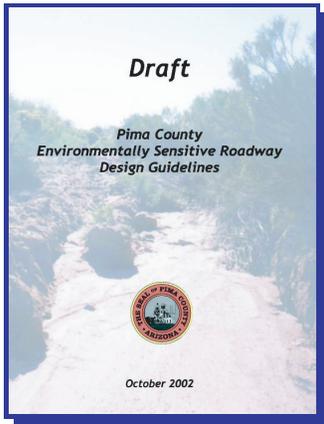


Colossal Cave Road Improvement Project: Acacia Elementary School to Old Vail Road

Environmental Assessment and Mitigation Report *Volume II*



Submitted to:
Pima County
Department of Transportation

Submitted by:



September 27, 2005

APPENDICES

- Appendix A Environmental Screening Matrix
- Appendix B *Biological Evaluation of the Colossal Cave Road Improvement Project*, prepared by SAGE Landscape Architecture & Environmental, Inc., July 22, 2004 and *Environmentally Sensitive Roadway Vegetation Inventory Report*, prepared by SAGE Landscape Architecture & Environmental, Inc., July 21, 2005
- Appendix C Letter re U.S. Army Corps of Engineers (ACOE) Jurisdiction Determination, from Marjorie E. Blaine, Senior Project Manager, Arizona Section, Regulatory Branch, ACOE, July 5, 2005
- Appendix D *Preliminary Initial Site Assessment: Vail/Colossal Cave Road Roadway Improvements, 12900 East to 13400 East Colossal Cave Road, Vail, Arizona*, prepared by Aplomado Environmental LLC, July 13, 2005
- Appendix E *Environmentally Sensitive Roadway Viewshed Sensitivity Report*, prepared by SAGE Landscape Architecture & Environmental, Inc., July 21, 2005
- Appendix F *An Archaeological and Historical Assessment of Colossal Cave Road near Vail, Pima County, Arizona*, prepared by Desert Archaeology, Inc., March 29, 2005

APPENDIX A

ENVIRONMENTAL IMPACT SCREENING
SUMMARY IMPACT MATRIX*

PROJECT NAME: Colossal Cave Road

PROJECT LIMITS: Acacia Elementary School to Old Vail Road

Applicable to project (✓)	Potentially Affected Environmental Categories ➔	Water quality	100-year floodplain (NA)	Protected waterways (NA)	Visual Quality / Viewsheds	Protected plants / vegetation	Protected animals / wildlife	Cultural res. (archaeological and historic)	Air quality	Noise	Hazardous materials	Land Uses/Community Character
NA	Change in the vertical or horizontal alignment											
NA	New alignment											
NA	Added capacity (i.e., through lanes)											
✓	Milling/grading	X			X	X	O	X	M	M	O	X
✓	Change in access (e.g., driveways, intersections)	X			X	X	O	X	O	O	O	X
✓	Clearing and grubbing	X			X	X	O	X-M	M	M	O	X
✓	Excavation	X			X	X	O	X-M	M	M	O	X
✓	Cut slope	X			X	X	O	X	O	O	O	X
✓	Demolition	X			X	X	O	O	M	M	O	X
✓	Demolition debris disposal	X			X	X	O	O	M	M	O	X
✓	Acquisition of additional ROW	X			X	X-M	O	X-M	X	X	O	X-M
✓	Temporary Construction Easements	X			X	X	O	O	X	X	O	X
✓	Discharge of dredge or fill material	X			X	X	O	O	X	X	O	X
✓	Channeling and dredging	X			X	X	O	O	X	X	O	X
✓	Hauling	X			X	X	O	O	X	X	O	X
NA	New signals											
✓	Storm water drainage	X			X	X	O	X-M	O	O	O	X
✓	Construction equipment	X			X (short view)	X	O	M-H	X	X-M	X	X-M (temporary)
NA	Detour route											

LEGEND

O = no involvement

X = potential involvement, but no or minimal impact

M = potential moderate impact

H = potential high impact

APPENDIX B

TECHNICAL REPORT

BIOLOGICAL EVALUATION OF THE COLOSSAL CAVE ROAD IMPROVEMENT PROJECT, PIMA COUNTY, ARIZONA

22 July 2004

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INTRODUCTION

Project Location and Description

The Colossal Cave Road improvement project is in the community of Vail, Pima County, Arizona. The roadway segment extends from its southwest limit near Acacia Elementary School (in the southeast ¼ of the northwest ¼ of Section 16, Township 16 South, Range 16 East, GSRM), across two Union Pacific Railroad tracks, to the northeastern limit at East Cienega Creek Road (in the southeast ¼ of the southeast ¼ of Section 9 of the same township). The roadway project is approximately 5/8-mile long, with existing rights of way that vary from 55 to 155 feet wide (PCDOT 2004). Pima County is planning roadway improvements that include addition of a continuous center turn lane and profile modifications near the two Union Pacific Railroad (UPR) tracks.

Existing Natural Resources

The project area is in the Basin and Range geophysical province, at the base of an alluvial fan on the southwest toe of the Rincon Mountains. Elevation ranges from approximately 3,240 feet AMSL at

southern limit to 3,220 feet near the northern limit. Soils vary throughout the roadway segment. Stagecoach-Sahuarita-Anthony soils occur in the southernmost 0.2 miles, followed by Hantz loam, which extends to the south UPR) track. Indiscernible, urban soils occur throughout the area across both UPR tracks, and Stagecoach-Sahuarita soils are present in the northern portion of the project area (Cochran and Richardson 2003). Stagecoach-Sahuarita-Anthony soils are calcareous, very deep and well drained, and occur on fan terraces. Soils generally consist of 50 percent Stagecoach very gravelly sandy loam and 25 percent Sahuarita very gravelly fine sandy loam. Stagecoach soil is light brown very gravelly sandy loam, and is typically covered with 50 to 65 percent gravel and cobble. Sahuarita soils are light yellowish brown very gravelly fine sandy loam, and are covered with 35 to 55 percent gravel. Anthony soils occur in floodplains and drainages within the association. Anthony soils are light yellowish brown fine sandy loams, and occur in floodplains and drainages. Hantz loam is very deep and well drained brown loam, with a clay component in subsurface layers (Cochran and Richardson 2003).

Conservation Lands System

The project site occurs in the Sonoran Desert Conservation Plan (SDCP) Conservation Lands System (CLS) Rincon Southeast, Santa Rita subregion, and the Cienega-Rincon SDCP subarea. Roughly 80% of upland areas have been designated as low intensity urban land use, and the remainder as medium intensity rural. No special elements or critical landscape linkages occur in the project rights of way, although the paloverde-mixed cacti special element flank the majority on each side of the road segment. Approximately 400 feet of the northernmost portion of the roadway occurs in the Multiple Use Management Area category within the SDCP CLS. The remaining project area is outside CLS categorized areas, while Biological Core Management Areas occur roughly one mile south and east of the project. The site does not contain any Special Management Areas or Important Riparian Area, but the nearby Pantano Wash is classified as such. The project is not in proposed park expansion or natural preserve areas, but does occur approximately 800 feet west of a buffer overlay zone, and Cienega Creek Natural Preserve is 0.5 mile to the east (PCDOT 2004).

METHODS

Habitat Inventory

The purpose of this study is to determine whether existing habitats in the project area may support protected species. Existing information was gathered for each special status species that typically included associations with vegetation and substrate, elevational range, and known geographic range and distribution. This information was compared to the plant communities, substrate, and elevation existing throughout the project area. The potential for each special status species to occur in the project area was based on a qualitative comparison of the habitats used by protected species and those that occur in the project area. Determinations were further based on available literature, direct field observations, and the professional judgement and experience of the qualified biologist conducting this study. The project area was visited by a qualified biologist on 21 May 2004. Pedestrian surveys were conducted along the entire study area, with special attention to unique microsites adjacent to the Colossal Cave right of way.

Special Status Species

Special status species are species of interest to regulatory and resource management agencies of the federal, state or local government that have jurisdiction in or near the study area. The special status species considered for the Colossal Cave Road study area were compiled from lists maintained and provided by the U.S. Fish and Wildlife Service (Service), the Arizona Game and Fish Department (AGFD), and Pima County (Appendix A). The Service's list is general and contains special status species that may occur in Pima County. The AGFD list includes animal and plant species recorded within 3 ½ miles of the roadway centerline. The County list includes those species proposed for protection under a draft Habitat Conservation Plan, the SDCP. Following is a description of these regulatory agencies and their jurisdictional responsibility to protect special status species.

The U.S. Department of the Interior Fish & Wildlife Service (Service) maintains a list of protected species and their critical habitat known to occur in each Arizona county. These species are currently listed or are proposed for listing as endangered or threatened under the Endangered Species Act (ESA; 16 USC §1531 *et seq.*). The list also includes Candidate species for proposal as threatened or endangered. The ESA specifically prohibits the *take* of a listed species. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct." Further, 50 CFR §17.3 defines *harm* as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Some bird species also receive legal protection under the federal Migratory Bird Treaty Act (16 USC §§703-712).

The Arizona Game and Fish Department (AGFD) tracks uncommon animal and native plant species. The AGFD formerly listed 116 species as extinct, endangered, threatened, and candidate in Arizona (AGFD 1988). While these terms were identical to those used by the Service, the AGFD categories were advisory and provided no legal protection for take or habitat modification. To avoid confusion, AGFD drafted a list of *Wildlife of Special Concern in Arizona* (WSC) that eliminated the endangered and threatened categories. The revised list has not yet been officially adopted, but has been published for public review (AGFD 1996). The AGFD Heritage Database Management System (HDMS) identifies species from both lists (AGFD 1988, 1996) as *Wildlife of Special Concern in Arizona*.

The Arizona Department of Agriculture (ADA) administers the Arizona Native Plant Law (ANPL; 7 ARS §3-901 *et seq.*), although AGFD HDMS maintains the records database of plants protected under the legislation. The ANPL categorizes some native plants as Highly Safeguarded and Salvage Restricted. Regardless of land ownership, it is unlawful to collect, transport, or kill Highly Safeguarded or Salvage Restricted plants without a permit. Exceptions include maintenance of developed properties less than ten acres, maintenance of existing utilities and their associated right-of-ways, and emergencies.

Pima County currently lists 55 *Priority Vulnerable Species* that warrant protection under the SDCP. These species would receive some level of protection from the county. The degree of

protection has not yet been determined but may equate to the creation of reserve areas with specified management prescriptions. Eleven of the 55 species currently have federal status (listed, proposed, candidate, or conservation agreement), although some incidental take is permitted under ESA Section 10 in exchange for perpetual protection of sensitive habitat.

Only species with suitable habitat in the project area were evaluated. For example, no aquatic or riparian obligates were considered because perennial water does not exist in the project area. Moreover, species with narrow habitat requirements not found in the project area and species restricted to one or a few sites distal to the project area are not considered further.

RESULTS

Vegetation Communities

Upland vegetation communities in the project vicinity are typical of those found in Sonoran Desert scrub, while washes contain strands of developed xeroriparian vegetation (Brown 1994). The desert scrub communities are influenced by some semidesert grassland species.

Upland communities are generally creosote-mixed scrub, although creosote flats occur in several large patches adjacent to the right of way. Most of the right of way is very disturbed, and adjacent areas extending 100 feet and more from the roadway centerline have been disturbed to various levels. Such areas have been impacted by historic and active development, grazing, and the railroad. As a result, many exotic, nuisance plants are established (Appendix B). Despite the high levels of disturbance, small patches of natural vegetation associations occur in and adjacent to the road right of way. Two needle-spined pineapple cactus (*Echinomastus erectocentrus erectocentrus*) were observed in and near the existing right of way, and Pima pineapple cactus (*Coryphantha scheeri robustispina*) occurs near the right of way (EEC 1992). Night-blooming cereus (*Peniocereus greggii*) is also known from the vicinity (AGFD 2004).

Two Harris riparian washes are present in the project area. Each wash bifurcates near the roadway, which traverses the washes in four locations. Two crossings occur south of Acacia Elementary School, and two occur between the school and the south UPR track. The Pantano Wash and its associated 100-year floodplain occur approximately 1,500 feet north of the project area and contain scrub grassland species. Xeroriparian vegetation along the washes is poorly to moderately developed, and is categorized as subclass C, with vegetative volumes between 0.500 0.675 m³/m² (PCDOT 2004; PCFCD 2004). Such vegetation chiefly includes velvet mesquite and desert broom. The washes have a higher water table compared to adjacent upland areas, resulting in a higher relative humidity that creates a cooler microenvironment. The washes serve as travel, resting, and nesting corridors for wildlife.

Special Status Species

Analysis for the determination of project impacts on special status species included consideration of modeled habitat, species requisites, habitat present in project area, reliable observations and records, and the professional judgement of this biologist.

Table 1. Modeled potential habitat and Priority Conservation Areas for Priority Vulnerable Species in the Colossal Cave Road project area, Pima County, Arizona. Key: ROW = right of way, L = low, M = medium, H = high.

Species	Modeled Potential Habitat		Priority Conservation Areas		Determination
	in/adjacent to ROW	within 2 miles of ROW	in/adjacent to ROW	within 2 miles of ROW	
Chiricahua leopard frog <i>Rana chiricahuensis</i>	--	1.5 miles to L in Pantano Wash	--	--	This frog is an aquatic obligate. No habitat is present in the project area.
lowland leopard frog <i>Rana yavapaiensis</i>	L	0.3 miles to H in Pantano Wash	Level 1	Level 1	This frog is an aquatic obligate. No habitat is present in the project area.
Abert's towhee <i>Pipilo aberti</i>	L	L, M, H in Pantano Wash	--	0.5 miles east to Level 1 in Pantano Wash	Habitat includes mesquite bosques and cottonwood-willow associations. Xeroriparian washes in the project area provide suitable dispersal habitat.
Bell's vireo <i>Vireo bellii</i>	L	L, M, H in Pantano Wash	--	1.0 mile east to Level 1 in Pantano Wash	Habitat includes hydroriparian vegetation not found in the project area.
cactus ferruginous pygmy-owl <i>Glaucidium brasilianum cactorum</i>	L	L, M, H in Pantano Wash	--	--	Habitat includes Sonoran desert scrub and xeroriparian communities that occur along washes in the project area.
rufous-winged sparrow <i>Aimophila carpalis</i>	L	L, M, H in Pantano Wash	--	1.0 mile northeast and 0.8 miles southeast to Level 1	Habitat includes Sonoran desert thorn scrub and xeroriparian communities that occur along washes in the project area.
southwestern willow flycatcher <i>Empidonax trailii extimus</i>	--	1.5 miles to L, M in Pantano Wash	--	--	Habitat includes dense tamarisk and hydroriparian vegetation with structural complexity. No such habitat occurs in project area.

Table 1. Modeled potential habitat and Priority Conservation Areas for Priority Vulnerable Species in the Colossal Cave Road project area, Pima County, Arizona. Key: ROW = right of way, L = low, M = medium, H = high.

Species	Modeled Potential Habitat		Priority Conservation Areas		Determination
	in/adjacent to ROW	within 2 miles of ROW	in/adjacent to ROW	within 2 miles of ROW	
Swainson's hawk <i>Buteo swainsonii</i>	M, L	H in Pantano Wash		0.25 miles south to Level 1	Habitat includes grasslands and adjacent riparian areas. Project area might provide foraging habitat.
western burrowing owl <i>Athene cuculara hypugea</i>	H, M	H, M, L	--	--	Typical habitat in desert scrub includes irrigated lands and scrubland with dense rodent populations. No such habitat occurs in project area.
western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	--	0.3 miles to L, M, H in Pantano Wash	--	2.0 miles south and east of project to Level 1 in Pantano Wash	Habitat includes dense tamarisk and hydriparian vegetation with structural complexity. No such habitat occurs in project area.
Allen's big-eared bat <i>Idionycteris phyllotis</i>	L	L	--	--	Habitat includes mine shafts and caves in forests, woodlands, and hydriparian streams. No such habitat occurs in the project area.
Arizona shrew <i>Sorex arizoniae</i>	L, M	L, M	--	--	Habitat includes pine-oak forests and associated riparian areas. No such habitat occurs in project area.
California leaf-nosed bat <i>Macrotus californicus</i>	L, M	L, M	n/a	n/a	Habitat includes caves and mines in desert scrub. No such habitat occurs in the project area.
lesser long-nosed bat <i>Leptonycteris curasoae yerbabuena</i>	M	M	Level 1	Level 1	Habitat includes caves and mines in desert scrub. No such habitat occurs in the project area.

Table 1. Modeled potential habitat and Priority Conservation Areas for Priority Vulnerable Species in the Colossal Cave Road project area, Pima County, Arizona. Key: ROW = right of way, L = low, M = medium, H = high.

Species	Modeled Potential Habitat		Priority Conservation Areas		Determination
	in/adjacent to ROW	within 2 miles of ROW	in/adjacent to ROW	within 2 miles of ROW	
pale Townsend's big eared bat <i>Plecotus townsendii pallescens</i>	--	--	--	0.5 mile east to Level 1	Habitat includes caves and mines in desert scrub. No such habitat occurs in the project area.
Merriam's mouse <i>Peromyscus merriami</i>	M	M	--	--	Habitat includes mesquite bosques and mesquite woodland with dense undershrubs. Suitable habitat exists in xeroriparian communities traversed by the project area.
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	L	L	Level 1	Level 1	Habitat includes mine shafts and caves in forests, woodlands, and chapparal. No such habitat occurs in the project area.
western red bat <i>Lasiurus blossevillii</i>	L	1.5 miles to M in Pantano Wash	--	--	Habitat includes broadleaf woodlands that do not occur in the project area.
western yellow bat <i>Lasiurus xanthinus</i>	L, M, H	L, M, H	--	--	Habitat includes large trees, especially fan palms, in desert scrub. No such habitat occurs in the project area.
Acuña cactus <i>Echinomastus erectocentrus acunensis</i>	L, M	L, M	--	--	Project is outside geographic and elevational ranges of cactus (nearest known locations are near Florence and Ajo).
Pima pineapple cactus <i>Coryphantha scheeri robustispina</i>	L, M	L, M	Level 1	Level 1	Known to occur within 75 feet of Colossal Cave Road right of way.
needle-spined pineapple cactus <i>Echinomastus erectocentrus erectocentrus</i>	L, M	L, M	--	0.3 miles east to Levels 2 & 3	Known to occur in Colossal Cave Road right of way.

Table 1. Modeled potential habitat and Priority Conservation Areas for Priority Vulnerable Species in the Colossal Cave Road project area, Pima County, Arizona. Key: ROW = right of way, L = low, M = medium, H = high.

Species	Modeled Potential Habitat		Priority Conservation Areas		Determination
	in/adjacent to ROW	within 2 miles of ROW	in/adjacent to ROW	within 2 miles of ROW	
Tumamoc globeberry <i>Tumamoca macdougali</i>	M, H	M, H	n/a	n/a	Habitat includes shady microsities within xeroriparian washes in Sonoran desert scrub. Suitable habitat occurs in the project area.
desert box turtle <i>Terrapene ornata luteola</i>	M	0.3 miles to H in Pantano Wash	--	--	Habitat includes open grasslands that often contain prairie dog colonies. No such habitat occurs in the project area.
giant spotted whiptail <i>Cnemidophorus burtii stictogrammus</i>	--	0.6 miles to M, H on north side Pantano Wash	--	--	Habitat includes vegetated edges of intermittent and perennial streams. No such habitat occurs in the project area.
ground snake <i>Sonora semiannulata</i>	--	0.3 miles south and east to L, M	--	--	Habitat includes sparsely vegetated desert flats. Suitable habitat occurs in the project area.
Mexican garter snake <i>Thamnophis eques megalops</i>	L	0.3 miles to M in Pantano Wash	Level 3	1.0 mile east to Level 1	This snake is an aquatic obligate. No habitat is present in the project area.
Tucson shovel-nosed snake <i>Chionactis occipitalis klauberi</i>	M	M	--	--	Habitat includes sandy desert scrub flats and washes. Suitable habitat occurs in the project area.

Federal Threatened and Endangered Species

Lesser long-nosed bat

Lesser long-nosed bat is known to occur at Colossal Cave. No agaves or columnar cacti occur in the right of way, although several landscaped agaves exist in adjacent properties. Therefore, foraging habitat for lesser long-nosed bat is poor. Further, no caves, fissures, or culverts were observed in the project area that provide potential roosting habitat. Therefore, lesser long-nosed bat is not expected to use existing habitats in the project area and mitigation measures are not warranted.

Cactus ferruginous pygmy-owl

The proposed project site occurs in pygmy-owl survey zone 2, or areas having moderate potential for pygmy-owl occupancy (USFWS 2000a), but is outside both proposed critical habitat (USFWS 2002) and draft recovery areas (USFWS 2003). Although no saguaros are present, the project area contains suitable pygmy-owl dispersal habitat along the washes. Survey status of the site is unknown. Because dispersal habitat exists and the current legal status is unclear, two consecutive years of surveys are recommended to minimize the risk of incidental take (USFWS 2000b). Preservation of large trees and columnar cacti, as well as implementation of a native plant salvage effort, should adequately mitigate any impacts to pygmy-owl habitat.

Pima pineapple cactus

The proposed project site has low to medium potential to contain Pima pineapple cactus (PPC) based on a habitat model (PCBS 2000). One PPC was incidentally observed adjacent to the right of way on 21 May 2004 by Sage staff, however, none were detected during a survey based on methods described by Roller (1996) conducted by a biologist the same day. Because PPC are known from the area, a full coverage pedestrian survey that follows the Roller protocol (1996) is recommended over the entire project area no sooner than two years before construction begins. The project should be designed to avoid individual cacti wherever possible, and impacted individuals should be mitigated via compensation or off-site habitat banking.

Priority Vulnerable Species

Abert's Towhee, Rufous-winged Sparrow

Dispersal habitat is present along xeroriparian washes traversed by the project area. Construction should be scheduled outside the breeding season (March-April and June-August) wherever possible to avoid potential nesting efforts.

Swainson's Hawk

Foraging habitat is present along much of project area, excluding hardscaped portions. Construction should be scheduled outside the breeding season (March-April) wherever possible to avoid potential nesting efforts.

Merriam's Mouse

Suitable breeding habitat occurs along xeroriparian washes traversed by the roadway. Impacts to such areas should be avoided to the maximum extent possible.

Tucson shovel-nosed snake, Ground snake

Suitable breeding habitat occurs throughout the project area, excluding hardscaped areas. The New Mexico Department of Fish and Game Trenching Guidelines should be implemented to reduce impacts to these two snakes and other fossorial species.

Needle-spined pineapple cactus

Known to occur in the project right of way. Individuals that cannot be avoided by the project should be translocated to a similar microsite outside of the disturbance footprint.

Tumamoc globeberry

Suitable habitat is present along xeroriparian washes traversed by the project area. Impacts to such areas should be avoided to the maximum extent possible. Individuals that cannot be avoided by the project should be translocated to a similar microsite outside of the disturbance footprint.

CONCLUSIONS AND RECOMMENDATIONS

Upland communities in portions of the project area may contain valuable native plants that could be salvaged. Recommendations include (1) relocation of any Pima pineapple cactus, needle-spined pineapple cactus, saguaro, and night-blooming cereus from harm's way to set-aside areas for perpetual preservation, (2) in-place preservation of all native plants to the extent practicable, (3) on-site relocation as practicable of healthy, viable trees, shrubs, yuccas, and barrel cactuses, and (4) coordination with Arizona Department of Agriculture for other potential salvage efforts.

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APPENDIX A

Agency Coordination

US Fish & Wildlife Service, List of Threatened and Endangered Species in Pima County

Arizona Game and Fish Department Special Status Species Information for Project Area

Pima County Sonoran Desert Conservation Plan Priority Vulnerable Species

County Species Lists-Pima County

Common Name	Scientific Name	Status	Description	County	Elevation Range	Habitat	Comments
▼ 1) Listed							
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Large, adults have white head and tail. Height 28-38"; wingspan 66-96". 1-4 yrs dark with varying degrees of mottled brown plumage. Feet bare of feathers.	Apache Cochise Coconino Gila Graham La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Some birds are nesting residents while a larger number winters along rivers and reservoirs. An estimated 200 to 300 birds winter in Arizona. Once endangered (32 FR 4001, 03-11-1967; 43 FR 6233, 02-14-78) because of reproductive failures from pesticide poisoning and loss of habitat, this species was down listed to threatened on August 11, 1995. Illegal shooting, disturbance, and loss of habitat continues to be a problem. Species has been proposed for delisting (64 FR 36454) but still receives full protection under the ESA.
Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	Endangered	Small (Approx. 7"), diurnal owl reddish brown overall with cream-colored belly streaked with reddish brown. Some individuals are grayish brown.	Cochise Gila Graham Greenlee Maricopa Pima Pinal Santa Cruz Yuma	<4000 ft	Mature cottonwood/willow, mesquite bosques, and Sonoran desertscrub	Range limit in Arizona is from New River (North) to Gila Box (East) to Cabeza Prieta Mountains (West). Only a few documented sites where this species persists are known, additional surveys are needed. Proposed critical habitat occurs in Pima and Pinal counties (67 FR 71032; 11-27-02).
California Brown pelican	<i>Pelecanus occidentalis californicus</i>	Endangered	Large dark gray-brown water bird with a pouch underneath long bill and webbed feet. Adults have a white head and neck, brownish black breast, and silver gray upper	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave	Varies	Coastal land and islands; species found around many Arizona lakes and rivers	Subspecies is found on Pacific Coast and is endangered due to pesticides. It is an uncommon transient in Arizona on many Arizona lakes and rivers. Individuals wander up from Mexico in summer and fall. No breeding records in Arizona.

						parts.	Navajo Pima Pinal Santa Cruz Yavapai Yuma
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	Threatened	Cream colored tubercles (spots) on a dark background on the rear of the thigh, dorsolateral folds that are interrupted and deflected medially, and a call given out of water distinguish this spotted frog from other leopard frogs.	3300-8900 ft	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs	Require permanent or nearly permanent water sources. Populations north of the Gila River may be closely-related, but distinct, undescribed species. A special rule allows take of frogs due to operation and maintenance of livestock tanks on State and private lands.	
Desert pupfish	<i>Cyprinodon macularius</i>	Endangered	Small (2 inches) smoothly rounded body shape with narrow vertical bars on the sides. Breeding males blue on head and sides with yellow on tail. Females and juveniles tan to olive colored back and silvery sides.	< 5,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. Two subspecies are recognized: Desert Pupfish (<i>C.m.macularis</i>) and Quitobaquito Pupfish (<i>C.m.ereumus</i>).	
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically occurred in backwaters of large rivers but is currently isolated to small streams and springs.	
Huachuca water umbel	<i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i>	Endangered	Herbaceous, semi-aquatic perennial in the parsley family (<i>Umbelliferae</i>) with slender erect, hollow, leaves that grow from the nodes of creeping rhizomes. Flower: 3 to 10 flowered umbels arise from root nodes.	3500-6500 ft	Cienegas, perennial low gradient streams, wetlands.	And in adjacent Sonora, Mexico, west of the continental divide. Populations also on Fort Huachuca Military Reservation. Critical habitat in Cochise and Santa Cruz counties (64 FR 37441, July 12, 1999)	
Jaguar	<i>Panthera onca</i>	Endangered	Largest species of cat native to Southwest. Muscular, with relatively short,	1,600 - >9,800 ft	Found in Sonoran desertscrub up through subalpine conifer forest	Also occurs in New Mexico. A Jaguar conservation team is being formed that is being led by Arizona and New Mexico state	

massive limbs, and a deep-chested body. Usually cinnamon-buff in color with many black spots. Weights ranges from 40-135 kg (90-300 lbs).

entities along with private organizations.

Kearney blue star	<i>Amsonia kearneyana</i>	Endangered	A herbaceous perennial in the dogbane family (Apocynaceae). Thickened woody root and many pubescent (hairy) stems that rarely branch. Flowers: white terminal inflorescence in April and May.	Pima	3600-3800 ft	West-facing drainages in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.	Plants grow in stable, partially shaded, coarse alluvium along a dry wash in the Baboquivari Mountains. Range is extremely limited. Protected by Arizona Native Plant Law.
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	Endangered	Elongated muzzle, small leaf nose, and long tongue. Yellowish brown or gray above and cinnamon brown below. Tail minute and appears to be lacking. Easily disturbed.	Cochise Gila Graham Greenlee Pima Pinal Maricopa and Santa Cruz	< 6000 ft	Desert scrub habitat with agave and columnar cacti present as food plants.	Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. This species is migratory and is present in Arizona usually from April to September and south of the border the remainder of the year.
Loach minnow	<i>Tiaroga cobitis</i>	Threatened	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache *Cochise Graham Greenlee Gila *Pima Pinal Navajo *Yavapai	<8000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Blue River, Campbell Blue Creek, San Francisco River, Dry Blue River, and the mainstem upper Gila River. Critical habitat was removed March 1998; but re-proposed December 1999 and finalized April 2000. Species also found in Cattron, Grant, and Hidalgo counties in New Mexico. *Counties with critical habitat presently contain no known existing populations of loach minnow.
Masked bobwhite	<i>Colinus virginianus ridgewayi</i>	Endangered	Males brick-red breast and black head and throat. Females are generally nondescript but resemble other raves such as the	Pima	1000-4000 ft	Desert grasslands with diversity of dense native grasses, forbs, and brush.	Species is closely associated with <i>Acacia angustissima</i> . Formerly occurred in Altar and Santa Cruz Valleys, as well as Sonora, Mexico. Presently only known from reintroduced populations on

Mexican gray wolf	<i>Canis lupus baileyi</i>	Endangered	Texas bobwhite. Large dog-like carnivore with varying color, but usually a shade of gray. Distinct white lip line around mouth. Weigh 60-90 pounds.	Apache Cochise Coconino Greenlee Pima Santa Cruz	4,000 - 12,000 ft	Chapparal, woodland, and forested areas. May cross desert areas.	Buenos Aires. Historic range is considered to be larger than the counties listed above. Unconfirmed reports of individuals in the southern part of the state (Cochise, Pima, Santa Cruz) continue to be received. Individuals may still persist in Mexico. Experimental nonessential population introduced in the Blue Primitive Area of Greenlee, Apache, and Coconino counties.
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache Cochise Coconino Gila Graham Greenlee Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai	4100-9000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nests in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was removed in 1998 but re-proposed in July 2000 and finalized in February 2001 for Apache, Cochise, Coconino, Graham, Mohave, Pima counties; Also in New Mexico, Utah, and Colorado.
Nichol Turk's head cactus	<i>Echinocactus horizionthalonius</i> var. <i>nicholii</i>	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one downward short; 2 spines upward and red or vasally gray. Flower: pink fruit: woolly white.	Pima Pinal	2400-4100 ft	Sonoran desertscrub alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountainsides.	Found in unshaded microsites in Sonoran desertscrub on dissected limestone mountains and on inclined terraces and saddles on limestone mountainsides.
Ocelot	<i>Leopardus</i> (=Felis) <i>pardalis</i>	Endangered	Medium-sized spotted cat whose tail is about 1/2 the length of head and body. Yellowish with black streaks and stripes running from front to back. Tail is spotted and face is less heavily streaked	Cochise Pima Santa Cruz	< 8000 ft	Humid tropical and sub-tropical forests, savannahs, and semi-arid thornscrub.	May persist in partly-cleared forests, second-growth woodland, and abandoned cultivation reverted to brush. Universal component is presence of dense cover. Unconfirmed reports of individuals in the southern part of the state continue to be received.

