Chapter 3: Environment

This section describes the environmental context and environmental consequences of the No Build and Build Alternative, as well as measures considered to avoid, minimize, and mitigate impacts associated with the Build Alternative. While all resources were considered during project scoping, this EA provides more detailed discussions of resource topics and impacts most relevant to the decision-making process.

3.1 Land Use

3.1.1 Land Use and Development Trends

This section identifies land use and development trends and summarizes applicable land management plans and related information provided during public scoping and coordination with local land managers.

As shown in **Figure 3-1**, 54 percent of the project corridor is publicly owned, while the remaining 46 percent is private land within the city of Moab or unincorporated Grand County. Land use adjacent to US-191 between 400 North and Cermak Drive is fully developed for tourist-related commercial uses and includes hotels, outdoor outfitters (cycling and river runners), off-road vehicle rentals, as well as local services. Land uses to the north of Cermak Drive and south of the Colorado River are less developed, but also include a mix of tourist-related commercial uses and some residences. Tourist attractions along this section include campgrounds/RV parks, hotels, restaurants, a water park, and Lions Park. Land use north of the Colorado River is dominated by public lands and includes open space and recreational opportunities associated with Arches National Park and Bureau of Land Management (BLM) lands, former industrial use associated with the Moab UMTRA site, and limited tourist services.

According to the Moab General Plan, “the most recent ‘boom’ in Moab’s tourist economy has brought about an explosion of commercial development heretofore unknown in Moab” (Moab, 2001). As such, both the city and county have planned and zoned for tourism-related growth along the project corridor. Water and sewer service is being extended along the western side of US-191 to the Colorado River as part of the North Area Trunk and Lateral Sewer Construction Project to serve this anticipated growth. While the rate of development may increase with the expansion of these services, the city does not expect the type of planned/zoned land use to

change with the provision of additional water and sewer lines (Olsen and Hugie, December 8, 2005). Local planners do not anticipate land uses and future development to deviate from current plans because:

- Along the project corridor, much of the undeveloped and private land is already zoned for resort and general commercial uses to encourage and promote tourism-based economic development (Four Corners Planning, 2001).
- Private land is limited. Public land holders include the National Park Service (NPS), BLM, USDOE, and the Division of Wildlife Resources.
- Physical constraints also limit the amount of private land that can be developed. Constraints between the US-191 Colorado River Bridge and Moab include poor drainage, steep slopes, and ridgeline restrictions (Hofhine, December 8, 2005).

The following sections provide further detail about applicable land management plans and related information provided during public scoping and coordination with local land managers.

3.1.1.1 Grand County

The northern portion of the project is located within unincorporated Grand County. Grand County land use planning documents applicable to the project include the Grand County General Plan Update (Four Corners Planning, 2004) and the North Corridor Gateway Plan (Four Corners Planning, 2001).

The General Plan Update notes that the overriding land use issue in the county is public land ownership. State, federal, and tribal governments manage 96 percent of Grand County's total land area and the supply of private land for development is limited. The General Plan Update states that growth will be concentrated in Moab and unincorporated areas of Spanish Valley, south of Moab.

The North Corridor Gateway Plan focuses on land use issues along the northern gateway to Moab, an area known as the North Corridor. Land use goals for the North Corridor include retaining the rural character north of the Colorado River and encouraging hospitality accommodations and mixed uses south of the river as part of a resort commercial zoning district. The plan stresses corridor design character and quality, while discouraging light industrial land uses and visually sterile uses. Open space and recreational opportunities are integral to planning efforts and are expressed in the vision statement as follows:

> As the primary gateway to Moab – the community and the resort – the north corridor should be welcoming and friendly to pedestrians, bikers, residents, and visitors alike. The built environment should protect and complement Moab's unique character, promote economic opportunity, demonstrate community pride, and offer a positive first impression without inhibiting design creativity (Four Corners Planning, 2001).

Grand County was also granted land from BLM solely for recreation purposes (BLM, 1963). This land was granted to Grand County prior to the designation of Arches National Park and encompasses about 155 acres in T25S R21E Section 26, Lots 3, 6, 7, 8, 9, and 10. Lots 3 and 8 are adjacent to the project corridor, as shown on **Figure 3-1**.

3.1.1.2 Moab

Moab's city limits are illustrated in **Figure 3-1**. Existing commercial zoning (i.e., C-1, C-2, C-3, and C-4) and some residential zoning (R-2) parallels US-191 along the project corridor, as illustrated in **Figure 3-2**. The city is in the process of annexing from unincorporated Grand County additional parcels that are adjacent to US-191, and several property owners have signed pre-annexation agreements. In order for a property to be annexed, the city is requiring that safe and adequate drainage for all properties along US-191 are possible (Olsen and Hugie, December 8, 2005). In anticipation of annexation, Moab has initiated the North Area Trunk and Lateral Sewer Construction Project to facilitate planned resort-commercial development within the North Corridor area. This project is located west of US-191 and extends from the existing Moab city limits to the US-191 Colorado River Bridge.

Land use goals identified in the Moab General Plan include maintaining a vital downtown characterized by a small town feel and compact development patterns, while buffering conflicting land uses (Moab, 2001). Aesthetic goals include maintaining the visual integrity and preserving viewsheds and open space. Social and economic goals include providing diverse and year-round employment and affordable housing. Non-motorized travel was identified as the cornerstone of the city's transportation system. According to the Moab General Plan, the number of driveway accesses should be minimized along US-191 to reduce traffic congestion and conflicts.

3.1.1.3 Division of Forestry, Fire and State Lands (FFSL)

Sovereign Lands within the project study area include land below the ordinary high water mark of the Colorado River. The Utah Code directs the FFSL to administer Sovereign Lands under a comprehensive land management program that incorporates

multiple-use, sustained-yield principles. However, a comprehensive management plan for the Colorado River has not yet been developed (Grierson, June 1, 2006).

3.1.1.4 Division of Wildlife Resources

A small portion of the Scott Matheson Wetland Preserve is located within the project study area. Of the preserve's 875 acres, the Division of Wildlife Resources owns 425.8 acres in the northern part of the preserve and The Nature Conservancy (TNC) owns the remaining acreage. The Site Conservation Plan for the preserve identifies ecological and programmatic goals. The primary management goals are to protect, enhance, and preserve the wetlands and associated habitat for rare and/or desirable species. In addition, the plan allows opportunities for compatible scientific, educational, sporting, and recreational uses (Division of Wildlife Resources, 1994).

