Existing climate prediction models**, which use GHG emissions as inputs** for the **analysis and** prediction of climate change**,** are global in nature; therefore, they are not at the appropriate scale to estimate potential impacts **on** climate change **from** the Slower, Longer Project Alternative.

3.6.3.7.6 Residual Effects

The residual adverse impacts of the Slower, Longer Project Alternative include fugitive $PM_{10}$, $PM_{2.5}$, and Pb emissions from vehicular traffic, blasting, and material handling and processing operations. Other impacts include combustion emissions of $PM_{10}$, $PM_{2.5}$,CO, $NO_2$, $SO_2$, and VOC (and resulting $O_3$ formation) generated by numerous processes as a result of the Slower, Longer Project Alternative, including combustion emissions from diesel engines and burning propane, fuel oil, or coal in various process equipment. These impacts would be less than under the Proposed Action.

## 3.7 Visual Resources

### 3.7.1 Regulatory Framework

Scenic quality is a measure of the visual appeal of a parcel of land. Section 102(a)(8) of FLPMA placed an emphasis on the protection of the quality of scenic resources on public lands. Section 101(b) of the NEPA of 1969 required that measures be taken to ensure that aesthetically pleasing surroundings be retained for all Americans.

To ensure that these objectives are met, the BLM devised the VRM System. The VRM system provides a means to identify visual values, establish objectives for managing these values, and provide information to evaluate the visual effects of proposed projects. The inventory of visual values combines evaluations of scenic quality, sensitivity levels, and distance zones to establish visual resource inventory classes, which are "informational in nature and provide the basis for considering visual values in the land use planning process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities" (BLM 1986b).

VRM classes are typically assigned to public land units through the use of the visual resource inventory classes in the BLM's land use planning process. One of four VRM classes is assigned to each unit of public lands. The specific objectives of each VRM class are presented in Table 3.7-1.

Although there is a dark-sky movement whose goal is to reduce light pollution, there are no federal or State of Nevada regulations that regulate dark skies.

### 3.7.2 Affected Environment

3.7.2.1 Study Methods

Visual resources are characterized according to guidelines given in the Visual Resource Inventory Manual (BLM 1986b). The three primary components of the VRM system are scenic quality, visual sensitivity, and visual distance zones. Based on these three factors, land is placed into one of four visual resource inventory classes. The inventory classes rank the relative value of the visual resources and provide the basis for considering visual values in the RMP process.

The study area for visual resources is defined as the viewshed of the Project, or the area from which the Project can be seen (Figure 3.7.1). The viewshed includes parts of the Cortez Mountains and Simpson Park Range to the west, Toquima Range, Antelope Valley to the south, Diamond Mountains and a portion of the Ruby Mountains to the northeast, and an area south of Carlin to the north. Within this viewshed are large areas from which Mount Hope is not visible due to topography.

**Table 3.7-1: BLM Visual Resource Management Classes**

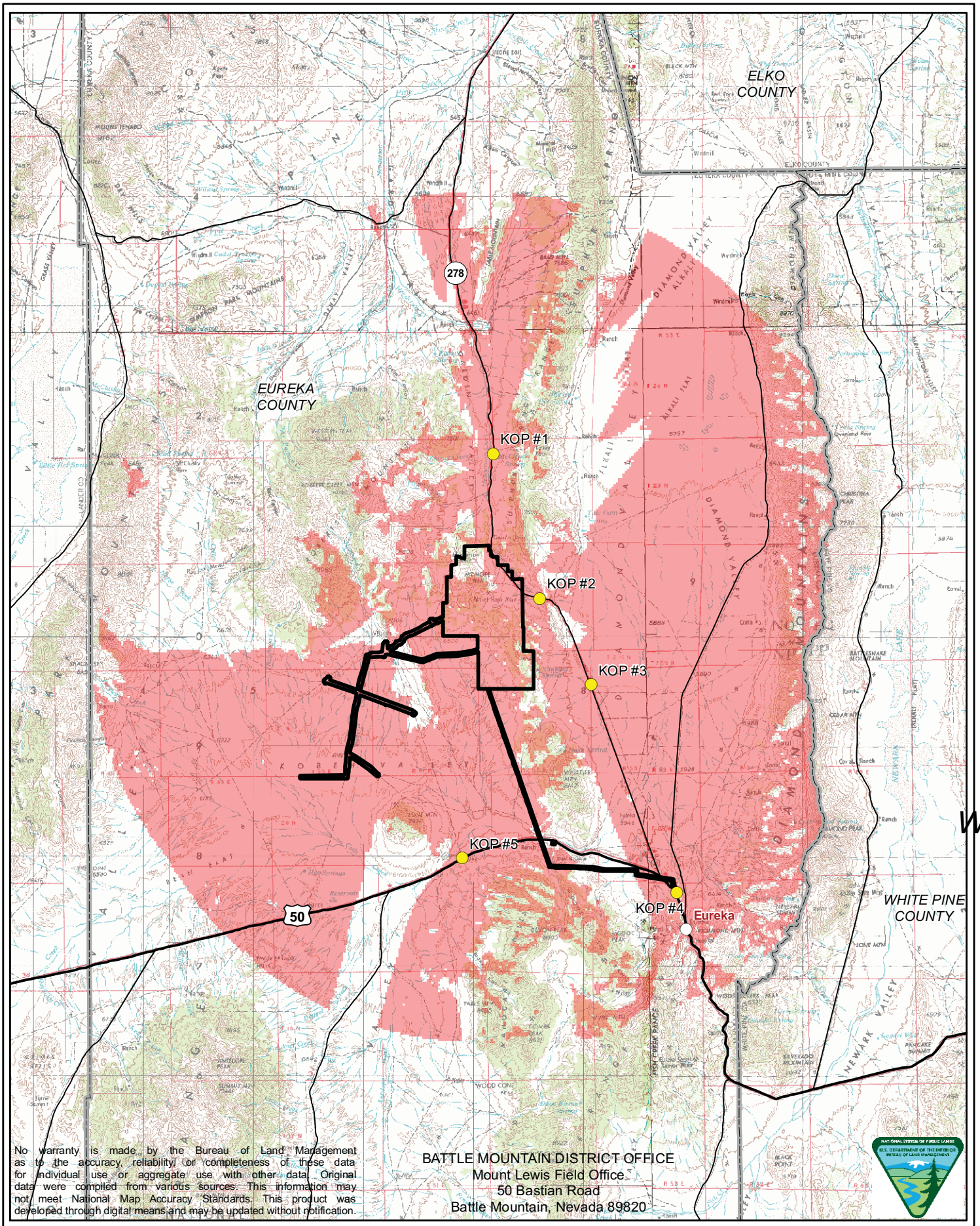
| Class | Description |
|---|---|
| I | The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention. |
| II | The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any change must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. |
| III | The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. |
| IV | The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. |

Source: BLM 1986b

### 3.7.2.2 Existing Conditions

The study area lies in the Great Basin Section of the Basin and Range Province of the US. The Great Basin Section is characterized by wide, flat to gently sloping basins bounded by isolated mountain ranges. These mountain ranges rise from 3,000 to 5,000 feet above the basins. While most of the mountain ranges tend to be elongated in a northeast direction, the proposed Project lies on the southeast flank of a conical mountain called Mount Hope. Mount Hope has an elevation of 8,411 feet amsl and is located between the Roberts Mountains to the northwest and the Whistler Range to the southeast. Mount Hope is located 1.5 miles west of SR 278 at Garden Pass approximately 23 miles north of the Town of Eureka, Nevada. The Project is located in an area that has been explored, prospected, and mined historically. Both historic and recent operations are visible on Mount Hope and include waste rock dumps, roads, drill pads and buildings.

Vegetation on Mount Hope is typical of the surrounding mountain ranges and consists of areas of piñon-juniper in the higher elevations and sagebrush in the lower elevations. Previous mining and exploration activities have occurred in the higher elevations and are visibly evident because the light colored cleared areas contrast with the darker piñon-juniper stands and darker weathered rock formations.




**EXPLANATION**

- Project Boundary
- Key Observation Points
- Viewshed

N

0 5 10 Miles

| DESIGN: EMLLC | DRAWN: CVD/GSL | REVIEWED: RFD |
|---|---|---|
| CHECKED: - | APPROVED: RFD | DATE: 07/31/2012 |

FILE NAME: p1635_Fig3-7-1_KOP&Viewshed.mxd

**BUREAU OF LAND MANAGEMENT**

**MOUNT HOPE PROJECT**

DRAWING TITLE:

**Top of Mount Hope Viewshed and Key Observation Points**

**Figure 3.7.1**

The Mount Hope area was inventoried by the BLM for the Shoshone-Eureka Resource Management Plan as a combination of Visual Management Class **II,** III**,** and IV areas (BLM 1986a). **The visual classes in the vicinity of the Project Area are illustrated on Figure 3.7.2.** The BLM has mapped Class **II,** III**,** and Class IV **areas** at Mount Hope and the surrounding area. The Class III area includes the northeastern portion of Mount Hope as well as the area around SR 278 from Garden Pass to Diamond Valley. **The Class II area is located in a portion of the Project's powerline within the existing Falcon-Gondor corridor.** The remainder of the Project Area is in Class IV. Class IV is the least restrictive of the four management classes. A management activity in this class could draw attention as a dominant feature in the landscape, but attempts should be made to minimize the contrast by repeating the form, line, color, and texture of the characteristic landscape (BLM 1986a). In a Class III area the objective is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Light pollution in the Mount Hope area is minimal and primarily limited to dispersed pinpoints of light associated with ranches. The Town of Eureka, 23 miles south of the Project Area, is the largest source of light pollution in the immediate area.

### 3.7.3 Environmental Consequences and Mitigation Measures

#### 3.7.3.1 Significance Criteria

The assessment of visual impacts is based upon impact criteria and methodology described in the BLM Visual Contrast Rating System (BLM Manual Handbook, Section 8431-1). Effects to visual resources are assessed for the construction, operation, and closure of the Proposed Action and the alternatives. Quality of the visual environment is defined by the BLM VRM classes. Two issues, as follows, are addressed in determining impacts: a) the type and extent of actual physical contrast resulting from the Proposed Action and the alternatives, and b) the level of visibility of a facility, activity, or structure. These impacts would be considered significant if visual contrasts that result from landscape modifications are inconsistent with the changes allowed under the BLM VRM classification.

The extent to which the Proposed Action and the alternatives would affect the visual quality of the viewshed depends upon the amount of visual contrast created between the proposed facilities and the existing landscape elements (form, line, color, and texture) and features (land and water surface, vegetation, and structures). The magnitude of change relates to the contrast between each of the basic landscape elements and each of the features. Assessing the Proposed Action's or an alternative's contrast in this manner indicates the potential impacts and guides the development of mitigation measures that fulfill the VRM objectives.

#### 3.7.3.2 Assessment Methodology

As discussed in Section 3.7.1, the BLM prescribes VRM classes for all BLM administered lands, including the area of the Proposed Action and alternatives. The visual effects of the facilities and operations of the Proposed Action were evaluated with respect to conformance with the established VRM Classes (**II,** III**,** and IV). The analysis was initiated through a Geographic Information System (GIS) viewshed analysis using a 25-mile radius of Mount Hope. Based on

this viewshed analysis and BLM and Eureka County input concerning Project visibility, five key observation points (KOPs) were chosen from routinely accessible vantage points from which the Project facilities may be visible. The viewshed and KOPs for the Project are shown on Figure 3.7.1.

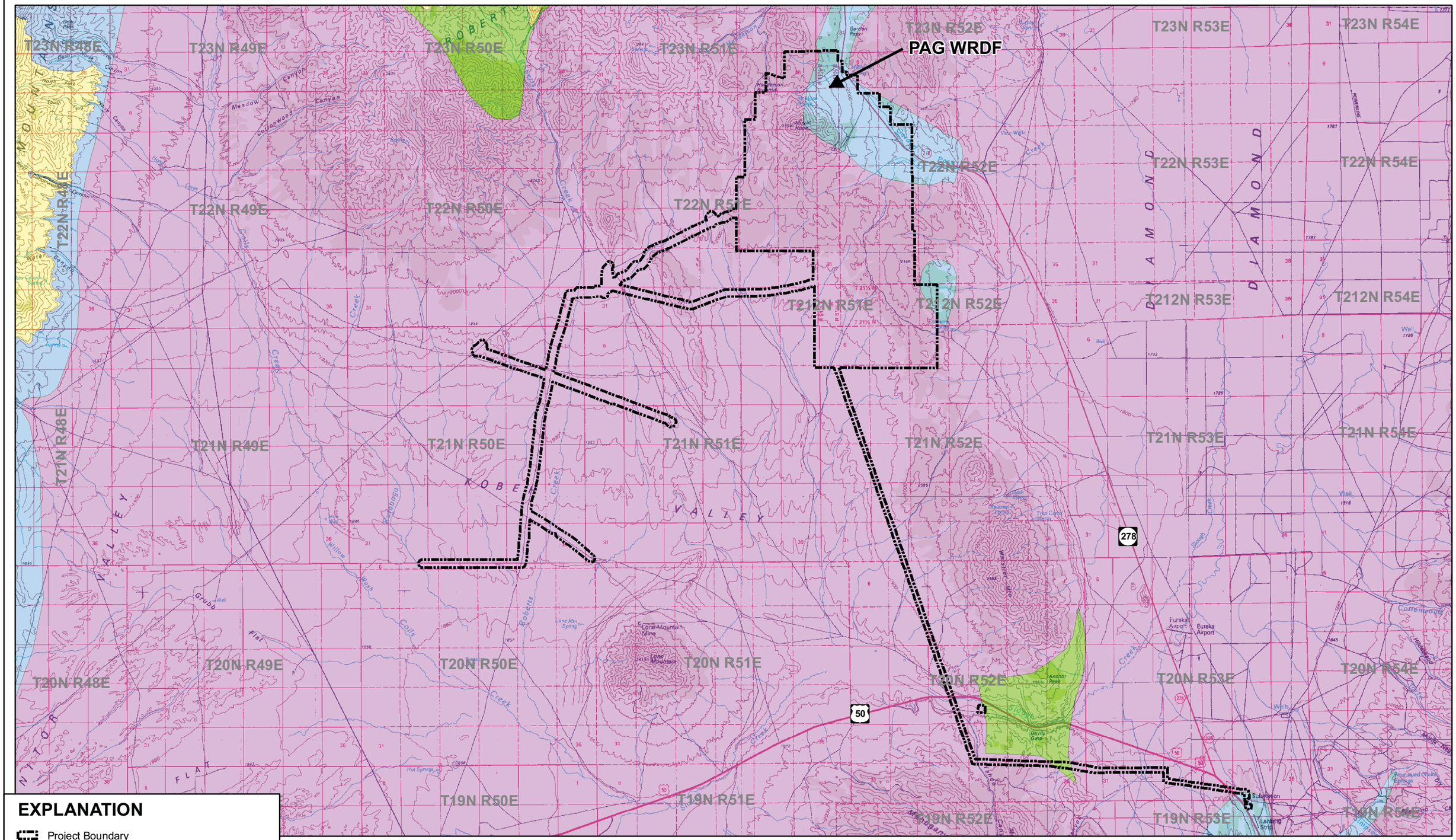
The process used to assess visual impacts is the BLM Contrast Rating Process, as outlined in BLM Technical Manual 8432, "Visual Contrast Rating." This is a systematic process that is used to identify, describe and analyze potential visual impacts of proposed projects and activities. VRM Form 8400-4 was prepared for each KOP. This process consists of first separating the existing landscape into major features, which include land/water, vegetation and structures. Then the landscape character elements, which include form, line, color and texture, are described for each feature. As is common throughout the Great Basin Physiographic region, views are open and expansive. Potentially sensitive viewing locations (places where people travel, recreate, or reside) were examined and from these, five KOPs were identified and evaluated. The VRM process was then conducted for the Project. The degree of contrast between the features and elements of the existing landscape and post-development landscape was then determined. The Visual Management Class for the Mount Hope area **are** either Class IV, where there can be strong contrasts between the existing landscape and post-development landscape, Class III, where there can be moderate contrast between the existing landscape and post-development landscape that does not dominate the view**, or Class II, where the level of change to the characteristic landscape should be very low and must not attract attention.** Contrast rating sheets that represent the No Action Alternative were prepared to analyze the Proposed Action and the alternatives. Photosimulations were then prepared that show maximum build out (Year 32 for KOPs 1 through 4 and Year 44 for KOP 5) fully reclaimed and the Partial Backfill Alternative fully reclaimed. The following sections describe these scenarios. For KOP #2 a Year 20 scenario was also developed to inform local residents and interested parties of the anticipated view at Year 20 (approximately half of the expected mine life) of the 44-year active Project.

3.7.3.2.1 KOP #1 - Nevada SR 278 Southbound

KOP #1 is located on SR 278 approximately six miles north of the Project Area. This KOP is located at the point where the Project Area is in the observers line-of-sight for an extended period of time when driving south on SR 278. Figures 3.7.**3** a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**3**a); 2) a photosimulation of maximum build out at Year 32 (Figure 3.7.**3**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**3**c); and 4) a photosimulation of the Partial Backfill Alternative at final reclamation (Figure 3.7.**3**d).

Figure 3.7.**3**a is a photograph of the current conditions. The landscape consists of navy blue and mauve colored pyramidal shaped hills in the background with a predominantly tan, brown, and sage green colored flat foreground. There are bold diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.**3**b is a photosimulation showing maximum build out at Year 32. The landscape consists of a dark blue and mauve colored flat dome feature with light colored material on the top that represents the active WRDF. Mount Hope is a small pyramidal shape. The foreground is predominantly tan, brown, and sage green colored flat. There are bold primarily horizontal lines




## EXPLANATION

Project Boundary

**Battle Mountain District VRM**

- Class I
- Class II
- Class III
- Class IV

N

NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

0 1 2 3 4 5 6 7 Miles

IF THE ABOVE BAR DOES NOT SCALE 1 INCH, THE DRAWING SCALE IS ALTERED

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

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| CHECKED: | - | APPROVED: | RFD | DATE: | 08/23/2012 |
| FILE NAME: | p1635_Fig3-7-2_VRM.mxd | | | | |

**BUREAU OF LAND MANAGEMENT**

**MOUNT HOPE PROJECT**

DRAWING TITLE:

**Visual Classes Within and Adjacent to the Project**

**Figure 3.7.2**

and some diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.**3**c is a photosimulation showing the landscape as it would appear after mining and post reclamation. There would be a rounded trapezoidal shaped WRDF in the background. Vegetation on the lower portions of the WRDF would be more mature than the upper reaches but would likely blend in with the colors of the surrounding undisturbed areas because the vegetation types would be similar but less mature. The vegetation would be sparser and slightly lighter in color. Exposed ground surfaces would likely be lighter than surrounding undisturbed surfaces due to the different type of lighter colored rocks mined from the open pit.

Figure 3.7.**3**d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of dark blue and mauve colored pyramidal shaped hills in the background with a predominantly tan, brown, and sage green colored flat foreground. There are bold diagonal lines in the background and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

3.7.3.2.2 KOP #2 - Nevada SR 278 Northwestbound

KOP# 2 is located on SR 278 approximately four miles east southeast of the Project Area. This KOP is located at the point where the Project Area first becomes visible when traveling northbound on SR 278 where the highway turns westward between the Sulphur Range and the Whistler Range and where the majority of the public would first view the full visual effect of the Project. Figures 3.7.3 a, b, c, d, and e show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**4**a); 2) a photosimulation of the Project build out at Year 20 (Figure 3.7.**4**b); 3) a photosimulation of maximum build out at Year 32 (Figure 3.7.**4**b); 4) a photosimulation of the fully reclaimed Project (Figure 3.7.**4**d); and 5) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**4**e).

