RECLAMATION

Managing Water in the West

Patua Bypass Road

Environmental Assessment

U. S. Department of the Interior
Bureau of Reclamation
Lahontan Basin Area Office
705 N. Plaza, Room 320
Carson City, NV 89701

January 2009

ENVIRONMENTAL ASSESSMENT

PATUA BYPASS ROAD

Churchill County, Nevada

U.S. Bureau of Reclamation
Lahontan Basin Area Office
Carson City, Nevada

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1.0 INTRODUCTION

1.1 Background

The Bureau of Reclamation (Reclamation) Newlands Project provides water for irrigation and wetlands purposes from the Truckee and Carson Rivers for approximately 57,000 acres in the Lahontan Valley near Fallon and Fernley in western Nevada.

Reclamation has withdrawn land in Churchill County, Nevada, for the Newlands Project. Vulcan Power Company (Vulcan) is requesting authorization to construct a bypass road in T20N, R26E Ssection 28, Mount Diablo Meridian (MDM), northwest of Hazen, NV. The new right-of-way would be parallel to and up to 50 feet southwest of the existing Kinder Morgan right-of-way for a total length of 1550 feet (0.29 miles). Figure 1 shows the location of the proposed bypass road in Section 28. The road would be 15 feet wide over the length of this course. Road construction would consist of making a 10-15 foot deep slot cut for a maximum of 450 feet (0.085 miles) of the total 1550 foot proposed roadway. Grading of the remaining portions of the proposed road area would not require removal of additional soil material; the majority of the material removed from the cut area would be placed directly on the remaining portion of the improvement (0.205 miles/1,100 feet). Temporary stockpiling of material would be limited to topsoil, organic material, and rock/cobble/gravel cover in accordance with the revegetation specifications (Appendix C - Revegetation and Erosion Control Specifications). Figure 2 shows a cross-section of the proposed work. The construction activity would occur within the 70-foot wide right-of-way and would not affect the Kinder Morgan pipeline. The duration of construction shall not exceed 21 days. No temporary work areas outside the right-of-way would be required. The improvement is intended for year-round use.

The Bureau of Land Management (BLM) has issued geothermal leases to Vulcan on 15 square miles of federal land in the Hazen area, held in a checkerboard pattern with private holdings. Reclamation has surface management authority over six of these sections and will review proposals for geothermal development on lands under its jurisdiction. The Kinder-Morgan right-of-way passes through two of these sections, sections 20 and 28.

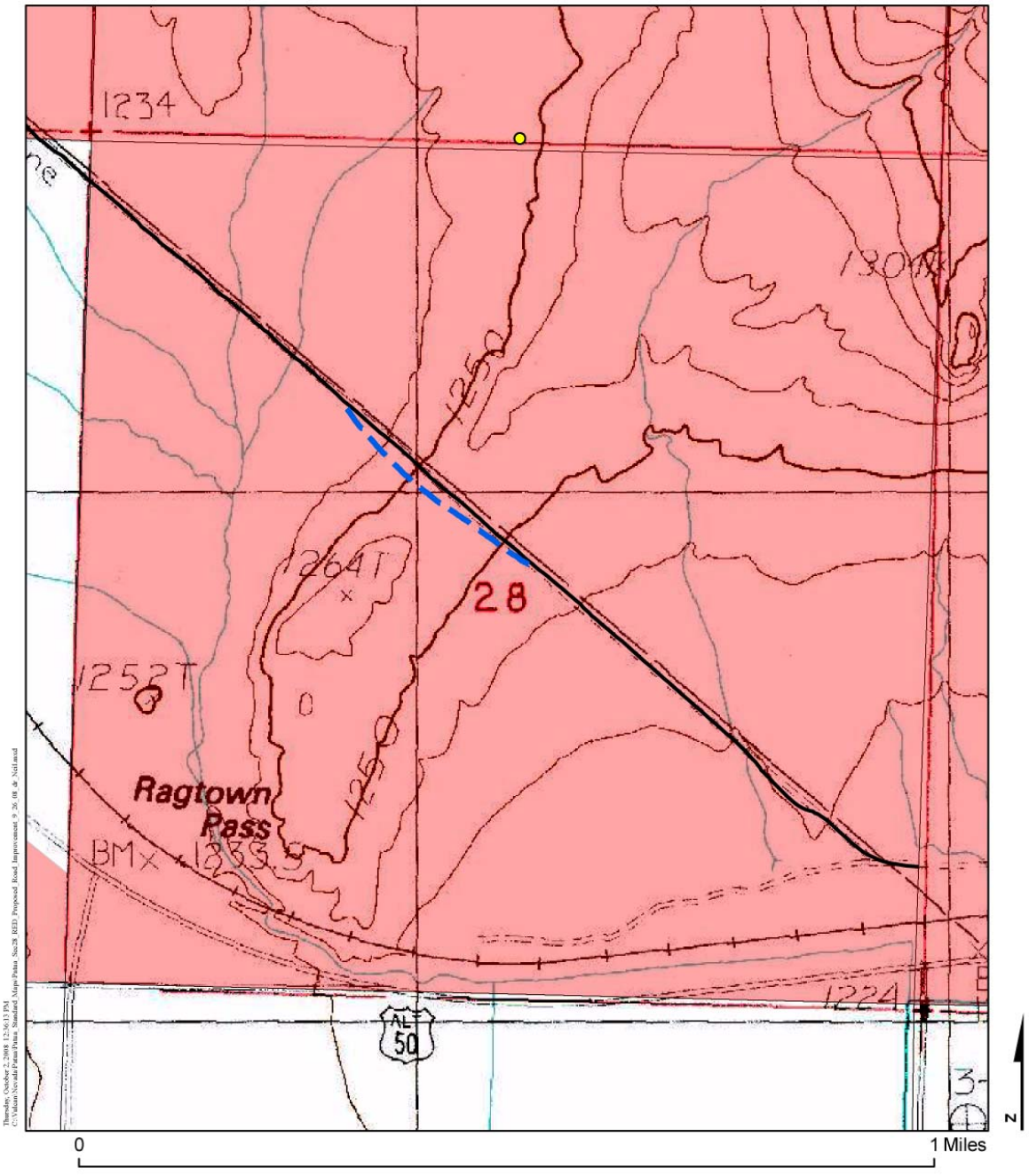
The proposed bypass road would allow Vulcan to explore the potential for the geothermal resources in privately held portions of the Hazen-Patua lease area. Figure 3 shows the Vulcan leases in the Hazen area and the access road through Reclamation land to the privately held lease areas in section 17, T20N, R26E, MDM. Vulcan has two Nevada Division of Minerals permits for wells in section 17, Permit 826 and 827 for Industrial Production Wells 23-17 and 37-17. Vulcan has constructed the well pads at these locations in Lyon County, NV, using existing access road through private and Reclamation lands to reach these private holdings, but cannot use the 1500-foot portion of this road in section 28 to bring in heavy equipment, such as the drill rigs and large water trucks. The drilling rigs include a rotary drill rig and a triple rig. The large water trucks are necessary for compliance with atmospheric dust control regulations.