3.1.1.5 National Park Service

Arches National Park is located on the northern end of the project corridor, as illustrated in **Figure 3-1**. The General Management Plan and Development Concept Plan for Arches National Park states that:

> Arches National Park is in the high desert country of southeastern Utah, part of the Colorado Plateau. Lying entirely within Grand County, and north of Moab, Utah, the park contains 73,379 acres . . . The park contains the greatest concentration of natural stone arches in the country . . . Prehistoric rock art and historic remains of past ranching activity are listed on the National Register of Historic Places. Archaeological sites represent at least three Indian cultures (NPS, 1989).

Two management zones are present with the project area: natural and cultural. The plan states that the natural zone is managed to conserve the natural resources and processes of the Park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are dispersed and limited to those that have little effect on scenic quality and natural processes. Examples of such facilities include foot trails, signs, and trailside information displays. The cultural zone is managed to preserve, protect, and interpret cultural resources (both prehistoric and historic) and their settings. One site listed on the National Register of Historic Places (NRHP) is a popular Moab rock art panel that is located just beyond the project study area, approximately 400 feet from US-191 near Lower Courthouse Wash.

In 2004, a highway easement deed was issued to UDOT for the purpose of maintaining and operating a public highway (US-191) and an adjacent bicycle path through federal lands (FHWA, 2004). The UDOT highway easement is shown on **Figure 3-1** and typically extends about 200 feet from the centerline of the existing

roadway. Near the Colorado River, the park boundary extends into centerline of the existing roadway section, and it is unclear as to whether this easement covers this section (T25S R21E Section 26). For the purpose of this EA, it is assumed that the easement deed intended to cover this section since portions of the roadway and foot path currently exist on federal land. As such, the conditions of the easement would apply to this section as well. The conditions outlined in the easement deed include taking measures to protect the resources of Arches National Park during maintenance and construction activities, providing the NPS the opportunity to review plans and enter right of way, and taking measures to prevent erosion, sediment and exotic weed invasions. The use of pesticides or herbicides without the consent of the NPS is prohibited. And, upon discovery of any archaeological, paleontological, or historical findings, activities are to be halted and the NPS notified.

Arches National Park released their Draft Transportation Implementation Plan and Environmental Assessment for public comment September 2006. This plan includes a concessionaire-operated motorized tour program. The tour would originate in Moab, and make intermediate stops between Moab and Arches, in locations such as Lions Park (NPS, 2006d).

3.1.1.6 Bureau of Land Management

BLM lands within the project study area occur at the junction of US-191 and Potash Road. BLM also administers land east of US-191 between Moab and the Colorado River (as shown in **Figure 3-1**). The BLM Moab Field Office manages 1.8 million acres for multiple uses. Attracting over 1.6 million visitors annually, this area has become a premier destination for mountain bikers, campers, rock climbers, and off-road vehicle enthusiasts. To provide opportunities for these visitors, BLM manages approximately 400 campsites, grooms and marks numerous trails with signage, and provides toilet facilities and other amenities (USDOI, 2004). The Moab Field Office is currently revising the Grand Resource Area Resource Management Plan (RMP) (BLM, 1985). The RMP guides how natural resources, activities, and uses will be managed during the next 15 years. The revised RMP is expected to be implemented in 2008.

3.1.1.7 United States Department of Energy

USDOE's land holdings are located along US-191 between the Colorado River and SR-279 (Potash Road). These USDOE lands include the Moab UMTRA site that was once a uranium-ore processing facility owned and operated by the Uranium Reduction Company and later by the Atlas Minerals Corporation (Atlas). While in

operation, the facility accumulated uranium mill tailings that contain naturally radioactive residue. In 1998, Atlas filed for bankruptcy and the USDOE became responsible for clean-up of the site. In addition to active ground water remediation, the USDOE plans to remove uranium mill tailings and other contaminated material from the site and nearby off-site properties and relocate them to a site at Crescent Junction, using predominantly rail transportation. Because of potential radiation contamination issues, access to the site will be restricted during remediation, which is expected to take up to 75 years (USDOE, 2006). Thus, there are no plans for the future development of this property.

3.1.2 No Build Alternative

The No Build Alternative is not expected to result in land use impacts. Land along US-191 south of the Colorado River is likely to continue to be developed as planned for tourist-related commercial uses, while land north of the river should remain predominantly undeveloped due to extensive public ownership for conservation, recreation, and remediation. Existing tourist-related commercial uses between the Colorado River and Lower Courthouse Wash are likely to remain and may expand on the limited, privately-owned parcels.

3.1.3 Build Alternative

The Build Alternative would convert about 0.3 acres of private land to transportation use. These impacts would occur south of the Colorado River Bridge and would affect commercial land uses. Business displacements are also anticipated, as discussed in **Section 3.4.3**. North of the Colorado River Bridge, improvements would occur within the limits of the UDOT highway easement, which is already designated for transportation use. For the purpose of this analysis, an assumed easement boundary has been identified for T25S R21E Section 26 (as discussed in **Section 3.1.1.5** and shown on **Figure 3-1**).

Other than this minor land use conversion, land along US-191 south of the Colorado River is likely to continue to be developed similar to the No Build Alternative (see **Section 3.1.2**). The Build Alternative is consistent with local, state, and federal land use and transportation plans because:

- Improved traffic flow would support existing and planned tourist-related commercial development south of the Colorado River and improve access to recreational opportunities north of the river.

- Land use changes are consistent with existing and planned land uses. Impacts to lands in recreation or conservation use would be limited and most of the disturbance is short-term or temporary in nature.
- Proposed enhancements to the trail system would help provide connections for a continuous paved trail between Moab and Arches National Park.
- Stormwater runoff from the increased roadway surface would be controlled with stormwater management features.

Secondary effects are not anticipated because future land development is severely constrained by the limited amount of developable land. Much of the private land is constrained by steep slopes, ridgelines, or drainage issues. Improvements are not projected to induce traffic or alter development plans when compared to the No Build Alternative. From a traffic management standpoint, the Build Alternative would remove a bottleneck caused by the short, two-lane section of road between 400 North in Moab and SR-279 (Potash Road). While this bottleneck is an inconvenience, it is not considered a constraint to development by local planners (Olsen and Hugie, December 8, 2005). Also, funding for road widening is not yet secured but annexation and additional development are imminent. Therefore, the Build Alternative is not expected to alter the character of land use or the rate of development.

3.1.4 Mitigation Measures for Land Use Impacts

Coordination with local land managers has been an on-going process. Constraints were identified early in project scoping and measures that were able to avoid and minimize resources important to land managers have been incorporated throughout the development of the Build Alternative.