Pima pineapple cactus	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	Endangered	than the back and sides. Hemispherical stems 4-7 inches tall 3-4 inches diameter. Central spine 1 inch long straw colored hooked surrounded by 6-15 radial spines. Flower: yellow, salmon, or rarely white narrow floral tube..	Pima Santa Cruz	2300-5000 ft	Sonoran desertscrub or semi-desert grassland communities.	Occurs in alluvial valleys or on hillsides in rocky to sandy or silty soils. This species can be confused with juvenile barrel cactus (<i>Ferocactus</i>). However, the spines of the later are flattened, in contrast with the round cross-section of the <i>Coryphantha</i> spines. Also the areoles (spine clusters) of <i>Coryphantha</i> are on tubercles (bumps), while the areoles of <i>Ferocactus</i> are on ridges (ribs). 80-90% of individuals occur on state and private land.
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	Endangered	Buff on back and white below, hooped with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Maricopa Pima Yuma	2,000-4,000 ft	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations	Typically, bajadas are used as fawning areas and sandy dune areas provide food seasonally. Historic range was probably larger than exists today. This subspecies also occurs in Mexico.
Southwestern willow flycatcher	<i>Empidonax traillii eximius</i>	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	<8500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Migratory riparian obligate species that occupies breeding habitat from late April to September. Distribution within its range is restricted to riparian corridors. Difficult to distinguish from other members of the <i>Empidonax</i> complex by sight alone. Training seminar required for those conducting flycatcher surveys. Critical habitat was set aside by the 10th Circuit Court of Appeals (May 17, 2001).
Spikedace	<i>Meda fulgida</i>	Threatened	Small (<3 inches) slim with silvery sides and "spine" on dorsal fin. Breeding males brassy golden color.	*Apache *Cochise Graham Greenlee *Gila Navajo *Pima Pinal Yavapai	< 6000 ft	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities over sand and gravel substrates. Recurrent flooding and natural hydrograph important.	Presently found in Aravaipa Creek, Eagle Creek, Verde River, East-West-Main and Middle Forks of the Gila River in New Mexico, and Gila River from San Pedro River to Ashurst Hayden Dam. Critical habitat was removed in March 1998, but re-proposed December 1999 and finalized in April 2000. Species also found in Catron, Grant, and Hidalgo

▼ 2) Proposed

Gila chub	<i>Gila intermedia</i>	Proposed Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise Coconino Gila Graham Greenlee Maricopa Pima Pinal Santa Cruz Yavapai	2000 - 3500 ft	Pools, springs, cienegas, and streams.	Multiple private landowners, including the Nature Conservancy, the Audubon Society, and others. Also Fort Huachuca. Species also found in Sonora, Mexico.
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1

countries in New Mexico.
*Counties with critical habitat presently contain no known existing populations of spikedace.

▼ 3) Candidate

Acuna cactus	<i>Echinomastus erectocentrus</i> var. <i>acunensis</i>	Candidate	<12 inches high spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Flowers pink to purple.	Pima Pinal	1300-2000 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Inmature plants distinctly different from mature plants. They are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Radial spines are dirty white with maroon tips.
Sonoyta mud turtle	<i>Kinostemon sonoriense longifemorale</i>	Candidate	Primarily a pond turtle, prefers mud or sandy bottoms. Body 3 1/2 to 6 1/2. Head and neck mottled with contrasting light and dark markings. Found in Quitobaquito Springs.	Pima	1,100 ft	Ponds and streams.	Species also found in Rio Sonoyta, Sonora, Mexico.
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate	Medium sized bird with a slender, long-tailed profile, slightly down-curved bill, which is blue-black with yellow on the lower half of the bill. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache Cochise Coconino Gila Graham Greenlee La Paz Maricopa Mohave Navajo Pima Pinal Santa Cruz Yavapai Yuma	< 6,500 ft	Large blocks of riparian woodlands (Cottonwood, willow, or tamarisk galleries).	Species was found warranted, but precluded for listing as a distinct vertebrate population segment in the western U.S. on July 25, 2001. This finding indicates that the Service has sufficient information to list the bird, but other, higher priority listing actions prevent the Service from addressing the listing of the cuckoo at this time.

3

▼ 4) **Conservation Agreement**

<p>Gooddings onion</p>	<p><i>Allium goodingii</i></p>	<p>Conservation Agreement</p>	<p>Herbaceous perennial plant; broad, flat, rather blunt leaves; flowering stalk 14-17 inches tall, flattened, and narrowly winged toward apex; fruit is broader than long; seeds are short and thick.</p>	<p>Apache Greenlee Pima</p>	<p>> 7,500 ft Forested drainage bottoms and on moist north facing slopes of mixed conifer and spruce fir forests.</p>	<p>Conservation agreement between the Service and the Forest Service signed in February 1998. In New Mexico on the Lincoln and Gila National Forests.</p>
<p>San Xavier talussnail</p>	<p><i>Sonorella eremita</i></p>	<p>Conservation Agreement</p>	<p>Land snail, less than one inch in diameter (about 19 mm), 4.5 whorls, round shell, white to pinkish tint.</p>	<p>Pima</p>	<p>3,850-3,920 feet Deep, limestone rockslide with outcrops of limestone and decomposed granite.</p>	<p>Conservation agreement signed by the Service, Arizona Game and Fish Department, El Paso Natural Gas Company, and Arizona Electric Power Cooperative, Inc. in September 1998.</p>

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THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT

2221 WEST GREENWAY ROAD, PHOENIX, AZ 85023-4399
(602) 942-3000 • AZGFD.COM

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DEPUTY DIRECTOR
STEVE K. FERRELL



May 27, 2004

Mr. Bruce Pavlick
Sage
2315 E. Speedway Blvd.
Tucson, AZ 85719

Re: **Special Status Species Information for Township 16 South, Range 16 East, Section 16, North Half and Section 9, South Half; Pima County DOT Vail/ Colossal Cave Road Improvement. Proposed Continuous Center Turn Land and Profile Improvements around Union Pacific Railroad Tracks.**

Dear Mr. Pavlick:

The Arizona Game and Fish Department (Department) has reviewed your request, dated May 21, 2004, regarding special status species information associated with the above-referenced project area. The Department's Heritage Data Management System (HDMS) has been accessed and current records show that the special status species listed on the attachment have been documented as occurring in the project area (3-mile buffer). In addition, this project does not occur within the vicinity of any Proposed or Designated Critical Habitats.

The Department's HDMS data are not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity.

Making available this information does not substitute for the Department's review of project proposals, and should not decrease our opportunities to review and evaluate new project proposals and sites. The Department is also concerned about other resource values, such as other wildlife, including game species, and wildlife-related recreation. The Department would appreciate the opportunity to provide an evaluation of impacts to wildlife or wildlife habitats associated with project activities occurring in the subject area, when specific details become available.

Mr. Bruce Pavlick

May 27, 2004

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If you have any questions regarding the attached species list, please contact me at (602) 789-3618. General status information, state-wide and county distribution lists, and abstracts for some special status species are also available on our web site at: <http://www.azgfd.com/hdms>.

Sincerely,

A handwritten signature in cursive script, appearing to read "Sabra S. Schwartz". The signature is written in black ink and is positioned above the typed name.

Sabra S. Schwartz
Heritage Data Management System, Coordinator

SSS:ss

Attachment

cc: Bob Broscheid, Habitat Branch Chief
Joan Scott, Habitat Program Manager, Region V

AGFD #05-21-04(03)

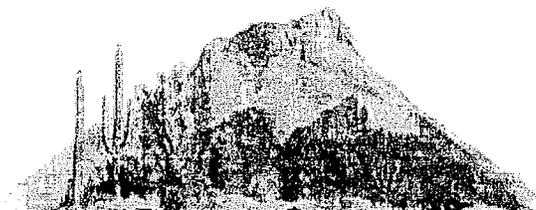
Special Status Species within 3 Miles of T16S,R16E Sec 16 N2; Sec 9 S2

Arizona Game and Fish Department, Heritage Data Management System

May 27, 2004

Scientific Name	Common Name	ESA	USFS	BLM	WSCA	NPL
<i>Agosia chrysogaster</i>	Longfin Dace	SC		S		
<i>Choeronycteris mexicana</i>	Mexican Long-tongued Bat	SC		S	WSC	
<i>Coryphantha scheeri var. robustispina</i>	Pima Pineapple Cactus	LE				HS
<i>Rana yavapaiensis</i>	Lowland Leopard Frog	SC	S		WSC	

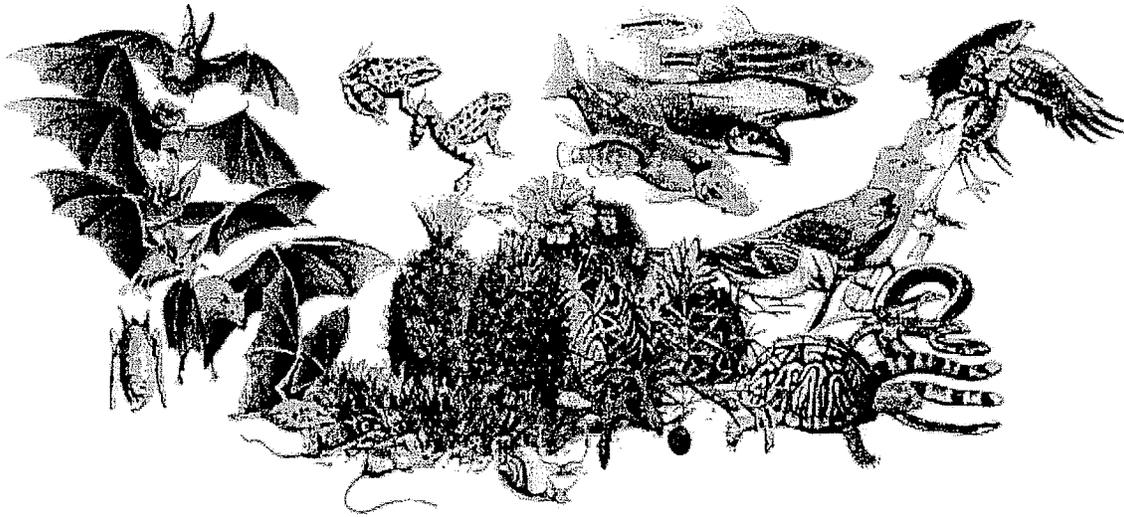
No Critical Habitats in project area. AGFD # 05-21-04(03), Proposed Pima County DOT Vail/ Colossal Cave Road Improvement - adding continuous center turn lane.



Sonoran Desert Conservation Plan

Species Fact Sheets

Priority Vulnerable Species in Pima County



Priority Vulnerable Species

are species that are being considered and analyzed as potentially covered species under the multi-species habitat conservation plan. These species were chosen through a process of scientific review of over 100 species that are already listed as Threatened or Endangered or recognized by the federal government as imperiled, extirpated species, and a much larger number of species that are in decline, and potentially on the way toward ESA listing.

Amphibians

Lowland Leopard Frog - *Rana yavapaiensis*

Birds

Abert's Towhee - *Pipilo aberti*

Plants

Gentry indigo bush - *Dalea tentaculoides*

Needle-spined Pineapple Cactus - *Echinomastus erectocentrus* var. *erectocentrus*

Tumamoc Globeberry - *Tumamoca macdougalii*

Bell's Vireo - *Vireo bellii*

Burrowing Owl - *Athene cunicularia*

Rufous-winged Sparrow - *Aimophila carpalis*

Swainson's Hawk - *Buteo swainsoni*

Fish

Desert Sucker - *Pantosteus clarki*

Longfin Dace - *Agosia chrysogaster*

Sonora Sucker - *Catostomus insignis*

Invertebrates

Talus Snails - *Sonorella species*

Arkenstone Cave Psuedoscorpion - *Albiorix anophrhalmus*

Mammals

Allen's big-eared bat - *Idionycteris phyllotis*

Arizona Shrew - *Sorex arizonae*

California leaf-nosed bat - *Macrotus californicus*

Mexican Long-tongued Bat - *Choeronycteris mexicana*

Merriam's Mesquite Mouse - *Peromyscus merriami*

Pale Townsend's big-eared bat - *Plecotus townsendii pallescens*

Southern Yellow Bat - *Lasiurus ega*

Western Red Bat - *Lasiurus borealis*

Reptiles

Desert Box Turtle - *Terrapene ornata luteola*

Ground Snake - *Sonora semiannulata*

Giant Spotted Whiptail Lizard - *Cnemidophorus burti stictogrammus*

Mexican Garter Snake - *Thamnophis eques*

Organ Pipe Shovel-nosed Snake - *Chionactis pararostris*

Red-backed Whiptail Lizard - *Cnemidophorus burti xanthonotus*

Tucson Shovel-nosed Snake - *Chionactis occipitalis klauberi*

APPENDIX B

Plant Species in Colossal Cave Road Project Area Right of Way

Table B1. Plants observed on 21 May 2004 in the Colossal Cave Road right of way from 800 feet south of Acacia Elementary School to Cienega Creek Road, Pima County, Arizona.	
Common Name	Scientific Name
alkali saltbush	<i>Atriplex polycarpa</i>
banana yucca	<i>Yucca baccata</i>
Bermudagrass	<i>Cynodon dactylon</i>
bladderpod	<i>Lesquerella gordonnii</i>
blue paloverde	<i>Cercidium floridum</i>
brittlebush	<i>Encelia farinosa</i>
bush muhly	<i>Muhlenbergia porteri</i>
creosote	<i>Larrea tridentata</i>
cow tongue prickly pear (landscaped)	<i>Opuntia lindheimeri linguiformis</i>
curly mesquite grass	<i>Hilaria berlanderi</i>
desert broom	<i>Baccharis sarothroides</i>
desert holly	<i>Acourtia nana</i>
desert bird of paradise (landscaped)	<i>Caesalpinia gilliesii</i>
desert zinnia	<i>Zinnia acerosa</i>
desert senna	<i>Cassia covesii</i>
desert spoon (landscaped)	<i>Dasyllirion wheeleri</i>
desert hackberry	<i>Celtis pallida</i>
desert marigold	<i>Baileya multiradiata</i>
Englemann hedgehog	<i>Echinocereus englemannii</i>
Englemann prickly pear	<i>Opuntia phaeacantha discata</i>
filaree	<i>Erodium cicutarium</i>
fingerleaf gourd	<i>Cucurbita digitata</i>
fishhook barrel cactus	<i>Ferocactus wislizenii</i>

Table B1. Plants observed on 21 May 2004 in the Colossal Cave Road right of way from 800 feet south of Acacia Elementary School to Cienega Creek Road, Pima County, Arizona.

Common Name	Scientific Name
fluff grass	<i>Erioneuron pulchellum</i>
foothill paloverde	<i>Cercidium microphylla</i>
globe mallow	<i>Sphaeralcea digitata</i>
honey mesquite (landscaped)	<i>Prosopis glandulosa</i>
mariola	<i>Parthenium incanum</i>
mesquite	<i>Prosopis velutina</i>
Mexican paloverde	<i>Parkinsonia aculeata</i>
Mormon tea	<i>Ephedra trifurca</i>
needle-spined pineapple cactus	<i>Echinomastus erectocentrus erectocentrus</i>
Palmer agave (landscaped)	<i>Agave palmeri</i>
pencil cholla	<i>Opuntia leptocaulis</i>
purple ground cherry	<i>Physalis lobata</i>
rabbit ear prickly pear (landscaped)	<i>Opuntia microdasys</i>
rabbitbrush	<i>Chrysothamnus nauseosus</i>
rambling milkweed vine	<i>Sarcostemma hirtellum</i>
red brome	<i>Bromus rubens</i>
Russian thistle	<i>Salsola kali</i>
Santa Rita prickly pear (landscaped)	<i>Opuntia violacea santa-rita</i>
silverleaf nightshade	<i>Solanum eleagnifolium</i>
soaptree yucca (landscaped)	<i>Yucca elata</i>
spotted (?) spurge	<i>Chamaesyce maculata</i>
staghorn cholla	<i>Opuntia versicolor</i>
teddy bear cholla	<i>Opuntia bigloveii</i>
twining snapdragon vine	<i>Maurandya antirrhiniflora</i>
unknown thistle	<i>Cercium sp.</i>
unknown perennial shrub resembles gooseberry	
white bursage	<i>Ambrosia dumosa</i>

Table B1. Plants observed on 21 May 2004 in the Colossal Cave Road right of way from 800 feet south of Acacia Elementary School to Cienega Creek Road, Pima County, Arizona.

Common Name	<i>Scientific Name</i>
whitethorn acacia	<i>Acacia constricta</i>
wooly paperflower	<i>Psilostrophe tagatina</i>

**ENVIRONMENTALLY SENSITIVE ROADWAY (ESR)
*VEGETATION INVENTORY REPORT***

**FOR THE COLOSSAL CAVE ROAD IMPROVEMENT PROJECT
PIMA COUNTY, ARIZONA**

21 JULY 2005

Prepared by
SAGE Landscape Architecture & Environmental, Inc.
2315 East Speedway Boulevard
Tucson, Arizona 85719

Prepared for
Pima County Department of Transportation
201 North Stone Avenue, 3rd Floor
Tucson, Arizona 85726

On Behalf of
Parsons Brinckerhoff
TransAmerica Building, Suite 500
177 North Church Avenue
Tucson, Arizona 85701

General Characteristics of Vegetation

The project area is in the Arizona Upland Subdivision of the Sonoran Desertscrub biome, but has influences of Semi-desert grassland (Brown 1994). Many of the species in the Right of way are characteristic of this biome. Native plants that are protected under both the Arizona Native Plant Law (ADA 1997) and Pima County Native Plant Preservation Ordinance (Pima County Code (PCC), 1998) are present. A complete list of protected plant species observed in the project area is included in Table 1.

Type	# plants	Total Cal. Inch or Ht.	ave. cal. or height
<i>Acacia constricta</i>	39	162	4.15
<i>Agave americana</i>	1	6	6.00
<i>Cercidium floridum</i>	8	66	8.25
<i>Cercidium microphyllum</i>	4	31	7.75
<i>Ferrocactus wislizeni</i>	13	202" ht	15.54"
<i>Fouquieria splendens</i>	1	10	10.00
<i>Echinomastus erectocentrus</i> var. <i>erectocentrus</i>	2	6	3"
<i>Prosopis velutina</i>	32	237	7.41
<i>Yucca thurberi</i>	3	13 heads	4.33 heads ea

Type	# plants	Total Cal. Inch or HT.	Ave cal. Or Ht.
<i>Acacia constricta</i>	42	174.5	4.15
<i>Agave americana</i>	1	6	6
<i>Cercidium floridum</i>	6	83	13.83
<i>Ferrocactus wislizeni</i>	12	228	19
<i>Fouquieria splendens</i>	7	59	8.43
<i>Echinomastus erectocentrus</i> var. <i>erectocentrus</i>	1	3	3
<i>Prosopis velutina</i>	23	272	11.83
<i>Yucca thurberi</i>	2	9 heads	4.5 heads ea

The right of way has been greatly disturbed from pull-off traffic and utility line maintenance. This disorganized type of disturbance has led to a broad, overall degradation of plant community within the right of way. The plant community is nearly non-existent between the two railroad tracks.

The plant survey consisted of two samples. The first is a survey strictly within the right of way. The second component of the survey consisted of a 15-foot wide buffer on each side of the right of way. This buffer extended into the adjacent property, and was

conducted to better describe the natural plant community and to identify individual plants that might be affected by future changes or acquisitions for right of way. Results of both samples are presented in summary table 1. Generally, plants were denser at the edge of the right of way. Further, throughout the town of Vail, the majority of mesquite trees (*Prosopis velutina*) surveyed evidently was Chilean or Argentinean mesquite hybrids. These hybridized trees were not marked for salvage or transplant. These specimens shall be replaced with native mesquite trees to maintain a natural vegetative community.

The southern and middle sections of the project area exhibited signs of being heavily grazed by cattle. The middle sections of the project area had several non-native and ornamental plants, where plants could be found within the project area. The portion of the project area north of the water tank contained the most natural plant community in the project area. The hilltop on the northern end had an undisturbed community that contained desert scrub and grassland species. Dominant plants include foothills paloverde (*Cercidium microphyllum*) and Banana yucca (*Yucca bacata*).

Paloverde-Mixed Cactus Scrub

This vegetation series is the most extensive in the Arizona Upland Subdivision and is best developed on bajadas and mountainsides such as those in the proposed project vicinity. Dominant plants are foothills paloverde, cat claw acacia (*Acacia greggii*), triangle leaf bursage (*Ambrosia deltoidea*), and various cactus species including barrel cactus (*Ferocactus wislizeni*), Englemann's prickly pear (*Opuntia phaeacantha*), chainfruit cholla (*O. fulgida*), buckhorn cholla (*O. acanthocarpa*), and Christmas cactus (*O. leptocaulis*).

Xeroriparian Mixed Scrub

Riparian habitats are defined as plant communities occurring in association with any spring, cienega lake, watercourse, river, stream, creek, wash, arroyo, or other body of water (PCC, 1998). Riparian habitats are further divided into three subdivisions, of which Xeroriparian is one of the subdivisions, and the only one that is present in the study area. These xeroriparian habitats are present in unnamed washes that traverse the project area. These habitats are generally characterized by a difference in plant species composition or an increase in the size and/or density of vegetation as compared to adjacent upland areas (PCC, 1998). Within the right of way, xeroriparian communities are primarily composed of relatively large mesquite and acacia trees and are generally distinguishable by a decline in the abundance of species associated with more xeric (dryer) conditions, such as cactus.

Disturbed Upland

The disturbed upland plant community is most prevalent along roadside shoulders, frontage roads, driveways, access paths, within former roadway excavations, and along utility corridors. The dominant species of this community are almost exclusively non-native and invasive native species, including buffelgrass (*Pennisetum ciliare*), desert broom (*Baccharis sarothroides*), and London rocket (*Sisymbrium irio*). Most of these plants are small in stature and offer limited structural diversity. Also found in this community is the hybridizing mesquite. As development continues to move into more

rural and natural areas, the people who support that development bring with them plants that are not native to the area. This is the case with Vail, where South American varieties of mesquite have been introduced and have naturalized through hybridization with the native populations.

Environmental Screening

Existing Conditions

Project Area Plant Inventory

The new Environmentally Sensitive Roadway (ESR) guidelines provide methodology to survey a project area's native plant community in an effort to catalog what exists in the roadway and in the adjacent communities. The ESR methodology consists of two phases: an inventory of existing native plant material within the project boundary, and plot sampling. These two survey methods are conducted to inventory existing conditions and to help the design team develop a seed mix and plant replacement density that closely approximates the roadway's pre-project conditions.

The project area along the Vail Road right of way contains very few areas in native condition. For the most part, native plants exist in small patches along the roadway. In some cases, such as between the railroad tracks, non-native plant material has been introduced. Table 1 shows all of native plant material protected by Pima County's Native Plant Preservation Ordinance (Ord. # 18.72.040) in the right of way.

The ESR guidelines recommend replacement of a similar number and equivalent caliper size of those plants removed from site. Few of the whitethorn acacia (*Acacia constricta*) and cat-claw acacia (*Acacia greggii*) trees can be transplanted because their natural sprawling growth habit makes them difficult to transplant. Most of the barrel cactus (*Ferocactus wislizeni*), ocotillo (*Fouquieria splendens*), and needle spined cactus (*Echinomastus erectocentrus* var. *erectocentrus*) should be transplanted.

Releve Method Inventory

The second component of the native plant surveys is the Releve Method inventory. Relevés are sample plots that are randomly selected in or near the project area. All plant species and their coverage densities are inventoried within the releve boundary. The resulting species list provides information that will aid in the development of a seed mix and plant replacement schedule. In this project, the relevés were circles with a twenty-foot radius. Five relevés were placed in the project area, two in xeroriparian habitats, and three in Upland habitats.

The Releve Survey results are summarized in Table 2.

Table 2: Revele Survey Summary Table

				DENSITY																
Common Name	Botanical Name	Invasive?	Seed Available?	Upland Entity						Riparian Entity						Total Average % cover	Riparian Entity Average % cover	Upland Entity Average % cover	Average per revele (0.028 acre)	re-planting density (per acre)
				Releve U1		Releve U2		Releve U3		Releve R1		Releve R2								
				% cover	# found	% cover	# found	% cover	# found	% cover	# found	% cover	# found	% cover	# found					
Large Shrubs and Trees																				
Whitethorn acacia	<i>Acacia constricta</i>	n		0%	0	0%	0	0%	0	60%	15	50%	19	5.20%	10.00%	2.00%				
Creosote	<i>Larrea tridentata</i>	n		10%	4	45%	25	0%	0	0%	0	0%	0	12.00%	2.50%	18.33%				
Four Wing Saltbush	<i>Atriplex canescens</i>			0%	0	0%	0	0%	0	0%	0	3%	2	0.60%						
Western Hackberry	<i>Celtis reticulata</i>			0%	0	0%	0	0%	0	3%	1	0%	0	0.60%						
Mesquite	<i>Prosopis velutina</i>	n		0%	0	0%	0	0%	0	20%	5	25%	4	9.00%	22.50%	0.00%				
Wolfberry	<i>Lyceum spp.</i>			0%	0	0%	0	0%	0	3%	1	0%	0	0.60%						
Graythorn	<i>Ziziphus obtusifolia</i>	n		0%	0	0%	0	0%	0	0%	0	3%	1	0.60%						
Cacti (not in seed mix)																				
Hedgehog cactus	<i>Echinocereus engelmannii</i>	n	n/a	0%	0	1%	3	1%	1	0%	0	0%	0				1.60	57.1424		
Chainfruit cholla	<i>Opuntia fulgida</i>	n	n/a	0%	0	1%	1	1%	2	0%	0	0%	0							
Staghorn cholla	<i>Opuntia versicolor</i>	n	n/a	0%	0	<1	2	0%	0	0%	0	<1	2				0.20	7.1428		
Teddy bear cholla	<i>Opuntia biglovii</i>	n	n/a	0%	0	2%	1	0%	0	0%	0	0%	0				0.40	14.2856		
Prickly Pear Cactus	<i>Opuntia engelmannii</i>	n	n/a	35%	18	0%	0	7%	5	1%	3	1%	1				0.20	7.1428		
Christmas Cholla	<i>Opuntia leptocaulis</i>	n	n/a	2%	7	<1	1	1%	1	5%	2	0%	0				0.80	28.5712		
Barrell cactus	<i>Ferocactus wislizenii</i>	n	n/a	0%	0	1%	1	0%	0	0%	0	0%	0				0.20	7.1428		
Subshrubs, Forbs, and Grasses																				
Range ratany	<i>Krameria erecta parvifolia</i>	n		0%	0	3%	6	0%	0	0%	0	0%	0	0.60%	0.00%	1.00%				
Wright's Buckwheat	<i>Eriogonum wrightii</i>			5%	4	0%	0	0%	0	0%	0	0%	0	1.00%						
Three Awn	<i>Aristida adscensionis</i>	n		0%	0	1%	n/a	0%	0	0%	0	0%	0	0.20%	0.00%	0.33%				
buffelgrass	<i>Pennisetum ciliare</i>	Y	No	0%	0	0%	0	40%	n/a	15%	n/a	0%	0	11.00%		13.33%				
White ratany	<i>Krameria grayi</i>	n		0%	0	2%	n/a	0%	0	0%	0	0%	0	0.60%	0.50%	0.67%				
Desert Zinnia	<i>Zinnia acerosa</i>	?		1%	4	1%	7	0%	0	0%	0	0%	0	0.30%						
Sideoats grama	<i>Bouteloua curtipendula</i>	?		1%	7	0%	0	0%	0	0%	0	0%	0	0.20%						
Curly Mesquite	<i>Hilaria belangeri</i>	?		40%	n/a	0%	0	2%	n/a	0%	0	0%	0	8.40%						
Bahia	<i>Bahia absinthifolia</i>	?		1%	13	0%	0	0%	0	0%	0	1%	n/a	0.40%						
Desert Holly	<i>Acourtia nana</i>	n		1%	n/a	0%	0	0%	0	0%	0	10%	n/a	2.20%						
Shrubby coldenia	<i>Tiquilia enescens</i>	n		1%	1	1%	10	5%	50	0%	0	0%	0	1.40%						
Peppergrass	<i>Lepidium lasiocarpum</i>	?		0%	0	1%	n/a	0%	0	0%	0	0%	0	0.20%						
Fairy Duster	<i>Calliandra eriophylla</i>	n		0%	0	1%	3	0%	0	0%	0	0%	0	0.20%						
Shrubby dogweed	<i>Dyssodia acerosa</i>	?		0%	0	1%	1	0%	0	0%	0	0%	0	0.20%						
Paper flower	<i>Psilostrophe cooperi</i>			0%	0	0%	0	5%	n/a	0%	0	1%	1	1.20%						
New Mexico silverbush	<i>Argythamnia neomexicana</i>	maybe	?	0%	0	0%	0	0%	0	0%	0	1%	n/a	0.20%						
Silver leaf Nightshade	<i>Solanum Elaeagnifolium</i>			0%	0	0%	0	0%	0	0%	0	1%	n/a	0.20%						
Spiny chorizanthe	<i>Chorizanthe rigida</i>	n		0%	0	0%	0	0%	0	0%	0	0%	0	0.20%		0.33%				

Potential Impact

The replanting effort should reconstruct the natural plant community, and coincide with the visual mitigation measures intended to direct views into attractive viewsheds and screen distracting views presented by commercial buildings or railroad tracks. As the current right of way is currently in a degraded condition, any re-introduction of native plant material will benefit the right of way and surround areas by providing greater plant and animal dispersal area.

Seed Collection

The ESR guidelines recommend creating a seed mix created from the results of the releve samples. The seed mix should reflect the density and plant types found in the releves. Many of the minor plants in the releves are not currently available through seed providers that serve the region. If the seed mix will truly represent what was found in the surveys, a seed collection may have to be commissioned. Seed collections may be difficult, as the plants being collected may set seed at different times of the year, or may be unreliable to find. If a seed collection is commissioned, the seed mix may not be complete for two years or more, depending on the availability of the plant from which seed is being collected.

We believe that the existing seed bank, or the plants in the immediate vicinity, is likely adequate to provide the seeds needed for regeneration of the natural plant community. However, the area must be managed for invasive pioneers during the period of establishment of the native plant community. This invasive plant management effort may make a seed collection unnecessary.

MITIGATION

A. Seed Mixture

A Seed mixture derived from releve studies will be applied to all degraded areas within the right-of-way, and outside of the right-of-way when feasible. The seed mix shown will be utilized to the extent possible, depending upon availability of seed. Most of the plant material shown has seed commonly available, such as Creosote and Whitethorn acacia. Many of the plants in the releve surveys do not have commercially available seed. Therefore, a contract grow by a seed supplier would be required to provide the seeds for these plants. Because the local seed bank will remain, and the natural colonization of those local species will be encouraged. This method will provide, after time, a re-naturalized plant community.

Table 3 – Vail Road Revegetation Seed Mix

Botanical Name	Common Name	Pure Live Seed (PLS) Lbs. Per Acre	Form
<i>Krameria erecta parvifolia</i>	Range Ratany	0.5	forb
<i>Acacia constricta</i>	Whitethorn acacia	0.50	Shrub/ tree
<i>Aristida adscensionis</i>	Three Awn	.25	grass
<i>Psilostrophe cooperi</i>	Paper flower	1.25	forb
<i>Tiquilia cenescens</i>	Shrubby coldenia	1.0	forb
<i>Larrea tridentata</i>	Creosote bush	1.25	Shrub
<i>Prosopis velutina</i>	Mesquite	1.00	Tree
<i>Acourtia nana</i>	Desert Holly	2.0	forb
<i>Hilaria belangeri</i>	Curly mesquite	8	grass
<i>Eriogonum wrightii</i>	Wright's Buckwheat	1	forb
<i>Ziziphus obtusifolia</i>	Graythorn	1	shrub
<i>Lyceum spp.</i>	Wolfberry	1	shrub
<i>Celtis reticulata</i>	Western hackberry	1	Shrub
<i>Atriplex canescens</i>	Fourwing Saltbush	1	Shrub
density based upon this calculation:			
pound per acre = 1% average cover across all five releves.			
ex: Range Raany density across all five releves resulted in an average density of 0.6%, therefore the seed mix shows 0.5 pounds per acre.			

B. Creation of a planting plan that transplants existing trees and cactus when possible, and utilization of native plants in the site. Due to the historic and scenic quality of the site, some non-native but drought tolerant trees are utilized.

Examples of the plants we intend to utilize in the planting plan are these:

Natives:

<i>Cercidium floridum</i>	Blue paloverde	tree
<i>Prosopis velutina</i>	Native mesquite tree	tree
<i>Chilopsis linearis</i>	Desert willow	tree
<i>Acacia smallii</i>	Sweet acacia	tree
<i>Foqueria splendens</i>	Ocotillo	cactus
<i>Vauquelinia californica</i>	Arizona rosewood	shrub
<i>Larrea tridentata</i>	Creosote bush	bush
<i>Simmondsia chinensis</i>	Jojoba	bush

NonNatives:

<i>Pistachia chinensis</i>	Chinese pistache	tree
<i>Pithecellobium flexicaule</i>	Texas ebony	tree
<i>Sophora secundiflora</i>	Tx. mountain laurel	shrub/ tree

C. Management plan

A management plan that focuses on removal of invasive species is important and should work in tandem with the application of the seed mixture. This site has a large, established seed bank within the degraded shoulder area of this roadway. Some invasive plants exist along this roadway, and have become naturalized. After the application of the seed mix, many plants will germinate. Some of these will not be desired species. After the expense and effort to provide a seed mix, those desired seeds still need to become naturalized. This naturalization process will not happen if the more vigorous invasive species out compete these seedlings. The ESR mandate is to protect the delicate biological and visual context through which a roadway passes. This delicate biological context will establish itself after a few years of a management plan focused on removal of invasive species.

