5.0 RENDIJA CANYON TRACT

Chapters 5 through 14 contain the discussions of the No Action Alternative and the Proposed Action Alternative (convey and transfer each tract) for each of the 10 land tracts. Each chapter presents tract-specific affected environment information and the consequences of each alternative. The results of these discussions are summarized in a table at the end of Chapter 2. Consequences of the alternatives described in these chapters also are addressed in Chapter 15, where the cumulative impacts are described. The data regarding the land uses were collated from personal communications between representatives of the DOE, Los Alamos County, and the Pueblo of San Ildefonso.

5.1 Affected Environment

5.1.1 Land Use

The Rendija Canyon Tract consists of approximately 910 acres (approximately 369 hectares) located to the north of the Los Alamos townsite's Barranca Mesa residential subdivision (see Figure 5.1.1-1, Rendija Canyon Tract Layout). The tract is bounded by U.S. Forest Service (USFS) property to the north, east, and west, and Los Alamos County (LAC) lands to the south (DOE 1998b). Public access to Rendija Canyon is from San Ildefonso Road on Barranca Mesa to Rendija Canyon Road, an unimproved road. The two-lane road (Rendija Canyon Road) is paved for a short distance and then continues generally eastward as an unpaved forest road eventually connecting with State Road 4. The Rendija Canyon Road provides access to over 12,000 acres (4,900 hectares) of USFS land.

Rendija Canyon is a relatively broad, flat-bottomed canyon that serves as a major drainage basin for the Jemez Mountains. The site is heavily forested with ponderosa pine, mixed conifers, and aspen (DOE 1999c), and contains both archaeological sites and sensitive wildlife habitat. The Rendija Canyon Tract currently is not a part of LANL mission operations, although it played such a role in the past. Historically, the tract was used as a firing site for military ordnance. The restricted access associated with former impact sites represents the only areas of

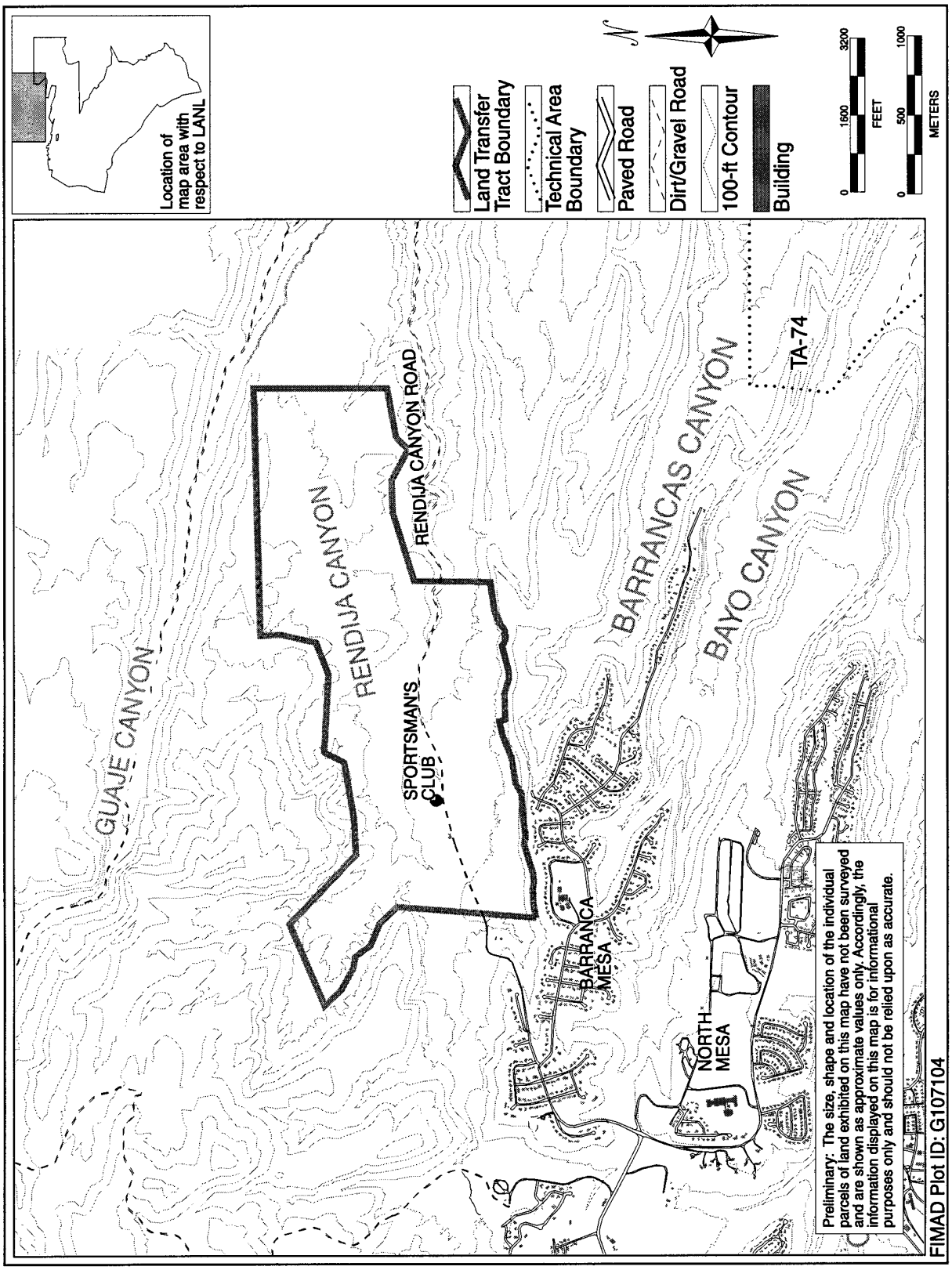

Figure 5.1.1-1. Rendija Canyon Tract Layout.

restricted access currently within the tract (LAC 1987a).

At present, the only development within the tract includes an area of roughly 20 acres (approximately 8 hectares) on lease until the end of December of 2001 from the DOE to the Los Alamos Sportsman's Club for use as a rifle and pistol shooting range (LAC 1987a). The Los Alamos Sportsman's Club also leases an additional 80 acres (approximately 32 hectares) from the DOE on an annual basis for use as an archery range, picnic grounds, clubhouse, police trailer, and storage area (LAC 1987a). The only other structures or development within the tract are pumping stations and utility corridors.

Other existing land use at the tract includes the unregulated use of the canyon by the general public for hiking, horseback riding, hunting, and off-road vehicle travel and for access to USFS properties. Numerous marked and unmarked trails criss-cross the tract, including the Pajarito Trail, which crosses the western corner of the tract north to south (LANL 1998c), and the Guaje Canyon Trail, which divides the tract west to east (LAC 1995) (see Figure 3.2.1-2 in Chapter 3). Adjacent land uses include the residential activities of the Barranca Mesa development and the recreational activities on USFS lands and Los Alamos County property. Rendija Canyon Road and an unimproved USFS road serve as fire-break roads within the tract.

5.1.1.1 Environmental Restoration

The Rendija Canyon Tract contains four potential release sites (PRSs), one canyon system, and possibly one DOE-owned structure. The four PRSs categorized as surface units include former mortar impact areas used by the Army between 1944 and 1948 and the Los Alamos Sportsman's Club. There were no historical LANL operations conducted upstream of the tract; therefore, upstream contamination is unlikely to be of concern. Three of the four PRSs in the parcel have been sampled for environmental contamination, and the results show that no contamination exists above cleanup levels appropriate for either preservation or residential development. Although there are no human health-based or ecologically based risks associated with environmental contamination in the Rendija Canyon Tract, there may be safety risks associated with undetected unexploded ordnance that might remain buried on the tract despite several recovery efforts conducted to remove such materials. Activities at the Los Alamos Sportsman's Club site currently produce environmental contamination from spent lead shot and related munitions materials. Areas associated with the Los Alamos Sportsman's Club have not undergone environmental remediation.

Figure 5.1.1.1-1 shows the areas with potential contamination issues (PCIs) within this tract, as well as areas with no known contamination. PCI acreage is estimated to total approximately 340 acres (138 hectares). The southern and eastern parts of the tract, away from the PRSs, appear to have no PCIs.

5.1.2 Transportation

The Rendija Canyon Tract currently has limited transportation access (see Figure 5.1.1-1). This site is reached via the unpaved Rendija Canyon Road, which extends from the Barranca Road-San Ildefonso Road intersection. This road receives minimal vehicle traffic but provides essential access to over 12,000 acres (4,900 hectares) of the Santa Fe National Forest, pumping stations, utility corridors, the Los Alamos Sportsman's Club, and recreational opportunities within the tract. Access to the Rendija Canyon Road is via San Ildefonso Road, a local two-lane road with a current carrying capacity of approximately 1,850 passenger cars per hour (pcph). In the far eastern portion of the County, San Ildefonso Road intersects with

Figure 5.1.3-1. Rendija Canyon Tract Utilities and Infrastructure.

distance zone was designated as "foreground/middleground" due to the proximity of the unit to the road, a major viewing point. The sensitivity level was considered to be "high" due to public interest and visibility from nearby viewpoints. The combination of these components using the Inventory Class Matrix result in a Scenic Class II for Rating Unit 1.

