sagebrush habitat would result in habitat fragmentation, particularly when impacts occur along transitional ranges, both spatial and temporal.

Habitat fragmentation can be defined as loss of habitat, reduced patch size, and an increasing distance between patches, but also an increase of new habitat (e.g., restored mining facilities, fire affected habitats). Ecologists commonly believe that the decreasing proportion of the suitable habitat would result in a decline in the population size of a species, particularly through

habitat loss in landscapes with a high proportion of suitable habitat (which would generally support greater numbers). However, as the proportion of suitable habitat decreases in the landscape, area and isolation effects start influencing the population size of the species. The relative importance of pure habitat loss, patch size, and isolation are expected to differ at different degrees of habitat fragmentation. Habitat fragmentation is often cited as one of the more important factors to special status species' decline. In some cases, these unique species are a result of habitat fragmentation, which can result in endemism (i.e., living only in a particular location, such as springsnails). Conversely, species diversity can expand as a result of a mosaic of habitats, including those habitats that are manmade.

Table 4.8-2 Mining and Processing Facilities Disturbance by Habitat Type

Habitat Type	Total Acres	Percentage of Project Area
Inter-Mountain Basins Big Sagebrush Shrubland	1,917	49
Great Basin Pinyon-Juniper Woodland	765	20
Inter-Mountain Basins Mixed Salt Desert Scrub	538	14
Great Basin Xeric Mixed Sagebrush Shrubland	495	13
Inter-Mountain Basins Greasewood Flat	154	4
Invasive Annual and Biennial Forbland	9	<1
Inter-Mountain Basins Semi-Desert Grassland	6	<1
Inter-Mountain Basins Montane Sagebrush Steppe	4	<1
Developed, Medium-High Intensity	3	<1
Developed, Open Space-Low Intensity	2	<1
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	<1	<1
Invasive Annual Grassland	<1	<1
Total	**3,894**	**100**

Exploration disturbance was not included in the above calculations because future exploration drill locations would depend on past exploration results.

Big Game Species

Mule Deer

The location of the pit, haul road, and WRSF in proximity to a known migratory corridor for mule deer would effectively fragment their seasonal habitat. Likewise, the location of the pit relative to the migratory corridor within Long Canyon could pose additional barriers should the perimeter fencing and/or gate preclude or slow passage. The Nevada Department of Wildlife (NDOW) has expressed concerns that project facilities could impede mule deer during their migration. The Proposed Action proposes to develop the mine in a way such that the least amount of mule deer habitat is removed along the interface of pinyon-juniper woodland. The remaining facilities and WRSF would be developed farthest from the pit first. Newmont proposes to concurrently reclaim habitat along the edges of the WRSF in a manner that could, in time, provide cover for mule deer during migration.

Nevertheless, noise and human activity would be expected to cause deer to avoid areas of active disturbance, particularly during the early phases of mine development (Sawyer et al., 2009). Migrating deer may attempt to skirt disturbance as they move through the area during migration (Sawyer et al., 2009; Lendrum et al., 2013). If activities at the mine force deer to move through a narrower corridor along the ridgeline above the mine pit, the deer may be more susceptible to predation by mountain lions, they would likely expend more energy, or they may not move to crucial winter habitat (e.g., change migratory patterns) (Sawyer et al., 2006 cited in Lendrum et al., 2012; Cox et al., 2009). As activities continue, deer may acclimate to disturbance to some degree, but it is anticipated that the haul road located between the mine pit and the WRSF represents a hazard for deer that do move through the approximately 500-foot corridor between the pit and the WRSF. Newmont has committed to concurrent reclamation, which would facilitate habitat recovery, but impacts to the migration route would still occur during active operations. There is scant information for acceptable widths for mule deer corridors. The only published distance of over 2,000 feet (Harrison, 1992) is for white-tailed deer. Similarly, mule deer are constrained at natural bottle necks (Sawyer, et al., 2005); however, the Proposed Action has infrastructure for over 5.5 miles long adjacent to the juniper-sage interface, from the borrow sites to the TSF.

As proposed, the perimeter fencing would be constructed in a manner to allow passage of wildlife. The mine perimeter fencing (Section 2.2.18.15) would be a three-strand fence with the top two strands barbed and the bottom strand smooth. In areas of heavy cattle pressure, the fence would be a four-strand fence with three barbed strands with a smooth wire bottom strand placed to facilitate wildlife movement. These types of fencing would allow wildlife passage. As part of an EPM, Newmont intends to work with NDOW and BLM to select areas where fencing can be temporarily laid-down (depending on where cattle are) to assist mule deer migration.

A gate on Long Canyon Road is proposed to prevent access to the Plan boundary by humans for safety concerns. Mule deer collar data indicate the deer use the road because the slopes above Long Canyon are steep. Deer are skilled at traversing relatively steep terrain; however, easy passages are favored as they preserve the deer's energy resources (Parker et al., 1984). Although the fencing and Long Canyon gate would not preclude migratory access along the Long Canyon Road, mule deer may avoid crossing the fences to access the road. In that case, their passage would be along the steeper terrain, making them more susceptible to predation and result in increased energy use (Parker et al., 1984; Sawyer et al., 2009). Recent studies of deer migrating through heavily developed habitat for oil and gas developments, as well as suburban areas, suggest changes in movement along traditional migration corridors appear to depend on the level of risk to the animals. In areas that are moderately developed, deer tend to select areas with concealment cover, whereas deer in less developed areas selected better foraging habitat, pausing to browse along their route. Deer avoid roads in all but the most developed areas (Lendrum et al., 2012). Where bottle necks occurred within a historic migratory corridor, the deer still migrated within them, despite adjacent roads (Sawyer et al., 2005; Lendrum et al., 2013). The deer moved through higher risk areas by increasing their rate of travel (Lendrum et al., 2012 and 2013). However, if the risk is too high, the deer may change their traditional migratory patterns (Sawyer et al., 2006 cited in Lendrum et al., 2013; Cox, 2012;

Cox, et al., 2009), which comes with consequences in years with heavy snow because some of the snow-free habitat may not be accessible to these deer, increasing their risk of starvation (Monteith et al., 2011). However, Merrill et al. (1994) found that movement of mule deer around a phosphate mine in Idaho differed in years of different snowfall. Mule deer avoided the mine in years of low snow, and traveled through the mine during years with heavy snowfall. During the year with the heaviest snowfall, deer delayed their migration through the mine (Merrill et al., 1994).

One concern for migratory mule deer is their availability to access stopover habitat. This relates back to deer moving more rapidly through a migratory corridor. Stopover habitat allows deer to maximize nutritious browse and is important for sustaining fitness and weight during migration, particularly over large distances (Sawyer and Kauffman, 2011). In Wyoming, stopover habitat areas are where the deer are spending the majority of their time during migration, refueling, then moving on (Sawyer and Kauffman, 2011). For collared deer within the Area 7 herd, descriptions or interpretation of habitat use have not been analyzed. The project is located within winter habitat for this herd. During low snow years (e.g., winter of 2012), it appears approximately seven of the collared deer intensely utilized Sixmile Canyon, Long Canyon, and the habitat surrounding Sixmile Creek west of the project area (Blum and Stewart, 2013a). Some of the collared deer continued south along the Pequop Mountains by descending Long Canyon; however, it is unclear if the deer are utilizing this area as stopover or mild-winter habitat. Under current conditions, it appears the deer do not utilize the lower elevation habitats within the project area as stopover habitat; however, variations in weather change from year to year.

A long-term study on mule deer migration in the Sierra Nevada Mountain Range documented that autumn migration was variable and dependent on the gender and age of the mule deer. Older does tended to stay in summer ranges longer than other deer and the trigger for migration appeared to be dependent on weather (Monteith et al., 2011). These deer risked becoming stranded by early snowfall, or an exhausting migration in deep snow. Migration in spring was more closely tied to plant phenology. As snow receded, the deer began migration (Monteith et al., 2011) capitalizing on plant green-up. Relating this study to the project hinges on deer remaining on summer range too long. A deer leaving summer range late during a high snow year may expend considerable resources to reach winter range, they may not have access to stopover sites, and they may arrive to the winter range in poor body condition (Parker et al., 1984). The facilities may pose a last hurdle, potentially preventing access to winter browse (Schroeder, 2014).

Another concern for mule deer is where migratory barriers occur on traditional corridors and whether or not they are passable. In Wyoming where widespread anthropogenic disturbance occurs from oil and gas development, housing, roads, fences, and other perturbations, the perception of permeable barriers is extremely relevant because these deer experience significant changes from year to year within their traditional migratory corridors (Sawyer et al., 2013). The Area 7 herd has similar barriers including major roadways. These barriers are becoming less hazardous with the development of wildlife crossings. The mine facilities would be a barrier to migration and the permeability for deer migration would be dependent on a

variety of factors, including noise, traffic, and mine features on the landscape. The Proposed Action occurs along a long corridor that would provide a migration corridor, or gap for mule deer, of approximately 500 feet. This could potentially reduce functional habitat or create an impermeable barrier.

Indirect impacts would likely be a result of increased mine disturbance both during construction and operations. Construction and operation noise, traffic, and blasting may stress deer during the winter months, particularly if winter snows push the deer lower where they may seek crucial winter habitat further south to the western edge of Goshute Valley and the Pequop Mountains that are free of deep snow.

Other impacts are chemical hazards associated with mining, primarily in the form of process water ingestion or physical hazards associated with open process ponds. Newmont has proposed to primarily utilize process tanks in lieu of open process ponds, reducing risks of wildlife exposure to process solutions. Newmont would utilize ponds for initial start-up activities and for new leach cell development. Under normal operating conditions, ponds would be dry except for some water needed to submerge the intake pumps. The heap leach pads would be fenced, excluding wildlife access. Adverse impacts associated with process solutions, heap leach facility, or ditches are not anticipated.

The direct long-term impacts associated with the mine facility locations during mule deer migration could have a major effect to the Area 7 deer herd. There are two corridors where collared mule deer have been documented within the Plan boundary near the location of the proposed mine features. The primary corridor is located to the west of the proposed pit, where mule deer move from the north to Goshute Valley. The secondary corridor is along the juniper-sage interface habitats within Goshute Valley (Figure 3.8-2). The haul road, pit, WRSF, and access road are located within this secondary corridor, thought to be a traditional mule deer migration corridor by NDOW, located along the eastern flank of the Pequop Mountains at the interface of the pinyon-juniper and sagebrush. These project features may create obstacles to mule deer during migration and may pose a mortality risk. However, existing Global Positioning System (GPS) collar data currently indicates low use by mule deer within this interface. The deer have likely been avoiding the area currently under exploration; in part because early season snow has not forced them to use the lower elevation corridor. Lower elevation corridors are critical when early deep-snow potentially closes off higher elevation access. The GPS data indicates that collared deer use the Long Canyon corridor, which would contain proposed project features such as the pit, perimeter fencing, and gate. A few mule deer have migrated to the Toano Mountains to the east and return north along the western flank of the Pequop Mountains (Blum and Stewart, 2013a and 2013b). Direct habitat removal would occur to mule deer crucial winter habitat (NDOW, 2014). Approximately 1,129 acres (not including exploration disturbance) of crucial winter habitat would be disturbed or removed by construction of mine facilities. Of this total approximately 934 acres are on public land. The long-term impacts would be associated with the pit (beyond the life of the mine) which encompasses approximately 693 acres on public land. The long-term effects to this mule deer herd as a result of the Proposed Action are likely to be documented by monitoring deer collar data.

Elk and Pronghorn Antelope

Elk may show avoidance behavior similar to mule deer as they move between slopes of the Pequop Mountains and foraging areas near Big Springs. Currently, portions of a pasture at the Big Springs Ranch are fenced to minimize elk use of the fields that the ranch maintains for their cattle operation. Pronghorn antelope may initially avoid areas of active disturbance, and remain to the east of project disturbance. Fencing erected on the Plan boundary perimeter would allow passage for both elk and pronghorn antelope. Both of these game species would have some direct impacts from removal of approximately 4,290 acres of available habitat; however, it is not anticipated to be more than negligible impact, particularly after reclamation. Therefore, the short-term and long-term, direct and indirect impacts to elk and pronghorn antelope are expected to be negligible.

Game Birds

Development of the Long Canyon Mine is expected to have little effect on dusky grouse, which generally occur at elevations and in habitats located above the proposed pit. Foraging and nesting habitat for mourning doves would be lost due to development of the Proposed Action, and some loss of chukar and California quail habitat may occur through habitat removal. Impacts to greater sage-grouse are discussed further under the Special Status Species section.

Impacts to the springs system could occur as a result of modeled predictions that indicate that the combined pumping of the mine supply well and new municipal wells may reduce the flow in Big Springs by 220 gpm, and cause reductions in flow of up to 10 gpm in other (combined) springs in the Johnson Springs system (Golder, 2013a). Waterfowl are not expected to be adversely impacted by the proposed mine. Waterfowl are generally adaptable and some amount of change to the aquatic environment could be tolerated. If the spring flows are diminished to the point of not sustaining the wetland habitat, waterfowl would avoid most of the project area. Further discussion on waterfowl species is presented below under migratory birds and special status species. Short- and long-term direct impacts are not anticipated. Indirect long-term impacts to game birds could be gradual over the life-of-mine and result in reduced available habitat for waterfowl. Impacts as a result of the Proposed Action would be negligible to minor.

Mammals

Impacts to small mammals include direct mortality during clearing and grubbing operations and loss of occupied habitat. Mountain lions, secretive by nature, may remain higher in the mountains above the mine site. Lions and other mammals throughout the Plan boundary would be displaced in the long-term from direct impacts of habitat removal and indirect impacts of mine disturbance. These impacts are not expected to be more than minor to most mammalian species and the impacts would not result in population level impacts.

Raptors

The Plan boundary represents foraging habitat for a number of species of raptors including northern harriers, red-tailed hawks, rough-legged hawks, prairie falcons, American kestrels, turkey vultures, and great horned owls. Direct long-term impacts to raptors may include habitat

or nesting substrate removal and mortality as a result of collision.Placement of communication towers may pose a threat to some species of birds from collision; however, the risk is extremely low for migrating and resident raptors. This is primarily because they are diurnal migrators, and the Goshute Mountains act as a funnel concentrating migrating raptors along the range's spine (Slater, 2013).

Removal of nesting substrate (e.g., rocks, trees) would have direct long-term impacts to nesting raptors, particularly at the pit location. One prairie falcon nest was identified within the area of the pit by NDOW (NDOW, 2013b); however, this sighting is from 1972 and the nest may no longer exist. One golden eagle nest was observed adjacent to the pit boundary during raptor surveys, and this nest is discussed under Special Status Species section. Within the Plan boundary and Goshute Valley in general, there is potentially suitable nesting habitat for some affected species. Removal of foraging habitat would also have direct long-term effects to resident and migratory raptors. At the end of the project, the disturbed habitat would be reclaimed and provide both foraging and nesting habitat for some raptor species. The pit could create nesting substrate for prairie falcons and other cliff nesters, while holes or crevices could provide nesting habitat for some owls and American kestrels. Short-term direct affects to raptors are expected to be minor and likely a result of mine disturbance. The long-term direct and indirect impacts are expected to be negligible to minor. Additionally, Newmont has developed a Bird and Bat Conservation Strategy (BBCS), which is included in Appendix 2D. This document outlines actions Newmont has committed to reduce potential impacts to avian species, including raptors. Impacts to special status raptors are addressed further under the Special Status Species section below.

Migratory Birds

Habitats within the Plan boundary support a diversity of migratory birds. The mine and processing facilities would remove approximately 3,897 acres (not including exploration) of habitat in the project area. Until reclamation occurs, this habitat would be lost as potential migratory bird nesting and foraging habitat. The majority of the habitat that would be impacted, is Inter-Mountain Basins Big Sagebrush Shrubland (Table 4.8-2). This habitat type may be used as nesting habitat by such species as western meadowlarks, sage sparrows, and BLM sensitive species such as sage thrashers and Brewer's sparrows. Other acres impacted would be to Great Basin Pinyon-Juniper Woodland habitat, removing nesting habitat for black-throated gray warblers, blue-gray gnatcatchers, and chipping sparrows. The remaining habitat types that would be impacted include Inter-Mountain Basins Mixed Salt Desert Scrub Habitat, Great Basin Xeric Mixed Sagebrush Shrubland, Inter-Mountain Basins Greasewood Flat, and others (Table 4.8-2). Impacts to these habitat types would remove potential nesting habitat for black-throated sparrows and other migratory bird species. Most of the mine features would be reclaimed and restored to suitable habitat for many migratory bird species.

Communication towers pose a risk for collision for most avian species, and pose a threat to the greatest number of birds during migration. Night migrating passerines and waterfowl are particularly susceptible. Communication towers have been associated with collision hazards due to their height, lighting, and guy wires. Most data indicates that a greater percentage of

birds are killed during the autumn migration, with 65 percent of documented mortalities occurring then, while 20 percent of the documented mortalities occurred during spring migration. Part of the increase in autumn is due to the larger number of birds from the breeding season (first season birds) (Manville, 2005).

Indirect impacts associated with water resources could occur, but their potential effects are difficult to qualify or quantify. As discussed in Section 4.2, the Johnson Springs system feeds Hardy Creek, which becomes a losing stream as it progresses down Goshute Valley. Its importance as a surface water resource is primarily due to its functional support of wetlands and other biological resources where flow is sustained. Indirect effects on Hardy Creek stream flow could occur if the mine operations include any removal of groundwater that would otherwise contribute to Hardy Creek's flow or to the wetlands associated with the spring systems. Indirect impacts associated with process solutions are not anticipated due to the proposed lack of ponds and open water systems, though if there is a reduction in wetland acreage, any ponding of process water on the heap leach pads may attract avian species. Other indirect long-term impacts could occur through noise, increased vehicular use, and human presence resulting in increased flushing responses, stress, displacement from otherwise suitable habitat, decreased reproductive success and/or increased depredation by predators (Bayne et al., 2008; Knight et al., 2012; McClure et al., 2013).

Direct impacts to migratory birds would occur in the form of habitat removal as discussed above; however, these impacts are not anticipated to be more than negligible in the short- and long-term. Some habitats would recover after reclamation and provide nesting and foraging habitat for migratory birds. The borrow pits excavated below the depth of groundwater could potentially provide some habitat depending on the depth of water that accumulates, complementing the wetlands supported by the spring complex.

Direct short-term impacts to migratory birds are expected to be negligible, due in part to EPMs discussed in Chapter 2. Measures include preconstruction surveys for ground-disturbing activities from March 15 to July 31. If nests are found, a 300-foot no disturbance buffer would be maintained until there is no longer breeding/brood-rearing activity around the nest site as determined by a BLM-approved biologist. Habitat loss as a result of project implementation would have short- and long-term impacts to migratory birds from direct habitat removal and habitat fragmentation. These impacts would be negligible to minor as the habitats impacted, with the exception of the wetlands, are common throughout the region. Indirect impacts resulting in aquatic habitat or wetland degradation may alter the seasonal uses of a number of bird species. This impact would be considered a negligible to moderate long-term indirect impact to migratory birds. Impacts associated with mine disturbance would likely have a long-term negligible to minor impact to birds, until the mine is reclaimed. Additionally, Newmont has developed a Bird and Bat Conservation Strategy (BBCS), which is included in Appendix 2D. This document outlines actions Newmont has committed to reduce potential impacts to avian species, including migratory birds.

Reptiles and Amphibians

Direct impacts to reptiles would likely result from land-clearing activities or as a result of increased traffic on roads. While these impacts may be significant for individuals, they are not likely to result in a population level effect. Direct short- and long-term impacts to reptiles would be negligible. Impacts to the amphibians that may reside adjacent to or within the wetland could occur as an indirect effect of wetland loss from groundwater extraction. These impacts may be minor to moderate depending on the species that occur in the wetlands/springs and to what extent the wetlands are impacted.

Special Status Species

Greater Sage-Grouse

The Proposed Action would impact approximately 2,785 acres of mapped Preliminary Priority Habitat (PPH). The majority of this habitat type is Inter-Mountain Basins Big Sagebrush Shrubland followed by Great Basin Xeric Mixed Sagebrush. A minor amount of Preliminary General Habitat (PGH) habitat would be impacted by comparison (472 acres). Table 4.8-3 outlines the greater sage-grouse habitat classifications potentially impacted by the Proposed Action, including those habitats on public land and the total disturbance footprint. Only habitat potentially affected by mine and mine features are included in Table 4.8-3 because acres associated with exploration activities occur in the same locations as the future mine facilities.

Short-term direct impacts would occur by habitat removal, through construction of the project, and through noise during project construction. The Big Springs lek is approximately 0.9 miles from the proposed southern TSF, 1.7 miles from the southern borrow pit, and 0.7 miles from the access road to the south, which would access the Cities' water production wells. Pipeline construction would also occur within the newly constructed roadway for the water supply. A power line would be built to power the Cities' new municipal water wells (see below for further discussion). For the Proposed Action, the mine perimeter fence is located approximately 420 feet from the lek.

Table 4.8-3 Greater Sage-Grouse Habitat Proposed Disturbance in the Mining and Processing Area

Habitat Category	Public Acres	Private and Public Acres
PPH	863	2,785
PGH	113	472
Total	**976**	**3,257**

Though construction impacts would be transitory, there is the potential for minor to major disturbance should these activities occur during the breeding season or when nesting and brood-rearing hens are in close proximity to these activities. Fences have been implicated in direct mortality to greater sage-grouse as a result of collision or indirectly by increasing predation by providing perches for raptors (Knick et al., 2011). Communication towers and electrical distribution lines have been implicated as collision hazards to many birds including greater sage-grouse (Wisdom et al., 2011; Leu and Hanser, 2011; APLIC, 2012; Manville,

2005). Furthermore, for the hens seeking brood-rearing habitat near Hardy Creek or within the pasture/meadow habitat within the Johnson Springs system, the borrow sites, fencing, distribution line, and increased human presence may impede access to this habitat. This effect may be a long-term impact depending on how the hens move from nesting/brooding to brood-rearing habitat.

Any disturbance to greater sage-grouse that would preclude birds from attending the lek or limit access to habitat (i.e., PPH, PGH, brood-rearing, etc.) would be considered a moderate to major effect to this Population Management Unit (PMU) because the birds within this PMU have restricted suitable habitat and their numbers are thought to be low. Greater sage-grouse populations at the peripheries of occupied range may have a higher risk of extirpation (localized extinction), and most of the greater sage-grouse extirpated habitat has occurred along the edge of their historic range (Wisdom, et al., 2011). Core populations are considered more stable because they can easily interchange and have recruitment from adjoining groups. Populations at high risk may undergo extirpation during periods of high environmental variation such as during a severe and prolonged drought. A variety of factors place this PMU's persistence at risk including habitat modification as a result of fire, drought, or invasive species; habitat fragmentation; direct loss of habitat; and direct competition of resources all of which could result in low reproductive rates. Decline of greater sage-grouse is not the result of one anthropogenic disturbance, but rather multiple influences are affecting the bird's population (Leu and Hanser, 2011). The same multi-layered disturbances are affecting this PMU.

Habitat removal for mine features would result in habitat fragmentation, though the bird's use of the area north of the springs is likely limited. Excavation of the borrow pits, pumping of groundwater for processing, or potential water quality degradation could affect surrounding habitat in a manner that would alter greater sage-grouse habitat, specifically, the more mesic brood-rearing habitat of Hardy Creek. The creek bed provides a more diverse forb and grass/grass-like habitat with abundant insects preferred by greater sage-grouse for brood-rearing. Pumping groundwater for Newmont's process features and the Cities' water supply may have an impact to the mesic habitat of the spring complex and Hardy Creek but to what extent is unknown. See discussion in the Water Resources Section 4.2. Any impacts to the brood-rearing habitat of mesic or wetland systems would be considered a long-term indirect impact, and depending on the amount of habitat altered, a minor to major effect. The only known brood-rearing habitat in Goshute Valley is the spring supported wet meadows and Hardy Creek corridor (Roberts, 2013a). The Pequop Mountains do not provide typical meadow habitats, as they are too dry. Therefore, this brood-rearing habitat is the only habitat available in the area to hens from Big Springs lek and Little Lake Pass lek.

As outlined in Chapter 3.8 and discussed above, greater sage-grouse are susceptible to loss of habitat and habitat fragmentation through direct removal or through indirect effects associated with human presence and noise. Recent studies have demonstrated that noise does affect greater sage-grouse and other wildlife. A number of peer-reviewed journal articles have been published regarding the impacts of noise on birds, likewise a number have recently been published regarding affects to greater sage-grouse at leks. Blickley, Blackwood and Patricelli

(2012a) examined lek attendance by male and female greater sage-grouse during chronic intermittent (i.e., drilling for energy development) and continuous noise (i.e., road), and on control leks with no noise. They documented a 29 percent and 73 percent decrease in male lek attendance for continuous and intermittent noise sites relative to the control leks for that year; however, noise playback was not found to have a cumulative effect over time on peak male attendance after the experiment ended. Blickley and Patricelli (2012c) measured noise (produced by natural gas development and drilling activities) at low-frequencies and low-amplitudes that masked greater sage-grouse acoustic displays. Male greater sage-grouse use complex acoustic displays to attract females to the lek and to mate. Anthropogenic noises at similar frequencies or amplitude to greater sage-grouse displays likely result in female greater sage-grouse being unable to detect males at leks. Likewise, these noises mask sounds of approaching predators, which are attracted to concentrations of birds (Blickley et al., 2012a).

The same researchers studied the stress levels of birds at a lek (Blickley et al., 2012b). This study sampled fecal material from lek sites where anthropogenic noise, in this case, playback of drilling for oil and gas, increased stress-related hormones (glucocorticoids) of those sage-grouse attending the lek (all male samples) (Blickley et al., 2012b). They compared the immunoreactive corticosterone metabolites samples of males on both noise-treated and control leks in two breeding seasons. The increase in stress hormones was a 16.7 percent higher mean in samples from noisy leks compared with samples from paired control leks (Blickley et al., 2012b). The study concluded that taken together with results from a previous study (Blickley et al., 2012a) finding declines in male lek attendance in response to noise playbacks, these results suggest that chronic noise pollution can cause greater sage-grouse to avoid otherwise suitable habitat, and can cause elevated stress levels in the birds who remain in noisy areas (Blickley et al., 2012b). Both studies indicate noise-related impacts resulted in a decline in lek attendance, which can potentially result in a decrease of the overall population of the sage-grouse. These studies did not indicate a cumulative impact (Blickley et al., 2012a and 2012b).

The Nevada BLM currently does not have a published document with a standard specifying a noise threshold for evaluation of mining projects on the effects to wildlife. The threshold would be used as a point of reference above previously recorded ambient noise that should not be exceeded by anthropogenic sources. As discussed in Section 3.8, baseline noise was recorded in June 2012. Though this recording was not conducted during the breeding season, it likely represents conditions similar to those times when birds would be present at the lek. The BLM Elko District Office has selected guidelines suggested for evaluating project impacts based on the most recent literature (Patricelli, et al., 2013) using 10 decibels A-weighted (dBA) (10 dBA) noise increase above ambient or residual levels as a threshold for disturbance to greater sage-grouse at a lek during the lekking season (March 1 to May 15). Until recently, few studies explored the physiological effects of noise on wildlife. Likewise, only recently have wildlife management agencies expressed concerns over noise-related impacts and applied noise impact thresholds to sensitive wildlife.

Recent studies have demonstrated that noise does affect sage-grouse and other wildlife in a variety of ways that are not completely understood. These studies have documented avian avoidance of noisy sites during migration (McClure, et al., 2013), reduction of reproductive success (Knight et al., 2012) and a reduction of species abundance in nesting territories (Bayne et al., 2008). For sage-grouse, these same findings have been supported by Blickley and Patricelli.

Brennan (2014) modeled the Proposed Action and alternatives at one to five years (short-term), which represents start up, and at year nine (long-term), which represents operations with a mill. Within the Brennan report, one to five years was identified as short-term and year nine as long-term. Noise level contours were developed for these scenarios and the results are presented in Table 4.8-4.

Brennan used the hours from 5 AM to 10 AM, as directed by the BLM, to represent the lekking hour, or those considered to be the most crucial for greater sage-grouse at leks. Greater sage-grouse are known to roost at or near the lek sites at night and vocalize and display in the pre-dawn through early daylight hours of the morning. Greater sage-grouse have also been known to gather at or near the lek in the evening and display as well (Connelly et al., 2000).

Table 4.8-4 Predicted Short-Term and Long-Term Mining Noise Levels at the Big Springs Lek

Lek	Modeled L50 for the Proposed Action (dBA short- and long-term)	Ambient Lekking Hours Mean Sound Level (dBA)		
		Leq	L50	L90
Big Springs	31	35	24	17

Source: Brennan, 2014

Brennan reported ambient noise values in Leq, L50, and L90 in their report. The Leq value is generally described as the average noise value. The L50 value is generally described as the value exceeded 50 percent of the time. The L90 is generally described as the sound level exceeded 90 percent of the time for each hour during the monitoring period. In this analysis, L90 was identified as the appropriate noise value to be compared to the modeled L50 value for noise impact analysis.

The increase of 10 dBA above residual ambient (L90) noise levels has been thought to be sufficient to protect greater sage-grouse. It should be noted that a 10 dB increase is equivalent to a 10-fold increase in noise (e.g., increase in amplification). More simply, an increase in 10 dB means that a receiver must be three times closer to hear a vocalization compared to quiet conditions (Patricelli, et al., 2013).