APPENDIX C



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
TUCSON PROJECT OFFICE
5205 EAST COMANCHE STREET
TUCSON, ARIZONA 85707

REPLY TO

July 5, 2005

Office of the Chief
Regulatory Branch

Ms. Karla Reeve-Wise
Environmental Specialist
Pima County Department of
Transportation and Flood Control District
201 North Stone Avenue Fl 3
Tucson, Arizona 85701-1207

File Number: 2005-01603-MB

Dear Ms. Reeve-Wise:

Reference is made to your letter of May 9, 2005 in which you inquired as to whether or not a Section 404 permit is required from the U.S. Army Corps of Engineers to widen the existing two-lane Vail/Colossal Cave Road to a 3-lane undivided road from a point south of the Tucson city limits to east of Cienega Creek Drive (Sections 9, 16, and 21, T16S, R16E), Vail, Pima County, Arizona.

Based on the information furnished in your letter (referenced above), we have determined that your proposed project is not subject to our jurisdiction under Section 404 of the Clean Water Act. Since there are no waters of the United States within the aforementioned proposed project area, no Section 404 permit is required from our office.

The receipt of your letter is appreciated. If you have questions, please contact me at (520) 584-1684.

Sincerely,

A handwritten signature in cursive script that reads "Marjorie E. Blaine".

Marjorie E. Blaine
Senior Project Manager
Arizona Section, Regulatory Branch

Enclosure

APPENDIX D

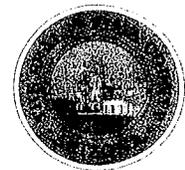
PRELIMINARY INITIAL SITE ASSESSMENT

VAIL/COLOSSAL CAVE ROAD ROADWAY IMPROVEMENTS 12900 East to 13400 East Colossal Cave Road Vail, Arizona

JULY 13, 2005

Aplomado Project No.
03-109-002

Prepared For: **Pima County**
Department of Transportation
1313 South Mission Road
Tucson, Arizona 85713



On Behalf of: **Parsons Brinckerhoff Quade & Douglas, Inc.**
177 North Church Avenue
Suite 500
Tucson, Arizona 85701



Prepared By:

APLOMADO
ENVIRONMENTAL LLC

3054 North 1st Avenue, Suite 7
Tucson, Arizona 85719



FINAL

PRELIMINARY INITIAL SITE ASSESSMENT

VAIL/COLOSSAL CAVE ROAD ROADWAY IMPROVEMENTS

12900 East – 13400 East Colossal Cave Road

Vail, Arizona

July 13, 2005

Prepared For:

Parsons Brinckerhoff Quade & Douglas, Inc.

Prepared by:

A handwritten signature in black ink, appearing to read "Homer Hansen".

**Homer Hansen
Environmental Scientist**

For:

APLOMADO ENVIRONMENTAL LLC

Aplomado Project Number 03-109-002

www.aplomado.com

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Appendix A	PISA Form
Appendix B	Photographic Documentation

1.0 INTRODUCTION

1.1 Purpose

The purpose of this study was to assess Vail/Colossal Cave Road from 12900 East to 13400 East Colossal Cave Road, Vail, Pima County, Arizona, for potential environmental liability as it relates to present and past utilization of the subject property. Proposed improvements for the subject property include roadway widening and pedestrian improvements. This Preliminary Initial Site Assessment (PISA) was conducted to identify recognized environmental conditions in connection with the property in general accordance with the Environmental Determination Guidelines for the Arizona Department of Transportation (ADOT). To complete the ADOT PISA Form, the assessment was conducted in general accordance with the *ASTM Standard Practice for Environmental Site Assessments: Transaction Screen Process, Fourth Edition*, E 1528-00, dated May 10, 2000. Please refer to Appendix A for the completed ADOT PISA form. This standard is established by the American Society for Testing and Materials (ASTM) as a practice that constitutes “all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice” as defined in 42 USC § 9601(35)(B). The PISA was performed by conducting a site reconnaissance; reviewing public agency records and applicable Federal, State, and local agency records; completing the PISA form; and preparing this report.

1.2 Scope of Work

Parsons Brinckerhoff Quade & Douglas, Inc. entered into an agreement with Aplomado Environmental LLC (Aplomado) on April 6, 2004 for a Preliminary Initial Site Assessment for recognized environmental conditions in connection with the above-mentioned subject property. The term recognized environmental conditions is defined as the presence or likely presence of any hazardous substances or petroleum products on the subject property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products onto or into structures, the soil, groundwater, or surface water of the subject property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis or insignificant conditions that generally do not present a material risk of harm to public health or the environment. This is a standard initial assessment and does not involve the comprehensive sampling of surface or subsurface soils, water, groundwater, air, or structural materials.

1.3 Limitations

The intent of this PISA was to identify recognized environmental conditions in connection with the subject property and to evaluate the potential for hazardous substance and/or petroleum product contamination. To accomplish this, the historical and present uses of the subject property were studied by researching readily available records and by conducting a site reconnaissance of the subject property. Certain conditions or activities involving hazardous substances or petroleum products will not have been addressed by this site assessment unless they were specifically addressed by others during interviews or when documents were reviewed. These conditions or activities include:

- hazardous substances or petroleum products that are not readily apparent, upon diligent review,
- hazardous substances or petroleum products that came to be located on the subject property through surreptitious activities or otherwise without the knowledge of previous owners, tenants, or agencies,
- hazardous substances or petroleum products, constituents, or concentrations of substances that are not currently defined as “hazardous” but which may be so defined in the future,
- hazardous substances or petroleum products placed on the subject property following the site reconnaissance and submission of this report, and
- naturally occurring hazardous substances, not discovered upon diligent review.

This study is limited by time and financial considerations, as well as the limits of available technologies for practical environmental reconnaissance. Aplomado and its subcontractors used reasonable care to diligently assess the potential for recognized environmental conditions in connection with this property. However, the absence of recognized environmental conditions found in this assessment of the subject property does not constitute a guarantee from Aplomado or its subcontractors that no recognized environmental conditions are present, nor does the discovery of some recognized environmental conditions imply that all potential recognized environmental conditions have been found. Aplomado assumes no responsibility for omissions after the final report is submitted. Aplomado assumes no responsibility for false testimony given by interviewed parties or false or incorrect data supplied by government agencies.

This report is provided expressly for Parsons Brinckerhoff Quade & Douglas, Inc. and Pima County. This report applies only to the subject property, although other properties may be mentioned in this study. Other persons who rely on this report or those who rely on it at a future date do so at their own risk.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

The subject property is located along Vail/Colossal Cave Road, Vail, Pima County, Arizona. The subject property consists of the paved, two-lane roadway and adjoining right-of-way from the intersection of Colossal Cave Road and Cienega High School Drive to the point approximately 700 feet south of the drive to the Acacia Elementary School. The subject property is between 12900 East and 13400 East Colossal Cave Road and includes the right-of-way approximately 75 feet either side of the existing roadway centerline. The geographical location of the subject property is within the southeast corner of Section 9 and the north half of Section 16 of Township 16 South, Range 16 East, Pima County, Arizona.¹

2.2 Site and Vicinity Characteristics

The subject property is comprised of approximately 0.8 miles of a paved, two lane roadway with approximately 12 foot lanes and gravel shoulders. The roadway travels from southwest to northeast with an eastward curve in the northern portion. The subject property right-of-way is predominantly undeveloped and lacks pedestrian sidewalks and other associated infrastructure. The subject property is predominantly adjoined by native desert in the southern portion, by commercial and public development along the western portion, and by commercial and residential development along the eastern portion. The roadway is utilized by residential, commercial, and commuter traffic traveling within the Vial community and towards the interstate. The elevation of the subject property ranges from approximately 3236 to 3205 feet above mean sea level (msl) from southwest to northeast.

The surface topography of the roadway is predominantly level, with a small natural rise in the southern portion and two grade increases from rail road crossings in the central portion. Surface drainage of meteoric water for the roadway is controlled by the topography of the adjoining properties and typically flows from southeast to northwest. Surface drainage for the subject property relies predominantly on sheet flow of meteoric water across the surface.

Overhead electrical and subsurface natural gas, petroleum, electrical, water, and telecommunications were observed in connection with the right-of-way. Sanitary sewer systems were not observed in connection with the subject property. Land use in the vicinity of the subject property consisted of public schools, postal service, and retail to the west; gasoline service and residential to the east; and the Union Pacific Rail Road in the central portion.

3.0 RECORDS REVIEW

It is Aplomado's approach to investigate the historical use of the subject property by researching permitted activities which were or may have been conducted on the property and correlating these findings with regulations for various environmental hazards or debilitating conditions resulting from the past or present occurrence of hazardous substances or petroleum products. Interviews with current and previous owners, private personnel, and regulatory agencies provide additional information. Table 3.0 outlines the laws and regulations that were used as avenues of research and reference. The agencies authorized to implement these laws were researched as detailed on the following pages.

Table 3.0

Key Hazardous Substances Legislation

RCRA	The Resource Conservation and Recovery Act of 1976. Regulates the generation, handling, transportation, storage and disposal of hazardous wastes. 42 USC § 321 <i>et seq.</i>
HSWA	The Hazardous and Solid Waste Amendments of 1984. This Act extended the scope and application of RCRA. PL 98-616.
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980. Also known as "Superfund", the Act, along with SARA, applies to illegal discharges, abandoned facilities, etc. 42 USC § 9601 <i>et seq.</i>
SARA	The Superfund Amendments and Reauthorization Act extends and expands the original Superfund of 1986. 42 USC § 9601 <i>et seq.</i>
TSCA	The Toxic Substances Control Act of 1976. This act regulates the production, handling, and use of certain toxic substances such as PCBs, asbestos, and aerosol propellants. 15 USC § 2601 <i>et seq.</i>
FIFRA	The Federal Insecticide, Fungicide, and Rodenticide Act of 1972. 7 USC § 135 <i>et seq.</i>
CWA	The federal Clean Water Act of 1977 regulates contaminants in water. 33 USC § 1251 <i>et seq.</i>
CAA	The federal Clean Air Act of 1970 regulates emissions into the air. 42 USC § 7401 <i>et seq.</i>
USTA	The federal Underground Storage Tank Act of 1986. This act regulates operational and abandoned underground storage tanks. There are local enforcement policies which may differ from the federal program.
AEQA	The Arizona Environmental Quality Act manages several Federal programs on the state level. ARS Title 49.
WQARF	The Arizona Water Quality Assurance Revolving Fund. This is a state Superfund program which focuses on groundwater quality. ARS Title 49, Chapter 2.

3.1 Standard Environmental Record Sources

ASTM standard environmental record sources and the recommended search distances are provided in Table 3.1 below. The minimum recommended search distances were utilized based on the land use and extent of human impact related to the subject property. Selected internet and paper databases from the Arizona Department of Environmental Quality (ADEQ) and Environmental Protection Agency (EPA) were reviewed for this study.

Table 3.1

Standard Environmental Record Sources and Recommended Search Distances

Name	Distance
Federal National Priorities List	1.0 mi
State National Priorities List	1.0 mi
Federal RCRA CORRACTS TSD Facilities List	1.0 mi
Federal RCRA non-CORRACTS TSD Facilities List	0.5 mi
Federal CERCLIS List	0.5 mi
State CERCLIS List	0.5 mi
State Landfill and/or Solid Waste Disposal List	0.5 mi
State Leaking Underground Storage Tank (LUST) List	0.5 mi
State Registered UST List	Property & Adjoining
Federal RCRA Generators List	Property & Adjoining
Federal CERCLIS NFRAP List	Property & Adjoining
Federal ERNS List	Property

Federal National Priorities List (NPL). The NPL is an EPA database of uncontrolled or abandoned hazardous sites identified for priority remedial actions under the Superfund program. A site must meet or surpass a predetermined hazard ranking system score, be chosen as a state's priority site or meet three specific criteria set jointly by the US Department of Health and Human Services and the US EPA in order to become a NPL site. A review of the March 4, 2004 EPA Federal NPL database indicated that the subject property was not located on or within one mile of a NPL site.

State NPL — Water Quality Assurance Revolving Fund (WQARF) Sites. A WQARF area, which is also referred to as a state Superfund area, is a region designated by the ADEQ for further investigation regarding environmental concerns involving groundwater. A review of the May 23, 2003 State Superfund databases did not indicate a WQARF site on or within one mile of the subject property.

FINAL

Federal RCRA Lists — Resource Conservation and Recovery Information System (RCRIS). This database is a nationwide listing of businesses or industries which have obtained either a final or an interim status permit for the treatment, storage, or disposal (TSD) of hazardous waste under the Resource Conservation and Recovery Act (RCRA) regulations. The database also lists generator or transporter status pursuant to RCRA regulations. Registration with the EPA enables a business or industry to store hazardous waste for specified lengths of time until proper disposal can be arranged. Certain quantities and types of waste place a “generator” in this category. Database information regarding compliance and corrective actions (CORRACTS) for generators or transporters is also provided. Non-CORRACTS generators or transporters are in compliance and have not been notified by the EPA to take corrective actions.

The review of the May 10, 2004 RCRIS database did not indicate RCRA CORRACTS TSD facilities on or within one mile of the subject property. Review of the May 10, 2004 RCRIS database did not indicate RCRA non-CORRACTS TSD listings on or within one-half mile of the subject property.

Federal CERCLA Information System (CERCLIS). The CERCLIS list is a compilation of locations nationally identified as hazardous or potentially hazardous which are subject to investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for possible contamination of soil, surface water, or groundwater. After investigation, a location may be placed on the NPL if it scores high enough in the Federal Hazard Ranking System or the site may be designated as No Further Remedial Action Planned (NFRAP) by the EPA. A review of the May 13, 2004 database did not indicate listed sites on or within one-half mile of the subject property.

State CERCLIS — Arizona Superfund Programs List & WQARF Preliminary Investigation List. The Arizona Superfund Programs List consists of active or registered State WQARF sites, State NPL sites, and State Department of Defense (DOD) sites. The WQARF Preliminary Investigation (PI) List compiles locations subject to investigation under the State WQARF program and CERCLA for possible contamination of soil, surface water, or groundwater. After investigation, a location may be placed on the NPL if it scores high enough in the Federal Hazard Ranking System, or the location may be placed on the WQARF list, or the site may be designated for no further investigation. Inclusion of any facility or site on the WQARF PI List does not mean that the location is contaminated, is causing contamination, or is in violation of State or Federal statutes or regulations. The review of the May 23, 2003 Superfund Programs List and the October 23, 2003 WQARF PI List did not indicate listed sites on or within one-half mile of the subject property.

State Landfills — Active Municipal Solid Waste Landfills, Rubbish Landfills, Private Solid Waste Landfills, Closed Solid Waste Landfills (CSWLF) and Closed Solid Waste Dumps (CSWD). These databases, part of the state landfill and solid waste disposal lists, provide information on active landfills, closed landfills, and closed dumps in Arizona, respectively. Review of the May 2004 and June 2001 databases did not indicate listings on or within one-half mile of the subject property.

State Leaking Underground Storage Tanks (LUSTs). This database lists leaking underground storage tanks that have been registered with the ADEQ. A review of the April 12, 2003 LUST database did not indicate any listed LUST sites on or within one-half mile of the subject property.

FINAL

State Registered Underground Storage Tanks (USTs). This ADEQ database lists facilities which have completed a notification form for ownership of an underground storage tank which contains a regulated substance. Review of the February 11, 2004 UST databases did not indicate registered USTs on the subject property. Database review indicated two registered UST sites adjoining the subject property. Of the two sites, the Quick Mart #11, located at 13142 East Colossal Cave Road, had two listed tanks, one was listed as “closed” and one was listed as “in use.” The Vail School District #20, located at 13299 East Colossal Cave Road, had three tanks listed as “removed.”

Federal RCRA Generators List. The federal RCRA database lists waste generators and their status pursuant to RCRA regulations. Registration with the EPA enables a business or industry to generate and store hazardous waste for specified lengths of time until proper disposal can be arranged. Certain quantities and types of waste place generators within four categories; large quantity, small quantity, conditionally exempt, and deactivated. Review of the January 12, 2004 RCRA database did not indicate a listed RCRA generator on or adjoining the subject property.

Federal CERCLIS NFRAP List. The NFRAP database contains information on CERCLA sites which have been removed and archived from the inventory of the Federal CERCLIS listed sites. The archive status indicates that the assessment of the site has been completed and has designated that no further steps will be taken to list the site on the NPL. A review of the May 13, 2004 database did not indicate listed sites on or adjoining the subject property.

Federal Emergency Response Notification System (ERNS). This system is a national database used to collect information on reported releases of oil and hazardous substances. The database contains information acquired through the National Response Center. The U.S. EPA and Department of Transportation database search from January 1, 1983 through June 6, 2004 did not indicate records for the subject property.

3.2 Additional Environmental Record Sources

Local Emergency Response Departments. Apломado personnel contacted the local fire departments for information regarding hazardous material spills and emergency responses for the subject property. Information provided by Rincon Valley Fire District and Rural Metro Fire Department indicated that HAZMAT and emergency responses had not occurred in the vicinity of the subject property during the past 15 years.

Tucson Electric Power Company (TEP). This company maintains a database for the electrical utility services provided within the Pima County region, including maintenance records for pad and pole-mounted transformers. Information provided by TEP indicated that the pad-mounted electrical transformers located on the subject property were “non-detectable for poly-chlorinated biphenyls (PCBs).” The pole-mounted electrical transformers were indicated to have “not been tested for PCBs and are therefore classified as contaminated (50 to 500 ppm PCBs).” In the event of a release, TEP is responsible for any sampling and remediation pursuant to 40 CFR Part 761.

4.0 SITE RECONNAISSANCE

Aplomado personnel conducted a site reconnaissance for the Vail/Colossal Cave Road from approximately 700 feet south of Acacia Elementary School to Cienega High School Drive, Vail, Pima County, Arizona on June 11, 2004. Photographic documentation taken during the site reconnaissance is provided within Appendix B. The site reconnaissance for Vail/Colossal Cave Road was conducted in vehicle and on foot commencing at the northeastern end of the subject property (Please refer to Photo 1 of Appendix B).

Observations of the subject property during the site reconnaissance indicated that the property was comprised of a paved and striped two lane roadway. Within the right-of-way, the shoulder of the roadway was predominantly barren with a gravel surface. The roadway curved southwestward from the intersection of Colossal Cave Road and Cienega High School Drive towards the Union Pacific Rail Road tracks. The southeasterly right-of-way contained subsurface telecommunication utilities, while the northwesterly right-of-way contained overhead electric and subsurface natural gas utilities.

Several pad-mounted transformers were located near and within the right-of-way, including three transformers and two electrical meter pedestals located on the northwestern corner of the intersection (Photo 2). Surface staining or other indications of leakage or spillage were not observed in connection with the transformers.

Southwest of the intersection along the northern shoulder of the roadway, PVC conduit was observed protruding from the ground surface near a utility pole (Photo 3). The conduit appeared to be associated with electrical or telecommunication utilities. In near vicinity to the utility pole, Aplomado personnel observed incidental surface staining resulting from leakage of automotive fluids from vehicles parked near the high school adjoining the roadway (Photo 4). Aplomado personnel did not observe unusual odors in connection with the surface staining. Along the southern shoulder of the roadway, the Vail School District aboveground water storage tank and associated components bordered the right-of-way. Subsurface water utilities were observed in the right-of-way in connection with the water storage tank.

Farther south, the roadway was traversed by a cattle guard followed by two separate crossings of the Union Pacific Rail Road tracks. The tracks were laid on imported slag and fill and were adjoined by crossing signals and related features. Aplomado personnel observed pole-mounted transformers associated with the rail road crossings. Observations of the ground surface below the transformer associated with the northern rail road crossing indicated an area of surface stained soil. The stained soil was approximately ten inches in diameter by less than one inch in depth and had a strong petroleum hydrocarbon odor (Photo 5). Readily apparent indications of spillage and/or leakage were not observed in connection with the northern transformer (Photo 6). Similarly, indications of leakage, spillage, or surface staining were not observed in connection with the pole-mounted transformer associated with the southern rail road crossing. A subsurface utility labeled "petroleum pipeline" was observed paralleling the tracks south of the southern rail road crossing.

FINAL

The shoulder and right-of-way south of the rail road tracks was in part overgrown with shrubs and grasses. Within the overgrown vegetation along the easterly right-of-way near the gasoline service station, Aplomado personnel observed a conglomeration of a foam-like substance. The foam-like substance was hardened and was approximately 18 inches by 24 inches by 16 inches in size (Photo 7). Unusual odors, surface staining, or other noteworthy features were not observed in connection with the foam-like substance. Near the southern terminus of the subject property along the easterly right-of-way Aplomado personnel observed three pole-mounted electrical regulators. Evidence of surface staining, leakage, or spillage were not observed in connection with the regulators.

Site reconnaissance observations indicated occasional discarded household trash and debris scattered within the right-of-way. Aplomado personnel did not observe indications of pits, lagoons, drains, underground storage tanks, or drywells in association with the subject property. Sanitary sewer systems also were not observed on the subject property. In addition, Aplomado personnel did not observe discarded chemical waste containers, drums, buckets, or wildcat dumping in connection with the subject property. Atypical stressed or dying vegetation also was not observed in connection with the subject property.

The properties adjoining Vail/Colossal Cave Road were observed during the site reconnaissance. The easterly adjoining properties were comprised of residential development, a church, a stormwater retention basin, and a gasoline station. The westerly adjoining properties were comprised of a high school, a feed store, a post office, and an elementary school. The southerly adjoining properties were predominantly undeveloped. Evidence of surface stains, releases, or spills were not observed on the subject property in connection with the adjoining properties. Environmental impact to the subject property from adjoining properties was not readily observed.

4.1 Interviews

Aplomado personnel contacted the Union Pacific Rail Road Environmental Management Department regarding emergency responses and the northern railroad crossing transformer. On July 6, 2004, Aplomado personnel spoke with Mr. Dennis Johnson, the Chemical Transport Safety Officer responsible for the rail road in the vicinity of Vail, Arizona. Mr. Johnson stated that there have not been any emergency responses to the Vail area during the past 10 years. Mr. Johnson was unaware of recent or historical releases from transformers near the rail road crossings.²

5.0 FINDINGS AND CONCLUSIONS

Aplomado has performed a Preliminary Initial Site Assessment in general accordance with the ADOT Environmental Determination Guidelines and the ASTM Practice E 1528 for Vail/Colossal Cave Road from 12900 East to 13400 East Colossal Cave Road, Vail, Pima County, Arizona. The assessment for the subject property consisted of a site reconnaissance, a review of available agency databases, a review of historical records related to hazardous materials usage for the subject property and vicinity, and the preparation of the PISA form. This report summarizes the findings of the assessment.

The subject property is comprised of a paved two-lane roadway which will be widened and improved within the existing right-of-way. The roadway was adjoined by commercial, retail, residential, scholastic, and ecclesiastic development as well as undeveloped land. The central portion of the subject property was developed by the Union Pacific Rail Road. Surface drainage of the subject property was controlled by the local topography with generally northwestward sheet flow of water.

The site reconnaissance indicated overhead and subsurface utilities, including electrical, petroleum, natural gas, water, and telecommunications. Pad-mounted and pole-mounted transformers were observed in connection with the utilities and the rail road operations. The site reconnaissance indicated surface stained soils with a petroleum hydrocarbon odor beneath the northern rail road crossing transformer. Evidence of leakage or spillage was not observed in connection with the northern transformer or the other transformers. An interview with the Union Pacific Rail Road did not indicate emergency responses or transformer releases in connection with the rail road operations. The reconnaissance also indicated incidental surface staining from leakage of automotive fluids located on the gravel shoulders of the roadway.

Reconnaissance of the subject property indicated incidental items of household trash and litter in connection with the roadway and right-of-way, including a hardened, foam-like substance. Unusual surface staining or odors were not observed in connection with the foam-like substance. Site reconnaissance and database review did not indicate underground storage tanks, pits, lagoons, or drywells in association with the subject property. Sanitary sewer systems were not indicated from the site reconnaissance. Buckets, drums, discarded chemical or waste containers, wildcat dumping, atypical stressed or dying vegetation, or other environmental impacts were not indicated from the site reconnaissance. The site reconnaissance did not indicate adverse environmental impacts to the subject property in connection with the adjoining properties.

A review of the environmental records databases indicated that the subject property is not located on or within one mile of a federal NPL site. The review indicated that the subject property is not located on or within one mile of a state WQARF site.

FINAL

The environmental records database review indicated that the subject property is not located on or within one mile of a RCRA CORRACTS TSD facility, nor is the subject property located on or within one-half mile of a RCRA non-CORRACTS TSD facility. Environmental records database review did not indicate compliance violations, administrative actions, or CORRACTS on or within one-half mile of the subject property.

Environmental records database review indicated that the subject property is not located on or within one-half mile of a federal or state CERCLA site.

Review of the environmental records databases indicated that the subject property is not located on or within one-half mile of active municipal solid waste landfills, active rubbish landfills, active private solid waste landfills, closed solid waste landfills, or closed solid waste dumps.

A review of the environmental records database did not indicate a listed LUST site on or within one-half mile of the subject property. The environmental records database review did not indicate registered USTs on the subject property. The database review indicated two UST facilities adjoining the subject property. The facilities were registered at 13142 East Colossal Cave Road and 13299 East Colossal Cave Road. Of the five USTs listed for the two facilities, four were listed as "removed" or "closed." Based on the removal of the USTs and the lack of reported UST releases, Aplomado does not consider the USTs to pose a significant environmental risk to the subject property at this time.

Review of the environmental records database did not indicate RCRA generators on or adjoining the subject property. The review did not indicate a CERCLA NFRAP site located on or adjoining the subject property.

Database research indicated no reported ERNS records for the subject property. Information provided by local fire departments did not indicate hazardous materials spills or responses for the subject property.

5.1 Recommendations

Aplomado has performed a Preliminary Initial Site Assessment of Vail/Colossal Cave Road from 12900 East to 13400 East Colossal Cave Road, Vail, Pima County, Arizona. The Preliminary Initial Site Assessment was performed in general accordance with the ADOT Environmental Determination Guidelines and the scope and limitations of ASTM Practice E 1528. This assessment has revealed no indications of recognized environmental conditions in connection with the subject property at this time. Based on the findings and conclusions, further studies of the subject property are not recommended at this time.

6.0 QUALIFICATIONS

Aplomado is a southeastern Arizona company specializing in professional environmental services for industry, commercial business, government agencies, development, and private land owners. Environmental services provided by Aplomado include: transaction screen and Phase I Environmental Site Assessments, soil and water sample collection, characterization and remediation of environmentally hazardous sites, and biological studies for plant and animal species.

Aplomado's project team is comprised of qualified individuals who possess diverse experience in conducting environmental studies. A team approach is vital for ESA projects, as so many different disciplines are involved. These include natural sciences, regulatory interpretation, hazardous materials recognition and identification, interpretation of aerial photographs, demographics, electronic database management, interviewing, public records access, and local knowledge. The qualifications of the individual Aplomado team members conducting the ESA are as follows:

Mr. Homer Hansen, B.S., Project Manager.

Mr. Hansen has over twelve years of multi-disciplinary experience in environmental sampling, database and agency research, and remediation operations. For over seven years, Mr. Hansen has conducted comprehensive Phase I and Transaction Screen ESA services for business complexes, industrial facilities, large tracts of vacant lands, mining operations, and farm lands. Mr. Hansen is skilled in procedures related to environmental site inspection and assessment as well as technical research and writing. Mr. Hansen has managed project teams for site assessment, characterization, and remediation.

Warren "Butch" Jackson, Environmental Manager.

Mr. Jackson has acted as an environmental manager for over 100 environmental assessment, sampling, and remediation projects. Mr. Jackson's experience includes: emergency response operations for confined spaces and transportation releases; field operations manager for the remediation of metals, pesticides, and other hazardous substances; and, oversight for profiling, shipment, and disposal of hazardous wastes. Past clientele include government and regulatory agencies, industrial and commercial enterprises, and private landowners. Mr. Jackson's knowledge contributes to the assessment and evaluation of recognized environmental conditions and their management.

Ms. Jennifer Godwin, Environmental Technician.

Ms. Godwin has over three years experience with database, library, and internet research, along with associated computer applications. Ms. Godwin is especially adapt at conducting field surveys and recording pertinent environmental details. In addition to conducting field surveys, Ms. Godwin is familiar with the preparation of project summary reports for field work.

7.0 REFERENCES

1. U.S. Geological Survey. *Vail*. 7.5 Minute Series Topographical Map, Scale 1 : 24 000. 1981.
2. Personal communication. Mr. Dennis Johnson. Union Pacific Rail Road — Environmental Management. (520) 629-2170. July 6, 2004.

APPENDIX A

PISA FORM

PRELIMINARY INITIAL SITE ASSESSMENT FORM

Project No. 16-04-P-134047-0204 Tracs No. Not Applicable

Section I: Site Location Information:

Assessor Parcel No. Not Applicable ADOT Parcel No. Not Applicable

Address/ Route & Milepost: Vail/Colossal Cave Road

Section: 9 & 16 Township: 16S Range: 16E $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

Latitude: 32.0490 – 32.0398 Longitude: 110.7092 – 110.7163

Site Characteristics: Past Land Use:

Agriculture Residential X Commercial X Industrial Natural X

Vehicle Maintenance: Chemical Storage: UST System:

Septic System: Water/Dry Well: Pesticide/Herbicide:

Other

Section II: Site Surface Conditions:

Street Dimensions: Length: Approx. 0.8 miles Width: Approx. 24 feet

Total Area: 100,800 Sq. Feet or 9,349 Sq. Meters or 2.31 Acres

Topography: Level terrain with rolling hills in the southern portion

Geology: Alluvial deposits

Vegetation: Sonoran desertscrub

Structures: Residential, Commercial, Scholastic, Ecclesiastical

Utilities: Water, electric, natural gas, telecommunications, petroleum

Section III: Results of Database Review:

No concerns on Project X Concerns on Project

(Complete Section IV)

PRELIMINARY INITIAL SITE ASSESSMENT FORM

Section IV: Environmental Concerns:

Observed: Incidental surface stained soil

Suspected: _____

Unusual Conditions: None Observed

Section: IV: Recommendations:

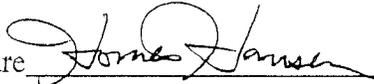
High Priority Phase 1 Medium Priority Phase 1 Low Priority Phase 1

No Additional Survey Required: Aerial Photographic Review

Section VI: Comments:

No recognized environmental conditions observed in connection with the subject

property at this time.

Name Homer Hansen Signature  Date 07Jul04

APPENDIX B

**PHOTOGRAPHIC
DOCUMENTATION**

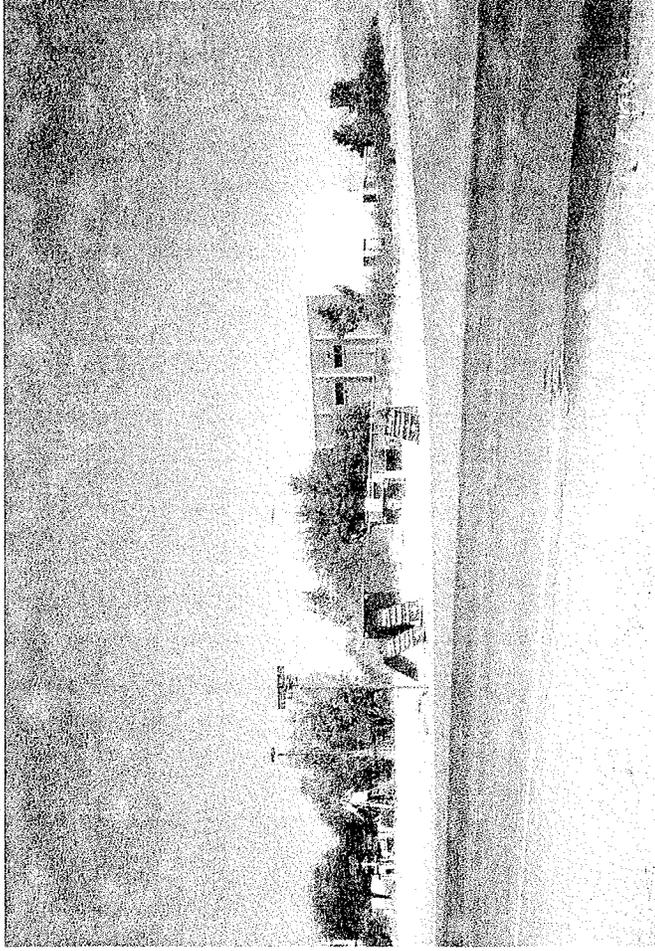


PHOTO 1: Northwest-facing view of the northern terminus of the subject property.