Three components were analyzed for Rating Unit 2. Scenic quality was determined to be "A" primarily due to few manmade modifications and interesting vegetation and landforms within and adjacent to the unit. The distance zone was determined to be "background" because it is not adjacent to major viewpoints. The sensitivity level was determined to be "high" due to public interest and views of the site. The combination of these components using the Inventory Class Matrix result in a Scenic Class II for Rating Unit 2. Both units within the Rendija Canyon Tract are assigned to Scenic Class II, which indicates visual resources of high public value.

5.1.6 Socioeconomics

The most meaningful economic region of influence (ROI) for all of the tracts is the regional setting described in Chapter 3 of this CT EIS. Labor and housing markets extend well beyond any of the tract boundaries affected by the proposed land transfer.

The only development in the Rendija Canyon Tract is a shooting range and associated recreational facilities. Employment associated with this development is minimal.

5.1.7 Ecological Resources

Approximately 80 percent of the vegetative cover in Rendija Canyon is ponderosa pine forest and pinyon-juniper woodland. There are no identified perennial streams and one ephemeral stream that supports wetland vegetation. Stream flow and seasonality information is not available. The streambed consists of approximately 5,597 linear feet (1,206 meters) of a floodplain associated with the streambed, but has not been delineated for 100-year or 500-year floodplain (see Appendix D for further description of the floodplains and wetlands). Flora and fauna are characteristic of the region, and overall the tract is relatively undisturbed. The tract contains large portions of suitable habitat for the Mexican spotted owl, American peregrine falcon, and bald eagle. Rendija Canyon has not been surveyed for threatened and endangered species concerns before 1998. In May 1998, University of California personnel conducted a survey of Rendija Canyon to evaluate potential threatened and endangered species habitat. Analysis of survey data and other information indicates that portions of the Rendija Canyon area are potential Mexican spotted owl habitat, and areas have been designated as areas of environmental interest (AEI) core and buffer area (PC 1999e). However, there are no known observation records for threatened and endangered species within this tract. Current land use throughout the tract is primarily recreational, consisting of hiking, biking, and off-road motorcycling on well-established trails. The Los Alamos Sportsman's Club maintains a shooting range, and one residence is located adjacent to the shooting range. Human-generated noise in the Rendija Canyon Tract results primarily from the firing range and recreational motorized vehicles. No permanent artificial light sources are present in this tract other than those at the residence and small lights on the pump houses in the canyon bottom. The Rendija Canyon Tract is south of and adjacent to Guaje Canyon (LANL 1998b). Guaje Canyon contains a perennial stream and associated wetlands. Guaje Canyon is within the Santa Fe National Forest and supports a perennial stream in the middle and upper sections of the canyon. A small surface water reservoir is present in the upper canyon. Vegetation is characterized by mixed conifer with aspen and ponderosa pine forests in the middle and

upper canyon reaches. Pinyon-juniper is present in the lower section. Wetland vegetation is supported within and adjacent to the streambed and reservoir.

5.1.8 Cultural Resources

Rendija Canyon was used from the Archaic period through the U.S. Territorial/ Statehood period. The tract was part of the Ramon Vigil Spanish land grant. The ROI for this tract includes the land tract itself, plus nearby cultural resources located off the tract. For this tract, these nearby resources are located on private, County, and Santa Fe National Forest lands.

One hundred percent of the Rendija Canyon Tract has been inventoried for prehistoric and historic cultural resources. Survey results indicate that there are 53 cultural sites within the tract, of which 48 are prehistoric and 5 are historic. Of the prehistoric sites, 41 have been evaluated as eligible or potentially eligible for listing on the National Register of Historic Places (NRHP) and 7 as not eligible. All five of the historic sites have been evaluated as eligible or potentially eligible for listing on the NRHP. An inventory for LANL buildings and structures located on the Rendija Canyon Tract indicates that there are no such resources present on the tract.

Currently, there are seven known traditional cultural properties (TCPs) located within the Rendija Canyon Tract. The Pueblo of San Ildefonso has indicated, in general terms, that TCPs are present on this tract. There is a high probability that additional TCPs will be identified during future consultations with Native American and Hispanic groups regarding the traditional uses of this tract. None of the TCPs have been evaluated for NRHP eligibility. There is a potential for unidentified resources, including subsurface archaeological deposits and unrecorded burials, in the tract.

Additional information on the cultural resources of the Rendija Canyon Tract is presented in Appendix E of this CT EIS.

5.1.9 Geology and Soils

The Rendija Canyon Tract is located in a relatively broad, flat-bottomed canyon. The tract is heavily forested and is susceptible to wildfires that would increase soil erosion and transport via surface runoff. There are major north-south trending faults visible across this tract that are collectively known as the Rendija Canyon Fault. Although there are no significant structures on this tract, the tract is susceptible to a greater than magnitude 7 seismic event (as measured on the Richter scale).

5.1.10 Water Resources

Figure 5.1.1-1 shows the location of the Rendija Canyon Tract. The tract is transected by the Rendija Canyon drainage, an ephemeral drainage that receives stormwater runoff and snowmelt from adjacent mesa tops and the Jemez Mountains. There are no known springs in or upstream of the tract. There are no National Pollutant Discharge Elimination System (NPDES)-permitted outfalls within or upstream of the tract. There are no groundwater test or supply wells within the tract or within a distance of 0.5 mile (0.8 kilometer).

The U.S. Fish and Wildlife Service's (USFWS's) National Wetland Inventory (NWI) identifies a riverine wetland associated with the streambed in the Rendija Canyon Tract. Details regarding the assessment of wetlands within tracts can be found in Appendix D, Floodplain and Wetland Assessment for the Proposed Conveyance and Transfer Tracts.

There are no stream gages or established surface water or groundwater monitoring stations located upstream of the tract. The closest environmental monitoring location maintained by the LANL Environmental

Surveillance and Compliance Program is for annual groundwater sampling in the Guaje well field.

Portions of the Rendija Canyon Tract lie within the 100-year floodplain. Assessment of floodplains within tracts can be found in Appendix D.

5.1.11 Air Resources

The air quality of the Rendija Canyon Tract is high. Although the State does not maintain an ambient air monitoring station in the canyon, it is part of New Mexico Region 3, an attainment area that meets National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Except for small amounts of carbon monoxide and ozone resulting from hydrocarbons emitted from motor vehicles in the canyon and an occasional campfire, there are no sources of criteria pollutants within the canyon itself. As for hazardous and other chemical pollutants, analyses performed for the LANL SWEIS (DOE 1999c) estimate that concentrations of chemical air pollutants will not exceed health-based standards for any point beyond the LANL boundary. From this information, we can extrapolate that the same conclusion can be applied to Rendija Canyon. Finally, analyses for doses from radioactive air pollutants indicate that a resident of Los Alamos received, during 1997, an estimated dose from radioactive air pollutants of 0.03 millirem, or less than 1 percent of the EPA standard (LANL 1998d, page 50).

5.1.11.1 Global Climate Change

Rendija Canyon is undeveloped except for water pumping stations maintained by the DOE and a commercial shooting range operated by the Los Alamos Sportsman's Club. Few greenhouse gases are emitted except for small amounts of carbon dioxide resulting from motor vehicles in the canyon, facility heating of the Los Alamos Sportsman's Club and DOE pumping facilities, and occasional campfires. Carbon dioxide emissions from these stationary sources are estimated to be approximately 30 tons (27 metric tons) per year.

5.1.12 Human Health

5.1.12.1 The Radiological Environment for the Rendija Canyon Tract

The Rendija Canyon Tract is the most remote of the 10 land tracts. It is the farthest from LANL and would be least affected by radioactive air emissions associated with LANL operations. Radiation doses to the members of the public who currently use this tract (such as the Los Alamos Sportsman's Club) would be much less than that to the LANL offsite maximally exposed individual (MEI) (an effective dose equivalent [EDE] of 1.93 millirem) and would not approach the regulatory limit of 10 millirem per year. Background radiation would be the same as that given for any individual in the Los Alamos townsite area (an EDE of 360 millirem plus 53 millirem from medical and dental sources).

5.1.12.2 The Nonradiological Environment for the Rendija Canyon Tract

Because this tract is the most remote of the 10 land tracts, exposures to nonradiological contaminants associated with LANL operations should decrease significantly with distance from LANL due to airborne diffusion and dispersion. Exposures to nonradiological contaminants via the airborne pathway in the LANL vicinity have already been shown not to be significant (DOE 1999c). No LANL activities take place on this tract other than routine environmental monitoring.

Parts of the tract lie within canyon bottom areas, which are susceptible to flooding. The tract also is heavily forested and would provide a substantial fuel load for wildfires.

The tract lies in close proximity to the Rendija Canyon Fault and the Guaje Fault. Natural events such as floods, earthquakes, and wildfire could pose health and safety risks to individuals on the tract.

5.1.12.3 Facility Accidents

Chemical Accidents

The LANL SWEIS (DOE 1999c) posits six chemical accidents, as discussed in Chapter 4, Section 4.1.12, of this CT EIS. For all of these accidents, chemical concentrations in the air plume released by the potential accidents would be below both Emergency Response Planning Guideline (ERPG)-3 (life-threatening) and ERPG-2 (serious health effects) by the time the air plume reached Rendija Canyon, even under adverse weather dispersion conditions. Accordingly, chemical accidents have no estimated public consequences at the tract.

Radiological Accidents

There are 13 credible radiological accident scenarios postulated in the SWEIS, as discussed in Chapter 4, Section 4.1.12, of this CT EIS. Using data from the LANL SWEIS, doses to the MEI at Rendija Canyon have been estimated for each of these, as shown in Table 5.1.12.3-1.