1.2 <u>Location of Patua Bypass Road:</u>

A strip of land extending from the NW1/4 of the SE1/4 of Section 28, T20N, R26E into the Southeast Quarter of the Northwest Quarter of Section 28, T20N, R26E, MDM, County of Churchill, NV; said strip having a total width of 70 feet, lying within 35 feet on each side of the following described centerline.

The true point of beginning lies on the centerline of an existing gravel road (Kinder Morgan right-of-way), distant South 1°05’24” East, 2626.75’ from a 2-inch iron pipe with a 2.5-inch U.S. Government Land Office (USGLO) brass cap set at the N¼ Corner of said section (28), thence along the following four (4) courses:

VULCAN POWER COMPANY

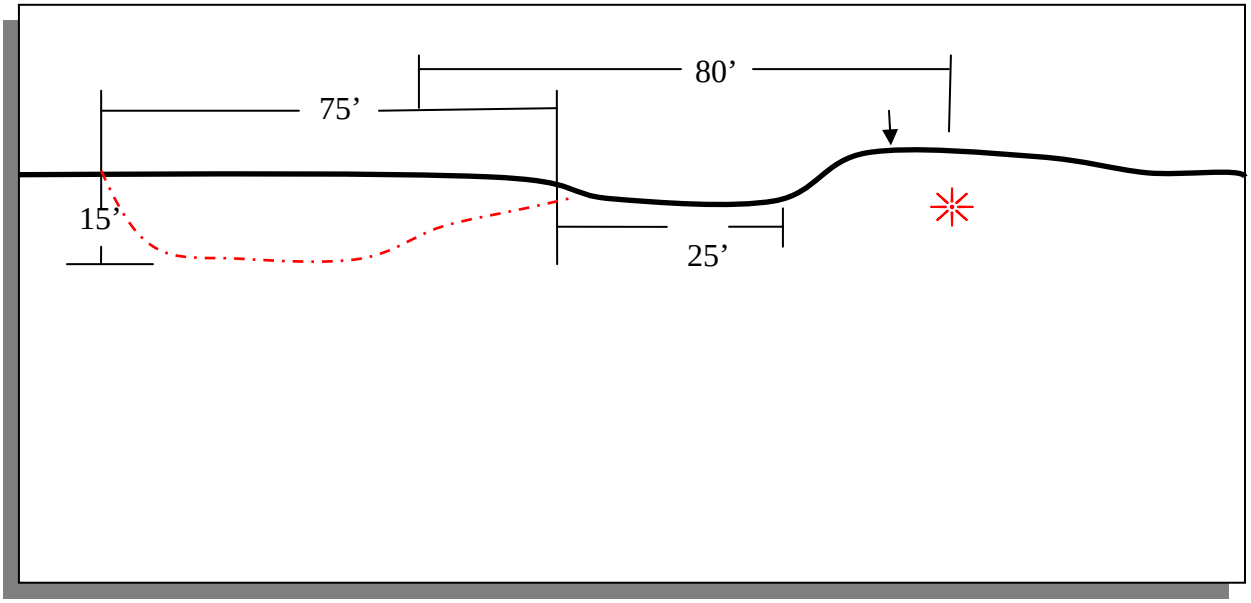


Vulcan Private & BLM Issued Leases
BLM & Private non-issued Leases
Roads
Proposed Road Improvement
Survey Monuments
Boundaries from US PLSS.
Approximate.

Figure 1

Proposed Patua Bypass Road Location

Figure 2. Proposed Patua Bypass Road North-South Cross Section at highest project area elevation.



Present Topography
Proposed Cut
Kinder Morgan Pipeline location

Figure 2
Proposed Patua Bypass Road Construction

1) North 55°24’36” West 705.09 feet.
2) North 49°09’36” West 303.35 feet.
3) North 42°25’22” West 378.90 feet.
4) North 33°27’22” West 140.47 feet, more or less, to the center of the existing Kinder Morgan road centerline at a point South 34°03’00” West, 1951.67 feet from said N¼ Corner of S28, T20N, R26E, MDM, in Churchill County, NV.

The sidelines of said strip of land being lengthened or shortened as necessary to begin in said existing road centerline and terminate in said existing road centerline. The approximate area of the strip of land is 2.6 acres.

The Basis of Bearings for the above described access road is a line between the NW Corner of Section 29 and the N¼ Corner of S28, T20N, R26E, MDM, in the County of Churchill, NV, bearing South 88°19’48” East 7967.979’. This bearing in reference to the North American Datum 1983 (NAD 83) Modified State Plane Coordinate System West Zone and GPS survey of the following USGLO Section corner markers:

	N Coordinate	E Coordinate
(1) N¼ Corner Monument (S28, T20N, R26E)	4382860 N	322113 E
(2) NW Corner Monument (S29, T20N, R26E)	4382930 N	319686 E

Said monuments being permanent survey markers located in the immediate project area.