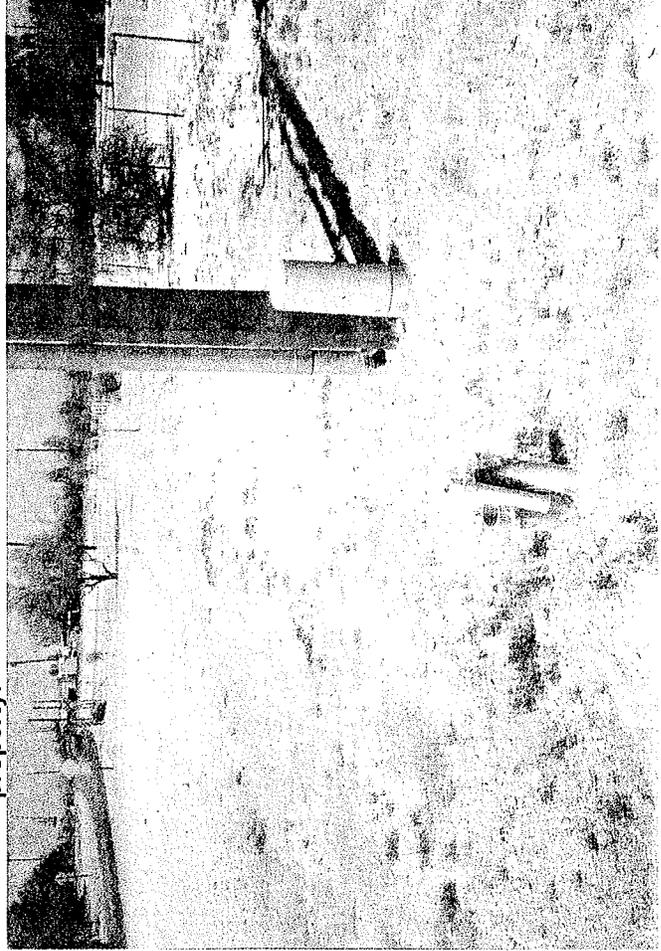


PHOTO 3: View of the PVC conduit located near the utility pole in the northern portion of the property.

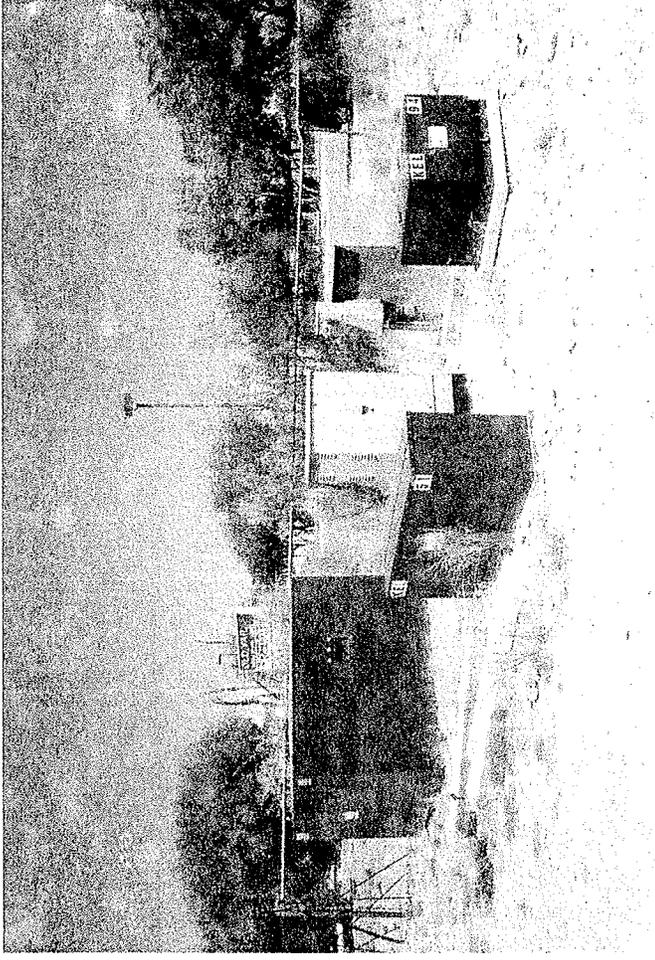


PHOTO 2: View of the pad-mounted transformers and electrical meter pedestals located in the northern portion of the property.

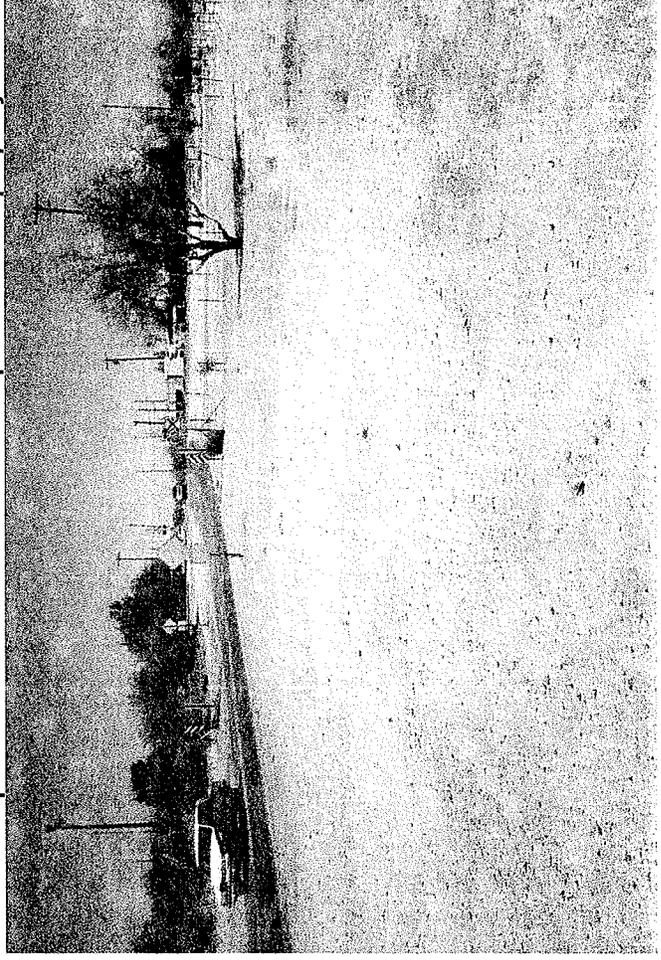


PHOTO 4: Area of incidental surface staining from automotive fluids.



PHOTO 5: View of the area of surface stained soil located below the pole-mounted transformer.



PHOTO 7: View of the foam-like substance located in the right-of-way near the gasoline service station.

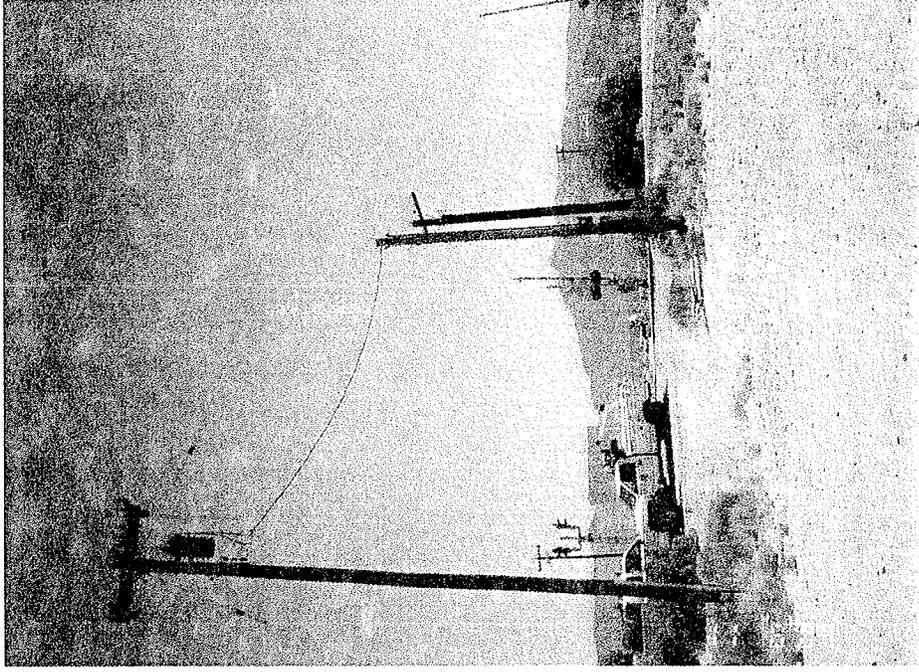


PHOTO 6: View of the pole-mounted electrical transformer.

APPENDIX E

**ENVIRONMENTALLY SENSITIVE ROADWAY (ESR)
*VIEWSHED SENSITIVITY REPORT***

**FOR THE
COLOSSAL CAVE ROAD IMPROVEMENT PROJECT
PIMA COUNTY, ARIZONA**

21 July 2005

**Prepared by
SAGE Landscape Architecture & Environmental, Inc.
2315 East Speedway Boulevard
Tucson, Arizona 85719**

Prepared for
Pima County Department of Transportation
201 North Stone Avenue, 3rd Floor
Tucson, Arizona 85726

On Behalf of
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177 North Church Avenue
Tucson, Arizona 85701

The Vail Road study area is designated as a Scenic Major Route on the August 2002 version of the Major Streets and Routes Plan map. This street is defined as possessing scenic value, and this roadway design should allow for the continued prominence of the mountain views in the area, especially the nearby Santa Catalina Mountains and the Rincon Mountains. The project area winds through the Town of Vail, which offers a scenic experience separate from the wider, regional scenic quality of the roadway. While in Vail, the views are shorter and are of more intimate, human scale elements, such as buildings and signage. When heading north, the driver is confronted with a majestic view of the Santa Catalina Mountains to the north immediately after the roadway curves to the east (in central Vail). This view, and the moment the view is discovered, is of utmost importance to the driver's experience. The character of Vail is at once prominent, and contextual to the region. This view should be honored and preserved.

Similar to the plant surveys, the ESR guidelines prescribe a visual quality inventory and evaluation process. This process is similar to the Federal Highway Administration (FHWA) designed process, in that it includes viewers off site and their views onto the roadway, not simply the driver's perspective views. This new process will aid in reducing the project elements' contrast with the environmentally sensitive resources.

The future presence of one or several retail stores at the corner of Old Vail road and a projected new road alignment at the north end of the project area will have a definite effect on the visual resources of the area. This area is not directly visible to the northbound traveler until they pass over the northern set of railroad tracks. Once these railroad tracks are passed, the proposed stores' location is highly visible. If these stores are built at the current grade, they will not only obstruct much of the Pantano Wash valley view, but also present a high contrast element in a sensitive viewshed. This contrast can be mitigated some through the control of the elevation of the buildings, which, if built at a lower elevation behind the existing knoll, would present less contrast. However, the amount of parking lot space and associated lighting required for both a Safeway and a Walgreen's will be a visual impediment in the area, especially at night, as the parking lot and marquis lighting will be visible for a long distance in all directions.

Identification of Visual Resources

In May 2004, and again in July 2004, SAGE staff conducted a site survey of the roadway's visual resources.

The views are of prominent, well known mountains such as the Santa Catalina and Rincon Mountains, as well as smaller mountains such as Pistol Hill. The roadway, on the approach to Vail from the south, presents horizontal, or side-to-side views of the nearby desert plain. On the southern approach to interstate 10 from Vail, the Santa Rita mountain range is intermittently visible as the road dips up and down through cross-road drainages.

The project highpoint is occupied by Acacia Elementary school parking lot entry. From this point views are prominent both to the north, northwest, east, and south. The overall viewing patterns seem to be focused on the middle and far ground scenic views, with an occasional near ground view, as exhibited by the few buildings within the town of Vail.

Viewers

To gauge the viewers sensitivity, 6 Key Observation Points (KOP) were selected per Pima County Roadway Design Guidelines (2003). KOP were selected to gauge the sensitivity of locations along the roadway and off the roadway. See Figure 3 for location of KOP along the project area:

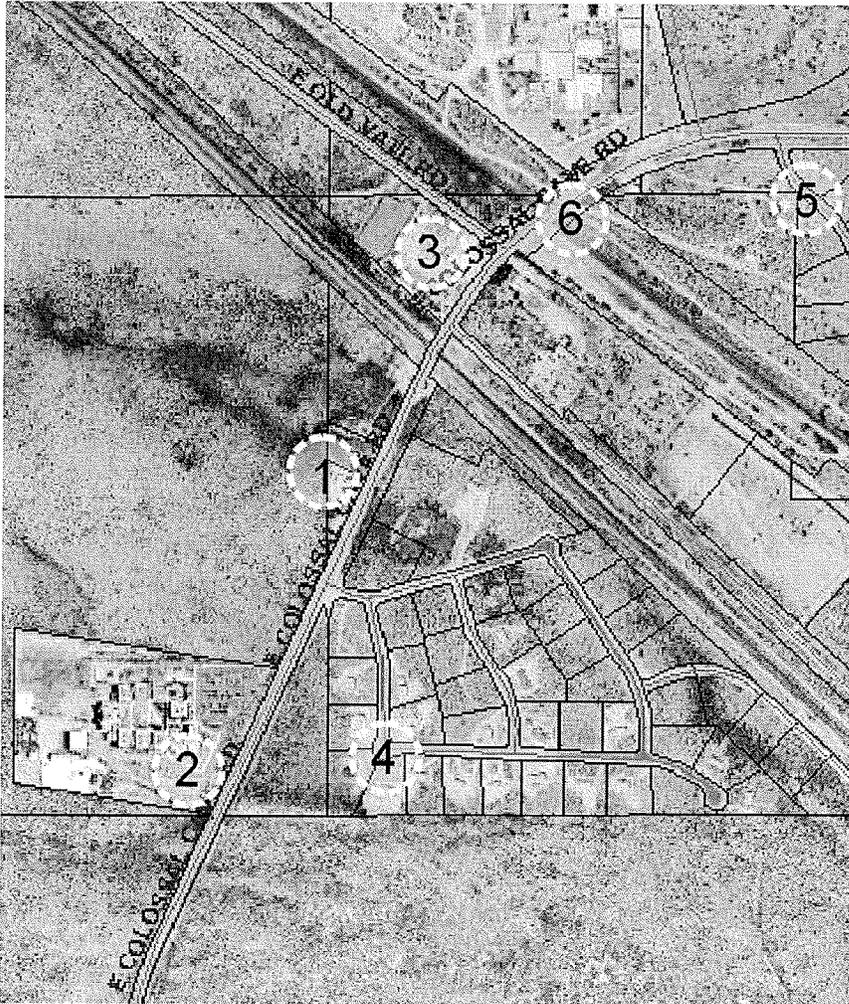


Figure 3: Location of Key Observation Points

Data from these KOP were condensed into several different matrices. Tables 4 - 7 below are modified versions of the sample matrices presented in the ESR guidelines.

Table 4: Viewer Sensitivity Level Evaluation					
Location (KOP)	User Type	Use Volume	Public Interest	Special Areas	Sensitivity Level
<i>Travel Routes/ Trails</i>					
3. Vail Rd. between RR Tracks	Res., Rec., SS, Com.	High	High	Church and buildings nearby. Far views add context.	High
6. Roadway by Middle School	Res., Rec., SS, Com.	High	Medium	Can see Catalinas, and up close will view water tank	Moderate
<i>Use Areas</i>					
1. Post Office	Res., Com.	High	Medium	Catalinas, Rincons, Santa Ritas.	Moderate
2. Acacia Elementary	Res., Com., SS.	High	High	360 degree views, esp. of Rincons and Catalinas	Traffic is big issue.
4. Neighborhood	Res.	Low	Low	School. Quicke mart. All mountains	Low
Table 4 (continued): Viewer Sensitivity Level Evaluation					
Location (KOP)	User Type	Use Volume	Public Interest	Special Areas	Sensitivity Level
5. Neighborhood Exit, on N. end	Res.	Mod.	Mod.	Middle School nearby. Northern mountain ranges.	Moderate
Residential (res), Recreation (Rec), Sight Seeing (SS), Commuters (Com)					
National (N), State (S), Local (L).					

Table 5: Viewing Condition Evaluation

Location, KOP or General	Viewer Variable Criteria				Notes
	Viewer Orientation	Duration	Distance	Visibility	
	<i>perpendicular vs. parallel views</i>	<i>considers speed of travel</i>	<i>views from and to the roadway</i>	<i>the "edge condition" of the roadway</i>	
1. Post Office	Perpendicular. Valley between Railroad and Highpoint	Moderate	1/4 Mile each way	High, no screening. Post Office drop-off	Some plants in front of Post Office. Railroad highly visible. Open views.
2. Acacia Elementary	Perpendicular. Roadway not very involved in viewshed.	Short	Cars top hill and drop away.	High	Could use intermittent screening, but views shall be honored.
3. Vail Road between RR Tracks	Views to East are screened	Short	RR breaks viewshed	Low	Near Catholic church, lots of vegetation and low lying roadway.
4. Adjacent Neighborhood	Perpendicular Can see tall vehicles on road. Little visual connection to roadway.	Short	Close, and again at the bottom of the hill by Quicke Mart	Low	This neighborhood is more visible (for longer) than the roadway is from here.
5. Neighborhood Entrance/ Exit, North end.	Perpendicular Views of road channeled by cut slopes.	Short	Views of road channeled by cut slopes.	Moderate. More visible from roadway than vise/ versa.	
6. Roadway by Middle School	Parallel	Short	Short on Roadway Far views	Highly visible No screening extant.	Could use intermittent screening. See photos.

Table 6: Visibility Level Synthesis

Location <i>(Key Observation Points)</i>	Viewer Variables				
	Sensitivity Level	Viewer Orientation	Distance	Score	Sensitivity
Name KOP	L,M,H	L,M,H	L,M,H	L=1, M=2, H=3	
1. Post Office	High	Low	Moderate	6	Moderate
2. Acacia Elementary	High	Mod	Mod	7	High
3. Vail Road between RR Tracks (Town of Vail)	High	Moderate	High	8	High
4. Adjacent Neighborhood	Low	Low	Moderate	4	Low
5. Neighborhood Entrance/ Exit, North end.	Moderate	Moderate	Moderate	6	Moderate
6. Roadway by Middle School	Moderate	Moderate	Moderate	6	Moderate

These Sensitivity Level indicators help distill which of the areas are most sensitive. In this project, KOP 3, the project center point, is the most sensitive area, for both views onto or from the roadway. Of secondary priority, but still sensitive, are the post office, the neighborhood driveway on project's northern end, Acacia Elementary School, and the middle school. (KOPs 1,2,5,6). Of tertiary sensitivity are the KOPs that lie off of the roadway, the only one of which is KOP 4. The view from this KOP is screened and less sensitive.

Setting

The second component that accompanies the Viewers in the Visual Analysis is the Setting of the project. The ESR guidelines define settings as either “developed” or “natural”. This project area falls under the “developed” category. As such, the analysis should focus on how the project elements fit within the site’s visual image and character. “The degree to which the roadway project affects the visual and aesthetic quality of a natural or developed setting depends on the contrast created between the project and the existing setting.” (PCRD, 4-20).

As exhibited in Table 7 below, the programmed project elements won’t contrast dramatically with the existing condition. Plantings and walls may restrict access onto or off of the roadway, which could enhance the right of way. Lighting will pose the largest threat to the project, in terms of creating contrast. The roadway passes through a rural, rustic atmosphere, and large, bright lights will contrast greatly with the existing environment, not to mention not enhancing the existing conditions that defined this roadway as a Scenic Roadway.

Table 7: Project Settings/ Project Elements Contrast Matrix

Project Elements			
Contrast with Setting, with respect to:	Pavement Improvements	Landscape Planting	Pedestrian Accommodations
Circulation	Circulation is currently restricted, and congested by Railroad. Paving improvements may alleviate some congestion.	Some planting can facilitate circulation.	Sidewalks exist on some of project area, but signage and visual cues need to be provided for pedestrian safety.
Structural	Paving should avoid currently existing structures.	Planting should accentuate existing structures, not block them from view.	No effect.
Open Space Modifications	none anticipated	Planting should echo pre-project conditions, or improve on the vegetational community.	Pedestrian accommodations will interact with landscape plantings, the connection being an open space mod.
Viewer Orientation	Pavement will follow existing roadway	Planting will be kept from obstructing the good views, while screening the poor views.	Pedestrian accommodations should be brightly signed so pedestrians can be seen, even if viewer orientation is in opposite view.

Visual Analysis

Vail Road has an open, unstructured appearance, and project elements such as a widened shoulder, pedestrian pathway, landscape plantings, lighting, retaining walls and screening walls should be evaluated for their contrast in the project context. As the existing environment is a high-contrast environment already, consistently used project elements are unlikely to negatively affect the roadways visual quality. A guiding principle of the visual analysis will be the elimination of contrast between project elements and the project's current setting. When contrast is reduced, the visual quality is less negatively affected.

Potential Impacts

Impacts to the visual quality of these KOPs may be affected by obstructions. The project area presents some areas that may benefit from screening, but the overall scenic quality of the background views should be the priority of the visual mitigation efforts. A roadway with landscape amenity plantings, and possibly gateway plantings, were this condition to exist, could accommodate some of the other project goals while not greatly interfering with the visual quality of the roadway.

Future buildings within the project area, or nearby the project area, could negatively affect the scenic quality of the roadway. These buildings should be screened in some fashion in order to reduce visual contrast. This screening does not have to happen in the building envelope, but could happen throughout the project area with well-placed, appropriate trees. For example, as Vail Road curves to the east (when traveling north), the inside of the curve could be treated with large scale, signature trees that both enhance the "placehood" of Vail and screen the negative, high contrast elements such as commercial buildings, railroads, etc.

Mitigation

Tree types to consider:

- Blue Paloverde – *Cercidium floridum*
- Sweet acacia - *Acacia smallii*
- Arizona cypress (smooth barked) - *Cupressus arizonica/ Cupressus glabra*
- Soaptree yucca - *Yucca elata*
- Hollywood Juniper - *Juniperus chinensis 'Torulosa'*

Design Intent

The absence of any formalized design along the Vail Road roadway offers an opportunity to create "something" from "nothing". Aside from the presence of some physical constructions, very little signals a person they are in Vail, leaving Vail, etc. Currently unifying elements are non-existent, but this project has an opportunity to explore some place-making techniques such as signature plant groupings, iconic signage or plant materials, and picturesque walls and/or pedestrian facilities. The design intent we will pursue will be to envision this roadway as a whole unit, and to facilitate "way finding" by

providing definite cues to the roadway user that they are progressing through a definite space. By providing gateway elements at each end of the project site, as well as throughout the project site, multiple objectives can be achieved, such as screening, directing views, establishment of place, and cuing the participant to modify their current action or behavior.

Creation of Space

Nothing in Vail provides impetus for employing a formalistic design. Straight rows of trees, or straight hedges, would be in opposition to the context of Vail. The Railroad tracks are straight, and elevated, but don't play into the arrangement of the town, but merely pass through the town. Therefore, a more sympathetic design standard would be the naturalistic, casual arrangement of plant material and built objects, while adhering to other objective design concerns such as safety and comfort. Gateways can be achieved through casually associated plant materials. Wayfinding and placemaking need not utilize any formal design standard. Vail's context is of a natural setting, influenced by agriculture and the nearby mountains. In keeping with this context, the planting design will strive to enhance the new roadway's sense of place, while not becoming overbearing in its presence.

APPENDIX F

An Archaeological and Historical Assessment of Colossal Cave Road near Vail, Pima County, Arizona

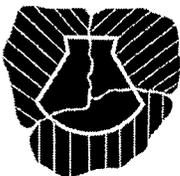
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Project Report No. 03-207
Desert Archaeology, Inc.
Project No. 03-154

3975 N. Tucson Blvd., Tucson, AZ 85716 • 29 March 2005

ABSTRACT

DATE: 29 March 2005

AGENCY: Pima County

REPORT TITLE: An Archaeological and Historical Assessment of Colossal Cave Road near Vail, Pima County, Arizona

CLIENT PROJECT NAME: Colossal Cave Road Improvement Project

FUNDING LEVEL: County

PROJECT DESCRIPTION: Proposed road improvements including the following options: widening all or part of the road, adding center medians, adding drainage culverts, adding a right hand turn lane in one area, adding sidewalks or multiuse paths in some areas, and intermittent landscaping.

PERMIT NUMBER: Arizona Antiquities Act Blanket Permit No. 2004-005bl, Arizona State Museum Accession No. 2004-0482.

LOCATION:

County: Pima

Description: Sections 9 and 16, Township 16 South, Range 16 East on the USGS 7.5-minute topographic quad Vail, Ariz. (AZ BB:14 [SW]).

NUMBER OF SURVEYED ACRES: 33

NUMBER OF SITES: 5

LIST OF REGISTER-ELIGIBLE PROPERTIES: Southern Pacific Railroad (AZ Z:2:40 [ASM]), El Paso & Southwestern Railroad (AZ EE:3:74 [ASM]), Vail Railroad Station site (AZ BB:14:18 [ASM]), old Vail Post Office (AZ BB:14:708 [ASM]), and the Shrine of Santa Rita (AZ BB:14:703 [ASM]).

LIST OF INELIGIBLE SITES: NA

RECOMMENDATIONS: Avoidance of all sites is recommended. It is also recommended that the 2-lane option be used for the section of road between the two railroad crossings and adjacent to BB:14:703 and BB:14:708. If final plans include indirect impacts that would threaten the National Register integrity of either BB:14:703 or BB:14:708, mitigation should take the form of stabilization, documentation, or public interpretation, as applicable. Should any previously unidentified cultural materials be encountered during construction, work should be halted in that area and a qualified archaeologist contacted to evaluate the find.

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AN ARCHAEOLOGICAL AND HISTORICAL ASSESSMENT OF COLOSSAL CAVE ROAD NEAR VAIL, PIMA COUNTY, ARIZONA

INTRODUCTION

Pima County has proposed a roadway improvement project for Colossal Cave Road near the community of Vail, Arizona, in eastern Pima County. Parsons Brinckerhoff, consultants to the county, requested a cultural resources assessment of this project area to determine if any significant archaeological or historical resources will be affected. Desert Archaeology, Inc., was contracted to complete this evaluation. Field survey was carried out on 28 May 2004 by Michael Brack. Follow up field inspections were carried out on 1 June 2004 by Janet Parkhurst, historical architect, and on 28 January 2005 by Allison Diehl. William H. Doelle, Ph.D., of Desert Archaeology, was the Principal Investigator, and fieldwork was authorized under Arizona Antiquities Act Blanket Permit No. 2004-005bl. Additional project-related records are curated by the Arizona State Museum (ASM) under Accession No. 2004-0482.

A historical and archaeological inventory for the project identified five sites/properties. Significant remains include the Vail Railroad Station site (AZ BB:14:18 [ASM]), the El Paso & Southwestern Railroad tracks (AZ EE:3:74 [ASM]), the Southern Pacific Railroad tracks (AZ Z:2:40 [ASM]), the old Vail Post Office (AZ BB:14:708 [ASM]), and the Shrine of Santa Rita (AZ BB:14:703 [ASM]). The preferred design plans avoid direct impacts to the post office and the shrine, and Desert Archaeology recommends this approach. A small portion of the Vail Railroad Station site could be affected by construction. Avoidance is the preferred mitigation at this site also. There will be no impact to the two railroad lines. In the event any of the significant sites/properties will be affected by the Colossal Cave Road project, additional cultural resources investigation is recommended.

In accordance with Desert Archaeology's Publication Style Guide, formal site numbers, containing the state prefix (for example, AZ) and institutional suffix (for example, ASM), are used for the first reference to specific sites in the text, in headings, and in figure and table captions. Other references to the sites use only the site number.

PROJECT AREA LOCATION AND DESCRIPTION

Pima County has proposed improving Colossal Cave Road in the vicinity of Vail, Arizona. The project area is located in Sections 9 and 16 of Township 16 South, Range 16 East on the USGS 7.5' topographic quad Vail, Ariz. (AZ BB:14 [SW]). The area includes the existing Colossal Cave Road beginning approximately 700 feet south of Acacia Elementary School (Figure 1). Roadway improvements will extend north for approximately 0.93 miles to East Cienega High School Drive. Parsons Brinckerhoff specified a project area measuring 75 ft on

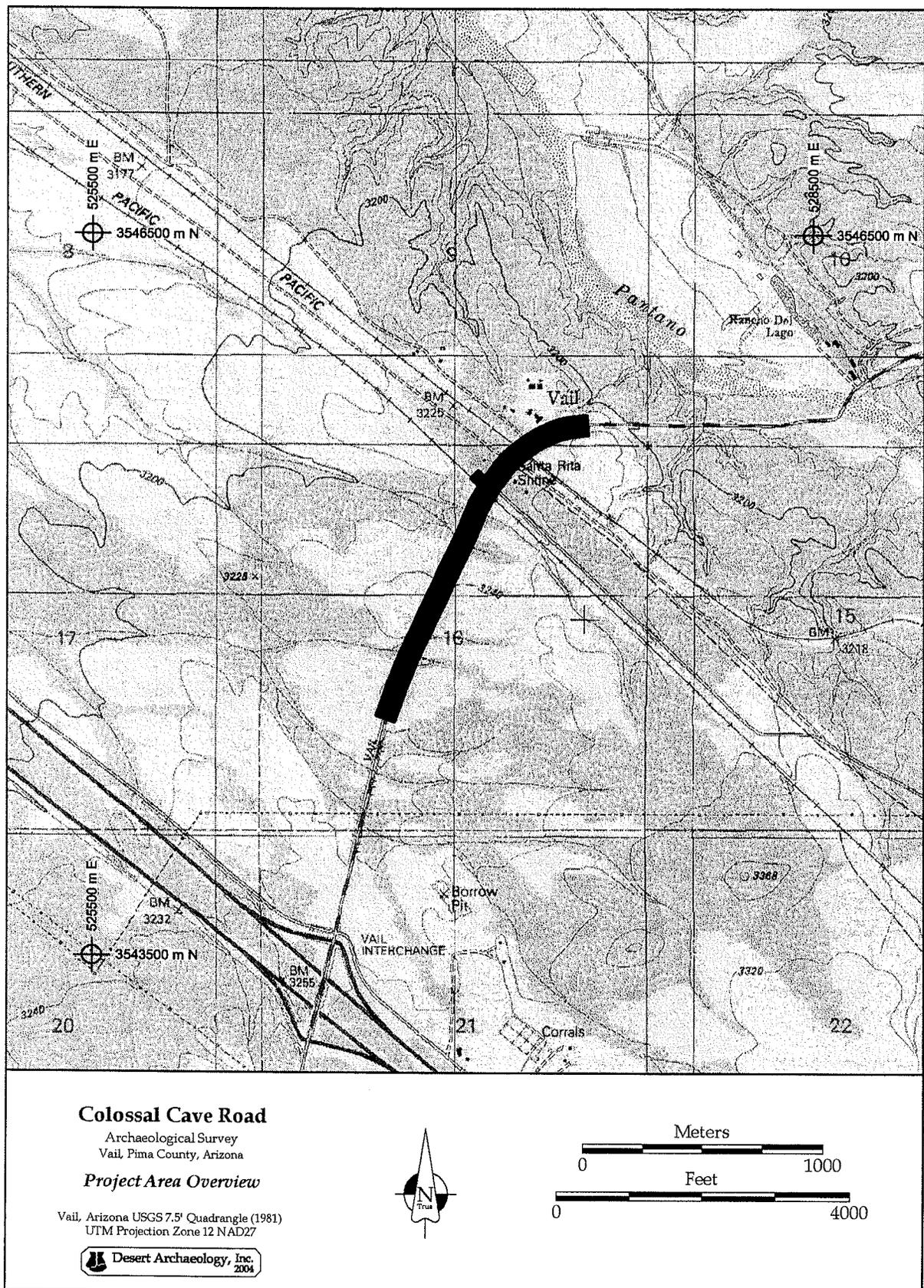


Figure 1. Reproduction of USGS 7.5-minute topograph quad Vail, Ariz. (AZ BB:14 [SW]), showing location of the project area.

either side of the existing Colossal Cave Road centerline in most areas. Approximately 33 acres were surveyed for cultural resources.