Figure 3.7.**4**a is a photograph of the current conditions. The existing landscape consists of a dark blue, mauve, and tan pink colored pyramidal hill in the background and yellow brown and sage green colored flat foreground. There are bold diagonal lines in the background and weak horizontal lines in the foreground. Drill roads in the background are readily evident from KOP #2 because of their horizontal lines and light tan to pink color contrasts with the diagonal lines and blue green color of the background. The existing highway in the foreground is a prominent structure in the foreground. The highway leads the observers eyes to Mount Hope, and its lines and color strongly contrast with those of other foreground features.

Figure 3.7.**4**b is a photosimulation showing build out at Year 20. The landscape consists of Mount Hope, a white pyramidal feature near the center, flanked on the west side by a smooth grey green flat feature (reclaimed) and on the east side a flat trapezoidal feature with light colored material on the top that represents the active PAG WRDF. The middleground shows a tan ovoid shape that is primarily white to gray in color with strong horizontal features that dominate the landscape. The foreground is flat and predominantly tan to yellow brown, sage, and medium green colored. There are bold primarily horizontal lines and some diagonal lines in the

background and middleground and weak horizontal lines in the foreground. The most prominent structure visible in the foreground is the existing road that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the northbound observer's eyes to Mount Hope and the LGO Stockpile.

Figure 3.7.**4**c is a photosimulation showing maximum build out at Year 32. The landscape consists of Mount Hope, a white pyramidal feature near the center, flanked on the west side by a smooth grey green flat feature (reclaimed) and on the east side a flat trapezoidal feature with light colored material on the top that represents the active PAG WRDF. The middleground shows a tan ovoid shape that is primarily white to gray in color with strong horizontal features that dominate the landscape. The foreground is flat and predominantly tan to yellow brown, sage, and medium green colored. There are bold primarily horizontal lines and some diagonal lines in the background and middleground and weak horizontal lines in the foreground. The most prominent structure visible in the foreground is the existing road that is a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope and the LGO Stockpile.

Figure 3.7.**4**d is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A light colored pit highwall and WRDFs would be prominent in the background. The post-mining landscape would be changed from predominantly pyramidal shaped features in the background to rolling features. The WRDFs would be light colored versus the brown and dark green colored existing background. There would still be bold horizontal and diagonal lines. The most prominent structure visible is the existing road in the foreground, a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

Figure 3.7.**4**e is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of dark to light blue and white snow covered pyramidal shaped hills in the background. The middleground is dark blue to mauve with a light colored pyramidal and horizontal highwall shape that also shows some of the undisturbed portions of Mount Hope. The flat foreground is predominantly tan, brown, sage, and medium green colored. There are bold diagonal lines in the middleground and moderate horizontal lines in the foreground. The most prominent structure visible is the existing road in the foreground, a diagonal feature against the more prominent horizontal lines of the landscape. The road leads the southbound observer's eyes to Mount Hope.

#### 3.7.3.2.3 KOP #3 - Nevada SR 278 Northbound

KOP #3 is located at the intersection of 11th Street and SR 278 approximately six miles southeast of the Project Area. This KOP is located at the point where the Project Area is visible from ranches located east and southeast of SR 278. Figures 3.7.4 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**5**a); 2) a photosimulation of Year 44 (Figure 3.7.**5**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**5**c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**5**d).

Figure 3.7.**5**a is a photograph of the current conditions. The landscape consists of medium blue and mauve colored pyramidal and rolling hills in the background with some white snow capped mountains in the far background. The middleground is flat and is light yellow, brown, and sage green colored. The foreground is grey pavement and gravel. The background has bold diagonal

lines and weaker horizontal lines. The middleground has horizontal lines. Drill roads in the background are moderately evident from the KOP because of their horizontal lines and tan pink color contrasts with the diagonal lines and blue color of the background. The existing highway in the foreground is a prominent structure. The highway cuts across the foreground; however, the contrasts are minimized by the close proximity of the road to the observer and the horizontal line of the road.

Figure 3.7.**5**b is a photosimulation showing maximum build out at Year 32 with active upper WRDFs. The landscape consists of white snow capped blue mountains in the far background. There is a light colored pyramidal form (Mount Hope) flanked on each side by flat dark blue green forms topped by lighter colored material from WRDFs in the closer background. The middleground is flat and is light yellow, brown, and sage green colored. The foreground is grey pavement and gravel. The background has bold horizontal and moderate diagonal lines. The middleground has horizontal lines. The existing highway in the foreground is a prominent structure. The highway cuts across the foreground; however, the contrasts are minimized by the close proximity of the road to the observer and the horizontal line of the road.

Figure 3.7.**5**c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A pit highwall and WRDFs would be prominent in the background. The post-mining landscape would be changed from predominantly pyramidal shapes in the background to flat/rectangular shapes. The color would change from grey colors to blue green after revegetation. The Project would add a bold horizontal line component to the background.

Figure 3.7.**5**d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. The landscape consists of white snow-capped blue mountains in the far background. A pit highwall would be prominent in the background along with medium blue and mauve colored rolling hills.

3.7.3.2.4 KOP #4 - Eureka County Fairgrounds

KOP #4 is located at the east end of the Eureka County Fairgrounds approximately 20 miles southeast of the Project Area. This KOP is located at a point where the public gathers and would be able to observe the Project Area off in the distance. Figures 3.7.5 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**6**a); 2) a photosimulation of Year 35 (Figure 3.7.**6**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**6**c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**6**d).

Figure 3.7.**6**a is a photograph of the current conditions. The landscape consists of white snow-capped blue colored mountains in the far background. The closer background landscape contains medium blue and mauve colored, pyramidal shaped features with bold diagonal lines. The middleground has a green hummocky irregular line. The foreground has light tan to pink features with horizontal and diagonal lines. The structures in the foreground include a pink colored road and parking area with bold horizontal lines; green colored fence with horizontal lines and vertical fence posts, and brown colored power poles with vertical lines.

Figure 3.7.**6**b is a photosimulation at maximum build out at Year 32, with active upper WRDFs. The landscape consists of white snow capped blue mountains in the far background. The closer background landscape contains a grey prominent pyramidal shaped form (pit highwall) flanked by medium blue and mauve colored features with bold diagonal lines. The middleground has a

green hummocky irregular line. The foreground has light tan to pink features with horizontal and diagonal lines. The structures in the foreground include a pink colored road and parking area with bold horizontal lines, green colored fence with horizontal lines and vertical fence posts, and brown colored power poles with vertical lines.

Figure 3.7.**6**c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. A pit highwall would be prominent in the background. Contrasts between the existing conditions and the proposed Project would be minimized by the distance from the observation point. There would be a strong contrast in color between the existing blue to mauve color and the lighter color of the mined area.

Figure 3.7.**6**d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. This alternative would result in the same view as 3.7.5c except that the skyline angle on the east side of Mount Hope would be steeper because of the removal of the North WRDF.

3.7.3.2.5 KOP #5 – U.S. Highway 50

KOP #5 is located on U.S. Highway 50 at the intersection of Roberts Creek Ranch Road. This KOP is located at the point where the south side of the Project Area is prominently visible when traveling eastbound on U.S. Highway 50 and the Roberts Creek Ranch Road. The KOP is approximately 15 miles south of the Project Area. Figures 3.7.6 a, b, c, and d show the following: 1) the view of existing conditions (No Action Alternative) (Figure 3.7.**7**a); 2) a photosimulation of Year 44 (Figure 3.7.**7**b); 3) a photosimulation of the fully reclaimed Project (Figure 3.7.**7**c); and 4) a photosimulation of the Partial Backfill Alternative (Figure 3.7.**7**d).

Figure 3.7.**7**a is a photograph of the current conditions. The existing background landscape would consist of medium blue and mauve colored pyramidal forms, which have bold horizontal and diagonal lines. The middleground is flat with grey green and medium brown colors. The lines are horizontal. The foreground is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.**7**b is a photosimulation at maximum build out at Year 44 with the unreclaimed North TSF. The existing background landscape would consist of a mauve colored pyramidal form with a strong contrast between the lighter colored highwall and the medium blue rolling to angular hills on either side of Mount Hope, which have bold horizontal and diagonal lines. The middleground is flat with a strongly contrasting white narrow rectangular form near the center and a brown narrow rectangular form to the east. The lines are horizontal. The foreground is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.**7**c is a photosimulation showing the landscape as it would appear after mining and post-reclamation. The existing background landscape would consist of a medium blue colored pyramidal form with a strong contrast between the lighter colored highwall and the medium blue rolling to angular hills on either side of Mount Hope, which have bold horizontal and diagonal lines. The middleground view is flat with weakly contrasting brownish narrow rectangular

horizontal forms. The foreground view is flat with grey and sage green colors with weak horizontal lines and green hummocky blobs. The structures in the foreground are a tan colored parking area with a horizontal line and a brown colored fence with a horizontal line and strong vertical features.

Figure 3.7.7d is a photosimulation showing the fully reclaimed landscape as it would appear after mining and implementation of the Partial Backfill Alternative. This alternative would result in the same view as 3.7.6c except that more of the lighter colored pit highwall would be visible because of the removal of the PAG WRDF.

### 3.7.3.3 Proposed Action

#### 3.7.3.3.1 KOP Effects

The primary visual resources issues would include the following: 1) the development of a viewshed that could be seen from multiple sites and is substantially different than the existing viewshed; and 2) the ultimate appearance of the Project at full reclamation.

The results of the contrast rating assessment for KOP #1 indicate that there would be moderate contrast in the form, line and color between the existing landscape and the post-mining/post-reclamation background landscape. Excluding the open pit, any color contrast would be naturally mitigated after revegetation of the dump and after the vegetation matures. The changes, as described and viewed from KOP #1, would conform with the area's Visual Class III and IV designations.

The results of the contrast rating assessment for KOP #2 found that there would be a strong contrast in the form and color between the existing landscape and the post-mining/post-reclamation landscape. Except for the open pit area, the color contrast would be mitigated after revegetation of the dumps and after the vegetation matures. The open pit area would still be visible from the KOP even when the Proposed Action is fully reclaimed and would have a sustained substantial contrast to the surrounding reclaimed facilities and undisturbed topography. Since the view from this portion of the Project Area has a Class III designation the changes would not conform to the VRM objectives for the area.

The results of the contrast rating assessment for KOP #3 found that there would be a strong contrast in form, line and color between the existing landscape and the post-mining landscape. The color contrast should mitigate over time as the vegetation on the waste rock dumps matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. Given the distance and visual aspect of the Project, the changes in the landscape conform to the VRM objectives for the area, which is Class III or IV, depending on which portion of the Project Area is viewed.

The results of the contrast rating assessment for KOP #4 found that there would be a strong contrast in the color of the land and vegetation. The color contrast should mitigate over time as the vegetation on the waste rock dumps matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. Given the distance and visual aspect of the Project, the

changes in the landscape conform to the VRM objectives for the area, which are Class III or IV, depending on which portion of the Project is viewed.

The results of the contrast rating assessment for KOP #5 found that there would be a strong contrast in the color of the land, vegetation and structures. The color contrast should mitigate over time as the vegetation on the waste rock dumps and tailings matures to include more shrubs and trees. Within this distance zone, particularly during midday light conditions, color, form, and line contrasts created by the Proposed Action would be evident. The changes in the landscape conform to the VRM objectives for the area, which is Class IV.

Visual contrast would be reduced by reclamation practices, which would consist of recontouring and revegetating the WRDFs and the TSFs facility slopes; recontouring and revegetating exploration roads; and removing all buildings, structures, and equipment brought to the site, before recontouring and revegetation of all building sites. Following successful reclamation, the visual contrast of the Proposed Action would be slightly reduced. The use of surrounding landscape colors and native plant materials are appropriate means of reducing visual contrast. Over the long term, natural vegetation would begin to blend with the color and texture of the existing natural landscape. Although recontouring and revegetation of the disposal and heap leach/tailings areas would help to reduce the color and form contrasts, the scale of visual disturbance of these modified pyramidal landforms would remain visually evident. Buildings associated with the Proposed Action could draw the viewer's eye due to the color and form during mining and processing operations. The Proposed Action would not otherwise impact visual resources.

- **Impact 3.7.3.3-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  **Significance of the Impact:** This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

**Figure 3.7.3a: Kop #1: No Action Alternative.** Looking south (approximately seven miles) at Mount Hope from 0.2 miles south of mile marker #27 on State Highway 278.