Table 5.1.12.3-1. MEI Doses at Rendija Canyon Resulting from Hypothetical Accidents at LANL Facilities

ACCIDENT SCENARIO	ACCIDENT LOCATION	FACILITY	FREQUENCY PER YEAR	MEI DOSE (mrem)	ACCIDENT DESCRIPTION
RAD-01	54-38	RANT	1.6×10^{-2}	33	Fire in the outdoor container storage area
RAD-02	03-29	CMR	1.5×10^{-6}	8,000	Natural gas pipeline failure
RAD-03	18-116	Kiva #3	4.3×10^{-6}	19	Power excursion at the Godiva-IV fast-burst reactor
RAD-05	21-209	TSTA	9.1×10^{-6}	1	Aircraft crash
RAD-07	50-69	WCRR	3.0×10^{-4}	67	Fire in the outdoor container storage area
RAD-08	54-230	TWISP	4.3×10^{-6}	46	Aircraft crash
RAD-09A	54-226	TWISP	4.9×10^{-1}	1	Puncture or drop of average-content drum of transuranic waste
RAD-09B	54-226	TWISP	4.9×10^{-3}	29	Puncture or drop of high-content drum of transuranic waste
RAD-12	16-411	--	1.5×10^{-6}	2,610	Seismic-initiated explosion of a plutonium-containing assembly
RAD-13	18-116	Kiva #3	1.6×10^{-5}	29	Plutonium release from irradiation experiment at the Skua reactor
RAD-15A	03-29	CMR	3.6×10^{-5}	32	Fire in single laboratory
RAD-15B	03-29	CMR	3.2×10^{-5}	600	Fire in entire building wing
RAD-16	03-29	CMR	3.5×10^{-6}	3	Aircraft crash

Notes: mrem = millirem; RANT = Radioactive Assay and Nondestructive Test; CMR = Chemistry and Metallurgy Research; TSTA = Tritium Systems Test Assembly; WCRR = Waste Characterization, Reduction, and Repackaging; TWISP = Transuranic Waste Inspectable Storage Project

Because there is but a single residence in Rendija Canyon and few public workers, estimated tract collective dose and estimated excess latent cancer fatality (LCF) are both zero.

Natural Event Accidents

There are five natural event accident scenarios postulated in the LANL SWEIS: four earthquakes and one wildfire. The most severe earthquake scenario (accident SITE-03B) has an estimated frequency of 3×10^{-5} per year, or once every 330,000 years. The postulated earthquake would release chemicals from a number of facilities, including formaldehyde from the Health Research Laboratory (Building 43-01) and chlorine from the chlorinating station within the Los Alamos townsite (Building 00-1109). For all earthquake scenarios, chemical concentrations in the air plume released by the potential accidents are below both ERPG-3 (life-threatening) and ERPG-2 (serious health effects) by the time air plume reached Rendija Canyon, even under adverse weather dispersion conditions. Accordingly, earthquakes have no estimated chemical consequences at the Rendija Canyon Tract. The most severe earthquake scenario, however, would release significant quantities of radioactive materials from several buildings, especially from the Chemistry and Metallurgy Research (CMR) Building (Building 03-29). Radiological consequences are estimated to result in a maximum dose of 24 Roentgen equivalent man (rem) at Rendija Canyon.

The site wildfire scenario would burn about 8,000 acres (3,240 hectares) within LANL boundaries, or about 30 percent of LANL, including most of Mortandad Canyon and parts of Los Alamos and DP Canyons east of Technical Area (TA) 21. Chemical releases would be estimated to be less severe than in the earthquake scenarios. The largest quantities of radioactive materials would be released from the transuranic (TRU) waste storage domes at Area G. The maximum dose at Rendija Canyon is estimated to be less than 0.1 rem. Such a wildfire has an estimated frequency of 0.1 per year, or once every 10 years.

Because there is but a single residence in Rendija Canyon and few public workers, estimated tract collective dose and estimated excess LCF are both zero for all five natural event accident scenarios.

5.1.13 Environmental Justice

Any disproportionately high and adverse human health or environmental effects on minority or low-income populations that could result from the actions undertaken by the DOE are assessed for the 50-mile (80-kilometer) area surrounding LANL, as described in Chapter 3, Section 3.2.1.14.

5.2 No Action Alternative

5.2.1 Land Use

There would be no anticipated change in land use at the Rendija Canyon Tract as currently described under the No Action Alternative. Lease agreements between the DOE and the Los Alamos Sportsman's Club would be anticipated to continue according to the terms and duration of the lease, including the annual lease renewal of additional portions of DOE property currently used for archery, picnic grounds, and storage. No additional construction or abandonment of roads or utilities are planned. Similarly, there would be no contemplated changes in existing access or right-of-way or ongoing County or Federal management plans, policies, or procedures that would impact the recreational activities identified previously. Access to areas of the tract originally used for military ordnance testing would remain posted and restricted.

5.2.1.1 Environmental Restoration

Characterization and cleanup of this tract would take place as described in DOE's *Accelerating Cleanup: Paths to Closure* (DOE 1998c) or similar plans. The plan focuses on completing work at as many contaminated sites as possible by the end of fiscal year 2006, although some LANL sites may take longer. The plan includes input from all major field sites, including LANL.

The DOE has developed preliminary information based on current knowledge of contamination at the Rendija Canyon Tract, as briefly discussed in the Affected Environment portion of this chapter, Section 5.1. Information includes estimates of sampling and cleanup costs, decommissioning costs, types and volumes of wastes that would be generated, and length of time required to effect the cleanup. An overview of this preliminary information is set forth in Appendix B of this CT EIS. All information has been extracted from the Environmental Restoration Report (DOE 1999b).

This information indicates that a range of possible remedies are likely for the tract, and that from one to four removal actions could take place. Cleanup duration is estimated to be 30 months for the longest cleanup segment. (Multiple sites can be restored simultaneously, so that cleanup duration is determined by that which requires the most time.) Waste volumes are projected to total approximately 7,500 cubic yards (5,331 cubic meters). Cost estimates for remedial action at this parcel range from about $19,053,000 to $20,462,000. These estimates are based on the information currently available for each PRS or structure, and are subject to change if significantly different information is discovered during the course of investigation or remediation. It should be noted that all PRSs, including those at which no remediation is ultimately required, must be characterized, and the results must be reported to the administrative authority. As a consequence, there are almost always costs and wastes associated with PRSs that do not require actual "cleanup." Although different cleanup approaches have been identified, it is possible that the administrative authority could require additional actions, resulting in greater waste volumes, a longer cleanup duration, and higher costs. It also should be noted that environmental restoration actions and costs represent only a portion of the actions and total costs that may be required for conveyance and transfer of this parcel. These additional costs may be significant.

5.2.2 Transportation

The No Action Alternative would result in no significant changes in traffic volume on San Ildefonso Road near the Rendija Canyon Tract. It is expected that the future operational performance of San Ildefonso Road and Diamond Drive would remain similar to that of the existing performance.

5.2.3 Infrastructure

The No Action Alternative would not result in any changes in the infrastructure or utilities of this tract; therefore, the impacts would be the same.

5.2.4 Noise

In the No Action Alternative, Rendija Canyon would continue to be used for outdoor recreation such as hiking, trail biking, and by the Los Alamos Sportsman's Club as a shooting range. As such, daytime noise levels would continue as they are currently—generally at 20 to 30 dB, with noise levels increasing to 40 dB whenever a slow-moving vehicle passes by. Gunshots would emit noise at similar levels, but for shorter durations and would mostly affect Los Alamos Sportsman's Club members who choose to partake in shooting activities. Nighttime noise levels would also continue as today, with only an occasional passing vehicle.

5.2.5 Visual Resources

Under the No Action Alternative, it is expected that the visual resources of the tract would remain much as they exist today. The visual character of forested areas and bottomland areas would be expected to remain the same. Views to and from the site would remain substantially unchanged.

5.2.6 Socioeconomics

Under the No Action Alternative, there would be no anticipated changes in land use or change in employment on the tract.

5.2.7 Ecological Resources

Under the No Action Alternative, there would be no changes in land use at the Rendija Canyon Tract, as described in Section 5.1.1. Therefore, no additional impacts to ecological resources are projected under the CT EIS No Action Alternative other than those addressed from a site-wide perspective and as specified in the LANL SWEIS (DOE 1999c).

5.2.8 Cultural Resources

Under the No Action Alternative, the Rendija Canyon Tract would remain the responsibility of the DOE, and the treatment of the cultural resources present would continue to be subject to Federal laws, regulations, guidelines, executive orders, and Pueblo Accords. Other positive impacts of the No Action Alternative would be the passive preservation of resources due to lack of development and the continued access to TCPs afforded to traditional practitioners in most areas of the tract. Ongoing negative impacts from natural processes (such as erosion) on the physical integrity of cultural resources would continue. Also, the potential for negative impacts from continued recreational activities (such as hiking, horseback riding, hunting, and off-road vehicle travel), access by the public, and the lack of security would continue. These impacts include unintentional destruction or damage of resources, vandalism, unauthorized collection of materials and artifacts, and disturbance of traditional practices and ceremonies. These impacts apply both to resources within the tract and to those located nearby and outside of the tract boundary on private, County, and Santa Fe National Forest lands.