The modified Colossal Cave Road right-of-way will be narrower than 150 ft in all but two areas, but the wider corridor was surveyed to cover potential design modifications and alternatives. In the Union Pacific land west of Success Road, the right-of-way for the road will extend along the eastern side of the tracks for a parallel distance of approximately 390 ft within a 75-ft-wide area. At Acacia Elementary, the right-of-way will be extended into driveway areas between 10-15 ft to accommodate changes to the entrances. The proposed right-of-way includes existing Pima County land, State of Arizona land, private property, and rights-of-way of the Union Pacific Railroad.

Road widening and grade improvements are proposed for the existing Colossal Cave Road, a two-lane improved blacktop. Proposed alternatives include: (1) a continuous center turn lane through the length of the project area; (2) a center turn lane that runs between project endpoints and the two railroad crossings, leaving the section of road between the railroad crossings without a center turn lane; (3) drainage improvements through the addition of at least two culverts; (4) possible profile grade improvements that would necessitate an additional three culverts; (5) a possible right-turn lane at Acacia Elementary School; (6) possible sidewalks or multiuse paths through some portions of the project area; and (7) intermittent landscaping improvements. In addition, existing portions of Colossal Cave Road will be resurfaced within the project area. The proposed alternatives in the Draft Design Concept Report dated 10 December 2004 have been analyzed by Parsons Brinckerhoff. However, final plans have yet to be decided. Depending on the options chosen, the width of the road right-of-way—and the extent of impacts—will differ. This report assesses the maximum possible impact as outlined in the proposed plans.

An Area of Potential Effect (APE) can be defined for the Colossal Cave Road improvement project. The APE refers to the “geographic area or areas within which an undertaking may cause changes in the character or use of historic properties” (36 CFR 800.16[d]). This APE includes the footprint of the proposed Colossal Cave Road improvements. It also includes historical properties adjacent to the right-of-way that may be directly or indirectly affected by the work.

ENVIRONMENTAL SETTING OF THE PROJECT AREA

The Colossal Cave Road project area runs perpendicular to the west bank of Pantano Wash. This drainage follows the interface between the bajadas of the Empire and Santa Rita mountains to the south and the Rincon Mountain complex to the north. The project area occupies the distal margin of the southern fan system. In this area, Pantano Wash has cut a series of weakly developed terraces on its west bank. The western end of the project area is characterized by a distinct terrace that overlooks the Pantano bottomlands. Moving southwest, the landform rises gently to a maximum elevation of about 3,240 ft above mean sea level. The project area is crossed by a series of northwest trending minor channels that drain this segment of the bajada.

This reach of the Pantano drainage is characterized by a vegetative pattern that shares characteristics of the Sonoran and Chihuahuan deserts. Where natural vegetation is preserved, communities are well established. Creosotebush is the dominant plant species and is complemented by varying densities of mesquite trees. Mesquite stands typically occupy better-watered settings and areas near human development. The mesquite overstory is sometimes accompanied by acacia and, to a lesser degree, paloverde. Cacti are common, consisting primarily of prickly pear and dispersed fishhook barrel. Ground cover ranges from intermittent to moderately heavy and includes bursage and grasses.

Modern development parallels much of Colossal Cave Road. Major public school facilities are located at the northern and southern extremes, and dispersed commercial development characterizes the central section of the project area. Two rail lines cross Colossal Cave Road and define the nucleus of the historical settlement of Vail, Arizona. In these developed portions of the project area, grading and paving have been widespread, and the modern ground surface is generally obscured or disturbed. Relatively unaffected desert landscape occurs between modern developments. These undeveloped properties are characterized by mixed creosotebush and prickly pear desert scrub and grasses. Vegetation is typically light and affords good to excellent visibility of the ground surface. Relatively undisturbed desert can be found adjacent to Acacia Elementary School and in the lands east of Cienega High School and the Union Pacific Railroad.

CULTURAL BACKGROUND OF THE PROJECT AREA

The history of the Southwest and of the Tucson Basin is marked by a close relationship between people and the natural environment. Environmental conditions have strongly influenced subsistence practices and social organization, and social and cultural changes have, in turn, made it possible to more efficiently exploit environmental resources. Through time, specialized adaptations to the arid region distinguished people living in the Southwest from those in other areas. Development of cultural and social conventions also became more regionally specific, and by A.D. 650, groups living in the Tucson Basin can be readily differentiated from those living in other areas of the Southwest. Today, the harsh desert climate no longer isolates Tucson and its inhabitants, but life remains closely tied to the unique resources of the Southwest. The chronology of the Tucson Basin is summarized in Table 1.

Paleoindian Period (11,500?-7500 B.C.)

Archaeological investigations suggest the Tucson Basin was initially occupied some 13,000 years ago, a time much wetter and cooler than today. The Paleoindian period is characterized by small, mobile groups of hunter-gatherers who briefly occupied temporary campsites as they moved across the countryside in search of food and other resources (Cordell 1997:67). The hunting of large mammals, such as mammoth and bison, was a particular focus of the subsistence economy. A Clovis point characteristic of the Paleoindian period (circa 9500 B.C.) was collected from the Valencia site, located along the Santa Cruz River in the southern Tucson Basin (Doelle 1985:183-184). Another Paleoindian point was

Table 1. Periodization and chronology of the Santa Cruz Valley-Tucson Basin prehistory.

Periods	Phases	Date Ranges
Historic		
American Statehood		A.D. 1912-present
American Territorial		A.D. 1856-1912
Spanish and Mexican		A.D. 1697-1856
Protohistoric		
		A.D. 1450-1697
Hohokam Classic	Tucson	A.D. 1300-1450
	Tanque Verde	A.D. 1150-1300
Hohokam Sedentary	Late Rincon	A.D. 1100-1150
	Middle Rincon	A.D. 1000-1100
	Early Rincon	A.D. 950-1000
Hohokam Colonial	Rillito	A.D. 850-950
	Cañada del Oro	A.D. 750-850
Hohokam Pioneer	Snaketown	A.D. 650/700-750
	Tortolita	A.D. 500-650/700
Early Ceramic	Late Agua Caliente	A.D. 350-500
	Early Agua Caliente	A.D. 50-350
Early Agricultural	Late Cienega	400 B.C.-A.D. 50
	Early Cienega	800-400 B.C.
	San Pedro	1200-800 B.C.
	(Unnamed)	2100-1200 B.C.
Archaic	Chiricahua	3500-2100 B.C.
	(Occupation gap?)	6500-3500 B.C.
	Sulphur Springs-Ventana	7500-6500 B.C.
Paleoindian		11,500?-7500 B.C.

found in Rattlesnake Pass, in the northern Tucson Basin (Huckell 1982). These rare finds suggest prehistoric use of the Tucson area probably began at this time. Paleoindian use of the Tucson Basin is supported by archaeological investigations in the nearby San Pedro Valley and elsewhere in southern Arizona, where Clovis points have been discovered in association with extinct mammoth and bison remains (Huckell 1993, 1995). However, because Paleoindian sites have yet to be found in the Tucson Basin, the extent and intensity of this occupation are unknown.

Archaic Period (7500-2100 B.C.)

The transition from the Paleoindian period to the Archaic period was accompanied by marked climatic changes. During this time, the environment came to look much like it does today. Archaic period groups pursued a mixed subsistence strategy, characterized by intensive wild plant gathering and the hunting of small animals. The only Early Archaic period (7500-6500 B.C.) site known from the Tucson Basin is found in Ruelas Canyon, south of the Tortolita Mountains (Swartz 1998:24). However, Middle Archaic period sites dating between 3500 and 2100 B.C. are known from the bajada zone surrounding Tucson, and, to a lesser extent, from floodplain and mountain areas. Recent investigations conducted at Middle Archaic period sites include excavations along the Santa Cruz River (Gregory, ed. 1999), in the northern Tucson Basin (Roth 1989), at the La Paloma development (Dart 1986), and along Ventana Canyon Wash and Sabino Creek (Dart 1984; Douglas and Craig 1986).

Archaic period sites in the Santa Cruz floodplain were found to be deeply buried by alluvial sediments, suggesting more of these sites are present, but undiscovered, due to the lack of surface evidence.

Early Agricultural Period (2100 B.C.-A.D. 50)

The Early Agricultural period (previously identified as the Late Archaic period) was the period when domesticated plant species were first cultivated in the Greater Southwest. The precise timing of the introduction of cultigens from Mexico is not known, although direct radiocarbon dates on maize indicate it was being cultivated in the Tucson Basin and several other parts of the Southwest by 2100 B.C. (Mabry 2005). By at least 400 B.C., groups were living in substantial agricultural settlements in the floodplain of the Santa Cruz River. Recent archaeological investigations suggest canal irrigation also began sometime during this period.

Several Early Agricultural period sites are known from the Tucson Basin and its vicinity (Diehl 1997; Ezzo and Deaver 1998; Freeman 1998; Gregory 2001; Huckell and Huckell 1984; Huckell et al. 1995; Mabry 1998, 2005; Roth 1989). While there is variability among these sites—probably due to the 2,150 years included in the period—all excavated sites to date contain small, round, or oval semisubterranean pithouses, many with large internal storage pits. At some sites, a larger round structure is also present, which is thought to be for communal or ritual purposes.

Stylistically distinctive Cienega, Cortaro, and San Pedro type projectile points are common at Early Agricultural sites, as are a range of ground stone and flaked stone tools, ornaments, and shell jewelry (Diehl 1997; Mabry 1998). The fact that shell and some of the material used for stone tools and ornaments were not locally available in the Tucson area suggests trade networks were operating. Agriculture, particularly the cultivation of corn, was important in the diet and increased in importance through time. However, gathered wild plants—such as tansy mustard and amaranth seeds, mesquite seeds and pods, and agave hearts—were also frequently used resources. As in the preceding Archaic period, the hunting of animals such as deer, cottontail rabbits, and jackrabbits, continued to provide an important source of protein.

Early Ceramic Period (A.D. 50-500)

Although ceramic artifacts, including figurines and crude pottery, were first produced in the Tucson Basin during the Early Agricultural period (Heidke and Ferg 2001; Heidke et al. 1998), the widespread use of ceramic containers marks the transition to the Early Ceramic period (Huckell 1993). Undecorated plain ware pottery was widely used in the Tucson Basin by about A.D. 50, marking the start of the early Agua Caliente phase (A.D. 50-350).

Architectural features became more formalized and substantial during the Early Ceramic period, representing a greater investment of effort in construction, and perhaps more permanent settlement. A number of pithouse styles are present, including small, round, and basin-shaped houses, as well as slightly larger subrectangular structures. As during the

Early Agricultural period, a class of significantly larger structures may have functioned in a communal or ritual manner.

Reliance on agricultural crops continued to increase, and a wide variety of cultigens—including maize, beans, squash, cotton, and agave—were an integral part of the subsistence economy. Populations grew as farmers expanded their crop production to floodplain land near permanently flowing streams, and it is assumed that canal irrigation systems also expanded. Evidence from archaeological excavations indicates trade in shell, turquoise, obsidian, and other materials intensified and that new trade networks developed.

Hohokam Sequence (A.D. 500-1450)

The Hohokam tradition developed in the deserts of central and southern Arizona sometime around A.D. 500 and is characterized by the introduction of red ware and decorated ceramics: red-on-buff wares in the Phoenix Basin and red-on-brown wares in the Tucson Basin (Doyel 1991; Wallace et al. 1995). Red ware pottery was introduced to the ceramic assemblage during the Tortolita phase (A.D. 500-650/700). The addition of a number of new pottery vessel forms suggests that, by this time, ceramics were utilized for a multitude of purposes.

Through time, Hohokam artisans embellished this pottery with highly distinctive geometric figures and life forms such as birds, humans, and reptiles. The Hohokam diverged from the preceding periods in a number of other important ways: (1) pithouses were clustered into formalized courtyard groups, which, in turn, were organized into larger village segments, each with their own roasting area and cemetery; (2) new burial practices appeared (cremation instead of inhumation) in conjunction with special artifacts associated with death rituals; (3) canal irrigation systems were expanded and, particularly in the Phoenix Basin, represented huge investments of organized labor and time; and (4) large communal or ritual features, such as ballcourts and platform mounds, were constructed at many village sites.

The Hohokam sequence is divided into the pre-Classic (A.D. 500-1150) and Classic (A.D. 1150-1450) periods. At the start of the pre-Classic, small pithouse hamlets and villages were clustered around the Santa Cruz River. However, beginning about A.D. 750, large, nucleated villages were established along the river or its major tributaries, with smaller settlements in outlying areas serving as seasonal camps for functionally specific tasks such as hunting, gathering, or limited agriculture (Doelle and Wallace 1991). At this time, large, basin-shaped features with earthen embankments, called ballcourts, were constructed at a number of the riverine villages. Although the exact function of these features is unknown, they probably served as arenas for playing a type of ball game, as well as places for holding religious ceremonies and for bringing different groups together for trade and other communal purposes (Wilcox 1991; Wilcox and Sternberg 1983).

Between A.D. 950 and 1150, Hohokam settlement in the Tucson area became even more dispersed, with people utilizing the extensive bajada zone as well as the valley floor (Doelle and Wallace 1986). An increase in population is apparent, and both functionally specific seasonal sites, as well as more permanent habitations, were now situated away from the

river; however, the largest sites were still on the terraces just above the Santa Cruz. There is strong archaeological evidence for increasing specialization in ceramic manufacture at this time, with some village sites producing decorated red-on-brown ceramics for trade throughout the Tucson area (Harry 1995; Heidke 1988, 1996; Huntington 1986).

The Classic period is marked by dramatic changes in settlement patterns and possibly in social organization. Aboveground adobe compound architecture appeared for the first time, supplementing, but not replacing, the traditional semisubterranean pithouse architecture (Haury 1928; Wallace 1995). Although corn agriculture was still the primary subsistence focus, extremely large Classic period rock pile field systems associated with the cultivation of agave have been found in both the northern and southern portions of the Tucson Basin (Doelle and Wallace 1991; Fish et al. 1992).

Platform mounds were also constructed at a number of Tucson Basin villages sometime around A.D. 1275-1300 (Gabel 1931). These features are found throughout southern and central Arizona and consist of a central structure that was deliberately filled to support an elevated room upon a platform. The function of the elevated room is unclear; some were undoubtedly used for habitation, whereas others may have been primarily ceremonial. Building a platform mound took organized and directed labor, and the mounds are believed to be symbols of a socially differentiated society (Doelle et al. 1995; Elson 1998; Fish et al. 1992; Gregory 1987). By the time platform mounds were constructed, most smaller sites had been abandoned, and Tucson Basin settlement was largely concentrated at only a half-dozen large, aggregated communities. Recent research has suggested that aggregation and abandonment in the Tucson area may be related to an increase in conflict and possibly warfare (Wallace and Doelle 1998). By A.D. 1450, the Hohokam tradition, as presently known, disappeared from the archaeological record.

Protohistoric Period (A.D. 1450-1697)

Little is known of the period from A.D. 1450, when the Hohokam disappeared from view, to A.D. 1697, when Father Kino first traveled to the Tucson Basin (Doelle and Wallace 1990). By that time, the Tohono O'odham people were living in the arid desert regions west of the Santa Cruz River, and groups that lived in the San Pedro and Santa Cruz valleys were known as the Sobaipuri (Doelle and Wallace 1990; Masse 1981). Both groups spoke the Piman language and, according to historic accounts and archaeological investigations, lived in oval jacal surface dwellings rather than pithouses. One of the larger Sobaipuri communities was located at Bac, where the Spanish Jesuits, and later the Franciscans, constructed the mission of San Xavier del Bac (Huckell 1993; Ravesloot 1987). However, due to the paucity of historic documents and archaeological research, little can be said regarding this inadequately understood period.

Spanish and Mexican Periods (A.D. 1697-1856)

Spanish exploration of southern Arizona began at the end of the seventeenth century A.D. Early Spanish explorers in the Southwest noted the presence of Native Americans living in

what is now the Tucson area. These groups comprised the largest concentration of population in southern Arizona (Doelle and Wallace 1990). In 1757, Father Bernard Middendorf arrived in the Tucson area, establishing the first local Spanish presence. Fifteen years later, the construction of the San Agustín Mission near a Native American village at the base of A-Mountain was initiated, and by 1773, a church was completed (Dobyns 1976:33).

In 1775, the site for the Presidio of Tucson was selected on the eastern margin of the Santa Cruz River floodplain. In 1776, Spanish soldiers from the older presidio at Tubac moved north to Tucson, and construction of defensive and residential structures began. The Presidio of Tucson was one of several forts built to counter the threat of Apache raiding groups who had entered the region at about the same time as the Spanish (Thiel et al. 1995; Wilcox 1981). Spanish colonists soon arrived to farm the relatively lush banks of the Santa Cruz River, to mine the surrounding hills, and to graze cattle. Many indigenous settlers were attracted to the area by the availability of Spanish products and the relative safety provided by the Presidio. The Spanish and Native American farmers grew corn, wheat, and vegetables, and cultivated fruit orchards, and the San Agustín Mission was known for its impressive gardens (Williams 1986).

In 1821, Mexico gained independence from Spain, and Mexican settlers continued farming, ranching, and mining activities in the Tucson Basin. By 1831, the San Agustín Mission had been abandoned (Elson and Doelle 1987; Hard and Doelle 1978), although settlers continued to seek the protection of the Presidio walls.

American Period (1856-Present)

Through the 1848 settlement of the Mexican-American War and the 1853 Gadsden Purchase, Mexico ceded much of the Greater Southwest to the United States, establishing the international boundary at its present location. The U.S. Army established its first outpost in Tucson in 1856 and, in 1873, founded Fort Lowell at the confluence of the Tanque Verde Creek and Pantano Wash, to guard against continued Apache raiding.

Railroads arrived in Tucson and the surrounding areas in the 1880s, opening the floodgates of Anglo-American settlement. With the surrender of Geronimo in 1886, Apache raiding ended, and the region's settlement boomed. Local industries associated with mining and manufacturing continued to fuel growth, and the railroad supplied the Santa Cruz River valley with the commodities it could not produce locally. Meanwhile, homesteaders established numerous cattle ranches in outlying areas, bringing additional residents and income to the area (Mabry et al. 1994).

By the turn of the century, municipal improvements to water and sewer service, and the eventual introduction of electricity, made life in southern Arizona more hospitable. New residences and businesses continued to appear within an ever-widening perimeter around Tucson, and city limits stretched to accommodate the growing population. Tourism, the health industry, and activities centered around the University of Arizona and Davis-Monthan Air Force Base have contributed significantly to growth and development in the Tucson Basin in the twentieth century (Sonnichsen 1982).

Historical Development in the Vicinity of the Project Area

The Vail area has long been synonymous with cattle ranching. Mountain Spring Ranch was established in the 1870s near the confluence of Posta Quemada and Agua Verde creeks and became an early center of commerce and transportation. Now included in the Pima County Colossal Cave Park, this ranch functioned as a stage and mail stop and ultimately included a hotel. Mountain Spring was followed by numerous cattle ranching ventures. One of these operations was the Empire Land and Cattle Company. Among others, early business partners included the Vail brothers, Walter and Edward. With a humble origin of 160 acres on Cienega Creek, the Empire Ranch swallowed up land, becoming one of the largest and most widely known ranches in the Arizona Territory. At its apex, the Empire controlled much of the land lying between the Rincon foothills and the Santa Rita Mountains.

In 1880, the Southern Pacific Railroad laid tracks along the southern bank of Pantano Wash. Named in honor of the landowner, a station was established in the present location of Vail (Figure 2). This train stop was the jumping off point for miners headed into the Santa Rita Mountains and became a source for goods and mail. A small settlement grew up along the tracks, and in 1901, a post office was established. This facility also served as a community center for the early town. Built of mud-brick adobe, the post office building remains standing along Colossal Cave Road.

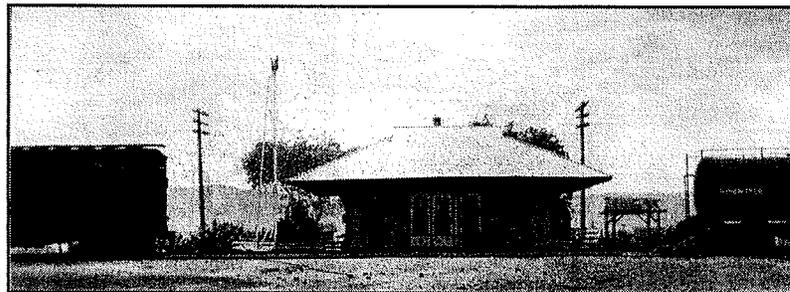


Figure 2. Historical photograph of the Vail Railroad Station

With the death of Walter Vail in 1906, the Empire Ranch dissolved with the same speed it grew. Vast tracts of the Empire Ranch were sold off piecemeal over the next twenty years. In 1928, the Chiricahua Cattle Company bought the remainder of the Empire Ranch, and in turn, divided the land for sale. The Vail area became the center of numerous dispersed ranches, including the Rancho del Lago and Posta Quemada Ranch (formerly the Mountain Spring Ranch).

Vail proper, "the town between the tracks," never became much more than a post office, a train station, a few residences, and fluctuating business enterprises fed by the surrounding ranches. The train stop was abandoned in the early 1950s, but the community of Vail persisted. In recent years, Vail has become the center of considerable rural-suburban growth. Dispersed residential housing has grown up around Vail along Pantano Wash and Cienega Creek. A major housing community and a golf course now occupy the east bank of the Pantano. Aside from two new major public schools, the town of Vail itself has yet to

experience much growth stemming from the influx of recent residential development. Vail currently includes a modern post office, a feed store, a veterinary clinic, and a convenience store. The town still functions much as it did 100 years ago, acting as a central hub for dispersed populations living in the surrounding area.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Previous Surveys

AZSITE, Arizona's cultural resources database, documents 19 previously completed surveys within 1 mile of the Colossal Cave Road project area (Table 2). Investigations consisted primarily of small-to-large block surveys associated with residential and commercial development. Those projects are complemented by a number of right-of-way surveys for roadway and utility development. Two of the linear surveys evaluated Colossal Cave Road and overlap the current project area. Both surveys (ASM Project Nos. 1991-134 and 1999-587) were related to the construction of buried communication lines. An additional linear survey (ASM Project No. 1987-98) and a block survey (ASM Project No. 1996-85) were completed adjacent to Colossal Cave Road and may have included some of the current project area. Further, Archaeological Research Services, Inc. (ARS), completed a Class I literature review for the current Colossal Cave Road project area (Wright 2002).

ASM Project No. 1996-439 is the most important of the previous investigations. Lone Mountain Archaeological Services, Inc. (Lone Mountain), surveyed nearly 2,000 acres along Pantano Wash (Seymour et al. 1997). Including prehistoric and historic-period resources, 25 sites were documented. This project provided a relatively large sample of the local archaeology. Prehistoric sites include pre-Classic and Classic period Hohokam occupations. Components signify small habitation sites and specialized activity locales. These sites typically occupy stable terrace settings that overlook the Pantano floodplain. Habitations were far more common on the eastern bank, while limited-activity sites were characteristic of the western terraces. Historical occupations utilized similar settings and included residential habitations and more ephemeral campsites. Important historic-period resources in the Lone Mountain project area include the mission-style Rancho del Lago buildings (AZ BB:14:662 [ASM]) that have functioned variously as the headquarters of a working ranch, a restaurant, reportedly a brothel, and an early guest ranch. Probably relating to the del Lago, Lone Mountain also investigated the residence of Ned Crane (AZ BB:14:628 [ASM]), an early African American resident of the Pantano valley. Lone Mountain followed the survey with data recovery investigations, but this work has yet to be published.

Previously Recorded Sites

AZSITE documents 32 archaeological sites within 1 mile of the Colossal Cave Road project area (Figure 3). This sample includes 21 prehistoric and 11 historic-period components (Table 3). Sites concentrate along the banks of Pantano Wash, but particularly on the low eastern terraces overlooking the floodplain. Prehistoric sites consist primarily of limited-

Table 2. Summary data for previously completed surveys within 1 mile of the project area.

Project No.	Project Name	Organization	Citation
1955-3	Southern Pacific Pipeline Survey		Holzkamper and McConville n.d.
1982-74	American Legion Post #109	Arizona State Museum	Madsen 1982
1985-98	Vail Pit	Arizona State Museum	
1987-210	Colossal Cave Pantano Bridge	Institute for American Research	Mayro 1987
1987-222	U.S. Telecom Buried Fiber Optic Cable	Dames and Moore	Bruder et al. 1986
1987-98		Arizona State Museum	Madsen 1987
1988-227	MCI Fiber Optic Cable, Rialto to El Paso	Dames and Moore	Bruder et al. 1990
1990-70	Optic Line Adjacent to SR 90 and US 10	SWCA Environmental Consultants	Slaughter 1990
1991-134	Vail South Exchange	Archaeological Consulting Services	Adams 1991
1996-439	Vail Survey	Lone Mountain Archaeological Services	Seymour et al. 1997
1996-85	Old Vail Village	Old Pueblo Archaeology Center	Jones 1996
1999-107	Vail Road TI	EcoPlan	Folb 1999
1999-587	PBNS Level 3 Fiber Optic Line	SWCA Environmental Consultants	Doak 2001
2000-485	Sahuarita Corridor Survey	SWCA Environmental Consultants	Hesse 2001
2000-822	Tucson Maintenance - I-10	Archaeological Research Services	Barnes and Wright 2001
2000-826	AT&T NexGen/Core Project Link 2 Class 3 Survey	Western Cultural Resources Management	Kearnes 2001
2001-266	Miller Proposal Survey	Tierra Right of Way Service	Zaglauer 2001
2002-200	Vail-Sundown Blvd. Cultural Resources Survey	Old Pueblo Archaeology Center	Jones and Dart 2002
2002-63	Vail 270-Acre Survey	Tierra Right of Way Service	Doak 2002
NA	Shrine of Santa Rita Survey	Professional Archaeological Services & Technologies	Stephen 2003

activity sites and dispersed, small residential hamlets. Hohokam Rincon and Rillito phase components are most common, with some occupations during the Classic period. Some site settings and assemblages are suggestive of Archaic or Early Agricultural sites. Sites of this age are abundant along Cienega Creek, a Pantano tributary located to the southeast, but preceramic sites are not widely known near Vail.

Although publication is limited, Lone Mountain's work remains the best sample for prehistoric archaeology in this reach of Pantano Wash (Seymour et al. 1997). Sites recorded by Lone Mountain are temporally and functionally diverse. Investigations demonstrated that habitation sites are common on the lower terraces above Pantano Wash. These sites are small in comparison to village or hamlet sites along the Santa Cruz drainage, but suggest dispersed sedentary populations were intensively utilizing Pantano Wash. The general pattern identified by Lone Mountain consists of 3-10 houses occupying favorable topographic locations with nearby arable lands. Limited-activity locales often lie outside the habitation areas. Habitation sites were found almost exclusively on the eastern bank of the Pantano, while smaller, specialized sites were found on landforms both east and west of the trunk stream.

Table 3. Summary data for previously recorded archaeological sites within 1 mile of the project area.

ASM Site No.	Recording Organization	Site Description	Age
BB:14:16		Habitation	Hohokam
BB:14:18	Dames and Moore	Southern Pacific RR station	Historical (1882-1950)
BB:14:511	Desert Archaeology	Limited habitation	Rincon phase Hohokam
BB:14:604	Old Pueblo ¹	Limited habitation	Historical (1880-1910)
BB:14:611	Lone Mountain ²	Limited habitation	Tanque Verde phase Hohokam
BB:14:612	Lone Mountain	Limited habitation	Rillito or Rincon phase Hohokam
BB:14:613	Lone Mountain	Limited habitation	Rincon phase Hohokam
BB:14:614	Lone Mountain	Limited activity area	Early Agricultural?
BB:14:615	Lone Mountain	Habitation	Colonial/Sedentary period Hohokam
BB:14:616	Lone Mountain	Limited habitation or campsite	Historical (1880+)
BB:14:620	Lone Mountain	Habitation	Rillito to Tanque Verde phase Hohokam
BB:14:621	Lone Mountain	Limited activity area	Prehistoric
BB:14:622	Lone Mountain	Limited habitation	Rillito or Rincon phase Hohokam
BB:14:623	Lone Mountain	Limited activity area	Hohokam
BB:14:624	Lone Mountain	Limited activity area	Hohokam
BB:14:625	Lone Mountain	Limited habitation or limited activity area	Rillito or Rincon phase Hohokam
BB:14:626	Lone Mountain	Limited habitation or limited activity area	Hohokam
BB:14:627	Lone Mountain	Habitation	Rillito or Rincon phase Hohokam
BB:14:628	Lone Mountain	"Ned's Place"-multi-component habitation	Rillito or Rincon phase Hohokam and historical (1880-1910)
BB:14:629	Lone Mountain	Cemetery	Historical (1898-1903)
BB:14:632	Lone Mountain	Limited activity area	Prehistoric
BB:14:633	Lone Mountain	Limited habitation	Rincon phase Hohokam
BB:14:650	Lone Mountain	Limited activity area	Early Agricultural
BB:14:662	Lone Mountain	"Rancho del Lago" cattle and guest ranch	Historical (1880-1950)
BB:14:683	Archaeological Research Services	Limited habitation or limited activity area	Classic period Hohokam
BB:14:684	Archaeological Research Services	Commercial trash scatter; possible service station	Historical (1940-1960)
BB:14:685	Archaeological Research Services	Domestic trash scatter	Historical (1940-1960)
BB:14:703	Professional Archaeological Services & Technologies	Shrine of Santa Rita	Historical (1935)
BB:15:510	Desert Archaeology	Limited activity area	Prehistoric
EE:3:74	Bureau of Land Management	El Paso & Southwestern Railroad	Historical (1912-present)
FF:9:17	Archaeological Research Services	US 80 roadbed	Historical (1932)
Z:2:40		Southern Pacific Railroad	Historical (1880-present)

¹Old Pueblo Archaeology Center²Lone Mountain Archaeological Services

Euro-American occupation of the Vail area has a long history, and documented historical components are diverse. This reach of Pantano Wash played an early role as a transportation and communication corridor. Documented sites around the project area include road and rail features, including a railroad station (BB:14:18). Ranching has been a primary pursuit in this locale going back over 100 years. Sites such as the Rancho del Lago (BB:14:662), Ned's Place (BB:14:628), and other campsites (AZ BB:14:616 [ASM]) evidence this historical land use. Other domestic habitations are known in the area, and community-based sites such as a cemetery (AZ BB:14:629 [ASM]) and commercial enterprises (AZ BB:14:684 [ASM]) have also been documented.

Prior to the start of the present project, seven numbered sites (five historic-period and two prehistoric) were known within the immediate vicinity of the Colossal Cave Road APE. Three of the known sites relate to the railroad. These are the Vail Railroad Station site (BB:14:18) and the alignments of the Southern Pacific (Z:2:40) and El Paso & Southwestern (EE:3:74) railroads. Two relate to the early occupation of Vail. The building used as the first Vail post office is still standing on the western side of the road between the railroad tracks, and the Shrine of Santa Rita (BB:14:703), an active shrine and small church that was built directly across the road in 1934. These five sites were reinspected with the current inventory. The final historical site, AZ BB:14:604 (ASM), is a trash scatter about 400 m east of Colossal Cave Road. It may represent a temporary habitation or campsite. Because of its dating and association with the Southern Pacific rail, recorders have suggested this may have been a railroad line camp.

Two small prehistoric sites are located north of the northern end of the project area. They occupy terrace settings on the margin of Pantano Wash. AZ BB:14:613 (ASM) is a ceramic period site that seems to have functioned as either a campsite or limited habitation area. AZ BB:14:614 (ASM) is a surface site consisting of a limited lithic scatter. It is essentially aceramic, but its affiliation with the Archaic or Early Agricultural period cannot be conclusively demonstrated. These site types are typical for the west bank of the Pantano.

Survey Expectations

On the basis of the culture history of the project area and the results of previous surveys in the area, the Vail area is expected to contain evidence of historic-period occupation including standing buildings, structures, sites, and isolated artifacts. Prehistoric use of the areas away from Pantano Wash appear to have been limited to short-term activities, so sites are likely to be sparse and consist of limited-activity areas with little depositional depth. However, habitation sites are possible and are more likely in the northern portion of the project area. Historic and modern use of the project area would be expected to have disturbed, obscured, or destroyed some cultural remains.