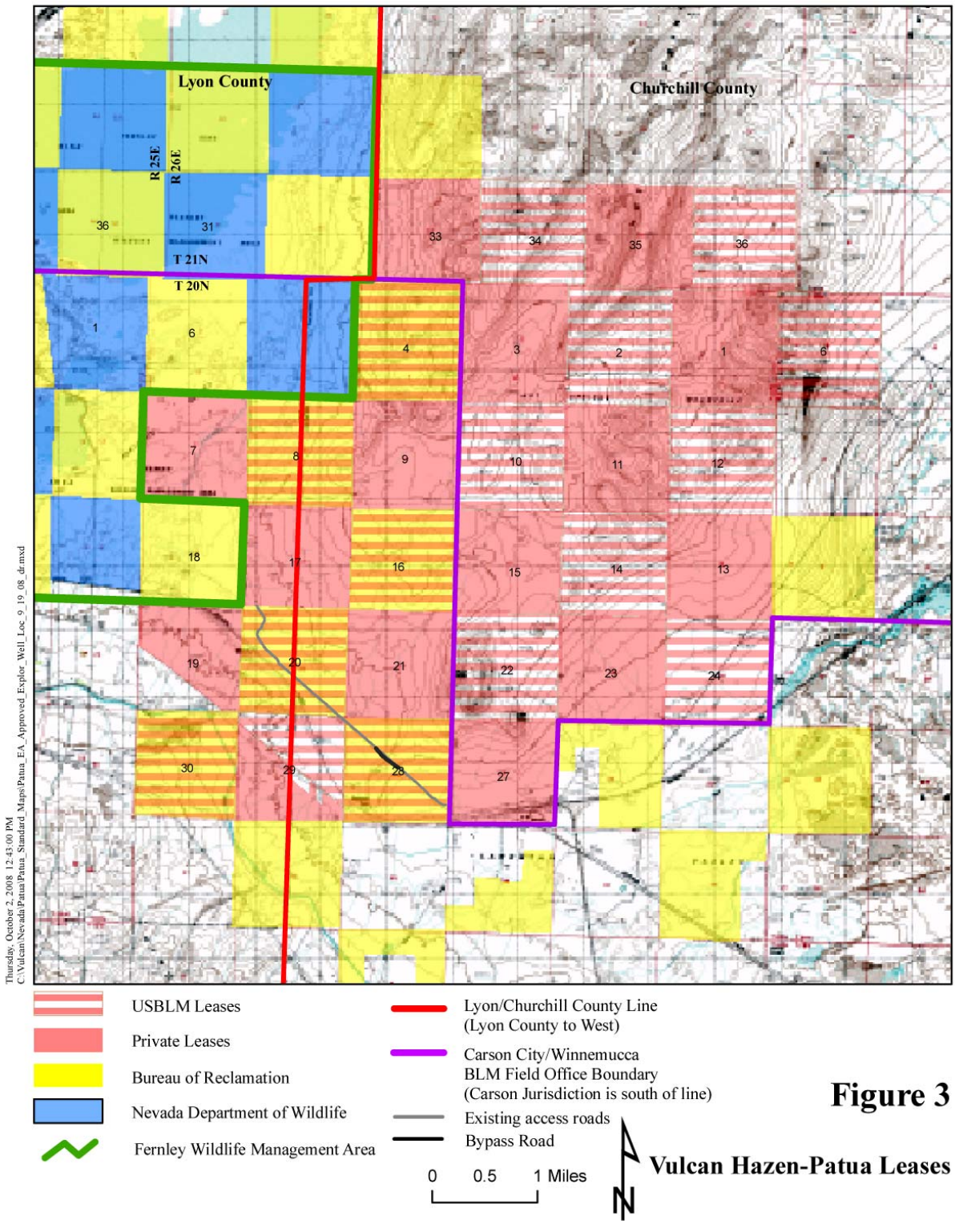


Figure 3

Vulcan Hazen-Patua Leases

1.3 Use Authorization

Reclamation Manual Directives and Standards LND 08-01 - Land Use Authorizations discusses Reclamation's direction related to use of Reclamation managed lands as follows:

Permit/License.

Use of Permit/License. The majority of use authorizations issued are generally in the form of permits and licenses as applicants seldom need greater (easement) interest, and granting greater land interest is often not in the best public interest. Authorizations for short-term (less than three years) or one-time short-duration use authorizations such as for recreation events, material storage, or for other miscellaneous temporary uses or privileges are the types of uses authorized through permits. Construction or placement of transmission or distribution lines, access roads, trails, pipelines, power lines, telephone lines, and other facilities involving installation or construction of longer-term capital improvements (requiring amortization periods over three years) are the types of uses authorized through a longer term license. Permits and licenses constitute a contract between the parties.

Term of Permit/License. All licenses, including permits, should be limited to a period of 25 years or less. Perpetual terms are discouraged except in limited circumstances where perpetual term is needed to comply with local statutes, financing requirements, or the like. In no case will licenses, including permits, be issued for more than the period required for the described purpose.

Terms and Conditions. Permits or licenses may, in some cases, be renewed upon expiration; however, in most cases a new permit or license should be prepared. Permits or licenses should be issued with clear language detailing under what conditions the permit or license may be renewed, terminated, amended, assigned or transferred, and/or have the rental rate adjusted, and should also include specific instructions on primary points of contact, service of notices, and administrative resolution of disputes.

As stated above for conditions to protect Reclamation's interests, 43 Code of Federal Regulations § 429.9 **Hold Harmless Clause** states:

(a) The following clause shall be a part of every land-use document issued by Reclamation:

The grantee hereby agrees to indemnify and hold harmless the United States, its employees, agents, and assigns from any loss or damage and from any liability on account of personal injury, or death arising out of grantee's activities under this agreement.

1.4 Purpose and Need for Action

The purpose of the proposed action is to allow better access to Vulcan's privately held leased areas in adjacent lands. The existing Kinder Morgan road in this location is too steep for large water trucks (necessary for compliance with atmospheric dust control regulations), transportation

of drilling rigs and associated equipment, and other heavy equipment to access the privately held lease areas west of the Hot Springs Mountains.

The need for the proposed action is meet the requirements of Executive Order (EO) 13212 and the Energy Policy Act of 2005. EO 13212 directs executive departments and agencies to "take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy." The order further states that "(f)or energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections." The Energy Policy Act of 2005 amends the Geothermal Steam Act of 1970 to facilitate development of new geothermal resources in an environmentally responsible manner to help meet the increasing interest in geothermal energy development on public lands in the western US.

1.5 Public Involvement, Consultation and Coordination

Consultation letters dated September 18, 2008 requesting scoping comments on the proposed bypass road were sent to the Fallon Paiute-Shoshone Tribe and the Pyramid Lake Paiute Tribe pursuant to federal legislation and executive orders concerning Native American government-to-government consultation, including NEPA and Indian Trust Assets. Reclamation did not receive comments from the tribes on either letter.

2.0 ALTERNATIVES

2.1 Alternative 1 - Proposed Action

Reclamation would allow the construction of a bypass road to allow access for large trucks and heavy equipment to the Vulcan Hazen-Patua lease area. The bypass road would be constructed to Bureau of Land Management road standards in Road Design Manual 9113 (Appendix D). Reclamation would not conduct an engineering review of the project and would only authorize construction across Reclamation withdrawn lands.

2.2 Alternative 2 - No Action

Reclamation would not provide concurrence to allow a 0.3-mile bypass road in Section 28, and Vulcan would have to find an alternative route for large trucks and other heavy equipment to access pads 23-17 and 37-17 in Section 17, T20N, R26E, MDM (see Figure 4). Vulcan has at least two alternative options for accessing its existing pads.