5.2.9 Geology and Soils

Consequences would be limited to existing uses. The tract is not developed; no additional utilities, roadwork, or buildings would be required. No additional construction or abandonment of roads or utilities would be planned. No soil disturbance or change in availability of resources would be anticipated. No impacts would be expected from implementing the No Action Alternative.

5.2.10 Water Resources

Continuation of the current and minimal use of this tract by the DOE would be anticipated under this alternative. Consequences to water resources under the No Action Alternative would be no different than those already existing in the affected environment.

5.2.11 Air Resources

As projected in analyses performed for the LANL SWEIS, air quality in Rendija Canyon would remain high under the No Action Alternative. Analyses indicate that the Los Alamos region would continue as an attainment area for criteria pollutants—that is, it will continue to comply with NAAQS. Similarly, analyses showed that concentrations of hazardous and other chemical air pollutants would continue to be below health-based standards for any point beyond the LANL boundary. This same conclusion can be extrapolated to chemical air pollutant concentrations in Rendija Canyon. No adverse impact would likely

result from the implementation of the No Action Alternative.

Finally, analyses for radioactive air pollutants indicate that a resident of Rendija Canyon would receive a dose of less than 2 millirems per year, or less than 20 percent of the EPA standard (DOE 1999c).

5.2.11.1 Global Climate Change

In the No Action Alternative, land use in Rendija Canyon would not change from its current uses. Small amounts of carbon dioxide would continue to be emitted from vehicles and the few facilities that require heat. Other greenhouse gases would not be emitted. Carbon dioxide emissions would be estimated to remain at approximately 30 tons (27 metric tons) per year.

5.2.12 Human Health

There would be no identifiable human health consequences of the No Action Alternative for the Rendija Canyon Tract. No changes in cancer risk should be expected for this alternative. PRSs shown for this tract related to artillery impact areas have been cleaned up based on the findings of human health and ecologically based risk assessments submitted to the New Mexico Environment Department (NMED) for No Further Action (NFA). Therefore, human health risks associated with these PRSs would be negligible for the No Action Alternative. Because this tract is currently beyond the LANL perimeter, it has already been taken into consideration by the LANL SWEIS accident analysis.

Currently, there is only one resident in a trailer on land leased by the Sportsman's Club. Physical injury to this individual could occur if any one of the three natural event accidents takes place (flood, seismic event, or wildfire) in Rendija Canyon.

5.2.12.1 Chemical Accidents

Accident assessment would be the same as discussed in the Affected Environment section of this chapter (Section 5.1). For all postulated accidents, chemical concentrations in the air plume that would be released by potential chemical accidents are below both ERPG-3 (life-threatening) and ERPG-2 (serious health effects) by the time air plume reached Rendija Canyon, even under adverse weather dispersion conditions. Accordingly, chemical accidents would have no estimated public consequences at the tract.

5.2.12.2 Radiological Accidents

Accident assessment would be the same as discussed in the Affected Environment section of this chapter. MEI doses would be greater than 500 millirem for 3 of 13 scenarios. The estimated tract collective dose and estimated excess LCF would both be zero.

5.2.12.3 Natural Event Accidents

Accident assessment would be the same as discussed in the Affected Environment section of this chapter. Neither the postulated wildfire nor any of the earthquakes would have chemical consequences, even under adverse weather dispersion conditions. The MEI dose resulting from the postulated wildfire would be expected to be less than 0.1 rem; the maximum dose from the most severe earthquake would be about 24 rem. Because there is but a single residence in Rendija Canyon and few public workers, estimated tract collective dose and estimated excess LCF would both be zero for all five natural event accident scenarios.

5.2.13 Environmental Justice

For environmental justice impacts to occur, there must be high and adverse human health or environmental impacts that disproportionately affect minority or low-income populations. The human health

analyses estimate that air emissions and hazardous chemical and radiological releases from normal LANL operations, which would continue under the No Action Alternative, would be expected to be within regulatory limits and that no excess LCFs would likely result. The human health analyses also indicate that radiological releases from accidents at LANL would not result in disproportionate adverse human health or environmental impacts. Therefore, such accidents would not have disproportionately high and adverse impacts on minority or low-income populations.

The analyses also indicate that socioeconomic changes resulting from implementing the No Action Alternative would not lead to environmental justice impacts.

5.3 Proposed Action Alternative

There are no DOE facilities or activities on this tract that would have to be relocated or otherwise affected by the proposed disposition of this tract. Under the Proposed Action Alternative, the Los Alamos Sportsman's Club lease would transfer to the new owner and the club would remain operational at least for the duration of the current lease agreement. Therefore, there would be no direct consequences of the transfer of ownership of the tract other than those associated with potential loss of Federal protection of cultural and ecological resources (see Sections 5.3.7 and 5.3.8, respectively, below).

5.3.1 Land Use

Indirect consequences would be anticipated from the subsequent uses of the tract contemplated by the receiving party or parties. The contemplated uses and the associated consequences are discussed in the following sections. The potential relocation of, or effect on, currently existing non-DOE facilities or activities are considered indirect consequences and are discussed in the following sections.

5.3.1.1 Description of Contemplated Uses

The two contemplated land uses identified for the Rendija Canyon Tract include the natural areas and residential development scenario and the cultural preservation scenario. The following paragraphs describe these future use scenarios upon which later discussions of indirect impacts are based.

Table 5.3.1.1-1 and Table 5.3.1.1-2 provide summaries of the attributes of the

Table 5.3.1.1-1. Attributes of Future Land Use for the Rendija Canyon Tract Under the Natural Areas and Residential Scenario

NATURAL AREAS (340 ACRES [138 HECTARES])
• Trail system and appropriate facilities linking to existing trails are proposed. • Arroyos and canyons left as open spaces providing linkages to existing recreational areas in the lower canyons and adjacent USFS lands. • Passive management of resources.
RESIDENTIAL DEVELOPMENT (570 acres [230 hectares])
• Dedicated to residential and support uses. Residential density proposed as three dwelling units per acre, assumes 2.5 people per household. • Total of 1,260 new dwelling units, 3,500 new residents, and 2,900 personal vehicles. • Conventional single-family detached and single- and multiple-family attached housing; clustering where topographically amenable (420 acres [170 hectares]). • Support uses would include such facility requirements as schools and day-care centers, community recreation and meeting facilities, fire, safety, and utility substations (150 acres [60 hectares]).

Table 5.3.1.1-2. Attributes of Future Land Use for the Rendija Canyon Tract Under the Cultural Preservation Land Use Scenario

CULTURAL PRESERVATION
• Entire tract held in cultural preservation. • Land use would be dominated by cultural practices and activities necessary to meet continuing stewardship needs. • Future use of the tract for hiking, horseback riding, or other recreation by members of the general public would be eliminated. • Passive management of resources. • Removal of Los Alamos Sportsman's Club structures.

land uses proposed under each of these scenarios for the Rendija Canyon Tract.

Natural Areas and Residential Development Land Use Scenario

Land uses proposed under this scenario include the development of 570 acres (230 hectares) of the 910-acre (370-hectare) tract for single- and multiple-family detached housing and streets, parks, and community infrastructure (Figure 5.3.1.1-1). The remaining 340 acres (138 hectares) would be dedicated to developed (for example, the Los Alamos Sportsman's Club) and open-space and recreation or natural areas. Residential areas would include 420 acres (170 hectares) of the developed 570 acres (230 hectares). Residences would be developed at a density of three dwelling units per acre with a population planning factor of 2.5 people per household. The integration of natural areas into the development plan would likely reaffirm the continued uses of the land. New roads would be constructed to provide access to both the developed and open-space areas. Los Alamos Sportsman's Club activities would likely remain in the canyon for the foreseeable future.

Cultural Preservation Land Use Scenario

Land use under this scenario would be dominated by cultural practices and activities necessary to meet continuing stewardship needs. To ensure the preservation of resources at the site, future use of the tract for hiking, horseback riding, or other recreational use by members of the general public would be eliminated. Access to over 12,000 acres (4,900 hectares) of Santa Fe National Forest would be eliminated. Access would be provided to use TCPs in the area. Management of the tract would be passive. The Los Alamos Sportsman's Club likely would be removed or demolished upon expiration of its lease term.

5.3.1.2 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Development of the Rendija Canyon Tract under this scenario would result in a notable change in land use of approximately 63 percent of the total lands of the tract. Impacts associated with construction activities would be temporary in nature and would be minor with regard to land use.