The primary mitigation for land use impacts is compensation for the purchase of property, as discussed in **Section 3.3.8**. Other measures related to concerns and issues associated with land management are included under their respective heading. Specifically, stormwater runoff is addressed in **Section 3.9.8**, access management is in **Section 3.4.4**, median treatments and trails are in **Section 3.3.8,** and aesthetics are in **Section 3.18.4**.

Additionally, utility companies and/or local entities who have expressed a desire to attach utilities to the new bridge are encouraged to enter into UDOT's permit process as soon as possible so that these needs can be considered in the design of the bridge.

3.2 Farmland

The United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) oversees the Farmland Protection Policy Act (FPPA). For the purposes of implementing the FPPA, farmland is defined as prime or unique farmlands or farmland that is determined by the state or unit of local government agency to be farmland of statewide or local importance. However, it does not include farmland already in or committed to urban development or water storage (7 CFR 658.2). Since the 0.3 acres of land use impacts occur on land already in or committed to urban development, the requirements of the FPPA do not apply.

3.3 Community Resources

Community resources were assessed and modeled after FHWA's community impact assessment (CIA) process (1996). A CIA focuses on issues that affect the community and the quality of life of its people. The level of detail presented in discussing community character and cohesion, environmental justice populations, public facilities and services, relocations, and recreation resources are proportional with the potential for project-related impacts.

Community resources and potential impacts are reviewed at the corridor level and at the demographic study area level, as well as for the city of Moab, Grand County, and/or the state of Utah. The project corridor and demographic study area consisting of four Census block groups is illustrated in **Figure 3-3**. Demographic information was collected from 2000 Census block groups to characterize communities and identify sub-populations within the demographic study area. Data were also obtained from the Grand County Assessor, local plans, public service agencies, interviews with local planners and community representatives, and through on-site reviews. Information provided by community members throughout the public involvement process was used to augment these data.

Community outreach and participation is discussed in **Chapter 6**. Local general plans and zoning are summarized in **Section 3.l**. There are no local regulations applicable to community character and community cohesion. However, both the city and county have general social and economic goals which support and strengthen the existing community and its quality of life.

3.3.1 Community Character and Cohesion

According to the North Corridor Gateway Plan, "Moab is not just another tourist town – it is both a community and tourist hub" (Four Corners Planning, 2001). In

2000, Moab had a population of 4,779 residents and by 2030 it is projected to grow to 5,603 residents. As illustrated in **Table 3.3-1**, historic population growth trends in both Moab and Grand County have been at a slower rate than the State as a whole. The decline in population between the 1980s and 1990s reflects the downturn in the area's mineral extraction industry. Population trends in **Table 3.3-1** do not reflect the seasonal population fluctuations due to an influx of tourists, second home owners, and seasonal, service-oriented workers. These seasonal populations rely on the Moab community to provide goods and services and short-term housing.

Table 3.3-1 Population Growth Trends

LOCATION	1970	1980	1990	2000	2010	2020	2030
Moab	4,793	5,333	3,971	4,779	5,000	5,394	5,603
Grand County	6,688	8,241	6,620	8,485	9,039	9,751	10,129
State of Utah	1,059,273	1,461,037	1,722,850	2,246,553	2,833,337	3,486,218	4,086,319

Sources: Census Bureau, 2000; GOBP, 2005.
Note: Grand County population includes Moab.

General demographic characteristics for residents of Grand County included 27 percent of the population under 18 years old and 13 percent over 65 years old in 2000. The median age for Grand County residents was 36.9 years. Over 2,700 persons ages five years or older in Grand County identified themselves with a disability in the 2000 Census. Disabilities included sensory, physical, mental, self-care, go-outside-home, or employment.

Along the project corridor, residences and neighborhoods are located to the west of US-191 and concentrated between 500 West and 400 North. In general, these residents are buffered from US-191 by a strip of commercial development and these neighborhoods lack formal names and boundaries (Olsen and Hugie, December 8, 2005). Tourists also stay along the project corridor in any of the three campgrounds, several hotels, and/or condominiums with seasonal and short-term rentals. Local planners have noted that the second home market is increasing property values to the point that property is becoming less affordable to low- and moderate-income residents (Olsen and Hugie, December 8, 2005).

Figure 3-4 shows the location of educational facilities, religious institutions, social institutions, medical facilities, and parks and recreation resources on or near the project corridor. Other public services such as police, fire, and rescue, as well as social services, are located south of the project area within downtown Moab.

According to the Moab Area Economic Development Office (Moab, 2006), public services and utilities in the area include the following:

- Telecommunication needs are served by Citizen's Telecom, Precis Cable, and several cellular service providers.
- Sewer services are provided by Moab. Moab has its own wastewater treatment plant which has been upgraded to meet state requirements and to increase capacity.
- Irrigation and culinary water needs are met by the Grand County Water Conservancy District; a retailer for valley irrigation needs and a wholesaler for culinary water to the city of Moab. The Moab Irrigation Company, a privately owned business, also provides water for irrigation to its members. These providers possess sufficient water rights to accommodate water needs for future planned growth and development within the project area.
- Garbage services are provided by Moab.
- Electrical power is supplied by Rocky Mountain Power.
- Natural Gas is supplied by Utah Gas Service Company and Questar Gas.

3.3.2 Environmental Justice Populations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Minority refers to the following minority groups: (1) Black, (2) Hispanic, (3) Asian-American, and (4) American Indian/Alaskan Native. Low-income persons are defined as, "a person whose household income level is at or below the Department of Health and Human Services (HHS) poverty guidelines" (FHWA, 1998). These populations were initially identified at the Census block group level. Public involvement, on site review, and interviews with local planners provided supplemental data.

Tables 3.3-2 and **3.3-3** present minority and income data for Grand County and the four Census tract block groups that comprise the demographic study area. **Figure 3-3** illustrates the correlation of the Census geography with the project corridor. In the 2000 Census, over 89 percent of residents in Grand County were white and non-Hispanic. Minority populations reside within the demographic study area and American Indian/Alaska Native and Hispanic are the largest minority groups. Local planners noted that American Indians currently comprise a portion of the seasonal workforce and that they are beginning to experience an increase in the number of Hispanic seasonal workers (Olsen and Hugie, December 8, 2005). Low-income populations also reside within the demographic study area. Grand County has a higher rate of residents with incomes below the poverty level than the state as a whole. Local planners noted that property is becoming less affordable for low- and moderate-income residents. Additionally, approximately 25 percent of Moab's residents reside in mobile homes, many of which are non-conforming with regard to meeting code and safety standards (Olsen and Hugie, December 8, 2005).