The lek period residual ambient value of 17 dBA (L90) plus 10 dBA yields an impact threshold of 27 dBA. The short- and long-term modeled noise level for the Proposed Action is 31 dBA (L50). When compared to the impact threshold, the lek would be exposed to noise levels of 4 dBA above the threshold (Brennan, 2014). Because the features of the mine along the southern

portion of the site would be static in relation to the lek, the modeled noise would be the same after adding the mill and processing, and the long-term noise numbers would also exceed the threshold.

Short- and long-term noise-related impacts would occur at the Big Springs lek and could reduce numbers at the lek or preclude lek attendance, potentially causing the Big Springs lek to become inactive. These impacts would be considered a moderate to major impact during the life of the project.

Long-term direct impacts to greater sage-grouse would occur through habitat removal, fragmentation of their habitat, as well as long-term indirect impacts from potential habitat degradation. Given the potential extent of these impacts, they would be considered moderate to major because of this PMU's small population; any impacts to one lek could cause the loss of greater sage-grouse within the PMU for the reasons previously stated. This PMU is along the eastern periphery of their range within Nevada and future recruitment (repopulation) is not likely.

A Memorandum of Understanding (MOU) titled *Regarding the Establishment of a Partnership for the Conservation and Protection of the Greater Sage Grouse and Greater Sage Grouse Habitat* establishes a formal partnership among BLM Nevada State Office, United States Forest Service (USFS) Humboldt-Toiyabe National Forest, the Nevada Department of Conservation and Natural Resources, Barrick Gold of North America, Newmont, and other members of the Nevada Mining Association. This MOU provides a consultation process for proposed mining projects that may occur in greater sage-grouse PPH and PGH habitat. This MOU is consistent with BLM Washington Office Instructional Memorandum (IM) 2012-43.

According to IM 2012-43, the BLM shall work in cooperation with applicants to minimize habitat loss, fragmentation, and direct and indirect effects to greater sage-grouse and its habitat, particularly PPH habitat. The BLM must determine, in coordination with the respective state wildlife agency, whether the proposed decision would likely have more than minor adverse effects to greater sage-grouse and its habitat. If the proposed decision would have more than minor adverse effects, then the following should be implemented:

- The BLM would document the reasons for its determination and implement measures to minimize impacts to greater sage-grouse habitat.
- In addition to considering opportunities for on-site mitigation, the BLM would consider whether it is appropriate to condition the approval with a requirement for off-site mitigation that the BLM, coordinating with the respective state wildlife agency, determines would avoid or minimize habitat and population-level effects (WO-IM-2008-204).
- Unless the BLM determines, in coordination with their respective state wildlife agency, that the proposed project and mitigation measures would cumulatively maintain or enhance greater sage-grouse habitat, the proposed project must be forwarded to the appropriate BLM State Director, State Wildlife Agency Director, and USFWS representative for their review. If this group is unable to agree on the appropriate

mitigation, then the proposed decision must be forwarded to the Greater Sage-Grouse National Policy Team with the addition of the State Wildlife Agency Director, when appropriate, for its review. If the National Policy Team and the State Wildlife Agency Directors are unable to agree on the appropriate mitigation for the proposed project, the National Policy Team would coordinate with and brief the BLM Director for a final decision in absence of consensus.

Pygmy Rabbit

Baseline surveys and subsequent investigations have identified 16 pygmy rabbit burrow complexes, all of which were considered active depending on the month of visit. Fourteen individual burrows were also identified during inventories and found to be either collapsed or considered inactive. Project implementation would cause direct long-term impacts through habitat removal and potentially impact four individual burrows and two complexes. For these complexes, avoidance could be an easy solution, as one complex is along the edge of a growth medium stockpile, and the other complex within a road to a borrow pit.

Impacts from the Proposed Action would cause minor short- and long-term impacts to pygmy rabbit. The BLM and NDOW believe this population is stable and minor impacts through habitat loss would not impact the population as a whole or further the species decline. Additionally, as outlined in Section 2.2.18.15, Newmont has committed to minimizing impacts to pygmy rabbit by mowing occupied habitat 72 hours prior to ground-clearing activities, allowing the rabbits to seek other sites. However, mowing with a mechanical mower or a cutting bar includes the risk of collapsing an occupied burrow.

Small Mammals

Two species of BLM sensitive small mammals may occur within the project area: dark kangaroo mouse and Preble's shrew. Neither were surveyed for during the baseline surveys. Both species have potentially suitable habitat within the project area, though both are difficult to detect. Preble's shrew, should it occur within or adjacent to the meadow habitats associated with the spring systems and Hardy Creek, are least likely to encounter direct impacts since these areas would not be disturbed. If sandy or gravelly soils occur within the sagebrush communities, the dark kangaroo mouse could inhabit these sites. Direct temporary and short-term impacts could result through direct mortality and habitat removal. Preble's shrew could experience indirect impacts associated with a change in habitat conditions if impacts occur to the mesic and meadow systems. Impacts to these species would be considered minor and long-term.

Bats

Shafts or adits are not known to occur within the Plan boundary. The principal impacts to BLM sensitive bat species would occur as impacts to forested habitats, which represent potential roosting habitat for such species as long-eared myotis and silver-haired bats and to bat foraging habitat. The most important bat foraging habitat in the area are the wetlands associated with the spring complex and the adjacent meadows, as these habitats support the greatest insect diversity. The Proposed Action is designed to minimize or avoid any impacts to these habitat types. Impacts to those cliffs and outcrops that do occur in small amounts could also impact bat

roosting habitat. However, habitat removal would be unlikely to cause effects to the bat species that may occur in the area, as their roosting habitat types are common throughout the region.

Mattoni's Blue Butterfly

Occupied Mattoni's blue butterfly habitat has been identified in Long Canyon, with known populations located primarily at elevations higher than those of the proposed mine facilities. Impacts, either short-term or long-term, are not anticipated as a result of the pit and other mine features, which could result in crushing eggs, pupae, and larvae or trampling of host plants. Further, there is no physical perimeter fence within the habitat occupied by the butterflies.

Other Special Status Species

BLM Sensitive Birds

The Proposed Action impacts to sagebrush habitat would remove approximately 2,414 acres of potential sage-thrasher and Brewer's sparrow nesting and foraging habitat. Removal of approximately 763 acres of pinyon-juniper woodland would reduce potential pinyon jay nesting and feeding habitat. Impacts to large shrubs, particularly large black greasewood, could impact loggerhead shrike nesting habitat. Loss of these habitat types would not result in more than negligible impacts to these BLM sensitive birds. Sage-thrasher, Brewer's sparrow, pinyon jay, or loggerhead shrike would have transient impacts during habitat removal, but would have negligible short- or long-term impacts associated with habitat removal since these habitat types are abundant within the region. As discussed under Migratory Birds above, Newmont would conduct land-clearing activities outside the avian nesting season, or would have pre-construction surveys to identify and protect nesting birds.

Golden Eagle

Surveys during 2012, 2013, and 2014 of raptors identified 18 golden eagle nests within the 10-mile buffer of the Plan boundary, three of which were located within the Plan boundary.

One of the nests in the Plan boundary is located approximately ten feet from the pit footprint. The nest would not intentionally be removed by construction of the pit; however, blasting associated with mining may alter the nest substrate, damaging or removing the nest. Direct take of the nest is not expected, but may occur if the nesting substrate becomes damaged during mining operations. Impacts may still occur if eagles do not use the nest during active mining. Physically removing the nest and its substrate would represent a direct take of a nest. Take, as defined in the Bald and Golden Eagle Protection Act (BGEPA), includes, "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means, "to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior."

On September 11, 2009, the USFWS published a rule under the Bald and Golden Eagle Protection Act of 1940 (as amended) (BGEPA) (50 CFR 22.26) authorizing limited issuance of permits to take bald eagles and golden eagles "for the protection of …other interests in any

particular locality'' where the take is compatible with the preservation of the bald eagle and the golden eagle, is associated with and not the purpose of an otherwise lawful activity, and cannot practicably be avoided" (USFWS, 2009a).

The two other golden eagle nests identified within the Plan boundary may be impacted by mining-related disturbance throughout the life of the mine. The eagles may at some point return to the nests to successfully produce young during operations, depending on the tolerance of the birds. Once the mine is inactive, the nest locations and substrate would remain for future use. Pit walls have been known to provide suitable nesting habitat for golden eagles. General reactions of golden eagles to noise and disturbance include (Pagel et al., 2010):

- Agitation behavior (displacement, avoidance, and defense);
- Increased vigilance at nest sites;
- Change in forage and feeding behavior; and
- Nest site abandonment.

While golden eagles may be initially disturbed by an increase of noise in a project area, eagles have been known to habituate to increased noise levels, depending on the distance to the disturbance and where the nest or roost is within line of sight of the activities (Guinn, 2013). Over time and with regular exposure to the increased noise levels, an individual may return to near baseline behavior.

Additionally, direct disturbance to golden eagle foraging habitat would occur as a result of the Proposed Action. A total of 3,896 acres (not including exploration operations) (Table 4.8-2) of habitat would be disturbed including approximately 2,412 acres of sagebrush habitat and 692 acres of greasewood and salt desert scrub, reducing available prey base. These long-term impacts would occur through the life of the mine, though some areas would receive concurrent reclamation during mining activities. The available foraging habitat within Goshute Valley is likely able to support foraging of displaced golden eagles within another territory. These long-term direct impacts would be minor because of the amount of foraging habitat available in the area.

Therefore, impacts to golden eagles and their nesting territory as a result of the Proposed Action would be moderate, long-term indirect impacts for the life of the mine. Moderate long-term direct impacts may occur to the nest adjacent to the pit if the nesting substrate becomes damaged by blasting. Foraging habitat within the Plan boundary is expected to regain sufficient prey base over time, and once operations cease, golden eagles would likely return to this territory.

Ferruginous Hawk

Ferruginous hawks are known to nest in the general area; however, ferruginous hawk nests have not been identified within the Plan boundary. One known nest, mapped by NDOW, is located adjacent to the southern portion of the project area; direct or indirect impacts to this nest are not anticipated.

Western Burrowing Owl

Western burrowing owls have been observed in the Plan boundary, but no active burrows have been found. Newmont would conduct vegetation-clearing activities outside of the season western burrowing owls would be expected to occur in the area to the extent possible. Pre-disturbance surveys would be conducted by a BLM-approved biologist prior to any vegetation-clearing activities conducted during the period when western burrowing owls may be present. Impacts would be none to negligible in the short- or long-term.

Aquatic Species

Relict dace may be impacted by flow reductions to the Johnson Springs system or Big Springs from the Proposed Action. Any significant reductions in flow could adversely affect the relict dace population that occurs in the springs.

Direct impacts to aquatic species from the Proposed Action are not expected. Indirect impacts could result from changed aquatic systems that support relict dace or other aquatic special status species. These impacts could be minor to moderate depending on the resultant effects of water use.

Power Supply Pipeline

The power supply pipeline would be constructed within or adjacent to existing roads. The pipeline would be located within a ROW that has been previously disturbed, with the exception of the section of the pipeline located south of I-80. The temporary nature and subsequent reclamation of the pipeline route would minimize impacts to wildlife that could occur as a result of project implementation.

Table 4.8-5 Proposed Disturbance* to Habitat for Power Supply Pipeline – SWReGAP Data

Landover/Habitat Description	Acres of Proposed Disturbance
Inter-Mountain Basin Mixed Salt Desert Scrub	114
Inter-Mountain Basins Big Sagebrush Shrubland	113
Great Basin Xeric Mixed Sagebrush Shrubland	27
Inter-Mountain Basins Greasewood Flat	10
Developed, Open Space - Low Intensity	3
Agriculture	3
Inter-Mountain Basin Semi-Desert Grassland	3
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	1
Developed, Medium - High Intensity	1
Inter-Mountain Basins Montane Sagebrush Steppe	<1
Great Basin Pinyon-Juniper Woodland	<1
Invasive Annual and Biennial Forbland	<1
North American Arid West Emergent Marsh	<1
Total	**275**

*Assuming a 50-foot disturbance width

Big Game Species

Mule Deer, Elk, and Pronghorn Antelope

Mule deer occur throughout the region, but the power supply pipeline area is not thought to be of importance for migration or part of a migratory corridor. Mule deer, elk, and pronghorn antelope do move through the valley and likely utilize the meadow and spring sites adjacent to the corridor. Construction-related impacts would occur in the form of minor habitat disturbance and noise. Big game would be expected to vacate the area during construction and would likely return once construction and reclamation are complete. Therefore, short- and long-term impacts would be considered negligible to big game species as a result of pipeline construction.

Game Birds

Impacts to game birds would be in the form of temporary noise during construction. Additionally, avoidance and minimization measures of the EPMs would avoid impacts to nesting birds. There would be negligible impacts to game birds as a result of construction and operations of the pipeline.

Mammals

Impacts to small mammals would be similar to those described for big game species with the exception of direct impacts to those species who are not mobile or would seek shelter below ground. These individuals could have direct mortality-related impacts from construction equipment. While this would be significant to individuals, these impacts would not affect the population and would be negligible to minor short-term impacts. There would be no long-term impacts after restoration of the corridor.

Raptors

Impacts to nesting raptors could occur during construction, should construction occur during breeding season. Ferruginous hawks, western burrowing owl (see Special Status Species below), and red-tailed hawks are known to nest within the vicinity of the corridor. Should construction occur during the hawk's nesting season, then pre-construction surveys would be conducted to determine if the nests are active. If nests within one-third-mile of the construction corridor are active, then measures would be enacted as described in the EPMs discussed in Chapter 2 and in coordination with the BLM and NDOW. Construction could resume within the corridor once a qualified biologist determines the young have fledged. Temporary direct impacts to raptors would not be anticipated due to pre-construction monitoring and avoidance; and there would be no short- and long-term impacts, direct or indirect.

Migratory Birds

Impacts to migratory birds could result from temporary construction disturbance and short-term habitat removal. However, with avoidance and minimization measures outlined above in the Proposed Action, there would be no direct impacts to nesting birds. Should construction disturb habitat for nesting, this impact would be short-term and negligible, given the amount of suitable habitat surrounding the pipeline corridor. There would be no long-term impacts.

Reptiles and Amphibians

Impacts to reptiles and amphibians would be similar to those presented above under small mammals, and only temporary minor direct or indirect impacts would occur to reptiles and amphibians should they occur in the corridor. Short- or long-term impacts to reptiles and amphibians are not anticipated.

Special Status Species

Greater Sage-Grouse

Two leks occur north of the pipeline corridor; both are approximately three miles northwest of the corridor. The West Cobre lek and the Murdock leks were monitored in 2014 and both were active with greater sage-grouse. The West Cobre lek had 36 males and seven females, and the Murdock lek had seven males and no females (Roberts, 2014b). Direct impacts to greater sage-grouse would not be anticipated from the pipeline; however, indirect impacts could occur should construction noise travel to leks during the breeding season. The construction of the pipeline could have short-term impacts to habitat. Table 4.8-6 shows the amount of potentially impacted mapped greater sage-grouse habitat. It is likely that brood-rearing habitat for greater sage-grouse utilizing the West Cobre and Murdock leks occurs within the north Pequop Mountains. Brood-rearing and breeding habitat is generally thought to occur within the habitat mapped as PPH and not the meadows and pastures of Tecoma Valley (which are not mapped PPH or PGH).

Impacts to greater sage-grouse as a result of the pipeline construction would be negligible and short-term. There would be no long-term impacts to greater sage-grouse as a result of pipeline construction.

Table 4.8-6 Greater Sage-Grouse Habitat Potentially Impacted by the Power Supply Pipeline

Habitat Category	Public Acres	Public and Private Acres
PPH	68	144
PGH	7	17
Total	**75**	**161**

Pygmy Rabbit

Pygmy rabbits were recorded along the corridor with 17 active burrow entrances noted, representing 11 complexes. Depending on the locations of the active burrows, direct impacts could occur to pygmy rabbits during construction through mortality. One burrow and three complexes (within the Plan boundary) are directly within the corridor, while the others were within the survey boundary or on the edge. These impacts would be a major impact to individuals, though it would likely not affect the population and would be a transient direct impact. However, to minimize impacts to pygmy rabbits, pre-construction mowing of vegetation within pygmy rabbit habitat would be conducted 72 hours prior to ground-disturbing activities to minimize direct impacts to pygmy rabbits. Long-term impacts would not be anticipated; however, it would take years for the vegetative cover to return to conditions desired by pygmy rabbits.

Small Mammals

Dark kangaroo mouse and Preble's shrew could occur within the pipeline corridor in suitable habitat. Surveys were not conducted for these small mammals and habitat is limited. Preble's shrew could have suitable habitat within and adjacent to the meadow areas of the springs and hay meadows crossed by the pipeline. Dark kangaroo mouse could have suitable habitat in a few locales based on the presence of sandy and gravelly soils. Impacts during construction, if it occurs in occupied habitat, could result in temporary direct impacts to these species; impacts would be similar to those presented under the Proposed Action. There would be no short- or long-term effects to small mammals from the power supply pipeline.

Bats

The project would not disturb roosting bats that may occur in the outcrops, or within trees found along the corridor. Some foraging habitat removal would occur, but no impacts would occur to foraging habitat within the corridor. There would be no anticipated impacts to bat species.

Mattoni's Blue Butterfly

Suitable habitat for this butterfly was not located within the power supply pipeline survey corridor; therefore, impacts are not anticipated.

Other Special Status Species

BLM Sensitive Birds

A number of other birds considered sensitive by the BLM were recorded along the pipeline, including sage thrasher and loggerhead shrike. Direct transient impacts could occur by land clearing and trenching. However, by following the measures described in the Migratory Birds section for the Proposed Action and EPMs, no transient or short-term direct or indirect impacts are anticipated.

Golden Eagle

Seven golden eagle nests were located along the pipeline corridor. One of these nests is within 150 feet of the mile survey buffer, while the remaining nests vary from one third of a mile to over one mile from the buffer. There would be no direct impacts to golden eagles, although disturbance to nesting eagles could occur, particularly if a nest is within one mile and line of sight to the corridor. Golden eagles are known to abandon nests early in the nesting chronology due to anthropogenic disturbance. Incidental take is outlined above under the Proposed Action. If construction activities occur during the golden eagle nesting season (January 1 through August 31), pre-construction surveys would be conducted to determine nest occupancy. If a nest is found to be active, an appropriate construction buffer, determined by the BLM, would be enacted until the bird’s nest is no longer considered active and/or the young have fledged as determined by a BLM-approved biologist. Short- and long-term impacts to golden eagles are not anticipated from construction of the pipeline.

Ferruginous Hawk

Three ferruginous hawk nests are located within one-quarter mile of the corridor, while four are approximately one mile from the corridor. Three nests were recorded by Great Basin Ecology,

Inc. (GBE, 2013a), while the remaining four are from historic NDOW data and may no longer exist. If construction activities occur during the ferruginous hawk nesting season (March 1 through August 1), pre-construction surveys would be conducted to determine nest occupancy. If a nest is found to be active, a 0.5-mile buffer around the nest would be enacted until the birds nest is no longer considered active and/or the young have fledged as determined by a BLM-approved biologist. Short- and long-term impacts to ferruginous hawks are not anticipated from construction of the pipeline.

Western Burrowing Owl

At the time of the survey, one active and four inactive western burrowing owl burrows were adjacent to or within the corridor. Direct impacts could occur during construction activities, particularly if burrows are occupied by owls. If construction activities occur outside the western burrowing owl nesting season (March 15 through August 31), impacts are not anticipated. Should construction occur while owls are present during the breeding season, pre-construction surveys would determine occupancy and species appropriate construction buffers as determined by the BLM would be enacted until the birds have left the burrows as determined by a qualified biologist. Short- and long-term impacts to western burrowing owls are not anticipated from construction of the pipeline.

Aquatic Species

No known aquatic special status species occurs within the corridor. Springsnails could occur within the spring systems of the valley, but the pipeline corridor does not cross or come close to the spring systems. No impacts are anticipated to aquatic species, due primarily to the lack of habitat crossed by the corridor.

Cities' Water Supply

Newmont and the Cities have a framework agreement in place for replacement of the Cities' use of Big Springs for municipal water supply. Disturbances associated with this are presented in Table 4.8-7. The proposed water wells would be within the 50-foot water pipeline corridor disturbance area.

Table 4.8-7 Proposed Disturbance* to Habitat for Cities' Water Supply – SWReGAP Data

Landcover/Habitat Description	Acres of Disturbance
Inter-Mountain Basins Big Sagebrush Shrubland	20
Inter-Mountain Basins Mixed Salt Desert Scrub	2
Inter-Mountain Basins Greasewood Flat	1
Great Basin Xeric Mixed Sagebrush Shrubland	<1
Total	**23**

*Assuming a 50-foot disturbance corridor for the pipeline. Well disturbance is located within this 50-foot corridor.

Wildlife and Special Status Species

Impacts associated with the water wells and pipeline primarily include short-term impacts through construction and reclamation. These habitats are generally common throughout the Goshute Valley and the region. Potential impacts are the same for all wildlife resources as with the Proposed Action. However, with the exception of the perimeter fence for the Proposed Action, the water pipeline would be the closest disturbance to the greater sage-grouse lek. The wells would require a roadway or access road in an area where none currently exists and a 24kV distribution line, which would be located approximately 4,135 feet from the Big Springs Lek. The existing main road is located southeast of the proposed pipeline. As presented previously under the Proposed Action, distribution lines pose additional hazards to greater sage-grouse through the potential for collision as well as poles providing perches for raptors or corvids, potentially creating advantageous hunting sites for raptors (Leu and Hanser, 2011; Wisdom et al., 2011; APLIC, 2012; Manville, 2005).

Table 4.8-8 Greater Sage-Grouse Habitat Potentially Impacted From the Cities' Water Supply

Habitat Category	Public Acres	Public and Private Acres
PPH	9	23
PGH	0	0
Total	**9**	**23**

Routine maintenance activities performed by the City of West Wendover would occur at the well locations for the water supply. These impacts could cause temporary but minor impacts to the greater sage-grouse lek, should these activities occur during the hours greater sage-grouse are at the lek. While minor relative to the mine facilities, impacts would be similar to those presented in the Proposed Action.

One pygmy rabbit complex would be directly impacted by the Cities' water supply pipeline (GBE, 2014). Three pygmy rabbit complexes occur within approximately 900 feet or less of the proposed pipeline and road, two of these would not incur direct impacts through construction; however, one colony could receive direct impacts because of construction. Mowing of occupied pygmy rabbit habitat would occur 72 hours prior to ground-disturbing activities. These impacts could be minor or moderate short-term to long-term impacts to the affected colony.

Mitigation

Mule Deer

Mitigation Measure W-1

Newmont would mitigate crucial winter habitat at a 1:1 ratio for habitat lost during construction and operation of the mine. Mitigation under this measure would occur on mule deer habitat that is not also categorized as greater sage-grouse habitat.

Mitigation would include habitat enhancements within the northwest corner of the Plan boundary; however, if exploration/mining activities expand within the mitigated/enhanced

habitat, then Newmont would continue to mitigate loss of habitat at the 1:1 ratio. These additional enhancements would occur off-site. Off-site, but regionally important, habitat enhancements could include funding locations in the south Pequop Mountains/Spruce Mountain for pinyon-juniper thinning, browse species seeding, or other habitat enhancements beneficial to the Area 7 mule deer. An MOU between BLM, NDOW, and Newmont would be established to guide mitigation funding and enhancement projects. Mitigation costs would be $600 per acre (NDOW, 2010). Table 4.8-9 provides the proposed disturbance to public land that would be mitigated under this mitigation measure.

Table 4.8-9 North Facilities Alternative Mule Deer Crucial Winter Habitat Mitigation Acres (Public Acres)

Mule Deer Crucial Winter Habitat on Public Land	934
Overlap with Greater Sage-Grouse Mitigation	-151
Total Mule Deer Crucial Winter Habitat Mitigation Acres	**783**

Aquatic Species

Mitigation Measure W-2

During the operation Newmont would conduct monitoring of water resources in accordance with the monitoring program developed for the state permits. If there is a significant change noted during this monitoring Newmont would inform the BLM of the changing conditions and the BLM would then determine if a working group is necessary to develop a management strategy for sensitive species using the wetland and riparian resources.

At the end of the operation the BLM would look at the conditions and available information on the spring system and determine if it is necessary to develop a working group and management strategy for the system to protect sensitive species using the wetland and riparian resources.

Greater Sage-Grouse

Mitigation Measure W-3

A seasonal restriction would be in place for exploration drilling. This restriction includes no exploration disturbances within a three-mile radius of the Big Springs lek from March 1 to May 15 from 5 AM to 10 AM.

Mitigation Measure W-4

A seasonal restriction for the use of the south borrow pit, access road to the borrow pit, the Cities' water supply area, and the access to the Cities' water supply area would be in place. The restriction includes no human or vehicular access from March 1 to May 15 from one hour before sunrise to 10 AM. Emergency access, if necessary, to the Cities' water supply area during these seasonal restrictions would be coordinated with the BLM.

Mitigation Measure W-5

Compensation for impacts to greater sage-grouse habitat within the project area would be required by the BLM and NDOW. Funding for habitat improvement on public land would be

based on the acres of PGH and PPH habitat impacted on public land by the proposed project. Funding from Newmont would occur to support off-site habitat improvement projects to improve greater sage-grouse PGH and PPH habitat. Habitat improvement projects would take place within the East Valley PMU or adjacent PMUs. The funding would be no more than 3:1 ratio for PPH and 2:1 PGH at $600 per acre (BLM, 2013k). Mitigation compensation would be assessed annually based on the disturbance planned for the upcoming year. This would be outlined in an MOA between BLM and Newmont. Table 4.8-10 provides the proposed disturbance to public land that would be mitigated under this mitigation measure.

Table 4.8-10 Proposed Action Greater Sage-Grouse Mitigation Acres (Public Acres)

PPH Habitat	
Mining and Processing Facilities	863
Power Supply Pipeline	68
Cities' Water Supply	9
Total	**940**
PGH Habitat	
Mining and Processing Facilities	113
Power Supply Pipeline	7
Cities' Water Supply	0
Total	**120**

Mitigation Measure W-6

Newmont would install flight diverters on fencing near the greater sage-grouse lek and brood-rearing habitat to reduce collisions. The placement of the flight diverters would follow the recommendations provided in the current scientific industry standards and coordinated with BLM and NDOW. Additionally, Newmont would fully implement recommendations in their BBCS.

Golden Eagle

Mitigation Measure W-7

Newmont's BBCS was developed in coordination with the BLM and NDOW to avoid or minimize potential impacts to raptors, migratory birds, and bats from mine construction and operations. Newmont would fully implement and adhere to the construction techniques, design standards, and avian injury and mortality reporting set forth in the BBCS. The BBCS is provided in Appendix 2D.

Unavoidable Adverse Impacts on Wildlife Resources

Unavoidable adverse impacts on wildlife resources would occur to mule deer, golden eagle, and greater sage-grouse habitat. The EPMs and proposed mitigation measures minimize these long-term impacts; nevertheless, some residual impacts would exist.

Irreversible and Irretrievable Commitments of Resources

The proposed pit would not be reclaimed, resulting in the permanent or irreversible loss of approximately 700 acres of Great Basin Pinyon-Juniper Woodland and 36 acres of Great Basin Xeric Mixed Sagebrush Shrubland. Other habitats lost during the life of the mine would eventually return after reclamation, representing an irretrievable loss during that time. The potential decline of wetlands could lead to the loss of endemic species including relict dace, potential springsnail habitat, or other aquatic species residing in the spring systems.

Relationship of Short-Term Uses and Long-Term Productivity

Wildlife utilizing the project area would be affected during the life of the project, but, in the long-term and with successful reclamation, impacts to long-term productivity of the majority of wildlife resources would be negligible to minor. Short-term uses of water resources could impact long-term productivity for wetland resources including where endemic aquatic wetland obligate species occur, although other future uses of water resources by the Cities' may have a greater impact on these species. Potential short-term uses (e.g., water use) may diminish long-term productivity for greater sage-grouse by reducing greater sage-grouse numbers due to loss of brood-rearing habitat within this portion of the PMU, potentially making the PMU unsustainable over time.

4.8.3 North Facilities Alternative

Under the North Facilities Alternative, most mine facilities would be moved to the north, farther from special status species habitat including the greater sage-grouse lek near the southern part of the Plan boundary. Table 4.8-11 summarizes disturbance that would be created as a result of the North Facilities Alternative including the power supply pipeline and the Cities' water supply pipeline by SWReGAP habitat type.