Recreational land use at the tract would also be anticipated to undergo change. Residential and other development proposed at the tract would conflict with some traditional recreational opportunities at the site such as off-road vehicle travel and hunting. These activities would be viewed as incompatible with residential land use for safety reasons. Other recreational opportunities at the site such as hiking and horseback riding would be adversely affected by the proposal due to the presence of a large number of new residents. The development of this tract could require the Los Alamos Sportsman's Club to move at some time,

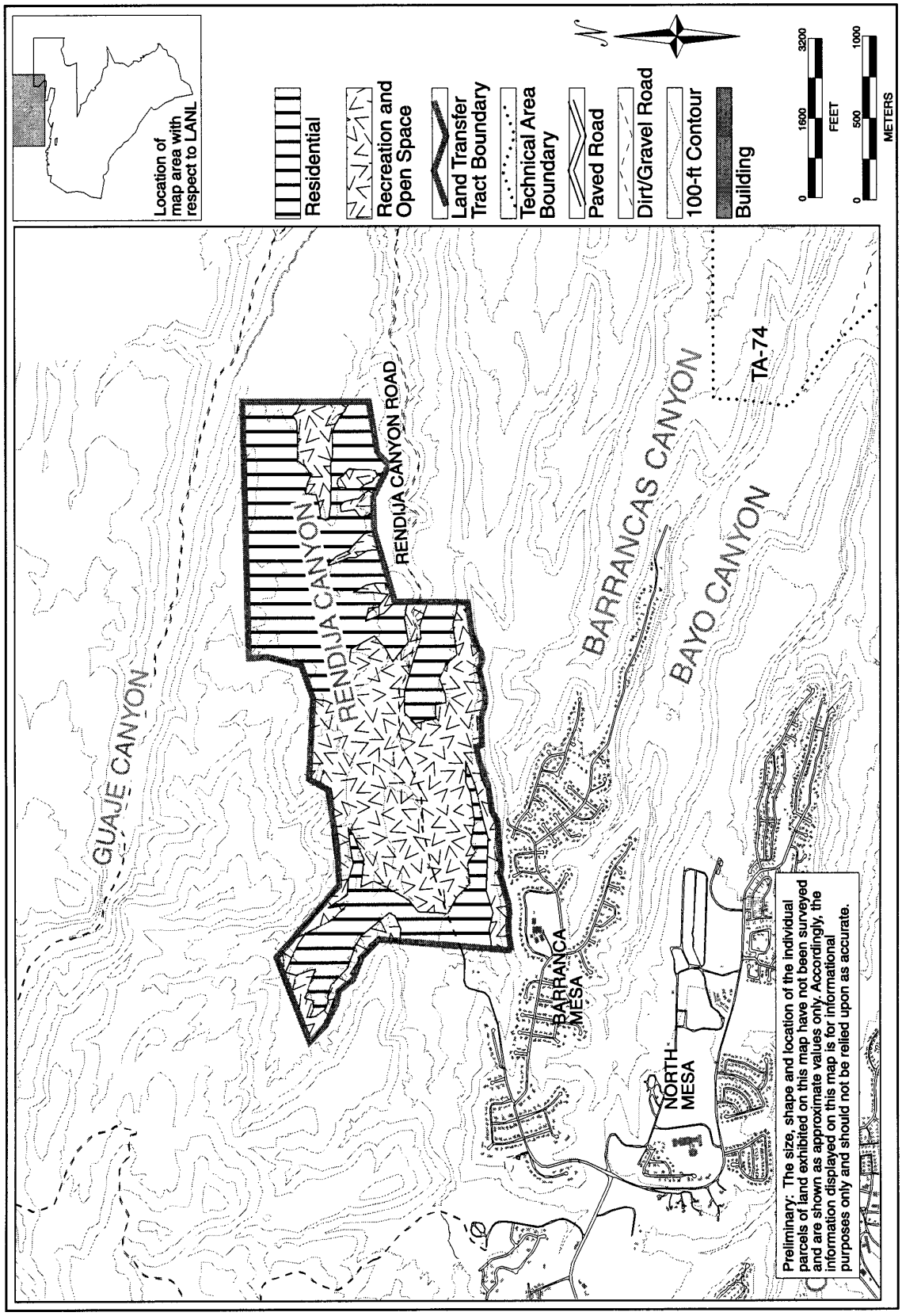

Figure 5.3.1.1-1. Rendija Canyon Tract Contemplated Land Uses.

depending on location of future residences. The existing Los Alamos Sportsman's Club facilities might remain and be put to other uses (for example, community center, picnic facilities, etc.) or could be razed.

Cultural Preservation Land Use Scenario

Land use proposed under this scenario would avoid impacts associated with land disturbance and development. However, the change in access under this scenario would represent a meaningful loss to recreational use of the tract as well as USFS access. Under this contemplated land use it is likely that the Los Alamos Sportsman's Club would have to move once the existing lease expires in December 2001. Either the entrance road would not be gated until the lease expired, or a short-term easement would have to be granted for use of the road by Club members. After the expiration of the lease, the Club facilities would likely be razed.

5.3.1.3 Environmental Restoration

No additional restoration actions would be required under the Proposed Action Alternative because restoration activities must occur before the tract would be considered suitable for conveyance or transfer.

5.3.2 Transportation

5.3.2.1 Environmental Consequences of the Contemplated Uses

Each of the contemplated uses discussed in Section 5.3.1.1 would result in a different set of transportation system impacts for the Rendija Canyon Tract.

Natural Areas and Residential Development Land Uses Scenario

The natural areas and residential development land use scenario envisions retention of additional open-space recreational opportunities and facilities, along with significant residential development. The natural areas (open-space recreational) land uses would have minimal impact on the weekday peak-hour traffic volume because recreational facilities generally have higher use on weekends. Therefore, this analysis considers only the transportation impacts associated with the proposed residential development.

Residences are planned to be developed on 420 acres (170 hectares) of the tract with a density of three dwelling units per gross acre, resulting in an estimate of 1,260 dwelling units. Table 5.3.2.1-1 shows the number of trips the Institute of Transportation Engineers (ITE) Trip Generation Manual estimates would be generated by this development (ITE 1997).

Table 5.3.2.1-1. Estimated Increase in Traffic for the Contemplated Natural Areas and Residential Development Scenario

ITE ESTIMATED TRAFFIC VOLUMES FOR RENDIJA CANYON TRACT								
Land Use	ITE Land Use Code	24 Hour Two-Way Volume	Morning Peak Hour Trips		Evening Peak Hour Trips		Saturday Peak Hour Trips	
			Enter	Exit	Enter	Exit	Enter	Exit
1,260 Single-Family Detached Housing	210	12,058	239	706	819	454	643	542

As shown in the table, the proposed residential development could add an additional 706 exiting trips to San Ildefonso Road in the weekday morning peak hour and an additional 819 entering trips in the weekday evening peak hour. The natural areas and residential development land use scenario also could add another 12,058 trips per day to the local transportation system.

Adding these new trips to those already existing on the transportation network could result in approximately 16,500 trips on San Ildefonso Road and 26,000 trips on Diamond Drive on a daily basis in the year 2018. The LOS on Diamond Drive would decline from LOS A for the No Action Alternative to LOS B, which is the condition where speeds begin to be restricted somewhat by traffic conditions, but overall operating conditions are still considered to be good.

Because all trips under this scenario would have to utilize San Ildefonso Road, the volume of additional trips could cause the LOS to degrade to LOS F. This LOS is defined as a traffic jam, where operation is at low speeds and volumes are above capacity. Should Los Alamos Sportsman's Club activities eventually be relocated, current local users would likely have to drive farther distances to use the new facilities.

Cultural Preservation Land Use Scenario

The contemplated cultural preservation land use scenario would reduce the current amount of traffic in this tract. Access to the tract would be restricted to visits required to maintain or operate water pumping stations or power lines. Access to over 12,000 acres (4,900 hectares) of Santa Fe National Forest would be eliminated unless easement was granted. Vehicular traffic could decrease by as much as 90 percent. Residents who use the tract for recreation likely would have farther to drive to other locations.

5.3.3 Infrastructure

5.3.3.1 Environmental Consequences of the Contemplated Uses

The indirect impacts on utilities and infrastructure associated with the contemplated land uses, described in Section 5.3.1.1 of this CT EIS, would vary greatly.

Natural Areas and Residential Development Land Use Scenario

The indirect impacts of the contemplated uses of the land for the natural areas and residential development scenario with regard to utilities and infrastructure would include increased utility usage and ground disturbance resulting from construction of new facilities. With the lack of infrastructure on this tract, high-density development would require construction of new utilities and enhancement to existing ones. The existing water and electricity lines would be inadequate for the needs of a community of this size. The electricity lines would have to be supplemented or replaced, and a new dedicated 13.2-kilovolt circuit from the Los Alamos substation would be needed. The existing water supply to the canyon would have to be supplemented with new wells and appropriate pumping and storage facilities. A new natural gas main from the Cemetery Road area and regulator stations would be needed. The closest wastewater treatment plant to the Rendija Canyon Tract is the Bayo Wastewater Treatment Plant, but the distance and elevation over which sewage would need to be pumped makes treatment at that facility impractical. A new sewage treatment plant and associated plumbing would probably need to be built also.

Table 5.3.3.1-1 shows the estimated increase in power, electricity, gas, water, wastewater, and solid waste as compared to the capacity currently available in the local utility systems. Although treatment of wastewater from the anticipated development

Table 5.3.3.1-1. Estimated Increase in Utility Usage for Proposed Development in Rendija Canyon

	PEAK POWER mw	ELECTRICITY gwh	GAS mcf (mly)	WATER mgy (mly)	SEWAGE[a] (BAYO) mgy (mly)	MSW tpy (mty)
Estimated annual increase	1.4	8	164 (4,644)	126 (477)	63 (238)	1,134 (1,028)
Available system capacity	5	277	5,040 (142,700)	297 (1,125)	135 (511)	NA

Notes: mw = megawatts, gwh = gigawatt-hours, mcf = million cubic feet, mly = million liters per year, mgy = million gallons per year, tpy = tons per year, msw = municipal solid waste, mty = metric tons per year.