An existing road to the drilling area runs east of Black Butte Mountain and curves west along sections 8, 9, and 10 to the drilling locations. This existing road crosses approximately five washes, one ravine, and two areas on private land that topographically similar to the ridge where the bypass road is proposed. The road connects to other roads in the area for a route that is approximately 6.8 miles long, located in Sections 8, 9, 10, 14, 15, 23, and 27, T20N, R26E, MDM. Elevation at the base of the Hot Springs Mountains reaches 4350 feet that gently slopes toward the location of the well pad in section 17.

Alternatively, Vulcan could construct a new road to the pads along a route that crosses diagonally through the private land and would require corner crossing of Reclamation managed land, which are under review by Reclamation for the GRID Project. The alternative new route would be located in Sections 17, 21, and 27, T20N, R26E, MDM. This route is 3.3 miles long and would cross at least two areas of steep terrain, in addition to ravines and washes. The access road would be steep near the base of Black Butte Mountain with an elevation of approximately 4500 feet.

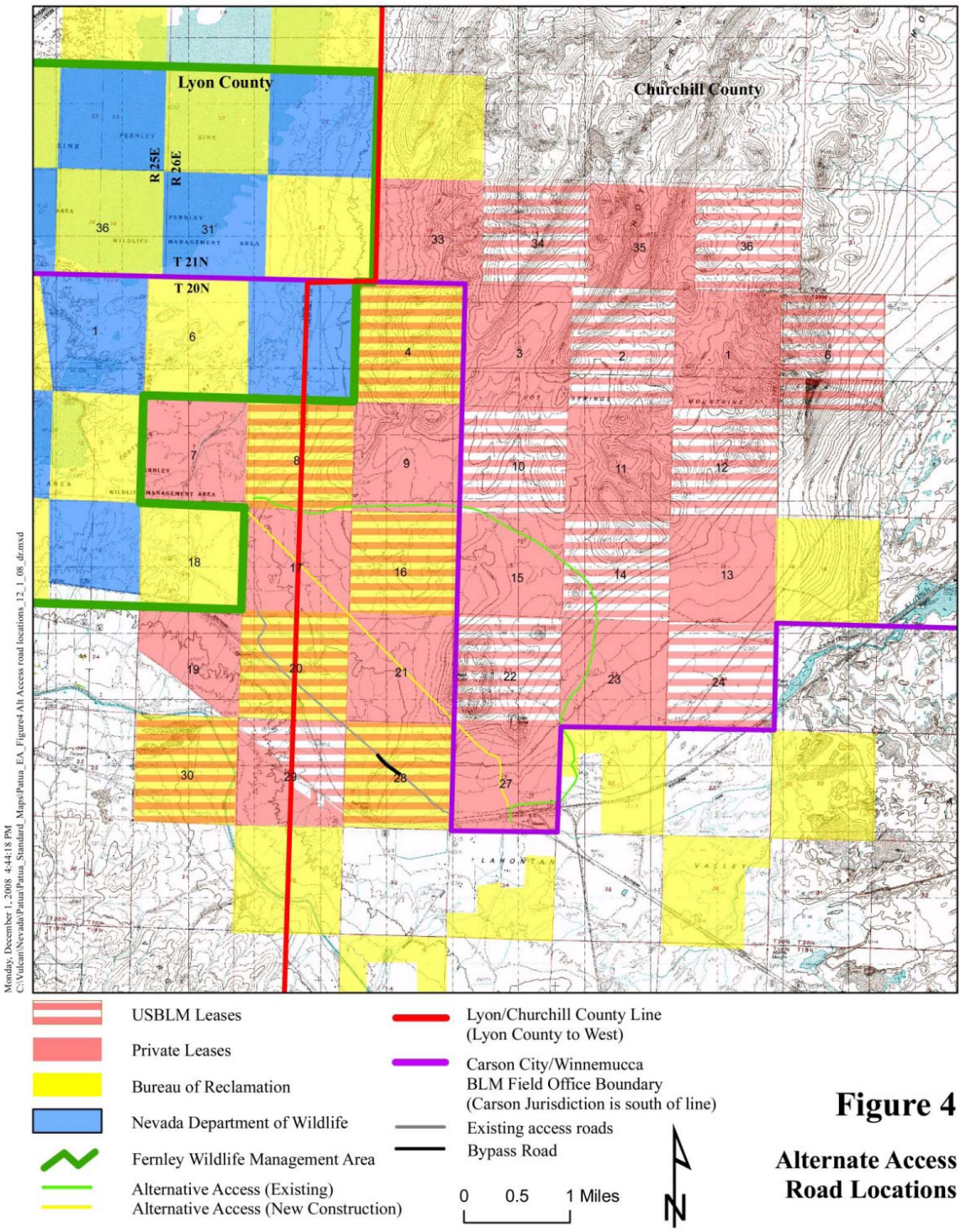


Figure 4

Alternate Access Road Locations

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Environmental resources potentially impacted by the alternatives and other issues of concern are described in this section. The impacts include identifying any direct, indirect, or cumulative effects.

3.1 Site Description

The Vulcan Power Hazen-Patua lease area, approximately five miles east of Fernley, is located in Churchill County, Nevada. This area is in the Great Basin, characterized by low-lying alluvial-filled valleys, beach gravels, dune deposits, and north- or northeast-trending, fault-bounded mountain ranges. The climate is arid with an average annual precipitation of less than eight inches on the basin floor to about sixteen inches on the surrounding ranges. Vegetation primarily consists of desert shrub. The soil is almost all Biddleman association in the western part of the lease area and Celeton very cobbly sandy loam in the eastern part of the lease area (USDA 2006).

The Vulcan Hazen-Patua leases are adjacent to the Fernley Wildlife Management Area (WMA), an area of low, marshy lands and wetlands that provides habitat for a variety of migratory birds. Recalamtion manages the Fernley WMA pursuant to an agreement with the Nevada Department of Wildlife and the Truckee-Carson Irrigation District, dated March 3, 2008. As a wildlife management area administered by the Secretary of the Interior through Recalmation, the Fernley WMA is not available for geothermal leasing (43 CFR 3201.11(e)). Vulcan does not propose to construct any geothermal facilities within the Fernley WMA.

The Pyramid Lake Paiute Indian Reservation is approximately six miles northwest of the Hazen-Patua lease area, and Fallon Paiute-Shoshone Indian Reservation is approximately 16 miles southeast of the Hazen-Patua lease area.

The Churchill County Master Plan, which guides development on non-federal lands in the area, identifies the area as open lands (Churchill County 1990). Primary uses for open lands would include outdoor recreation, agriculture, or environmentally sensitive areas, such as wetlands.