Table 4.8-11 North Facilities Alternative Proposed Disturbance by Mine Facility – SWReGAP Data

Mine Facilities	Acres of Disturbance	Habitat/Landcover
Mine Pit	700	Great Basin Pinyon-Juniper Woodland
	36	Great Basin Xeric Mixed Sagebrush Shrubland
Waste Rock Storage Facility	576	Inter-Mountain Basins Big Sagebrush Shrubland
	385	Inter-Mountain Basins Mixed Salt Desert Scrub
	19	Great Basin Xeric Mixed Sagebrush Shrubland
	2	Inter-Mountain Basins Greasewood Flat
Tailings Storage Facility	220	Inter-Mountain Basins Big Sagebrush Shrubland
Mine Support and Mill Facilities	183	Inter-Mountain Basins Big Sagebrush Shrubland
	1	Great Basin Xeric Mixed Sagebrush Shrubland
Heap Leach Facility	220	Inter-Mountain Basins Big Sagebrush Shrubland

Mine Facilities	Acres of Disturbance	Habitat/Landcover
Mine Borrow Sites	148	Inter-Mountain Basins Greasewood Flat
	141	Inter-Mountain Basins Big Sagebrush Shrubland
	87	Inter-Mountain Basins Mixed Salt Desert Scrub
	27	Great Basin Xeric Mixed Sagebrush Shrubland
	9	Invasive Annual and Biennial Forbland
	4	Inter-Mountain Basins Semi-Desert Grassland
Growth Medium Stockpile	100	Inter-Mountain Basins Big Sagebrush Shrubland
	40	Inter-Mountain Basins Mixed Salt Desert Scrub
	28	Great Basin Pinyon-Juniper Woodland
	1	Great Basin Xeric Mixed Sagebrush Shrubland
Service Roads (Includes Main Site Access Road and Miscellaneous Site Access and Service Roads)	46	Inter-Mountain Basins Big Sagebrush Shrubland
	27	Inter-Mountain Basins Mixed Salt Desert Scrub
	15	Great Basin Pinyon-Juniper Woodland
	8	Great Basin Xeric Mixed Sagebrush Shrubland
	4	Inter-Mountain Basins Montane Sagebrush Steppe
	3	Inter-Mountain Basins Greasewood Flat
Facility Water Supply Well, Storage Tanks, and Pipelines	16	Inter-Mountain Basins Big Sagebrush Shrubland
	2	Great Basin Xeric Mixed Sagebrush Shrubland
	1	Inter-Mountain Basins Mixed Salt Desert Scrub
Haul Roads	63	Inter-Mountain Basins Big Sagebrush Shrubland
	8	Great Basin Xeric Mixed Sagebrush Shrubland
	<1	Inter-Mountain Basins Mixed Salt Desert Scrub
Miscellaneous	65	Inter-Mountain Basins Big Sagebrush Shrubland
	15	Inter-Mountain Basins Mixed Salt Desert Scrub
	13	Great Basin Xeric Mixed Sagebrush Shrubland
	4	Great Basin Pinyon-Juniper Woodland
	3	Developed, Medium-High Intensity
	3	Developed, Open Space-Low Intensity
	2	Inter-Mountain Basins Greasewood Flat
	<1	Inter-Mountain Basins Montane Sagebrush Steppe
Power Supply Gas Pipeline	103	Inter-Mountain Basins Mixed Salt Desert Scrub
	91	Inter-Mountain Basins Big Sagebrush Shrubland
	30	Great Basin Xeric Mixed Sagebrush Shrubland
	8	Inter-Mountain Basins Greasewood Flat
	3	Agriculture
	1	Developed, Medium-High Intensity
	1	Inter-Mountain Basins Semi-Desert Grassland
	1	Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland
	<1	Great Basin Pinyon-Juniper Woodland
	<1	Invasive annual and Biennial Forbland
	<1	North American Arid West Emergent Marsh

Mine Facilities	Acres of Disturbance	Habitat/Landcover
Water Supply to Cities with Associated Facilities	22	Inter-Mountain Basins Big Sagebrush Shrubland
	3	Inter-Mountain Basins Mixed Salt Desert Shrub
	1	Inter-Mountain Basins Greasewood Flat
	1	Great Basin Xeric Mixed Sagebrush Shrubland
Total	**3,485**	

Exploration disturbance was not included in the above calculations because future exploration drill locations would depend on past exploration results. Calculations of disturbance for the WRSF and TSF are presented separately in this table; however, they overlap each together. The calculations presented subtract all overlapping features to prevent double counting acres.

Construction of the North Facilities Alternative would disturb approximately 3,221 acres of habitat in the project area (acreage does not include exploration operations, the power supply pipeline or Cities' water supply areas). This total includes 1,743 acres of habitat identified as Inter-Mountain Basins Big Sagebrush Shrubland (Table 4.8-12), which is 174 acres less than the Proposed Action. The majority of this disturbance would be created by construction of the WRSF and the heap leach facility. Disturbance that would result from the creation of the pit is the same as that created under the Proposed Action (736 acres). Approximately 659 acres of Inter-Mountain Basins Mixed Salt Desert Scrub Habitat and 162 acres of Inter-Mountain Greasewood Flat would be disturbed largely due to the creation of the WRSF and the two borrow sites. Selection of the North Facilities Alternative would reduce impacts to the Great Basin Xeric Mixed Sagebrush Shrubland habitat type, with 145 acres disturbed under this alternative, versus 495 acres under the Proposed Action. The North Facilities Alternative alone would disturb 3,221 acres of habitat, the power supply pipeline would include 238 acres of disturbance, and the Cities' water supply pipeline approximately 26 acres.

The greatest habitat loss would be within sagebrush habitat types such as Inter-Mountain Basins Big Sagebrush Shrubland and Great Basin Xeric Mixed Sagebrush Shrubland (Table 4.8-11). The loss of 1,888 acres of sagebrush habitat would result in habitat fragmentation, particularly when impacts occur along transitional ranges, both spatial and temporal. Nevertheless, the North Facilities Alternative (excluding exploration disturbance) would disturb approximately 700 fewer acres over all compared to the Proposed Action.

Table 4.8-12 North Facilities Alternative Disturbance by Habitat Type

Habitat Type	Acres Impacted	Percentage of North Facilities Alternative Project Area
Inter-Mountain Basins Big Sagebrush Shrubland	1,743	50
Great Basin Pinyon-Juniper Woodland	746	21
Inter-Mountain Basins Mixed Salt Desert Scrub	659	19
Inter-Mountain Basins Greasewood Flat	162	5
Great Basin Xeric Mixed Sagebrush Shrubland	145	4
Invasive Annual and Biennial Forbland	9	<1
Inter-Mountain Basins Semi-Desert Grassland	5	<1
Developed, Medium-High Intensity	4	<1
Inter-Mountain Basins Montane Sagebrush Steppe	4	<1
Agriculture	3	<1
Developed, Open Space-Low Intensity	3	<1
Great Basin Foothill and Lower Montane Riparian Woodland and Shrubland	1	<1
North American Arid West Emergent Marsh	1	<1
Total	**3,485**	**100**

Exploration disturbance was not included in the above calculations because future exploration drill locations would depend on past exploration results.

Big Game Species

Mule Deer

The North Facilities Alternative positions mine facilities so that there is an approximately 2,200-foot wide corridor between the WRSF and mine pit, although the haul road would cross perpendicular to this corridor. NDOW originally identified a preference for a wider gap between the pit and WRSF, but with appropriate designs of haul road, slope angle, breaks in berms, and other enhancements, mule deer would likely use the corridor (Jenne, 2013). To improve this corridor, Newmont would reclaim portions of the WRSF during the active mining phase of the project. Performing concurrent reclamation on the west side of the WRSF would widen the area of the wildlife corridor. This corridor would allow deer migrational movement and other wildlife movement through the Plan boundary should heavy, early season snow force them to utilize the lower elevation corridor.

As is the case with the Proposed Action, noise and human activity would be expected to cause deer to avoid areas of active disturbance; however, for the North Facilities Alternative, areas disturbed would be located on a smaller, more concentrated disturbance footprint, which would reduce the overall area affected by mine activities. Similar to the Proposed Action, the haul road located between the pit and WRSF would create a hazard for deer that do move through the corridor between the pit and WRSF. The direct short- and long-term impacts to mule deer would be moderate. Recommended mitigation for mule deer movement is discussed in the mitigation section.

Elk and Pronghorn Antelope
Impacts to other big game species would be similar to those presented under the Proposed Action; however, approximately 700 less acres would be disturbed.

Game Birds
Impacts to other game birds would be similar to those presented under the Proposed Action; however, approximately 700 less acres would be disturbed.

Mammals
Impacts to mammals would be similar to those presented under the Proposed Action; however, approximately 700 less acres would be disturbed.

Raptors
Impacts to raptors would be similar to those presented under the Proposed Action; however, approximately 700 less acres would be disturbed that can be used as foraging habitat.

Migratory Birds
The North Facilities Alternative would result in the removal of approximately 3,485 acres of habitat in the project area (excluding exploration operations). Until reclamation occurs, this habitat would be lost as potential migratory bird nesting habitat. The majority of the habitat impacted would occur in Inter-Mountain Basins Big Sagebrush Shrubland (Table 4.8-11), reducing potential foraging and nesting habitat for those species that occur in this habitat type (western meadowlarks, sage sparrows, and BLM sensitive species sage thrashers and Brewer's sparrows). The North Facilities Alternative would result in the same level of impact to the Great Basin Pinyon-Juniper Woodland habitat as would occur under the Proposed Action. At the borrow sites, Inter-Mountain Basins Mixed Salt Desert Scrub and Inter-Mountain Basins Greasewood Flat would be converted to some other habitat type for the long-term. These impacts would affect a similar suite of migratory bird species as those affected by impacts as a result of implementation of the Proposed Action. Impacts to migratory birds would be the same as those described under the Proposed Action, although fewer acres of habitat would be affected by the North Facilities Alternative.

Reptiles and Amphibians
Impacts to reptiles and amphibians would be similar to those presented under the Proposed Action.

Special Status Species
Despite a reduction in the acres of habitat potentially impacted by the North Facilities Alternative, potential impacts associated with the North Facilities Alternative would be the same as the Proposed Action for the following special status species: small mammals, bat species, Mattoni's blue butterfly, and birds (including golden eagles and other raptors), Aquatic resources may have similar impacts as under the Proposed Action; however, it is anticipated to be lessened under the North Facilities Alternative due to 20 percent less predicted water use. The following species are discussed below: greater sage-grouse and pygmy rabbit.

Greater Sage-Grouse

The North Facilities Alternative would locate many of the mine facilities further north away from the lek and wetlands, although the borrow sites would be in the same areas adjacent to Hardy Creek. The facilities would also be more compact and therefore, impact fewer acres of greater sage-grouse habitat. Table 4.8-13 identifies the current mapped greater sage-grouse habitat potentially impacted by this alternative. Only habitat potentially affected by mine and mine features are included in Table 4.8-13 because acres associated with exploration activities occur in the same locations as the future mine facilities.

Table 4.8-13 Acres of Greater Sage-Grouse Habitat Impacted by the North Facilities Alternative

Habitat Category	Public Acres	Public and Private Acres
PPH	590	2,087
PGH	152	507
Total	**742**	**2,594**

For the North Facilities Alternative, there would be fewer acres of PPH habitat disturbed compared to the Proposed Action, and an increase in disturbed PGH habitat. However, impacts to mapped greater sage-grouse habitat would be farther from the lek and likewise farther from nesting and brood-rearing habitat.

The pit relative to the lek would be in the same location, approximately 3.86 miles at its closest edge, while the WRSF and TSF would be over five miles away. By contrast, the Proposed Action facilities (TSF) would be within one mile of the lek. Additionally, the mine perimeter fence would be approximately 9,100 feet north of the lek, which is approximately 8,680 feet further away than for the Proposed Action.

The acres of disturbance for the power supply for the North Facilities Alternative would be slightly less, approximately 36 acres less as show in Table 4.8-14.

Table 4.8-14 Greater Sage-Grouse Habitat Potentially Impacted by the Power Supply Pipeline

Habitat Category	Public Acres	Public and Private Acres
PPH	66	123
PGH	<1	2
Total	**66**	**125**

Conversely, acres of disturbance in greater sage-grouse habitat would be greater for the Cities' Water Supply with the North Facilities Alternative, by about three acres (Table 4.8-15).

Table 4.8-15 Greater Sage-Grouse Habitat Potentially Impacted From the Cities' Water Supply

Habitat Category	Public Acres	Public and Private Acres
PPH	11	26
PGH	2	0
Total	**13**	**26**

Noise levels were modeled for the North Facilities Alternative for the short- and long-term (Table 4.8-16) and are presented below. As previously stated, an increase of 10 dBA above residual ambient noise levels has been identified as the threshold for noise impacts at leks. The predicted short- and long-term noise level from mining operations for the North Facilities Alternative is 25 dBA (L50). The lek period residual ambient value of 17 dBA (L90) plus 10 dBA yields an impact threshold of 27 dBA. When compared to the impact threshold, the lek would be exposed to noise levels two dBA below the threshold (Brennan, 2014). Because the features of the mine along the southern portion of the site would be static in relation to the lek, the modeled noise would be the same after adding the mill and processing, and the long-term noise numbers would also be under the threshold.

Table 4.8-16 Predicted Short-Term and Long-Term Mining Noise Levels at the Big Springs Lek

Lek	Modeled L50 for the North Facilities Alternative (dBA short- and long-term)	Ambient Lekking Hours Mean Sound Level (dBA)		
		L_{eq}	L50	L90
Big Springs	25	35	24	17

Source: Brennan, 2014

Based on the noise modeling, it is anticipated that the lek would experience increased noise levels, but not at the threshold that would affect the greater sage-grouse attending the lek.

Greater sage-grouse would have habitat fragmentation from implementation of the North Facilities Alternative as a result of habitat loss, disturbance from human presence and noise, and potential increased habitat degradation based on potential changes to brood-rearing habitat. This habitat is found within Hardy Creek and meadows of the spring system. Most of these impacts would be less severe than those of the Proposed Action because the facilities would be farther from the lek and have a smaller footprint of disturbance. Nearly every aspect of the mine facilities would be moved north, such as the perimeter fence, WRSF, heap, and mine buildings. Only the borrow sites, the Cities' water supply pipeline, and municipal wells are in the same locations. Nevertheless, short-term and long-term direct and indirect impacts to greater sage-grouse from the North Facilities Alternative would occur. Impacts would be minor to moderate due to habitat removal, habitat fragmentation, and increased anthropogenic disturbances.

Pygmy Rabbit

Three pygmy rabbit complexes occur within the locations of the heap leach facility and WRSF; they represent dozens of active entrances to burrows and a multitude of inactive or collapsed burrows. Two complexes located within the area of the proposed heap leach facility have hundreds of recorded entrances, though few were recorded as active (GBE, 2014). Two individual inactive or collapsed burrows occur within the core storage facility. Impacts from the North Facilities Alternative would cause minor to moderate short- and long-term impacts to pygmy rabbits. The BLM and NDOW believe this population is stable and impacts through habitat loss would not impact the population as a whole or further the species decline. Additionally, as outlined in Section 2.2.18.15, Newmont has committed to minimizing direct impacts to pygmy rabbits through mowing occupied habitat 72 hours prior to ground-clearing activities, allowing the rabbits to seek other sites. However, mowing with a mechanical mower or a cutting bar includes the risk of collapsing an occupied burrow.

Mitigation

Mule Deer

Mitigation Measure W-1

Newmont would mitigate crucial winter habitat at a 1:1 ratio for permanent habitat lost during construction and operation of the mine. Mitigation under this measure would occur on mule deer habitat that is not also categorized as greater sage-grouse habitat.

Mitigation would include habitat enhancements within the northwest corner of the Plan boundary; however, if exploration/mining activities expand within the mitigated/enhanced habitat, then Newmont would continue to mitigate loss of habitat at the 1:1 ratio. These additional enhancements would occur off-site. Off-site, but regionally important, habitat enhancements could include funding locations in the South Pequop Range/Spruce Mountain for pinyon-juniper thinning, browse species seeding, or other habitat enhancements beneficial to the Area 7 mule deer. An MOU between BLM, NDOW, and Newmont would be established to guide mitigation funding and enhancement projects. Mitigation costs would be $600 per acre (NDOW, 2010). Table 4.8-17 provides the proposed disturbance to public land that would be mitigated under this mitigation measure.

Table 4.8-17 North Facilities Alternative Mule Deer Crucial Winter Habitat Mitigation Acres (Public Acres)

Mule Deer Crucial Winter Habitat on Public Land	749
Overlap with Greater Sage-grouse Mitigation	-151
Total Mule Deer Crucial Winter Habitat Mitigation Acres	**598**

Aquatic Species

Mitigation Measure W-2

During the operation Newmont would conduct monitoring of water resources in accordance with the monitoring program developed for the state permits. If there is a significant change noted during this monitoring Newmont would inform the BLM of the changing conditions and the BLM would then determine if a working group is necessary to develop a management strategy for sensitive species using the wetland and riparian resources.

At the end of the operation the BLM would look at the conditions and available information on the spring system and determine if it is necessary to develop a working group and management strategy for the system to protect sensitive species using the wetland and riparian resources.

Greater Sage-Grouse

Mitigation Measure W-3

A seasonal restriction would be in place for exploration drilling. This restriction includes no exploration disturbances within a three-mile radius of the Big Springs lek from March 1 to May 15 from 5 AM to 10 AM.

Mitigation Measure W-4

A seasonal restriction for the use of the south borrow pit, access road to the borrow pit, the Cities' water supply area, and the access to the Cities' water supply area would be in place. The restriction includes no human or vehicular access from March 1 to May 15 from one hour before sunrise to 10 AM. Emergency access, if necessary, to the Cities' water supply area during these seasonal restrictions would be coordinated with the BLM.

Mitigation Measure W-5

Compensation for impacts to greater sage-grouse habitat within the project area would be required by the BLM. Funding for habitat improvement on public land would be based on the acres of PGH and PPH habitat impacted on public land by the proposed project. Funding from Newmont would occur to support off-site habitat improvement projects to improve greater sage-grouse PGH and PPH habitat. Habitat improvement projects would take place within the East Valley PMU or adjacent PMUs. The funding would be no more than 3:1 ratio for PPH and 2:1 PGH at $600 per acre (BLM, 2013k). Mitigation compensation would be assessed annually based on the disturbance planned for the upcoming year. All aspects of greater sage-grouse mitigation would be outlined in the MOA between BLM and Newmont. Table 4.8-18 provides the proposed disturbance to public land that would be mitigated under this mitigation measure.

Table 4.8-18 North Facilities Alternative Greater Sage-Grouse Mitigation Acres (Public Acres)

PPH Habitat	
Mining and Processing Facilities	590
Power Supply Pipeline	66
Cities' Water Supply	11
Total PPH	**667**
PGH Habitat	
Mining and Processing Facilities	152
Power Supply Pipeline	1
Cities' Water Supply	2
Total PGH	**155**

Mitigation Measure W-6

Newmont would install flight diverters on fencing near the greater sage-grouse lek and brood-rearing habitat to reduce collisions. The placement of the flight diverters would follow the recommendations provided in the current industry standards and coordinated with BLM and NDOW. Additionally, Newmont would fully implement recommendations in their BBCS.

Golden Eagle

Mitigation Measure W-7

Newmont's BBCS was developed in coordination with the BLM and NDOW to avoid or minimize potential impacts to raptors, migratory birds, and bats from mine construction and operations. Newmont would fully implement and adhere to the construction techniques, design standards, and avian injury and mortality reporting set forth in the BBCS. The BBCS is provided in Appendix 2D.

Unavoidable Adverse Impacts on Wildlife Resources

Unavoidable adverse impacts on wildlife resources would occur to mule deer, golden eagle, and greater sage-grouse habitat to a lesser degree than for the Proposed Action, particularly for greater sage-grouse and mule deer. The adverse impacts to golden eagle nesting territory would be long-term but not permanent. The implementation of Mitigation Measures would minimize potential degradation of wildlife resources; nevertheless, some residual impacts may exist.

Irreversible and Irretrievable Commitments of Resources

The proposed pit would not be reclaimed, resulting in the permanent or irreversible loss of approximately 700 acres of Great Basin Pinyon-Juniper Woodland and 36 acres of Great Basin Xeric Mixed Sagebrush Shrubland. Other habitats lost during the life of the mine would eventually return after reclamation, representing an irretrievable loss during that time. The potential decline of wetlands could lead to the loss of endemic species including relict dace, potential springsnail habitat, or other aquatic species residing in the spring systems.

Relationship of Short-Term Uses and Long-Term Productivity

Wildlife utilizing the project area would be affected during the life of the project, but, in the long-term and with successful reclamation, impacts to long-term productivity of the majority of wildlife resources would be negligible to minor. Short-term uses of water resources could impact long-term productivity for wetland resources including where endemic aquatic wetland obligate species occur, although other future uses of water resources by the Cities' may have a greater impact on these species. Potential short-term uses may diminish long-term productivity for greater sage-grouse by reducing greater sage-grouse numbers due to loss of brood-rearing habitat within this portion of the PMU, potentially making the PMU unsustainable over time.

4.8.4 No Action Alternative

The No Action Alternative would result in Newmont continuing exploration and the proposed project would not be constructed; therefore, there would be no associated project impacts on wildlife resources excluding those impacts that are the result of actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011). Impacts to vegetation resources from this approved action result from surface disturbance of 114 acres of habitat over the life of the project. Reclamation would begin upon completion of exploration activities. The nature of the disturbance (roads and drill pads) results in a higher likelihood that it would be re-colonized by surrounding vegetation and the habitat would recover to a similar condition.

4.9 Range Resources

4.9.1 Indicators and Methods

Primary issues related to range resources include potential temporary suspension of active Animal Unit Months (AUMs) due to: direct loss of area available for grazing caused by proposed disturbance and the fenced project area; the potential for reduced forage production resulting from the loss of vegetation caused by the open pit mining operation; potential impacts to existing water sources and range improvements; and potential impacts to seasonal livestock movement within grazing allotments.

The following indicators were considered when describing the affected environment for range resources:

- Number of livestock allotments affected by the project, and the AUMs supported by or approved for use of these areas;
- Acres of rangeland to be affected by the Long Canyon Project;
- Acres within each allotment affected by the Long Canyon Project; and
- Locations of water developments, springs, fences, and other range improvements in relation to the project area.

These indicators were evaluated using the following criteria:

- Percentage of each allotment in the project area that would be affected;
- Estimated number of AUMs lost in each affected allotment; and
- Number of water sources that would be within the project area and the availability of other alternative water sources available within the affected allotments.

The following methods were used to determine potential effects:

- Use Geographic Information System (GIS) technology to map and measure the extent of the project component in acres or linear feet that are within affected allotment boundaries and determine the approximate total area of land that would be lost to forage production within these areas due to construction and/or operation of the open pit mining operation in both short- and long-term time frames.
- Utilize soils and vegetation data, and review allotment acreage and total AUMs available within each allotment that intersects the project area.
- Determine the average number of acres required to support one AUM for each allotment, based on allotment acres and AUMs available per allotment. Determine the number of AUMs affected based on estimated acreage affected.

4.9.2 Proposed Action

The potential impacts of the proposed project on range resources can be classified into short-term and long-term duration. During operations, impacts would result from surface disturbances, exclusion, and limited access to areas arising from construction, operation, and interim, concurrent, and final reclamation activities. These impacts would cease upon mine closure and completion of successful reclamation. Long-term impacts consist of permanent changes to the composition and amount of forage availability, irrespective of reclamation success, permanent loss of range improvements, and permanent changes in livestock management due to project-related activities.

Under the Proposed Action, impacts to range resources would result from the installation of the perimeter fence around the proposed boundary and surface-disturbing activities associated with facilities located outside the perimeter fence. The installation of the perimeter fence would exclude access to available forage inside the fenced areas. Outside the perimeter fence, surface-disturbing activities would include the municipal water supply wells for the Cities and the power supply pipeline.

Direct effects to range resources would result from surface-disturbing activities, increased vehicle traffic, potential damage to range improvements (e.g., fences, gates, and water sources), limited access to water sources, and expanded road and utility networks. The Proposed Action would result in the short-term loss of forage during facility construction, operation, and interim, concurrent, and final reclamation of the project area, and a long-term loss of livestock forage from the creation of the open pit that would not be reclaimed. The

installation of the perimeter fence would result in the short-term loss of forage, restrict cattle movement, and limit access to water sources. An increase in traffic, especially along the access road, could lead to increased mortality and injuries to livestock, and cause disruptions to livestock management. Vehicle traffic along the access road may disrupt livestock management during seasonal cattle movements between grazing areas.

Indirect impacts would include the spread of noxious and invasive plant species, and fugitive dust that could result in a reduction of forage and forage quality. Following surface-disturbing activities, noxious and invasive plant species may readily spread and colonize areas that typically lack or have minimal vegetative cover or areas that have been recently disturbed. Impacts from increased erosion and invasion and spread of noxious and invasive plant species could cause the potential conversion of native plant communities resulting in a loss of forage. The conversion of native vegetative communities and associated loss of forage could potentially be a permanent change resulting in a long-term impact.

To reduce conflict with livestock, Newmont would establish cattle guards and fencing to prevent cattle movement into the project area. Elko Land and Livestock Company would apply prescribed grazing within the project area, namely on the Big Springs Ranch private land. A revised grazing management plan would be developed and the prescribed grazing would be designed to support vegetation and livestock objectives for the Big Springs Ranch.

Mining and Processing Facilities

Table 4.9-1 lists the acreage of disturbance per allotment, decrease in available AUMs per allotment, and the percentage of AUMs that could be lost from the installation of the perimeter fence around the proposed Plan boundary, and surface-disturbing activities outside the perimeter fence. The proposed project would result in the exclusion of 16,739 acres of rangeland vegetation in the East Big Springs Allotment from grazing; and suspension of 558 active AUMs during the life of the project (Moore, 2013). Long-term impacts would result in the loss of 736 acres and a loss of 25 AUMs from the development of the open pit within the East Big Springs Allotment, which would not be reclaimed. The northeast portion of the East Pequop Bench Pasture would be the most affected by the Proposed Action. A few fences would be impacted by the Proposed Action, including the Headquarters fences (JDR #505621). Due to their age, the fences have limited remaining economic value to the permittee (Moore, 2013). The Long Canyon Springs trough accessed via the Six Mile Canyon road would also be available to livestock during the life of the project.

Table 4.9-1 AUMs Affected by Project Area Activities

Grazing Allotment	Allotment Acreage Excluded from Grazing in Project Area	Short-Term Projected AUMs Lost	Long-Term Projected AUMs Lost	Percent Loss of Total Active AUMs
East Big Springs	16,739	558	25	5.74

Exploration disturbance was not included in the above calculation because exploration drill locations would depend on exploration results.

Power Supply Pipeline

Table 4.9-2 lists the acreage of disturbance per allotment, number of AUMs per allotment, and the percentage of AUMs that could be lost from the construction of the power supply pipeline within the 50-foot ROW. This loss of AUMs would be short-term because the area would be reclaimed immediately following construction. This area currently provides marginal grazing value as it is located within the ROW for the county road. Portions of this area currently are lacking in vegetation. If access is required through a livestock fence, Newmont or its contractors would repair the fence when finished. No other range improvements would be affected by the power supply pipeline.

Table 4.9-2 AUMs Affected by Power Supply Pipeline

Grazing Allotment	Allotment Acreage Disturbance within the Power Supply Corridor	Short-Term Projected AUMs Lost	Percent Loss of Total Active AUMs
East Big Springs	46	2	0.02
Pilot Valley	58	2	0.04
Gamble Individual	52	2	0.01
Dairy Valley	0	0	0.00
Total	**156***	**6**	0.07

*Portions of the Power Supply Pipeline go through areas with no BLM-identified grazing allotments.

Cities' Water Supply

Table 4.9-3 lists the acreage of disturbance per allotment, number of AUMs per allotment, and the percentage of AUMs that could be lost from the construction of the power supply pipeline. Loss of AUMs due to construction of the Cities' water supply pipeline would be short-term and negligible due to reclamation immediately following completion of construction. No range improvements would be affected by the Cities' water supply.

Table 4.9-3 AUMs Affected by the Cities' Water Supply

Grazing Allotment	Allotment Acreage Excluded from Grazing in Project Area	Short-Term Projected AUMs Lost	Percent Loss of Total Active AUMs
East Big Springs	23	1	0.01

Mitigation

Mitigation measures have not been identified for range resources.

Unavoidable Adverse Impacts on Range Resources

Unavoidable adverse impacts on range resources would be unlikely to occur as a result of surface disturbance associated with the Proposed Action. The implementation of EPMs would minimize potential degradation of range resources.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of range resources would result from the development of the proposed pit. It would result in a permanent loss of 736 acres of grazeable land, causing the loss of 25 AUMs within the East Big Springs Allotment.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of range resources would be affected during the life of the project, but in the long-term, impacts to long-term productivity of range resources would be negligible to minor.

4.9.3 North Facilities Alternative

The North Facilities Alternative would be similar to the Proposed Action, except that the facilities would be located in the northern portion of the project area and change the configuration of the perimeter fence. Overall, this alternative would result in the short-term exclusion of 12,006 acres from grazing during the life of the project, which is 4,733 acres less than the Proposed Action.

Table 4.9-4 lists the acreage of disturbance per allotment, decrease in AUMs per allotment, and the percentage of AUMs that could be lost from the installation of the perimeter fence around the North Facilities Alternative boundary, and surface disturbing activities outside the perimeter fence. The proposed project would result in the short-term exclusion of 12,006 acres of rangeland vegetation in the East Big Springs Allotment from grazing. There would be 352 active AUMs suspended during the life of the project (Moore, 2013). Long-term impacts would result in the disturbance of 736 acres and a loss of 25 AUMs from the development of the open pit within the East Big Springs Allotment, which would not be reclaimed. The Long Canyon Springs trough would also be unavailable to livestock during the life of the project.