SURVEY METHODS

Parsons Brinckerhoff specified a study area consisting of a 150-ft- (46-m-) wide corridor along Colossal Cave Road from East Cienega High School Drive at the northern end to

approximately 700 ft (213 m) south of Acacia Elementary School. This corridor was intensively surveyed for archaeological and historical remains by Michael Brack on 28 May 2004. Two pedestrian survey transects were completed on each side of the existing Colossal Cave Road. These transects paralleled the roadway and were spaced at no more than 20 m apart. The evaluation included the existing right-of-way and unpaved areas within the survey corridor. Where surface conditions did not afford good ground visibility, adjacent areas were examined for signs of possible buried materials.

A Trimble GPS receiver was used for navigation and the documentation of remains identified in the project area. Archaeological finds and other pertinent geophysical features were mapped with this instrument. These data are the basis for the current project area cartography.

Allison Diehl returned to the project area on 28 January 2005 to inspect two areas shown in a later draft of project plans that will extend outside the previously surveyed 150-ft corridor. The added areas are a portion of the Union Pacific Railroad right-of-way just west of Success Road and driveway areas at the front of Acacia Elementary School in the proposed new right-of-way.

Historical architect Janet H. Parkhurst was consulted for an assessment of the old Vail Post Office and the Shrine of Santa Rita. She completed her fieldwork on 1 June 2004. This consisted of a physical inventory of the structures and onsite personal interviews with the owners/caretakers.

SURVEY RESULTS

Approximately 33 acres were evaluated for the Colossal Cave Road project (Figure 4). Survey expectations for the area were confirmed: no new sites were identified. However, portions of five previously known cultural properties within the APE were reinspected: the Vail Railroad Station site (BB:14:18), the Southern Pacific Railroad tracks (Z:2:40), the El Paso & Southwestern Railroad tracks (EE:3:74), the old Vail Post Office (reported in Wright 2002), and the Shrine of Santa Rita (BB:14:703).

The five sites were identified, mapped, and photographed during the archaeological survey of Colossal Cave Road. Allison Diehl completed ASM site cards for the Shrine of Santa Rita (BB:14:703) and the old Vail Post Office (BB:14:708) (Appendix A). Janet Parkhurst evaluated the significance of the historic buildings on the two sites and recorded more detailed architectural information. State of Arizona Historic Property Inventory Forms completed by Janet Parkhurst are presented in Appendix B and are summarized below. Pedestrian survey also documented 34 historic-age isolated artifacts and a single modern roadside shrine/memorial feature.

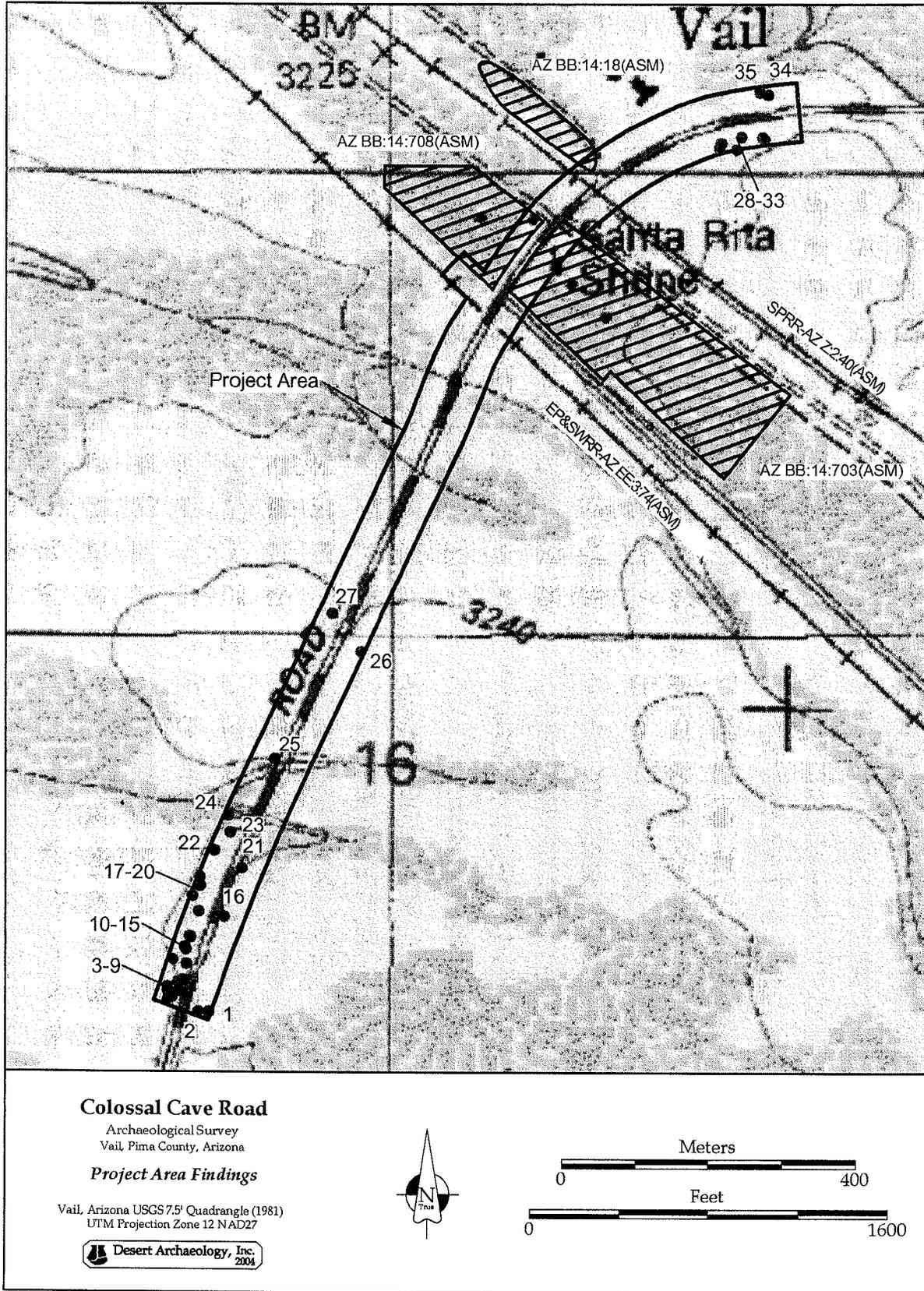


Figure 4. Project area findings – sites and isolated artifacts.

AZ BB:14:18 (ASM), Vail Railroad Station site

This site was initially recorded in 1961 and was reassessed in 1989 during a survey of the Union Pacific Railroad right-of-way by Dames and Moore. That survey, related to the installation of a fiber optic system, resulted in limited data recovery (Bruder et al. 1990).

Remains of the Vail Railroad Station are located immediately north of the original Southern Pacific rail grade, approximately 120 m northwest of Colossal Cave Road (Figure 5). The site lies between service roads that parallel the railroad tracks. The site is manifested primarily as two artifact concentrations, remains of the station facilities, and a small cemetery plot. The 1989 recording of BB:14:18 discussed the small cemetery located immediately northwest of the railroad station property, but these remains were not assigned an archaeological site number. As a result of the current survey, the boundary of BB:14:18 has been enlarged to include the cemetery. BB:14:18 measures approximately 210 m by 40 m and encompasses 1.8 acres. Much of the site is overgrown with scrub vegetation, and some of the site has been graded.

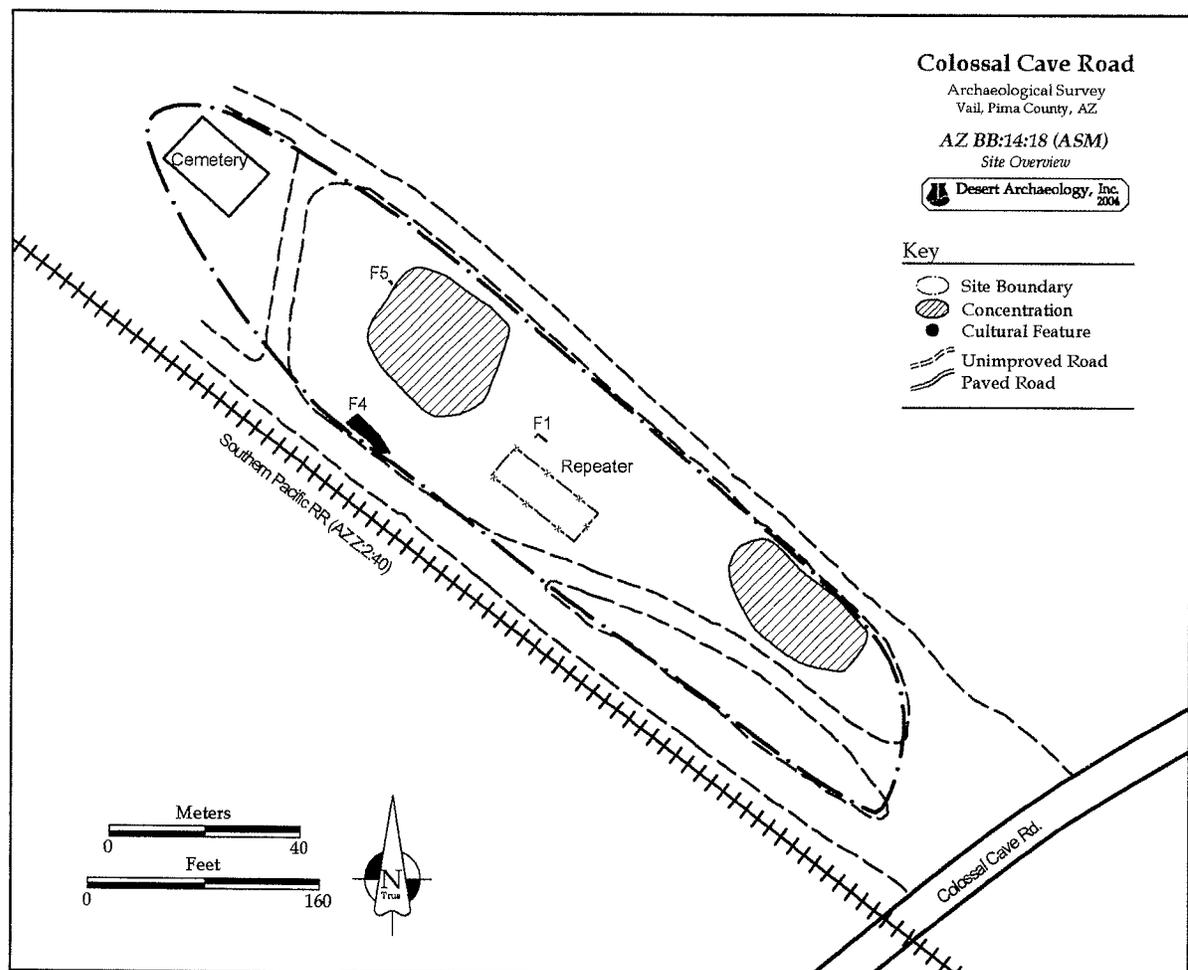


Figure 5. Site map of AZ BB:14:18 (ASM).

Dames and Moore reported six features during their data recovery investigations (Bruder et al. 1990:96-112). The concrete foundation of the station building (Feature 1) is located centrally in the site. A well and a probable utility box (Features 2 and 3) were a few meters to the east. Feature 4 is a disturbed concrete pad. Its size and location are consistent with a passenger or freight-loading platform. At the far western portion of the site, Feature 5 is a low pile of rounded river cobbles. This material is similar to the capstones of the nearby, marked graves, and Feature 5 could be a material store for the cemetery. Feature 6 is located between the station (Feature 1) and the loading platform (Feature 4). It consists of a concrete slab with a 3-inch-hole or socket in its center. It is thought to have been the base for a flagpole or utility pole.

Dames and Moore also identified four small artifact concentrations clustered centrally between Features 1, 4, and 5 (Bruder et al. 1990). These were interpreted as disturbed trash pits, and diggings from bottle hunters were noted. Additionally, dispersed trash was found over the length of the site; much of this material was thought to be mixed with modern dumping.

The small cemetery noted outside the northwest margin of BB:14:18 was estimated to include 22 graves. Graves were marked with oblong piles of river cobbles, and nine of the features included green wooden crosses. The plot was fenced and apparently was being maintained. During the Dames and Moore survey, there was no investigation beyond surface recording.

Construction of a fiber optic repeater station required more intensive study (Bruder et al. 1990), and data recovery at BB:14:18 focused on artifact collection and feature recording. A sample of diagnostic artifacts was collected over the entire site using four systematic collection units. Diagnostics were also collected from each of the four artifact concentrations. Feature 1 was documented, but it is unclear whether fill within the foundation was excavated by Dames and Moore. A single hand-unit had been excavated in the area of the proposed repeater station. This unit was found to be essentially sterile (Bruder et al. 1990).

Surface collections recovered 415 artifacts. These included glass, metal, and ceramics. The vast majority of identified materials were dinnerware. Food and beverage containers, bleach bottles, construction materials, and medicine bottles made up the remainder of the sample. Date ranges could be assigned to 31 of the artifacts. They suggest the identified trash deposits are associated with the later occupation of the station and date roughly between 1920 and 1950 (Bruder et al. 1990:110).

The historic Vail Railroad Station site was assessed again as a part of the Colossal Cave Road improvement project. Locational information for BB:14:18 archived by ASM was found to be incorrect. The site is oriented roughly northwest to southeast, but ASM documents the site as paralleling Colossal Cave Road, approximately 90 degrees from its actual orientation. Site information has been updated to correct this error.

The current condition of the site is comparable to documentation provided by Dames and Moore (Bruder et al. 1990). The repeater station has been built, and consists of a series of small, semipermanent structures surrounded by a chain link fence. It occupies a built-up gravel grade in the central portion of the site. Construction of this facility essentially

destroyed Feature 1, the station building. The only remaining surface evidence of the building is a 3-m-long segment of stem wall from the northwestern corner of the building. Features 4 and 5, the loading platform and a rock pile, were found as previously described. Features 2, 3, and 6 could not be relocated. This may have been due to the dense vegetation, but some or all of the features were likely destroyed during construction of the repeater.

Artifacts occur over the extent of the sites, but densities are typically low except for two concentrations. The eastern concentration was not reported earlier, while the western feature is consistent with the four artifact clusters defined by Dames and Moore (Bruder et al. 1990). The eastern artifact concentration is made up mainly of food cans. These artifacts include solder-dot milk cans, and fewer quantities of hole-in-cap meat cans and sardine cans. A few lard and coffee cans are also present. Industrial metal debris such as flat iron and steel banding are also present and probably came directly from the railroad. Modern refuse occurs in this same area, making it difficult to discriminate from the historical station trash. A harmonica reed was found at the western end of this scatter. Harp reeds are a relatively common find at historic-period sites.

The western concentration is characterized by much higher quantities of ceramic and glasswares. White ware, fiesta ware, and crockery were noted. Sun-colored amethyst glass was found frequently, along with examples of zinc-cap quart canning jars. Food and tobacco cans occur in the eastern concentration, but are notably less dense than in the west. Similarly, there seems to be less intrusive modern trash with the western concentration. Bottle hunters have disturbed much of this area. Backdirt piles and excavations pockmark the concentration, but indicate there is depth to this midden feature.

At the far west of the site is the small, fenced cemetery plot. It has changed superficially during the 10 years since Dames and Moore visited the site (Bruder et al. 1990:101). A new chain link fence encloses a 12-m by 18-m area containing about 20 graves. In 1990, green crosses adorned some of the graves; currently, the crosses are painted white. Graves remain capped with river cobble cairns, and there is no evidence of vandalism or disturbance. The property is owned by the Vail School District (Pima County Tax Parcel No. 30510005A). Dames and Moore suggested this was an informal pauper or railroad cemetery (Bruder et al. 1990), although there is no evidence of its origin. The style of grave construction would be consistent with practices of the late nineteenth to the early half of the twentieth century. As a result of the Colossal Cave Road project, the site boundary of BB:14:18 is being expanded to encompass this cemetery plot.

AZ Z:2:40 (ASM), Southern Pacific Railroad

The Southern Pacific mainline ran from Yuma to the New Mexico border. Construction began in Yuma in 1877, and the line spanned the entire state by 1881. Track was laid through Vail early in 1880. Servicing passengers and freight, a station stop was established on the western bank of Pantano Wash (BB:14:18). This became the seed for the settlement of Vail. The Vail station was abandoned in 1955 (Myrick 1975:109), but Southern Pacific trains continued to pass through Vail. The rail line was ultimately absorbed by the Union Pacific and continues to carry westbound traffic on a modern rail line.

Z:2:40, the Arizona site designation for the Southern Pacific Railroad, follows the modern right-of-way for the northern track of the Union Pacific Railroad. Existing conditions in the Vail right-of-way suggest little possibility for any preservation of the historical railroad mainline. The Union Pacific rail is built on a modern, rock-ballasted grade with recently laid concrete ties. In addition to the mainline, there is a dead spur that ends just south of Colossal Cave Road. It comes off the mainline about 450 m to the southeast and parallels the other rail. This segment of rail is obviously older and has not been recently refurbished. Although a different material, this grade is also ballasted with crushed rock. Wooden ties carry the rail, and fasteners are of an antiquated design.

The 1957 USGS Rincon Valley, Arizona 15-minute topographic quadrangle depicts a siding in this same location. This source shows the siding continuing about 400 m north of Colossal Cave Road and rejoining the mainline. Myrick has published a series of photographs documenting the construction and refurbishment of rail on the Southern Pacific (1975:110-111). These photographs were taken in 1959 and 1960 and clearly show similar construction and hardware as was used on the Vail siding. It is reasonable to think the Vail siding was built (or rebuilt) during this same time period. The 1981 USGS Vail, Arizona 7.5-minute topographic quadrangle (based on 1975 aerial photographs) depicts this same feature in its present configuration as a dead spur rather than a siding.

AZ EE:3:74 (ASM), El Paso & Southwestern Railroad

This site documents the historical alignment of the El Paso & Southwestern Railroad between Fairbank and Tucson. EE:3:74 follows the modern grade of the southern track of the Union Pacific Railroad. The railroad intersects the Colossal Cave Road project area about 250 m south of the Vail Railroad Station site (BB:14:18) and is the southern limit of the historical Vail settlement.

This rail line was originally constructed to link copper mining around Bisbee with the Southern Pacific mainline (Myrick 1975). In 1912, rail was laid from Benson to Vail, and ultimately into Tucson, where it joined rail of the Southern Pacific Railroad. This track was known as the Tucson Extension of the El Paso & Southwestern. In 1924, the El Paso line merged with Southern Pacific and ultimately became part of the Union Pacific rail system. Much of the El Paso & Southwestern has been abandoned or torn up, but the Vail portion of the alignment has not been rerouted. This grade still carries westbound rail traffic for the modern Union Pacific, albeit on a modern track and grade.

Existing conditions in the modern Union Pacific Railroad right-of-way are such that any preservation of original El Paso & Southwestern grade or track is unlikely near Vail. The existing feature is a modern, high-speed rail line. It is deeply ballasted with crushed rock rather than the furnace slag typical for historic-period grades in southeastern Arizona. Ties, rail, and other accessories are obviously modern, and there is no evidence of any other secondary grade in the railroad right-of-way. This set of tracks has a crossing at Colossal Cave Road, which is securely of modern construction. The El Paso & Southwestern Railroad undeniably passed through the project area and shared the same alignment as the modern Union Pacific right-of-way; however, there is no evidence of the earlier structure.

AZ BB:14:708 (ASM), Old Vail Post Office

The old Vail Post Office is a simple adobe brick building located north of Colossal Cave Road between the two tracks of the Union Pacific Railroad (Figure 6). It is located on the 4.82-acre property of the Vail Feed Store and is owned by Patricia and Jonathan Kelley. The building is currently being used for storage. The structure is approximately 17 m north of the existing Colossal Cave centerline and 13 m from the edge of pavement. The entire structure lies within the area surveyed for this project.

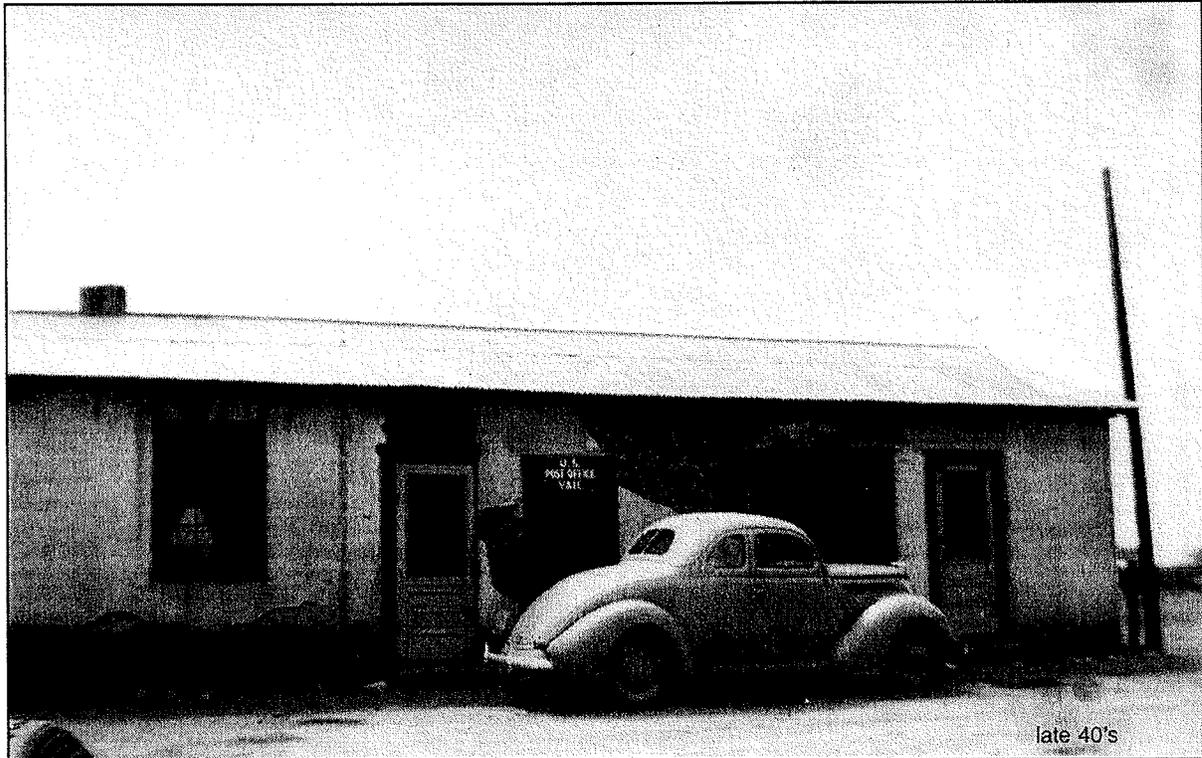


Figure 6. Historical photograph of the Old Vail Post Office taken in the 1940s (courtesy of Roger Anyon, Pima County).

The building is rectangular in plan and lies perpendicular to Colossal Cave Road (Figure 7). The original structure, reportedly constructed in the 1890s, was a 31-ft by 21-ft mud brick adobe with a stucco exterior. Historical photos depict a flat, sparsely vegetated setting. In the 1920s, a 19-ft by 21-ft cobble walled addition with a stucco exterior was added. The building has a side gabled roof, sheeted with corrugated metal that was probably installed with the addition. The interior of the original mud brick structure is finished with mud plaster, while walls of the newer addition are cement plastered. The interior ceiling is capped with a layer of earth, presumably as insulation. A 1973 newspaper article indicates that gas and electricity were installed in the late 1950s (Keating 1973). The utilities apparently fell into disuse, because the current owners report that they installed electricity to the structure in 1976. In that same year, cement was poured, replacing the original dirt floor.

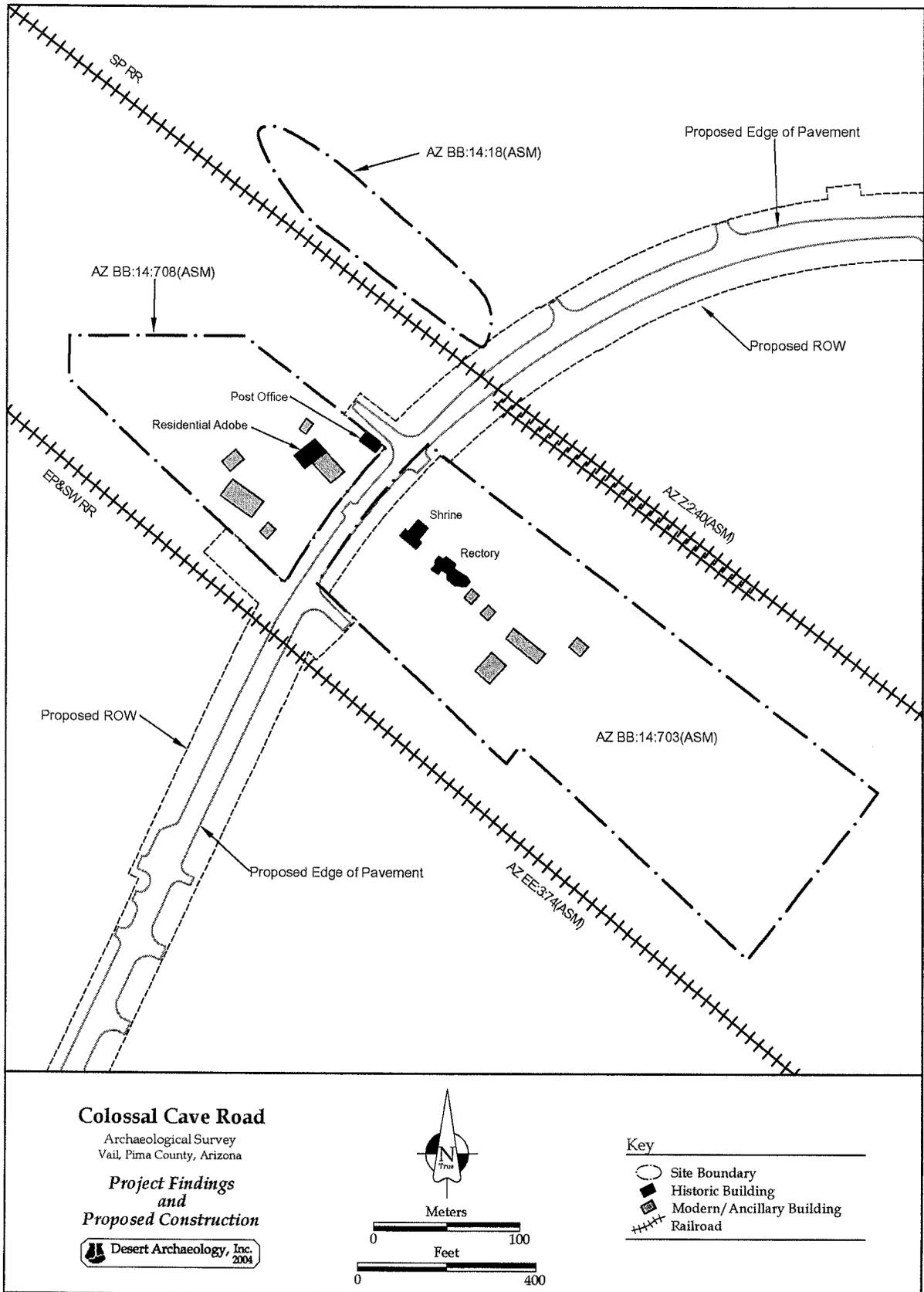


Figure 7. Site map of AZ BB:14:703 (ASM) and AZ BB:14:708 (ASM), showing proposed new right-of-way.

Recounting the 39-year career of the Vail postmistress, a 1973 newspaper article identified this old adobe as the post office and its residential quarters (Keating 1973). Based on local informants, the current property owner determined the structure was probably built in the late 1890s, although Vail did not have an official post office until 1901. The building is reported to have been first used as a saloon (Stiles 1980) and ultimately served as a general store and post office until 1974. Although a small community grew up around the train stop and post office, the old Vail Post Office is the only pre-1900 standing structure that remains preserved at Vail.

Historical architect Janet H. Parkhurst, identifies this as an excellent example of regional vernacular architecture (Appendix B). Its form and technology are representative of late 1800s and early 1900s construction and would be typical for southeastern Arizona. The building is structurally sound but is deteriorating primarily due to vacancy. The weathering of 100-plus years has taken its toll. The building is historically significant because of its association with the early settlement of Vail and its architectural qualities. A new ASM site number was assigned to this property as part of this project (BB:14:708).

The old Vail Post Office property boundary is congruent with the boundary of the 4.82 acre parcel in which it is located (Pima County Assessor's ID No. 305-13-0520). The property now contains several newer buildings, including an adobe former ranch house dating to the 1930s or 1940s. Because this building is outside the scope of the project, it was not intensively documented or researched. Further, the modern buildings on the property (post-1975) were not documented.

AZ BB:14:703 (ASM), Shrine of Santa Rita

The Shrine of Santa Rita is a small Catholic chapel located immediately south of Colossal Cave Road between the Union Pacific tracks (see Figure 7). It was assigned a site number in 2003 (Stephen 2003), although a site card was not submitted to the ASM at that time. The property measures about 13 acres and has a number of examples of Spanish Colonial Revival architecture, including the chapel itself and a rectory. One of the more recent buildings incorporated the frame of an early 1900s schoolhouse, moved from its original location. The chapel grounds also include a number of Colonial Revival courtyards defined by stucco walls. The only standing building located within the APE of the Colossal Cave Road improvement project is the chapel. The chapel is located about 29 m south of the existing centerline and 25 m from the edge of the pavement. About one-half of the chapel lies within the 150-ft-wide corridor surveyed for this project.

The Shrine of Santa Rita was constructed as a memorial to Dr. Jokichi Takamine, by his widow Caroline Hitch. Takamine was a noted Japanese medical researcher, remembered primarily for arranging a gift of cherry trees between Tokyo and Washington, D.C., in 1912. These cherry trees are an important feature of Washington, D.C., and remain a springtime tourist destination. Following Takamine's death in 1922, Caroline Hitch began plans to memorialize her late husband. She later married Vail rancher Charles Beach.

Designed by H.D. Figge, the Shrine of Santa Rita was constructed between about 1930 and 1935. It is a Spanish Colonial Revival style complex of adobe structures characterized by flowing lines of white-stuccoed architecture and red mission-style roof tiles (Figure 8). Small walled courtyards adjoin the structures and divide the property into distinct spaces. The chapel is characterized by stained glass windows (purchased from the First Methodist Church in Tucson), arched doorways with carved wooden doors, scored concrete floors, and exposed trusses.



Figure 8. Photograph of the Shrine of Santa Rita taken during its dedication in 1935 (courtesy of Roger Anyon, Pima County).

The shrine was envisioned as a memorial serving local Hispanic families who generally worked the ranches, mines, and railroads around Vail. With a low population in Vail, the church was too small to warrant its own priest. Between 1935 and 1968 the shrine was a Franciscan mission serviced by priests from Tucson. Following 1968, the chapel became a Salvatorian Parish with a resident padre. The chapel seats approximately 100 parishioners, and services are still held at the Shrine of Santa Rita. The shrine has served and still functions as a religious and cultural center for Vail residents. Although the chapel is not widely known outside of Vail, it is a destination for international tourists familiar with Jokichi Takamine.

Photographs taken at the dedication of the shrine in 1935 indicate the building site had been cleared of most native vegetation (see Figure 8). Several saguaros and yucca plants appear to have been transplanted around the perimeter of the building within 5 ft of the walls. Additional landscaping was added later. The shrine is situated on a church-owned parcel that includes additional buildings and structures, some historic and some recent. The only historical landscaping associated with the property is adjacent to the standing historic-period buildings. Vegetation growing within the proposed Colossal Cave Road right-of-way is not historical and does not contribute to the significance of the property.

Janet H. Parkhurst identified the Shrine of Santa Rita as a significant example of Spanish Colonial Revival architecture (Appendix B). It exhibits excellent workmanship and classic architectural details of the Revival style. Further, the shrine has functioned as a community symbol and center for Vail since 1935. An ASM site card was completed for BB:14:703 as a part of this project and is presented in Appendix A.