The proposed bypass road is located in Section 28, T20N, R26E, MDM, approximately 1.5 miles southeast of the Fernley WMA, situated on steep terrain near Black Butte and the Hot Springs Mountains. The bypass road crosses a ridge, northeast of Ragtown Pass, that has an approximate slope of 9% and approximate elevation of 4,150 feet above sea level (asl).

3.2 Affected Environment/Environmental Consequences for the Proposed Action and No Action Alternatives

Based on initial analysis, impacts to economics, hydrology, climate, soils, floodplains and wetlands, fisheries, geology, mineral resources, recreation, land use, topography, energy, and hazardous waste are not considered in detail in this EA because the project would not affect them.

3.2.1 Wildlife

Affected Environment
Carter Schleicher of Carter Schleicher Consulting conducted a reconnaissance survey of the affected area on September 10, 2008, and reported that wildlife species that may inhabit the project area are typical of the little greasewood-shadscale vegetation community. These would include coyote, black-tailed jackrabbit, whitetail antelope squirrel, and red-tailed hawk.

The project area may support the presence of common migratory birds. The U.S. Fish and Wildlife Service has conservation and management authority for migratory birds under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 *et seq*.). Under the MBTA, nests with eggs or young of migratory birds may not be harmed, nor may migratory birds be killed.

Environmental Consequences
Proposed Action
Consequences to wildlife resources generally result from impacts to individuals, populations, or from disturbance to wildlife habitat. The majority of potential impacts to wildlife are associated with habitat disturbance and vegetation removal. The 2.6 acres of wildlife habitat in the proposed right-of-way is sparsely vegetated and heavily disturbed. Denser habitat is found on the 3,840 acres of Reclamation lands in the Vulcan leases areas surrounding the bypass road. Construction activities, such as grading, digging, and the use of heavy vehicles, could result in short-term direct adverse impacts to some wildlife. The present wildlife that occupies the project area would be displaced during construction of the bypass road. No mitigation is proposed.

No Action
The vegetation and terrain along the existing roads is similar to the proposed route and wildlife use along the route is expected to be similar to that found at the proposed bypass road location. If Vulcan used the 6.8-mile network of existing roads for exploratory drilling area in section 17, it would have to make improvements at three locations where terrain is similar to that at the proposed bypass location, resulting in greater loss of wildlife habitat than the proposed action.

If Vulcan were to construct a new road 15 feet wide along the 3.3-mile route through private lands, at least 5.9 acres of wildlife habitat would be lost, not counting the additional cuts and fills that would be needed in some areas.

3.2.2 Threatened and Endangered Species

Affected Environment
The U.S. Fish and Wildlife Service identifies the Lahontan cutthroat trout as the only listed species under the Endangered Species Act of 1973 (Act), as amended, in Churchill County, Nevada (U.S. Fish and Wildlife Service, 2008). The Lahontan cutthroat trout is considered a threatened species under the Act. The nearest populations of the Lahontan cutthroat trout are in the Carson River and Lahontan Reservoir, approximately 11 miles south of the Vulcan leases at Hazen. The site survey reported that there are no perennial streams in the proposed project area or at the alternative road locations that would support the Lahontan cutthroat trout.

Environmental Consequences, both Alternatives
Neither alternative would affect the Lahontan cutthroat trout since it does not occupy these areas.

3.2.3 Water Resources

Surface Water
Affected Environment
The site for proposed action is on high ground, in the southwest portion of the Hot Springs Mountains, approximately 2.5 miles from the wetland areas at Patua. The area for the proposed action has no perennial streams.

No permanent surface water features are located along either of the alternative routes, but both routes cross several dry washes.

Environmental Consequences - Proposed Action
Construction of the proposed bypass road could lead to an increase in soil erosion, but the proposed bypass site has no surface water sources and construction activity would not affect water quality. In areas with slopes greater than 5%, Vulcan would employ Best Management Practices (BMPs) (Appendix A. Stormwater Pollution Abatement Plan for Construction Activities) to reduce sediment erosion, in compliance with non-point (stormwater) pollution prevention requirements of the Clean Water Act. Similarly, petroleum products or other chemical spills that may occur during construction would be isolated and any contaminated material would be treated appropriately or removed and disposed of, in compliance with state and local requirements. Water used for dust abatement would be trucked into the project area and would not affect surface waters in the project area.

Environmental Consequences - No Action
Erosion from the cuts and fills needed along the 6.8-mile route and new construction along the 3.3-mile route across private land would potentially affect surface water runoff during high runoff storms. If the 6.8-mile route were used, additional water would be needed for dust control.

Groundwater
Affected Environment
The western half of Hazen-Patua lease area has a shallow water table with relatively saline groundwater resulting from evaporation and concentration of salts in surface water derived from

irrigation drainage. The groundwater hydrology of the basin is the result of a complex depositional history that includes periodic inundations by Lake Lahontan or smaller lakes, dry periods when sediments were reworked by winds and streams, and deposition of volcanic material, including ash. Depth to the water table ranges from 1.5 feet or less to about 15 feet in most of the area (Morgan 1982; SCS 1975). Confined groundwater is under artesian pressure in many areas. Groundwater quality tends to improve with depth. Deeper groundwater appears to be connected with, and mixed with, thermal water circulating at greater depths.

Environmental Consequences – Both Alternatives
Neither alternative would result in discharges to groundwater. Spills that could potentially infiltrate to shallow groundwater would be cleaned up in accordance with federal and state requirements to avoid contamination.

3.2.4 Air Quality

Affected Environment
The federal government has established ambient air quality standards for criteria pollutants, including ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), fine and inhalable particulate matter (PM2.5 and PM10), and lead particles. With the exception of the SO2 standard, the Nevada Division of Environmental Protection (NDEP), Bureau of Air Quality has adopted the federal standards to regulate air pollution in the state. NDEP has adopted an SO2 standard more stringent than the federal standards.

Nevada uses air quality data gathered by monitoring networks to determine the areas within the state that do not meet federal and state air quality standards, referred to as "nonattainment areas." There are no nonattainment designations for Churchill, Mineral, and Lyon counties, and conformity rules promulgated in accordance with section 176(c) of the CAA, USC § 7506(c) do not apply to the actions in nonattainment areas.