Table 4.9-4 AUMs Affected by the North Facilities Alternative

Grazing Allotment	Allotment Acreage Excluded from Grazing in Project Area	Short-Term Projected AUMs Lost	Long-Term Projected AUMs Lost	Percent Loss of Total Active AUMs
East Big Springs	12,006	352	25	4.33

Exploration disturbance was not included in the above calculation because exploration drill locations would depend on exploration results.

Mitigation

Additional mitigation measures are not required.

Unavoidable Adverse Impacts on Range Resources

Unavoidable adverse impacts on range resources would be unlikely to occur as a result of surface disturbance associated with the North Facilities Alternative. The implementation of EPMs would minimize potential degradation of range resources.

Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of range resources would result from the development of the proposed pit. It would result in a permanent loss of 736 acres of grazeable land, causing the long-term loss of 25 AUMs within the East Big Springs Allotment.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of range resources would be affected during the life of the project, but in the long-term, impacts to long-term productivity of range resources would be negligible to minor.

4.9.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and there would be no associated project impacts on range resources excluding those impacts that are the result of actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011d). Impacts to range resources from the North Facilities Alternative would result from surface disturbance of 69 acres of vegetation over the life of the project. Disturbance would be created incrementally and be dispersed throughout the exploration project area. Livestock could continue grazing in the area and the impact of the project activities on range resources would be minimal.

Indirect impacts to livestock as a result of the No Action Alternative would occur as a result of short-term temporary loss of vegetation as a result of project-related surface disturbances. There could be a long-term improvement of the habitat in the project area once the surface disturbances have been reclaimed and revegetated providing a greater amount of herbaceous vegetation species available for livestock foraging. No impacts to the livestock watering troughs would result from the No Action Alternative.

4.10 Wilderness

This section describes the potential direct and indirect effects on wilderness resources that would result from implementation of each alternative, and whether those effects would be short-term or long-term. Wilderness resources discussed in this section include federally-designated Wilderness Areas and Wilderness Study Areas (WSAs), and lands with wilderness characteristics.

4.10.1 Indicators and Methods

The following indicators were used to determine whether the implementation of the Proposed Action and the action alternative would have an impact on wilderness resources:

- Loss of wilderness characteristics within an area identified as lands with wilderness characteristics; and
- Reduction of the total area identified as lands with wilderness characteristics.

Federally-designated Wilderness Areas and WSAs do not occur within or near the project area. Effects on federally-designated Wilderness Areas and WSAs would not be expected to result from implementation of any of the alternatives analyzed in this EIS, and development of impact indicators is unnecessary. Federally-designated Wilderness Areas and WSAs are not discussed further.

4.10.2 Proposed Action

Mining and Processing Facilities

Construction and operation of the Proposed Action, including the mining and processing facilities, would not require surface disturbance within the portion of the project area that has been identified by BLM as lands with wilderness characteristics (Figure 3.10-1). Consequently, the area identified as lands with wilderness characteristics would not be fragmented by project activities and the size of the area would not be affected. Human impacts outside the boundaries of lands with wilderness characteristics are normally not considered in assessing the naturalness of an area (BLM, 2012c). Thus, with no surface disturbance occurring within lands with wilderness characteristics, there would not be any impacts on naturalness, which is a defining wilderness characteristic criteria (BLM, 2012c).

Members of the general public would be restricted from accessing the area within the fenced or otherwise barricaded perimeter of the project area for the duration of the proposed project. As a result, the public would be unable to access the approximately 373 acres of lands with wilderness characteristics that would be located within the fenced or barricaded project area. The size of an area is a defining criteria of lands with wilderness characteristics (BLM, 2012c). Under most circumstances, an area must be at least 5,000 acres in size to be considered as lands with wilderness characteristics. Approximately 27,385 acres of lands with wilderness characteristics located adjacent to the Plan boundary would remain accessible, which exceeds the minimum size criteria. The opportunity for solitude or the opportunity to engage in a primitive and unconfined type of recreation is another defining criteria of lands with wilderness characteristics (BLM, 2012c). Opportunities for solitude and for primitive and unconfined recreation would be diminished as a result of the restricted access to the lands with wilderness characteristics that occur within the project area.

Construction and operation of the proposed project would occur within relatively close proximity to lands with wilderness characteristics, particularly the area of lands with wilderness characteristics located on the west side of Long Canyon. Components of the proposed project, including the mining and processing facilities, may be visible from this area of lands with wilderness characteristics. The proposed project, including the mining and processing facilities would also be visible from high-elevation locations within other areas of lands with wilderness characteristics. During nighttime hours, lights on project equipment and ancillary facilities would be visible from these locations. Construction and operation of the proposed project would also generate noise that may be audible from the lands with wilderness characteristics located in Long Canyon. Noise would be generated by the operation of project equipment and vehicles, and from the active construction, operation, and reclamation of the proposed project. However, not all project activities would generate noise that is audible from the within the lands with

wilderness characteristics. Noise resulting from the Proposed Action would occur during the life of the project only, but some components of the project may be visible beyond the life of the project, such as the pit.

The east ridge of Long Canyon is located between the land with wilderness characteristics and the area where most of the proposed project activities would occur. Accordingly, the east ridge of the canyon would shield some project activities from view within the lands with wilderness characteristics located in Long Canyon at elevations below than the crest of the east ridge. The east ridge of the canyon would reduce the volume of project noise within areas identified as lands with wilderness characteristics, but not so much that it would be entirely inaudible.

Detection of project noise and visibility of project facilities from within the area of lands with wilderness characteristics would increase the evidence of mankind in the vicinity and reduce the opportunity for outstanding solitude. The lands with wilderness characteristics that would be affected by noise and visibility of the project are within relatively close proximity to several existing roads, including I-80. Noise related to motor vehicle traffic on these roads, particularly I-80, contribute to existing ambient noise in the area. Likewise, these roads and other constructed additions to the landscape, such as Big Springs Ranch, are visible from within some lands with wilderness characteristics. Therefore, the opportunity for outstanding solitude has been jeopardized to some degree by existing noises and visibility of activities associated with humans. The Proposed Action would however, increase the amount of visible and audible evidence of humankind that is perceptible from with the lands with wilderness characteristics.

The lands with wilderness characteristics that would not be accessible to the public during the life of the project are part of the lands with wilderness characteristics that would be affected by visibility of the proposed project and project-related noise. The affected area represents approximately 14.7 percent of the approximately 2,537 acres of lands with wilderness characteristics within the area of analysis. Additionally, the approximately 2,537 acres of lands with wilderness characteristics within the area of analysis is part of a larger, approximately 27,835-acre area of lands with wilderness characteristics. Due to the rugged topography, vegetative screening, and overall area of the lands with wilderness characteristics, the opportunity for solitude and outstanding primitive and unconfined recreation beyond the affected area would not be impacted. Accordingly, the Proposed Action would be expected to have a minor, long-term impact on wilderness resources.

Power Supply Pipeline

The power supply pipeline would not be located within any area identified as lands with wilderness characteristics. The pipeline would be buried and therefore would not be visible from any area identified as lands with wilderness characteristics. Construction of the power supply pipeline may produce temporary noises that are audible from within the area of lands with wilderness characteristics located in Long Canyon. However, only a short segment of the pipeline would be located within the project area. The majority of the pipeline would be located north of the project area, many miles away from lands with wilderness characteristics. Because construction noise is temporary, and would only be required briefly in proximity to lands with

wilderness characteristics, direct impacts on wilderness resources attributed solely to the power supply pipeline would be negligible.

The power supply pipeline is just one of the three primary components of the proposed project. Implementation of the Proposed Action would result in construction and operation of the entire proposed project. Thus, the impact that the Proposed Action would have on wilderness resources is the impact that the proposed project would have on wilderness resources as a collective whole. Accordingly, while the impact of the pipeline would be negligible and temporary, the impact on wilderness resource that would result from Proposed Action would be long-term and minor.

Cities' Water Supply

The Cities' water supply would not be located within any area identified as lands with wilderness characteristics. Construction of the water supply would generate noise that may be audible from the lands with wilderness characteristics, particularly within Long Canyon due to its proximity to the water supply location. Construction noise would be produced temporarily, for the duration of drilling the water supply wells and installing the water pipeline. The direct impacts on wilderness resources attributed solely to the Cities' water supply would be negligible and temporary.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Wilderness

Visibility of some components of the proposed project and increased noise levels from construction and operation of the proposed project would have an indirect unavoidable adverse impact on wilderness resources. The increased noise and visibility of the proposed project would result in the loss of opportunities for outstanding solitude, which is a defining element of lands with wilderness characteristics (BLM, 2011d). Impacts associated with visibility of the proposed project would persist beyond the life of the project, but would be reduced by concurrent reclamation and reclamation occurring at the end of the project life. Impacts associated with increased noise would persist for the life of the project, but only some noises would be audible from lands with wilderness characteristics. Additionally, the noise that would be audible from lands with wilderness characteristics may not be produced constantly during construction or operation of the proposed project.

Irreversible and Irretrievable Commitments of Resources

Visibility of the proposed project and detection of sounds generated by its operation would be an irretrievable commitment of the lands with wilderness characteristics that occur within the project area. The proposed mine pit area would not be reclaimed and would remain visible from some locations within the area of lands with wilderness characteristics. Visibility of the mine pit would reduce the opportunity for outstanding solitude within the area because it would increase the evidence of humans within the lands with wilderness characteristics. Accordingly, this would be an irreversible commitment of wilderness resources.

Relationship of Short-Term Uses and Long-Term Productivity

Most effects on wilderness resources would be long-term for the life of the project, which is expected to be between eight and 14 years. However, some of the loss of opportunity for outstanding solitude that would result from visibility of some project components would persist beyond the life of the project. Most components would be reclaimed, which would reduce their visual contrast with the natural landscape, and thus their visibility. The long-term productivity of the area to provide lands with wilderness characteristics at existing levels and conditions would not be affected.

4.10.3 North Facilities Alternative

Implementation of the North Facilities Alternative would not require surface disturbance to occur within any area identified as lands with wilderness characteristics. Consequently, the size and naturalness of the lands with wilderness characteristics would not be diminished. Under the North Facilities Alternative, approximately 308 acres of lands with wilderness characteristics would be located within the fenced or otherwise barricaded perimeter of the project. Members of the general public would be restricted from accessing this area for the duration of the proposed project. Opportunities for solitude and for primitive and unconfined recreation, which is a defining criteria of lands with wilderness characteristics (BLM, 2012c), would be diminished as a result of the restricted access to the approximately 308 acres of lands with wilderness characteristics that are in the project area. Approximately 27,527 acres of lands with wilderness characteristics adjacent to the project area would remain accessible. This area would exceed the minimum 5,000-acre criteria typically required for designation as lands with wilderness characteristics.

Under the North Facilities Alternative, construction and operation of most components of the project would occur further away from the lands with wilderness characteristics located within the area of analysis. The increased distance separating the project components and the lands with wilderness characteristics would allow for decreased impacts of project noise. Attenuation would be expected to prevent most project noise from being audible within the lands with wilderness characteristics. However, the mine pit would be located in the same place under this alternative and the Proposed Action. This would place the mine pit within close proximity to the lands with wilderness characteristics that are located in Long Canyon. Noise produced from activities at the mine pit would be audible from the lands with wilderness characteristics located in Long Canyon. The east ridge of Long Canyon is located between the land with wilderness characteristics and the area where most of the proposed project activities would occur, including the activities at the mine pit. Accordingly, the east ridge of Long Canyon would attenuate rate of noise produced from activities performed at the mine pit.

Some components of the proposed project would also be visible from the area of lands with wilderness characteristics located in Long Canyon, including the mine pit. The east ridge of Long Canyon would be expected to obstruct the view of some project components from lands with wilderness characteristics located at elevations below the top of the ridge. As elevation is increased above the top of the east ridge, areas in Goshute Valley farther from, and north to northeast of, the canyon become visible. Continued increases in elevation above the ridge

result in more areas of Goshute Valley closer to the canyon becoming visible. Under the North Facilities Alternative, several components of the project would be located farther north in Goshute Valley and away from Long Canyon than they would be under the Proposed Action. These components would be visible from lands with wilderness characteristics as well as lands with wilderness characteristics at elevations below those from which the Proposed Action would be visible. Thus, a larger area of lands with wilderness characteristics would be affected from the North Facilities Alternative than would be from the Proposed Action. The visibility of some project components would persist beyond the life of the project, such as the mine pit, which would not be reclaimed.

Detection of project noise generated at the mine pit and visibility of the project would increase the evidence of mankind and reduce the opportunity for outstanding solitude within lands with wilderness characteristics. The lands with wilderness characteristics that would be affected by project noise are part of the larger contiguous area of lands with wilderness characteristics. The affected area represents a minor fraction of the total contiguous area of lands with wilderness characteristics. The opportunity for outstanding solitude is a defining wilderness characteristic (BLM, 2011d), but according to BLM (2012c), there does not need to be an opportunity available in all portions of an area for that area to be considered lands with wilderness characteristics. Accordingly, implementation of the North Facilities Alternative would result in the loss of some defining wilderness characteristics, but not a loss in the area identified as lands with wilderness characteristics.

The lands with wilderness characteristics that would be affected are within relatively close proximity to several existing roads, including I-80. Noise related to motor vehicle traffic on these roads, particularly I-80, contribute to existing ambient noise in the area. Likewise, these roads and other constructed additions to the landscape, such as Big Springs Ranch, are visible from within the lands with wilderness characteristics. Therefore, the opportunity for outstanding solitude has been reduced to some degree by existing noises and visibility of activities associated with humans. The North Facilities Alternative would increase the amount of visible and audible evidence of humankind that is perceptible from the lands with wilderness characteristics.

The lands with wilderness characteristics that would not be accessible to the public during the life of the project are part of the lands with wilderness characteristics that would be affected by visibility of the proposed project and project-related noise. The affected area represents only a minor fraction (approximately 12 percent) of the approximately 2,537 acres of lands with wilderness characteristics within the area of analysis. Additionally, the approximately 2,537 acres of lands with wilderness characteristics within the area of analysis are a minor fraction of a larger, approximately 27,835-acre area of contiguous lands with wilderness characteristics. Due to the rugged topography, vegetative screening, and overall size of the lands with wilderness characteristics area, the opportunity for solitude and outstanding primitive and unconfined recreation beyond the affected area would not be impacted. Accordingly, the Proposed Action would be expected to have a long-term, minor impact on wilderness resources.

Mitigation
Mitigation measures are not required.

Unavoidable Adverse Impacts on Wilderness
Unavoidable adverse impacts resulting from the North Facilities Alternative are the same as those described for the Proposed Action.

Irreversible and Irretrievable Commitments of Resources
Implementation of the North Facilities Alternative would result in the same irreversible and irretrievable commitment of wilderness resources that are described for the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity
Under the North Facilities Alternative, the relationship of short-term uses and long-term productivity would be the same as those described for the Proposed Action.

4.10.4 No Action Alternative
Under the No Action Alternative, the proposed project would not be constructed and there would be no associated project impacts on wilderness resources excluding those impacts that are the result of actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011d). Impacts to wilderness resources from this approved action have been the result of surface disturbance within lands with wilderness characteristics, and the loss of naturalness and opportunity for solitude within lands with wilderness characteristics. The surface disturbance affected approximately 14.26 acres of lands with wilderness characteristics. The loss of naturalness and outstanding solitude are temporary effects associated with the visual disruption and increased noise levels during drilling and construction of roads and pads (BLM, 2011d). Impacts related to increased noise would not persist following reclamation of the areas affected by this approved action. Following reclamation, the intensity of the impact resulting from the visual disruption of this approved action would be reduced.

4.11 Cultural Resources and Paleontology

As outlined in the cultural resources Programmatic Agreement (Appendix 2E), all components of the final design would be fully inventoried and Section 106 satisfied prior to any project related disturbance. Project components, or portions thereof, not included in field investigations, would be subject to a Class III inventory as project planning proceeds and prior to any ground disturbing activities in those locations. Data from the project-specific studies were incorporated into this analysis.

4.11.1 Indicators and Methods

Cultural Resources

The term "historic property" is defined in the National Historic Preservation Act of 1966 (as amended) (NHPA) as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the NRHP”; such term includes artifacts, records, and remains, which are related to such district, site, building, structure, or object as described in the NHPA.

The following indicators were considered when analyzing potential impacts to historic properties (i.e., National Register of Historic Places (NRHP)-eligible cultural resources):

- The number of NRHP-eligible or unevaluated sites impacted.

No Traditional Cultural Properties (TCPs) have been identified in the project area. Therefore, discussion of TCPs is not carried forward in the impact analysis.

Assessment of potential effects or impacts on cultural resources is based on the NHPA regulations that define an effect as a direct or indirect alteration to the characteristics of a “historic property” that qualify it for inclusion in the NRHP. Adverse effects diminish the integrity of a property’s location, setting, design, materials, workmanship, feeling, or association.

As defined in 36 CFR 800.5, adverse effects on historic properties include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;
(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary’s Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;
(iii) Removal of the property from its historic location;
(iv) Change of the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance;
(v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features;
(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property’s historic significance.

Paleontology

The potential for impacts included a literature review of known resources and assignment of paleontological sensitivity based on strata. The following indicators were considered when analyzing potential impacts to paleontology:

- Known paleontological resources;
- Proximity to geologic strata with potential to contain significant paleontological resources;
- Disturbance area; and
- Depth of excavations associated with project components.

Known paleontological resources were reviewed and used to determine potential paleontological sensitivities as determined by the BLM Potential Fossil Yield Classification system (PFYC) guidelines.

4.11.2 Proposed Action

Potential impacts to cultural resources that are common to the Proposed Action and the North Facilities Alternative include the following and are described below:

- Direct and indirect impacts to prehistoric, historic, and multi-component sites;
- Discovery of unanticipated finds during operations; and
- Increased traffic and accessibility.

Mining and Processing Facilities

Cultural Resources

Prehistoric and historic sites eligible for listing in the NRHP (or unevaluated but treated as eligible) are distributed throughout the APE. Direct impacts to NRHP-eligible sites, including surface or subsurface disturbance incurred during project construction could occur within the mining and processing facilities area. Activities such as access road construction or improvements; transmission and/or pipeline construction; vegetation removal; and ancillary facilities for mining equipment and personnel have the potential to disturb NRHP-eligible cultural resources.

As stated in the Programmatic Agreement (Appendix 2E), all sites would be avoided where practicable by project design. If avoidance is not feasible, further mitigation for properties must be undertaken by the Proponent in accordance with the Programmatic Agreement. A Historic Properties Treatment Plan (HPTP) would be developed that may include testing and/or mitigation determined to be adversely affected. An amendment to the Programmatic Agreement (Appendix 2E) also states that an indirect effects study and analysis of all historic properties located within the indirect effects APE be conducted. If any of these properties are adversely affected either visually and/or from noise (audio), a HPTP would be written to mitigate these indirect effects. During construction activities, any unanticipated cultural resources discovered

would require that all work within a 100-meter area cease immediately and the BLM Authorized Officer be notified immediately. The BLM would then evaluate the discovery in coordination with other consulting parties in order to determine and implement appropriate treatment, if necessary. The amendment to the Programmatic Agreement states that the indirect effects from the project on historic properties would also be evaluated. If such adverse indirect effects were found, the Programmatic Agreement amendment (Appendix 2E) states that a HPTP would be developed specifically to mitigate these impacts.

Under the mining and processing facilities component, 103 NRHP-eligible or unevaluated sites would be directly impacted through project construction/operations (Table 3.11-1). Additional impacts could occur to eligible sites along the power supply pipeline. Impacts could potentially be avoided through construction design modification or mitigated through data recovery studies. Impacts to cultural resources would likely be minor to moderate with mitigation (i.e., data recovery) and long-term.

In addition, potential indirect effects could result from improved access to areas within the APE that currently lack road access and from building roads in close proximity to historic properties. Creation of new or improved access can have substantial and long lasting adverse effects if cultural resources are present. A number of studies (Williams, 1978; Lyneis et al., 1980; Nickens et al., 1981) have shown that increased access leads to both intentional and incidental deterioration of nearby cultural resources. Nickens et al. (1981) found that most archaeological sites within approximately 300 feet of improved roads exhibited evidence of vandalism or illegal collection. Sites at considerably greater distances also suffered damage but with less frequency as distance increased (De Jean and Wilson, 1990; Ison et al., 1981; Nickens et al., 1981). With the advent of widespread all-terrain vehicle use in the last decade, the BLM could anticipate that the spread of damage beyond new access roads may now be even greater.

Paleontology

Paleontological resources could be affected from the disturbance of the ore and waste rock during mining of the pit and construction of associated haul/access roads. Invertebrate fossils in the specific geologic materials that would be disturbed are not scientifically significant or restricted only to the Long Canyon project area and are likely to be found throughout the outcrop area of these formations in northeast Nevada. It is unlikely that any vertebrate fossils would be encountered, as none is known to occur in the formations that would be disturbed by mining or associated operations. Based on the formations present, the geologic materials that would be disturbed in mining would be Classes 1-3 under the BLM PFYC (Section 3.11.3) (BLM, 2007c). Therefore, potential direct and indirect impacts to bedrock paleontological resources would be negligible to minor.

Power Supply Pipeline

Under the power supply pipeline component, additional NRHP-eligible sites would be directly impacted by pipeline construction; the number of eligible sites is pending review by Nevada State Historic Preservation Office (SHPO). Indirect effects would be similar to those described under the mining and processing facilities component. Prior to construction, a HPTP would be

developed to mitigate any adverse direct and indirect effects to NRHP-eligible or unevaluated sites within the power supply pipeline APE.

Cities' Water Supply

Under the Cities' water supply component, there would be no additional NRHP-eligible sites impacted by water supply construction as the two sites are within the footprint of an access road.

Mitigation

Adverse impacts to NRHP-eligible cultural resources and National Trails would be mitigated as described below. Mitigation measures are not required for paleontology resources.

Cultural Resources and National Trails

Mitigation Measure C-1

A Programmatic Agreement between BLM, Nevada SHPO, and Newmont has been developed for direct impacts to cultural resources which outlines how NRHP-eligible cultural resources would be managed throughout the life of the project.

Mitigation Measure C-2

A HPTP has been developed to define how NRHP-eligible cultural resource sites within areas of proposed disturbance would be mitigated.

Mitigation Measure C-3

The Programmatic Agreement currently in place has been amended to add the indirect APE. An analysis report has been initiated to assess the indirect effects such as noise and visual on cultural resources including the Hastings Cutoff and other historic properties within the APE which could be affected from the proposed project. The Programmatic Agreement Amendment directs that a HPTP be developed to mitigate the indirect adverse effects on the identified historic properties. All mitigation would be concurred upon with the BLM and Nevada SHPO. Other parties may be included such as NPS for the Hastings Cutoff. A draft of the amended Programmatic Agreement is available for review as Appendix 2E.

Unavoidable Adverse Impacts

Cultural Resources

Unavoidable or residual adverse impacts to NRHP-eligible cultural resource sites would include compromised site integrity and loss of data due to physical damage to the sites. Impacts would be mitigated to the extent possible through data recovery or other appropriate treatment prior to any construction or operation activities through an approved treatment plan. The presence of upgraded public access roads could lead to increased casual visitation to nearby site locations resulting in greater vulnerability to site disturbance, unauthorized artifact collection, and vandalism.

Paleontology

Unavoidable adverse impacts on paleontological resources would be negligible as a result of surface disturbance associated with the Proposed Action. The implementation of EPMs would minimize potential degradation of significant paleontological resources that may be discovered.

Irreversible and Irretrievable Commitments of Resources

Cultural Resources

Any loss of context or destruction of NRHP-eligible or unevaluated cultural resource sites would constitute an irreversible commitment of that resource. This loss would be site-specific, as well as a loss of cumulative data on the local and regional level. Mitigation of impacts through data recovery would also constitute an irreversible commitment of that resource.

Paleontology

There would be negligible irreversible and/or irretrievable commitments of paleontological resources as a result of the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

Cultural Resources

The short-term use of the area during project activities would result in adverse effects to cultural resource sites located within the project area. These impacts would be mitigated to the extent possible through data recovery or other appropriate treatment. The potential for inadvertent damage or destruction of cultural sites during construction, operation, maintenance, or associated activities, could result in the loss of significant information. Further, information and data retrieved through mitigation measures (i.e., data recovery) would represent short-term use of cultural resources at the expense of future research opportunities. Therefore, long-term productivity would be lost.

Paleontology

Short-term uses of the geologic materials (ore, waste rock, construction materials) that may contain minor amounts of paleontological resources would occur during the life of the project, but impacts to long-term productivity of these same geologic materials to continue to provide paleontological resources elsewhere would be negligible.

4.11.3 North Facilities Alternative

Under the North Facilities Alternative, 47 NRHP-eligible or unevaluated sites would be within the footprint of disturbance of the mining and processing facilities (Tables 3.11-1 and 4.11-1). Since fewer sites would be within the area of disturbance (Table 4.11-1), impacts would be reduced but similar to those described under the Proposed Action. With mitigation, impacts to cultural resources would likely be minor to moderate and long-term.

Under the North Facilities Alternative, the impacts to paleontological resources would be the same as the Proposed Action.

Power Supply Pipeline

The power supply pipeline component of the North Facilities Alternative would impact six NRHP-eligible sites including three prehistoric, two historic, and one ethnohistoric site types.

Cities' Water Supply

Under the Cities' water supply component of the North Facilities Alternative, there would be two NRHP-eligible sites (one historic and one prehistoric) impacted by water supply construction.

Mitigation

Adverse impacts to NRHP-eligible cultural resources and National Trails would be mitigated as described below. Mitigation measures are not required for paleontology resources.

Cultural Resources and National Trails

Mitigation Measure C-1

A Programmatic Agreement between BLM, SHPO, and Newmont has been developed for direct impacts to cultural resources which outlines how NRHP-eligible cultural resources would be managed throughout the life of the project. An Amendment to the Programmatic Agreement states how properties would be managed from indirect effects through a HPTP.

Mitigation Measure C-2

A HPTP has been developed to define how NRHP-eligible cultural resource sites within areas of proposed disturbance would be mitigated.

Mitigation Measure C-3

The Programmatic Agreement currently in place has been amended to add the indirect APE. An analysis report has been initiated to assess the indirect effects such as noise and visual on cultural resources including the Hastings Cutoff and other historic properties within the APE which could be affected from the proposed project. The Programmatic Agreement Amendment directs that a HPTP be developed to mitigate the indirect adverse effects on the identified historic properties. All mitigation would be concurred upon with the BLM and Nevada SHPO. Other parties may be included such as NPS for the Hastings Cutoff. A draft of the amended Programmatic Agreement is available for review as Appendix 2E.

Unavoidable Adverse Impacts on Cultural Resources

Unavoidable adverse impacts on cultural resources would be similar to the Proposed Action.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources would be would be similar to the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

Short-term uses and long-term productivity would be would be similar to the Proposed Action.

4.11.4 No Action Alternative

Under the No Action Alternative, the project would not be constructed and there would be no associated project impacts on NRHP-eligible cultural resource sites (historic properties) or historic resources other than those already approved for exploration activities.

Under the No Action Alternative, there would be no impacts to the paleontological resources other than the construction of drill pads and access roads related to the authorized exploration activities discussed in Section 2.2.

4.12 Native American Religious and Traditional Values

4.12.1 Indicators and Methods

The analysis of potential impacts to Native American religious concerns and traditional values is based on a review of known tribal interests, TCPs, trust assets/treaty rights resources, and consultation with the potentially affected tribes (Section 3.12).

There are no known potential places of cultural and/or geographic interest to the tribes within or near the project area. No formal or informal issues or concerns have been raised to date by the various tribes regarding any religious or traditional cultural property concerns for the project.

Impacts to prehistoric cultural resource sites are disclosed in Section 4.11. Consultation with the tribes regarding impacts to NRHP-eligible prehistoric cultural resource sites is required under Section 106 of the NRHP.

4.12.2 Proposed Action

Various tribes have been consulted or informed of the proposed project, and no specific concerns have been raised to date by these tribes regarding any religious site, sacred site, or TCP. If Native American concerns emerge through consultation, BLM would consult with the appropriate tribe(s) and individuals to obtain information about those concerns, the importance of the resource, and what mitigation measures might be appropriate, such that BLM can determine an appropriate course of action taking that information into account.

Mining and Processing Facilities

No TCPs or Executive Order (EO) 13007 sites have been identified within the Proposed Action area of disturbance that might be impacted by the Proposed Action. Therefore, no impacts to Native American religious concerns or traditional values are anticipated from the Proposed Action.

Power Supply Pipeline

No TCPs or EO 13007 sites have been identified within the power supply pipeline area of disturbance. Therefore, no impacts to Native American religious concerns or traditional values are anticipated from this portion of the Proposed Action.

Cities' Water Supply

No TCPs or EO 13007 sites have been identified within the Cities' water supply area of disturbance. Therefore, no impacts to Native American religious concerns or traditional values are anticipated from this portion of the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Native American Values

Unavoidable adverse impacts on Native American resources would be unlikely to occur as a result of disturbance associated with the Proposed Action. The implementation of EPMs would minimize potential degradation of Native American resources.

Irreversible and Irretrievable Commitments of Resources

There would be no irreversible and/or irretrievable commitments of Native American resources as a result of the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

There would not be any significant trade-off between short-term uses and long-term productivity in terms of Native American resources, concerns, and interests under the Proposed Action.

4.12.3 North Facilities Alternative

Impacts would be similar to those under the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Native American Values

Unavoidable adverse impacts on Native American resources would be unlikely to occur as a result of disturbance associated with the North Facilities Alternative. The implementation of EPMs would minimize potential degradation of Native American resources.