[a] Treatment of wastewater from the contemplated development at the Bayo Wastewater Treatment Plant is considered impractical. The remaining capacity of that plant is tabulated for comparison purposes.

would be impractical at the Bayo Wastewater Treatment Plant, the remaining capacity of that plant is tabulated for comparison. Impacts to the utility systems from residential development on this tract would be minimal because the increase in utility demand would not be expected to exceed system capacities.

Installation of new utility facilities and upgrades to existing ones would require creation of trenches and access and maintenance roads. This construction and extension of utility lines would cause soil disturbance. Refer to Section 5.3.9 of this chapter for detail on impacts resulting from ground disturbance from new construction. Should Los Alamos Sportsman's Club activities eventually be relocated new construction and installation of utilities may be required.

Cultural Preservation Land Use Scenario

The indirect impacts on utilities and infrastructure would be limited to ground disturbance and the possible relocation of utilities and structures. Once the lease for the Los Alamos Sportsman's Club has expired, the Club would likely be relocated. Removal and backfilling of the septic tanks would be required. Furthermore, the water and electricity lines that run through the tract may need to be removed or abandoned in place. Continuing the Club's activities (such as shooting or archery practice and competitions) at a different location could require construction of a new clubhouse, installation of water and electrical power lines where none exist, and installation of a water and septic system.

5.3.4 Noise

5.3.4.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Noise impacts would increase under the natural areas and residential development land use scenario through the introduction of typical residential noises. The most prevalent increase would result from increased vehicular traffic as residents come and go from work, school, social events, shopping, etc. New noises also would be introduced, including construction activities when housing is first introduced and lawn mowers and other devices used for routine care and maintenance of the residences. In short, daytime noise levels would be expected to increase from the current maximum of

40 A-weighted decibels (dBA) (estimated) to about 60 or 70 dBA. Noises also would be encountered more often than at present, during both the day and night. Noise from Los Alamos Sportsman's Club activities would be closer to residential receptors. Should Los Alamos Sportsman's Club activities eventually be relocated, noises from shooting practices and competitions would be eliminated but would likely reappear in another, as-yet-unknown location.

Cultural Preservation Land Use Scenario

Noise impacts would likely decrease from current levels if the Rendija Canyon Tract were to be used for cultural preservation. The Los Alamos Sportsman's Club and all recreational use of the land would cease, and the dirt road through the canyon likely would be gated and its use restricted to maintenance of the water pumping station and other minimal activities. As such, although maximum noise levels would remain as they are currently, the occurrence of noise events would greatly diminish. (For example, vehicular traffic would most likely decrease by 90 percent or more.) Once the lease for the Los Alamos Sportsman's Club has expired, the Club would likely be relocated. Noises from shooting practices and competitions would thus be eliminated from Rendija Canyon, although they would likely reappear in another, as-yet-unknown location.

5.3.5 Visual Resources

5.3.5.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Residential development would bring modifications to the landscape. It is unlikely that housing units or other built facilities and associated roads and infrastructure could be designed to preserve the visual character of the landscape. Because the eastern portion of the site is more forested than the western portion, it may have more capacity to absorb alteration due to development without losing its visual character. However, it would be difficult to retain the landscape character associated with the high public value for the visual resource.

Cultural Preservation Land Use Scenario

With this land use, the tract would remain undeveloped and retain the existing high public value associated with Scenic Class II. Access to view points within the tract would be restricted.

5.3.6 Socioeconomics

5.3.6.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

The construction of new residential areas would temporarily increase employment in the ROI. This would, in turn, generate increases in regional income. These changes would be temporary, lasting only the duration of the construction period. Because the majority of the jobs generated would be filled by the existing ROI labor force, there would be no impact on ROI population or increase in the demand for housing or public services in the region. Construction of residential housing would increase the housing base in the area, increasing the options available.

Cultural Preservation Land Use Scenario

Under this contemplated land use scenario, there would be no construction and no development. Thus, there would be no indirect socioeconomic impact from transfer of ownership of the Rendija Canyon Tract.

5.3.7 Ecological Resources

Direct impacts of the conveyance or transfer itself would be limited to the changes in responsibility for resource protection.

Environmental review and protection processes for future activities for both receiving parties would not be as rigorous as those which govern DOE activities.

5.3.7.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

The natural areas and residential development scenario would effectively disrupt the structure and function of the existing Rendija Canyon ecosystem. Ponderosa pine forest and pinyon-juniper woodland habitat would be significantly modified or lost. Highly mobile wildlife species or wildlife species with large home ranges (such as deer, elk, and birds) would be able to relocate to adjacent undeveloped areas. However, successful relocation may not occur due to competition for resources to support the increased population and the carrying capacity limitations of areas outside the proposed development. Species relocation may result in additional pressure to lands already at or near carrying capacity. The impacts could include overgrazing (in the case of herbivores), stress, and overwintering mortality. For less-mobile species (reptiles, amphibians, and small mammals), direct mortality could occur during the actual construction event or ultimately result from habitat alteration. Acreage used for the development also would be lost as potential hunting habitat for raptors and other predators. In addition to the area to be disturbed, there would be a decrease in quality of the habitat immediately adjacent to the proposed development due to increased noise level, traffic, lights, and other human activity, both pre- and post-construction. One little-addressed consequence of urban development is the influence of domestic animals upon wildlife populations. For example, free-roaming domestic cats may kill more than 100 animals each year. Studies have shown that approximately 60 percent of the wildlife cats kill are small mammals; 20 percent are birds (predation at bird feeders can be substantial; one Virginia study estimated 28 kills per urban cat per year); and 10 percent are amphibians, reptiles, and insects. Due to the presence of coyotes in the Rendija Canyon area, predation by cats would tend to be limited to within developed and closely adjacent natural areas (Goldsmith et al. 1991, Crooks 1997-98, Hawkins 1998, and CSBC 1998). Free-ranging domestic dogs are known to harass and disrupt the activities of many wildlife species and are documented to have caused mortality in animals such as deer and foxes (Goldsmith et al. 1991).

The adjacent habitat also would experience a loss of quality from the reduction in size, segmentation of the habitat, and restrictions on mobility for some mammals. The loss of acreage due to development would result in a reduction of breeding and foraging habitat for wildlife currently utilizing the property.

There are three species that are Federal-listed as threatened or endangered that may potentially use the Rendija Canyon Tract: the bald eagle, American peregrine falcon, and the Mexican spotted owl. With respect to the bald eagle, this area has a low level of potential use for foraging. The American peregrine falcon and Mexican spotted owl are likely to use the area for foraging because approximately 80 percent of the vegetative cover is their preferred habitat. Loss of the entire tract to development would decrease the total available habitat on DOE/LANL property by approximately 3 percent. The Mexican spotted owl Rendija Canyon AEI core and buffer habitat would be reduced by approximately 129 acres (52 hectares) and 427 acres (173 hectares), respectively (PC 1999d).

Development in this tract could result in the direct loss of wetland vegetation and function. Even if construction and development does not occur in the wetland,

indirect impacts, such as additional surface runoff from an increase of impermeable surface areas (such as pavement), resulting in accelerated streambed erosion and increased downstream and offsite sedimentation could occur. Subsequently, floodplain boundaries may be modified.

The Rendija Canyon Tract and adjacent lands do, in some areas, support a high density of ponderosa pine trees that contribute to a high fuel load and wildfire risk. Without active participation by the party receiving the land on the Interagency Wildfire Management Team, which recommends and coordinates regional wildfire hazard mitigation actions, the potential for wildfire occurrence in the general area may increase as a result of development and additional human activities in Rendija Canyon and surrounding lands.

The adjacent Guaje Canyon would probably be affected from increased recreational use as a result of the Rendija Canyon development. Nesting and foraging habitat in Guaje Canyon would likely receive increased human use, potentially disturbing nesting habitat and the behavior of the Mexican spotted owl and American peregrine falcon. This human disturbance may not be compatible with the adjacent habitat for the Mexican spotted owl on adjoining Santa Fe National Forest land. Development and increased recreational use on the edge of this habitat may impact physical and biological features essential to the conservation of the species and may require special management consideration.

The watershed management approach to natural resource management requires the integration of natural resource management plans across several land management agencies. The current lack of a natural resources management plan by either the County of Los Alamos or the Pueblo of San Ildefonso would impede the development of an integrated, multiagency approach to short- and long-term natural resource management strategies.

Cultural Preservation Land Use Scenario

Under this proposed land use scenario, impacts to natural resources would be similar to the No Action Alternative, with two primary differences. Removal of the Los Alamos Sportsman's Club would result in the transition of this area from bare ground and weedy vegetation to the natural vegetation of the area, primarily grassland and ponderosa pine. Noise (gun fire) associated with the Los Alamos Sportsman's Club would cease and remove a potential disturbance to wildlife from the local area. Wildlife disturbance, both visual and auditory, from recreational use would be diminished. Consequently, habitat for most species would be augmented and improved.

The watershed management approach to natural resource management requires the integration of natural resource management plans across several land management agencies. The potential land recipients' current lack of a natural resources management plan would impede the development of an integrated, multiagency approach to short- and long-term natural resource management strategies.

Environmental review and protection processes for future activities would not be as rigorous as those that govern the DOE. The LANL Threatened and Endangered Species Habitat Management Plan would not be developed or implemented for this tract, thereby potentially reducing the protection afforded threatened and endangered species and their potential habitat in this area.

Under this scenario, there could be major effects on the management of adjacent USFS lands. Currently, the only access to these lands is through the Rendija Canyon Tract. Closing this road would hinder the ability of Santa Fe National Forest personnel to manage the ecological resources on over 12,000 acres

(4,900 hectares), including wildfire management.