Environmental Consequences - Proposed Action
The proposed bypass road would require 1.7 acres of disturbance that could potentially result in fugitive dust. The proposed construction activities would result in additional temporary impacts to air quality including construction vehicle exhaust emissions, diesel generators, power tool use, and worker vehicle emissions. Vulcan would implement the following BMPs:

- All areas to be disturbed would be watered on a regular basis.
- Vehicle speeds would be limited to 10-15 miles per hour.
- Construction equipment operators would be trained to recognize excessive fugitive dust generation and have the authority to shut down operations until a water truck arrives and sprays the disturbed areas.
- Subcontractors would be informed of their responsibilities to control fugitive dust.
- All equipment used would be maintained per manufacturer's specifications and would meet all applicable emissions standards in order to minimize criteria pollutants (particulates, NOx, SOx) from diesel and gasoline engines.

These BMPs would reduce the temporary impacts associated with the grading, excavation, backfill operations, and vehicular traffic associated with the road bypass construction.

Environmental Consequences – No Action
The no action alternative would result in cuts and fills in three area along the 6.8-mile route on existing roads or the construction of a new 3.3-mile road to the drilling area, resulting in fugitive dust and temporary emissions of pollutants from construction equipment.

3.2.5 Noise

Affected Environment
The proposed project area is located approximately 0.6 miles north of Highway 50 Alt, which generates noise from vehicular traffic. The Fallon Naval Air Station is approximately 22-25 miles southeast of the project are and affects noise levels when aircrafts fly overhead.

Environmental Consequences- Both Alternatives
Construction of the bypass road and alternative new access roads would result in a temporary increase in noise levels in the immediate vicinity of the construction sites. Noise generated by construction activities could potentially affect birds and other wildlife in the vicinity of the proposed location; these effects would be temporary and wildlife in the project area would habituate to the noise.

3.2.6 Vegetation

Affected Environment
The project area lies in the little greasewood-shadscale association. It is the most extensive community in the region. It occupies the well-drained, broad, dry plains of the Lahontan sediments and the residual soils of the lower mountain ranges (Cronquist, et al; 1986). Well worn ATV trails cross the Kinder Morgan right-of-way along the top of the ridge.

There are no invasive, non-native species found at the project site during the biological survey.

Environmental Consequences- Proposed Action

The proposed project would affect approximately 2.6 acres of the little greasewood-shadscale association. The road disturbance would be permanent. Vulcan would revegetate the cut slopes within the right-of-way for the bypass road, where feasible. During clearing and grubbing, Vulcan would salvage any native material and organic matter and re-use them as a top-dressing for revegetation. Although poorly developed and shallow, the topsoil contains native seeds and microorganisms essential for nutrient cycling. (See Appendix C- Revegetation and Erosion Control Specifications.)

Weeds have the potential to move into an area where the soil and existing vegetation have been disturbed. Implementation of the noxious weed plan will prevent the spread of invasive plant species (Appendix B- Noxious Weed Abatement Plan).

Environmental Consequences- No Action
If Vulcan were to use the 6.8-mile route of existing roads, cuts would remove vegetation at the three areas of steep terrain. If Vulcan were to construct a new road to the drilling sites, it would

remove approximately 5.9 acres of greasewood-shadscale association vegetation. Vulcan would revegetate the cut slopes, where feasible. (See Appendix C- Revegetation and Erosion Control Specifications.)

Weeds have the potential to move into an area where the soil and existing vegetation has been disturbed. Implementation of the noxious weed plan will prevent the spread of invasive plant species (Appendix B- Noxious Weed Abatement Plan).

3.2.7 Hazardous Materials

Affected Environment
The proposed location is undeveloped and does not have facilities that store or use hazardous materials.

Environmental Consequences- Both Alternatives
Construction of the bypass road and the no action alternatives would involve the use of common hazardous materials, including, but not limited to, fuel, such as diesel and gasoline, oil, and lubricants. Vulcan would implement the following BMPs to reduce the risk of spills, fires, and release of pollutants:

- Gasoline, oil, and lubricants would be transported in approved containers in accordance with National Fire Protection Association Code,
- Sorbent material would be maintained on site to absorb petroleum products spills occurring during construction.

The risk of using routine hazardous materials during the construction of the road would be minimal.

3.2.8 Visual Resources

Affected Environment
The project area is characteristic of the Great Basin environment; desolate, sunny, and brush-strewn valley floors are bordered by often barren, but frequently colorful, elongated, and steep mountain ranges. Vegetation on the valley floor grows low and evenly and primarily consists of monochromatic desert brush (US Navy 2000).

The project area has an existing dirt road and is approximately 0.5 miles from the railroad and Highway 50. The road location is visible from Highway 50 Alt. The nearest recreational areas are Patua Hot Springs and the Fernley WMA, approximately 1.5 miles northwest of the bypass road location.

Environmental Consequences – Proposed Action
The proposed construction of the Patua bypass road would not deteriorate the visual resources in the area, since there is already an access road immediately adjacent and parallel to the bypass road. The removal of less than two acres of sparse vegetation for the bypass road would not alter the character of the visual landscape.

Environmental Consequences – No Action
The new road alternative would be similar to the proposed action and would run parallel to the existing Kinder-Morgan R-O-W. However, vegetation removal would increase to 5.1 acres, but would not alter the character of the visual landscape. The existing road alternative would be less visible from Highway 50 Alt, and no construction would be implemented to alter the character of the visual landscape.

3.2.9 Transportation

Affected Environment
Transportation in the proposed area is limited to Highway 50 Alt, which serves as a link in the interstate transport system, and the access roads north of the highway. The Southern Pacific Railroad also passes south of the project location.

Environmental Consequences –Both Alternatives
Implementation of either alternative would temporarily increase vehicular traffic from Highway 50 Alt to the Hazen-Patua lease area. The duration of the construction is expected to be less than 21 days.

3.2.10 Historic and Cultural Resources

Proposed Action
Affected Environment
Vulcan contracted Western Cultural Resource Management, Inc. (WCRM), who conducted a cultural resources inventory of the Area of Potential Effect (APE) on August 7, 2008. WCRM surveyed 3.5 acres, which included the entire APE. No cultural resources were identified within the APE.

Environmental Consequences
Reclamation consulted with the State Historic Preservation Officer (SHPO) regarding this undertaking on August 27, 2008. On October 2, 2008 SHPO concurred with Reclamation's finding and determination of no historic properties affected pursuant to 36 CFR Part 800.4(d)(1) (correspondence attached).

No Action
Affected Environment/ Environmental Consequences
One of the alternative routes, new construction for 3.3 miles, has already had cultural clearances done as part of a request for road and utility crossings for GRID Geothermal Development Project. (See NEPA Categorical Exclusion Checklist LO-08-24 for details.) No cultural resources were identified within this APE.