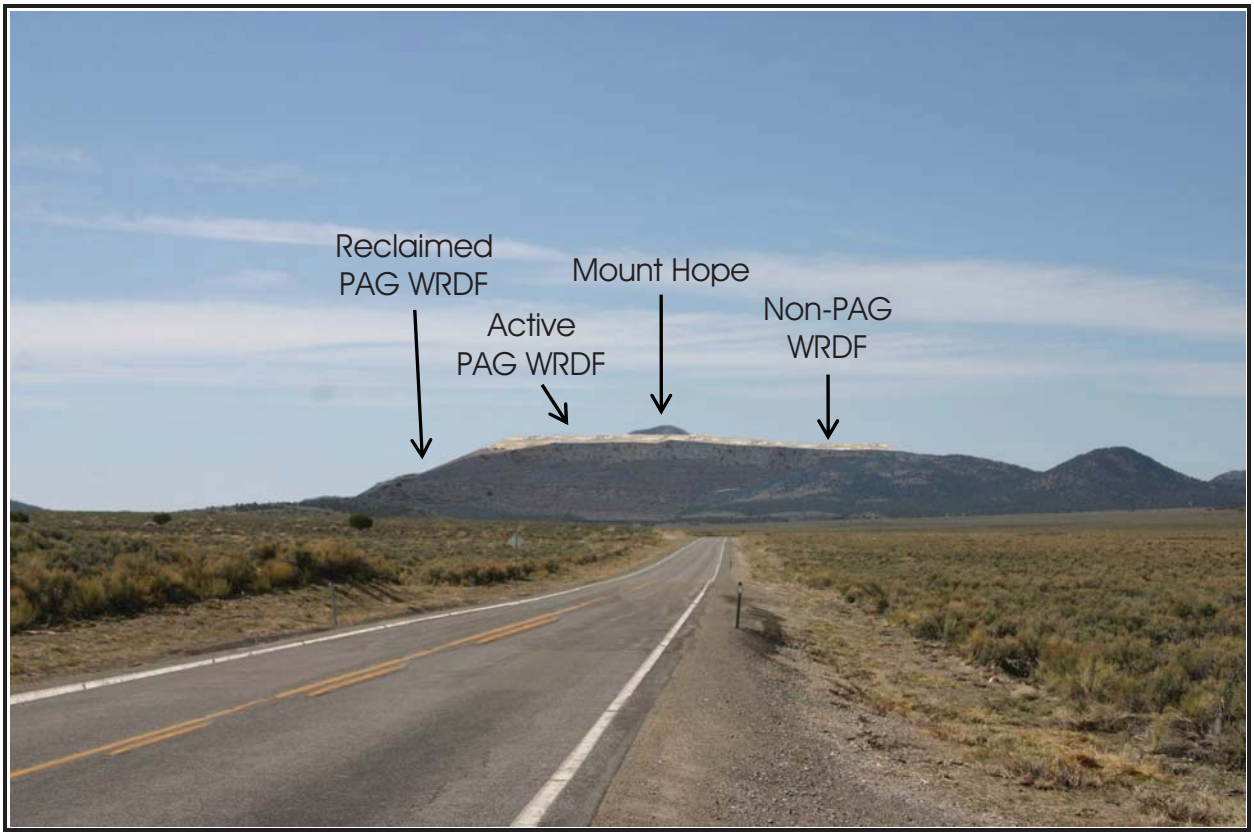



**Figure 3.7.3b: KOP #1: Proposed Action Maximum Build Out (Year 32)** with active upper WRDFs.

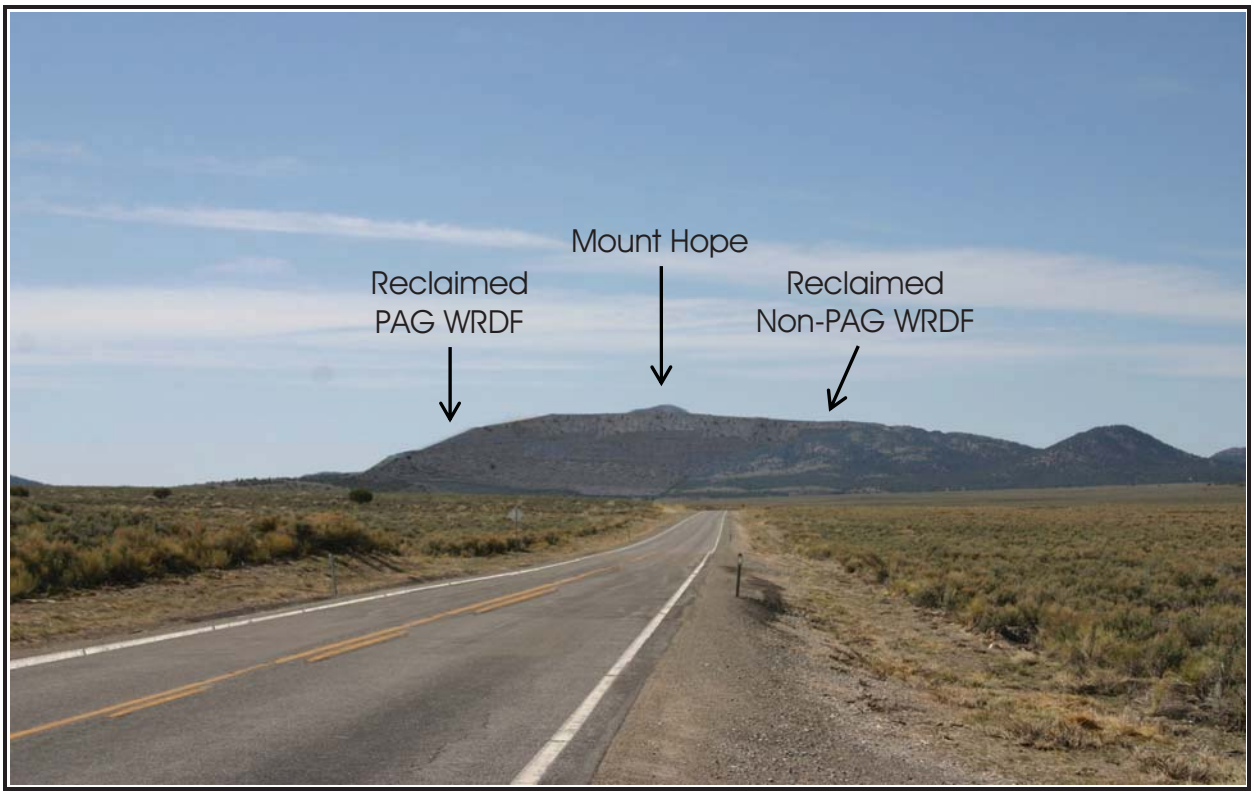



**Figure 3.7.3c: KOP #1: Proposed Action Fully Reclaimed.**

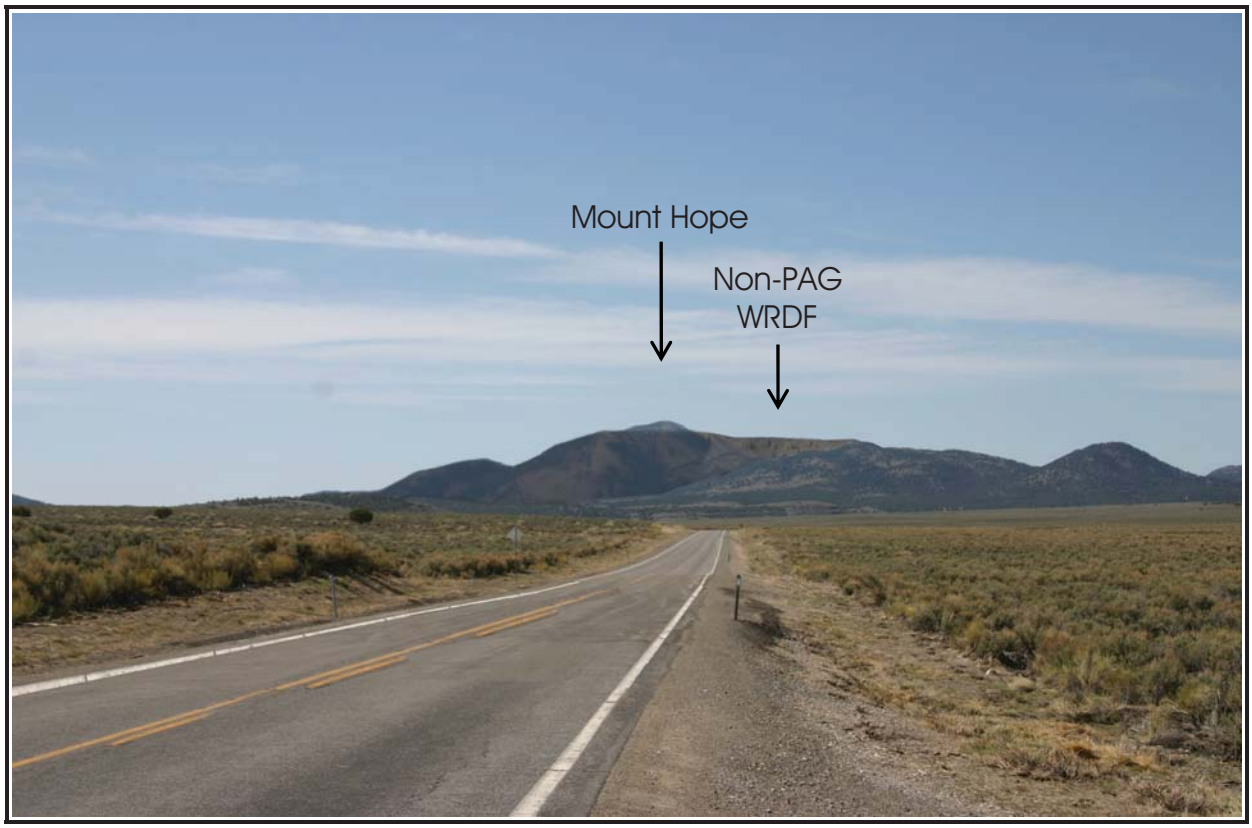



**Figure 3.7.3d: KOP #1: Partial Backfill Alternative Fully Reclaimed.**

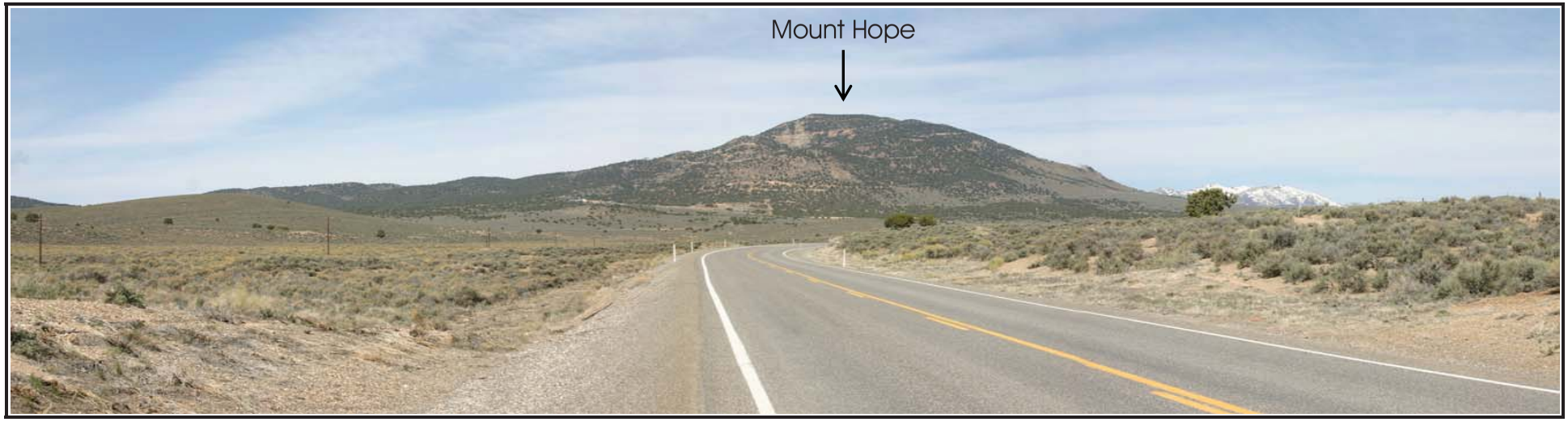



**Figure 3.7.4a: KOP #2: No Action Alternative.** Looking north-northwest at Mount Hope approximately four miles from State Highway 278.

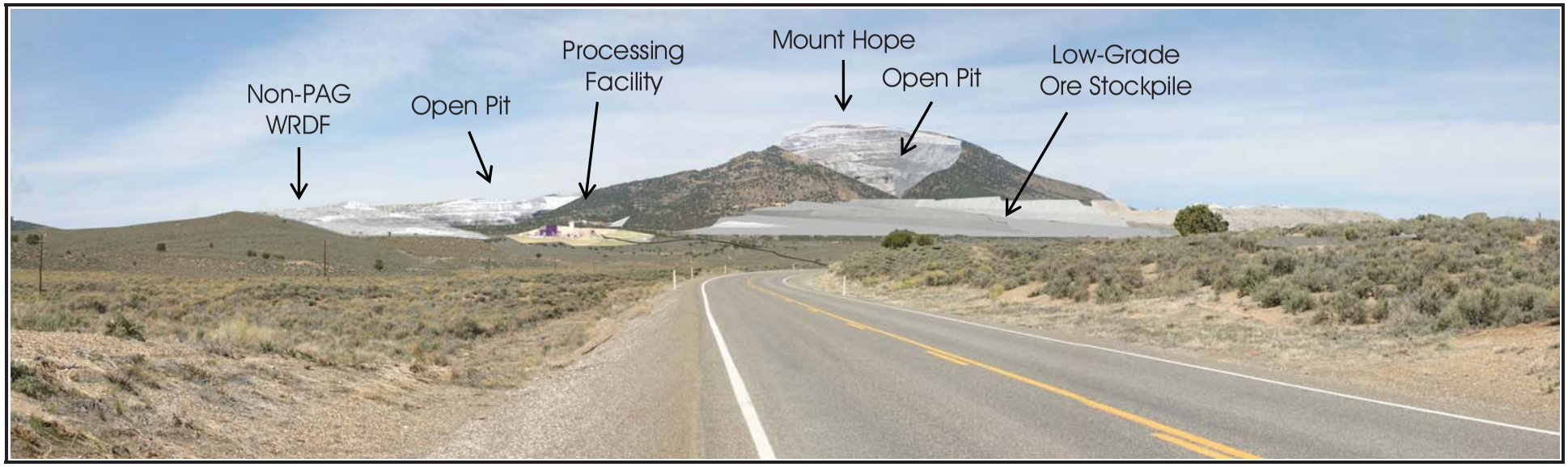



**Figure 3.7.4b: KOP #2: Proposed Action Year 20 Build Out.**

**Figure 3.7.4c: KOP #2: Proposed Action Maximum Build Out (Year 32).** Active waste rock dumps and low-grade ore stockpiles.

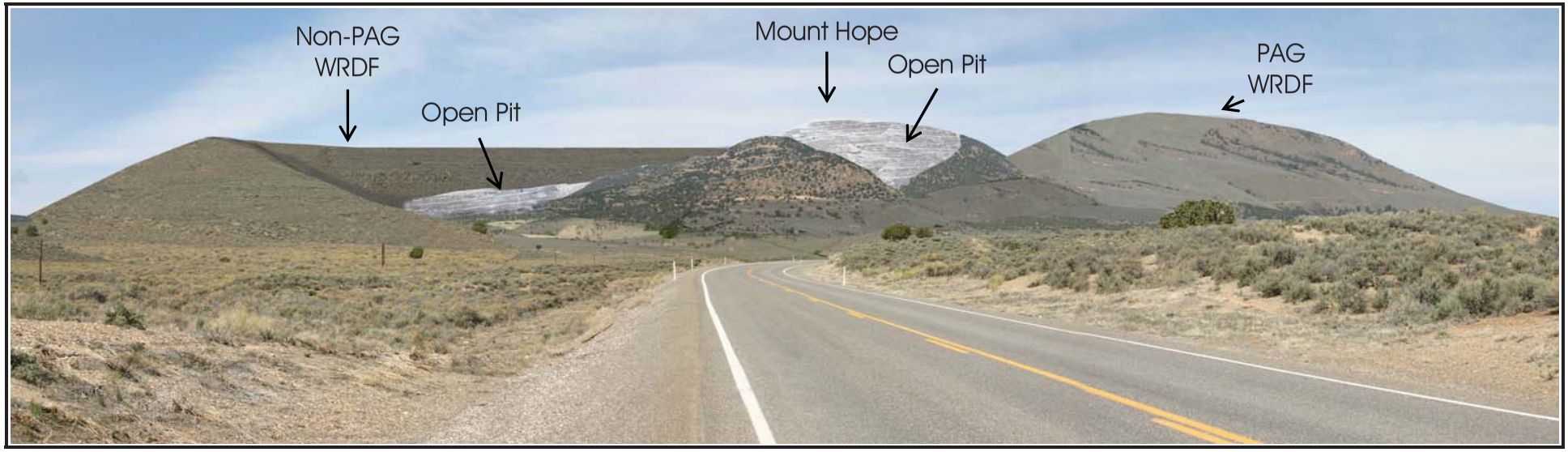



**Figure 3.7.4d: KOP#2: Proposed Action Fully Reclaimed.**

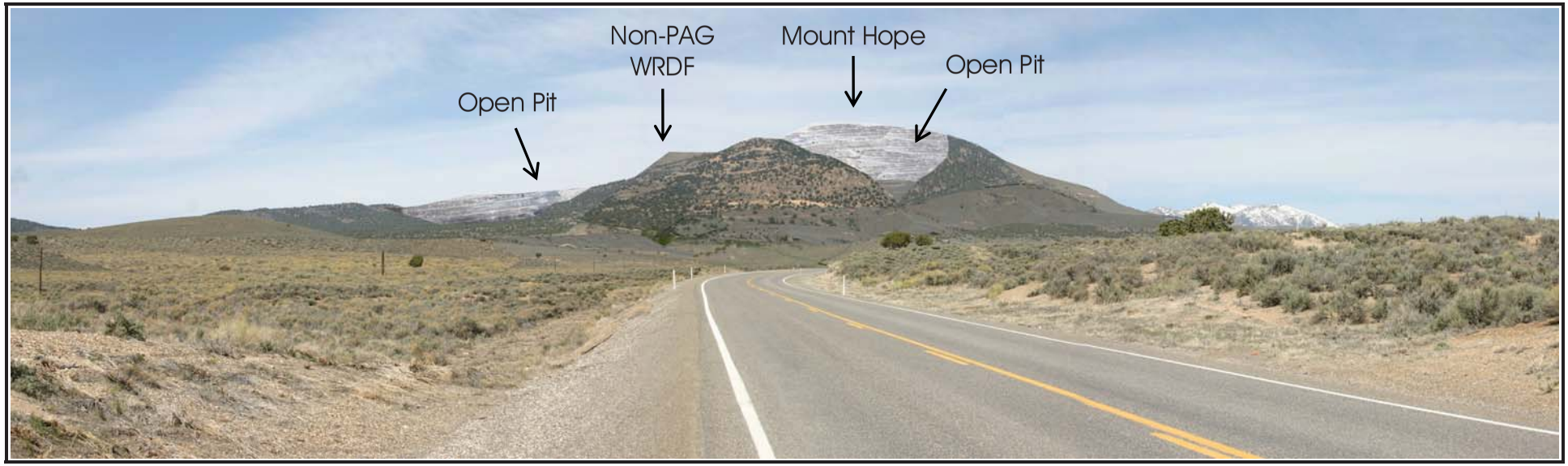



**Figure 3.7.4e: KOP #2: Partial Backfill Alternative Fully Reclaimed.**

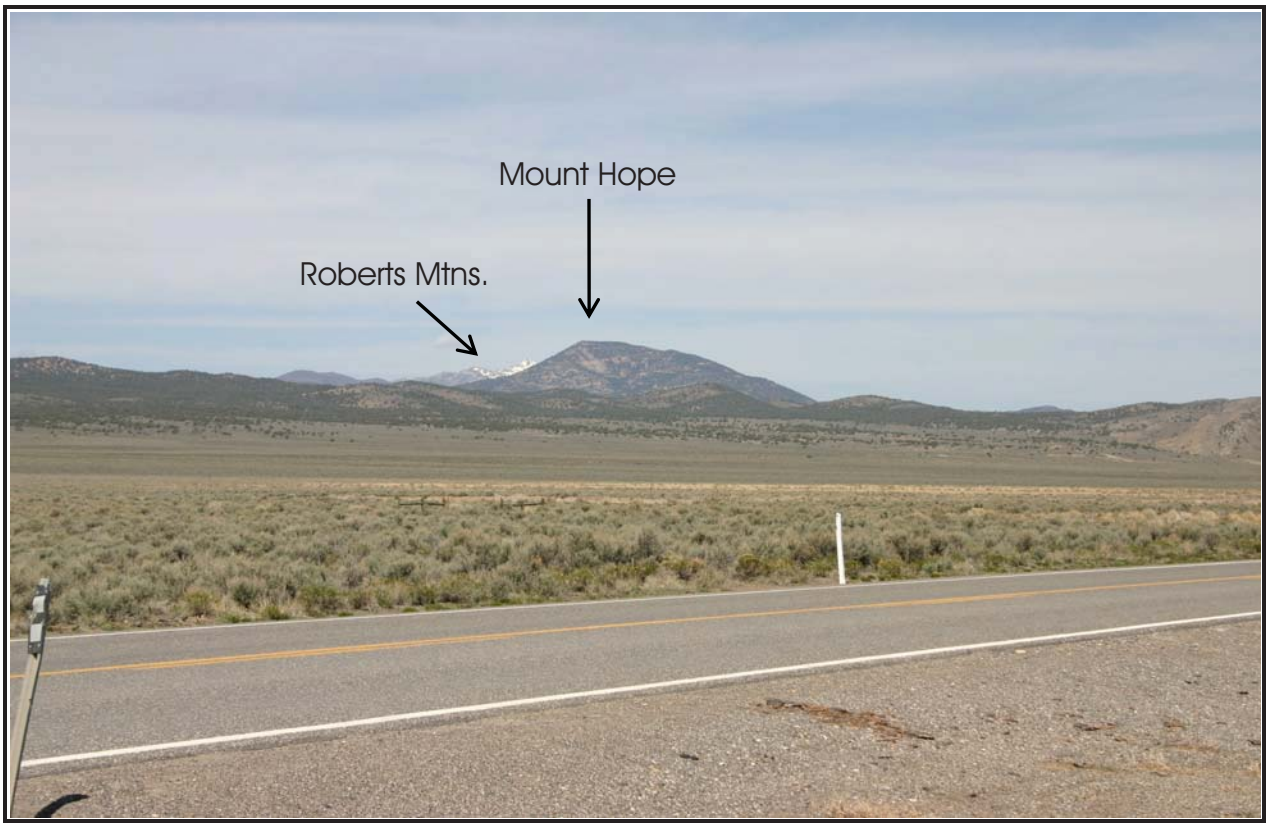



**Figure 3.7.5a: KOP #3: No Action Alternative.** Looking northwest at Mount Hope approximately eight miles from 11th Street intersection with State Highway 278.