For the purposes of this assessment, the Shrine of Santa Rita property boundary corresponds with the boundary of the parcel in which it is located (Pima County Assessor's ID No. 305-13-053A). This parcel measures 13.24 acres and was once part of a larger parcel measuring 15.94 acres. In the 1980s, a series of subdivisions and recombinations of smaller parcels resulted in the legal boundary in effect today. The property includes the chapel and all associated buildings. The Verhagen building (1990s) is considered a modern intrusive element on the property. The modern building constructed around the relocated frame of an early 1900s schoolhouse building also fails to contribute to the historical significance of the property.

Colossal Cave Road

A previously completed literature survey for the Vail project area identified Colossal Cave Road as a possible historical cultural resource (Wright 2002). Archaeological Research Services, Inc., reported the current road was constructed prior to 1935, probably during the Depression-era development of Colossal Cave Park by the Civilian Conservation Corps. The historical character of Colossal Cave Road was assessed during the project area survey. Historic-period features associated with the roadway were not discovered, and it has certainly been resurfaced since initially constructed. Only the alignment and road grade itself might be related to the original road construction, but this is a speculation. There is no physical evidence along Colossal Cave Road to warrant documenting this feature as an archaeological site or historical feature.

Isolated Occurrences

Thirty-five isolated occurrences (IO) were documented during the survey of Colossal Cave Road (Table 4). The isolates include 34 historic-period artifacts and a single modern roadside memorial (see Figure 4). Isolated artifacts cluster in two general areas. The southern group of artifacts is distributed primarily west of Colossal Cave Road in the southernmost 600 m of the project area. This group of isolates represents a concentration of 1950s to 1960s beverage cans. IO 1 through IO 27 were documented as a sample of this scatter. Twenty-one aluminum-top steel beer cans were mapped. As only a sample, this is about one-third of the total count of this can type that occurs in the scatter. These are church-key opened cans, and about an equal number of pull-tab aluminum-top steel cans are present. As a whole, the cans are so consistent that the scatter probably reflects a single source rather than general roadside dumping. The empty cans likely became scattered on the landform by wind and slopewash over the years.

Table 4. Isolated occurrences documented in the project area.

Isolate No.	Isolate Type	Easting ¹	Northing ¹
1	Oval tobacco can	526757.97	3544485.72
2	Church key-opened beer can	526743.78	3544486.18
3	Square metal food canister	526701.11	3544502.75
4	Church key-opened beer can	526707.97	3544506.19
5	Church key-opened beer can	526716.76	3544514.19
6	Church key-opened beer can	526700.86	3544514.33
7	Church key-opened beer can	526700.77	3544520.70
8	Church key-opened beer can	526715.63	3544526.72
9	Church key-opened beer can	526722.23	3544529.23
10	Church key-opened beer can	526727.70	3544550.99
11	Church key-opened beer can	526709.22	3544556.55
12	Solder-dot milk can	526726.81	3544570.45
13	Church key-opened beer can	526725.41	3544573.75
14	Church key-opened beer can	526733.39	3544587.20
15	Church key-opened beer can	526731.50	3544587.98
16	Church key-opened beer can	526778.96	3544614.51
17	Church key-opened beer can	526744.37	3544621.63
18	Church key-opened beer can	526735.85	3544642.53
19	Arizona automobile tag (1959)	526746.56	3544656.27
20	Church key-opened beer can	526745.99	3544668.09
21	Church key-opened beer can	526802.54	3544680.17
22	Church key-opened beer can	526765.66	3544703.77
23	Church key-opened beer can	526787.21	3544728.25
24	Church key-opened beer can	526784.33	3544751.50
25	Modern shrine	526847.33	5444828.21
26	Church key-opened beer can	526965.41	3544974.22
27	Lard can	526926.37	3545026.65
28	Sanitary food can	527478.16	3545656.16
29	Stovepipe collar	527455.03	3545657.73
30	Solder-dot milk can	527457.37	3545664.49
31	Hole-in-cap meat can	527515.77	3545669.74
32	Oval tobacco can	527513.13	3545672.30
33	Coffee can	527484.72	3545673.06
34	Solder-dot milk can	527520.93	3545730.98
35	Sanitary food can	527509.52	3545734.20

¹UTM Zone 12N NAD27

A 1959 Arizona automobile tag (IO 19) was also found in the scatter and it is directly comparable in age to the cans. A few older artifacts also occur in the southern concentration of isolates. A square metal canister (IO 3), an oval hinge-lid tobacco can (IO 1), a solder-dot milk can (IO 12), and a lard can (IO 27) were recorded. These artifacts are more consistent with a 1910 or 1920 to 1940 date.

These older artifacts are similar to those found with the northern cluster of isolates. This group of eight isolates concentrates at the extreme northern end of the project area and were deposited on a high terrace surface overlooking Pantano Wash. Artifacts in this area include

two sanitary cans, two solder-dot milk cans, a meat can, a coffee can, and a tobacco can. A stovepipe collar was also recorded. These artifacts would all be consistent with a 1910 to 1940 date. Limited historic-period can scatters are typical for the terraces along Pantano Wash. A similar historical surface sample was present at nearby BB:14:614 when that site was tested. These dispersed historical remains may represent isolated trash dumps or possibly limited cowboy camps.

The final isolate, IO 25, is a modern roadside shrine. It is located toward the southern end of the project area in the western right-of-way of Colossal Cave Road. The marker memorializes Bruce Folkers and carries a 2004 date. Mr. Folkers died from injuries resulting from an automobile accident at this locale. The shrine consists of a large natural boulder with a plaque. The boulder is topped with a simple cross.

SIGNIFICANCE ASSESSMENT

National Register of Historic Places

The National Register of Historic Places (National Register) is the nation's inventory of historic sites. It was established after the passage of the National Historic Preservation Act (NHPA) of 1966 to promote preservation and study of historic resources. Most projects involving federal agencies, federal land, or federal funds require evaluation and mitigation of their impacts on properties eligible for the National Register. In addition, many state and local laws, ordinances, and regulations require similar evaluations. Pima County follows procedures set forth under the NHPA to evaluate the effect of county-funded undertakings on cultural resources. However, the assessment conducted for this project is not a federally mandated process.

In order for a property to be listed in the National Register, it must meet integrity requirements and at least one of four significance criteria. These criteria are summarized in Table 5. An important aspect of significance is a property's historic context (cultural

Table 5. National Register eligibility criteria (Code of Federal Regulations, Title 36, Part 60).

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad pattern of our history; or
 - B. That are associated with the lives of persons significant in our past; or
 - C. That embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
 - D. That have yielded, or may be likely to yield, information important in prehistory or history.
-

affiliation and dates of use). If a historic context cannot be established, or if the property cannot be shown to be significant within its historic context, then it does not meet eligibility requirements for the National Register. Further, except in special circumstances, properties must be at least 50 years old to be considered for inclusion in the National Register.

Assessment of AZ BB:14:18 (ASM)

This site includes the remains of the Vail station of the Southern Pacific Railroad and a small cemetery plot. The site was previously investigated by Dames and Moore (Bruder et al. 1990). AZSITE records indicate the site has not been evaluated for National Register eligibility. However, the choice by Dames & Moore to conduct data recovery at the site after an initial assessment implies they found it met National Register eligibility criteria for information potential (Criterion D) at that time. Modern construction has affected the integrity of the railroad station, but the cemetery remains intact. Surface structural features are present at the site, and indicators suggest there are subsurface trash deposits associated with this locale. Additional subsurface features are possible.

The Vail Railroad Station site relates to early transportation and communication development in southeastern Arizona. The railroad was critical to the development of commerce and industry in a regional scope. Locally, the railroad fostered the development of the Vail settlement and supported numerous outlying ranches and mines. Further, the rail station was an important element of the Vail community, supplying a means of transport and a source of mail and supplies. Little is known about the Vail station stop. Basic resources for southern Arizona railroading do not address the Vail station beyond its construction date (Myrick 1975). Other similar stops, such as those at Pantano and Mescal, were photographed and are at least minimally documented in archival sources (Myrick 1975).

Although the condition of the Vail Railroad Station site is variable, BB:14:18 meets eligibility requirements for the National Register under Criterion D for its potential to produce significant information about the little-known station, the people who used it, and its role in the larger network of railroad lines and contemporaneously used stations. Integrity of the site is best in the vicinity of the cemetery, and there are sufficient remaining archaeological remains to warrant further study of the site. The station site does not meet eligibility requirements for Criterion A because without standing structures or buildings, it lacks integrity of feeling and association. Further, the site is not associated with any individuals who figured prominently in history (Criterion B), nor does the site possess significant artistic or design characteristics (Criterion C).

Assessment of AZ EE:3:74 (ASM)

The section of the El Paso & Southwestern Railroad that runs through the project area was constructed in 1912. The tracks and railroad bed have been refurbished, and the line continues to carry rail traffic. The rail grade was inspected, but historic-period remains were

not discovered within the APE. The railroad is currently a modern high speed rail line lacking evidence of the historic-period grade and components.

The El Paso & Southwestern Railroad Tucson to Benson line has been found to meet eligibility criteria for the National Register for its significance in historic railroad transportation to Tucson and southern Arizona (Criterion A). The Arizona State Historic Preservation Office has determined that the section of tracks in the vicinity of downtown Tucson retains sufficient integrity to convey this significance because it retains some original components (Collins 2004). Within the current APE, the historic line has been heavily modified. It lacks the integrity of materials and feeling necessary to convey significance under Criterion A. It is also possible that integrity of location has been impacted by slight changes in alignment. The crossing at Colossal Cave Road retains some integrity of association owing to the line's continued use and its contiguity with the rest of the line. Therefore, while EE:3:74 meets National Register eligibility criteria, its integrity at different points on the line is highly variable.

Assessment of AZ Z:2:40 (ASM)

Z:2:40 is the site number assigned to the 400-mile Southern Pacific Railroad mainline that runs across southern Arizona. The line, built between 1878 and 1881, forms an important part of the transcontinental railroad system. Its completion allowed for economic transportation into and out of Arizona Territory, permitted the development of large-scale mining activities, contributed to the expansion of agriculture, and led to increased tourism and settlement.

The Vail segment of Z:2:40 was built in 1880. The railroad brought about the development of the settlement of Vail and contributed to the growth of ranching and mining in this area. The rail line has been refurbished. A second set of tracks is present at the Colossal Cave Road crossing. This was once a siding of the Southern Pacific but is currently a dead spur. This rail can be traced as far back as 1918, but the alignment may be older. Myrick (1975) documents a major refurbishment of the Southern Pacific in the late 1950s and early 1960s. Field inspections reveal that the spur/siding was probably refurbished during that time.

The Southern Pacific Mainline (Z:2:40) meets significance criteria for the National Register under criterion A for its role in the expansion of transcontinental railroading in the late nineteenth century and for its contributions to the expansion of mining, agriculture, tourism, and settlement in Arizona. Overall integrity of Z:2:40 is variable across the state. In the Colossal Cave Road project area, only the historical alignment has been well preserved. The bed, tracks, and other associated components are all modern, and the setting of the Colossal Cave Road crossing has changed. The segment does not contribute appreciably to the overall historical significance of the line.

Assessment of AZ BB:14:708 (ASM)

The old Vail Post Office is a small stuccoed adobe structure located central in Vail. Records suggest that it was built in the 1890s, with a major renovation in the 1920s. The building functioned initially as a general store and possibly a saloon. Beginning in 1901, the building served as a U.S. post office until 1974.

Janet Parkhurst (Appendix B) found the old Vail Post Office meets eligibility requirements of the National Register. She cites the importance of this building in the development of the Vail settlement as a center of commerce and postal service. Further, this building is architecturally significant as an outstanding example of its style. The old Vail Post Office meets eligibility requirements of the National Historic Register under Criteria A and C.

Assessment of the AZ BB:14:703 (ASM)

The Shrine of Santa Rita is a small, active Catholic church located centrally in Vail. It includes a Spanish Colonial Revival chapel, rectory, and patios located on a 13.24 acre property that also contains modern buildings and a building constructed around the re-located frame of an 1890s schoolhouse. The chapel was constructed as a memorial to a Japanese physician in the early 1930s. It is reported to have been built to serve poor Hispanic labors and has become a community center for Vail. In 2003, the property was assessed as potentially eligible for inclusion on the National Register under Criterion A, B or C, but a detailed assessment was not carried out (Stephen 2003:4).

Janet Parkhurst (Appendix B) identifies the chapel building as an excellent example of the Colonial Revival style with excellent structural integrity. She cites the association of these structures with the development of Vail and for their architectural importance. The shrine has been a center feature of the Vail community since it's founding, and this style of architecture is exceedingly rare in the Vail area.

Ordinarily, properties owned by religious institutions or used for religious purposes are not eligible for listing on the National Register of Historic Places. However, a religious property deriving primary significance from architectural or artistic distinction or from historical importance can qualify for listing. Because the Shrine of Santa Rita property falls into both categories, it meets eligibility requirements for the National Register under Criteria A and C.

ASSESSMENT OF PROJECT EFFECT

Pima County has proposed refurbishing Colossal Cave Road in the vicinity of Vail, Arizona. The existing road will be widened to construct a continuous or intermittent center turn lane, and railroad crossings will be modified. Grading and earthwork is anticipated, and disturbance will extend beyond the existing Colossal Cave right-of-way. Landscaping, guttering, and minor drainage improvements will also be installed.

An archaeological and historical assessment of the proposed Colossal Cave Road APE identified five significant cultural resources. These National Register-eligible sites/properties are the Southern Pacific Railroad (Z:2:40), The El Paso & Southwestern Railroad (EE:3:74), the Vail station of the Southern Pacific Railroad (BB:14:18), the old Vail Post Office (BB:14:708), and the Shrine of Santa Rita (BB:14:704). Each of these cultural resources lies at least partially within the 150-ft-wide survey corridor.

AZ Z:2:40 (ASM) and AZ EE:3:74 (ASM)

Although both the Southern Pacific and the El Paso & Southwestern railroad lines meet eligibility requirements for the National Register, integrity of the sites is highly variable along their lengths. In the vicinity of the project area, the tracks and railroad beds have been replaced with modern materials. However, the integrity of track alignments is good, the affected sections are contiguous with the remainder of the respective lines, and use of the tracks for their historical purpose has continued uninterrupted to this day. The proposed road improvements will not affect use of the tracks nor change the track or bed alignment. Affects will be entirely indirect and limited to small areas where modern materials have completely replaced historical components. Therefore, the National Register eligibility of Z:2:40 and EE:3:74 will not be effected by the proposed work.

AZ BB:14:18 (ASM)

The majority of the Vail Railroad Station site lies outside the project area. Although ASM documentation shows the site paralleling Colossal Cave Road, this information is incorrect. The site lies perpendicular to the roadway, and only the easternmost 20 m of the site falls within the cultural resources survey area. This includes about 350 m² on the periphery of BB:14:18. In this area, the site is characterized by a light scatter of mixed historic, modern, and railroad-related trash. The eastern artifact concentration is located about 10 m beyond the edge of the project area and is an important element of the site. Current project designs specify a 75-foot right-of-way north of Colossal Cave Road in the vicinity of BB:14:18. This right-of-way delineation lies near but outside the site boundary of the Vail Railroad Station. As currently proposed, the Colossal Cave Road project will not affect any portion of BB:14:18.

AZ BB:14:703 (ASM) and AZ BB:14:708 (ASM)

A portion of the old Vail Post Office property lies within the project area. The post office is an adobe structure that is the oldest standing building in Vail, and is architecturally and historically significant. Because it lies within the APE, the potential exists that the building could be affected by construction. Both parties have expressed intent to avoid any affect to the old Vail Post Office. Design plans account for this cultural resource, and the right-of-way will not be extended into the building footprint itself.

The Shrine of Santa Rita (BB:14:703) presents a similar situation. This parcel containing the shrine lies partially within the APE. The Santa Rita chapel is the only historical element on the property that could potentially be affected by construction along Colossal Cave Road. The project design avoids direct effect to the chapel. As currently specified, the Shrine of Santa Rita chapel lies about 20 m outside the proposed Colossal Cave Road right-of-way.

Although there are no direct impacts planned to any of the standing historic buildings or associated historic property elements, there is a potential for indirect impacts stemming from construction and from changes to the visual setting of both properties. The old Vail Post Office is of particular concern because it is located directly adjacent to the road right-of-way and its condition is poor. The County is in the process of obtaining a building conditions report by a structural engineer to determine whether road construction-related activity such as vibration or future road use will affect the building.

Summary

The project will have no direct affects on any of the five sites and historic structures identified within the APE in this study. Indirect affects are a potential concern with two of the properties, the old Vail Post Office property (BB:14:708), and the Shrine of Santa Rita (BB:14:703). Indirect changes could affect the National Register integrity of either site.

RECOMMEDATIONS

Desert Archaeology recommends avoidance of the five National Register eligible sites and properties located within the APE of the Colossal Cave Road improvement project. As planned, the work will have no affect on the Southern Pacific railroad tracks (Z:2:40), the El Paso & Southwestern railroad tracks (EE:3:74), or the Vail Railroad Station Site (BB:14:18). Both the old Vail Post Office (BB:14:708) and the Shrine of Santa Rita (BB:14:703) will be indirectly affected by the project, and it is recommended that steps be taken to identify, reduce, and mitigate those impacts.

Potential indirect impacts on shrine and post office properties include visual, atmospheric, and audible effects. Vibration is also possible both during and after construction, especially if the improvements lead to increased traffic. Right-of-way increases may also affect the standing properties through the modification of parcel boundaries, which currently define the properties for National Register eligibility purposes. Although the new right-of-way areas are vacant and do not contain any historical elements, there is a potential for changes in the setting and feel of the properties as a result of this project or future undertakings within the land.

It is recommended that the results of the buildings conditions assessment currently underway be used to identify whether the proposed road work will accelerate deterioration of the old Vail Post Office. If a threat is identified, steps should be taken to mitigate the damage and preserve the building. This work might involve stabilization and rehabilitation

for future use. Additional treatment for standing buildings could include the development of interpretive signage and the submission of National Register nomination forms.

Further, it is recommended that the segment of Colossal Cave Road between the two sets of railroad tracks be left as a 2-lane road without a center median. Maintaining existing traffic patterns within this corridor will result in a roadway that is visually similar to historical and existing conditions. The 2-lane option will also minimize encroachment onto the properties containing historic buildings. It is also recommended that the general open feel of the area be maintained and that any new landscaping be compatible with the historic setting.

To avoid damage to historic and archaeological resources, contractors must place construction staging areas away from the Vail Railroad Station site, the old Post Office building, or the Shrine of Santa Rita. If plans for the Colossal Cave Road improvement project are altered, or if staging areas are needed outside the area surveyed for this report, an additional archaeological and/or historical assessment is recommended. Unidentified archaeological sites or historic properties in the project area are very unlikely. However, in the event cultural remains are discovered during later phases of the project, any ground-disturbing activities in that area should stop until an archaeologist is consulted.

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APPENDIX A

ARIZONA STATE MUSEUM SITE FORMS

AZSITE Site Form Temp AZ Number 1 Site Update

Agency Number AZ BB:14:703(ASM) Agency asm

Site Name: Shrine of Santa Rita Other Name:

Other Numbers: AZ BB:14:703(ASM)

Assigning Agency asm

Recorder: Allison Diehl, M.L. Recording Institution: Desert Archaeology, Inc.

AZ BB:14:703(ASM)

Date Recorded: 06/01/2004 Land Owner(s): Roman Catholic Church Diocese of Tucson

Address: 11401 E Old Vail Connection Road

Owner Address: 92 S Stone Ave. City: Vail Zip:

County: Pima UTM Coordinates:

Tax Parcel #: 30513053A

Legal Description:

Baseline	Township	Range	Section	Subdivision
<u>0</u>	<u>16 S</u>	<u>16 E</u>	<u>2</u>	<u>unplatted</u>
<u>0</u>	<u>16 S</u>	<u>16 E</u>	<u>16</u>	<u>unplatted</u>

Description/Remarks:

The Shrine of Santa Rita was constructed as a memorial to Dr. Jokichi Takamine, by his widow Caroline Hitch. Takamine was a noted Japanese medical researcher, remembered primarily for arranging a gift of cherry trees between Tokyo and Washington, D.C. in 1912. Designed by H.D. Figge, the Shrine of Santa Rita was constructed between about 1930 and 1935. It is a Spanish Colonial Revival style complex of adobe structures characterized by flowing lines of white-stuccoed architecture and red mission-style roof tiles. Small walled courtyards adjoin the structures and divide the property into distinct spaces. The chapel is characterized by stained glass windows (purchased from the First Methodist Church in Tucson), arched doorways with carved wooden doors, scored concrete floors, and exposed trusses.

The shrine was envisioned as a memorial serving local Hispanic families who generally worked the ranches, mines, and railroads around Vail. With a low population in Vail, the church was too small to warrant its own priest. The chapel seats approximately 100 parishioners, and services are still held at the Shrine of Santa Rita.

Janet H. Parkhurst identified the Shrine of Santa Rita as a significant example of Spanish Colonial Revival architecture.

Site Dimensions (In Meters): Max Dimension Min Dimension

Deposition: SURF Open Air Rockshelter Cave

AZSITE Site Form

Temp AZ Number

1

Site Update

District:

AZ BB:14:703(ASM)

National Register Status:

Opinion	Date	Authority	Level of Significance
<u>Considered Eligible</u>	<u>03/04/2005</u>	RECORDER	NATIONAL

Criteria											Themes
a	b	c	d	i1	i2	i3	i4	i5	i6	i7	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>History of Vail, Arizona: Colonial Revival architecture in the 1930s</u>

Site History:

Event	Event Date	Collections?	Repositor
<u>Survey and assessment</u>	<u>06/01/200</u>	<input type="checkbox"/>	

Project Name Vail Colossal Road Survey

Condition: Modern buildings added to property. Areas cleared of vegetation at time of initial construction now have mature landscaping, buildings still in regular use

Remarks: Site was originally assigned site number by Dave Stephen of in 2003 (PAST Cultural Resources Report No. 011 No site card was available at the time of the present survey.

Surface Assemblage:

<input type="checkbox"/> Historic Ceramic	<input type="checkbox"/> Shell	<input type="checkbox"/> Historic Wood
<input type="checkbox"/> Groundstone	<input type="checkbox"/> Faunal Remains	<input type="checkbox"/> Chipped Stone
<input type="checkbox"/> Glass	<input type="checkbox"/> Fire Cracked Rock	<input type="checkbox"/> Plant Remains
<input type="checkbox"/> Prehistoric Ceramic	<input type="checkbox"/> Metal	<input type="checkbox"/> Human Remains

Diagnostic Artifacts:

Occupation Component:

Temporal Component

Estimated Time Period

late historic

AD1900-1950

Remarks

Buildings date between 1934 and 1990s

AZSITE Site Form

Temp AZ Number

1

Site Update



Architecture:

Building Description: Catholic chapel and associated buildings

Architect: H. D. R. Flegge

Builder: John D. Steffens

Development Description:

AZ BB:14:703(ASM)

Construction Date: 1934

Primary Style: COLONIAL

Influence Style: REVIVAL

Length (ft):

Width (ft):

Number of Stories: 1

Foundation Type: CONCRE

Structural Material: ADOBE

Wall Sheathing: STUCCO

Roof Type: GABLE

Roof Sheathing: TILE

Entry:

Porches:

Windows:

Remarks:

AZSITE Site Form Temp AZ Number 2 Site Update

Agency Number AZ BB:14:708(ASM) Agency asm

Site Name: Old Vail Post Office Other Name:

Recorder: Allison Diehl, M.L. Recording Institution: Desert Archaeology, Inc.

Date Recorded: 06/01/2004 Land Owner(s): Patricia and Jonathan Kelley

AZ BB:14:708(ASM)

Address: 11366 S Vail Rd

Owner Address: 11366 S Vail Road City: Vail Zip:

County: Fma UTM Coordinates:

Tax Parcel #: 305150520

Legal Description:

Baseline	Township	Range	Section	Subdivision
<u>0</u>	<u>16 S</u>	<u>16 E</u>	<u>6</u>	<u>NE</u>

Description/Remarks:

The old Vail post office is a simple adobe brick building located north of Colossal Cave Road between the two tracks of the Union Pacific Railroad. The building is rectangular in plan and lies perpendicular to Colossal Cave Road. The original structure, reportedly constructed in the 1890s, was a 31-ft by 21-ft mud brick adobe with a stucco exterior. In the 1920s, a 19-ft by 21-ft cobble walled addition with a stucco exterior was added. The building is reported to have been first used as a saloon and ultimately served as a general store and post office until 1974. Although a small community grew up around the train stop and post office, the old Vail post office is the only pre-1900 standing structure that remains preserved at Vail.

Site Dimensions (In Meters): Max Dimension Min Dimension

Deposition: SURF Open Air Rockshelter Cave

District:

AZ BB:14:708(ASM)

National Register Status:

Opinion	Date	Authority	Level of Significance
<u>Considered Eligible</u>	<u>03/04/2005</u>	<u>RECORDER</u>	<u>LOCAL</u>

Criteria											Themes
a	b	c	d	i1	i2	i3	i4	i5	i6	i7	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>History of Vail, Arizona; Anglo-influenced vernacular adobe architecture</u>

Site History:

Event	Event Date	Collections?	Repositor
Survey	06/01/200	<input type="checkbox"/>	
Project Name <u>Vail Colossal Road Survey</u>			

Condition: Building deteriorating due to vacancy; roofing rusty; stucco cracking, spalling and missing in some places; openi frames, doors, and windows badly weathered

Remarks: Originally recorded on Arizona Historic Property Inventory Form in 1993

Surface Assemblage:

- | | | |
|----------------------------------------------|--------------------------------------------|----------------------------------------|
| <input type="checkbox"/> Historic Ceramic | <input type="checkbox"/> Shell | <input type="checkbox"/> Historic Wood |
| <input type="checkbox"/> Groundstone | <input type="checkbox"/> Faunal Remains | <input type="checkbox"/> Chipped Stone |
| <input type="checkbox"/> Glass | <input type="checkbox"/> Fire Cracked Rock | <input type="checkbox"/> Plant Remains |
| <input type="checkbox"/> Prehistoric Ceramic | <input type="checkbox"/> Metal | <input type="checkbox"/> Human Remains |

Diagnostic Artifacts:

Occupation Component:

Temporal Component	Estimated Time Period
<u>historic</u>	<u>AD 1500-1950</u>
Remarks	
<u>Constructed ca. 1890s</u>	

Cultural Affiliations:

Affiliation	Remarks
<u>Euro-American</u>	
<u>Mexican-American</u>	

Features:

Feature Type	Feature Count
<u>public building</u>	<u>1</u>
Feature Description	
<u>Rectangular adobe post office building, later used for feed store and storage</u>	

Bibliographic Reference:

.....
Architecture:

Building Description: Rectangular adobe mud building

Architect:

Builder:

Development Description:

AZ BB:14:708(ASM)

Construction Date: ca. 1890s **Primary Style:** VERNACLR **Influence Style:**

Length (ft): 50 **Width (ft):** 21 **Number of Stories:** 1 **Foundation Type:** ADOBE

Structural Material: ADOBE **Wall Sheathing:** STUCCO

Roof Type: GABLE **Roof Sheathing:** CORRUGTD

Entry:

Porches:

Windows:

Remarks:

APPENDIX B

STATE HISTORIC INVENTORY FORMS

Please type or print clearly. Fill out each applicable space accurately and with as much information as is known about the property. Use continuation sheets where necessary. Send completed form to: State Historic Preservation Office, 1300 W. Washington, Phoenix, AZ 85007

PROPERTY IDENTIFICATION

For properties identified through survey: Site No: N/A Survey Area: N/A

Historic Name(s): Old Vail Post Office (Update Form)
(Enter the name(s), if any, that best reflects the property's historic importance.)

Address: 11366 S. Vail Road

City or Town: Vail vicinity County: Pima Tax Parcel No. 305 -15 -0520

Township: 16S Range: 16E Section: 16 Quarter Section: NE 1/4 Acreage: 4.82

Block: NA Lot(s): NA Plat (Addition): NA Year of plat (addition): NA

UTM reference: Zone 12N Easting 527207ME Northing 3545560MN USGS 7.5' quad map: Vail, AZ

Architect: not determined known (source:)

Builder: not determined known (source:)

Construction Date: 1890s (cont. sht.) known estimated (source: Kelleys, Thomas, Theobold)

STRUCTURAL CONDITION

Good (well maintained, no serious problems apparent)

Fair (some problems apparent) Describe:

Poor (major problems; imminent threat) Describe: Building deteriorating due to vacancy; roofing rusty, stucco cracking, spalling and missing in places; opening frames, doors and windows badly weathered.

Ruin/Uninhabitable

USES/FUNCTIONS

Describe how the property has been used over time, beginning with the original use.

Saloon (possibly), Post Office, General Store, Storage Building for Feed Store

Sources: Kelleys 1993, 2004, Stiles 1980, Thomas 1993, Wright, 2002

PHOTO INFORMATION

Date of photo: 6-1-04
View Direction (looking towards) S
Negative No.: VA-3-6

Attach recent photograph of property to this space. Additional photos may be appended on continuation sheets.



SIGNIFICANCE

To be eligible for the National Register of Historic Places, a property must represent an important part of the history or architecture of an area. Note: a property need only be significant under one of the areas below to be eligible for the National Register.

- A. HISTORIC EVENTS/TRENDS (On a continuation sheet describe how the property is associated either with a significant historic event, or with a trend or pattern of events important to the history of the nation, the state, or a local community.)
(see continuation sheet)
- B. PERSON (On a continuation sheet describe how the property is associated with the life of a person significant in the past.)
- C. ARCHITECTURE (On a continuation sheet describe how the property embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or possesses high artistic values.)
(see continuation sheet)

Outbuildings: (Describe any other buildings or structures on the property and whether they may be considered historic.)

Adobe studio (1930s or 40s, historic), steel frame feed store (1994), straw bale house (1996), various sheds

INTEGRITY

To be eligible for the National Register, a property must have integrity, that is, it must be able to visually convey its importance. Provide detailed information below about the property's integrity. Use continuation sheets if necessary.

1. LOCATION Original Site Moved (date _____) Original Site: _____

2. DESIGN (Describe alterations from the original design, including dates—known or estimated—when alterations were made)
Original mud adobe building may have an early, mortared stone extension used as a living quarters; original dirt floors concreted in 1976, wood floor for living quarters remains.

3. SETTING (Describe the natural and/or built environment around the property) flat, sparsely vegetated desert site; post office located between railroad tracks allowed for convenient mail delivery. Apparently there was once an ocotillo fence surrounding the building.

Describe how the setting has changed since the property's period of significance: The site gradually built up to include the early adobe dwelling; most buildings and structures added after Kelley family purchase (1975).

4. MATERIALS (Describe the materials used in the following elements of the property)
Walls (structure): adobe, rubble stone Foundation: adobe, conc. Roof: corrugated metal
Windows: wood, 1/1 double hung.

If the windows have been altered, what were they originally? _____

Wall Sheathing: stucco

If the sheathing has been altered, what was it originally? _____

5. WORKMANSHIP (Describe the distinctive elements, if any, of craftsmanship or method of construction)
A typical, Anglo-influenced, regional vernacular, mud adobe building; adobes undoubtedly produced on site, other materials probably shipped by rail.

NATIONAL REGISTER STATUS (if listed, check the appropriate box)

Individually listed; Contributor Noncontributor to _____ Historic District
Date Listed: _____ Determined eligible by Keeper of National Register (date: _____)

RECOMMENDATIONS OF ELIGIBILITY (opinion of SHPO staff or survey consultant)

Property is is not eligible individually.
Property is is not eligible as a contributor to a potential historic district.
 More information needed to evaluate.