If the other alternative route was chosen, a cultural resources inventory would be completed before authorization for construction would be granted.

3.2.11 Indian Trust Assets

Affected Environment
Indian Trust Resources are legal interests in property or natural resources held in trust by the United States for Indian Tribes or individuals. Examples of trust resources are lands, minerals, hunting and fishing rights, and water rights. There are two tribes in the vicinity of the proposed crossings, the Fallon Paiute-Shoshone Tribe, approximately 16 miles away, and the Pyramid Lake Paiute Tribe, approximately 6 miles away.

Environmental Consequences- Both Alternatives
The proposed action and the no action alternatives would not affect Indian Trust Assets, since there are no trust resources within the project area.

3.2.12 Environmental Justice

Affected Environment
Executive Order No. 12898, Environmental Justice, requires each federal agency to achieve environmental justice as part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including social and economic effects, of its programs, policies, and activities on minority and low-income populations. EPA guidelines for evaluating potential adverse environmental effects of projects require identification of minority populations when a minority population either exceeds 50 percent of the population of the affected area or represents a meaningfully greater increment of the affected population than of the population of some other appropriate geographic unit.

Environmental Consequences- Both Alternatives
Neither the proposed action nor the no action alternative would disproportionately affect minority or low-income populations.

4.0 OTHER NEPA CONSIDERATIONS

4.1 Indirect Effects

Indirect effects are effects that are caused by an action but take place later in time or farther removed in distance but are still reasonably foreseeable.

4.1.1 Indirect Effects of the Proposed Action and No Action Alternatives

The indirect effects of the proposed action include the effects of bringing the drill rigs, large water trucks, and heavy equipment along the existing roads through Reclamation and private lands on the 3.4-mile route to the Vulcan well pad in section 17 and the effects of drilling of exploration wells at Vulcan's two existing well pads in Section 17. The pad for well 23-17 is more than 1,000 feet from the boundary of the Fernley WMA, and the pad for well 37-17 is more than 1,500 feet from the boundary of the wildlife area.

Wildlife – Both Alternatives
The increased traffic on the roads to the drilling area would have a small effect on the small mammals, birds, and other wildlife along the route due to possible road mortality.

Drilling exploratory wells at the two existing pads in section 17 would not have an adverse effect on the wildlife in the vicinity of the pads. The drilling fluids would be contained within reserve pits, during drilling operations and subsequently drained and fenced after operations are completed to prevent avian use of the ponds. Drilling each well is expected to last up to 45 days. Noise levels from drilling are not associated with adverse impacts to wildlife.

Water Resources - Both Alternatives
No permanent surface water features or major washes are along any route to the existing pads. The two existing well pads at section 17 are bermed to contain surface runoff and any accidental spills. Drilling fluids and rock cuttings would be contained within reserve pits. Installation of industry standard blow out prevention equipment (BOPE) at the wellheads would prevent the escape of fluid pressure during drilling and well completion operations.

Water will be needed for dust control. This water will be trucked to the project area from the Truckee-Carson Irrigation District in Fallon under an existing agreement; supplied from agreements with private parties who have water available for sale; or supplied from geothermal projects at other Vulcan leases. Vulcan does not expect to use water from surface or groundwater sources within the Hazen-Patua leases and would obtain a Nevada Division of Water Resources (NDWR) waiver if a water well is needed. The NDWR waiver would specify the amount of water allowed to be withdrawn to avoid adversely affecting the aquifer.

Air Quality – Both Alternatives
The additional vehicular traffic along the unimproved road would result in additional dust and emissions of criteria pollutants. Short-term emissions would also result from the diesel-powered engines equipment at the drilling sites. Vulcan would water the entire length of the access road and well pads surfaces and apply the other Best Management Practices described in section 3.2.4 to control atmospheric dust and pollutant emissions.

Exploratory drilling would result in emissions of pollutants from the drilling equipment and worker vehicles. Operational emissions would consist of temporary venting of noncondensable gases, including hydrogen sulfide, and water vapor plumes during well testing. Based on previous drilling by Magma Corp in the area, the hydrogen sulfide concentrations in the geothermal resources at Patua are low and do not require abatement.

Noise – Both Alternatives
The increase in traffic along the route and the drilling activities at the well pads would result in temporary increases in noise levels at these remote locations. Based on previous data, noise levels at 1,000 feet from the drilling rigs are expected to be less than 57 dBA, a level typical of a routine conversation (California Energy Commission, Preliminary Staff Assessment, Salton Sea, 2003). Such noise levels would not have adverse impacts on the adjacent wildlife area.

Vegetation – Both Alternatives
The additional use of the existing access roads and well pads from the bypass road would not result in any further loss of vegetation, but would impact vegetation due to dust settling on plants.

Hazardous Materials – Both Alternatives
Well drilling requires the transportation and use of petroleum products and drilling additives. Vulcan would have tanks at the well pads for diesel fuel for the drilling equipment, surrounded by secondary containment apparatus, Additional well pad design includes a system of trenches to insure any other fluids present on the surface of the drilling location would be directed toward the reserve pit.

Visual – Both Alternatives
The temporary use of the existing roads and well pads resulting from the bypass road would have minimal visual impacts. The drilling locations would be more than 1.2 miles from Highway 50 Alt and more than five miles from the entrance to the Fernley WMA from Interstate 95. While the derrick may be visible in the distance during drilling, it would be low on the horizon, approximately the same height as the transmission lines in the area, and would not interfere with the panoramic views of the distant mountains.

Transportation – Both Alternatives
The additional water trucks, six-person drilling crews, and other vehicles accessing the drilling sites would result in a slight increase in traffic along Highway 50 Alt and through the access roads at Hazen.

Historic and Cultural Resources – Both Alternatives
The use of the existing access roads the well pad sites would not affect historic or cultural resources. No such resources have been identified at the existing roads and pads, and use of the bypass road would not result in additional earthmoving at these locations.

4.2 Cumulative Effects

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

A reasonably foreseeable development scenario would involve the drilling and testing of additional exploratory wells to determine the capacity of the resource in the lease area. If the resource proves to be sufficient for power generation, Vulcan would develop additional well pads, pipelines, one or more power plants, and transmission lines to deliver electricity to the grid.

The environmental impacts of the reasonably foreseeable future development would depend on the temperature and extent of the geothermal reservoir; the success or failure of the phases of activity (i.e., exploration, development, production, and closeout); and the physical, environmental, and demographic characteristics of the local area involved.

As a result of these uncertainties, environmental impact analysis of cumulative impacts must be conceptual at this stage. Specific impacts and associated mitigation measures of subsequent activities would be addressed in the subsequent NEPA analysis and approval processes.