Table 3.3-2 Minority Populations

Census Area	Total population	White alone	Black or African American alone	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Two or more races	Hispanic or Latino
Census Tract 1, Block Group 1	1,199	1,134	3	24	4	0	22	12	78
Census Tract 2, Block Group 1	1,044	986	0	34	2	0	12	10	37
Census Tract 2, Block Group 2	1,348	1,128	10	139	4	4	44	19	120
Census Tract 2, Block Group 3	923	858	4	43	0	0	11	7	63
Grand County	8,485	7,861	21	327	19	4	141	112	471
Utah	2,233,169	1,992,975	17,657	29,684	37,108	15,145	93,405	47,195	201,559

Source: Census Bureau, 2000.
Note: Hispanic or Latino may be of any race.

Table 3.3-3 Household Income and Poverty Levels

Region or Census Block Group and Tract	Median household income in 1999	Per capita income in 1999	Persons with incomes below poverty level	Percent of persons with incomes below poverty level
Census Tract 1, Block Group 1	$ 26,190	$ 14,854	145	12%
Census Tract 2, Block Group 1	$ 28,654	$ 17,456	186	19%
Census Tract 2, Block Group 2	$ 37,222	$ 15,962	158	12%
Census Tract 2, Block Group 3	$ 36,016	$ 17,937	109	12%
Grand County	$ 32,387	$ 17,356	1,244	15%
Utah	$ 45,726	$ 18,185	206,328	9%

Source: Census Bureau, 2000.

Outreach to minority and low-income residents has occurred throughout the project development process. Project meetings have been held within walking and biking distance for residents along the project corridor. To date, there have been no requests for translation services. Other outreach efforts included individual coordination, a project website, direct mailing of project information, and local newspaper advertisements. Further detail about public outreach and participation is included in **Chapter 6**.

3.3.3 Parks and Other Recreational Resources

Approximately 96 percent of Grand County is publicly owned and much of this area offers year-round recreational opportunities. Spring (March through June) and fall (September through mid-November) are the peak tourist seasons for most outdoor recreation activities, including road cycling; hiking and backpacking; horseback riding; rock climbing, canyoneering, and bouldering; as well as photography, birding, hunting, fishing, and sight-seeing. Summer is the peak boating season for activities on the Colorado River, such as rafting, kayaking, and water cruises.

Grand County's General Plan Update states that tourism, primarily recreation-based, is Grand County's most important economic resource today. "During the 1970s and 1980s, Moab became perhaps the most important center for river running, mountain biking, and four-wheel drive recreation in Utah. Moab is the gateway to Arches and Canyonlands National Parks, Dead Horse Point State Park, and the famous Slickrock Bike Trail" (Four Corners Planning, 2004).

The Moab area is world renowned for its slickrock mountain biking trails. Non-motorized travel is encouraged for both transportation and recreation purposes throughout Grand County and Moab. As part of this vision, the Trails Master Plan (Grand County Trail Mix Committee, 2005) identifies a system of trails that would provide connectivity between Moab and recreation opportunities such as Arches National Park (see **Figure 1-3**). Bike lanes and/or sidewalks are provided along numerous local roads throughout Moab. Sidewalks extend along the southernmost portion of the project corridor (from 570 North southward), and continue through downtown Moab. In addition, sidewalks are planned along 500 West and 400 North, independent of this project. Cyclists currently use existing travel lanes or narrow shoulders along US-191.

In addition to the importance of parks and recreation to the local economy and quality of life, publicly-owned parks and other recreation resources may be protected by two regulations: Section 6(f) of the 1965 Land and Water Conservation Fund Act (LWCFA) and/or Section 4(f) of the 1966 Department of Transportation Act.

Section 6(f) refers to parks and recreation lands obtained or improved with funds or grants from the LWCFA. Based on coordination with staff at the Utah State Parks and Recreation, the administrator of Section 6(f) funds for Utah, there are no Section 6(f) properties within the project study area (McArthur, January 24, 2006). Therefore, the provisions of Section 6(f) of the LWCFA are not applicable to this project.

Section 4(f) is applicable only to agencies within the United States Department of Transportation (USDOT) and applies to publicly-owned parks, recreation areas, and wildlife and waterfowl refuges, as well as historic properties. Specific parks and other recreation resources near the project are illustrated in **Figure 3-4** and the applicability of Section 4(f) to these resources is identified in **Table 3.3-4**. Planned parks and other recreation resources are discussed in **Table 3.3-5** and their location is approximated in **Figure 1-3**. The applicability of Section 4(f) to historic properties is discussed in **Section 3.16**. **Chapter 4** explains Section 4(f) in further detail and addresses each Section 4(f) resource affected by the project.

Table 3.3-4 Existing Parks and Other Recreational Resources

Name/Type of Resource	Location and Access	Description	Section 4(f) Applicability
Arches National Park	US-191 and the Colorado River serve as the southern boundary. Primary entrance is from US-191, west of SR-279.	Arches National Park is described in **Section 3.1.1.5** and discussed further in **Chapter 4**.	Yes
Lions Park	Bounded by US-191, SR-128, and the Colorado River. Entrance is from SR-128.	This county park is owned by UDOT and Grand County and provides a variety of recreation opportunities, as discussed in **Chapter 4**.	Yes
Courthouse Wash to Colorado River Bridge Trail	Parallels north side of US-191 between the Courthouse Wash parking area and the US-191 Colorado River Bridge.	This path is a 0.5 mile long unimproved trail located within the UDOT highway easement. The path currently accommodates foot traffic and improvements are identified in the Trails Master Plan. This trail is discussed further in **Chapter 4**.	Yes
Colorado River Bridge Underpass (Trail/Path)	Begins west of US-191 near SR-128 and continues under the US-191 Colorado River Bridge, eastward through Lions Park.	This 0.3 mile long paved path is maintained by the Grand County/City of Moab's Trail Mix Committee for Non-Motorized Trails. A portion of this trail is located within UDOT right of way.	Yes
Moab Canyon Bike Path	Path extends from just north of the Courthouse Wash parking area to the entrance of Arches, along the north side of US-191.	This 2.2 mile long paved path is located within the UDOT highway easement and provides bicycle and pedestrian access to the entrance of Arches National Park, separated from US-191.	NA
Scott Matheson Wetland Preserve	West of US-191 and south of the Colorado River. Access is via 400 North, Stewart Lane, Kane Creek Road, or the US-191 frontage road south of the Moab Valley RV Resort.	The preserve is jointly managed by Division of Wildlife Resources and TNC. Division of Wildlife Resources owns the northern portion of the preserve and TNC owns the southern portion. This preserve is discussed further in **Chapter 4**.	Yes
Colorado River	Runs east-west through the project study area. Access is provided at the Moab Dock across the river from Lions Park or from the Potash Dock, 17 miles downstream.	The Colorado River is considered Sovereign Land and managed through FFSL incorporating multiple-use, sustained-yield principles. The project study area is in a calm-water section suitable for canoes, kayaks, and rafts. Commercial scenic river cruises and professionally outfitted tours are also available.	No
Campgrounds	Various locations adjacent to US-191, between 400 North and SR-279.	Privately-owned commercial campgrounds and RV parks offer tent and RV campsites, cabins, and recreational amenities such as swimming pools and playgrounds.	No
Butch Cassidy's King World Water Park	1500 North Highway 191	This privately-owned 17-acre commercial water park offers amenities such as waterslides, swimming pools, and picnic facilities.	No

NA = Resource is outside project construction limits and not otherwise affected by the project; therefore, Section 4(f) applicability was not determined.