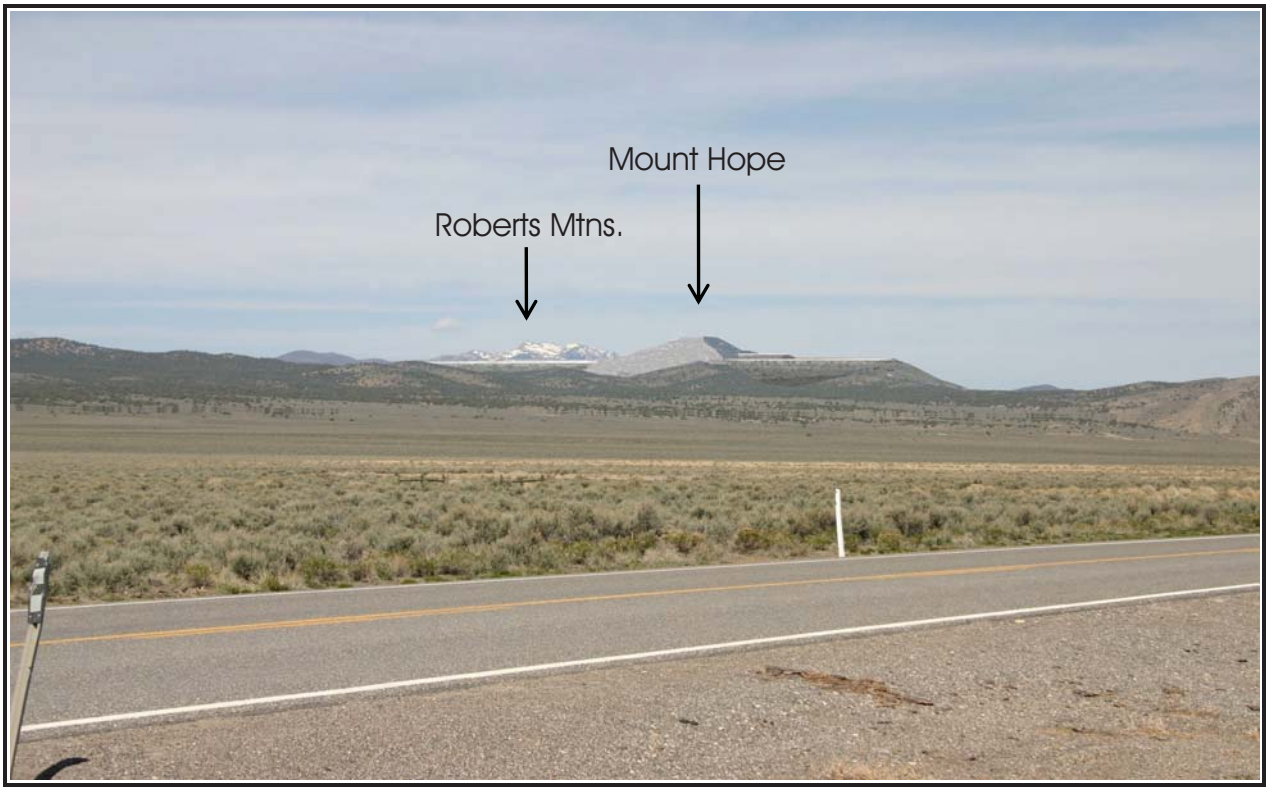



**Figure 3.7.5b: KOP #3: Proposed Action Maximum Build Out (Year 32)** with active upper WRDFs.

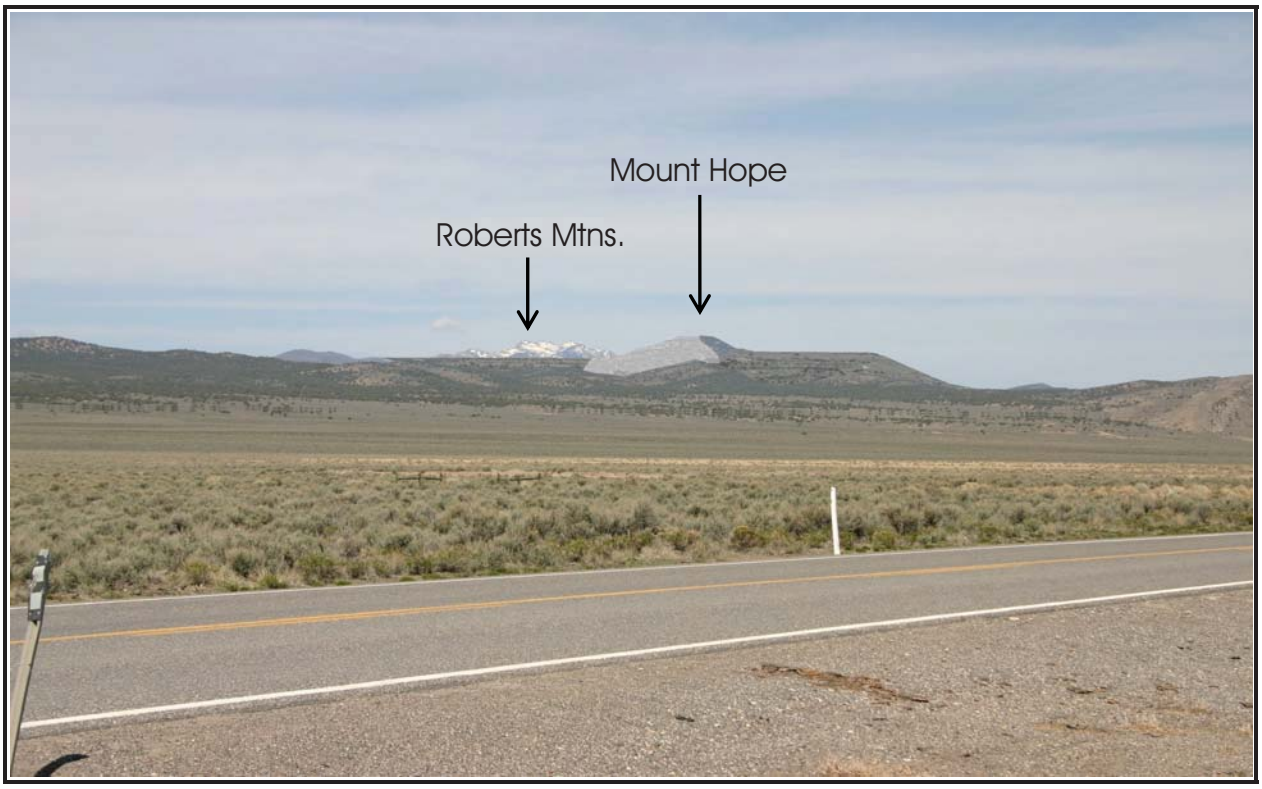



**Figure 3.7.5c: KOP #3: Proposed Action Fully Reclaimed.**

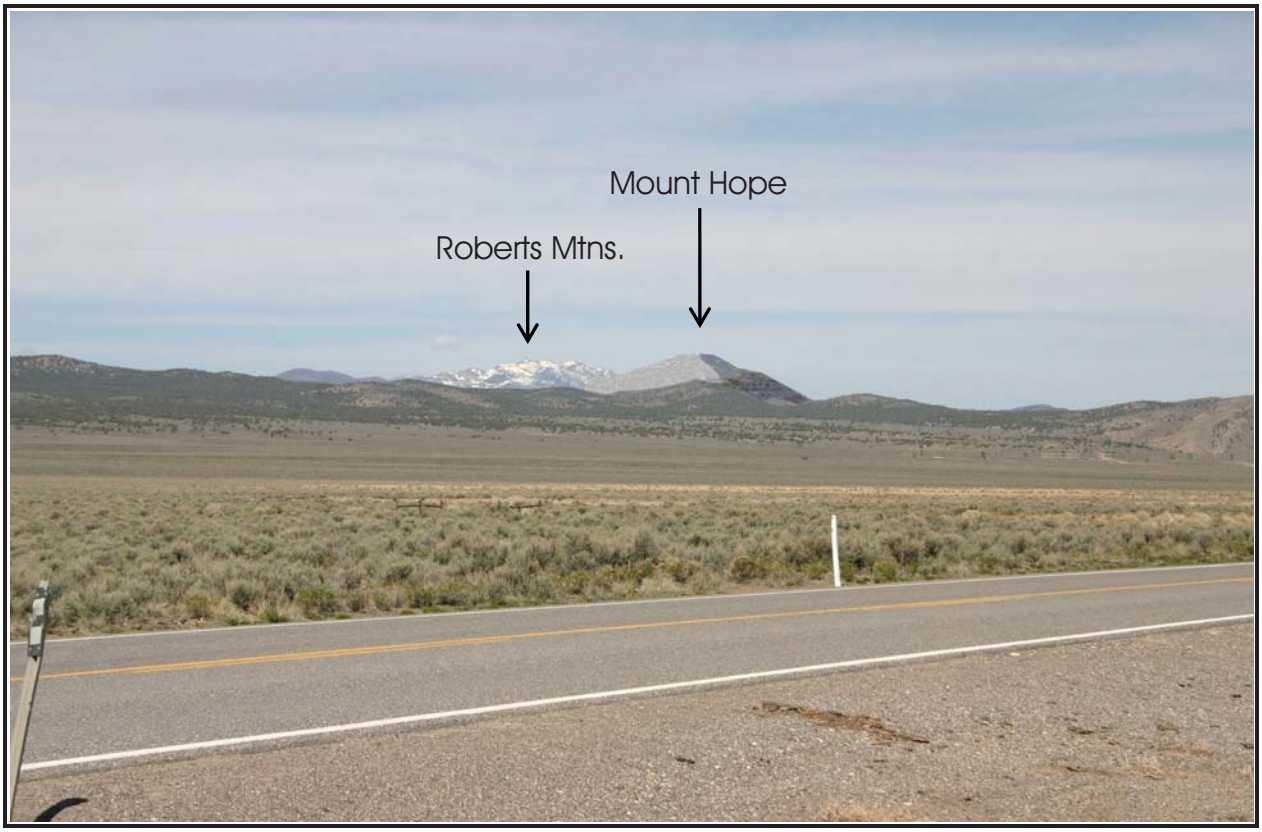



**Figure 3.7.5d: KOP #3: Partial Backfill Alternative Fully Reclaimed.**

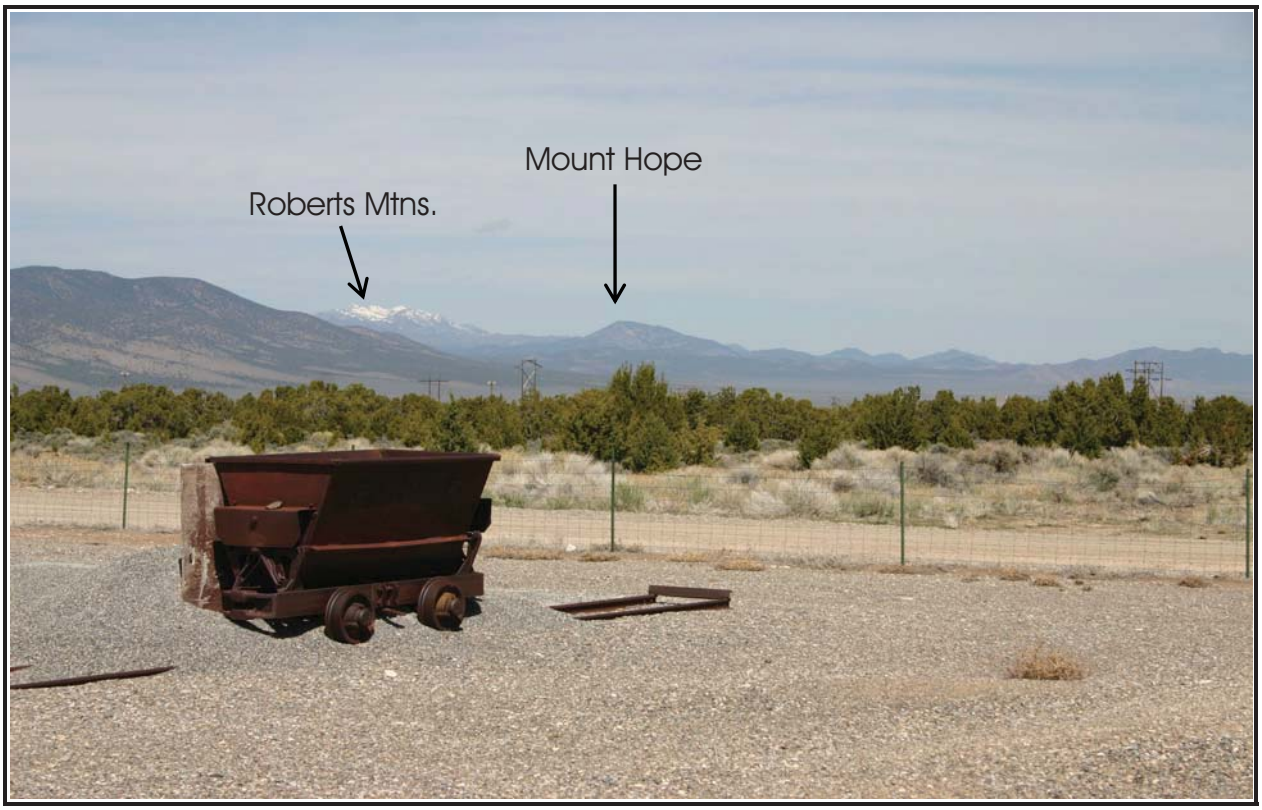



**Figure 3.7.6a: KOP #4: No Action Alternative.** Looking northwest from the Eureka County Fairgrounds (approximately 22 miles).