Irreversible and Irretrievable Commitments of Resources

There would be no irreversible and/or irretrievable commitments of Native American resources as a result of the North Facilities Alternative.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of Native American resources would be affected during the life of the project, but in the long-term, impacts to long-term productivity of Native American resources would be negligible to minor.

4.12.4 No Action Alternative

Under the No Action Alternative, there would be no impacts to Native American religious concerns or traditional values as a result of the existing explorations as no TCPs, EO 13007 sites, or other tribal concerns have been identified within the exploration area.

4.13 Land Use and Access

The Wells Resource Management Plan (RMP) makes provisions for protecting fragile and unique resources while not overly restricting the ability of other resources to provide economic goods and services. The RMP provides a framework for the future management of the public lands and resources in the Wells resource area that is consistent with existing legislation, regulations and the policy of management of public lands on the basis of multiple use and sustained yield (BLM, 1985). None of the alternatives analyzed conflict with the management goals and objectives of the current RMP.

The Elko County land use plans and designations allow for agricultural, residential, commercial, industrial development, recreation, and mining. None of the alternatives analyzed in this DEIS conflict with any county land use plan, zoning or land use designations.

The dominant land uses in the project area are livestock grazing/ranching, mining, hunting, and dispersed recreation. The project area consists of a combination of public and private lands, with some split estate lands. The portion of the project area on public lands is administered by the BLM Elko District Wells Field Office. The public lands administered by the BLM are managed for multiple-use. Impacts of the project to BLM grazing allotments are discussed under Range Resources in Section 4.9. Impacts of the project to recreation and hunting as a form of recreation are discussed in Section 4.15.

4.13.1 Indicators and Methods

Impacts on land use caused by project construction or operation were evaluated by determining the potential for:

- Conflicts with existing federal, state, and local land uses, plans, and policies;
- Conflicts with existing BLM land use authorizations;
- Restricted access; and
- Increased traffic on roads.

4.13.2 Proposed Action

The Proposed Action consists of mining and processing facilities, the power supply pipeline, and the Cities' water supply. To determine impacts, the mining and processing facilities, the power supply pipeline, and the Cities' water supply were considered collectively as the Proposed Action.

Mining and Processing Facilities

The mining and processing facilities are consistent with the BLM Wells RMP and applicable Elko County land use plans. The mining and processing facilities would comply with adopted plans and policies of potentially affected governmental entities.

Access to the Long Canyon Mine would be primarily from I-80. Traffic coming from Ely to the south and Jackpot to the north would use U.S. Highway 93. Newmont would upgrade County Road 790 from Exit 378 on I-80 into the project area (Figure 2.2-1). Public access would be prohibited on County Road 790 through the mine facilities and public access to the Goshute Valley south of the project would be via the Shafter Exit 387 off I-80 and existing roads (Figure 4.13-1). Public access to Long Canyon Road would be prohibited through the mine facilities at the west access gate to the mine facilities. Elko County has agreed to this temporary closure. The public would be able to access the Pequop Mountains south of the mine site on an alternate route through Shafter. Until the mill is constructed (estimated at 18 to 30 months after mining commences) mill grade ore would be stockpiled or shipped from the Long Canyon Project site to Newmont's Gold Quarry facilities near Carlin, 115 miles west on I-80. Ore shipped to Gold Quarry or milling would result in an estimated 10 truck trips per day until the new mill is constructed. Each truck hauling ore would haul approximately 40-ton loads. After the mill is constructed, ore shipment to Gold Quarry would cease. Loaded carbon would be hauled in a covered tanker truck for the life of the mine. The maximum amount of truck hauling of loaded carbon to the Gold Quarry facilities would be 208 truck trips per year. There would be an equal number of loads (i.e. 208 truck trips per year) of reactivated carbon trucked back to the Long Canyon Project from Gold Quarry.

The hauling of ore from Long Canyon to Gold Quarry would generate an additional 10 truck trips per day on the west bound on-ramp of the Oasis Interchange, and an additional 10 truck trips per day on the west bound off-ramp of the Central Carlin Interchange. The hauling of ore from the Long Canyon Project to Gold Quarry would increase the AADT, as shown in Table 3.13-3, for those affected intersections. The AADT, as shown in Table 3.13-3, on west bound I-80 from the Oasis Interchange to the Central Carlin Interchange would also increase as a result of hauling ore from Long Canyon to Gold Quarry.

The hauling of loaded carbon to the Gold Quarry facility would generate an additional 208 truck trips per year on the west bound on-ramp of the Oasis Interchange, and an additional 208 truck trips per year on the west bound off-ramp of the Central Carlin Interchange. This additional truck traffic would increase the existing AADT, as shown in Table 3.13-3, on those affected intersections. The existing AADT, as shown in Table 3.13-3, on west bound I-80 from the Oasis Interchange to the Central Carlin Interchange would also increase as a result of loaded carbon hauling to Gold Quarry.

The hauling of reactivated carbon back to the Long Canyon Project would generate an additional 208 truck trips per year on the east bound on-ramp of the Central Carlin Interchange, and an additional 208 truck trips per year on the east bound off-ramp of the Oasis Interchange. This additional truck traffic would increase the existing AADT, as shown in Table 3.13-3, on

those affected intersections. The existing AADT, as shown in Table 3.13-3, on east bound I-80 from the Central Carlin Interchange to the Oasis Interchange would also increase as a result of reactivated carbon hauling back to the Long Canyon Project.

The additional AADT generated from ore and carbon hauling would be in addition to the vehicle traffic generated by the Proposed Action's work force.

For the safety of the public and to protect mine property, the Proposed Action would result in active mining areas being restricted from public access, including livestock grazing, and recreation for the life of the mine. The total project boundary is 24,779 acres. Approximately 16,739 acres would be fenced or there is a natural barrier that would restrict public access during active mining and reclamation. Approximately five land use authorizations are within the project area. These land use authorizations are primarily in the form of ROWs for transmission lines, roads, and telephone and fiber optic facilities, a Notice of Intent (NOI), and a materials site. The ROW holders include Wells Rural Electric Company (WREC), Beehive Telephone Co. Inc., Nevada Department of Transportation (NDOT), Elko County, and Agnico-Eagle USA, LTD. Newmont would coordinate with WREC and Beehive Telephone Company to allow access to the portions of ROW (NVN 002115 and NVN 076708) within the project area for maintenance and operations of their facilities if necessary. The Proposed Action would prohibit access on County Road 790 (NVN 046998) for the life of the mine and public access to the Goshute Valley south of the project would be via the Shafter exit off I-80 and existing roads. A 10-acre portion of the NDOT material site (NVN 000958) occurs within the northwestern portion of the Plan area. However, the pit is permitted for Section 10, T36N, R66E, which is outside the Plan boundary. Newmont would work with NDOT to limit impacts to the material site. Agnico-Eagle USA, LTD has a permitted NOI for portions of the project area, which expires on August 2, 2013. The NOI is in the reclamation phase. The potentially impacted existing authorizations area shown in Table 4.13-1.

Table 4.13-1 Potentially Impacted Land Use Authorization within the Project Area

Serial Number	Description/Holder	Impact to ROW
NVN 000958	NDOT/Material Site	Approximately 10 acres of the ROW for the material site may be affected in Section 11, T36N, R66E.
NVN 002115	WREC/ROW for Overhead Distribution Line	The ROW within Section 22, T36N, R66E may be affected.
NVN 046998	Elko County/Road ROW	ROW for County Road 790 would be affected.
NVN 076708	Beehive Telephone Co. Inc./ROW for Underground Telephone Line	The ROW within Section 22, T36N, R66E may be affected.
NVN 085578	Agnico-Eagle USA LTD and Columbus Gold US Corp/Exploration Drilling NOI.	The NOI occurs within portions of the project area. NOI is in the reclamation phase.

Source: BLM, 2013a

Figure 4.13-1 Public Access under the Proposed Action

There are no WSAs within the project area. The closest WSA is the Bluebell WSA, which is approximately 10 miles southeast of the project area. In 1999, the BLM acquired approximately 70,000 acres adjacent to and encompassing the project area through the Big Springs Ranch Land Exchange. Under Section 201 of the Federal Land Policy and Management Act of 1976 (FLPMA), the BLM is required to maintain an inventory of public lands, which includes an inventory for resource values including wilderness characteristics. Approximately 2,537 acres of the project area were determined to possess wilderness characteristics (BLM, 2011d).

There would be no additional impacts to land use beyond those already noted above or presented in specific resource sections such as Geology and Minerals, Wildlife, Range, Wilderness, and Section Recreation.

Post-reclamation land use of the project area would be returned to multiple uses since approximately 3,554 acres would be reclaimed. These uses would be consistent with local and BLM land use plans and guidelines. The mine pit would remain unreclaimed, resulting in a permanent change from current uses (a reduction in approximately 736 acres available for post-mining uses). Newmont would construct berms around the unreclaimed pit for the safety of the public and reopen any closed portions of County Road 790.

Power Supply Pipeline

The power supply pipeline would result in the same types of impacts as described under the mining and processing facilities, except the power supply pipeline would follow State Route 233 to Montello, then north following County Road 765 to the existing Ruby Pipeline. The pipeline is approximately 42 miles in length. Additional granting of an approximate 50-foot wide ROW for construction and operation of the power supply pipeline would be required, temporarily affecting the land use in the area crossed by the pipeline ROW corridor. Temporary disturbance associated with the power supply pipeline would be approximately 275 acres. However, the pipeline would follow existing road ROWs (State Route 233 and County Roads 765 and 790), which would reduce impacts to land use.

Traffic on State Route 233 and County Road 765 north of Montello would temporarily increase from the existing conditions shown in Table 3.13-3 (Station I.D. 0070145, 0070150, 0070362 and 0070364) during the construction of the pipeline, and may result in traffic delays during construction of the pipeline. However, once construction of the pipeline is completed, traffic would likely return to the existing AADT on the affected intersections. Construction and maintenance of the power supply pipeline would be consistent with the Wells RMP and applicable county land use plans, as well as comply with adopted plans and policies of potentially affected governmental entities. The proposed power supply pipeline would be the property of a pipeline company. The 50-foot wide pipeline ROW would remain after mine operations are completed, resulting in a permanent change of the land use on approximately 275 acres. However, once the pipeline is constructed, it would be covered and the surface would be reclaimed. This in addition to the fact that the pipeline follows existing road ROWs would help mitigate impacts to future land use.

Cities' Water Supply

The Cities' water supply would result in the same types of impacts as described under the mining and processing facilities. Additional granting of an approximate 50-foot ROW would be required for the water supply corridor. The water supply corridor would include the new well sites, the new water pipeline connecting to the existing Cities' water supply pipeline, and the service road for the water pipeline. The ROW for the water supply corridor would change the land use in the area crossed by the water supply ROW corridor. The temporary disturbance associated with the Cities' water supply would be approximately 23 acres. Once the pipeline is constructed, it would be covered and the surface would be reclaimed. The 50-foot wide waterline easement would remain after mine operations are completed, resulting in a permanent change of the land use on approximately 23 acres. However, since the water pipeline would be buried and the surface would be reclaimed, impacts to land use would be mitigated.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Land Use

Unavoidable adverse impacts on land use and access under the Proposed Action include: restricting public access within the project area for the life of the mine; re-routing and restricting access on County Road 790 and Long Canyon Road; granting a ROW for the power supply pipeline, which would change the land use of the ROW corridor; granting the ROW necessary for the Cities' water supply, which would change the land use of the ROW corridor; and an increase of traffic in the area associated with construction and operations of the Proposed Action, and the increase in traffic generated by hauling ore and loaded carbon to Carlin, and the hauling of reactivated carbon back to Long Canyon from Gold Quarry.

Irreversible and Irretrievable Commitments of Resources

Implementation of the Proposed Action would result in irreversible and irretrievable commitment of land use and access. Irretrievable commitments would include the long-term loss of access to the 16,739 acres within the project area for other land uses. The loss of access on County Road 790 and Long Canyon Road through the project area would also constitute an irretrievable commitment of resources since access would be restricted during the life of the mine. Following reclamation, public access to the project area would be restored, and land use and access would be expected to return to near existing conditions. There would be approximately 736 acres of unreclaimed disturbance associated with the mine pit, which constitutes an irreversible commitment of land use as a result of the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

Many of the impacts associated with the Proposed Action would be short-term and would cease following successful reclamation. In the short-term, there would be a temporary loss of access through the project area. The project area would temporarily be unavailable for other land uses such as recreation, hunting, livestock grazing, and agriculture, and there would be a temporary increase in vehicle traffic (including large trucks) in the area. There would be a long-term loss of open space due to the permanent disturbance area not subject to reclamation (the mine pit).

However, once mining operations cease, and the majority of the project area is fully reclaimed, long-term impacts to land use productivity, traffic and access would be minor.

4.13.3 North Facilities Alternative

The North Facilities Alternative would result in the same types of impacts as described under the Proposed Action, except most of the mine facilities would be moved to the northeastern quadrant of the project area (Figure 4.13-2). The North Facilities Alternative would prohibit public access on approximately 12,006 acres during active mining operations and during reclamation operations, which is 4,733 acres less than the Proposed Action. Under the North Facilities Alternative, the length of the power supply pipeline would reduce to 39 miles because the power generating plant would be moved north, which would reduce the disturbance area for the power supply pipeline to 238 acres. The temporary disturbance associated with the Cities water supply would be approximately 26 acres.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Land Use

Unavoidable adverse impacts on land use and access would be similar to that described under the Proposed Action, with less area of restricted public access.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources resulting from the North Facilities Alternative would be similar to that described under the Proposed Action, except it would result in less area of restricted public access.

Relationship of Short-Term Uses and Long-Term Productivity

Short-term uses and long-term productivity would be similar to that described under the Proposed Action, except it would result in less area of restricted public access.

4.13.4 No Action Alternative

Under the No Action Alternative, authorized exploration activities would continue as discussed in Section 2.2. The EA prepared for the authorized exploration activities found that the activities "would not result in impacts to land use, access, or realty actions" (BLM, 2011d). There would be no change in existing impacts to land uses and access currently permitted within the Analysis Area.

4.14 Visual Resources

This section describes the potential direct and indirect effects on visual resources that would result from implementation of each alternative, and whether those effects would be short-term or long-term.

4.14.1 Indicators and Methods

Each of the alternatives considered in this EIS was analyzed for its potential to result in effects on visual resources. The following indicators were considered when analyzing the potential effects that each alternative would have on visual resources.

- Degree of contrast or conflicts with established BLM Visual Resource Management (VRM) class objectives; and
- Change in the scenic quality of the existing characteristic landscape from Key Observation Point (KOP) KOP-1 due to visibility of components of the Proposed Action or North Facilities Alternative.

The assessment of potential impacts on visual resources resulting from the Proposed Action and the other alternatives was completed using the BLM Visual Contrast Rating System. Under the BLM Visual Contrast Rating System, the extent of an alternative's impact is dependent on the degree of visual contrast the proposed project would have with the existing landscape features in terms of form, line, color, and texture. A detailed description of the BLM Visual Contrast Rating System is provided in *BLM Manual H-8431: Visual Resource Contrast Rating* (BLM, 1986b).

A comparison of the proposed project features that would be visible under each alternative and the existing landscape features was performed from KOP-1 (Figure 3.14-1). Computer-generated visual simulations of the proposed project were produced to help visualize the changes that would be imposed on the existing landscape as viewed from the KOP. The computer-generated visual simulations are effectively photographs of the existing landscape taken from KOP-1, but with modifications to show the proposed project components and their associated changes on the landscape.

The visual simulations were reviewed to identify the form, line, color, and texture that characterize the proposed project. This information was compared with the form, line, color, and texture elements of the existing landscape in order to quantify the degree of contrast the alternatives would be expected to have. The results of this comparison and expected degree of contrast were applied to the effect indicators listed above to determine the potential for each alternative to impact visual resources. The photographs of the existing characteristic landscape and the visual simulations prepared for each alternative are provided in Appendix 3E.

4.14.2 Proposed Action

Mining and Processing Facilities

Construction of the mining and processing facilities would require surface disturbance that removes existing vegetation cover from within the project area. Removal of vegetation cover would introduce form, line, color, and texture elements that contrast with the features of the existing landscape. Construction would also require mass-grading or reshaping of soils and landforms for the construction of roads, pits, WRSF, heap leach facility, and other project facilities described in Chapter 2 of this EIS. The removal of vegetation cover and mass movement of soils and landforms would introduce form, line, color, and texture elements that contrast with the features of the existing landscape.

Figure 4.13-2 Public Access under the North Facilities Alternative

Implementation of the Proposed Action would require ancillary facilities and structures to be installed, including fencing, buildings, and a new power line from the proposed mining and processing facilities to an existing power line approximately 3,000 feet north of I-80. These project components and facilities would also introduce form, line, color, and texture elements that contrast with the features of the existing landscape.

Operation of the mining and processing facilities would require that most of the project components and facilities persist through the life of the project. Thus, the contrasting visual resource elements introduced by the proposed project are anticipated to last through the life of the project. Project personnel, materials, vehicles, and equipment present in the project area during construction and operation of the mining and processing facilities may be visible from outside the project area boundaries at times, and would also introduce form, line, color, and texture elements that contrast with the features of the existing landscape.

Concurrent reclamation during operation of the proposed project would reduce the degree of contrast between the existing landscape features and the proposed mining and processing facilities. During final reclamation of the project area, all project materials, vehicles, and equipment would be removed from the project area. Fencing, power lines, and most other ancillary facilities and structures would be disassembled and removed from the area. Some of the ancillary facilities and structures that may remain for continued ranch operations include the office, shop, and mill. These facilities would not be visible from I-80 because they would be behind the WRSF. Project features would be graded to contours that resemble surrounding landforms to the extent possible and then seeded to establish vegetation cover. Thus, reclamation would reduce the visibility of the proposed project and lessen the degree of contrast it would have with existing landscape features.

The proposed mining and processing facilities would be located on private land and on BLM-administered public lands that have been designated as VRM Class IV, as shown on Figure 3.14-1. Sections of the proposed power line and the proposed main access to the project would be located within the three-mile-wide "Low Visibility Corridor" associated with I-80 (Figure 3.14-1). The Low Visibility Corridor is managed using VRM Class II objectives (ECA Community Planning, 2012a). The changes to the scenic quality of the existing characteristic landscape from KOP-1 (Figure 3.14-1) as a result of the addition of these elements are discussed below. The degree of contrast that the form, line, color, and texture elements of the proposed project would have with the features of the existing landscape at the KOP is also discussed below.

Nighttime Operations

Night sky resources include stars, constellations, comets, meteor showers, and other similar astronomical features or phenomena that are typically best viewed during nighttime hours. Urban sky glow, a type of light pollution, which brightens the night sky, is responsible for diminishing the ability to observe night sky resources in inhabited areas or areas with excessive lighting (International Dark-Sky Association, 2008). Night sky resources over the project area are not impacted by urban sky glow because the area is uninhabited and there are very few

existing light sources during nighttime hours. Project lights, specifically stationary lights required for nighttime operations, would cause urban sky glow over the project area. Unlike stationary lights, project vehicle and equipment lights (i.e., headlights) concentrate light in the direction of travel rather than allowing light to escape in all directions, including upward into the sky. The effects from urban sky glow due to project lights would be negligible because the number of stationary light sources introduced by the project would be minimal in comparison to the number found in inhabited areas typically associated with urban sky glow.

The operation of the proposed mining and processing facilities during nighttime hours would have a substantially different type of impact on visual resources than operation during the day. Most of the form, line, color, and texture elements of the proposed project and the existing landscape features would not be visible from KOP-1 or elsewhere during the night. Instead, the landscape would appear as open space that is black or nearly black in color due to very low existing ambient light conditions. During nighttime hours, project lights, including stationary lights and lights on vehicles and equipment would be viewed against the otherwise unlit black or nearly black backdrop of the landscape. The brightness of the lights and darkness of the black or nearly black background would create a strong contrast, and thus make the lights readily visible. Motorists travelling on I-80 would constitute the majority of observers in the area during night hours, and would be those to whom lights used for the project would be visible. The impact would be expected to be moderate for several minutes to passing motorists.

KOP-1

Based on the visual simulations for four years after project commencement (Appendix 3E), the proposed mine pit would be the most visible component of the project during morning and late-afternoon hours. The proposed mine pit would be located on the east slope of the Pequop Mountains in the background zone of the landscape. The proposed pit would appear as an irregular-shaped form that is very light gray in color during morning hours, and light gray during late-afternoon hours. These colors would have a strong degree of contrast with the surrounding vegetation during the morning hours and a moderate degree of contrast during the late-afternoon hours. The degree of contrast would be less during the late-afternoon hours because the vegetation cover in the background area would appear dark gray at this time, which is closer to the color of the proposed pit. The color of the proposed mine pit would be the direct effect of an absence of vegetation cover and excavation of soils and rock during operation of the proposed project. The contrasting color of the mine pit would accentuate its irregular-shaped form, which would make it readily noticeable from KOP-1.

The visual simulations prepared for conditions at nine years after commencement of the proposed project (Appendix 3E) suggest that the proposed pit would continue to be the most apparent component of the project at all times of the day. The color of the proposed mine pit would continue to be very light gray during morning hours and light gray during late-afternoon hours. The irregular-shaped form would be larger at nine years than four years due to continued development of the proposed mine pit in the five-year interval between the simulations.

The irregular-shaped form and color of the proposed mine pit would not be similar to form and color elements found in the background zone of the existing landscape. Thus, the proposed mine pit would have a strong degree of contrast with the existing landscape, and would be expected to be the major focus of viewer attention from KOP-1.

Straight lines that are horizontal and weak would also be added to the background zone as a result of the proposed mine pit. The lines would be associated with the top edge of slope benches that would be visible during morning hours along the west wall of the proposed pit. The lines would be visible at four years and nine years after project commencement. These lines would contrast with the background zone because there are no straight lines or horizontal lines in this area. However, the degree of contrast that they would have would be negligible because they would be weak lines and because they would repeat the subtle horizontal lines associated with color patterns in vegetation cover in the foreground-middleground zone.

The other components of the proposed project would be located in the foreground-middleground distance zone of the landscape. Based on the four-year and nine-year simulations, the components that would be visible from KOP-1 include the proposed WRSF, a small portion of the heap leach facility, the TSF, and growth medium stockpiles. Power poles associated with the proposed overhead power line would also be visible in the foreground-middleground zone of the landscape.

Due to its relatively larger size, the proposed WRSF would be the most discernible among these components at four and nine years after project commencement. The WRSF would add a wide and relatively flat trapezoid-shaped form to the foreground-middleground distance zone. During the morning hours, the proposed facility would appear light gray in color with a finely stippled texture. The texture would appear finely stippled during the late-afternoon hours as well, but the color would be a darker shade of gray because it would be in a shadow with less direct sunlight. The gray color of the proposed WRSF would create a strong angular silhouette line against the backdrop of the dark-colored vegetation cover in the background zone. The silhouette line would be stronger during the morning hours because the color of the WRSF would be a lighter shade of gray and appear more evident against the dark-colored vegetation in the background zone. The proposed WRSF would have a strong degree of contrast due to the height of its form above the flat valley floor and the angular silhouette line it would introduce to the foreground-middleground zone where existing lines are mostly straight and horizontal.

The WRSF would obstruct the view of most of the heap leach facility from KOP-1. Only the southern edge of the heap leach facility would be visible, and this portion would appear almost identical to the WRSF in terms of form, line, color, and texture. The final height of the heap leach facility would not be as great as the final height of the WRSF. As such, the heap leach facility would be more discernible at nine years after project commencement than at four years due to the relative difference in size between the two facilities. The nine-year visual simulation suggests that the proposed heap leach facility would appear approximately half the height of the WRSF, but still nearly identical in terms of form, line, color, and texture. However, the proposed

heap leach facility would have a moderate degree of contrast with the landscape because its form would not rise as high above the valley floor.

The TSF would introduce a low, flat form element to the most distant foreground-middleground zone. The form would appear trapezoid-shaped, much like the shape of the proposed WRSF and heap leach facility. The four-year and nine-year visual simulations suggest that the width of the form would increase noticeably during the five-year interval, and be at its maximum width by nine years after commencement. The TSF would also get slightly taller as time since commencement of project increases, but remain relatively low to the ground and stop increasing by nine years. During the morning hours, the TSF would appear light gray in color and have no discernible texture from KOP-1. The TSF would not have a discernible texture during the late-afternoon hours, but the color would appear as a darker shade of gray than during the morning hours. The color of the TSF would have a minor degree of contrast with the color of the existing vegetation surrounding it. However, the low, flat form of the facility would repeat the flat form of the vegetation in this area of the foreground-middleground zone, helping to reduce its contrast. The minor contrast in color and the flat quality of the form of the TSF create a subtle straight line across the top and bottom edges of the facility. These lines would have a negligible degree of contrast because there are subtle horizontal lines due to variations in the vegetation colors in this area, and because they would be weak lines. The proposed TSF would have a minor degree of contrast with the existing landscape because the form and line elements it would add repeat those found in the foreground-middleground zone.

The growth medium stockpiles would add trapezoid-shaped forms to the foreground-middleground zone that are low and flat. The four-year and nine-year simulations suggest that the stockpiles would be green and olive in color, which would be attributed to vegetation cover planted on the stockpiles. During the late-afternoon hours, the shade of green and olive colors would darken relative to morning hours. The growth medium stockpiles would not have a discernible texture from KOP-1. There would be no distinguishable line elements introduced by the stockpiles. Because the proposed stockpiles would have a low, flat form that is green and olive in color, it would appear similar to the existing landforms and vegetation cover. Thus, the growth medium stockpiles would have a negligible to minor degree of contrast with the existing landscape.

Power poles associated with the proposed overhead power line would also be visible in the foreground-middleground zone of the landscape. The power poles would introduce thin vertical form and line elements to the landscape. Due to the distance separating the power poles from KOP-1, the vertical lines would appear similar in height to the vertical lines associated with the existing fence posts in the immediate foreground-middleground zone. The power poles would appear very dark brown in color and have no discernible texture from KOP-1. The degree of contrast that the power poles would have would be negligible because the form, line, color, and texture elements would be repetitive of those associated with the fence posts in the existing landscape. The proposed power line would not be expected to attract the attention of the casual observer due to the negligible degree of contrast that they would have with the existing landscape.

The 25-year simulation shows conditions approximately 11 to 17 years after reclamation and final closure, depending on the length of the active mining period. Following the active mining period (i.e., operation of the proposed project) and final closure and reclamation, the degree of contrast that the proposed project would be expected to have with the existing landscape would be reduced. At 25 years after commencement, reclamation vegetation would have established itself on the components of the proposed project that would be located in the foreground-middleground zone, including the WRSF. Thus, the color and the texture of these components would be fundamentally identical to the color and texture of the existing vegetation cover surrounding them. The form and line elements associated with the WRSF, heap leach facility, and TSF would persist after final closure. However, due to their color and texture repeating those in the existing landscape, the degree of contrast that these elements would have would be reduced. The proposed pit would not be reclaimed and therefore appears nearly the same in the 25-year simulations as the nine-year simulations, with the only noticeable difference being slight variations in the color due to weathering of the rock in the pit wall. According to the simulations, the slight variations in color would be apparent during the morning hours only, when the pit wall is exposed to direct sunlight. The slight color variations from weathering do not reduce or increase the moderate degree of contrast that the proposed pit would have with the existing landscape at four or nine years after commencement of the project.

The area of the background zone where the proposed pit would be located has been designated as BLM VRM Class IV (Figure 3.14-1). The entire area within the foreground-middleground zone of KOP-1 has also been designated as BLM VRM Class IV. As described in Table 3.14-1, BLM VRM Class IV objectives indicate that the level of change to the landscape may be high, and activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the form, line, color, and texture elements found in the existing landscape.

The addition of the proposed pit and WRSF to the existing landscape would result in a high level of change because both would strongly contrast with the basic elements that characterize the existing landscape. Both of these project components would be expected to be the major focus of viewer attention from KOP-1 during the life of the project. Reclamation vegetation would be expected to reduce the contrast of the WRSF, and it would not be expected to continue to be the major focus of attention beyond the life of the project. The level of change to the existing landscape that would result from the addition of the other proposed project components that would be visible from KOP-1 would be less than high. These components would have negligible to moderate degree of contrast with the existing landscape. Reclamation would further reduce the contrast that these components would have beyond the life of the project. Accordingly, the visual contrast and intrusion of the proposed project would be compliant with the management objectives of BLM VRM Class IV.

The Low Visibility Corridor associated with I-80 is located within the northern area of the foreground-middleground zone of KOP-1 (Figure 3.14-1). Although the entire foreground-middleground area is designated as BLM VRM Class IV, the BLM-administered public lands within the Low Visibility Corridor are managed in accordance with BLM VRM Class II objectives. As described in Table 3.14-1, BLM VRM Class II objectives indicate that the level of change to the landscape should be low, and while activities may be seen, they should not attract the attention of the casual observer. Any changes must repeat the form, line, color, and texture elements found in the predominant natural features of the existing landscape.

With the exception of a section of the proposed power line, none of the project components visible from KOP-1, as described above, would be located in the Low Visibility Corridor. The proposed power line would have a negligible degree of contrast with the existing landscape because it would repeat form, line, color, and texture elements found in the existing landscape. The power line would not be expected to attract the attention of the casual observer due to its negligible degree of contrast with the landscape. The level of change to existing landscape that would result from the addition of the power line would be low. Accordingly, the Proposed Action would meet the management objectives of the Low Visibility Corridor.