Table 3.3-5 Planned Parks and Other Recreational Resources

Name/Type of Resource	Location and Access	Description	Section 4(f) Applicability
Highway 191 Bike Path	Along the east side of US-191, from approximately 600 North to SR-128.	Grand County is the sponsor of a 2006 transportation enhancement project to develop a meandering, paved path for non-motorized access from Moab City to the planned Colorado River Bridge Underpass at Lions Park, separated from US-191. The trail is being jointly developed and considered in conjunction with this project, and the specific location of this trail within UDOT right of way is not important.	No
Highway 128 Bike Path	Follows SR-128 and the Colorado River east of US-191.	This 3.2 mile paved trail would start at Lions park and continue to the Porcupine Rim Trail. A portion of this path would be constructed in conjunction with the Colorado River Pedestrian Bridge, as part of a transportation enhancement project sponsored by Grand County.	NA
Kane Creek / Colorado River Connector Trail	North/south through Preserve, connecting to the Colorado River Bridge Underpass.	This 2.3 mile unpaved trail would be limited to foot traffic. No alignment has been established, no funding source identified, and the property owner/land manager (TNC) is not in support of the locating trail through the Preserve.	NA
Colorado River Pedestrian Bridge	East of the US-191 Colorado River Bridge	Construction of a new pedestrian crossing of the Colorado River is expected to begin in 2006 as part of a transportation enhancement project, sponsored by Grand County.	NA

NA = Resource is outside project construction limits and not otherwise affected by the project; therefore, Section 4(f) applicability was not determined.

3.3.4 Property Acquisition

The No Build Alternative would not require additional property acquisition or result in displacements. Right of way and potential easements associated with the Build Alternative are identified in **Table 3.3-6** and illustrated in **Figure 2-4**.

Table 3.3-6 Existing and Proposed Highway Right of Way and Other Property Acquisition (in acres)

Type of Right of Way and Property Acquisition	South of Colorado River	Colorado River Bridge	North of Colorado River	Total
Existing Right of Way	39.5	8.0	32.1	**79.6**
Additional Right of Way Acquisition	0.3	0	0	**0.3**
Additional Permanent Easement	2.6	0	0	**2.6**
Temporary Easement	3.6	0	0.2	**3.8**

Note: The existing right of way north of the Colorado River includes the existing UDOT highway easement and the assumed easement boundary for T25S R21E Section 26, as shown in **Figure 3-1**.

The Build Alternative would require a minor amount of right of way (approximately 0.3 acres) to accommodate the widened roadway section (to one foot behind the

sidewalk). Permanent easements totaling about 2.6 acres from private commercial land south of the Colorado River Bridge would be necessary to accommodate cut/fill slopes, retaining walls, utilities, and/or increased stormwater runoff. Construction activities necessary to implement the project would likely temporarily disturb another 3.8 acres. The Build Alternative is not expected to displace residences, farms, or non-profit organizations, but would likely displace businesses. Potential business displacements are discussed in **Section 3.4**.

3.3.5 Impacts to Community Character and Cohesion

Neither the No Build nor Build Alternative would bisect, separate, or isolate the residential area to the west of US-191. The Build Alternative's potential impacts to community character and cohesion have been minimized through coordination with local stakeholders and by incorporating a design that requires minimal new right of way.

The No Build Alternative would not address issues associated with traffic congestion. Without improvements, US-191 is projected to operate at LOS E by 2030 (see **Section 1.4.2**). As such, existing and future traffic levels would cause inconvenience and delay for motorists due to inadequate capacity. Traffic congestion is intensified during the tourist season and the bottleneck on US-191 creates congestion problems that affect the accessibility of the tourist attractions, businesses, and community resources.

The Build Alternative would eliminate the bottleneck and relieve congestion, providing a LOS B in 2030; thereby supporting the existing quality of life for residents and tourists traveling along this section of US-191. Additionally, reducing congestion would improve travel times/response times for emergency services. Roadway improvements, such as the center median and widened shoulders, would also provide an easier and safer access into and out of residential areas that are accessed from North MiVida Drive and 400 North.

Paved shoulders, sidewalks, and improvements to non-motorized trails associated with the Build Alternative would enhance non-motorized access to tourist attractions, businesses, and community resources. These bicycle and pedestrian improvements would enhance safety and optimize connectivity to recreation opportunities consistent with the local community character and quality of life.

During construction, tourists and residents would be temporarily inconvenienced by traffic delays. Phasing of bridge construction would typically allow one lane of traffic to be provided in each direction. Other contractor restrictions would limit

major construction activities during peak tourist season. These commitments and other efforts to minimize potential construction impacts on the community are outlined in **Section 3.3.8.**

The Build Alternative would require relocating and/or upgrading utilities within the roadway or parkstrip (e.g., water lines, sewer, power, and storm water systems). The extent of these relocations and improvements would be identified during final design, but service interruptions would be limited.

3.3.6 Impacts to Environmental Justice Populations

Given that the minority and low-income populations are dispersed within the community and would share equally in the benefits and burdens, the project would not result in disproportionately high and adverse impacts to minority or low-income populations. Businesses potentially displaced by the Build Alternative do not specifically serve minority or low-income residents.

3.3.7 Impacts to Parks and Other Recreational Resources

Under the No Build Alternative, there would be no impacts to existing or planned parks and other recreation resources. However, UDOT is only proposing to fund improvements to the Courthouse Wash to Colorado River Bridge Trail under the Build Alternative. While such improvements to the unimproved trail are not precluded under the No Build Alternative, funding for such improvements would need to be secured separately should the No Build Alternative be selected. Additionally, since the two-lane portion of US-191 would remain a bottleneck to travel during periods of high tourist visitation, the ease of access to parks and other recreation resources within the area would continue to decline. However, it is not likely that this bottleneck would alter the actual use or enjoyment of the area's parks and other recreation resources. The Build Alternative would either enhance or have a minimal effect on parks and other recreation resources adjacent to US-191 as summarized in **Table 3.3-7**.