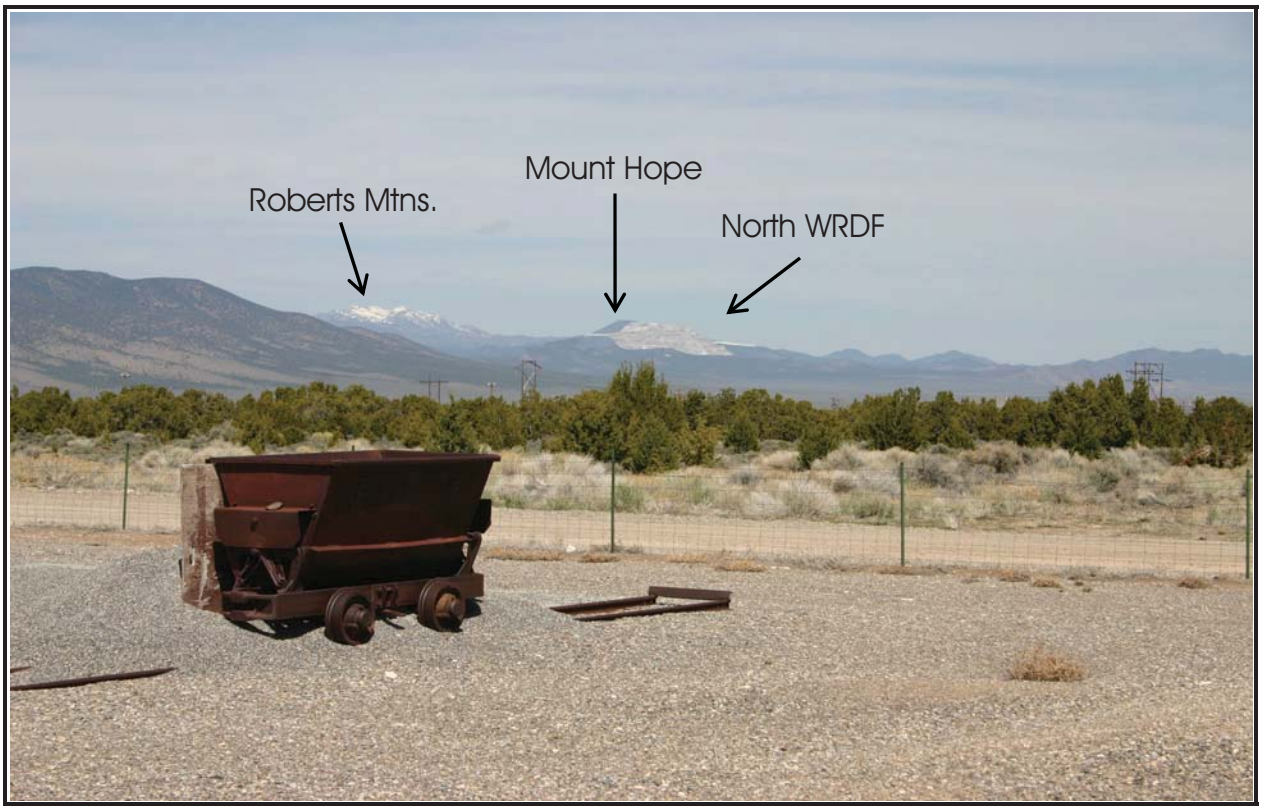



**Figure 3.7.6b: KOP #4: Proposed Action Maximum Build Out (Year 32)** with active upper WRDFs

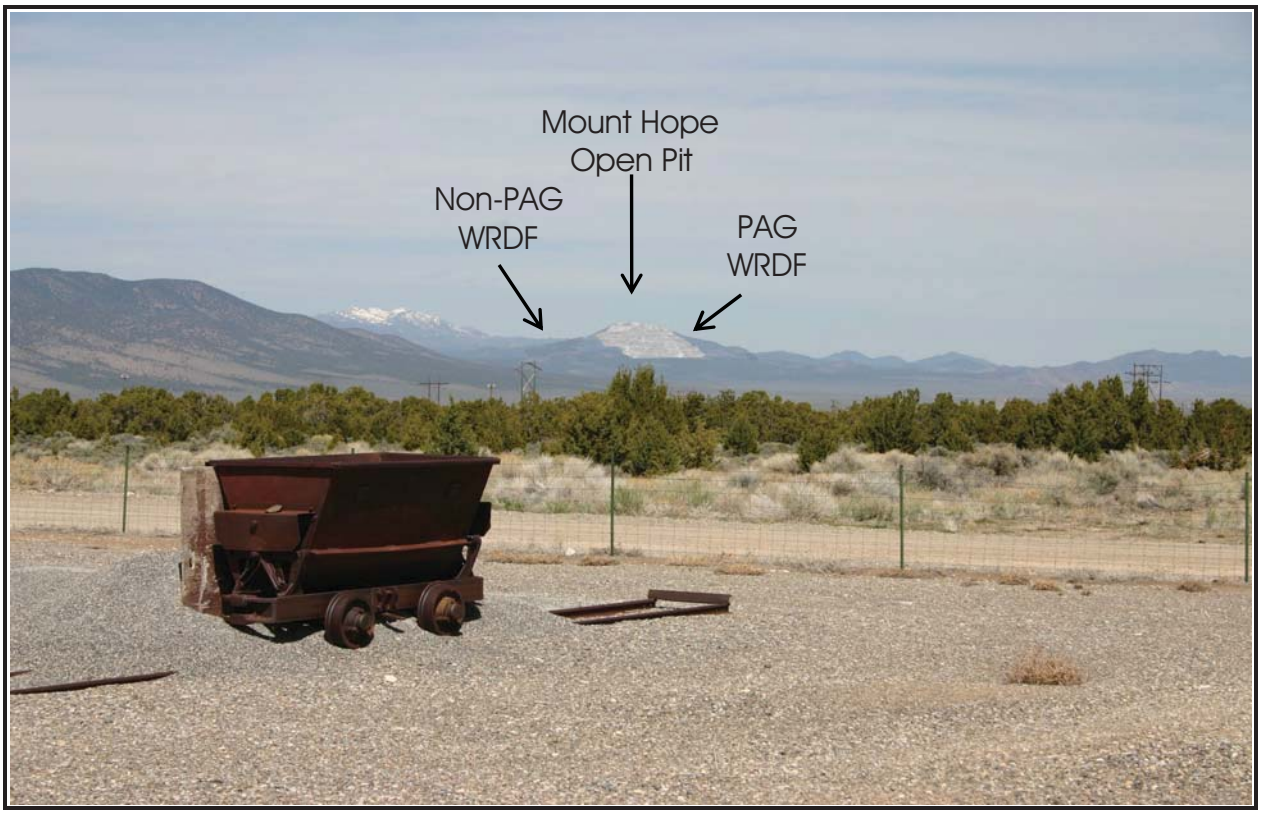



**Figure 3.7.6c: KOP #4: Proposed Action Fully Reclaimed.**

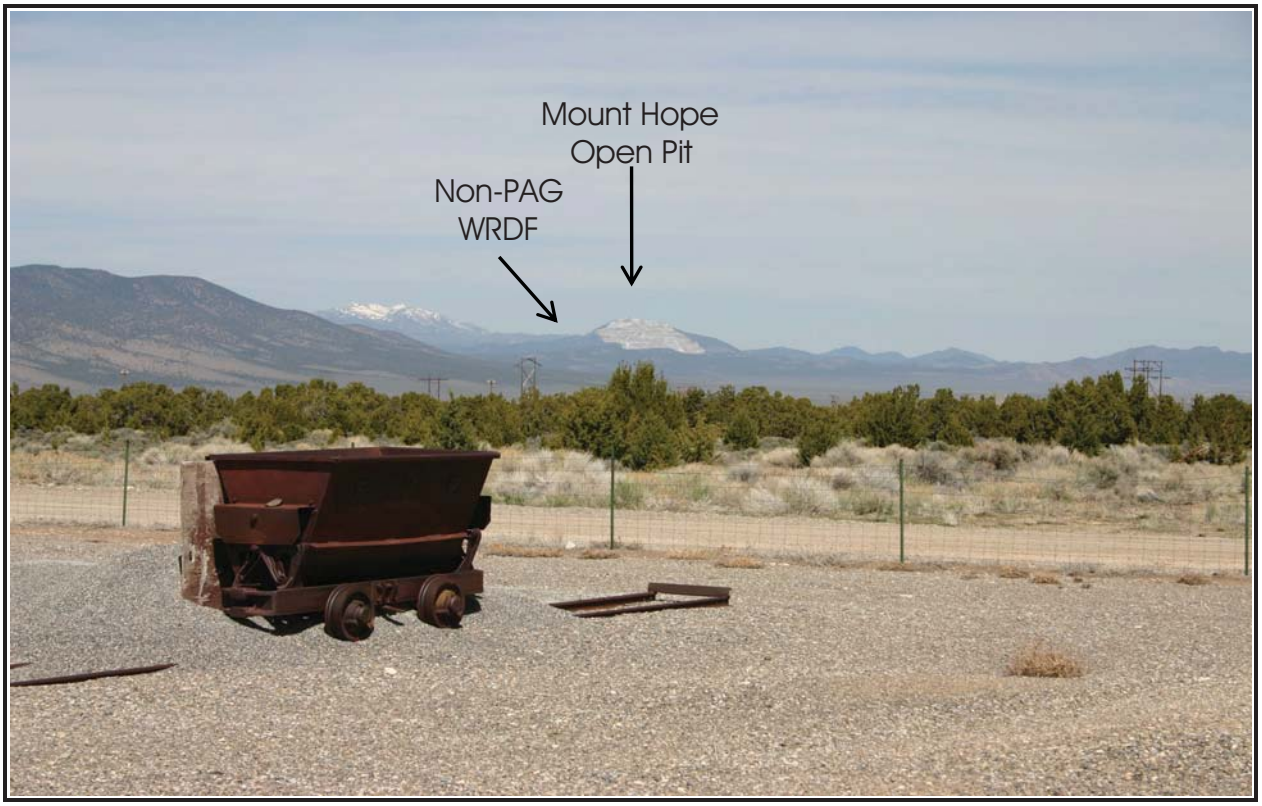



**Figure 3.7.6d: KOP #4: Partial Backfill Alternative.**

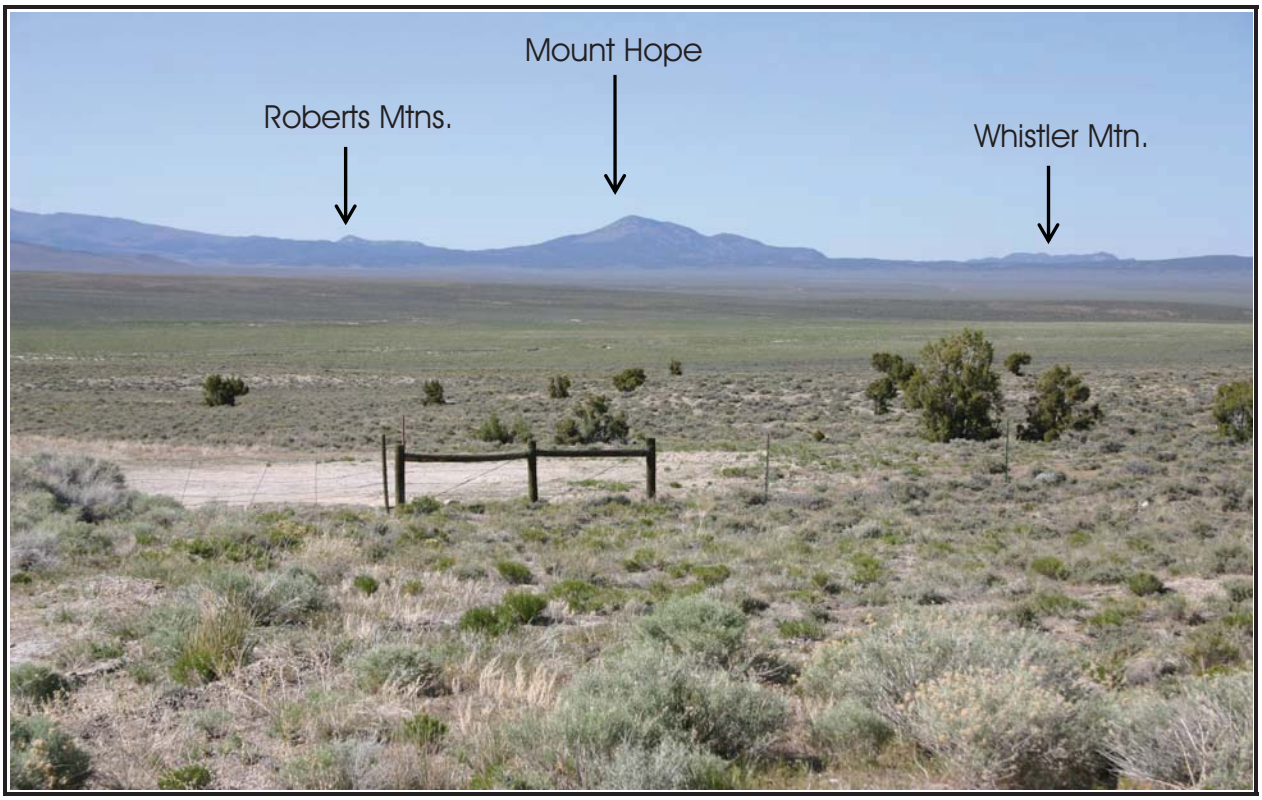



**Figure 3.7.7a: KOP #5: No Action Alternative.** Looking northerly approximately 17 miles from intersection of Roberts Creek Road and Highway 50.

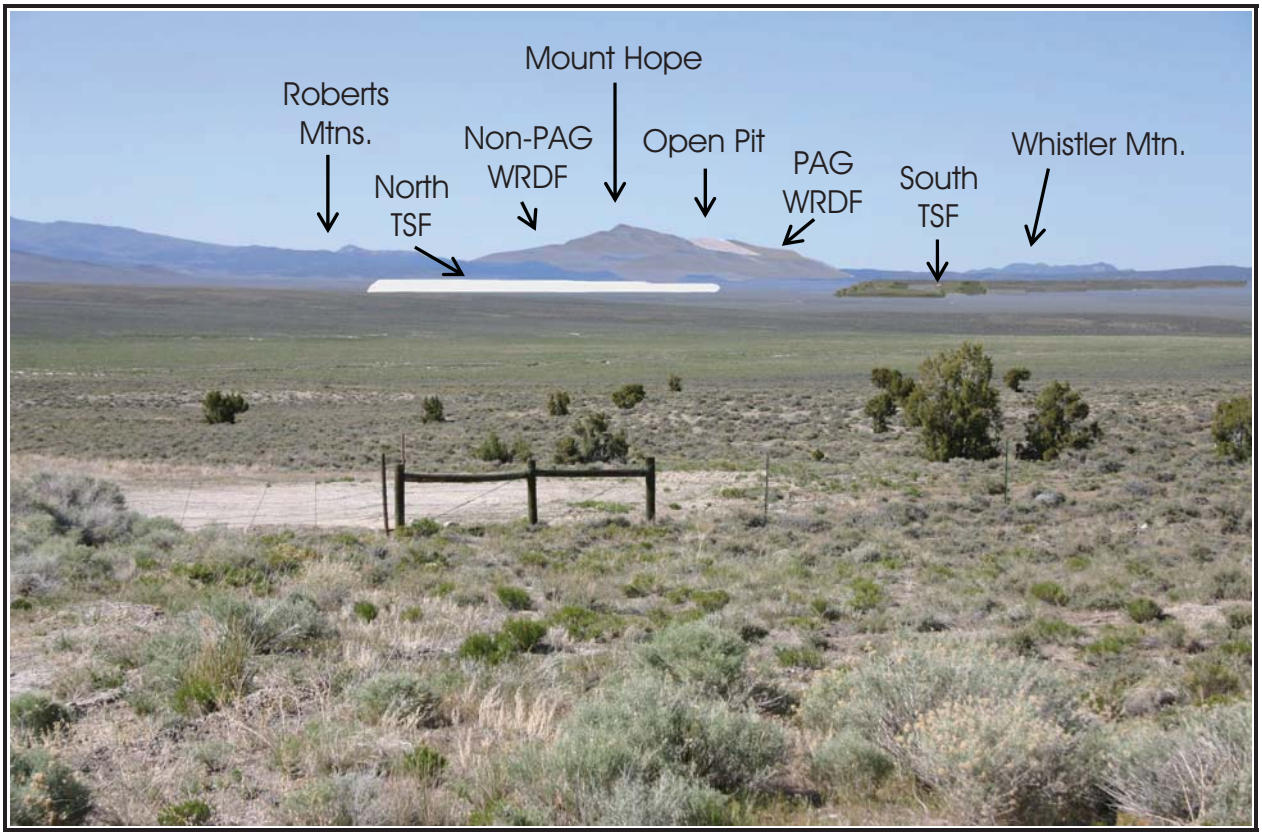



**Figure 3.7.7b: KOP #5: Proposed Action Maximum Build Out (Year 44).**

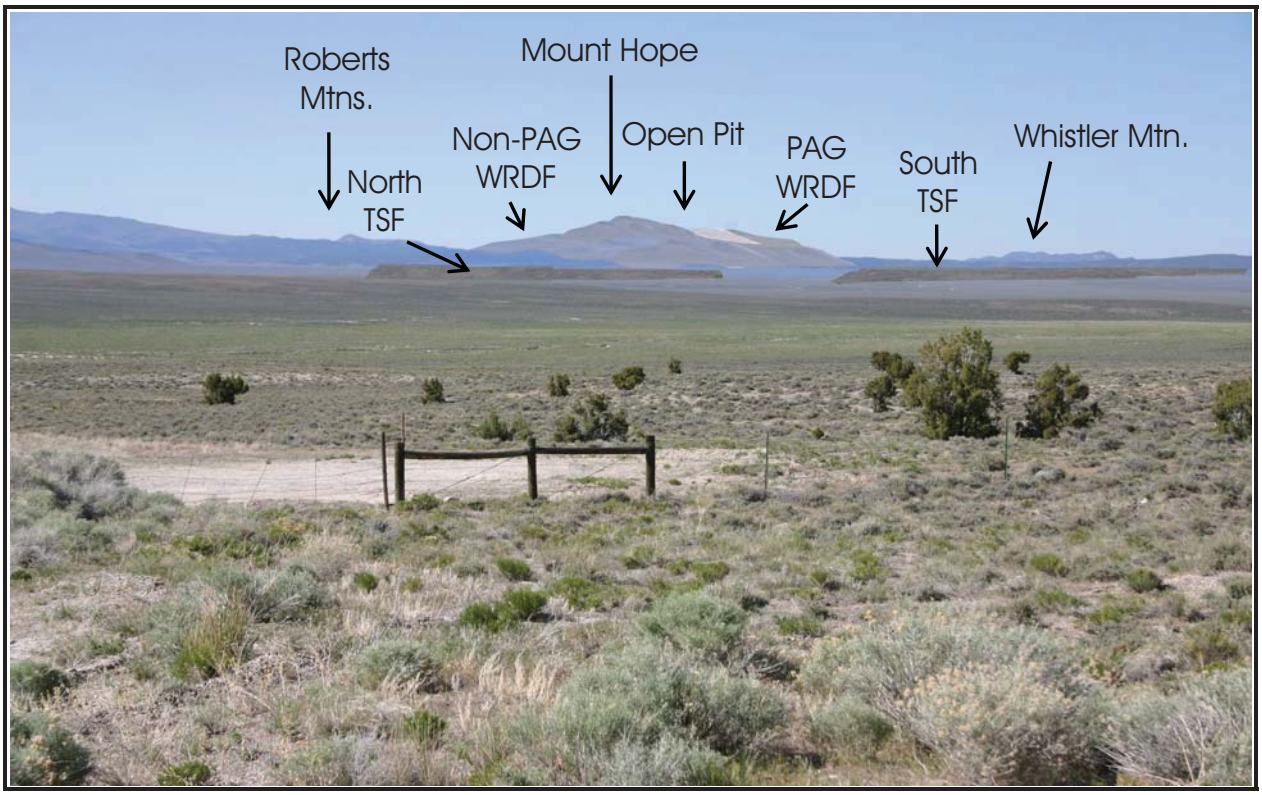



**Figure 3.7.7c: KOP #5: Proposed Action Fully Reclaimed.**

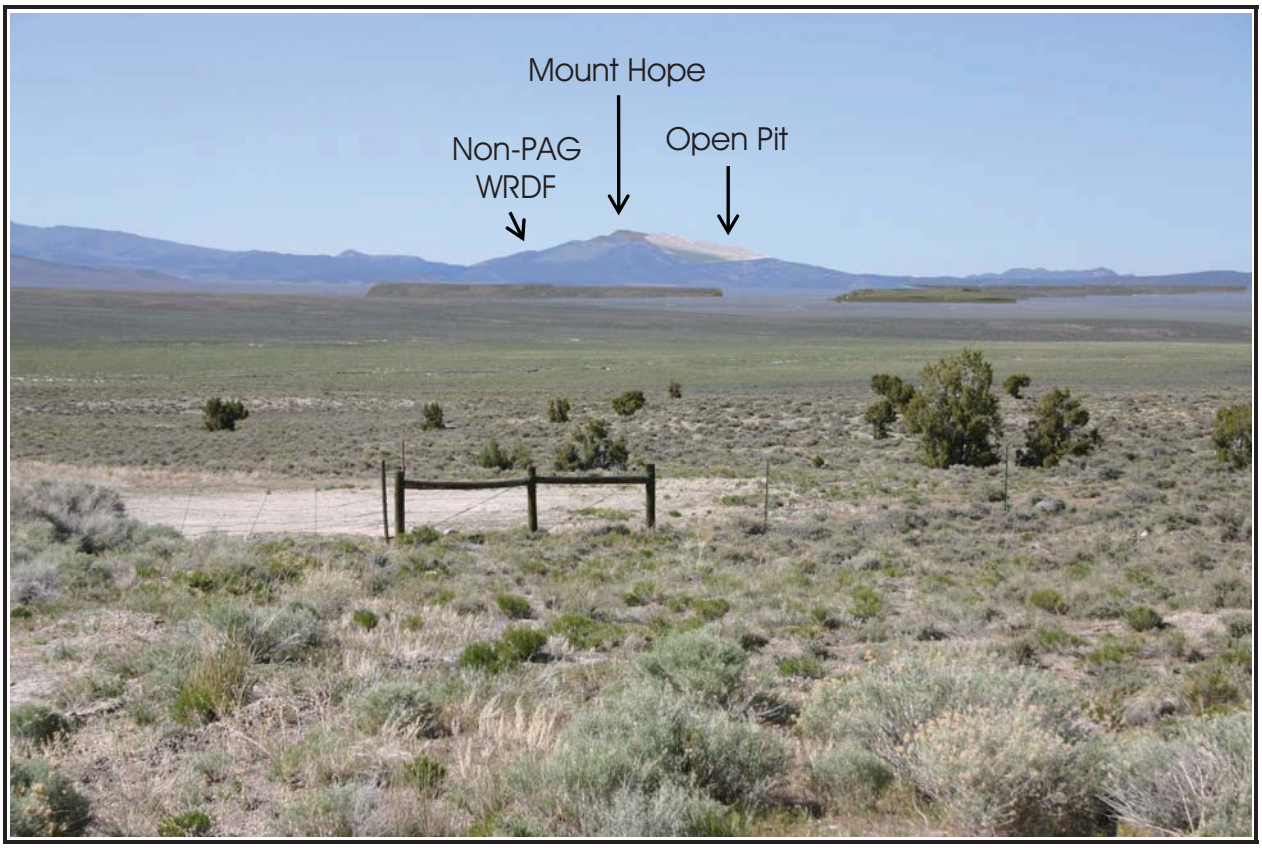



**Figure 3.7.7d: KOP #5: Partial Backfill Alternative Fully Reclaimed.**

Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective approach at limiting the impact. The Proposed Action would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

- **Impact 3.7.3.3-2:** The proposed buildings associated with mining activities would be visible from KOP #2 during mining and processing operations, which is not consistent with VRM Class III management.

  **Significance of the Impact:** This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape and help meet VRM objectives.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

#### 3.7.3.3.2 Lighting Effects

The Proposed Action would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.3-3:** The proposed mining activities would increase light pollution in the region.

  **Significance of the Impact:** This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.3-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be

cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

#### 3.7.3.4 No Action Alternative

Under the No Action Alternative, EML would not be authorized to develop the Project and mine the Mount Hope ore body as currently defined under the Proposed Action. The No Action Alternative would result from the BLM disallowing the activities proposed under the Plan (EML 2006); however, EML would be able to continue exploration activities as outlined in previously submitted Notices. Refer to Section 1.3 for a discussion of the existing Notice level activities. The area would remain available for future mineral development or for other purposes as approved by the BLM and at the time those actions are proposed and they would be subject to additional site specific environmental analysis.

##### 3.7.3.4.1 KOP Effects

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. Any visual impacts generated by exploration activities under Notice-level activities would be below the level of significance.

Under the No Action Alternative there would be no Residual Adverse Impacts.

##### 3.7.3.4.2 Lighting Effects

Under the No Action Alternative, none of the impacts associated with the Proposed Action would occur. Any light pollution generated by exploration activities under Notice-level activities would be below the level of significance.

Under the No Action Alternative there would be no Residual Adverse Impacts.

#### 3.7.3.5 Partial Backfill Alternative

Under this alternative, the Proposed Action would be developed and have the same surface disturbance footprint; however, at the end of mining, the open pit would be partially backfilled to eliminate the potential for a pit lake. The open pit would be backfilled to an elevation that varies from northwest to southeast across the open pit from approximately 7,300 to 6,850 feet amsl. The backfilling would commence in Year 32 and be completed in approximately 13 years.

##### 3.7.3.5.1 KOP Effects

The visual impacts under the Partial Backfill Alternative would be proportionally less than that described for the Proposed Action, except that the finalization of post-mining reclamation would be delayed for 13 years and it would take longer for the revegetation to mitigate visual impacts. The Partial Backfill Alternative requires that a portion of the waste rock removed during mining

be dumped back into the open pit to the point that would eliminate the potential for a pit lake. The impacts from the Partial Backfill Alternative are essentially the same as the Proposed Action, though generally slightly less due to the smaller WDRFs. However, this is most pronounced from KOP #2 where the reclaimed view (Figure 2.7.3e) does not have the Non-PAG WRDF and a portion of the open pit is covered by backfill.

- **Impact 3.7.3.5-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  **Significance of the Impact:** This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  **Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.**

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective at limiting the impact.

- **Impact 3.7.3.5-2:** The proposed buildings associated with the Partial Backfill Alternative would be visible from KOP #2 during mining and processing operations, which is not consistent with VRM Class III management.

  **Significance of the Impact:** This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

3.7.3.5.2 Lighting Effects

The Partial Backfill Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.5-3:** The proposed mining activities associated with the Partial Backfill Alternative would increase light pollution in the region.

  **Significance of the Impact:** This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.5-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

The Partial Backfill Alternative would result in unavoidable physical changes in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

3.7.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

Under this alternative, the open pit, WRDFs, and TSFs would be developed as outlined under the Proposed Action; however, the ore processing facilities would include only the milling operations and production of the molybdenum sulfide concentrate. The TMO and FeMo portions of the processing facility would not be constructed, and as a result, the surface disturbance footprint would be approximately 20 acres less than under the Proposed Action. In addition, the leaching of the concentrate would likely not be done on site. The production of molybdenum sulfide concentrate would occur at an average rate of approximately 45.8 million pounds per year. This material would be stored at the Project Area in a concentrate storage structure adjacent to the mill. The molybdenum sulfide concentrate would be loaded from this storage facility into

street legal haul trucks with covered containers and transported on the public transportation system to either an existing or new TMO facility.