4.2.1 Wildlife

Most research concerning the cumulative impacts of energy development (roads, pads and pipelines) has been conducted in relation to oil and gas drilling. However, the activities and related infrastructure of geothermal development are very similar. Although the development of a complete geothermal project, including well pads, access roads, pipelines, power plants, and transmission lines, typically occupies a small percent of a productive geothermal area, there are long term impacts due to direct habitat destruction, as well as from habitat fragmentation from these features and with interactions with humans. There is abundant evidence in literature of negative impacts from roads and well pads.

Adverse effects of habitat fragmentation include:

- Increased isolation of populations or species
- Changes in habitat vegetative composition
- Changes in availability of cover and increased edge effect
- Changing large landscapes into smaller patches and covert interior habitat into edge habitat
- Increased opportunities for exploitation by humans
- Changes in type and quality of the food base

The increased number of roads would likely lead to an increase in direct mortality from vehicle collisions.

Although the habitat type in the project area does not support any threatened or endangered species, nor provide critical habitat for large game species, the salt desert shrub community is important habitat for many types of raptors, passerine birds, small mammals and reptiles.

4.2.2 Threatened and Endangered Species

No threatened or endangered species occur on the land leased to Vulcan, and geothermal exploration and development in this area would not result in cumulative impacts to threatened or endangered species.

4.2.3 Water Resources

Spills of fuels, geothermal fluid, or other substances, while not likely, could occur during the construction and operation of future projects. A Storm Water Pollution Prevention Plan would be implemented for each phase of each project, and any accidental spills that occur would be cleaned up as required by the plan.

The power plant sites and well pads would have berms that would contain accidental spills and leaks. Oils and other products used for lubrication, water treatment, and other power plant uses would be stored in designated area and contained on site and would not affect surrounding resources.

Water use in the power plant would depend on the characteristics of the geothermal resources encountered at Patua. Water may be required for cooling in geothermal power plants and, if used, would likely be supplied by condensed steam produced from geothermal fluids. Most water used in power plant cooling would evaporate through cooling towers, but some cooling water must be discharged as blowdown, typically by injecting it back into the reservoir. Any surface discharges would require permits under the National Pollution Discharge Elimination System, and injection would require an Underground Injection Control permit. High quality groundwater is not abundant in the Fernley area; however, local groundwater supplies may be adequate for geothermal power production purposes. There is a low potential risk for impacts on groundwater supplies from the use of groundwater for geothermal cooling.

4.2.4 Air Quality

Future exploration, development, and production would involve new structures, roads, and operations. Temporary construction-related emissions would result from ground-disturbing activities, construction vehicle exhaust emissions, diesel generator and power tool use, and worker vehicle emissions. Operational emissions would include releases of hydrogen sulfide and other noncondensable gases from wells during testing and from some power conversation cycles. Concentrations of hydrogen sulfide in geothermal resources in Nevada are typically low, in parts per billion, and do not require abatement. Emissions would be subject to Clean Air Act permitting. Increased travel along unimproved roads would contribute to additional dust.

4.2.5 Noise

Future exploration, development, and production would produce noise levels similar to those that would occur from construction of the bypass road.

4.2.6 Vegetation

Cumulative impacts to vegetation communities within the development area could occur due to the incremental reduction of continuity in the native vegetation. This results in smaller areas of undisturbed vegetation. Fragmented plant communities can lose resilience to natural and man-made disturbance due to isolation from seed sources necessary for natural revegetation. Roads also serve as a means of dispersal for many non-native plant species, and ground disturbance associated with roads, pads and pipelines provide opportunities for non-natives to establish.

Impacts on vegetation could be mitigated by reseeding disturbed areas not needed for operation. Implementation of the noxious weed plan would help prevent the spread of invasive plant species; however, the potential also increases for weeds to move further into undisturbed remnant areas.

4.2.7 Hazardous Materials

Future actions based on the reasonable development scenario could result in potential impacts from hazardous materials during drilling and power plant operations. The transport, use, or disposal of hazardous materials could impact workers, the public, and the environment; however, training, experience, and knowledge of the drilling crews and plant operators combined with the use of BMPs would reduce the impact. By adhering to proper regulations on hazardous material use and transportation, the risk for potential cumulative impacts from hazardous materials would be low.

Proper installation and operation of equipment, personal protective equipment, and worker training would reduce the risk to worker safety. The remote location, fencing of the power plant sites, and proper installation and operation of equipment would minimize impacts to public health and safety. The direct impacts of the construction and operation of a potential geothermal power plant to public health and safety would be low.

4.2.8 Visual Resources

Future exploration, development, and production would involve new structures, roads, and operations. The effects of these new structures, roads, and operations would depend on the location where the geothermal resources were sufficient for power projects and the risk for impacts to scenic vistas would depend on the location and visual character of the sites.

4.2.9 Transportation

Future exploration, development, and production would involve increased use of construction equipment and delivery of materials. This would result in increased vehicular traffic from Highway 50 Alt to the access roads in the Hazen-Patua lease area.

4.2.10 Historic and Cultural Resources

Development of geothermal lease areas in Nevada has the potential to affect cultural and Native American resources. Previous work suggests that Patua Hazen leases have high potential to contain significant archaeological resources, including, but not limited to prehistoric use of rock shelter sites, rock art sites, open sites containing artifact scatters, pebble mound complexes, and historic-period resources associated with continued use of the region by Native Americans or as transportation routes and water conveyance. Based on the assessment of soils, elevation, topography, vegetation and water resources in surveyed areas with similar conditions, the potential for finding known or undocumented NRHP-eligible sites within the Patua Hazen lease parcels are high to moderate.

Geothermal lease areas that contain significant cultural resources that would be adversely affected by geothermal development may be mitigated through data recovery or other appropriate recording measures. Future actions based on the reasonable development scenario could be mitigated by conducting cultural surveys of the areas to be disturbed and avoiding significant resources to the extent feasible.

4.3 Irreversible and Irretrievable Commitments

Irreversible commitments of resources occur as a result of the use or destruction of a specific resource (e.g. mineral extraction, destruction of cultural resources) which cannot be replaced or, at a minimum, restored over a long period of time and possibly at great expense.

Irretrievable commitment of resources refers to actions resulting in the loss of production or use of natural resources. It represents opportunities foregone for the period of time that a resource cannot be used, e.g. land conversion to new uses; construction of levees preventing natural flooding of floodplains.

The proposed bypass road would not result in any operational changes or other physical impacts that would irreversibly or irretrievably commit resources from this federal action.

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