Table 3.3-7 Impacts to Existing and Planned Parks and Other Recreational Resources

Resource	Impact
Arches National Park	A total of 0.6 acres is within the construction limits. See **Chapter 4** for further detail.
Lions Park	A total of 0.25 acres is within the construction limits. See **Chapter 4** for further detail.
Courthouse Wash to Colorado River Bridge Trail	The existing informal footpath would be enhanced by the project. See **Chapter 4** for further detail.
Colorado River Bridge Underpass	In order to accommodate the bridge replacement and widened roadway section, portions of this trail would need to be shifted slightly and reconstructed. See **Chapter 4** for further detail.
Moab Canyon Bike Path	No impact.
Scott Matheson Wetland Preserve	A permanent drainage easement encompassing 1,312 square feet and a temporary construction easement consisting of 1,794 square feet is expected. See **Chapter 4** for further detail.
Colorado River	While recreational water-related activities would not be prohibited during construction of the bridge, some periodic restrictions may be necessary to accommodate safe passage under the bridge. These restrictions would reduce the potential for conflicts with construction equipment and falling debris. However, restrictions are not expected during peak boating season. Once constructed, the new bridge would not introduce a substantially different visual element to river users.
Campgrounds	Existing driveway connections may need to be re-established.
Butch Cassidy's King World Water Park	No impact.
Highway 191 Bike Path (Planned)	Since this trail is still in the planning stages, exact impacts cannot be determined at this time. Where terrain is steep, portions of the trail will likely need to be reconstructed as part of the US-191 roadway widening project.
Highway 128 Bike Path (Planned)	No impact.
Kane Creek / Colorado River Connector Trail (Planned)	No impact.
Colorado River Pedestrian Bridge (Planned)	No impact.

3.3.8 Mitigation Measures for Community Impacts

Property acquisition will be conducted in accordance with Title VI of the Civil Rights Act of 1964 and the Uniform Relocation Assistance and Real Property Acquisition Policies act of 1970 as amended (the Uniform Act). Relocation services and benefits will be administered through UDOT's Relocation Assistance Program.

UDOT will build upon successes of the Moab Main Street Project to minimize community impacts during construction. Coordination with local stakeholders has identified the following commitments that will be incorporated into the project:

- Landscaping and median treatments consistent with the North Corridor Gateway Plan will be considered during design (see **Section 3.18.4**).
- UDOT standards for traffic control management will be implemented to coordinate the efficiency and safety of construction activities throughout the duration of the project.
- Major construction activities would be halted on weekends during peak tourist season (i.e., March, April, and late October) and during major events (i.e., the Skinny Tire festival, the Canyonlands half marathon and five mile run, the Easter Jeep Safari, and the 24 Hours of Moab bike race).
- The city, residents, and travelers will be kept informed regarding construction activities.

Recreation activities on the Colorado River will not be restricted during peak boating season since work within the live channel is restricted during the summer months (see **Section 3.14.6**). Existing trails will remain open for use during peak tourist season. Site specific locations may require temporary closures at other times when construction activities make it unsafe for use by pedestrians and bicyclists. Proposed roadway shoulders and sidewalks, as well as restoration of disturbed trails, and the enhancement of the Courthouse Wash to Colorado River Bridge Trail will improve the safety of bicyclists and pedestrians along US-191 and also increase connectivity of non-motorized trails within the area.

3.4 Economics

Research on economics in the project area was completed through coordination with local businesses and state agencies. The Demographic and Economic Analysis section of the Governor's Office of Planning and Budget (GOPB) manages, analyzes, and disseminates economic, demographic, and fiscal data. Each county in Utah has a County Assessor's Office, which is responsible for examining all properties subject to

that particular county's assessment. Interviews were held with local government officials, local economic development plans were reviewed, and an on-site review was completed to assess the local economic conditions.

3.4.1 Economic Setting

The economic base of Grand County has shifted from mining and resource extraction to service-based tourism. Grand County's General Plan Update states that tourism, primarily recreation-based, is Grand County's most important economic resource today. Grand County's public lands are the foundation of the county's economic prosperity and economic benefit is derived from the management of public lands for multiple uses including: livestock, tourism, mineral extraction, recreation, and hunting (Four Corners Planning, 2004). Local economic goals include diversification that will strengthen the economy to provide year-round employment without compromising the natural environment or rural character.

Downtown Moab and Arches National Park are the employment centers of the County. The largest employers include the Grand County School District, the City Market grocery store, and the NPS. In 2000, the largest employment sectors were leisure and hospitality (36 percent); trade, transportation, and utilities (20 percent); and government (20 percent). As shown in **Table 3.3-8**, the education and health services is projected to be one of the fastest growing sectors, but the leisure and hospitality sector are projected to remain dominant in 2030.

Table 3.3-8 Grand County Employment by Sector

NAICS Sector	2000		2030		% Change 2000 - 2030
	Jobs	%	Jobs	%	
Natural Resources and Mining	75	2%	79	1%	5%
Construction	284	7%	439	7%	55%
Manufacturing	44	1%	122	2%	177%
Trade, Trans., Utilities	824	20%	1,023	16%	24%
Information	48	1%	123	2%	156%
Financial Activity	132	3%	345	5%	161%
Professional & Business Services	183	4%	443	7%	142%
Education & Health Services	207	5%	823	13%	298%
Leisure & Hospitality	1,499	36%	1,841	28%	23%
Other Services	49	1%	307	5%	527%
Government	822	20%	920	14%	12%
Total (non-farm jobs)	4,167	100%	6,465	100%	55%

Sources: Utah Department of Workforce Services, 2005; GOPB, 2005.
NAICS: North American Industrial Classification System

The property tax base in Grand County is limited by the amount of private land within the county, only 4.3 percent of the total land area. In 2004, the total assessed property value in Grand County was $645.6 million (Utah State Tax Commission, 2004). The average annual increase in land valuations has been 4.25 percent since 1995 (Four Corners Planning, 2004). Grand County collects tourism-based revenues from transient room tax, restaurant tax, car rental tax, and gross taxable sales. According to the North Corridor Gateway Plan, truck traffic "is a major impediment to pedestrianism and the development of a strong retail sales tax base" (Four Corners Planning, 2001).