5.1.8 Cultural Resources

Direct impacts of the conveyance and transfer itself would result from the transfer of known and unidentified cultural resources out of the responsibility and protection of the DOE.

First, under the Criteria of Adverse Effect (36 Code of Federal Regulations [CFR] 800.5(a)(1)) the transfer, lease, or sale of NRHP-eligible cultural resources out of Federal control is an adverse effect. Eligible cultural resources are present in the Rendija Canyon Tract and thus could be directly impacted by the Federal action.

Second, the conveyance and transfer of this tract could potentially impact the cultural resources by removing them from future consideration under the *National Historic Preservation Act*.

Third, the disposition of this tract may affect the protection and accessibility to Native American sacred sites and sites needed for the practice of any traditional religion by removing them from consideration under the *Religious Freedom Restoration Act*, *American Indian Religious Freedom Act*, and Executive Order 13007, "Indian Sacred Sites." Finally, the disposition of this tract would affect the treatment and disposition of any human remains, funerary objects, sacred objects, and objects of cultural patrimony that may be discovered on the tract. This impact would result from removing these items from consideration under the *Native American Graves Protection and Repatriation Act*, or from changing the way this act is applied to these remains and objects. Indirect consequences are discussed in the next section.

5.1.8.1 Environmental Consequences of the Contemplated Uses

Indirect impacts would be anticipated from the land uses contemplated for the Rendija Canyon Tract by the receiving parties. The two land uses identified for the Rendija Canyon Tract include natural areas and residential development, and cultural preservation. This analysis reflects the broad, planning-level impacts anticipated from each contemplated use based on known or probable cultural resources within the tract.

Natural Areas and Residential Development Land Use Scenario

The natural areas and residential development scenario would be anticipated to impact cultural resources present in the tract and in adjacent areas.

The development of planned natural areas would have the beneficial impact of minimizing more destructive and intrusive types of land development and thus allowing passive preservation of cultural resources on this part of the tract.

The introduction of additional residents, the sanctioning of recreational uses, and any enhancement of trails would increase access to cultural resources. Increased access could cause possible destruction and damage to resources, vandalism, unauthorized collection of materials and artifacts, and disturbance of traditional practices and ceremonies.

Residential development would cause large-scale disturbance to the cultural resources of the tract due to construction, grading, and trenching. These impacts include the destruction of archaeological sites and TCPs. Resources avoided by construction may become isolated or have their setting disturbed by the introduction of elements out of character with the resource, such as visual and audible intrusions. The development of land may cause changes to the presence or integrity of, or access to natural resources utilized by traditional communities for

subsistence, religious, or other cultural activities.

The construction of transportation infrastructure would have similar impacts on cultural resources as described for residential construction and also would increase impacts associated with access to resources.

Cultural Preservation Land Use Scenario

Under the cultural preservation scenario, the Rendija Canyon Tract would be used for cultural stewardship needs by the receiving party and access to these lands would be restricted to protect culturally important resources. It is anticipated that this scenario would involve little or no construction or development, but cultural preservation uses and users would be defined by the receiving party.

Dedicating the tract to cultural preservation would be anticipated to have a beneficial impact on any cultural resources present. The restriction of access by the general public would be anticipated to help protect the resources from vandalism, unauthorized collection of materials and artifacts, and disturbance of traditional practices and ceremonies. Another positive impact would be the passive preservation of resources and continued access to TCPs afforded to traditional practitioners of the receiving party. There may be potential negative impacts to some current traditional users if general access is precluded or restricted.

5.1.9 Geology and Soils

5.1.9.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Under the natural areas and residential development scenario, residential development, construction of transportation networks, and installation of sewer and electricity utilities would cause soil disturbances. New structures would be susceptible to a magnitude 7 seismic event (as measured by the Richter scale), and would be susceptible to wildfire episodes. In addition to the potential impact to structures from wildfire, soils would be susceptible to increased erosion and transport via surface runoff after the removal of ground cover vegetation.

Cultural Preservation Land Use Scenario

Under the cultural preservation land use scenario, impacts would be similar to the No Action Alternative with some exceptions. Removal of the Los Alamos Sportsman's Club facilities may cause soil disturbance. Restricting recreational access may decrease erosion.

5.1.10 Water Resources

5.1.10.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Residential development may potentially impact surface water quality and quantity within and downstream of the tract. Residential development would not affect groundwater quality or quantity beneath the tract but may contribute to the overall regional water level decline and possibly result in degradation of water quality within the aquifer.

Surface water quantity within the Rendija Canyon drainage may potentially increase as a result of stormwater runoff from paved roads and developed areas. Some undefined portion of the tract lies with in the 100-year and 500-year floodplains. The potential for flooding would increase with the denudation of the area or the area upstream by either development of the tract or natural causes such as a wildfire.

The quality of stormwater runoff may not meet State requirements for organics if contaminants such as motor oil or gasoline are washed from paved areas into the drainage. Also, runoff may have more erosive power if it is flowing across areas that have been denuded, thereby transporting more sediment into the drainage.

Cultural Preservation Land Use Scenario

The impacts to groundwater or surface water quantity or quality under this contemplated land use would be the same as described for those already existing in the affected environment, as described in Section 5.1.

5.1.11 Air Resources

5.1.11.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

Under the natural areas and residential development scenario, canyon air quality would remain the same as in the No Action Alternative for hazardous and radioactive air pollutants and would deteriorate slightly in criteria pollutants. Motor vehicle use would increase, and motor vehicles would emit small quantities of several criteria pollutants. In addition, homes heated with natural gas would also emit trace quantities of some criteria pollutants.

Cultural Preservation Land Use Scenario

Under the cultural preservation land use scenario, the canyon would receive even fewer visits than it does now. This land use would result in fewer emissions of criteria pollutants and no emissions of hazardous and radioactive air pollutants. Air quality would be slightly better than that anticipated for the No Action Alternative.

5.1.11.2 Global Climate Change

Natural Areas and Residential Development Land Use Scenario

Under the natural areas and residential development scenario, contributions to global warming would increase significantly. Carbon dioxide emissions would increase to an estimated 22,000 tons (20,000 metric tons) per year (versus 30 tons [27 metric tons] in the No Action Alternative) due to residential needs such as space heating, hot water heating, and motor vehicle use. There would continue to be little or no emissions of other greenhouse gases, however.

Cultural Preservation Land Use Scenario

Under the cultural preservation scenario, carbon dioxide emissions would be reduced from an estimated 30 to 13 tons (27 to 12 metric tons) per year and there would continue to be no emissions of other greenhouse gases. Contributions to global warming would be reduced compared to the No Action Alternative.

5.1.12 Human Health

5.1.12.1 Environmental Consequences of the Contemplated Uses

Natural Areas and Residential Development Land Use Scenario

The types of human health consequences anticipated would be similar to those of the No Action Alternative. Because all PRS or other contamination associated with LANL activities would be cleaned up prior to transfer, risk to human health would be minimal to nonexistent for any land use on this tract. The contemplated natural area land use would not put the public in closer proximity to LANL and does not require any additional analysis for radiological or nonradiological contaminant exposures.

Residential development would bring 3,500 new residents into closer proximity to

LANL facilities, thereby increasing the number of members of the public exposed to radiological and chemical air pollutants emitted by LANL operations. Residential development also would introduce more sensitive receptors, such as children and pregnant females, to an area that currently has but a single permanent residence. While all doses would be within health-based standards established by other Federal agencies, the closer proximity would slightly increase radiation doses received by the collective population within a 50-mile (80-kilometer) radius of LANL. In addition, closer public proximity would result in greater public consequences from some hypothetical accidents at LANL facilities.

Given the significant numbers of residents expected on the tract, some additional and perhaps significant risk could be incurred. Physical injury to individuals could occur if any one of the three natural event accidents takes place (flood, seismic events, or wildfire) in Rendija Canyon.

Cultural Preservation Land Use Scenario

The human health consequences for this land use would be the same as described for the affected environment (see Section 5.1).

5.1.12.2 Chemical Accidents

Accident assessment would be the same as described for the No Action Alternative. For all postulated accidents, chemical concentrations in the air plume released by potential chemical accidents would be below both ERPG-3 (life-threatening) and ERPG-2 (serious health effects) by the time air plume reaches Rendija Canyon, even under adverse weather dispersion conditions. Accordingly, chemical accidents would have no estimated public consequences at the tract.

5.1.12.3 Radiological Accidents

Regardless of land use subsequent to disposition, the MEI dose at this tract would be the same as described for the No Action Alternative. MEI doses would be greater than 100 millirem for 3 of 13 accident scenarios: 8 rem for RAD-02 (natural gas pipeline failure, explosion, and fire at the CMR Building), 2.6 rem for RAD-12 (plutonium release from the Dual Axis Radiographic Hydrodynamic Test [DARHT] Facility during an earthquake), and 0.6 rem for RAD-15B (explosion followed by fire in an entire wing of the CMR Building).

The estimated tract collective dose and estimated excess LCFs also would remain at zero as in the No Action Alternative if the contemplated cultural preservation land use was chosen subsequent to transfer of ownership. If the natural areas and residential development scenario occurred, there would be substantial increases in collective tract dose and excess LCFs. For example, the LANL SWEIS estimated a collective population dose of 120,000 person-rem for all people living within a 50-mile (80-kilometer) radius of LANL, resulting in an estimated 57 excess LCFs for hypothetical accident RAD-02 (DOE 1999c). This would increase by another 14,000 person-rem and 7 excess LCFs if Rendija Canyon Tract were developed residentially. Table 5.3.12.3-1 compares the estimated additional consequences of all hypothetical radiological accidents.