The Proposed Action would not conflict with established BLM VRM class objectives, and therefore, no effects on visual resources associated with the first effects indicator identified in Section 4.14.1 would be anticipated. The second effects indicator identified in Section 4.14.1 pertains to changes in the scenic quality of the existing landscape due to visibility of the proposed project. The anticipated effects on visual resources related to this indicator would be major because several components of the proposed project would be visible, including the proposed mine pit and WRSF, which would be a major focus of attention. The anticipated effects of the Proposed Action on visual resources would be considered long-term because they would persist during and beyond the life of the proposed project.

Power Supply Pipeline

Operation of the proposed project would require the construction and operation of the proposed power supply pipeline between the existing Ruby Pipeline and the proposed mining and processing facilities. The proposed power supply pipeline would be placed beneath the ground surface and would not be visible during operation of the proposed project. However, construction of the pipeline would require surface disturbance within the 50-foot-wide ROW that would be centered on and contain the pipeline. Excavation of the trench in which the pipeline would be buried would disrupt soils temporarily until the pipeline is in place and the trench is backfilled.

The removal of vegetation cover and the disruption of soils resulting from construction of the proposed pipeline would introduce a thin linear form element to the landscape that would appear as a nearly horizontal line in most places. The color elements introduced to the landscape would be light brown to brown in color, and defined by the soils exposed or disrupted during construction of the pipeline. The texture element introduced from construction would be fine and granular, and also created by the soils disrupted or exposed during construction.

The form, line, color, and texture elements introduced by the proposed project repeat the form, line, color, and texture elements found in the predominant natural features of the characteristic landscape. The majority of the pipeline would be next to and roughly parallel with State Route 233 from the project area to Montello, and with County Road 765 from Montello north to the Ruby Pipeline. A relatively short segment of the pipeline would also roughly parallel County Road 790. These roads contribute a thin linear form and nearly horizontal line elements to the landscape. The road surfaces also appear to have a fine granular texture that is similar to the texture that would be introduced during construction of the proposed pipeline. Consequently, the contrast created by the introduction of the proposed power supply pipeline would be minimal. Reclamation of the surface disturbance created during construction of the pipeline would include seeding the disturbed areas to establish vegetation cover. Thus, reclamation would reduce the visibility of the proposed pipeline construction disturbance and lessen the degree of contrast it would have with the existing characteristic landscape. As vegetation becomes established, the contrast would be expected to eventually diminish entirely to the common observer. Accordingly, the minimal degree of contrast associated with the pipeline would be temporary.

Because the proposed pipeline would be buried below the ground surface, and the surface disturbance required to construct it would have minimal and temporary contrast with the existing landscape, it would not attract the attention of the casual observer. The level of change to the landscape would be low and the existing character of the landscape would be retained. The proposed power supply pipeline would be consistent with the VRM objectives for VRM Class II, III, and IV, which are the classes designated to the public lands that would be crossed by the pipeline. The effects on visual resources that would result from the power supply pipeline would be negligible and temporary.

Cities' Water Supply

The Cities' water supply wells would be located adjacent to the mining and processing facilities area. The water supply pipeline would not be visible during operation because it would be buried below the ground surface. However, surface disturbance associated with construction the pipeline would be visible until it is installed and reclamation is completed. Because the water supply pipeline would be located within the same area as the mining and processing facilities, the construction disturbance associated with it has been included in the analysis of the mining and processing facilities.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Visual Resources

During construction and operation of the proposed project, unavoidable adverse impacts to visual resources would include the visibility of construction equipment and personnel, and possible fugitive dust emissions from disturbed areas within the project area. Operation of the project would require numerous project facilities and equipment that would be visible from KOP-1 and elsewhere along I-80 between KOP-1 and the Pequop Mountains. Visibility of these

project facilities and equipment would be unavoidable, as would the impact associated with the visual contrast they would have with the characteristic landscape. The degree of visual contrast associated with the project would be reduced following reclamation, but would not be eliminated entirely.

Irreversible and Irretrievable Commitments of Resources

The contrasting form, line, color, and texture elements added to the landscape by the proposed mining pit would be an irreversible and irretrievable commitment of visual resources because the mine pit would not be reclaimed. Reclamation of some project components, such as the WRSF and the heap leach facility would lessen the degree of contrast these components would have with the characteristic landscape, but not eliminate all contrast entirely.

Relationship of Short-Term Uses and Long-Term Productivity

Implementation of the Proposed Action would require short-term uses of visual resources. Short-term uses would result from the project components that would be reclaimed and have no meaningful contrast with the landscape afterwards. Long-term productivity of visual resources would be affected by project components that are not reclaimed, such as the mine pit, and components that would remain readily apparent and contrast with the landscape despite reclamation, such as the WRSF or heap leach facility.

4.14.3 North Facilities Alternative

Implementation of the North Facilities Alternative would result in the same project facilities and components being constructed and operated within the characteristic landscape that would be constructed for the Proposed Action. Contrasting form, line, color, and texture elements associated with construction and operation of the project that are described in Section 4.14.2 for the Proposed Action would also occur under implementation of the North Facilities Alternative.

Concurrent reclamation during operation of the proposed project that would be performed for the Proposed Action would also be performed for the North Facilities Alternative; and would reduce the degree of contrast between existing landscape features and proposed project components and facilities. Final reclamation would also be performed and would reduce the degree of contrast that the North Facilities Alternative would have with the existing landscape.

The project facilities would be located on private land and on BLM-administered public lands. As shown on Figure 3.14-1, the BLM-administered public lands have been designated as VRM Class IV. Similar to the Proposed Action, the North Facilities Alternative would require that sections of the proposed power line and main access road to the project be located within the three-mile-wide "Low Visibility Corridor" associated with I-80 (Figure 3.14-1). However, under the North Facilities Alternative several additional components of the project would also be located within the Low Visibility Corridor, including a growth medium stockpile, borrow site, power line, lay-down storage area, the heap leach facility, mine support and mill facilities, natural gas generators, and a portion of the WRSF and TSF. The changes to the scenic quality of the existing characteristic landscape from the location of KOP-2 (Figure 3.14-1) as a result of the North Facilities Alternative are discussed below. The degree of contrast that the form, line,

color, and texture elements of the proposed project would have with the features of the existing landscape at KOP-2, and whether this contrast meets VRM objectives, is also discussed below.

Nighttime Operations

Operation of the proposed project would occur during daytime and nighttime hours regardless of the potential implementation of the North Facilities Alternative or Proposed Action. The effects of nighttime operations on night sky and visual resources described in Section 4.14.2 for the Proposed Action would also occur under implementation of the North Facilities Alternative.

KOP-2

Implementation of the North Facilities Alternative would result in the same project facilities and components being constructed and operated within the existing landscape that would be constructed for the Proposed Action. As shown on the visual simulations (Appendix 3E), the proposed pit would be located in the same place and appear identical regardless of the potential implementation of the North Facilities Alternative or the Proposed Action. The proposed pit would have a strong degree of contrast with the viewshed of KOP-2. The proposed pit would also be likely to be a major focus of viewer attention from KOP-2 due to its strong contrast.

The proposed WRSF would add a wide and relatively flat trapezoid-shaped form to the foreground-middleground distance zone regardless of the potential implementation of the North Facilities Alternative or the Proposed Action. However, the form would be wider and lower under the North Facilities Alternative. The color and texture of the WRSF from KOP-2 would be the same as described for the Proposed Action from KOP-1. The color and the trapezoid shape of the WRSF would create a strong angular silhouette line against the backdrop of the low chroma colors in the background zone. The strong silhouette line would be added to the foreground-middleground zone, which contains lines that are mostly straight and horizontal. The degree of contrast that the WRSF would have under the North Facilities Alternative would be strong. The TSF would be located on top of the WRSF, but would be constructed below the top elevation of the WRSF. Accordingly, the TSF would not be visible from KOP-2.

The proposed heap leach facility would have a trapezoid-shaped form regardless of the potential implementation of the North Facilities Alternative or the Proposed Action. The color and texture of the heap leach facility would also be the same regardless of the potential implementation of either alternative. However, under the North Facilities Alternative the heap leach facility would be located farther north and behind a growth medium material stockpile instead of the WRSF. Positioned behind the smaller stockpile, a larger portion of the heap leach facility would be visible from the KOP, including the top and sides of the facility. The top and sides of the facility contribute a strong, angular silhouette line against the backdrop of low chroma colors in the background zone. The trapezoid-shaped form would be dissimilar to the surrounding flat, wide form of the land features and vegetation cover in the foreground-middleground zone of the viewshed from KOP-2. Thus, while a moderate degree of contrast would be associated with the heap leach facility under the Proposed Action, a high degree of contrast would result from the implementation of the North Facilities Alternative.

Two growth medium material stockpiles would be visible in the viewshed from KOP-2. Both stockpiles would have low and flat trapezoid-shaped forms that are brown in color and have no distinct texture. Although both stockpiles would be roughly the same size, the stockpile that would be located farthest south is farther from the KOP and would appear to be approximately 75 percent smaller. Despite its smaller size, this stockpile and the other stockpile to the north would rise above the valley floor such that their trapezoid shape is viewed against the backdrop of the Pequop Mountains in the background zone. Viewed against the background zone, both stockpiles would have a strong angular silhouette line. The line would become even stronger during late-afternoon hours when the chroma of colors in the background zone is reduced. The northern half of the stockpile to the north would also be viewed against the backdrop of the proposed heap leach facility. The trapezoid-shaped form would be less distinct against the backdrop of the heap leach facility, but the silhouette line would still be strong.

The proposed borrow site that would be visible in the foreground-middleground zone would have a flat, horizontal form that is similar to the form of the land features in this zone. However, the color would be brown and it would have no distinct texture. The brown color and absence of texture would cause the borrow site to have a minor degree of contrast with the surrounding vegetation cover, especially during morning hours when vegetation appears mostly gray in color. The minor degree of contrast would be expected to prevent the borrow site from attracting the attention of the casual observer or dominating the view from KOP-2.

As shown on the four-year visual simulations of the North Facilities Alternative (Appendix 3E), several pole structures along a short section of the proposed power line would be visible in the distant foreground-middleground zone beyond the heap leach facility. The pole structures would not be visible after the heap leach facility is constructed to its full size, as the nine-year simulations show. As the 25-year simulation shows, the tops of several of the pole structures would become visible once again following reclamation. Visible pole structures would have very thin and vertical forms that are brown in color. The pole structures would contribute straight, short vertical lines to the viewshed that are similar to the existing fence posts in the immediate foreground-middleground zone. The degree of contrast that the power poles would have would be negligible because the form, line, and color elements would be repetitive of those associated with the fence posts in the existing landscape. The proposed power line would not be expected to attract the attention of the casual observer due to the negligible degree of contrast that they would have with the existing landscape.

The reclamation activities that would be performed under implementation of the Proposed Action would also be performed under implementation of the North Facilities Alternative. Accordingly, reclamation would reduce the degree of contrast that the proposed project would have, but not eliminate it entirely. As the 25-year simulation shows, the borrow site and the growth medium material stockpiles would be reclaimed completely, and any contrast they have with the existing landscape would not persist beyond reclamation. The trapezoid-shaped form and angular silhouette line of the WRSF and heap leach facility would persist after reclamation and final closure, as would irregular-shaped form of the proposed pit. The contrast that these components have with the existing landscape would be lessened by reclamation that is applied

to them but would persist beyond the life of the project and would be expected to continue attracting the attention of the casual observer.

The project components that are visible from KOP-2 and located within the Low Visibility Corridor associated with I-80 include the borrow site, heap leach facility, the growth medium material stockpile in front of the heap leach facility, the northernmost portion of the WRSF, and the pole structures visible beyond the heap leach facility. The BLM-administered public lands within the Low Visibility Corridor are managed in accordance with BLM VRM Class II objectives. As described in Table 3.14-1, BLM VRM Class II objectives require that management activities not attract the attention or dominate the view of the casual observer. The level of change to the characteristic landscape must be low and repeat the form, line, color, and texture elements found in the predominant natural features of the existing landscape. As described above, the heap leach facility, growth medium material stockpile, and WRSF would have a strong or high degree of contrast with the existing landscape. These components of the project would be expected to attract the attention and dominate the view of the casual observer from KOP-2. Accordingly, implementation of the North Facilities Alternative would not meet the objectives of the Low Visibility Corridor. The borrow site and proposed power pole structures would be expected to attract some attention, but would not be the focus of attention or dominate the view of the casual observer. As shown on the visual simulations (Appendix 3E), other components of the proposed project that would be located in the Low Visibility Corridor, such as the natural gas generators, would not be visible from KOP-2. Therefore, these components would be compliant with VRM Class II objectives.

The proposed pit, the southernmost growth medium material stockpile, and the portion of the WRSF not located within the Low Visibility Corridor would be located on BLM-administered public lands designated and managed as VRM Class IV (Figure 3.14-1). Objectives of VRM Class IV specify that management activities may dominate the view and be the major focus of viewer attention (see Table 3.14-1). The strong or high contrast that the proposed pit, WRSF, and growth medium material stockpile would have with the characteristic landscape of KOP-2 would be consistent with management objectives of VRM Class IV.

The first effects indicator identified in Section 4.14.1 pertains to the proposed project's degree of contrast or conflicts with established BLM VRM class objectives. As it relates to this indicator, the impact of the North Facilities Alternative on visual resources would be major. The impact would be major because the North Facilities Alternative would not meet the objectives of the Low Visibility Corridor. The second effects indicator identified in Section 4.14.1 pertains to changes in the scenic quality of the existing landscape due to visibility of the proposed project. The anticipated effects on visual resources related to this indicator would be major because several components of the proposed project would be visible and a dominant focus of attention, including the proposed mine pit, heap leach facility, and WRSF. The anticipated major impacts of the North Facilities Alternative on visual resources would be considered long-term because they would persist during and beyond the life of the proposed project.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Visual Resources

The unavoidable adverse impacts on visual resources described in Section 4.14.2 for the Proposed Action would also occur from implementation of the North Facilities Alternative. Additionally, under the North Facilities Alternative the WRSF, heap leach facility, and a growth medium material stockpile would be located within the Low Visibility Corridor. These components of the proposed project would conflict with the VRM objectives of the corridor, and would contribute additional unavoidable adverse impacts on visual resources.

Irreversible and Irretrievable Commitments of Resources

The contrasting form, line, color, and texture elements added to the landscape by the proposed mine pit would be an irreversible and irretrievable commitment of visual resources because the mine pit would not be reclaimed. Reclamation of some project components, such as the WRSF and the heap leach facility would lessen the degree of contrast these components would have with the characteristic landscape, but not eliminate all contrast entirely. Both of these components, as well as a growth medium material stockpile would be located within the Low Visibility Corridor associated with I-80. The contrast of these components would not comply with the BLM VRM objectives of the corridor.

Relationship of Short-Term Uses and Long-Term Productivity

Implementation of the North Facilities Alternative would require short-term uses of visual resources. Long-term productivity of visual resources would be affected by project components that are not reclaimed, such as the mine pit, and components that would remain readily apparent and contrast with the landscape despite reclamation, such as the WRSF or heap leach facility. Long-term productivity of visual resources within the Low Visibility Corridor would be affected by the WRSF, heap leach facility, and a growth medium material stockpile.

4.14.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and there would be no associated project impacts on visual resources. The exploration actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011d), and earlier applications, would potentially continue to occur. These previously approved actions have, and would continue to result in, visual impacts that are related to the construction of new exploration drill roads and pads. Horizontal and shallow diagonal lines from new drill roads would cause moderate, temporary line contrasts with the natural landscape. Disturbance of vegetation where roads and pads are constructed would cause moderate, temporary color contrasts. With successful reclamation of exploration roads and pads, which includes seeding surface disturbance, the visual impacts would be minimized. Several years after reclamation has been completed, the visual impacts would be expected to be negligible.

4.15 Recreation

This section describes the potential direct and indirect effects on recreation that would result from implementation of each alternative, and whether those effects would be short-term or long-term.

4.15.1 Indicators and Methods

Each of the alternatives considered in this EIS was analyzed for its potential to result in effects on recreation. An alternative was considered to have an effect on recreation if its implementation would result in:

- Conflicts with existing federal, state, and local recreation management plans and policies;
- Changes in access to existing recreation opportunities or areas; and
- Changes in levels of use of existing recreation areas.

4.15.2 Proposed Action

Mining and Processing Facilities

The mining and processing facilities component of the Proposed Action would not conflict with the recreation management objectives that are stated in the *Proposed Wells Resource Management Plan and Final Environmental Impact Statement* (BLM, 1984), or the associated ROD (BLM, 1985). There would also be no known conflicts with the State Comprehensive Outdoor Recreation Plan (SCORP) (Nevada Division of State Parks, 2010), or any other state or local land use or recreation management plans and policies that are known to exist, such as the *Elko County General Open Space Plan* (Elko County, 2003).

The Proposed Action would result in access restrictions to the entire Plan boundary. Restricted access to the Plan boundary would reduce the area available for dispersed recreation within hunt unit 78 by approximately 16,738 acres, which represents approximately 7.7 percent of the total area of the hunt unit (approximately 218,532 acres). Approximately 7,909 acres of the area that would become inaccessible consists of BLM-administered public lands. This represents approximately 5.5 percent of the approximately 144,849 acres of public lands that are within hunt unit 78. The remaining approximately 8,829 acres within the project that would become inaccessible consists of private land. Restricted access would not impact any developed recreation sites or facilities because they do not exist within the project area. The project area does not offer unique recreational opportunities that are not found elsewhere in the vicinity. There are large areas of public lands, BLM-administered or otherwise, that are located in the BLM Elko District and adjacent to the project area that provide the types of dispersed recreation opportunities found within the project area.

There are approximately 6,146 acres of recommended Christmas tree cutting area located within the project boundary that would not be accessible to the public during the life of the project. Christmas trees can be cut from nearly any area of public land as long as the area is not designated a Wilderness Area and as long as suitable trees are present. There are more than 4,070 acres of recommended Christmas tree cutting area adjacent to the project area that would remain accessible to the public for the life of the project. Christmas trees can also be found in the Pequop Mountains outside of the recommended cutting area, as well as elsewhere throughout the BLM Elko District. Thus, Christmas tree cutting is not a recreation opportunity that is specifically unique to the project area. The recommended cutting area adjacent to the project boundary combined with the other areas where Christmas trees can be found and cut within the BLM Elko District would be expected to provide an adequate supply of trees for recreationists for the life of the project.

Wildlife trapping is an especially popular recreation activity in the northern portion of the Pequop Mountains, but is not a recreation opportunity that is unique to the project area or surrounding northern portions of the Pequop Mountains. There are approximately 5,254 acres of the Pequop Mountains within the area that would no longer be accessible to the public as a result of restricted access to the project area. Restricted access to approximately 5,254 acres represents approximately 5.4 percent of the total area in the northern Pequop Mountains. Recreational users unable to access the portion of the mountains within the project area for trapping would be anticipated to utilize the other approximately 95.6 percent of the northern Pequop Mountains that access to would be unaffected. Public access to the project area, including the approximately 5,254 acres of mountains within the project area would be permissible once reclamation of the proposed project is complete. However, the proposed pit would be located within the mountainous area of the project area and would not be reclaimed. Thus, although accessibility to the entire area would be restored, opportunities for wildlife trapping would be permanently reduced by the area of the pit (approximately 736 acres).

Although developed recreation sites and unique opportunities do not exist within the project boundary, there are roads and trails that are used for recreation by cyclists and mountain bike clubs within the boundary. Public access to and travel on the sections of these roads and trails within the project fence would be restricted for the life of the proposed project. There are existing roads and trails on nearby public lands, BLM-administered or otherwise, that offer physical characteristics (e.g., road surface, grade, width, etc.) similar to some of the roads and trails that would be impacted. However, some of the trails that would be impacted by restricted access offer unique views of mountain ranges to the east, including the Goshute, Toano, and Pilot mountain ranges.

The Proposed Action would have only slight changes in the area accessible for dispersed public recreation, and public access to the project area would be restored once reclamation is complete. There would be no loss of access to developed recreation sites or facilities. Loss of unique recreation opportunities that are otherwise unavailable elsewhere would be minimal and limited to scenic views associated with some trails in the project area. The loss of these trails would affect a small portion of recreation resources within the area of analysis. Accordingly, the

impact on recreation resources resulting from restricted access to the project area would be minor and long-term, with the exception of impacts to wildlife trapping, which would be permanent due to the approximately 736 acres of trapping area that would not be reclaimed within the proposed pit area.

Recreational users unable to access desired resources or opportunities within the project area would be anticipated to utilize other areas within the Elko District for dispersed recreation. The displacement of recreational users onto public lands outside of the project area would have an adverse impact on other recreational users who currently use these lands for dispersed recreation. Recreation users seeking experiences of isolation and solitude while engaging in dispersed recreation would be most sensitive to the increased level of use in these areas. Public access to the project area would be permissible once reclamation of the proposed project is complete. Changes in the level of use of public lands outside of the project area would be negligible because: 1) there are ample dispersed recreation opportunities elsewhere in the vicinity; and 2) unique opportunities do not occur within the project area. Accordingly, the impact on recreation resources related to displacement of users from within the project area would be negligible and long-term for the life of the project.

The quality of dispersed recreation on neighboring lands within proximity to the project area may be adversely affected by the visual disruption of the physical presence of the project within the landscape. Visual disruptions during the life of the project would change the area accessible to users who desire more primitive recreational experiences with little to no evidence of human modification to the natural landscape. Reclamation of surface disturbance within the area of analysis would reduce the visual disruption that the Proposed Action would have beyond the life of the project. However, some components of the proposed project, such as the mine pit, WRSF, and heap leach, would remain visually evident beyond the life of the project. Visual disruption that persists beyond the life of the proposed project would affect users within the project area as well, because access to the project area would be permitted once reclamation is completed. Human modifications to the natural landscape resulting from the Proposed Action would occur within a landscape that currently contains some existing human modifications. The area of analysis either contains, or is located within close proximity to I-80, numerous unpaved roads, power lines, fences, railroad tracks, mineral exploration disturbance, and facilities associated with the Big Springs Ranch. One or more of these existing modifications are visible from many areas of the neighboring lands that are located within close proximity to the project area and from within the project area. There are large areas of public lands located elsewhere in the BLM Elko District that are accessible for dispersed recreation uses and that provide primitive recreational experiences. The short-term and long-term impact that visual disruptions would have on recreation resources would be negligible because changes in the area that are accessible for dispersed recreation opportunities would be minimal. Changes in the area that are accessible to users that seek primitive recreational experiences from dispersed recreation uses would also be minimal because the Proposed Action would occur within a landscape containing existing human modifications. Recreation opportunities for which natural settings with little to no evidence of humans are less important, such as hunting or off-highway vehicle (OHV) use, would not be impacted by the visual disruption of the proposed project.

The quality of dispersed recreation on neighboring lands within proximity to the project area may also be adversely affected by increased noise levels during the life of the project. Increased noise levels would result from operation of project equipment and vehicles, and the active construction, operation, and reclamation of the proposed project. Increased noise from the Proposed Action would occur during the life of the project only. Much like the visual disruption of the proposed project, increased noise would reduce the area that is accessible to recreation users that desire more primitive recreational experiences with little to no sights or sounds of humans evident. As described above, the project area and surrounding lands are within close proximity to I-80 and numerous existing unpaved roads. Travel on these roads, particularly I-80, contribute to the existing ambient noise in the area. Therefore, existing ambient noise in the area is partially comprised of sounds generated from human sources. The Proposed Action would increase the volume of ambient noise in the area, and increase the percentage comprised of sounds from human activities. Areas that would be affected by increased noise levels would be limited to those within closest proximity to the project area because project noise would attenuate as distance from the project area increases. There are large areas of public lands located elsewhere in the BLM Elko District that are accessible for dispersed recreation and that provide primitive recreational experiences with little to no sounds of humans. Changes in the areas that are accessible to users seeking primitive recreational experiences would be minimal because the lands within close proximity to the project area contain noise sources related to human activities, and because the existing landscape contains evidence of human modifications. The impact would be long-term and negligible.

Public access to the project area would be restricted, which would also prevent hunting or any other recreational activities from occurring within the area. The impact that restricted access would have on hunting and other recreation activities related to wildlife would be long-term and negligible because the public lands within the Plan boundary represent a minor portion (approximately 5.5 percent) of the public lands open to hunting within hunt unit 78. Following reclamation, the project area would be accessible for recreation uses, including hunting. Maintaining the wetlands within the project area would assure water fowl are present following reclamation. Reclamation vegetation would provide wildlife habitat, but it may differ from the types of habitat that existed prior to the proposed project. Thus, the wildlife species that use the project area after reclamation and their pattern of use within the project area may change. This change would be a long-term impact on recreation resources that is negligible. See Section 4.8 for more detailed information pertaining to the potential impacts on wildlife and wildlife habitat.

Power Supply Pipeline

The power supply pipeline would not be expected to have any direct effects on recreation. However, the power supply pipeline is necessary for the operation of the proposed project, including the mining and processing facilities. Accordingly, the effects on recreation and wilderness described for the mining and processing facilities would be indirect effects of the power supply pipeline.

The power supply pipeline is just one of the three primary components of the proposed project. Implementation of the Proposed Action would result in construction and operation of the entire proposed project. Thus, the impact that the Proposed Action would have on recreation is the impact that the proposed project would have on recreation, as a collective whole. Accordingly, while the power supply pipeline would not be expected to impact recreation, the Proposed Action would be expected to have negligible and minor impacts on recreation that are long-term.

Cities' Water Supply

The Cities' water supply would not be expected to have any direct effects on recreation. However, the water supply is incorporated into the proposed project and therefore a required component of the construction and operation of entire proposed project. Accordingly, the effects on recreation and wilderness described for the mining and processing facilities would be indirect effects of the Cities' water supply.

The Cities' water supply is just one of the three primary components of the proposed project. Implementation of the Proposed Action would result in construction and operation of the entire proposed project. Thus, the impact that the Proposed Action would have on recreation is the impact that the proposed project would have on recreation, as a collective whole. Accordingly, while the Cities' water supply would not be expected to impact recreation, the Proposed Action would be expected to have negligible and minor impacts on recreation that are long-term.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Recreation

Unavoidable adverse impacts resulting from the Proposed Action would include the direct long-term loss of public access to the approximately 7,909 acres of BLM-administered public lands within the project area. Long-term access to the approximately 8,829 acres of private land within the boundary of the project area would also be restricted to persons other than the landowner. This impact is unavoidable because public access to mine sites must be prevented in accordance with Mine Safety and Health Administration (MSHA) safety regulations. In addition, there would be an indirect adverse impact to other recreationists that use adjacent or nearby public lands from the displacement of recreational users directly affected by restricted access to the project area. Following reclamation, public access to the project area would be restored, and recreational use of the area would return to existing conditions.

Visual disruption caused by the placement of the proposed project within the landscape and increase noise levels from operation of the proposed project would have an indirect unavoidable adverse impact on recreation. The impact resulting from the visual disruption of the proposed project would affect recreation opportunities and uses on lands within proximity to the area of analysis for the life of the project. The impact resulting from increased noise would affect areas within proximity to the area of analysis during construction of the proposed project, and areas within proximity to the project area during operation of the proposed project. Impacts resulting from increased noise would persist during the life of the project; noise levels would return to

existing conditions following reclamation activities. The visual disruption would be less apparent following reclamation, but would also affect the recreation resources within the project area.

Irreversible and Irretrievable Commitments of Resources

Implementation of the Proposed Action would result in the irreversible and irretrievable commitment of recreation resources. Irretrievable commitments would include the long-term loss of access to the approximately 7,909 acres of BLM-administered public lands and the approximately 8,829 acres of private land within the project area for dispersed recreation. In addition, there would be an irretrievable commitment of recreation resources on adjacent or nearby public lands resulting from the displacement of recreational users directly affected by restricted access to the project area. Following reclamation, public access to the project area would be restored, and recreational use of the area would be expected to return to near existing conditions. The proposed mine pit area would not be reclaimed and the mine pit area would remain unavailable for recreation permanently. Accordingly, this would be an irreversible commitment of recreation resources.

Relationship of Short-Term Uses and Long-Term Productivity

Most effects on recreation would be long-term for the life of the project, which is expected to be between eight and 14 years. However, some effects that result from visual disruption caused by the project would persist beyond the life of the project. Reclamation measures would be applied to areas affected by the proposed project and would reduce the intensity of these effects. The proposed pit would not be reclaimed and would remain an area that is unavailable for public recreation. The area of the pit would be approximately 736 acres.

4.15.3 North Facilities Alternative

The North Facilities Alternative would not conflict with recreation management objectives that are stated in the *Proposed Wells Resource Management Plan and Final Environmental Impact Statement* (BLM, 1984), or the associated ROD (BLM, 1985). There would also be no known conflicts with the SCORP (Nevada Division of State Parks, 2010), or any other state or local land use or recreation management plans and policies that are known to exist, such as the *Elko County General Open Space Plan* (Elko County, 2003).