If not considered eligible, state reason: _____

FORM COMPLETED BY:

Name and Affiliation: Janet H. Parkhurst (Janet H. Strittmatter Inc.) Date: June 16, 2004
Mailing Address: 3834 E. Calle Cortez, Tucson, AZ 85716 Phone No.: 520-320-9043

STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET

name of property Old Vail Post Office, Vail, Arizona

Continuation Sheet No. 1

ADDITIONAL PHOTOGRAPHS

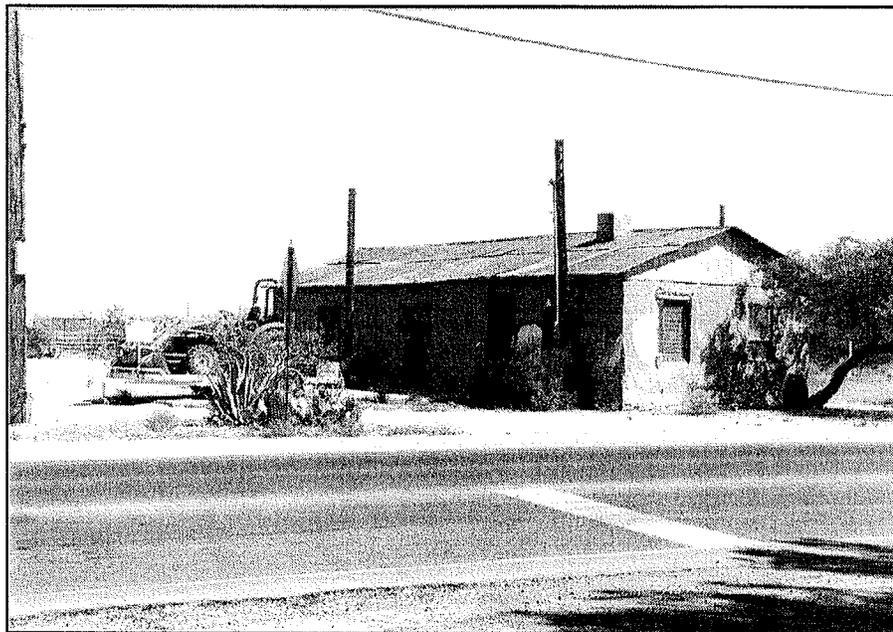
All the following have in
common:

Date: 6-1-04

1) Old Vail Post Office, $\frac{3}{4}$
view of south and east facades.

View Direction: N

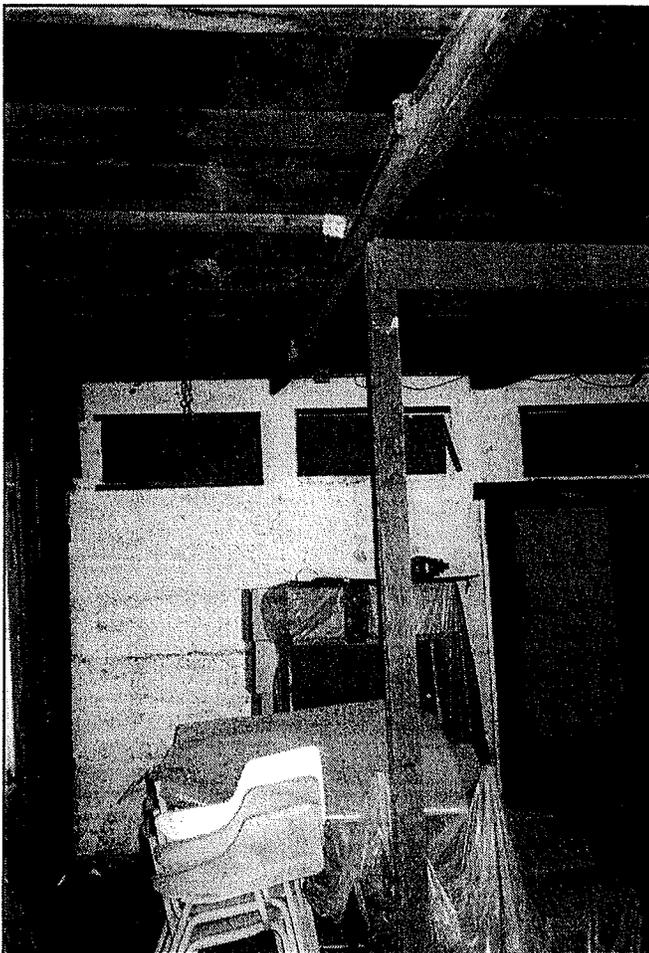
Negative No: VA-3-12



2) Post Office Interior, view of mail
room showing structure and materials.

View Direction: SE

Negative No: VA-2-1



STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET

name of property Old Vail Post Office, Vail, Arizona

Continuation Sheet No. 2

ADDITIONAL PHOTOGRAPHS

Studio, front façade; historic
former adobe ranch house, 1930s
or 1940s).

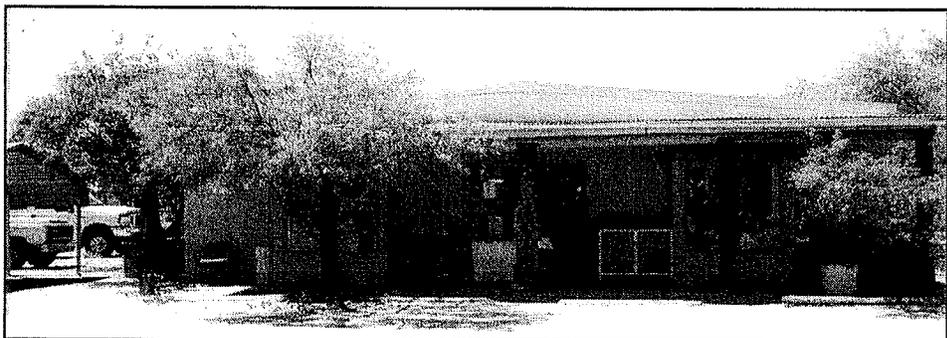
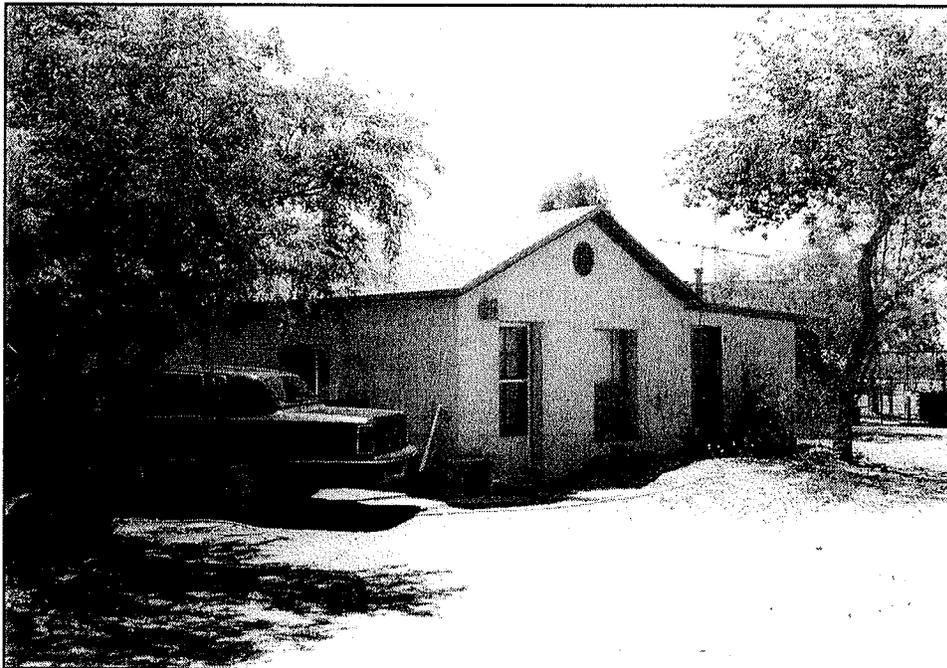
View Direction: SW

Negative No: VA-2-5A

4) Feed Store, 1994.

View Direction: NW

Negative No: VA-2-12A



STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM CONTINUATION SHEET

name of property Old Vail Post Office, Vail Arizona Continuation Sheet No. 3

Construction Date: According to the Kelleys, the building may date back to the 1890s. Originally it may have been a saloon for ranch hands (Stiles 1980). Diana Thomas of the SHPO states that the first post office in Vail was established in 1901 (Thomas 1993). The information appears in Theobold's book on territorial post offices and post masters (Theobold 1961: 134). This author could not locate city directories or Sanborn maps of Vail. Verification of the construction date will require a historian's efforts, not within the scope of this study.

CRITERION A. HISTORIC EVENTS/TRENDS

The Old Vail Post Office may be the last extant building from the original community (Kelley 1993). It is significant for its role in community development. Vail, once a vital railroad stop, has been connected to cattle ranching and transportation since its founding by the Vail family, owners of the large Empire Ranch headquartered to the south. In 1880 the Southern Pacific Railroad was granted permission to lay tracks across Vail's property. The station was named Vail in the landlord's honor. A significant settlement grew up including a post office adjacent to the tracks. (Wright 2002: 8.)

Throughout its history, the building changed functions several times. Its connection to the adobe studio, the former ranch house (1930s or 1940s) that is part of today's property, requires further research. Art Kelley, father of the current owners, Patricia and Jonathan Kelley, purchased the property in 1975. He established a farm and operated a general store in the old post office building.

CRITERION C. ARCHITECTURE

The Old Vail Post Office is significant as an excellent example of a regional vernacular, mud adobe building. Its one-story form is generated by a rectangular plan with a side gabled roof. Adobe, the principal wall material, is the result of technology originally introduced by early Spanish colonists in the region. Anglos adopted this technology out of necessity and used it in buildings like this post office. Proximity to the rail allowed components like milled double hung windows, cement and corrugated metal to be shipped from distant fabricators.

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Theobold, John and Lillian. Arizona Territory Post Offices and Postmasters. Phoenix: The Arizona Historical Foundation, 1961.

Thomas, Diana. Letter to Patricia and Jonathan Kelley, Vail, Arizona, re: Old Vail Post Office, dated October 4, 1993. On file, Arizona State Historic Preservation Office, Phoenix. 1993.

STATE OF ARIZONA

**HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET**

name of property Old Vail Post Office, Vail, Arizona Continuation Sheet No. 4

Wright, Thomas E. A Class 1 Cultural Resources Inventory for the Proposed Vail Road/Colossal Cave Road Project, Pima County, Arizona. Project Report No. 2202:036. Archaeological Research Services, Inc., Tempe. 2002.



ARIZONA STATE PARKS

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DEPUTY DIRECTOR

October 4, 1993

Patricia and Jonathan Kelley
11366 S. Vail Road
Vail, Arizona 85641

Re: Determination of eligibility to the National Register for the Vail Post Office.

Dear Patricia and Jonathan Kelley:

I have reviewed the Arizona State Historic Property Inventory form you submitted regarding the property at 11366 S. Vail Road and have placed it in the Arizona State Historic Properties Inventory where it will be housed as a permanent record. I would like to apologize for taking the time that has passed before responding to you, however, your inventory form arrived as our office was preparing to change location and at the commencement of our annual Heritage Fund grant cycle. Many of us are only now able to respond to letters and resume some of our daily tasks.

Although the Vail Post Office could be a strong candidate for the National Register under Criterion "A" and Criterion "C" as the last extant building from the original townsite, several elements require clarification before this structure can be determined eligible for the National Register of Historic Places. For example, our records indicate that the first post office in Vail was established in 1901, yet the date of construction on the form indicates it was built in the 1890's. Is this the first or second location of the post office? Essentially, the date of construction will require verification.

Secondly, I realize it is difficult to describe the alterations made to the building in the small space provided on the form, however, could you explain which portion of the extant building was original and specifically what portions of the building were added to or altered, along with the specific dates these changes took place? Was the pitch of the roof altered? I am looking for the degree of architectural integrity remaining as the building exists today. When looking at the photograph provided on the form, what original historic elements are we looking at?

I believe that with some additional clarification we will be able to conclusively, and likely positively, determine the eligibility status of the Old Vail Post Office. We appreciate your interest in this historic preservation project and support your efforts to nominate the Old Vail Post Office to the National Register. If you have any questions regarding the comments I have made above, do not hesitate to contact me at 542-7140 or Dr. Reba Wells Grandrud, our office historian at 542-7139.

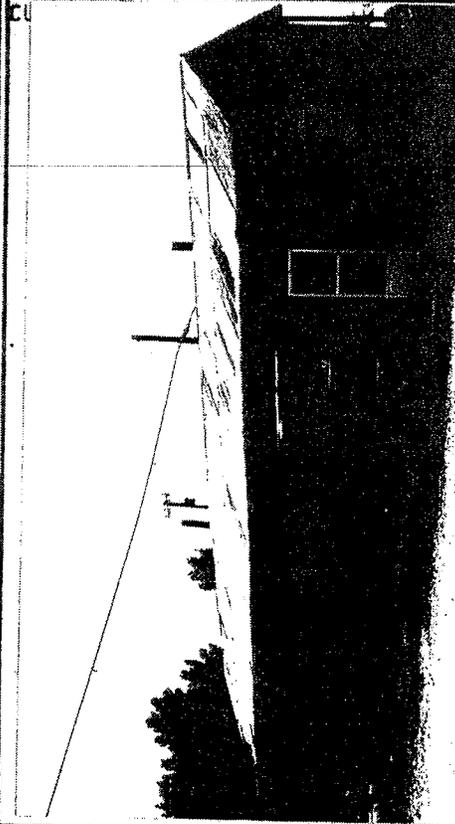
Sincerely,

Diana Thomas
Architectural Historian

MAY - 6 1993

ARIZONA STATE HISTORIC PROPERTY INVENTORY

HISTORIC PROPERTY NAME Old Vail Post Office		COUNTY Pima	INVENTORY NO.
COMMON PROPERTY NAME Vail Feed Store		QUAD/COUNTY MAP T.16S, R.16E, S.16 Book 10 p.65	
PROPERTY LOCATION-STREET & NO. 11366 S. Vail Rd.			
CITY, TOWN/VICINITY OF Vail, AZ		ASSESSOR'S PARCEL NO. 004G7	
OWNER OF PROPERTY Patricia, Jonathan Kelley 1/2 Jt		PHONE (602) 762-5301	
STREET & NO./P.O. BOX 11366 S. Vail Rd. / P.O. Box 132			
CITY, TOWN Vail		STATE AZ	ZIP 85641
FORM PREPARED BY Jonathan Kelley		DATE 03/29/93	
STREET & NO./P.O. BOX 11366 S. Vail Rd. / 132		PHONE 762-5301	
CITY, TOWN Vail		STATE AZ	ZIP 85641
PHOTO BY Patricia Kelley		DATE 03/30/93	
VIEW Front facade, looking southwest			
HISTORIC USE Post Office/Gen'l Store 1890-1974			
PRESENT USE Vail Feed Store Warehouse		ACREAGE appx 5	
ARCHITECT/BUILDER Unknown			
CONSTRUCTION/MODIFICATION DATES Late 1800's, Add on 1920's, elec 1975			



PHYSICAL DESCRIPTION

The Old Vail Post Office is a one-story, rectangular, adobe brick building with stucco exterior. It's roofing consists of 2x4 framed trusses and original corrugated tin. The ceiling is made up of 1x12 planks, on top of which the builders spread approximately 4" of dirt, for insulation purposes we assume. It's total exterior dimensions are 50' x 21'. This total dimension includes a 19' x 21' addition constructed of rock walls with stucco exterior to match the main building.

The addition, used as a living quarters for the post mistress, has cement plastered interior walls. The interior of the main post office has mud plastered walls. The building originally had dirt floors. A cement floor was poured in 1976, making it functional as a feed warehouse, which is it's current use. A wood floor is in the living quarters currently. Electricity was first brought into the building in 1976.

Considering it's age (approximately 130 years old) the building has held up very well. Cracks have developed in the stucco, the roof is leaking in places, but overall the building has been pretty well maintained in it's original quality.

The Old Vail Post Office is located 2 miles north of I-10 (exit 279) on Vail Rd., in Vail AZ. Placed between 2 sets of railroad tracks, across the street from St. Ritas Parish, it is hard to miss.

STATEMENT OF SIGNIFICANCE/HISTORY

The Old Vail Post Office is the last "standing" building from the once thriving town of Vail. The town at one time had three railroad tracks and was a main shipping point for cattlemen and mining companies. The people came from hundreds of miles in every direction to pick their mail at the Vail Post Office because it was the only post office between Tucson and Benson. Its remoteness made the Vail Post Office the focal point for the community. The town of Vail never had water, so it never had a chance to fully develop.

In the years since, the old adobe buildings that provided housing for the residents have crumbled to nothing but a foundation.

The school at Vail has been torn down and rebuilt. Yet, somehow the Vail Post Office has remained.

The town of Vail currently has a new, more modern post office.

But to many of the "old-timers", who still remember yester-year, the old adobe on the corner in Vail will always be the Old Vail Post Office.

SOURCES OF ABOVE INFORMATION/BIBLIOGRAPHY

Personal interviews with various long-time residents of Vail, past and present, over the past 10 years.

Reference Book, Tucson: "The Way It Was" (By Dr. Byrd Howell Granger)

GEOGRAPHICAL DATA/LEGAL DESCRIPTION/VERBAL BOUNDARY DESCRIPTION

Pima County, Arizona, recorded in the office of the County Recorder of Pima County, Arizona, in Book 10 of Maps and Plats Page 65. Township 16S, Range 16E, Section 16. Assessor's Parcel Number 004@7

GENERAL COMMENTS/FUTURE PLANS FOR PROPERTY

Future plans for The Old Vail Post Office include its renovation to as close as possible to original condition. Possible practical uses currently being discussed are its continued use as a feed warehouse, or as a "rustic" western saddle and tack shop.

STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM

Please type or print clearly. Fill out each applicable space accurately and with as much information as is known about the property. Use continuation sheets where necessary. Send completed form to: State Historic Preservation Office, 1300 W. Washington, Phoenix, AZ 85007

PROPERTY IDENTIFICATION

For properties identified through survey: Site No: N/A Survey Area: N/A

Historic Name(s): Shrine of Santa Rita (Enter the name(s), if any, that best reflects the property's historic importance.)

Address: 11401 E. Old Vail Connection Road

City or Town: Vail vicinity County: Pima Tax Parcel No. 305-13-053A

Township: 16S Range: 16E Section: 16 Quarter Section: NE 1/4 Acreage: 13.24

Block: NA Lot(s): NA Plat (Addition): NA Year of plat (addition): NA

UTM reference: Zone 12N Easting 527235ME Northing 3545498 USGS 7.5' quad map: Vail, AZ

Architect: H.D.R. Figge not determined known (source: Grigsby 1996)

Builder: John D. Steffens not determined known (source: Grigsby 1996)

Construction Date: 1935 known estimated (source: Grigsby 1996, Wright 2002)

STRUCTURAL CONDITION

Good (well maintained, no serious problems apparent)

Fair (some problems apparent) Describe:

Poor (major problems; imminent threat) Describe:

Ruin/Uninhabitable

USES/FUNCTIONS

Describe how the property has been used over time, beginning with the original use.

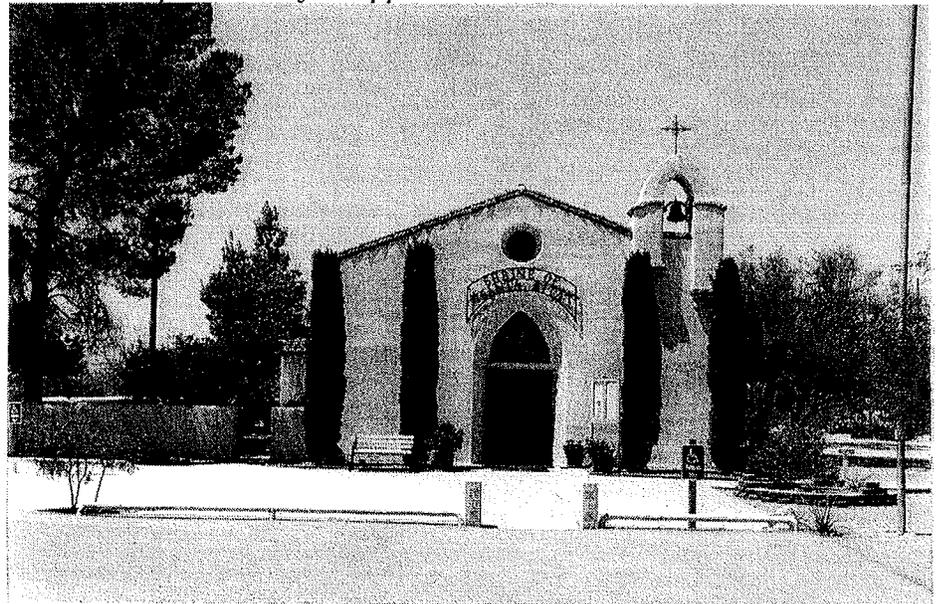
Franciscan Mission, Salvatorian Parish

Sources: Brosnan 2004, Wright 2002 Grigsby 1996 (see continuation sheet)

PHOTO INFORMATION

Date of photo: 6-1-04 View Direction (looking towards) SW Negative No.: VA-1-5

Attach recent photograph of property to this space. Additional photos may be appended on continuation sheets.



SIGNIFICANCE

To be eligible for the National Register of Historic Places, a property must represent an important part of the history or architecture of an area. Note: a property need only be significant under one of the areas below to be eligible for the National Register.

A. HISTORIC EVENTS/TRENDS (On a continuation sheet describe how the property is associated either with a significant historic event, or with a trend or pattern of events important to the history of the nation, the state, or a local community.)
(see continuation sheet)

B. PERSON (On a continuation sheet describe how the property is associated with the life of a person significant in the past.)

C. ARCHITECTURE (On a continuation sheet describe how the property embodies the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or possesses high artistic values.)
(see continuation sheet)

Outbuildings: (Describe any other buildings or structures on the property and whether they may be considered historic.)

Adobe Rectory, Adobe Garage, Hall & Parish Office (early adobe wing attached to relocated, early, frame Vail School House building); Verhagen Building (1990s), Frame Storage Bldg. (1960s). Adobe buildings intact and historic, probably built between 1935 and 1943. Not eligible are old school house due to relocation; storage and Verhagen buildings due to age.

INTEGRITY

To be eligible for the National Register, a property must have integrity, that is, it must be able to visually convey its importance. Provide detailed information below about the property's integrity. Use continuation sheets if necessary.

- 1. LOCATION Original Site Moved (date _____) Original Site: _____
- 2. DESIGN (Describe alterations from the original design, including dates—known or estimated—when alterations were made)
An intact, stuccoed-adobe, Spanish Colonial Revival style building; appears to have very few alterations.
- 3. SETTING (Describe the natural and/or built environment around the property 1935 dedication ceremony photos show scraped desert grounds nearly devoid of vegetation, a raw adobe, gabled building to east.

Describe how the setting has changed since the property's period of significance: over years site developed with additional buildings and structures, some historic and some recent. Planted landscaping has matured.

- 4. MATERIALS (Describe the materials used in the following elements of the property)
Walls (structure): adobe Foundation: concrete Roof: Mission tile
Windows: wood frame stained glass windows, salvage from Tucson's First Methodist Church
If the windows have been altered, what were they originally? _____
Wall Sheathing: stucco
If the sheathing has been altered, what was it originally? _____
- 5. WORKMANSHIP (Describe the distinctive elements, if any, of craftsmanship or method of construction) An excellent example of its style with stuccoed adobe walls, tile roof, bell tower, carved wood door, scored concrete floors, exposed trusses.

NATIONAL REGISTER STATUS (if listed, check the appropriate box)

Individually listed; Contributor Noncontributor to _____ Historic District
Date Listed: _____ Determined eligible by Keeper of National Register (date: _____)

RECOMMENDATIONS OF ELIGIBILITY (opinion of SHPO staff or survey consultant)

Property is is not eligible individually.
Property is is not eligible as a contributor to a potential historic district.
 More information needed to evaluate.
If not considered eligible, state reason: _____

FORM COMPLETED BY:

Name and Affiliation: Janet H. Parkhurst (Janet H. Strittmatter Inc.) Date: June 16, 2004
Mailing Address: 3834 E. Calle Cortez, Tucson, AZ 85716 Phone No.: 520-320-9043

HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET

name of property Shrine of Santa Rita, Vail, Arizona

Continuation Sheet No. 1

=====

ADDITIONAL PHOTOGRAPHS

All the following have in common:

Date: 6-1-04

1) View of Complex Showing
Rectory, Shrine in Background

View Direction: SW

Negative No: VA-1-21

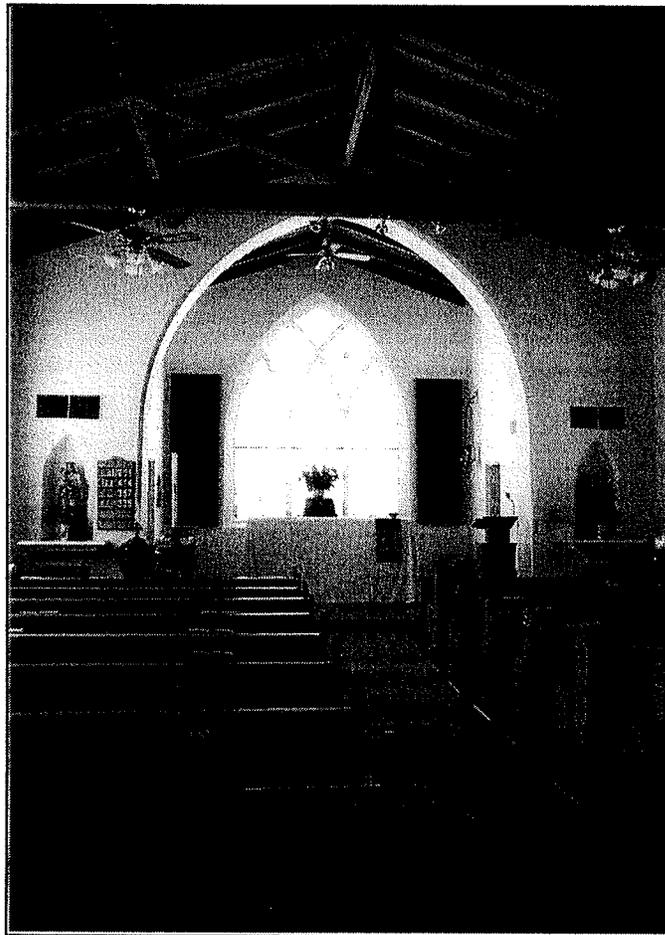


2) Interior of Shrine Towards

Altar

View Direction: S

Negative No: VA-1-24A



STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET

name of property Shrine of Santa Rita, Vail, Arizona

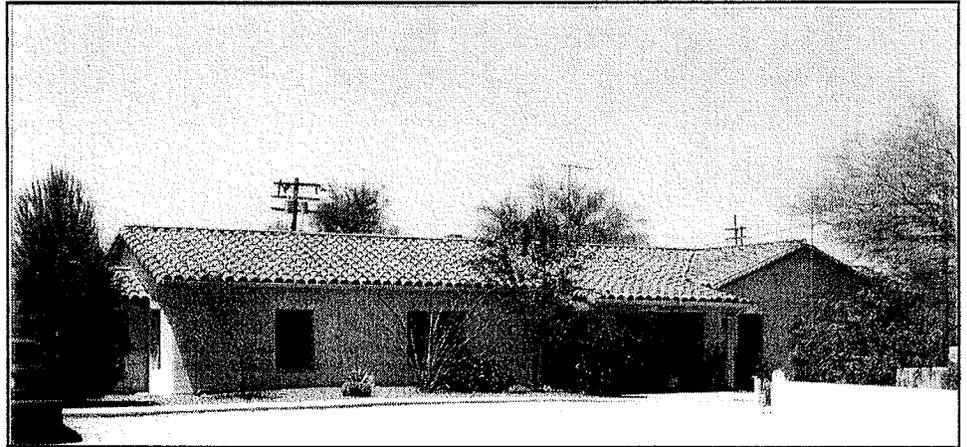
Continuation Sheet No. 2

ADDITIONAL PHOTOGRAPHS

3) Rectory, Spanish Colonial Revival,
Adobe, (b. 1935-1943)

View Direction: SW

Negative No: VA-1-8



4) Adobe Garage

(b. 1935-1943)

View Direction: SW

Negative No: VA-1-14



STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM
CONTINUATION SHEET

name of property Shrine of Santa Rita, Vail, Arizona

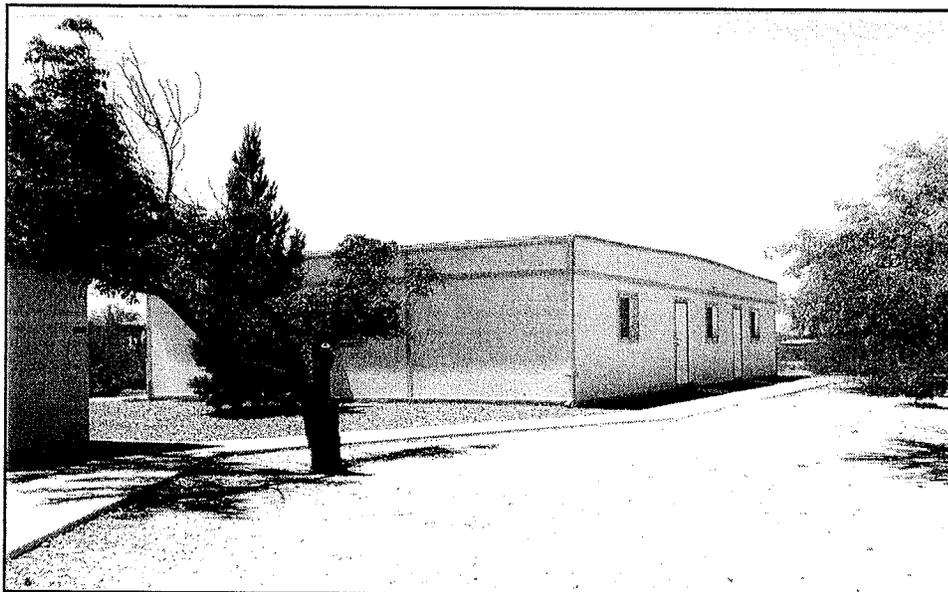
Continuation Sheet No. 3

ADDITIONAL PHOTOGRAPHS

5) Hall and Parish Office
(Old Vail School House to left,
early adobe wing to right)
View Direction: SW
Negative No: VA-1-20



6) Verhagen Building, 1990s
View Direction: SE
Negative No: VA-1-22



STATE OF ARIZONA

HISTORIC PROPERTY INVENTORY FORM CONTINUATION SHEET

name of property Shrine of Santa Rita, Vail, Arizona Continuation Sheet No. 4

CRITERION A. HISTORIC EVENTS/TRENDS

The Shrine of Santa Rita in the Desert, Vail, Arizona, was built in 1935 and remains in use today. It is located along the east side of Vail Road between the railroad tracks. Santa Rita is significant under two categories: 1) religion and 2) community development.

The Shrine was built in memory of Dr. Jokichi Takamine (1854-1922), a Japanese biochemist and medical researcher, by his widow, Caroline Takamine, after she had married Vail cattle rancher Charles Beach. This memorial was to serve as a Catholic church for Vail residents, predominantly poor, Hispanic, laboring families.

Under the Catholic Diocese of Tucson, the small Shrine of Santa Rita began service as a mission, too small to warrant its own priest. From 1935 to 1968 Franciscan priests assigned to San Xavier del Bac and Our Mother of Sorrows parish in Tucson came to Vail to officiate. The district grew and by 1968 Santa Rita was established as a parish with an assigned priest under the Salvatorian order. Today's district, still administered by Salvatorians, has grown to the point that a new parish church is being planned for the site. The Shrine will remain in use as a chapel.

The Shrine of Santa Rita was one of the institutions that contributed to the development of the modest community of Vail and its environs.

CRITERION C. ARCHITECTURE

The Shrine of Santa Rita is significant as an excellent example of the Spanish Colonial Revival style. Spanish Colonial Revival was one of the Southwestern Revivals in vogue in the United States from 1915 through the 1930s. Especially popular in the Southwest, it was very common in Arizona in many settings, from urban blocks to ranch landscapes. Spanish Colonial Revival was an eclectic style which employed decorative details borrowed from the entire history of Spanish architecture. The style was unified by the use of arches, courtyards or patios, plain stuccoed wall surfaces, form as mass and Spanish or Mission tile roofs, all derived from the Mediterranean region (Easton & McCall 1980: 87).

BIBLIOGRAPHY

Brosnan, Dan. Archivist, Catholic Diocese of Tucson. Telephone interview, June 16, 2004.

Easton, Bob & Wayne McCall, ed. Santa Barbara Architecture. Santa Barbara: Capra Press, 1980.

Grigsby, Ann M. Whispered Prayers in the Arizona Desert: The History of the Shrine of Santa Rita. Privately published, Tucson. 1996.

Wright, Thomas E. A Class 1 Cultural Resources Inventory for the Proposed Vail Road/Colossal Cave Road Project, Pima County, Arizona. Project Report No. 2002:036. Archaeological Research Services, Inc., Tempe. 2002.