#### 3.7.3.6.1 KOP Effects

The visual impacts under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be essentially the same as those under the Proposed Action. Please refer to Figures 3.7.2 a, b, and c for visual contrasts for existing views and photosimulations showing Year 44 and post-reclamation views. The impacts and mitigation measures outlined for the Proposed Action incorporate the Off-Site Transfer of Ore Concentrate for Processing Alternative.

- **Impact 3.7.3.6-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  **Significance of the Impact:** This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  **Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.**

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and scale of the action this mitigation would be the most effective at limiting the impact.

- **Impact 3.7.3.6-2:** The proposed buildings associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would be visible from KOP #2 during mining and processing, which is not consistent with VRM Class III management.

  **Significance of the Impact:** This impact is considered significant because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

#### 3.7.3.6.2 Lighting Effects

The Partial Backfill Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.6-3:** The proposed mining activities associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would increase light pollution in the region.

  **Significance of the Impact:** This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.6-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

The Off-Site Transfer of Ore Concentrate for Processing Alternative would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Proposed Action. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

### 3.7.3.7 Slower, Longer Project Alternative

Under this alternative, the open pit, WRDFs, TSFs, and processing facilities would be developed as outlined under the Proposed Action; however, the overall Project would occur at half the rate of the Proposed Action and take twice as long to complete.

#### 3.7.3.7.1 KOP Effects

The visual impacts under the Slower, Longer Project Alternative would be essentially the same as those under the Proposed Action; however, those impacts would occur over a different and longer time frame. Please refer to Figures 3.7.2 a, b, and c for visual contrasts for existing views and photosimulations showing what would be Year 88 and post-reclamation views. The impacts and mitigation measures outlined for the Proposed Action incorporate the Slower, Longer Project Alternative.

- **Impact 3.7.3.7-1:** The proposed mining activities would be visible from all five KOPs. The visual impacts would be consistent with VRM Class IV management at KOPs #1, #3, #4, and #5. From KOP #2, which is the only KOP where the Class III management area is visible, the view is not consistent with that management class.

  **Significance of the Impact:** This impact is considered significant, because of the views from KOP #2. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-1:** For reducing visual contrast, minimization of disturbance would be the most effective mitigation technique. Where disturbance is proposed, repetition of the basic landscape elements (form, line, color, and texture) would be implemented to minimize visual change. **In order to lessen long-term visual impacts from the pit wall, treatment may be required to ensure that the final pit wall mimics the surrounding landscape colors as visible from KOP #2. Methods could include, but are not limited to, painting, staining, varnishing, or some other treatment that minimizes the contrast of the visibly exposed and unweathered rock of the pit wall. Any mitigation applications must be pH neutral and contain no caustic or alkaline chemicals to avoid potential adverse environmental impacts. Treatment may occur when the pit wall reaches its final slope configuration. The need for this treatment would be determined by the BLM at that time based on the color of the exposed pit wall surface and its contrast with the surrounding landscape. Specific dimensions and areas of mitigation would be determined by the BLM, based on the actual color of the final pit wall.**

  **Clearing of land for WRDFs and facility construction would be done by creating curvilinear boundaries instead of straight lines to minimize disturbance of the landscape. Grading would proceed in a manner that would minimize erosion and conform to the natural topography. Revegetation following recontouring would also reduce visual impacts. The specifics on the final reclamation design implementation would be completed in consultation with interested parties.**

- **Effectiveness of Mitigation and Residual Effects:** The effectiveness of this mitigation in reducing the impact to less than significant is not likely; however, given the type and

scale of the action this mitigation would be the most effective at limiting the impact. The Slower, Longer Project Alternative would result in unavoidable physical change in the existing contour and character of the Project Area. The changes would be visibly most apparent over the active life of the Project, but would diminish through the completion of reclamation and revegetation activities contained as part of the Slower, Longer Project Alternative. The physical changes to the area would be permanent, but would lessen following the completion of final reclamation as natural processes continue to soften the line and form to match the surrounding landscape.

- **Impact 3.7.3.7-2:** The proposed buildings associated with the Slower, Longer Project Alternative would be visible from KOP #2, which is not consistent with VRM Class III management.

  **Significance of the Impact:** This impact is considered significant because of the views from KOP #2 during mining and process operations. The following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-2:** Visual contrast, associated with the buildings, would be reduced by using construction materials or paints that are earth tones. This would minimize color contrasts with the surrounding landscape.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would minimize color contrasts within the viewshed and effectively mitigate visual impacts from the buildings. There would be no residual effects from this impact.

#### 3.7.3.7.2 Lighting Effects

The Slower, Longer Project Alternative would result in unavoidable increases in the amount of light pollution associated with lighting required primarily for safety at the various facilities (processing facility, WRDFs, roads, etc.).

- **Impact 3.7.3.7-3:** The proposed mining activities associated with the Off-Site Transfer of Ore Concentrate for Processing Alternative would increase light pollution in the region.

  **Significance of the Impact:** This impact is not considered significant; however, the following mitigation measure would reduce the adverse effects of the impact.

- **Mitigation Measure 3.7.3.7-3:** To maintain dark sky conditions, and minimize visual disturbance, facility perimeter lighting, including lighting used to illuminate walkways, roadways, staging areas and parking areas, would be shielded so that the light would be cast in a downward direction. Low-pressure sodium lighting (or an improved technology, if readily available) would be used to reduce or eliminate detrimental lighting impacts and prevent unnecessary light pollution.

- **Effectiveness of Mitigation and Residual Effects:** Implementation of this measure would reduce the effects on the surrounding area and effectively mitigate impacts associated with light pollution in keeping with the objectives of dark sky goals.

## 3.8 Soil Resources

The soils resources section identifies the existing soil characteristics in the approximately **22,886-**acre Project Area, which includes the proposed open pit mine facility area, powerline corridor, and well field development area. This section also describes the potential impacts of the Proposed Action and alternatives on the soil resources within the Project Area, as well as mitigation measures to reduce these impacts.

### 3.8.1 Regulatory Framework

The laws, regulations, guidelines, and procedures that apply to management of soil resources potentially affected by the Proposed Action include the following:

#### 3.8.1.1 Bureau of Land Management, 43CFR Part 3800

Under 43 CFR Part 3800, the BLM has defined its final rule regarding Mining Claims Under the General Mining Laws; Surface Management to include performance standards that govern the operation and reclamation of surface mining projects. Section 3809.420(6)(b)(3) stipulates that the operator must initiate reclamation at the earliest feasible time and that reclamation shall include, but not be limited to: "(A) Saving of topsoil for final application after reshaping of disturbed areas have been completed; (B) Measures to control erosion, landslides, and water runoff; (C) Measures to isolate, remove, or control toxic materials; [and] (D) Reshaping the area disturbed, application of the topsoil, and revegetation of disturbed areas, where reasonably practicable..." When reclamation has been completed, the authorized officer shall be notified such that an inspection of the reclaimed areas can be made.

#### 3.8.1.2 Nevada Revised Statutes Chapter 519A: Reclamation of Lands Subject to Mining Operations of Exploration Projects

The Project is subject to the reclamation requirements under NRS 519A.200 and NRS 519A.210, which state that "A person shall not engage in a mining operation without a valid permit for that purpose issued by the Division [of Environmental Protection]" and that "A person who desires to engage in a mining operation must...agree in writing to assume the responsibility for the reclamation of any land damaged as a result of the mining operation." These statutes are enforced by NAC519A.325 and .330 which require the removal and stockpiling of topsoil and revegetation of the land. NAC519A.255 states that reclamation is not required beyond that approved by federal agency (i.e., the BLM).

#### 3.8.1.3 Nevada Best Management Practices

The use of BMPs in Nevada is addressed in the Handbook of Best Management Practices published by the Nevada Division of Environmental Protection and the Nevada Division of Conservation Districts (1994). The handbook references two definitions of BMPs. EPA guidelines define BMPs as "methods, measures, or practices to prevent or reduce water pollution, including but not limited to, structural and non-structural controls, operation and maintenance procedures, and scheduling and distribution of activities. Usually BMPs are applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility." NAC 445A.306 defines "Best Practices" as "measures, methods of

operation or practice that are reasonably designed to prevent, eliminate, or reduce water pollution from diffuse sources and that are consistent with the best practices in the particular field under the conditions applicable. This term is intended to be equivalent to the term 'best management practices' as used in federal statutes and regulations."

### 3.8.2 Affected Environment

#### 3.8.2.1 Study Methods

The term "soil", as used in this EIS, is defined as a natural body consisting of layers or horizons of minerals or organic matter of variable thickness, which differ from their parent material in their morphological, physical, chemical, and mineralogical properties as well as their biological characteristics. Topography, or local relief, controls much of the distribution of soils in the landscape to such an extent that soils of markedly contrasting morphologies and properties can merge laterally with one another and yet be in equilibrium under existing local conditions (Birkeland 1999).

The USDA NRCS was the primary source of information regarding soil resources within the Project Area. Digital soil survey maps from the Soil Survey Geographic Database (SSURGO) for the Diamond Valley and Eureka County Soil Survey Areas were compared to the Project boundary using GIS. A soil survey report was generated for the soil associations and complexes found within the Project Area. The report includes a description of physical soil characteristics, soil formation descriptions, and qualitative ratings for various soil use and management properties. The NRCS analyses of erodibility hazard potential and potential for use during reclamation activities as fill material and replacement topsoil has been incorporated as part of the evaluation of soil resources within the Project Area. Within the area of the potential water table drawdown in Kobeh Valley, soil erodibility has been assessed by looking at potential changes to the vegetation community.

Soil erodibility hazard potential has been assessed for both water driven and wind driven erosional causes on each soil unit within the Project Area. Erodibility ratings are based on analyzing the dominant conditions of the surface layer of each soil within a soil unit. Water driven causes have been qualified based on the NRCS K factor. The erosion K factor indicates the susceptibility of a soil to sheet and rill erosion by water, based primarily on the percentage of silt, sand, organic matter, and rock fragments within the soil unit and on soil structure and saturated hydraulic conductivity. Values of K range from 0.02 to 0.64 and have been qualified as being "slight" for K factor values between 0.02 and 0.17, "moderate" for values between 0.20 and 0.37, and "severe" for values between 0.43 and 0.64. Wind driven erosional causes have similarly been qualified based on NRCS wind erodibility group (WEG) ratings. WEG ratings range from 1 to 8 with values of 1 and 2 considered "severe", values from 3 to 6 considered "moderate", and values 7 and 8 considered "slight". The WEG value is closely correlated to the texture of the surface layer, the size and durability of surface clods, rock fragments, and organic matter, and the calcareous reaction potential of the soil. Soil moisture and frozen soil layers also influence WEG ratings **(NRCS 2012a)**.

NRCS ratings have been assigned to soils for their potential use as reclamation fill material based on soil properties that affect erosion and stability of the surface layer and the productive potential of the reclaimed soil. These properties include the sodium, salt, and $CaCO_3$ content of the soils, soil reaction (i.e., pH balance), available water capacity, erodibility, texture, rock

content, organic matter content, and other characteristics that affect fertility. Soils are rated "good", "fair", or "poor" based on the amount of suitable fill material available, the ease of excavation, and the performance of the material after it has been replaced. "Good" ratings reflect soils that are well suited for use as fill material, and the establishment of vegetation is relatively easy. "Good" soils are relatively stable, resist erosion, and have good productive potential. "Fair" soils possess certain soil properties that would need to be improved or supplemented to provide suitable fill material that promotes vegetative productivity. "Poor" soils would require difficult and costly improvements in order to provide suitable fill material during reclamation activities **(NRCS 2012a)**.

The NRCS has also assigned "good", "fair", and "poor" ratings to soils based on their potential use as reclamation topsoil. These soil ratings reflect the soil properties that promote plant growth and the ease of removing, loading, and spreading the material. Typically, soils that have been rated "good" contain more organic matter that improves the absorption and retention of water and nutrients, have sufficient depth to provide an adequate amount of material, and contain fewer rock fragments that would interfere with soil removal and spreading than soils rated "fair" or "poor" **(NRCS 2012a)**.

#### 3.8.2.2 Existing Conditions

The Project Area and cumulative effects study area (CESA) are located within the Central Nevada Basin and Range Major Land Resource Area (MLRA) (NRCS 2006). The Central Nevada Basin and Range MLRA is in the Great Basin Section of the Basin and Range geologic province. This area is dominated by nearly level, aggraded desert basins and valleys between series of north south mountain ranges. Locally, the Project Area lies in the southeastern corner of the Roberts Mountain between Kobeh Valley and Diamond Valley in Eureka County, Nevada. The Project Area is centered around Mount Hope, which forms the southern end of the Garden Valley, a subbasin of Pine Valley, and extends to the south and southwest into the Kobeh Valley.

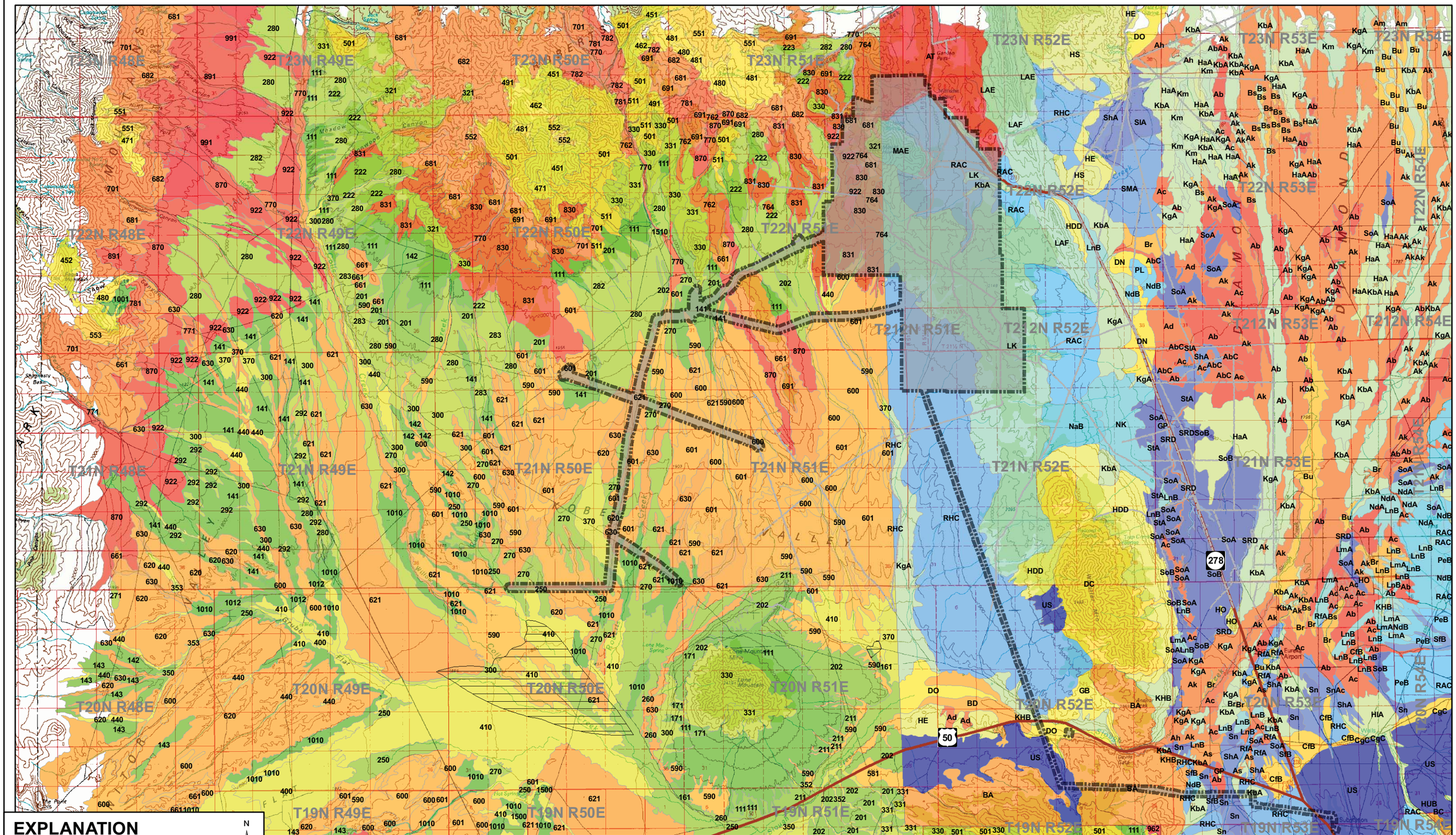
Forty-six soil units were identified within the Project Area from the SSURGO database analysis (Table 3.8-1, Figure 3.8.1). These soil units were mapped in the Diamond Valley and Eureka County Soil Mapping Areas.

**Table 3.8-1: Soils in the Project Area**

| Soil Mapping Unit Symbol | Soil Association or Complex Name | Acreage within the Project Area |
|---|---|---|
| Ab | Alhambra fine sandy loam | **9.9** |
| AT | Atrypa association | 814.5 |
| BA | Bartine-Overland association | **214.6** |
| DO | Dianev silty clay loam | **44.9** |
| KbA | Kobeh sandy loam | **235.2** |
| KHB | Kobeh gravelly fine sandy loam | **25.6** |
| LK | Labshaft-Rock outcrop complex | 6,815.3 |
| MAE | Mau stony loam | 775.7 |
| NdB | Nayped loam | **7**.5 |

| Soil Mapping Unit Symbol | Soil Association or Complex Name | Acreage within the Project Area |
|---|---|---|
| RAC | Ratto gravelly fine sandy loam | 3,054.6 |
| RHC | Rubyhill fine sandy loam | **3,138.1** |
| SfB | Shipley fine sandy loam | **22.5** |
| ShA | Shipley silt loam | **10.9** |
| Sn | Shipley complex | **18.0** |
| US | Umil association | **194.0** |
| 141 | Pedoli-Poorcal association | 3**20.6** |
| 201 | Umil loam | 4**9.2** |
| 202 | Umil-Hayeston association | 19.3 |
| 250 | Dianev silt loam | 105.4 |
| 270 | Poorcal loam | 3**40.8** |
| 280 | Coils loam | **544.7** |
| 321 | Mau-Shagnasty-Eightmile association | 159.9 |
| 330 | Hopeka-Solak-Ados association | **1.1** |
| 370 | Kobeh gravelly loam | 72.1 |
| 410 | Beanflat silt loam | 29.7 |
| 440 | Akercan loam | 133.0 |
| 590 | Hayeston sandy loam | **239.5** |
| 600 | Rubyhill sandy loam | 3**07.9** |
| 601 | Rubyhill-Barrier association | **909.2** |
| 620 | Silverado sandy loam | 23.2 |
| 621 | Silverado sandy loam | 316.**5** |
| 630 | Jesse Camp silt loam | 1**44.3** |
| 661 | Akerue-Simpark-Robson association | 17**4.7** |
| 681 | Chad-Cleavage-Softscrabble association | 269.8 |
| 764 | Shagnasty-Ravenswood-Rock outcrop association | 326.5 |
| 830 | Atrypa gravelly loam | 1,52**6.4** |
| 831 | Atrypa-Mau association | 857.**8** |
| 870 | Fortank very stony loam | 113.8 |
| 922 | Handy loam | 35**4.1** |
| 1010 | Bubus loam | 164.7 |
| Total | | 2**2,885.6** |

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.