Implementation of the North Facilities Alternative would result in the same effects on recreation that would be expected to result from the Proposed Action, as described in Section 4.15.2. However, the intensity of the effects would differ between the two alternatives because the project area for the North Facilities Alternative would measure approximately 12,006 acres, which is smaller than the approximately 16,739-acre project area for the Proposed Action. Consequently, a smaller area would be closed to public access for recreational use or otherwise under the North Facilities Alternative. Recreationists would be unable to access the dispersed recreation opportunities within this area for the life of the project. Approximately 6,007 acres of the area that would be inaccessible consists of BLM-administered public lands; private land constitutes the other approximately 5,998 acres that would be inaccessible during the life of the project.

The North Facilities Alternative would have only minor changes in the area accessible for dispersed public recreation within hunt unit 78. The approximately 6,007 acres of BLM-administered public lands that would be inaccessible represents approximately 4.1 percent of the total area of public lands within hunt unit 78. The entire approximately 12,006 acres within the project area represents about 5.5 percent of the total area within the hunt unit. Public access to the project area would be restored once reclamation is complete. There are no developed recreation sites or facilities that would be impacted from implementation of the North Facilities Alternative. Impacts on unique recreation opportunities that are not available elsewhere would be limited to the unique views from the trails that would also be impacted under the Proposed Action. There would be more than 4,200 acres of recommended Christmas tree cutting area adjacent to the project area that would remain accessible to the public for the life of the project in addition to the other areas in the BLM Elko District where Christmas trees can be found and cut. Accordingly, the impact on recreation resources resulting from restricted access to the project area and displacement of recreationists to other public lands in the vicinity would be minor and long-term.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Recreation

Unavoidable adverse impacts resulting from the North Facilities Alternative are the same as those described for the Proposed Action in Section 4.15.2 of this EIS. However, under the North Facilities Alternative, approximately 6,007 acres of BLM-administered public lands and approximately 5,998 acres of private land would be inaccessible to the public for recreation use. Inaccessibility would be long-term for the life of the project.

Irreversible and Irretrievable Commitments of Resources

Implementation of the North Facilities Alternative would result in the same irreversible and irretrievable commitment of recreation that is described for the Proposed Action in Section 4.15.2. However, the irretrievable commitment of long-term loss of public access would differ under this alternative because the project area is smaller. Under the North Facilities Alternative, access to approximately 6,007 acres of BLM-administered public lands and approximately 5,998 acres of private land would be restricted.

Relationship of Short-Term Uses and Long-Term Productivity

Under the North Facilities Alternative, the relationship of short-term uses and long-term productivity would be the same as those described for the Proposed Action in Section 4.15.2.

4.15.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed or operated and there would be no associated project impacts on recreation resources excluding those impacts that are the result of actions previously approved under the *Expanded Long Canyon Exploration Project, Elko County, Nevada, Environmental Assessment* (BLM, 2011d). The approximately 7,909 acres of BLM-administered public lands that public access would be restricted to under

the Proposed Action would remain open for public recreation under the No Action Alternative. Because access would not be restricted under the No Action Alternative, the trails on the east slope of the Pequop Mountains that offer unique views of the Goshute, Toano, and Pilot mountain ranges would not be impacted. Additionally, the area in the northern Pequop Mountains that is accessible for wildlife trapping would not be impacted under this alternative.

Impacts to recreation resources from exploration activities that were previously approved have been the result of visual disruption to the natural landscape, increased noise levels during drilling and construction of roads and pads, and public access to existing roads being temporarily blocked during exploration activities (BLM, 2011d). Impacts related to increased noise and temporary access restrictions would not persist following reclamation of the areas affected by this approved action. Following reclamation of exploration activities, recreational experiences would be anticipated to return to or near levels that existed prior to exploration. The intensity of the impact resulting from the visual disruption of this approved action would be reduced.

4.16 Socioeconomics

This section describes the potential direct and indirect effects on socioeconomics that would result from implementation of the Proposed Action and the alternatives, and whether those effects would be short-term or long-term.

4.16.1 Indicators and Methods

This section provides an analysis of potential socioeconomic impacts in the area of analysis associated with the construction, operation and closure of the Long Canyon Mine. The area of analysis for this analysis includes those directly affected communities located along the I-80 corridor near the project: Elko, Wells, West Wendover, and Wendover. Elko County is also included as an area of analysis entity for the analysis.

The social and economic impacts were evaluated for Elko County, with emphasis on the communities listed above. The anticipated socioeconomic impacts include:

- Potential social effects of changes in long-term population, employment, and earnings associated with the construction, operation and closure of the Long Canyon Mine;
- Potential project-related demands for housing, public services and infrastructure that would exceed capacity of existing providers and systems;
- Potential economic impacts of mine development, operation, and closure; and
- Potential effects on public sector fiscal conditions.

The economic impacts presented here are a summary of work completed in 2013 by Environmental Resources Management (ERM), a consulting company retained by Newmont to estimate the impacts of the Long Canyon Mine (ERM, 2013). The work conducted by ERM was reviewed by the BLM for incorporation in this EIS.

The economic impacts were estimated using IMPLAN® (MIG, Inc. 2011), a proprietary input-output modeling system founded on data available from the United States Bureau of Economic Analysis, Bureau of Labor Statistics, United States Census Bureau, and other sources. The analysis is based on the most current project description available as of September 24, 2012 and utilized data provided by Newmont regarding anticipated jobs and contracts, as well as known trends in hiring, supplier contracting and existing public data, such as commuting trends. As with any major capital project, the project design will continue to evolve and change over time. Such changes could affect the actual levels of economic contribution experienced at the local level. The findings in this report should therefore be considered as an estimate based on the modeled data.

The revenue impacts were calculated using information provided by Newmont, outputs of the IMPLAN analysis and current tax rates for sales and use taxes, the Net Proceeds of Minerals Tax and the Ad Valorem Property Tax. The analysis does not address revenues that would accrue to the State of Nevada.

4.16.2 Proposed Action

Long Canyon would be the only active mining operation in this area of Elko County, although there are two other exploration projects adjacent to the Long Canyon property (ERM, 2013). The three phases of the project include construction, operations, and closure.

Construction Phase

The construction phase of the project would last approximately 18 months and cost $601 million (2012 dollars), of which $300 million is for facility construction only, including $72 million for construction services. Newmont estimates nearly 300 person-years of construction workforce and another 51 person-years of construction management during the construction phase. About half of construction labor would be supplied locally. The remaining construction workforce would come from outside the area of analysis.

Operations Phase

Life of mine is estimated to be 10 years based on current reserve estimates. Estimated employment is 360 jobs (full-time and part-time), with the majority in the $50,000 to $100,000 annual pay class. Newmont predicts to spend $127 million per year on average, over 10 years of operations for capital goods and services. Of this, $40 million is the direct annual payroll of the mine.

Closure Phase

The closure phase is scheduled to last five years and includes reclamation and monitoring. An estimated $6 million, on average, would be spent each year during closure activities. Estimated employment is 50 full-time and part-time jobs with the majority of jobs in the $50,000 to $100,000 annual pay class. Bonding protocols for mine closure are defined under Nevada's Mined Land Reclamation Act, and administered by NDEP, Department of Conservation and Natural Resources.

Tables 4.16-1 and 4.16-2 summarize the direct expenditures and employment for each phase of the project.

Table 4.16-1 Direct Expenditures by Type and Phase (millions of 2012 dollars)

Type of Expenditure	Development	Operations	Closure
	Total for 18 Months	Annual Average for 10 Years	Annual Average for 5 Years
Payroll	$0.0	$40.0	$3.0
Materials and Services	$300.0	$80.0	$3.0
Construction Services	$72.0	-	-
All Other	$228.0	-	-
Equipment and Other Capital	$301.0	$7.0	-
Total	**$601.0**	**$127.0**	**$6.0**

Source: ERM, 2013

Table 4.16-2 Direct Employment by Community and Phase (average annual jobs)

Community	Development	Operations	Closure
	Total for 18 Months	Annual Average for 10 Years	Annual Average for 5 Years
Elko	-	144	10
Wells	-	70	15
West Wendover/Wendover	-	153	26
Other	-	2	0
Total in Area of Analysis	**148**	**360**	**50**
Outside Area of Analysis	**203**	**-**	**-**

Source: ERM, 2013

Employment and Income Effects

Tables 4.16-3 and 4.16-4 show the total impacts on employment and earnings in the area of analysis for each phase of the project. The employment impacts (jobs) are shown by place of work, which may not be the job holder's place of residence. Employment includes both full-time and part-time positions. Earnings are the total value of all compensation paid for the employee, including benefits, payroll taxes, bonuses and retirement contributions.

The total impact is the sum of all three distinct components of economic activity: direct, indirect, and induced. These impact types are further defined below:

- Direct Impacts: The set of investments resulting from activity in the area of analysis, which are run through the IMPLAN model as the direct effect. During the construction phase, the direct effects include construction employment and local expenditures for supplies and materials. During the operations and closure phases, the direct effects are Newmont's payroll costs.

- Indirect Impacts: The inter-industry impacts measuring the economic activity associated with the directly impacted industries selling and purchasing goods and services to and from other industries. The indirect impacts associated with construction spending include industries that support this type of activity, such as truck transportation, engineering and architectural services, and wholesale and retail trade. The indirect impacts of operations and closure include Newmont's direct spending on goods and services needed to operate and/or close the mine.

- Induced Impacts: The effects of increased consumer and household spending resulting from the direct and indirect incomes. The induced effects of the construction industry would include construction employees spending their incomes in the local economy. The induced effects of operations and closure would occur when mine employees and employees of companies that supply products to the mine spend their incomes in the local economy.

Note that ERM (2013) was unable to assign indirect and induced impacts to specific locations or communities, thus these impacts were assigned to the "Elko County Undistributed" category.

Table 4.16-3 Total Employment Impact by Place of Work (average annual jobs)

Place of Work	Development				Operations	Closure
	First Six Months	Second Six Months	Third Six Months	Total for 18 Months	Annual Average for 10 Years	Annual Average for 5 Years
Elko	14	33	47	93	144	10
Wells	0	0	1	1	70	15
West Wendover	2	4	5	10	105	18
Elko County Undistributed[1]	54	126	179	359	404	32
All Elko County	70	162	232	464	723	75
Wendover, Utah	1	3	4	8	48	8
Project Total	**71**	**165**	**236**	**472**	**771**	**82**

Source: ERM, 2013

[1]Includes impacts that would occur in Elko County, but which cannot be assigned to a specific community due to uncertainties about business location and work spending preferences.

Table 4.16-4 Total Earnings Impacts by Place of Work (thousands of 2012 dollars)

Place of Work	Development				Operations	Closure
	First Six Months	Second Six Months	Third Six Months	Total for 18 Months	Annual Average for 10 Years	Annual Average for 5 Years
Elko	$1,420	$3,314	$4,735	$9,470	$15,984	$600
Wells	$23	$53	$75	$150	$7,770	$900
West Wendover	$158	$368	$526	$1,052	$11,668	$1,095
Elko County Undistributed[1]	$2,688	$6,272	$8,960	$17,921	$20,068	$1,741
All Elko County	$4,289	$10,008	$14,296	$28,593	$55,490	$4,336
Wendover, Utah	$78	$183	$261	$522	$4,484	$421
Project Total	**$4,367**	**$10,190**	**$14,557**	**$29,115**	**$59,974**	**$4,757**

Source: ERM, 2013

[1] Includes impacts that would occur in Elko County, but which cannot be assigned to a specific community due to uncertainties about business location and work spending preferences.

As shown in Tables 4.16-3 and 4-16.4, employment and earnings generated by the Long Canyon Mine would contribute significantly to the area of analysis. An estimated 148 construction jobs and 320 secondary jobs filled by locals would be supported during construction. The associated earnings impact is approximately $29 million over an 18-month period.

During the 10-year mine life, 771 jobs and almost $60 million of earnings would be added to the area of analysis annually. This represents a county-wide increase of 2.8 percent in employment and 4.3 percent in earnings over the 2011 base. At least 20 percent of all job-holders would reside in Elko and another 30 percent in Wells and the Cities.

To the extent possible, Newmont would hire local residents to work at the mine. However, given the low county-wide unemployment rate, the skill levels needed for jobs at the mine, and the large number of secondary jobs created by the project, mining operations would exceed the capacity of the local labor force, triggering migration into the area of analysis. The potential effects of these relocations are discussed in the population section of this chapter.

Mine closure would require 50 direct jobs and affect another 32 jobs indirectly. Earnings associated with these jobs are estimated to be $4.8 million over the five-year closure period.

Tables 4.16-5 and 4.16-6 show the annual distribution and earnings of jobs by major industry for the proposed project. The top three industries benefiting from increased employment during construction would consist of (in decreasing order) construction, services, and trade. The top three industries benefiting from increased employment during operations would consist of mining, services, and trade. During closure, these same industries would see the largest increases as well, but at significantly lower levels.

Table 4.16-5 Total Project-Related Employment by Industry (average annual jobs)

Industry	Development				Operations	Closure
	First Six Months	Second Six Months	Third Six Months	Total for 18 Months	Annual Average for 10 Years	Annual Average for five Years
Agriculture	-	-	-	-	-	
Mining	0	0	1	1	368	51
Construction	23	53	75	151	38	9
Manufacturing	10	24	34	67	18	-
Transport and Utilities	2	5	7	14	22	1
Trade	6	13	19	37	87	5
Services	30	70	100	200	235	16
Government	-	1	1	2	3	-
Project Total	**71**	**165**	**236**	**472**	**771**	**82**

Source: ERM, 2013

While mining employment would account for 48 percent of all jobs created by the project during the operation phase, mining payrolls would account for 68 percent of earnings, signifying that the mining jobs would be high-paying jobs with benefits. Based on the impact analysis, mining jobs are projected to average more than $100,000 per year (payroll-double the average annual county-wide wage in 2011).

Table 4.16-6 Total Project-Related Earnings by Industry (thousands of 2012 dollars)

Industry	Development				Operations	Closure
	First Six Months	Second Six Months	Third Six Months	Total for 18 Months	Annual Average for 10 Years	Annual Average for 5 Years
Agriculture	$0	$1	$1	$2	$3	$0
Mining	$20	$48	$68	$136	$40,953	$3,165
Construction	$2,285	$5,331	$7,616	$15,233	$3,123	$729
Manufacturing	$675	$1,575	$2,251	$4,501	$862	$2
Transport and Utilities	$146	$340	$485	$970	$1,686	$79
Trade	$186	$433	$618	$1,237	$2,781	$162
Service	$1,028	$2,399	$3,428	$6,855	$10,307	$599
Government	$27	$63	$91	$181	$259	$21
Project Total	**$4,367**	**$10,190**	**$14,557**	**$29,115**	**$59,974**	**$4,757**

Source: ERM, 2013

The Proposed Action would bring hundreds of high-paying jobs to the area of analysis, expand the mining and services sectors, but do little to broaden the economic base of the county. Once the mine is operational, it would likely be an attractive employer for local residents who may already be employed. Consequently, local businesses may face competition for workers and upward pressure on wages, especially during project construction and early operations. This would be seen as an adverse situation for existing employers. For local residents, the

increased opportunities of high-paying employment would be considered beneficial. These impacts would be major, long-term, and both beneficial and adverse.

Population Effects

The residency status of the construction, operations, and secondary workforces and the household characteristics of those workforces would be the primary drivers of population effects. The residency assumptions used in this analysis reflect professional judgment based on the size and characteristics of the Elko County labor force and the distance of the project to other communities. To the extent that in-migration or household characteristics differ from the assumptions used in this analysis, the population effects could be larger or smaller than those presented in this EIS.

Construction

Newmont estimates that 148 construction workers would be hired from the local market and would be residents of the area of analysis. The remaining 203 workers needed during the construction phase would travel from outside the area of analysis and be considered transient construction workers.

Given the timeframe of construction, it is unlikely that transient construction workers would move families to the area. Instead, it is expected single construction workers from outside the area of analysis would travel to the area of analysis and stay in temporary housing rather than relocate. Thus, the population effects of construction compared to the population of the area of analysis would be minor and temporary.

Operations

The total employment impact during the mine's operation phase is estimated to be 771 jobs (360 jobs at the mine and 411 jobs in other industries). It is expected that 75 percent of the direct jobs needed at the mine would be filled with relocating workers. This would be 270 workers, of which one-third would be single workers and two-thirds would be larger family units. The remaining jobs would be filled by the local workforce.

The project would create 411 jobs in other industry sectors, primarily services and retail. Given the range of skills needed to fill these new jobs, the local market could provide 60 percent of the indirect jobs (247 jobs of the 411). Of the remaining 164 jobs, half (82 jobs) would be filled by spouses of mine workers and half would be filled with relocating workers, of which one-third would be single workers and two-thirds would be larger family units. The average household size of relocating family units is 3.21 (USCB, 2012b).

Table 4.16-7 shows the potential general population effects and the under-18 population effects based on the estimates presented above. Under these estimates, population in the area of analysis would increase by 847 people, 215 people would be under the age of 18; some portion of which would be school age children.

Table 4.16-7 Total Project-Related Population Effects

	Jobs	Population Effects[1]		
		General Population	Under 18 Population	Total Population
Direct Mining Operations Jobs				
Local Labor	90	0	0	0
Relocating Single-Person	89	89	0	89
Relocating Families	181	416	165	581
Total Direct	**360**	**505**	**165**	**670**
Secondary Jobs				
Local Labor	247	0	0	0
Relocating Single-Person	27	0	0	0
Relocating Families	55	127	50	177
Mine employee spouses[2]	82	0	0	0
Total Secondary	**411**	**127**	**50**	**177**
Total Effects - All	**771**	**632**	**215**	**847**

[1]Total population was based on an average household size of 3.21; of which 2.30 are persons over the age of 18 (general population estimate) and .91 are persons under the age of 18 (school age population estimate). These estimates are the averages for all family types as determined by the U.S. Census.
[2]The population effects of mine employee spouses are already accounted for in the Relocating Families estimates.

The population effects during the operations phase would be minor and long-term.

Closure

Closure of the mine would result in the reduction of almost 300 mining jobs and possibly hundreds of secondary jobs, compared to jobs held during operations. To the extent that workers are unable to find suitable employment in the area of analysis, they may seek employment outside the region, which would result in a decline in the area of analysis's population, compared to the population during operations.

Housing

Construction

During the construction phase, housing would be required for an estimated 203 transient workers. Given the short timeframe of the development phase, single transient construction workers are not likely to relocate their families but would travel to the area of analysis and stay in temporary accommodations for short periods. Temporary housing accommodations would include hotel and motel rooms, recreational vehicle (RV) and mobile home park pads, rental housing, and apartments.

Short-term housing opportunities are available in the area of analysis. Elko has 31 motels, hotels, and casinos, several mobile home parks, and seven RV parks. There are also several campgrounds in the area. Wells has six motels and four RV parks. The Cities have 13 casinos and hotels, which host more than 2,000 rooms. However, given the extremely low current vacancy rates in Elko, temporary housing in communities such as Wells and the Wendover area

would be the most available options for transient construction workers. Demand for temporary housing during the construction phase may cause a moderate and temporary increase in rental costs.

Operations

Operations workers and secondary workers who relocate to the area are likely to prefer conventional housing resources such as single-family homes, multi-family homes, apartments, and mobile homes. Based on the employment forecasts, and the estimates used to project population impacts, operations-related housing demand would be 352 units over the life of the project. This includes 236 relocating families (181 operations-related families and 89 secondary worker families) and 116 single-person households (89 single-person operations workers and 27 single-person secondary workers).

In the short-term, housing demand generated by the project would strain the currently available temporary and long-term housing resources in Elko County. As the only large city in the region, Elko is a desirable location for workers employed in the mining industry in northern Nevada. In 2010, Elko reported the lowest rental vacancy rate of all communities in the county (6.0 percent) and had just 239 housing units for sale or rent.

Other communities in the area of analysis have higher vacancy rates (and more units available for rent), but also have less housing stock. These communities include Wells and the Cities.

Wells has identified additional lands for future residential development, and has also extended (or developed plans to extend) utilities to these properties. In some cases, these new housing areas are outside of Wells' municipal boundaries and the city would require annexation as a condition of utility connection (Supp, J., 2011 in ERM, 2012). The City of West Wendover has existing platted subdivisions for single-family housing in addition to developed property for single and multi-family developments. Land and related infrastructure is in place.

Over the past 18 months, several residential developers have announced project plans that could help alleviate strain on the area's housing market. The largest project, Copper Trails, developed by Northern Nevada Homes and located off Fifth Street in Elko may eventually build up to 146 single-family homes starting in the low $200,000 price range (Sabo, 2012).

Short-term housing impacts might include an increase in housing prices or rental costs. These impacts would subside as more housing stock is developed in the area to accommodate the population growth.

Closure

The eventual closure of the mine could place a large number of housing units on the market, potentially depressing housing values in the areas if other job opportunities in the area are not available and unemployed mine workers (and workers in other industries) relocate. However, mine workers who retire and remain in their homes, would help reduce the number of houses coming on the market during this period.

Facilities and Services

Construction and operation of the Long Canyon Mine would increase incremental demand for some public facilities and services in the area of analysis. This demand would result primarily from project-related population growth and on-site operations at the mine.

Construction

During construction, a short-term peak of 203 workers would be living in temporary housing throughout the area of analysis. Increased demand for services would be concentrated in certain key services including law enforcement/criminal justice, emergency response (ambulance) and health care.

Public Safety

Contractor and construction workers commuting to the mine would increase daily traffic on local roads and I-80, potentially creating an increase in traffic-related accidents, and consequent demand for emergency response and law enforcement services. To help reduce commuter traffic to the mine, Newmont would establish parking areas in Wells, West Wendover, and Elko to encourage employees and contractors to use bus or van pooling to the Long Canyon Project site. Newmont encourages, but would not mandate, the use of buses and vans; however, Newmont's experience in northern Nevada is that most people choose this option for its convenience and cost savings.

The mine would have its own Emergency Medical Technicians (EMTs), fire responders, and equipment to provide first response to any emergencies on-site. This would include stationary and mobile fire extinguishing and hazmat response equipment, and an ambulance. Where additional assistance was required, local fire departments could be called to respond to fire incidents and accidents at the mine. The fire departments in Wells and West Wendover are the closest to the project area. While the fire department in West Wendover is staffed by a combination of paid and volunteer firefighters, the Wells fire department is staffed entirely by volunteers. As an all-volunteer unit, an increase in the number of fire and accident-related incidents would strain the resources of the Wells Fire Department and possibly those of West Wendover as well.

Health Services

Health care and emergency services are available at Northeastern Nevada Regional Hospital (NNRH) and clinics located in Elko, West Wendover, and Wells. Transient construction workers would likely use the health care facilities in the area of analysis for minor emergencies and urgent care, while utilizing health care options in their home communities for elective and routine care. Construction workers would be expected to obtain health insurance from their employers, which would be accessed to cover the costs of health care provided to them. A significant increase in demand for health care services would strain area resources. Elko County ranks 13 out of 15 counties in Nevada with the most limited access to and quality of clinical care.

Utilities

Mine construction would require potable water, electrical utility supplies, and would generate wastewater and solid waste. During construction, and until a potable water system is commissioned, personnel would be provided bottled water or other potable water sourced off-site.

Contractors would provide solid waste disposal off property until an on-site Class III landfill could be permitted, constructed, and commissioned. Contractors would be responsible for selecting an appropriate landfill and negotiating with communities for disposal privileges. This would create a short-term, minor impact to local landfill operations and reduce their long-term capacity by an incremental amount.

During construction, vendors would collect and remove sewage to existing publicly owned treatment works in the area, which would produce a short-term added influent load on these facilities. During operations, Newmont would dispose of sanitary wastes and sewage on-site through a RBC treatment works, discharging treated effluent to a sanitary leach field. When all sanitary wastes and sludge are handled on-site, there would be no impact to local government.

The initial power demand for the project would be approximately 10 megawatt to support mine and heap leach operations, and mill construction. Newmont would use the existing electric distribution line that services the Big Springs Ranch to supply electricity during construction. A new 69 kilovolt transmission line and substation would be constructed, after which the existing power line to the ranch would be removed. WREC, the current provider, has determined the main power distribution system in existence between Wells and the Cities is adequately sized to provide for the electrical demands outlined in the Proposed Action and would be able to handle the added load through mill construction without limiting growth for other customers. Newmont would install on-site power generation to handle the added load created by mill operations so this additional load would not impact electricity availability provided by the local provider.

Education

Based on the estimates in this analysis, the construction of the Long Canyon Mine would not have an adverse impact on local school systems. Students of local construction workers would already be accounted for in school enrollments and the transient labor force would not be expected to relocate families to the area of analysis. The impacts on education resources from construction of the project are expected to be negligible.

<u>Operations</u>

Public Safety

Mining operations would result in an estimated population increase of 847 persons, disbursed throughout the area of analysis. This increase is about 1.7 percent more than the number of people living in the area of analysis in 2010. Resulting from the increase in the population, there could be minor increases in the need for law enforcement, but these should be accommodated by the existing capabilities of the respective sheriff's offices and community police forces.

The effects on public safety providers during the operations phase would be similar to effects described during the construction phase. Travel to the project site would increase traffic along I-80. Calls for law enforcement and emergency response, including emergency medical, transport, and fire suppression could increase due to an increase in the number of traffic accidents associated with travel to the mine. Any significant increase in demand for law enforcement and emergency response could strain the existing resources of Elko, Wells, and West Wendover. The effects as related to public safety would be minor and short-term, lasting until market forces stabilize to meet additional demand.

Utilities

Initially, electricity would be supplied through WREC. Later, a natural gas pipeline would be built to the Ruby Pipeline and on-site generators would be used to provide electricity for operations. Generating power on-site would not burden the local power infrastructure.

Newmont would maintain a solid waste landfill on private ground at the project site for non-hazardous wastes generated on-site. The landfill would be a Class III waivered facility as regulated by NDEP, Bureau of Waste Management. Disposing of solid waste generated during the operation phase in this manner would place no burden on existing private landfills in the area of analysis.

Newmont would dispose of sanitary wastes and sewage on-site through a RBC, discharging treated effluent to a sanitary leach field. When all sanitary wastes and sludge are handled on site, there would be no impact to local government.

Newmont would develop and maintain a water supply system dedicated to the project. Water would be supplied by on-site wells for which water rights have been obtained.

Concerns have been raised by stakeholders in the cities of Wendover and West Wendover about the proximity of the mine's operation and its potential adverse effects on water quality and volume output of Johnson Springs system. Both cities have made significant investments in the rehabilitation of the spring and replaced miles of transmission pipeline with an obligation to utilize the improvements until the loans used to make these improvements are paid.

Big Springs is a major water source for the Cities. Changes to the quality and/or quantity of the spring's output would have a negative effect on future economic growth in the Cities. Newmont has a framework agreement with the Cities, which resolves these issues with water wells to replace the Big Springs water source and includes cash payments; the agreement is in Appendix 2A. A detailed analysis of the Cities' water supply is provided in Section 4.2.

Education

An estimated 215 persons of the 847 persons relocating to the area are expected to be under the age of 18, some portion of which would include school-age children. The capacity to handle additional growth varies by school. Schools in Elko and Wells (particularly in the junior and senior high schools) generally have capacity for growth. The elementary schools have less

capacity, but the Elko County School District (ECSD) owns land adjacent to the old City Hall and would consider utilizing temporary classrooms during school building construction (Webster and Ballard, 2011 in ERM 2012).

Wendover schools have some capacity, but have also seen an increase in students in the past years due to employment opportunities at the local casinos. West Wendover schools have room for growth. The ECSD is proceeding with a new elementary school facility to be under construction spring of 2015. The remodel of the existing elementary into a middle school will follow (ECSD, 2013).

The most noticeable effect of the Long Canyon Project on funding for the ECSD would likely be the indirect effect that would occur when project employees locate to Elko County and households with children enroll them in school. Each new student would add to the ECSD's total budget allowance for the year in an amount equal to the amount per pupil set for the district for the year by the legislature. The most recent amount of basic support per pupil allowed by the legislature for the ECSD has been $6,359 per pupil.

Recreation

Construction and operation of the mine would result in permanent, long-term access restrictions to the project area. Although such restrictions would negatively affect members of the public who recreate on these specific lands, there are substantial public lands adjacent to the project area that would provide continued recreation opportunities for residents of nearby communities. A detailed analysis of recreation effects is provided in Section 4.15.

Closure

Assuming some portion of the population would leave the area after the mine closes, service demands would decline, and the need for services reduced. Over time, depending on the number of families leaving the area, some community facilities may be underutilized, compared to conditions during operations. The effects on services would be temporary and short-term.

Public Finance

The proposed project would generate public revenues from sales and use taxes, Net Proceeds of Minerals Tax, and Ad Valorem Property Taxes. Tax effects were estimated by ERM (2013).

Sales and Use Tax Revenue

The Long Canyon Project would directly pay sales and use taxes on goods purchased during all three project phases. The project would also indirectly generate sales and use tax revenue because of taxes paid by households that buy consumer goods with their mining paychecks and earnings from jobs created indirectly through the project's multiplier effect.

Sales tax revenues would be heavily front-loaded as most of the major equipment purchases would occur during the 18-month construction period. It is estimated the project would generate approximately $4.0 million in sales tax for taxing entities in the study area during construction. This revenue stream impact would be moderate and temporary.

Sales taxes generated during the 10-year operating phase of the mine are estimated to average roughly $1.28 million annually, for a total over the 10-year project life of $12.8 million. This revenue stream impact would be moderate and long-term under the current life-of-mine estimate.