As discussed in **Section 3.1.1**, tourist-related businesses are concentrated along US-191 south of the Colorado River and additional commercial growth in this area is anticipated. Existing businesses along the project corridor include:

- Recreation attractions - Butch Cassidy's King World Water Park,
- Recreation outfitters - Red River Rapids, Tag-Along Expeditions, Farabee's Jeep Rental, Poison Spider Bikes, Chili Pepper Bike Shop, and Slick Rock Cycles,
- Restaurants - Desert Bistro, Sunset Grill, Buck's Grill House, and Denny's,
- Lodging - Moab Springs Ranch condominiums, Moab Valley RV Resort, Slickrock Campground and RV Park, Aarchway Inn, Holiday Inn, Motel 6, Super 8 Motel, Inca Inn, Adventure Inn, Cottage Inn (currently being redeveloped as a Hampton Inn), and Days Inn,
- Services - dental, chiropractor, computer, real estate, financial, auto repair, and natural gas, and
- Retail - Rock Shop and Maverick Country Store.

3.4.2 No Build Alternative

As explained in **Section 3.3.5**, the No Build Alternative would not address issues associated with traffic congestion. Heavy traffic congestion, especially during peak tourist season, limits accessibility to the businesses located on US-191 and is not consistent with the region's image as a major outdoor recreation destination.

3.4.3 Build Alternative

As the foundation of the local economy is tourism, project impacts potentially affecting tourism are the main focus of this section. Potential business displacements are shown in **Figure 2-4** and include:

- The Adventure Inn located at 512 North Main Street, and
- Four businesses in an office building located at 550 North Main Street: Moab Realty, Red Valley Chiropractic, Top Line Computers, and Fidelity Mortgage Company.

A vacant commercial building at 415 North Main Street would also be removed. Michael Baker Jr., Inc. conducted a survey of local real estate relocation options available in April 2006. According to this survey, the office-related businesses at 550 North Main Street could relocate into available existing office space in Moab. The Adventure Inn could choose to redevelop on the remaining parcel or build on a different parcel in the Moab area. The relocation of the Adventure Inn into an existing vacant motel in Moab is unlikely since the existing hotel/motel real estate market is more limited. Several motels/hotels were listed for sale in Green River, approximately 60 miles northwest of Moab along I-70.

The displacement of businesses would result in the temporary loss of employment as well as property, sales, and transient room tax revenues. Temporary employment loss is estimated to be less than 25 employees. Property, sales, and transient tax revenue impacts are estimated to have a minimal impact on the local economy. Based on Grand County tax assessor data, these three parcels would have a combined property tax value of $1,098,000 which represents 0.2 percent of the Grand County total assessed property value. Since these businesses provide services and not retail goods, the impact to local sales tax revenues are minimal. The displacement of the Adventure Inn would result in a loss of transient room tax revenues; however, it is one of 40 accommodations in Grand County (Census Bureau, 2004).

Because of its prime commercial location, it is likely that the Adventure Inn parcel would be redeveloped for commercial uses either by the existing owner or a new owner; thereby providing new jobs and tax revenues. Because of their limited size, the remnant parcels at 550 and 415 North Main Street may or may not be redeveloped, but may convert to other uses. While the city does not have a minimum lot size for commercial development, the site size and lack of parking would limit the type of business that could redevelop the site (Olsen, July 31, 2006). Additionally, these remnant parcels may be used to provide additional downtown parking or aesthetic improvements.

The Build Alternative would not permanently alter local traffic patterns. However, during construction, patrons may have a more difficult time getting to and from businesses because of restricted lanes of travel, reduced speed limits, and moderate delays. Businesses would be able to remain open with temporary construction access,

and the most direct construction-related impacts to businesses are expected to occur during construction activities associated with the roadway section south of the Colorado River.

Temporary construction-related impacts to local businesses would be similar to those experienced by downtown businesses during the recent Moab Main Street Project. The increased difficulty to access businesses during construction is not expected to result in additional loss of businesses because the duration of this impact is limited and minimized during peak tourist season. Business owners who are interested in ways that they can proactively plan for and successfully cope with construction are encouraged to obtain a copy of UDOT's Partners for the Road Ahead (UDOT, 2006a). This brochure is available online at www.udot.utah.gov/business-guide and copies will also be available at the public hearing for this project.

The addition of aesthetic and recreational amenities, as well as less congested access to the public lands, enhances the region's image as a major recreation destination, thus supporting the local tourist-based economy. Once constructed, the Build Alternative would reduce congestion and enhance amenities such as non-motorized trails. The reduced congestion would allow for convenient and safer access to businesses, as well as convenient access from downtown Moab to recreation attractions north of the Colorado River. The sidewalk and improvements to the informal foot path north of the Colorado River Bridge provides better non-motorized access to Moab area businesses and public lands.

Review of local plans and coordination with the public, business owners, and local government representatives has also identified that aesthetically pleasing design features would make the proposed improvement more compatible with the region's "gateway" vision. These man-made aesthetic features would be designed to complement the region's inspiring scenery. Aesthetics are discussed further in **Section 3.18**.

3.4.4 Mitigation for Economic Impacts

Mitigation measures and commitments to offset adverse economic impacts include those identified in **Sections 3.3.8** and **3.18.4**, as well as the following additional commitments:

- There will be at least one lane in each direction open during construction of the Colorado River Bridge.
- Pedestrian access to businesses will remain open during construction.

- Access to businesses will be maintained throughout construction and most driveways will remain open.
- Where amenable to the property owner, consolidation of driveway accesses will be considered in the design phase.
- UDOT's business guide, Partners for the Road Ahead, will be made available to businesses at the public hearing to assist them in proactively planning for and successfully coping with construction (also available online at www.udot.utah.gov/business-guide).

3.5 Pedestrian and Bicyclist Considerations

To avoid redundancy, pedestrian and bicyclist considerations are discussed as part of **Section 3.3** and, as applicable, in **Chapter 4**.

3.6 Air Quality

Consistent with NEPA and as further detailed in 23 CFR 771, projects must be evaluated for potential human environment air quality impacts. Additionally, the federal Clean Air Act (CAA) has established specific procedures and limitations for evaluating transportation projects in designated air quality nonattainment areas. These procedures, generally referred to as the "conformity regulations," are outlined in 42 USC 7401 (et. seq.) and are further detailed in 40 CFR 93. Although separate from the NEPA process, the conformity regulations also require a review of the potential transportation air quality impacts on the human environment.

Two notable differences exist between NEPA and CAA project level air quality requirements. NEPA applies to federal projects regardless of location, whereas the CAA applies to projects within specifically identified areas. Also, NEPA regulations provide limited detail on direction and criteria for project level air quality analyses, whereas the CAA and its implementing regulations provide substantial detail. Both NEPA and CAA apply National Ambient Air Quality Standards (NAAQS) for the relevant pollutants as the criteria for evaluating proposed projects and actions.