## EXPLANATION

- Project Boundary
- Unpaved Road
- Eureka County Area Soil Associations
- Diamond Valley Area Soil Associations
- Phreatophytes within the 10-Foot Drawdown

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**BUREAU OF LAND MANAGEMENT**

**MOUNT HOPE PROJECT**

DRAWING TITLE:

**Soil Mapping Units within the Project Area**

**Figure 3.8.1**

The soils in the mountainous central part of the Project Area are typically very stony to very gravelly loams found on eight to 50 percent slopes intermixed with rocky outcrops. These soils are shallow to moderately deep over lithic and paralithic bedrock and derive from residuum and colluvium from mixed igneous, metamorphic, and volcanic rocks. Soils found in the hilly terrain surrounding Mount Hope are on slopes ranging from four to 30 percent and derive from volcanic rocks and limestone.

The Project Area extends south and southwest as the topography transitions into the Kobeh Valley. Soils are found on alluvial fans, inset fans, fan pediments, skirts, and remnants as the terrain becomes more gentle and slopes decrease to eight percent or less. These soils are moderately deep to deep over duripan and derive from alluvium from mixed igneous, sedimentary, and volcanic rocks and ash. Soil texture becomes more fine as gravelly loams give way to fine sandy and silty loams. Soils found in the basins and basin floors within the Project Area are deep and derive from alluvium from mixed rocks and volcanic ash.

Soil unit composition and physical characteristics are detailed in Table 3.8-2. The NRCS surface soil erodibility ratings for the soils within the Project Area are shown on Figure 3.8.2 and the NRCS ratings for soil use potential as reclamation fill material and topsoil are portrayed in Figure 3.8.3. These erodibility hazard ratings and soil use ratings were derived from the analysis of various physical soil properties and characteristics that promote ease of use, stability, and revegetative success described in Section 3.8.2.1.

Approximately 93.1 percent of the soils within the Project Area are rated “moderate” to “slight / moderate” for both wind and water driven erosion potential. A small percentage of the soils within the Project Area (approximately 4.3 percent) have a “severe” soil erodibility hazard rating for water caused erosion. These soils are located in the northern, western, and southern segments of the well field development area and the southern portion of the powerline corridor. Soils that have “slight” erodibility ratings are found on the western and southwestern slopes of Mount Hope and the eastern segments of the well field development area. These soils make up approximately 2.6 percent of the Project Area (Figure 3.8.2).

The majority of the Project Area is centered on Mount Hope and the surrounding foothills and pediments. The soils in these areas, making up approximately 72 percent of the Project Area, are considered “poor” for use as either reclamation fill material or topsoil. Scattered portions of the powerline corridor and well field areas extending south and southwest into the Kobeh Valley consist of soils that are rated “fair” for use as fill material. Soils in the powerline corridor are also considered “fair” for use as topsoil; however, only two percent of the Project Area, located in the northern and western segments of the well field area, contain soils that are rated “good” for use as topsoil (Figure 3.8.3).

In general, the soils within the Project Area would require moderate to substantial improvements for use as either fill material or topsoil that would promote optimal vegetative productivity. The consequences of weather and climate change on soils can be subtle and complex. The projected changes in climate – increases in temperature, reductions in soil moisture, and more intense rainfall events – may affect erosion, ability of soils to sequester carbon, impacts to soil moisture, and fugitive dust concentrations.

### 3.8.3 Environmental Consequences and Mitigation Measures

Potential issues related to soil resources within the Project Area as a result of the Proposed Action and alternatives include the following:

- Potential erosional impacts or loss of physical soil stability;
- Availability of suitable soils and growth media for reclamation;
- Potential for alteration in soil chemical stability; and
- Potential for successfully reclaiming mine-related disturbance.

#### 3.8.3.1 Significance Criteria

Environmental impacts to soils would be significant if the Proposed Action or other alternatives resulted in any of the following:

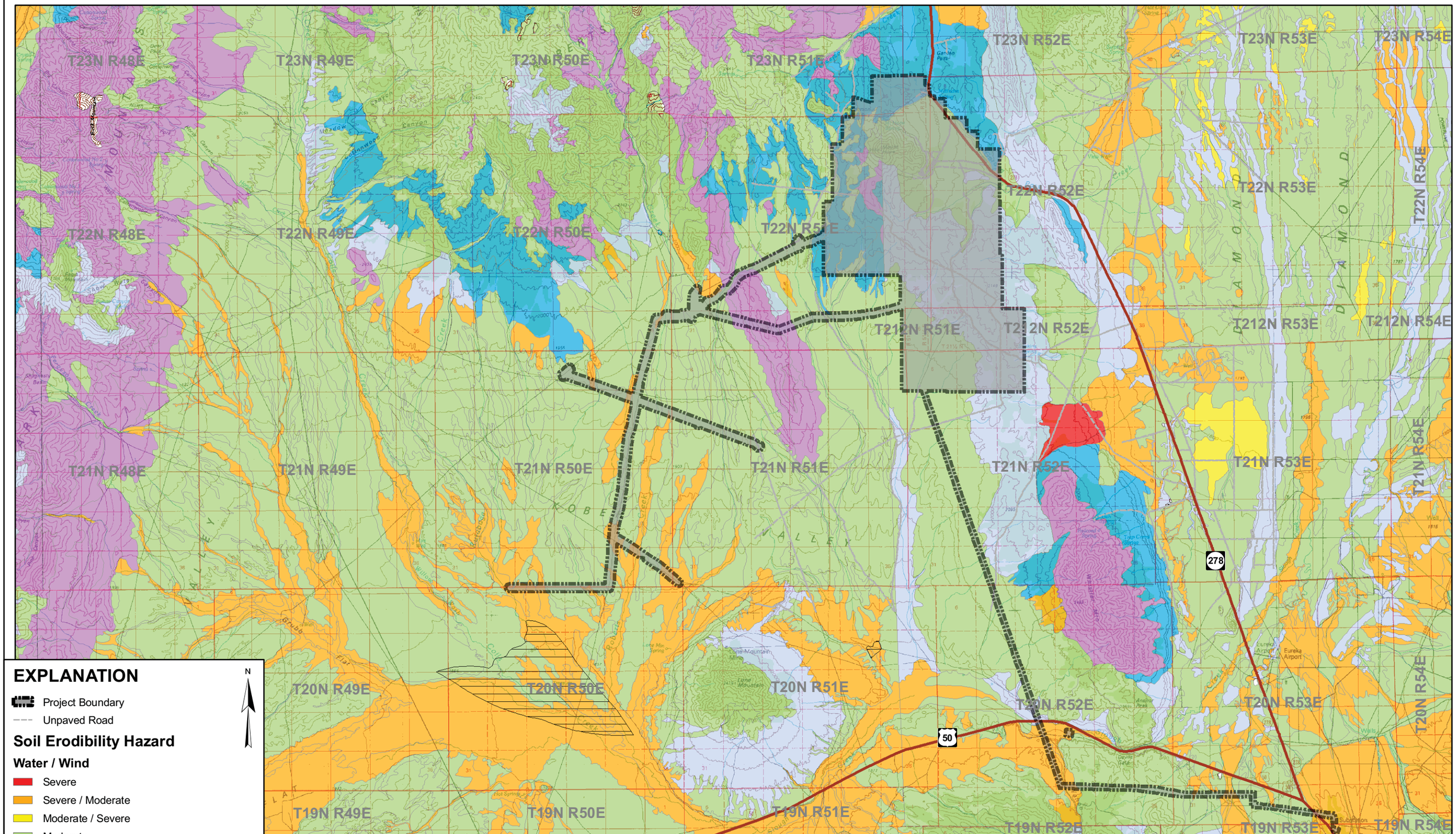
- Accelerated erosion in excess of soil loss tolerances on waste rock, pit slope, or stockpile facilities or other sloped surfaces;
- Substantial decrease in downstream water resource quality from erosion and sedimentation;
- Substantial decrease in the amount of overall site productivity from pre-mining to post-mining land uses;
- Compromised public safety through mass instabilities on slopes or fills, or inadequate closure procedures; and
- Loss of growth media during stockpiling or reclamation that would limit revegetation success.

#### 3.8.3.2 Assessment Methodology

Soils were assessed for erosion potential and for potential use as reclamation fill material and topsoil based on the NRCS ratings provided in the SSURGO database or a change in the vegetation community due to a decline in the water table. The analysis criteria that were used to determine these ratings are described above in Study Methods, Section 3.8.2.1. The environmental consequences and impacts described in the following sections are based on these ratings.

#### 3.8.3.3 Proposed Action

Direct impacts to soil resources within the Project Area would result from the disturbance of 8,3**55** acres under the Proposed Action. Many of the proposed facilities, such as the open pit, WRDFs, LGO stockpile, TSFs, and interpit area, would become permanent topographical features within the Project Area upon completion of the Project. Reclamation activities would include replacing growth media over the stabilized surface of these features prior to revegetation efforts. Growth media would be provided by salvaging and stockpiling the existing soil resources within the Project Area prior to the construction of Project facilities.




## EXPLANATION

- Project Boundary
- Unpaved Road

### Soil Erodibility Hazard

**Water / Wind**

- Severe
- Severe / Moderate
- Moderate / Severe
- Moderate
- Moderate / Slight
- Slight / Moderate
- Slight
- Not Rated
- Phreatophytes within the 10-Foot Drawdown

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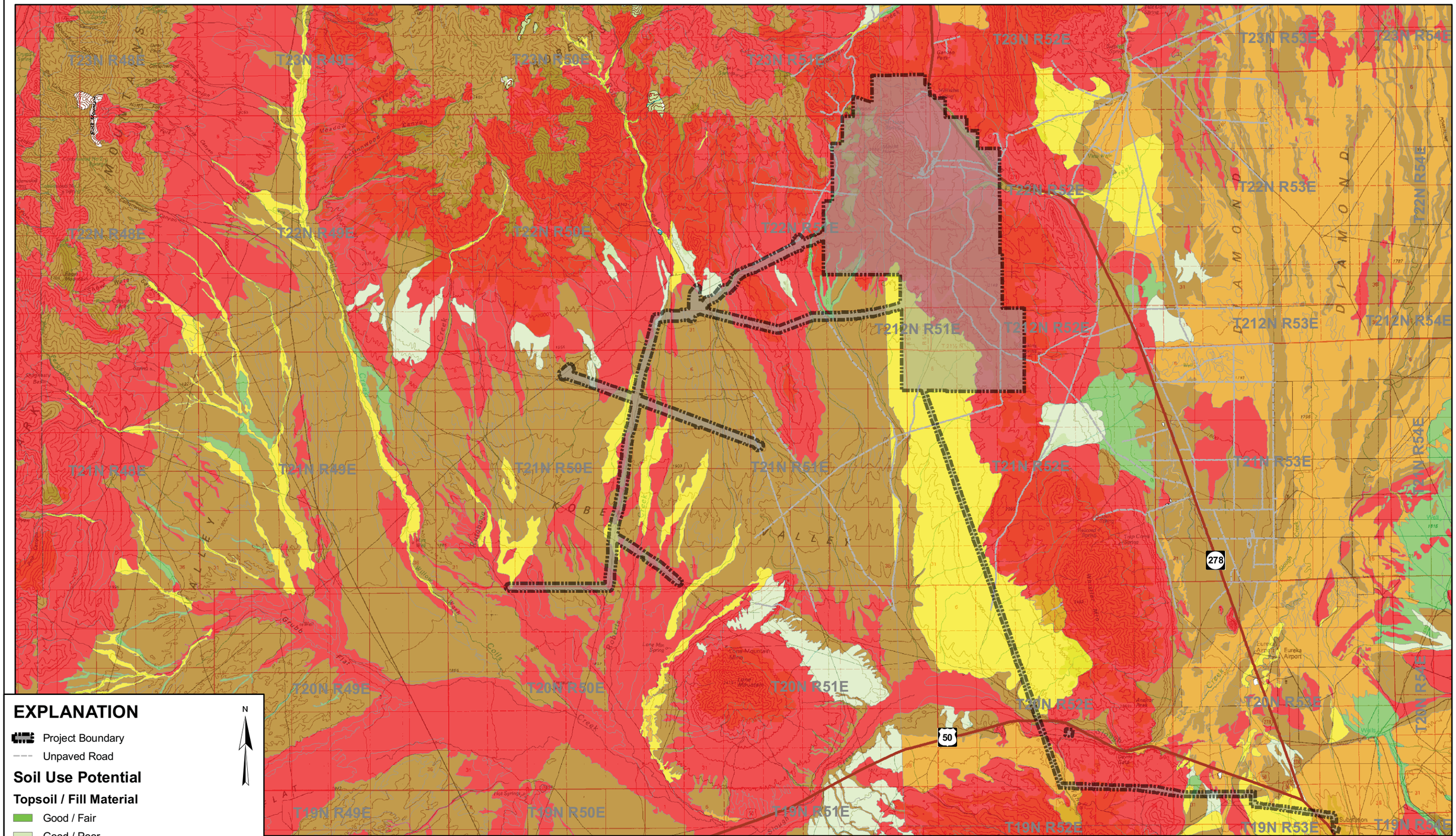
**BUREAU OF LAND MANAGEMENT**

**MOUNT HOPE PROJECT**

DRAWING TITLE:

**Soil Erodibility Hazard in the Project Vicinity**

**Figure 3.8.2**




## EXPLANATION

- Project Boundary
- Unpaved Road

### Soil Use Potential

**Topsoil / Fill Material**

- Good / Fair
- Good / Poor
- Fair
- Fair / Poor
- Poor / Fair
- Poor
- Not Rated

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**BUREAU OF LAND MANAGEMENT**

**MOUNT HOPE PROJECT**

DRAWING TITLE:

**Potential for Soil Use as Reclamation Fill Material and Topsoil in the Project Vicinity**

**Figure 3.8.3**

## Table 3.8-2: Summary of Soil Mapping Units and Characteristics

| Mapping Unit | Soil Series | Soil Depth in Inches (Restrictive Feature) | Hydrological Characteristics | Soil Erodibility Hazard | |
|---|---|---|---|---|---|
| | | | | By Water | By Wind |
| Alhambra fine sandy loam (Ab) | Alhambra (100%) | 60+ (unknown) | Well drained; high permeability; rarely flooded. | Moderate | Moderate |
| Atrypa association (AT) | Atrypa (60%) | 10 - 20 (paralithic bedrock) | Well drained; moderately high permeability. | Moderate | Slight |
| | Atrypa (30%) | 10 - 20 (paralithic bedrock) | Well drained; moderately high permeability. | | |
| Bartine-Overland association (BA) | Bartine (40%) | 20 - 40 (lithic bedrock) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Overland (40%) | 20 - 40 (lithic bedrock) | Well drained; moderately high permeability. | | |
| Dianev silty clay loam (DO) | Dianev (95%) | 60+ (unknown) | Somewhat poorly drained, moderately low permeability; rarely flooded; seasonal zone of water saturation March-June. | Severe | Moderate |
| Kobeh sandy loam (KbA) | Kobeh (100%) | 60+ (unknown) | Somewhat excessively drained; high permeability. | Moderate | Moderate |
| Kobeh gravelly fine sandy loam (KHB) | Kobeh (100%) | 60+ (unknown) | Somewhat excessively drained; high permeability. | Slight | Moderate |
| Labshaft-Rock outcrop complex (LK) | Labshaft (75%) | 10 - 20 (lithic bedrock) | Well drained; moderately high permeability. | Slight | Moderate |
| | Rock outcrop (15%) | 0 | N/A | | |
| Mau stony loam (MAE) | Mau (100%) | 20 - 40 (lithic bedrock) | Well drained; moderately low permeability. | Moderate | Moderate |
| Nayped loam (NdB) | Nayped (100%) | 60+ | Well drained; moderately high permeability. | Severe | Moderate |
| Ratto gravelly fine sandy loam (RAC) | Ratto (100%) | 12 - 20 (duripan) | Well drained; moderately low permeability. | Moderate | Moderate |
| Rubyhill fine sandy loam (RHC) | Rubyhill (100%) | 20 - 30 (duripan) | Well drained; moderately high permeability. | Moderate | Moderate |
| Shipley fine sandy loam (SfB) | Shipley (100%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| Shipley silt loam (ShA) | Shipley (100%) | 60+ (unknown) | Well drained; moderately high permeability; rarely flooded. | Severe | Moderate |
| Shipley complex (Sn) | Shipley variant (60%) | 60+ (unknown) | Well drained; moderately high permeability; rarely flooded. | Severe | Moderate |
| | Shipley (30%) | 60+ (unknown) | Well drained; moderately high permeability; rarely flooded. | | |

| Mapping Unit | Soil Series | Soil Depth in Inches (Restrictive Feature) | Hydrological Characteristics | Soil Erodibility Hazard | |
|---|---|---|---|---|---|
| | | | | By Water | By Wind |
| Umil association (US) | Umil (60%) | 7 - 14 (duripan) | Well drained; moderately high permeability. | Severe | Moderate |
| | Umil (30%) | 7 - 14 (duripan) | Well drained; moderately high permeability. | | |
| Lien-Hayeston association (111) | Lien (40%) | 6 - 14 (duripan) | Well drained, high permeability. | Slight | Moderate |
| | Lein (30%) | 6 - 14 (duripan) | Well drained; high permeability. | | |
| | Hayeston (15%) | 60+ (unknown) | Well drained; high permeability; rarely flooded. | | |
| Pedoli-Poorcal association (141) | Pedoli (65%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Poorcal (20%) | 60+ (unknown) | Well drained; moderately high permeability. | | |
| Pedoli-Shipley association (142) | Pedoli (80%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Shipley (15%) | 60+ (unknown) | Well drained; moderately high permeability; occasionally flooded. | | |
| Umil loam (201) | Umil (100%) | 7 - 14 (duripan) | Well drained; moderately high permeability. | Severe | Moderate |
| Umil-Hayeston association (202) | Umil (70%) | 7 - 14 (duripan) | Well drained; moderately high permeability. | Severe | Moderate |
| | Hayeston (20%) | 60+ (unknown) | Well drained; high permeability; rarely flooded. | | |
| Dianev silt loam (250) | Dianev (95%) | 60+ (unknown) | Somewhat poorly drained; moderately low permeability; occasionally flooded; seasonal zone of water saturation March-June. | Severe | Moderate |
| Poorcal loam (270) | Poorcal (100%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| Coils loam (280) | Coils (100%) | 20 - 40 (duripan) | Well drained; moderately low permeability. | Moderate | Moderate |
| Coils-Umil association (283) | Coils (50%) | 20 - 40 (duripan) | Well drained; moderately low permeability. | Moderate | Moderate |
| | Umil (40%) | 7 - 14 (duripan) | Well drained; moderately high permeability. | | |
| Rutab loam (300) | Rutab (100%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| Mau-Shagnasty-Eightmile association (321) | Mau (45%) | 20 - 40 (lithic bedrock) | Well drained; moderately low permeability. | Moderate | Moderate |
| | Shagnasty (30%) | 50 - 60 (paralithic bedrock) | Well drained; moderately low permeability. | | |