During the five-year closure phase, the project would generate tax income of about $22,000 annually (Table 4.16-8). This revenue stream impact would be minor and short-term.

Table 4.16-8 Total Project-Related Sales and Use Tax Revenue (2012 dollars)

Taxing Entity	Development Phase Total for 18 Months	Operations Phase Annual Average for 10 Years	Closure Phase Annual Average for 5 Years
Elko County Government	$1,247,000	$531,000	$9,000
Carlin	$156,000	$67,000	$1,000
Elko	$1,124,000	$479,000	$8,000
Wells	$102,000	$43,000	$1,000
West Wendover	$232,000	$99,000	$2,000
Jackpot	$120,000	$51,000	$1,000
Montello	$1,000	*	*
Mountain City	$1,000	*	*
Wendover, Utah	$2,000	$8,000	*
Tooele County, Utah Government	*	$2,000	*
Total	**$2,985,000**	**$1,280,000**	**$22,000**

Source: ERM, 2013
* Amount is less than $1,000 and is not included in the total

Net Proceeds of Minerals Tax

The Long Canyon Project would directly pay the Net Proceeds of Minerals Tax (NPOMT) on the proceeds of its output. The NPOMT payment is sent to the state, which then distributes the revenue to local taxing entities. The taxing entities in the area of analysis that receive NPOMT are: Elko County Government, ECSD, and two Special Districts.

Table 4.16-9 shows the estimated NPOMT payments for each taxing entity, for each year during the operation phase. The Long Canyon Project would not yield NPOMT revenue during the development phase or the closure phase because Newmont would not sell product during these phases.

Table 4.16-9 Net Proceeds of Mineral Tax Revenue (2012 dollars)

Operations Year	ECSD General Fund	ECSD Capital Projects	Elko County Government	Special Districts
1	$316,000	$474,000	$530,000	$34,000
2	$544,000	$815,000	$912,000	$58,000
3	$1,016,000	$1,524,000	$1,704,000	$109,000
4	$360,000	$540,000	$604,000	$39,000
5	$1,493,000	$2,239,000	$2,504,000	$160,000

Operations Year	ECSD General Fund	ECSD Capital Projects	Elko County Government	Special Districts
6	$1,332,000	$1,998,000	$2,223,000	$143,000
7	$0	$0	$0	$0
8	$190,000	$284,000	$318,000	$20,000
9	$71,000	$107,000	$119,000	$8,000
10	$10,000	$1,000	$17,000	$1,000
Total	**$5,331,000**	**$7,996,000**	**$8,941,000**	**$573,000**

Source: ERM, 2013
Note: Because of various credits and deductions, Newmont projects there would be no Net Proceeds due in Year 7.

Ad Valorem Property Tax

The Long Canyon Project would directly pay Ad Valorem Property Tax on the real and tangible personal property of the project (Table 4.16-10). The taxing entities that receive these tax revenues are the same as those receiving NPOMT.

Table 4.16-10 Project-Related Ad Valorem Property Tax Revenue on Facilities and Equipment (2012 dollars)

Taxing Entity	Development Phase Total for 18 Months	Operations Phase Annual Average for 10 Years[1]	Closure Phase Annual Average for Five Years
ECSD General Fund	Depends on appraisal and timing of work in progress.	$101,000	Depends on appraisal and timing of decommissioning.
ECSD Capital Projects		$152,000	
Elko County Government		$170,000	
Enterprise/Special Districts[2]		$11,000	
Total		**$434,000**	

[1]Appraisal of facilities and equipment on-site may vary with economic conditions and would likely decline over time because of obsolescence. The allowance for obsolescence would be assigned by local appraisers in proportion to the change in the mine's capitalized future expected income as estimated periodically during the life of the operation.
[2]The Enterprise Districts, also called Special Districts for property taxation are the Elko Convention and Visitors Authority and the Elko Television District.

Table 4.16-11 summarizes the total revenue impact of the project to local governments in Elko County, Nevada and to Tooele County and Wendover, Utah. The Nevada revenue impacts summarized in Table 4.16-11 include sales and use tax revenue, revenue from Net Proceeds of Minerals Tax and revenue from Ad Valorem Property Tax. The Utah revenue impacts include Local Option Sales Tax and County Option Sales Tax. These are the largest revenues that would be attributable directly or indirectly to the project. Tax revenues impact generated over the life of the Proposed Action would be moderate and long-term.

Table 4.16-11 Total Revenue Impacts (2012 dollars)

Taxing Entity	Construction Phase Cumulative 18 Months	Operations Phase Cumulative over 10 Years	Closure Phase Cumulative over 5 Years
Elko County School District[1]	$0	$15,857,000	$0
Elko County Government	$1,247,000	$15,955,000	$44,000
Carlin	$156,000	$665,000	$5,000
Elko City	$1,124,000	$4,788,000	$39,000
Wells	$102,000	$432,000	$4,000
West Wendover	$232,000	$989,000	$8,000
Jackpot	$120,000	$512,000	$4,000
Montello	$1,000	$3,000	$0
Mountain City	$1,000	$3,000	$0
Enterprise/Special Districts[2]	$0	$683,000	$0
Wendover, Utah	$2,000	$79,000	$2,000
Tooele County, Utah, Government	$0	$23,000	$0
Total	**$2,985,000**	**$39,989,000**	**$106,000**

[1]Amount for ECSD excludes revenue from Local School Support Tax
[2]The Enterprise Districts receive no additional sales and use tax revenue because their distribution from the Consolidated Tax Program has been capped. As Special Districts, the Elko Convention and Visitors Authority and the Elko Television District are authorized to receive additional property tax revenue.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Socioeconomic Resources

During the construction phase, there would be a temporary influx of construction workers, which would create adverse effects on housing and public safety. These effects would be temporary and moderate. Any effects caused by an increase in population during construction would subside once the construction is complete and workers leave. These effects would be minor and temporary.

No significant capacity or service issues have been identified for population-driven demand for public facilities or services in the area of analysis during operations of the facilities. Minor increases in population-driven demand for public facilities and services should be well within the existing capabilities of those systems.

Irreversible and Irretrievable Commitments of Resources

Under the Proposed Action, the social and economic structure of Elko County would not be significantly altered and there would be no irreversible and/or irretrievable commitments of socioeconomic resources.

Relationship of Short-Term Uses and Long-Term Productivity

A minor amount of socioeconomic resources would be affected during the life of the project, but in the long-term, impacts to the long-term productivity of socioeconomic resources would be negligible to minor.

4.16.3 North Facilities Alternative

The North Facilities Alternative is similar to the Proposed Action except most of the mine facilities would be moved to the northeastern quadrant of the project area. This would not change the area of analysis. Therefore, the socioeconomic effects of the North Facilities Alternative are the same as those described for the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Socioeconomic Resources

The unavoidable adverse impacts on socioeconomic resources for the North Facilities Alternative are the same as those described for the Proposed Action.

Irreversible and Irretrievable Commitments of Resources

The irreversible and irretrievable commitments of socioeconomic resources for the North Facilities Alternative are the same as those described for the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

The relationship of short-term uses and long-term productivity regarding socioeconomic resources for the North Facilities Alternative are the same as those described for the Proposed Action.

4.16.4 No Action Alternative

Under the No Action Alternative, the proposed project would not be developed and the related socioeconomic impacts for the Proposed Action would not occur. Impacts from the previously approved exploration activities, which would continue under the No Action Alternative, were found to be beneficial, with no adverse impacts in the EA prepared for that project (BLM, 2011d).

4.17 Environmental Justice

This section describes the potential effects on environment justice that would result from implementation of each alternative, and whether those effects would be direct or indirect, and short-term or long-term.

4.17.1 Indicators and Methods

Each of the alternatives considered in this EIS was analyzed for its potential to result in effects relative to environmental justice. An alternative was considered to have an effect on environmental justice if its implementation would result in any of the minority or low-income populations within the area of analysis being:

- Disproportionately burdened with adverse human health or environmental effects;
- Deprived of beneficial effects, such as increased per capita income, that the general population experiences; and
- Disproportionately burdened with an increased risk or rate of exposure to an adverse environmental hazard.

As described in detail in Section 3.17 of this EIS, the minority populations identified within the area of analysis consist of the Elko Colony and Wells Colony and the Cities. These populations have also been identified as the low-income populations within the area of analysis.

Effects relating to environmental justice were evaluated in terms of intensity and context; however, there is no standard set of criteria established for evaluating environmental justice impacts. The No Action Alternative would represent a continuation of the current environmental justice conditions and issues that exist within the area of analysis. Accordingly, the No Action Alternative was used as the basis of comparison for categorizing the intensity of the potential effects of the other alternatives that were analyzed. The intensity of the potential effects of the other alternatives was interpreted in terms of Major, Moderate, Minor, or Negligible based on the comparison with the No Action Alternative (Section 4.1).

Impacts were analyzed in context with the general population residing within the area of analysis, which consists of Elko County, Nevada, and Wendover, Utah. Impacts were also analyzed in context with the individual populations and communities within the area analysis that would be potentially affected by the proposed project. As described in Section 3.17 of this EIS, these populations and communities included Wells, Elko, the Cities, and the Elko and Wells colonies.

4.17.2 Proposed Action

The potential adverse human health and environment effects that would result from implementation of the Proposed Action would be anticipated to disperse as the distance increases from the source of the effects. Thus, the intensity of the effects would lessen and eventually dissipate with increasing distance from the project boundary.

The area within the project boundary does not contain any residents or populations, including any of the minority and low-income populations identified within the area of analysis. The nearest minority population to the area of analysis, which also is identified as a low-income population, is the Wells Colony. The Wells Colony is located approximately 28 road miles west of the project area. The adverse health and environmental effects that typically extend to the

farthest distances from mining activities, such as effects on air quality or increased noise, would be anticipated to disperse to negligible or less than negligible over the 27-mile distance. The Wells Colony is located immediately adjacent to Wells, and any negligible effects on the population of the Wells Colony would also affect the population of Wells. The population of Wells is not identified as minority or low income population. Accordingly, the population of the Wells Colony would not be disproportionately affected by any adverse human health or environmental effects resulting from the Proposed Action.

West Wendover is located approximately 32 miles east of the project area and is the next nearest minority population to the project area. Wendover is located about one mile east of West Wendover, and is also identified as a minority population. Per Section 3.17 of this EIS, both of these cities are also identified as low-income populations. While neither city is located within the project boundary, both obtain a portion of their municipal water supply from Big Springs, which is located within the project boundary. Under implementation of the Proposed Action, an alternative water supply and associated facilities for the Cities would be developed to replace the portion of their current water supply that comes from Big Springs. Accordingly, any potential effects on water quality or quantity within the project boundary would not have an effect on the population of either city. Any other potential adverse effects resulting from implementation of the Proposed Action, such as effects on air quality, would be expected to dissipate before reaching the population of either city.

The Elko Colony is located approximately 75 miles west of the proposed project, which is about 48 miles farther from the project than the Wells Colony. The potential adverse effects that would result from the implementation of the Proposed Action would be expected to dissipate before reaching the Wells Colony. Thus, impacts would be expected to also dissipate before reaching the Elko Colony.

No TCPs or EO 13007 sites (Indian Sacred Sites) have been identified within the project area, according to Section 3.12 of this EIS. To date, no specific concerns about the proposed project have been raised by any of the Native American tribes that were invited to enter into consultation for the proposed project. Therefore, there are no known effects on traditional Native American concerns associated with the Proposed Action.

Traffic on I-80 between Elko and Wendover would increase due to workers commuting to and from the project area. Delivery of supplies and materials to the proposed mine would also increase traffic on I-80. All of the minority and low-income populations identified within the area of analysis are located along I-80. However, other populations that are not identified as minority or low-income populations, such as Elko and Wells, are also located along I-80. Thus, any adverse effects related to increased travel and traffic on I-80 resulting from the Proposed Action would not disproportionately burden a minority or low-income population. Additionally, parking areas would be established in Wells, Elko, and West Wendover for employees to leave personal vehicles and use bus or van pooling to commute to the project site. This would reduce the number of vehicle trips on I-80 associated with the proposed project.

Implementation of the Proposed Action would result in the creation of approximately 300 to 500 new job opportunities during construction and operation of the proposed project. The new job opportunities would offer the ability for the unemployment rate to be reduced within the area of analysis, including within the minority and low-income populations identified within the area of analysis. Increased employment would result in increased per capita income and median household income. Consequently, the percentage of persons below the poverty level in these minority and low-income populations may be reduced. Additionally, the project workers may purchase goods and services, such as work clothing and tools or food and drinks for lunch from vendors in Elko, Wells, or the Cities. Such purchases in the Cities would increase revenue for vendors and increase tax revenue for the county, which would be a beneficial effect.

The Proposed Action would not result in a disproportionate effect on a minority population or a low-income population. The Proposed Action is unlikely to place an undue burden on these populations because the area separating them from the project area is great enough that adverse human health and environmental effects would be expected to dissipate. Because there is no disproportionate effect on an identified minority or low-income population, and because beneficial effects would be distributed equally to all populations, impacts related to environmental justice issues are not anticipated.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Environmental Justice

Unavoidable adverse impacts on environmental justice would be unlikely to occur as a result of implementation of the Proposed Action. Adverse human health and environmental effects, even those typically extending farthest from mining projects, would be anticipated to dissipate before reaching any minority or low-income population identified within the area of analysis.

Irreversible and Irretrievable Commitments of Resources

There would be no irreversible and/or irretrievable commitments of resources that disproportionately burden any identified minority or low-income population within the area of analysis.

Relationship of Short-Term Uses and Long-Term Productivity

The Proposed Action would affect various environmental resources during the life of the project. For example, vegetation would be cleared from areas where project components would be constructed. However, the long-term productivity of these resources would be restored close to the conditions present prior to the project, and effects would be negligible to minor. None of the short-term uses or long-term effects on the productivity of resources would disproportionately affect minority or low-income populations within the area of analysis.

4.17.3 North Facilities Alternative

Implementation of the North Facilities Alternative would result in the proposed project being constructed and operated from within the same general area as implementation of the Proposed Action. Accordingly, the effects of the North Facilities Alternative on environmental justice would be the same as those described for the Proposed Action in Section 4.17.2 of this EIS. The minority and low-income populations identified within the area of analysis would not be disproportionately burdened with adverse effects or increased risk of health hazards, and would have equal opportunity to benefit from advantageous effects.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Environmental Justice

Unavoidable adverse impacts on environmental justice would be the same as the Proposed Action under the North Facilities Alternative.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources that disproportionately burden any identified minority or low-income population within the area of analysis would be the same as the Proposed Action under the North Facilities Alternative.

Relationship of Short-Term Uses and Long-Term Productivity

Relationship of short-term uses and long-term productivity that disproportionately burden any identified minority or low-income population within the area of analysis would be the same as the Proposed Action under the North Facilities Alternative.

4.17.4 No Action Alternative

The current exploration operations have not resulted in any identified minority or low-income populations being disproportionately burdened with adverse effects or increased risk of health hazards. Any beneficial effects resulting from current operations have not been disproportionately deprived from any of these populations. Accordingly, no further environmental justice analyses are required for the No Action Alternative.

4.18 Hazardous Materials and Waste

4.18.1 Indicators and Methods

The following indicators were considered when analyzing potential impacts to resources from hazardous materials and solid waste:

- Tons or pounds per year of hazardous wastes and by-products;
- Amount and type of hazardous materials transported and stored at the project site;
- Location and type of solid or hazardous waste disposal sites/systems; and
- Existing risk assessments of effects of hazardous compounds.

4.18.2 Proposed Action

The Proposed Action would result in the use of hazardous materials and waste management practices for mine production, with the potential to affect the air, water, soil, and biological resources from an accidental release of hazardous materials and/or hazardous waste during transportation to and from the project area, or during storage and use on the project site.

Direct access to the project site is about one and a half miles south on Elko County Road 790 off I-80 at the Oasis/Montello exit (Exit 378) approximately 28 miles east-southeast of Wells and 32 miles west-northwest of West Wendover, Nevada. Bulk process chemicals, fuels, and supplies would be transported to the project area by truck along the highways in the region, using the routes identified in Section 3.18. A list of primary fuels and reagents that would be transported to and utilized on the mine is included in Table 2.2-4, and the storage locations are shown on Figure 2.2-6. Trucks would also transport small quantities of hazardous waste on an infrequent basis.

It is anticipated that the Proposed Action would result in the classification of the mine as a Small Quantity Generator of hazardous waste as defined by the EPA (maximum 220 pounds or 100 kilograms per month). Management of hazardous waste, including storage, disposal and reporting, would be in accordance with Resource Conservation and Recovery Act (RCRA) requirements, as administered by NDEP. Petroleum waste (used grease and oil) and hazardous materials that are not consumed on-site would be recycled or disposed off-site at an approved facility in accordance with applicable federal and state regulations. Hazardous materials and petroleum waste would not be disposed of on-site. An SPCC Plan has been prepared by Newmont that establishes procedures for responding to accidental spills and releases of petroleum products (Newmont, 2012d). An Emergency Response Plan has been prepared for the Long Canyon Project that establishes procedures for responding to accidental spills or releases of hazardous materials to minimize health risks and environmental effects (Newmont, 2012e). In addition, Newmont has developed numerous environmental standards that set minimum requirements for management of hazardous and non-hazardous materials and waste, and petroleum products. These standards include management for chemicals (Newmont, 2008a); cyanide (Newmont, 2008b); mercury (Newmont, 2008c); waste (Newmont, 2008d); and hydrocarbons (Newmont, 2008e).

Non-hazardous, solid waste would be managed on-site in a permitted Class III landfill (a disposal site that accepts only industrial solid waste per NRS 444.560) that complies with NAC 444.731 through 444.747 (Nevada, 2012). This facility would be on private property controlled by Newmont. Newmont would maintain the landfill for solid waste generated at the mine in compliance with the permit requirements, and train employees with respect to proper handling and disposal of materials in the landfill.

During construction of the Proposed Action facilities, solid waste streams generated would include industrial solid waste, sewage, construction debris, and small quantities of hazardous wastes (mostly painting products and cleaning solvents). Construction contractors would utilize portable toilets at work sites around the operation. These toilets would be periodically cleaned

by the service vendor and sanitary waste would be transported off-site for disposal at a permitted sanitary waste disposal facility by the service vendor.

Non-hazardous construction debris would be generated during construction and would consist of concrete, wood, scrap metal, and waste packaging materials. Solid waste would be disposed or recycled off-site or placed in an on-site in the Class III landfill.

Spent petroleum products, petroleum-contaminated solid waste or hazardous wastes may be generated from maintenance of heavy equipment in the field. These wastes would include used oil and grease, antifreeze, solvents, and used rags and adsorbents. These wastes would be properly contained, labeled, and recycled or disposed of off-site in existing permitted facilities.

Wastes produced during construction would be managed in compliance with all state and federal regulations and recycled or disposed of in existing, permitted facilities. These management practices would therefore produce negligible environmental impacts.

During operation and maintenance of the Proposed Action, hazardous materials would be utilized (Chapter 2) that largely would be consumed on-site in the operations. Minor amounts of non-hazardous solid waste would be generated, which would be taken to the on-site Class III landfill. The landfill would be permitted and opened to accommodate non-hazardous solid waste generated by the Proposed Action. Antifreeze, spent batteries, used oil and grease and used solvent would be recycled at approved off-site facilities.

Sewage would be treated through an on-site, RBC facility or septic system and treated effluent would be discharged to a sanitary leach field. The sewage treatment and disposal system would be connected to the office, shop, and mill complex facilities. Process chemicals and fuel would be transported to the mine by truck along highways in the region, and the proposed access road as identified in Section 3.18. Trucks would transport quantities of used petroleum products and hazardous waste from the mine on an infrequent basis. Transporters would comply with all applicable state and federal regulations governing the transportation of hazardous materials and waste.

Reagent storage would be located at the mill north of the heap leach facility. All reagents would be stored and used in designated areas with spill containment built into the facilities. Management of all operations utilizing cyanide would be in accordance with the BLM Nevada Cyanide Management Plan (BLM, 1991), as well as the Newmont environmental standard for cyanide management (Newmont, 2008b). Newmont would pursue certification at the Long Canyon Project to ISO 14001 and the International Cyanide Management Code (ICMI, 2011) through the use of regular external audits as provided by the registered certifying organization. Based upon the spill containment built into the facilities and use of proven BMPs for the handling and use of reagents and chemicals, the potential for significant releases of these agents to the environment from the facilities is considered to be negligible.

Explosive agents would be transported, stored, and used in accordance with Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE); the Department of Homeland Security provisions; MSHA regulations; and other applicable federal, state, or local legal requirements. All ammonium nitrate for blasting would be stored in silos within a remote and fenced (locked) site away from the main surface facility site, but adjacent to the main haul road that connects the office, shop and mill facility area with the mine pit. High explosive agents, boosters, and blasting caps would be located in a separate, secured magazine area, away from the explosives and other mine surface facilities. Explosive agents would be consumed in the mining operations and would not produce waste, except for minor amounts of packaging materials handled as non-hazardous solid waste.

Fuel storage would be in aboveground tanks with secondary containment structures capable of containing 110 percent of the volume of the largest tank located in the containment, and sufficient freeboard to contain precipitation, or would utilize self-contained tanks with built-in secondary containment. Newmont would maintain a SPCC Plan for the operation as required by 40 CFR 112 (EPA, 2002d) regulations. An existing Emergency Response Plan would allow the Long Canyon Project to effectively respond to an emergency to minimize adverse impacts to the environment. This would include a trained emergency response team that would be on-site 24 hours a day, seven days a week to assist in an emergency response, and a site emergency response coordinator to assure that responders and equipment are available (Newmont, 2012e). Based upon the spill containment built into the facilities and use of proven BMPs for the handling and use of petroleum products, the potential for significant releases of these materials to the environment from the facilities is considered to be negligible. It is more likely that small amounts of hydrocarbons would be released through minor leaks of these materials from vehicles and mobile equipment. These spills would be contained with adsorbents or soil affected by the leaks.

Petroleum-contaminated soils (PCS) generated from hydrocarbon spills or leaks in the project area would be managed under Newmont's Petroleum Contaminated Management Plan, which would outline the requirements for placing PCS on containment until it cleared screening criteria in accordance with NDEP guidelines. This plan would be submitted as a requirement of the Water Pollution Control Permit. Each of the identified PCS placement locations would undergo a risk evaluation to mitigate the risks posed by PCS. The risk evaluations would take into account storm water management, including identifying the methods used for monitoring of process and storm water solutions.

Small quantities of potentially hazardous wastes would be generated and accumulated on-site according to state, federal, and local regulations. These materials could include assay laboratory wastes; spent cleaning solvents; certain lamps, batteries and electronic parts, waste painting materials. These materials would be handled on-site in closed containers that would then be shipped off-site for treatment and/or disposal in permitted facilities.

Probability of a Release

Process chemicals, fuel, and waste materials could be accidentally released during transport to and from the facilities. The Proposed Action would require transport to the Proposed Action area of the chemicals and quantities described in Table 2.2-4.

The probability of a truck accident involving hazardous materials was analyzed using national accident statistics for truck shipments of hazardous materials (FMCSA, 2001). The primary emphasis in this analysis has been placed upon the release of liquid material that could pose an immediate human health hazard or an off-site contaminant hazard. The estimated deliveries of bulk diesel fuel, liquid sodium cyanide, and sulfuric acid have therefore been included in this analysis, as these chemicals are the largest quantities that would be used in liquid form. Other chemicals are transported in smaller quantities of liquid (drums or totes), or are solids, which would pose less of a concern in the event of a truck accident.

The probability of a truck accident that would result in the release of the selected hazardous materials was calculated using the national rate of releases per mile traveled. Four main travel route distances were assumed for this analysis: 370 miles for the Reno route, 80 miles for the Elko route, 36 miles for the Wendover route, and 160 miles for the Salt Lake City route.

Based upon the annual usage and shipment quantities shown in Table 2.2-4, the number of life-of-mine truck deliveries for the selected materials were calculated as follows:

- (9,000,000 gal annual diesel usage / 10,000 gal per shipment) x 14 yrs = 12,600 shipments;
- (1,000,000 lbs/yr sulfuric (95%) usage / 45,900 lbs per shipment) x 8 yrs = 174 shipments; and
- (1,500,000 lbs/yr cyanide (50% soln) usage / 51,200 lbs per shipment) x 8 yrs = 234 shipments.

Table 4.18-1 shows the release probability information calculated for all travel routes. A majority of the chemicals would potentially be transported from Elko, based on the railroad hubs located in Elko, as well as the numerous active mines in the Elko area.

The analysis shows that the probability of a release for each chemical would be as shown in Table 4.18-2. These results indicate a low probability of an accidental release of diesel fuel and a negligible probability of an accidental release of sulfuric acid or sodium cyanide to the environment during the estimated life of the Proposed Action. With the exception of a few miles at the beginning and end of each transportation trip, all transportation miles evaluated would be on the interstate highway system. Any releases involving transportation of hazardous materials would therefore most likely be contained within the interstate ROW. Based upon the smaller quantities of hazardous waste that would be generated by the Proposed Action, an accident resulting in a release to the environment during transportation off the Proposed Action area is not anticipated.

Table 4.18-1 Hazardous Material National Accident Rate Per Mile

Hazardous Material Category	Hazmat Miles	Total Hazmat Accidents	Hazmat Accident Rate Accident/Mile
3 – Flammable & Combustible	2,778,000,000	1,379	0.000000496
6 – Toxic	218,000,000	50	0.00000023
8 – Corrosive	1,945,000,000	257	0.000000132

Source: FMCSA, 2001

Table 4.18-2 Hazardous Material Probability of Transportation Accident

Hazardous Material	Number of LOM Truck Deliveries	Loaded Truck Haul Distance per Trip	Accidents Per Mile[1]	Incidents over LOM
Diesel (3)	12,600	Reno - 370	4.96E-07	2.31
		Elko - 80		0.5
		SLC - 160		1.0
		Wendover - 36		0.23
Sodium Cyanide (6)	234	Reno - 370	2.30E-07	0.02
		Elko - 80		0.004
		SLC - 160		0.009
		Wendover - 36		0.002
Sulfuric Acid (8)	174	Reno - 370	1.32E-07	0.008
		Elko - 80		0.002
		SLC - 160		0.004
		Wendover - 36		0.0008

[1]The rate is based upon the Haz Mat Category of the Chemical shown in Table 4.18-1
LOM = life of mine

Effects of a Release

The environmental effects of a release would depend on the substance, quantity, timing, and location of the release. The potential for off-site releases during transportation for selected hazardous substances shown in Table 4.18-2 does not indicate a volume or location. The event could range from a minor spill during loading or unloading where cleanup equipment would be readily available to a larger spill during transportation. Some of the materials transported could have immediate adverse effects on water quality and aquatic resources if a spill were to enter a flowing stream or wetland area. Considering the transport routes (mostly I-80) and the lack of sensitive aquatic environments along these routes, the probability of a spill of these materials impacting a wetland or other waterway is considered to be negligible.

Public Safety

Any large-scale release of these hazardous materials would have implications for public health and safety. The location and amount of the release would again be a primary factor in determining its importance. However, the probability of a release is low and the probability of a release in a populated area is lower. Therefore, it is not anticipated that a release resulting in a significant effect to human health or safety would occur during the life of the project.

In the event of a release during transport, the commercial transportation company would be responsible for first response and cleanup. Local and regional law enforcement and emergency response agencies also may be involved to secure the site and protect public safety. In the event of an accident involving hazardous substances, the carrier must notify local emergency response personnel as described in Section 3.18. The release of a reportable quantity of a hazardous substance must be reported to the appropriate state and federal agencies within the specified timeframes.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts of Hazardous Materials

Hazardous materials used or produced by the Proposed Action would be managed according to all applicable regulations and all wastes would be disposed in permitted waste management facilities to minimize environmental impacts. These wastes would contribute to the environmental impacts allowed by the waste management facility permits, which are negligible by design. Accidental releases of hazardous materials during transportation have low probabilities of occurrence with negligible probabilities of significant impacts to the environmental or human health and safety.

Irreversible and Irretrievable Commitments of Resources

Wastes produced during construction and operation of the facilities that would be disposed of off-site in existing permitted facilities would permanently consume some of the waste storage capacity at those facilities.

Relationship of Short-Term Uses and Long-Term Productivity

The use of hazardous materials and generation of solid and hazardous wastes in the construction of the Proposed Action (short-term) would consume some capacity, but not significantly impact the productivity of off-site waste management facilities in the long-term.

4.18.3 North Facilities Alternative

The types of wastes managed and the applicable management practices applied for the North Facilities Alternative would be the same as for the Proposed Action. The environmental impacts of these practices for the North Facilities Alternative would therefore be the same as the Proposed Action.

Mitigation

Mitigation measures are not required.

Unavoidable Adverse Impacts on Hazardous Materials

Unavoidable adverse impacts due to hazardous materials would be the same as described for the Proposed Action.

Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources would be the same as described for the Proposed Action.

Relationship of Short-Term Uses and Long-Term Productivity

Relationship of short-term uses and long-term productivity would be the same as described for the Proposed Action.

4.18.4 No Action Alternative

The No Action Alternative would result in the Proposed Action not being constructed or operated and therefore, no hazardous materials would be utilized in the project area and solid or hazardous wastes would not be generated beyond those already approved for exploration drilling. The EA prepared for the approved exploration activities estimated no impacts from wastes would result with implementation of a spill contingency plan, BMPs, and EPMs.

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