5.1.12.4 Natural Event Accidents

Natural event accidents would have no estimated chemical consequences at Rendija Canyon. For the postulated accidents (wildfire and four earthquake scenarios), chemical concentrations in the air plume released by potential chemical accidents would be below both ERPG-3 (life-threatening) and ERPG-2 (serious health effects) by the time the air plume reached Rendija Canyon, even under adverse weather dispersion conditions.

Table 5.3.12.3–1. Additional Accident Consequences Associated with the Natural Areas and Residential Development Scenario on the Rendija Canyon Tract

				NATURAL AREAS AND RESIDENTIAL DEVELOPMENT LAND USE[a]		LANL SWEIS ESTIMATES[b]	
Accident Scenario	Accident Location	Facility	Frequency per Year	Collective Dose[c]	Excess LCF	Collective Dose[c]	Excess LCF
RAD-01	54-38	RANT	1.6×10^{-3}	74	0.04	72	0.04
RAD-02	03-29	CMR	1.5×10^{-6}	14,000	6.9	120,000	57
RAD-03	18-116	Kiva #3	4.3×10^{-6}	41	0.02	100	0.06
RAD-05	21-209	TSTA	9.1×10^{-6}	2	0	24	0.01
RAD-07	50-69	WCRR	3.0×10^{-4}	140	0.07	1,300	0.69
RAD-08	54-230	TWISP	4.3×10^{-6}	110	0.05	400	0.2
RAD-09A	54-226	TWISP	4.9×10^{-1}	1	0	4	0
RAD-09B	54-226	TWISP	4.9×10^{-3}	67	0.03	230	0.12
RAD-12	16-411	--	1.5×10^{-6}	3,900	1.9	35,800	18
RAD-13	18-116	Kiva #3	1.6×10^{-5}	61	0.03	160	0.08
RAD-15A	03-29	CMR	3.6×10^{-5}	58	0.03	175	0.09
RAD-15B	03-29	CMR	3.2×10^{-5}	1,100	0.54	3,400	1.7
RAD-16	03-29	CMR	3.5×10^{-6}	7	0	56	0.03

Notes: RANT = Radioactive Assay and Nondestructive Test; TSTA = Tritium Systems Test Assembly; WCRR = Waste Characterization, Reduction, and Repackaging; TWISP = Transuranic Waste Inspectable Storage Project

[a] In addition to doses estimated in the SWEIS.

[b] For the entire population within a 50-mile (80-kilometer) radius of LANL.

[c] Person-rem.

MEI doses would be the same as described in the No Action Alternative, regardless of land use subsequent to disposition of ownership. The maximum dose resulting from the postulated wildfire would be less than 0.1 rem; from the most severe earthquake it would be about 24 rem. If the land use subsequent to transfer of ownership were cultural preservation, estimated tract collective dose and estimated excess LCF also would remain as described in the No Action Alternative (that is, both would remain zero).

If the tract were developed residentially, however, there would be significant increases in collective tract dose and excess LCFs. The most severe earthquake would result in an estimated tract collective doses greater than 30,000 person-rem, and in approximately 20 excess LCFs. These exposures would be in addition to those estimated in the LANL SWEIS (340,000 person-rem and 230 excess LCFs for SITE-03B).

5.1.13 Environmental Justice

For environmental justice impacts to occur, there must be high and adverse human health or environmental impacts that disproportionately affect minority or low-income populations. The human health analyses for the land uses contemplated for this tract estimate that air emissions and hazardous chemical and radiological releases associated with LANL operations would be expected to be within regulatory limits and that no LCFs would likely result. The human health analyses also indicate that radiological releases from accidents would not result in disproportionate adverse human health or environmental impacts to residents on the Rendija Canyon Tract. Therefore, such accidents would not have disproportionately high and adverse impacts on minority or low-income populations with regard to implementing the contemplated land uses on this tract.

The analyses also indicate that socioeconomic changes resulting from implementing either of the proposed alternatives would not lead to environmental justice impacts. Under the Proposed Action Alternative, modest economic benefits would arise from the additional jobs created during construction of the new housing. Secondary effects would include small increases in business activity and would likely increase revenues to local governments. Each of these impacts would be positive and would not disproportionately affect the low-income or minority area populations.

The analysis of impacts to cultural resources indicates that TCPs could be present on the tract or in adjacent areas. If present, TCPs could be impacted by the conveyance or transfer or by subsequent land uses. Consultations to determine the presence of these resources have not been completed, and the degree to which these resources may be impacted has not been ascertained. Impacts to TCPs potentially may cause disproportionately high or adverse effects on minority or low-income communities, but these effects cannot be determined at this point in the consultation process. Legal counsel for the Pueblo of San Ildefonso has expressed the opinion that conveyance and use of this tract would result in an environmental justice impact on the Pueblo's population.

Restricting public use of roads and trails on this land tract would hinder public and administrative access to Santa Fe National Forest lands. These lands afford not only recreation opportunities for the general public but serve as traditional firewood gathering and collection areas for other forest products by local Hispanic and Native American populations. Restricted access to this area could have a disproportionately adverse impact on these minority populations.

While there are no data on the use of this tract by traditional wood gatherers, these wood gatherers are often members of low-income or minority populations. The conveyance or transfer of this tract could reduce the amount of wooded area or restrict access to the tract, thus affecting the wood gatherers.

5.1.14 Irreversible and Irretrievable Commitment of Resources

This section describes the major irreversible and irretrievable commitments of resources that can be identified at the level of analysis conducted for this CT EIS. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations.

The actual conveyance or transfer of the Rendija Canyon Tract would not immediately cause any irreversible or irretrievable commitments of resources. Nor would cultural preservation, one of the two contemplated land uses subsequent to transfer

of ownership. Residential development would, however, cause irreversible commitments of ecological habitat and cultural resources within the tract and in adjacent areas and canyons (where human activity levels would increase due to the presence of 3,500 new residents).

New development also would cause the irretrievable commitment of resources during construction and subsequent use of 1,260 new homes. Energy would be expended in the form of natural gas and electricity. Additional water also would be consumed. Construction of these homes would require the irretrievable commitment of standard building materials such as lumber and roofing materials.

5.1.15 Unavoidable Adverse Environmental Impacts

The actual conveyance or transfer of the Rendija Canyon Tract could result in the loss of certain Federal protections for cultural resources on the tract. Loss of these protections could be considered an unavoidable adverse impact to these resources because development of previously undisturbed areas could result in physical destruction, damage, or alteration of cultural resources on the subject land tract and in adjacent areas. The conveyance or transfer of the tract also could result in the loss of certain Federal protections for ecological resources and consideration of these resources in planning future activities on the tract.

Subsequent use of the Rendija Canyon Tract for cultural preservation would have no adverse environmental impacts. Subsequent residential development, however, would cause unavoidable adverse impacts in several resource areas.

One such impact would be considerable loss of ecological habitat within the tract itself and more frequent human intrusion into adjacent habitat areas of the Santa Fe National Forest. The ecological impacts also could include fragmentation of habitat and potential disruption of wildlife migration corridors. There also is potential for adverse impacts caused by introduction of land uses that are incompatible with adjacent resource protection efforts.

Development also would result in increased demands for utilities (electricity, natural gas, water, solid waste, and sewage). Increased demand for three of these (water, solid waste, and sewage) would have adverse effects in the immediate Los Alamos region by lowering the aquifer level more quickly, shortening the remaining lifetime of the County landfill, and increasing both the quantities of sewage that require treatment and the quantities of treated sewage discharged to the environment. The environmental effects of increased demand for electricity and natural gas would be felt elsewhere (in the Four Corners region, for example), in the form of increased emissions of air pollutants in order to generate electricity. Increased consumption of natural gas adds to global climate change through increased emissions of carbon dioxide.

Development also would lead to an estimated 20 percent increase in personal vehicles in Los Alamos County, with attendant increases in congestion, road deterioration, and traffic noises. Noise levels would especially be impacted in Rendija Canyon itself, with noises increasing in magnitude, frequency of occurrence, and duration (into the night). The visual environment would deteriorate within the canyon itself and for some of the residents of nearby Barranca Mesa and North Mesa, who currently enjoy a view of Rendija Canyon from their homes.

Finally, residential development would increase the potential for degradation of surface water quality. Standard mitigation measures, however, can limit both short- and long-term impacts to surface water and groundwater quality.

5.1.16 Relationship Between Local Short-Term Use of the Environment and Maintenance of Long-Term Productivity

The actual conveyance or transfer of the Rendija Canyon Tract would not immediately cause any specific impacts on short-term uses of the environment. Under the cultural preservation land use scenario, the long-term productivity of this land tract could increase slightly due to the restriction on recreational use.

Subsequent residential development, however, would be incompatible with the long-term land uses of the adjacent Santa Fe National Forest (for example, natural resource protection, outdoor recreation, etc.). Development also would cause disruption to and loss of ecological habitat and resources in the previously undisturbed areas of this land tract. This development would reduce the ecological productivity of the local area and also would preclude future use of this land for ecological habitat or for cultural resource protection.