| Mapping Unit | Soil Series | Soil Depth in Inches (Restrictive Feature) | Hydrological Characteristics | Soil Erodibility Hazard | |
|---|---|---|---|---|---|
| | | | | By Water | By Wind |
| | Eightmile (15%) | 6 - 14 (paralithic bedrock) | Well drained; moderately high permeability. | | |
| Hopeka-Solak-Ados association (330) | Hopeka (45%) | 4 - 10 (lithic bedrock) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Solak (25%) | 10 - 20 (lithic bedrock) | Somewhat excessively drained; moderately high permeability. | | |
| | Ados (15%) | 30 - 40 (lithic bedrock) | Well drained; moderately high permeability. | | |
| Hopeka-Solak-Rock outcrop association (331) | Hopeka (40%) | 4 - 10 (lithic bedrock) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Solak (35%) | 10 - 20 (lithic bedrock) | Somewhat excessively drained; moderately high permeability. | | |
| | Rock outcrop (10%) | 0 | N/A | | |
| Kobeh gravelly loam (370) | Kobeh (100%) | 60+ (unknown) | Somewhat excessively drained; moderately high permeability. | Moderate | Moderate |
| Beanflat silt loam (410) | Beanflat (100%) | 60+ (unknown) | Somewhat poorly drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation December-May. | Severe | Moderate |
| Akercan loam (440) | Akercan (100%) | 60+ (unknown) | Well drained; moderately high permeability. | Moderate | Moderate |
| Hayeston sandy loam (590) | Hayeston (100%) | 60+ (unknown) | Well drained; high permeability; rarely flooded. | Moderate | Moderate |
| Rubyhill sandy loam (600) | Rubyhill (100%) | 20 - 30 (duripan) | Well drained; moderately high permeability. | Moderate | Moderate |
| Rubyhill-Barrier association (601) | Rubyhill (60%) | 20 - 30 (duripan) | Well drained; moderately high permeability. | Moderate | Moderate |
| | Barrier (25%) | 10 - 20 (duripan) | Well drained; moderately high permeability. | | |
| Silverado sandy loam (620) | Silverado (100%) | 60+ (unknown) | Well drained; high permeability. | Moderate | Moderate |
| Silverado sandy loam (621) | Silverado (100%) | 60+ (unknown) | Well drained; high permeability. | Moderate | Moderate |
| Jesse Camp silt loam (630) | Jesse Camp (100%) | 60+ (unknown) | Well drained; moderately high permeability; rarely flooded. | Severe | Moderate |
| Akerue-Simpark-Robson association (661) | Akerue (40%) | 15 - 26 (lithic bedrock) | Well drained; moderately low permeability. | Slight | Slight |
| | Simpark (35%) | 20 - 30 (lithic bedrock) | Well drained; moderately high permeability. | | |
| | Robson (10%) | 12 - 20 (lithic bedrock) | Well drained; moderately low permeability. | | |

| Mapping Unit | Soil Series | Soil Depth in Inches (Restrictive Feature) | Hydrological Characteristics | Soil Erodibility Hazard | |
|---|---|---|---|---|---|
| | | | | By Water | By Wind |
| Chad-Cleavage-Softscrabble association (681) | Chad (45%) | 40 - 60 (paralithic bedrock) | Well drained; moderately low permeability. | Moderate | Moderate |
| | Cleavage (20%) | 14 - 20 (lithic bedrock) | Well drained; moderately high permeability. | | |
| | Softscrabble (20%) | 60+ (unknown) | Well drained; moderately low permeability. | | |
| Shagnasty-Ravenswood-Rock outcrop association (764) | Shagnasty (45%) | 50 - 60 (paralithic bedrock) | Well drained; moderately low permeability. | Slight | Slight |
| | Ravenswood (25%) | 30 - 40 (lithic bedrock) | Well drained; moderately low permeability. | | |
| | Rock outcrop (15%) | 0 | N/A | | |
| Welch loam (770) | Welch (95%) | 60+ (unknown) | Well drained; moderately high permeability; occasionally flooded; seasonal zone of water saturation February-May. | Moderate | Moderate |
| Atrypa gravelly loam (830) | Atrypa (100%) | 10 - 20 (paralithic bedrock) | Well drained; moderately high permeability. | Moderate | Slight |
| Atrypa-Mau association (831) | Atrypa (75%) | 10 - 20 (paralithic bedrock) | Well drained; moderately high permeability. | Moderate | Slight |
| | Mau (15%) | 20 - 40 (lithic bedrock) | Well drained; moderately low permeability. | | |
| Fortank very stony loam (870) | Fortank (100%) | 30 - 40 (paralithic bedrock) | Well drained; moderately low permeability. | Slight | Slight |
| Handy loam (922) | Handy (100%) | 60+ (unknown) | Well drained; moderately low permeability. | Moderate | Moderate |
| Bubus loam (1010) | Bubus (100%) | 60+ (unknown) | Well drained; moderately high permeability. | Severe | Moderate |

Shaded rows denote mapping units that occur in the Diamond Valley Area, including portions of Eureka, Elko, and White Pine Counties. All other mapping units occur in the Eureka County Area.

Up to 21 million $yd^3$ of soil material could be salvaged from the disturbance footprint of Project facilities and stockpiled for use as interim and final reclamation cover material and growth media. Soil would be stripped from targeted soil units based on analyses of the NRCS soil mapping database and previous and proposed field testing. Salvaged soils would be stockpiled and designated as strictly organic, inorganic, or a mixture of both. Organic soils would be used as growth media topsoils, while the inorganic material would be stockpiled for use as cover material. Organic and inorganic growth media may be mixed if sufficient amounts of inorganic material are stockpiled for use as engineered cover. Soil and growth media stockpiles would have a higher erosion potential than the natural environment due to the potential for decreased soil compaction, increased slope gradients, and the loss of stabilizing vegetation cover. Growth

media stockpiles would be stabilized and revegetated following the removal of material for the reclamation of other facilities during final reclamation activities.

Soil erosion potential for other areas of disturbance within the Project Area would also be higher than the natural environment. The construction of sloped facilities, such as the WRDFs, LGO Stockpile, TSFs, and open pit, would increase the erodibility hazard of soils until the completion of stabilization and revegetation activities during reclamation. The construction of other features, including the yards and processing facilities, haul, secondary, and exploration roads, pipeline and powerline corridors, sediment control structures, water supply facilities, other ancillary facilities, and mineral exploration, would also increase the erosion potential of soils within the Project Area. Final reclamation activities under the Proposed Action would include the stabilization and revegetation of all disturbed areas within the Project Area. An indirect effect **to soils** could **occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover of phreatophytic vegetation in Kobeh Valley (Cooper et al. 2006). This would result in a change in vegetation species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

Potential increases in the soil erodibility hazard within the Project Area would be reduced by the implementation of **applicant** committed **practices** and BMPs by the applicant. Erosion and the sedimentation of precipitation runoff would be reduced through the diversion and routing of storm water around Project facilities and the construction of runoff controls (e.g., berms) and sediment collection ponds to protect downstream water quality. Potential wind and water erosion would be reduced by the placement of protective rock and gravel cover. Following construction, areas such as cut and fill embankments and growth media stockpiles would be seeded as soon as practicable and safe to provide vegetation cover that would also reduce wind and water erosion potential. Concurrent reclamation would be maximized to the extent practicable to accelerate the revegetation of disturbed areas. All sediment and erosion control measures would be inspected periodically and repairs or maintenance performed as necessary.

- **Impact 3.8.3.3-1:** Based on the 8,3**55** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Proposed Action due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  **Significance of the Impact:** Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

Potential impacts to soil resources within the Project Area would also include the loss of suitable growth media necessary for the successful reclamation of areas disturbed under the Proposed

Action. Reclamation under the Proposed Action would require the re-establishment of vegetation communities consistent with the pre-mining environment. To achieve this, reclamation activities would include the replacement of growth media, of suitable quality, over disturbed areas prior to revegetation efforts. Table 2.1-8 shows that at least 14.3 million $yd^3$ of material would be needed to reclaim the disturbed areas within the Project Area.

As described above, up to 21 million $yd^3$ of growth media could be stripped and stockpiled under the Proposed Action. This estimate takes into consideration a predicted ten percent material loss during the salvaging and stockpiling process. Growth media would be stripped during the development of the mine open pit and during construction of the WRDFs and TSFs. The characterization, salvage technique, and stockpiling of growth media would be carried out under the GMMP included in Appendix 10 of the Plan. The GMMP would be a living document that would be implemented to ensure sufficient quantities of suitable growth media are salvaged during the development and operation of the Project. The GMMP includes discussions on proper salvage criteria and techniques, stockpile construction and management practices, storm water and erosion control measures, growth media inventory practices and record keeping, and safety considerations. Under the GMMP, alluvium is considered suitable growth media under the Proposed Action; however, this should not significantly affect growth media quality since the majority of the soils that exist within the Project Area are rated "poor" by the NRCS for use as reclamation topsoil.

- **Impact 3.8.3.3-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Proposed Action.

  **Significance of the Impact:** Based upon the implementation of the GMMP, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

Soil horizon formation is a function of a range of geological, chemical, and biological processes that occur over very long time periods. Surface layer soils typically have higher organic matter content and contain higher nutrient levels than subsurface soils. Project-related surface disturbance, including the stripping of growth media, as described above, would inherently include the unavoidable impact of mixing existing soil horizons as soil is removed, transported, and stockpiled for use during reclamation. Soil biological activity and nutrient cycling would be substantially reduced or eliminated during stockpiling as a result of anaerobic conditions created in deeper portions of the stockpiles; therefore, growth media and cover replaced on Project facilities may not exhibit the level of soil productivity that the naturally occurring soil horizon stratigraphy provides.

The NRCS has rated the majority of the soils within the Project Area as "poor" for use as topsoil. This indicates that the disruption of the naturally occurring soil horizons would not significantly impact the pre-existing soil productivity. Furthermore, previous successful mine reclamation projects utilizing growth media salvaging techniques similar to the Proposed Action have shown that the effectiveness of the soil material to function as growth media is not significantly diminished as a result of stockpiling (Imus 1992).

- **Impact 3.8.3.3-3:** Surface disturbance activities under the Proposed Action would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  **Significance of the Impact:** Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Proposed Action, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.3.1 Residual Adverse Impacts

Implementation of the Proposed Action would result in the unintentional and unavoidable loss of minor amounts of growth media during the salvaging process; however, this impact is mitigated by the ten percent loss consideration used to estimate the total amount of growth media that would be salvaged under the Proposed Action. Furthermore, minor degradation in soil stability and productivity may result from the physical processes of stripping, stockpiling, and replacing growth media over the course of the Project lifespan.

3.8.3.4 No Action Alternative

Under the No Action Alternative, the Proposed Action would not take place; however, EML has **seven** Notices that authorize exploration activities to take place within the Project Area, allowing a total of 3**5** acres of surface disturbance. This disturbance would be isolated and scattered throughout the Project Area; therefore, under the No Action Alternative, impacts to soil resources caused by surface disturbance would be reduced from 8,3**55** acres to 3**5** acres. The impacts discussed under the Proposed Action, including soil erosion and stability impacts, availability of growth media for use during reclamation, and the mixing of existing soil horizons, would be significantly reduced, if not eliminated, under the No Action Alternative. The impact to soil productivity from potential PAG rock infiltration and metal leaching would be eliminated entirely under the No Action Alternative.

- **Impact 3.8.3.4-1:** Based on the 3**5** acres of direct effects to soils, accelerated soil erosion rates may occur under the No Action Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  **Significance of the Impact:** Based upon the implementation of **applicant committed practices**, BMPs, reclamation activities, and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the No Action Alternative.

  **Significance of the Impact:** Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

- **Impact 3.8.3.4-3:** Surface disturbing activities under the No Action Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  **Significance of the Impact:** Based upon the pre-existing soil conditions and the insignificant amount of surface disturbance that would be caused by the No Action Alternative, this impact is considered less than significant, and no further mitigation measures are proposed.

3.8.3.4.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the No Action Alternative would correspond to, but significantly less than, those described under the Proposed Action.

3.8.3.5 Partial Backfill Alternative

The impacts to soil resources under the Partial Backfill Alternative would be nearly identical to those described under the Proposed Action. Under the Partial Backfill Alternative, all Project operations would be carried out as described under the Proposed Action, creating the same amount of surface disturbance (8,3**55** acres) and associated direct and indirect effects; however, the Partial Backfill Alternative would create approximately 527 acres of surface disturbance that would require reclamation as the open pit is backfilled to a grade above the ground water level that would otherwise form a lake under the Proposed Action. Backfill material would be supplied from the Non-PAG WRDF such that all Non-PAG rock would be replaced into the open pit. The backfilled surface would then be reclaimed by replacing growth media prior to revegetation. Similar to the Proposed Action, an indirect effect **to** soils **could occur as a result of the decline in** the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion**. An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.5-1:** Based on the 8,3**55** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Partial Backfill Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  **Significance of the Impact:** Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

The Partial Backfill Alternative would alter the amount of growth media required for reclamation activities such that the 527-acre, backfilled, open pit bottom would be covered and reclaimed in a manner consistent with the rest of the Project facilities described under the Proposed Action; therefore, an additional 1.7 million $yd^3$ of growth media would be required to complete the reclamation process under the Partial Backfill Alternative. Growth media would still be required to cover the foundation of the PAG disposal facility and the remaining Non-PAG waste rock at the completion of the backfilling process.

The same amount of growth media (21 million $yd^3$) would be salvaged and stockpiled under the Partial Backfill Alternative as under the Proposed Action. This amount of material would be sufficient to provide cover for the reclamation of the facilities described under the Proposed Action with an estimated six million $yd^3$ of growth media remaining. Since it would only require 1.7 million $yd^3$ of material to cover the additional 527 acres of the backfilled mine pit bottom, there would be no significant impact to growth media availability for use during reclamation under the Partial Backfill Alternative.

- **Impact 3.8.3.5-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Partial Backfill Alternative.

  **Significance of the Impact:** Based upon the implementation of the GMMP, which would provide sufficient growth media for use during reclamation of the additional 527 acres required under the Partial Backfill Alternative, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

Surface disturbance and the construction of Project facilities would be identical under the Partial Backfill Alternative and the Proposed Action; therefore, the impacts to soil resources within the Project Area regarding soil horizon mixing would be the same under the Partial Backfill Alternative as those under the Proposed Action.

- **Impact 3.8.3.5-3:** Surface disturbing activities under the Partial Backfill Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  **Significance of the Impact:** Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Partial Backfill Alternative, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

3.8.3.5.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Partial Backfill Alternative would be identical to those described under the Proposed Action.

### 3.8.3.6 Off-Site Transfer of Ore Concentrate for Processing Alternative

The impacts to soil resources, both direct and indirect, within and adjacent to the Project Area would be the same under the Off-Site Transfer of Ore Concentrate for Processing Alternative as those described under the Proposed Action. Surface disturbance and the construction of Project facilities would be identical under both alternatives with the exception of 20 acres of surface disturbance associated with the TMO and FeMo processing facilities. These facilities would not be constructed under the Off-Site Transfer of Ore Concentrate for Processing Alternative, thereby reducing the total Project-related surface disturbance to approximately **8,315** acres; therefore, under the Off-Site Transfer of Ore Concentrate for Processing Alternative, the potential impacts to soil resources would be approximately 20 acres less than those under the Proposed Action. Similar to the Proposed Action, an indirect effect **to** soils **could occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.6-1:** Based on the **8,315** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Off-Site Transfer of Ore Concentrate for Processing Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  **Significance of the Impact:** Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

- **Impact 3.8.3.6-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative.

  **Significance of the Impact:** Based upon the implementation of the GMMP, this impact is not considered.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

- **Impact 3.8.3.6-3:** Surface disturbance activities under the Off-Site Transfer of Ore Concentrate for Processing Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

**Significance of the Impact:** Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Off-Site Transfer of Ore Concentrate for Processing Alternative, this impact is not considered significant.

**No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

3.8.3.6.1 Residual Adverse Impacts

Residual adverse impacts to soil resources under the Off-Site Transfer of Ore Concentrate for Processing Alternative would be identical to those described under the Proposed Action.

3.8.3.7 Slower, Longer Project Alternative

Impacts to soils from the Slower, Longer Project Alternative are expected to be similar to impacts from the Proposed Action at the end of the Project; however, impacts from the Slower, Longer Project Alternative would occur over a period approximately twice as long in duration compared to the Proposed Action. **Similar to the Proposed Action, a**n indirect effect **to** soils **could occur as a result of** the decline in the water table in Kobeh Valley due to the pumping of ground water for mine operations. This decline in the water table could **result in a shift from a more hydric soil to a more xeric soil. This change in soil conditions could result in a shift in species composition and percent cover; however, this change should not result in a net loss of vegetation sufficient to increase soil erosion.** An additional indirect effect would occur if fissures develop as a result of subsidence associated with the ground water pumping. If fissures develop (see Section 3.2.3) and surface water run-off is captured by the fissures, then the adjacent soils would be eroded into the fissures.

- **Impact 3.8.3.7-1:** Based on the 8,3**55** acres of direct disturbance of soils and the potential indirect effect to soils in Kobeh Valley as a result of potential fissure development and loss of vegetation, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative due to continued surface soil disturbance, the removal of vegetation cover, alterations in soil compaction and slope gradients, and soil salvaging and stockpiling activities.

  **Significance of the Impact:** Based upon the implementation of **applicant committed practices**, BMPs, and reclamation activities, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

- **Impact 3.8.3.7-2:** Growth media availability and quality necessary for the successful reclamation of the Project Area may decrease as a result of surface disturbance activities under the Slower, Longer Project Alternative.

  **Significance of the Impact:** Based upon the implementation of the GMMP, this impact is not considered significant.

**No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

- **Impact 3.8.3.7-3:** Surface disturbance activities under the Slower, Longer Project Alternative would cause the unavoidable mixing of existing soil horizons that may decrease soil productivity.

  **Significance of the Impact:** Based upon the pre-existing soil conditions and the proven methods for growth media management that would be implemented under the Slower, Longer Project Alternative, this impact is not considered significant.

  **No mitigation is proposed for this impact; see Section 3.1.1 for a general discussion of significance and the development of mitigation measures.**

#### 3.8.3.7.1 Residual Adverse Impacts

**Residual adverse impacts to soil resources under the Slower, Longer Project Alternative would be similar to those described under the Proposed Action. However, accelerated soil erosion rates may occur under the Slower, Longer Project Alternative for a longer duration of proposed activities relative to the Proposed Action.**

## 3.9 Vegetation Resources

This section addresses vegetation resources in and near the Project Area including information on plant communities. Wetland and riparian areas are discussed in Section 3.11.

### 3.9.1 Regulatory Framework

#### 3.9.1.1 Endangered Species Act

The Federal ESA of 1973, as amended, safeguards the continued existence of any species classified as "endangered" or "threatened," as well as habitat that is determined by the Secretary of the Interior to be critical to such species. The ESA is administered by the USFWS, in consultation with other federal and state agencies. The ESA defines the following terms:

- Endangered species: "... any species which is in danger of extinction throughout all or a significant portion of its range..."
- Threatened species: "... any species which is likely to become an endangered species within the foreseeable future..."
- Critical habitat: "... the specific areas within the geographical area occupied by the species... on which are found those physical or biological features (i) essential to the conservation of the species, and (ii) which may require special management considerations or protection..."

The ESA prohibits the "take" (i.e., killing, harming, or harassment) of listed threatened or endangered species without special exemptions. Candidate species are species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Analogous to the ESA,