3.6.1 Existing Air Quality Conditions

The general climatic and meteorological conditions in the study area identify Grand County as being in attainment for all the criteria pollutants. It is a rural area, sparsely developed, relatively speaking. The nearest air quality monitor is located in San Juan County (ID #490370101), approximately 35 miles to the southwest. There is an

Ozone monitor placed in Canyonlands National Park to determine the highest rural Ozone concentrations, and there has never been an NAAQS impact at this site.

3.6.2 Air Quality Impacts

Air quality impacts have been evaluated per UDOT's Air Quality Guidance (UDOT, 2003a). Ozone, Carbon Monoxide (CO) and Particulate Matter (PM_{10} and $PM_{2.5}$) were the pollutants evaluated. Mobile Source Air Toxics (MSATs) are also addressed.

Grand County is not located within a Metropolitan Planning Organization area and is designated as being in attainment for all criteria pollutants. Therefore, Regional Air Quality Conformity requirements do not apply. And, since there has never been an NAAQS criteria impact recorded in the region (adjacent San Juan County) for any criteria pollutant, there is no federal action required for any criteria pollutant and detailed air quality modeling is not required.

CO was screened through the process defined in the UDOT Air Quality Hot Spot Manual, Section C (UDOT, 2003a). Existing mainline average daily traffic (ADT) on US-191 is approximately 6,000 vehicles per day (vpd) and the predicted design year 2030 mainline vpd is just over 10,000. The screening threshold for maximum mainline traffic volumes that do not require CAL3QHC modeling is 30,000 vpd in the existing year and 50,000 vpd in the design year. The screening threshold for maximum intersection traffic volumes that do not require CAL3QHC modeling is 25,000 vpd in the existing year and 45,000 vpd in the design year. The existing and proposed traffic volumes are below the "hot spot" screening analysis thresholds for CO and pass the screening test. Therefore, it is anticipated that there will be no predicted NAAQS criteria impacts and no further analysis or mitigation is required.

Quantitative analyses tools for PM_{10} and $PM_{2.5}$ are not yet approved for use. Pending the release of official Environmental Protection Agency (EPA) hot spot quantitative tools, EPA's guidance for qualitative analysis for PM_{10} and $PM_{2.5}$ was followed. This guidance is described in EPA's final rule (71 FR 12468) that was signed by EPA and FHWA on March 29, 2006. Since the project is in an area designated as being in attainment for both PM_{10} and $PM_{2.5}$, no further analysis is necessary.

Reliable methods do not exist to accurately estimate the health impacts of MSATs from a proposed highway project at the project level; however, it is possible to qualitatively assess the levels of future MSATs emissions under the project. Qualitative analyses for MSATs are described in the FHWA's Interim Guidance on Air Toxic Analysis in NEPA Documents (FHWA, 2006a). This project is considered a minor widening project (less than 150,000 annual ADT), and the amount of MSATs

emitted would be proportional to the vehicle miles traveled (VMT). Because the estimated VMT are the same for both the No Build and Build Alternative in the design year 2030, it is expected there would be no difference in overall MSATs emissions. Also, emissions would likely be lower in the design year than the present levels as a result of EPA's national control programs that are projected to reduce MSATs emissions by 57 to 87 percent between 2000 and 2020. Though local conditions may differ, the magnitude of the EPA-projected reductions is so great (even accounting for VMT growth) that MSATs emissions in the project study area are likely to be lower in the future in nearly all cases.

Construction activities can have a short-term impact on local air quality during periods of site preparation, with particulate matter from fugitive dust having the greatest impact. This impact may occur in association with any excavation and earth moving, cement, asphalt, aggregate handling, heavy equipment operation, use of haul roads, wind erosion of exposed areas, and material storage piles. The effect of fugitive dust would be temporary and would vary in scale depending on local weather conditions, the degree of construction activity, and the nature of the construction activity.

3.6.3 Mitigation Measures for Air Quality

Best Management Practice (BMP) measures will be implemented, and the contractor will comply with the provisions of state laws governing the maintenance and operations of construction equipment and regulations governing fugitive dust. The emissions that are due to the construction operations for this project will be mitigated by implementation of the following BMP measures. Specific project level measures suggested during construction operations include:

- **Fugitive Dust Emission Control Plan:** During construction of the project, the contractor would maintain a fugitive dust control plan under the State or Utah Fugitive Emissions Program Rule R307-309-4, effective December 1, 2003. Strategies to control fugitive dust under R307-309-4 include wetting or watering, chemical stabilization, enclosing or covering operations, planting vegetative cover, providing synthetic cover, wind breaks, reducing vehicular traffic, reducing vehicular speed, cleaning haul trucks before leaving loading area, limiting pushing operations to wet seasons, paving or cleaning road ways, covering loads, conveyor systems, boots on drop points, reducing the height of drop areas, using dust collectors, reducing production, mulching, limiting the number and power of blasts, limiting blasts to non-windy days and wet seasons, hydro drilling, wetting materials before processing, using a

cattle guard before entering a paved road, washing haul trucks before leaving the loading site, and/or terracing.

- **Other Emissions Controls:** The contractor would shut off construction equipment when not in direct use to reduce idling, adhere to burning restrictions, control local source plant operations (e.g., asphalt, cement, and crushing), and minimize hauling.

3.7 Noise

A Noise Analysis was conducted for this project and is included as **Appendix A** (Michael Baker Jr., Inc, 2006c). The Noise Analysis has been conducted in accordance with Utah Code 72-6-111 and 112, which adopts and incorporates the FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772). Traffic noise impacts are defined in 23 CFR 772 as "impacts which occur when predicted traffic noise levels approach or exceed the Noise Abatement Criteria, or when the predicted traffic noise levels substantially exceed the existing noise levels." **Table 3.7-1** shows the UDOT Noise Abatement Approach Criteria, which provides subjective descriptors of the noise impact at the various occupied facilities along the proposed project route. A 10 a-weighted decibel (dBA) or greater increase in the noise level over the existing condition is considered to be a substantial increase impact by UDOT.

Table 3.7-1 Noise Abatement Approach Criteria*

HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (dBA)			
Activity Category	**L_{eq} (h) dBA***	**L_{10} (h) dBA***	**Description of Land Use Category**
A	55 (exterior)	58 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	65 (exterior)	68 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	70 (exterior)	73 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	-	-	Undeveloped lands.
E	50 (interior)	53 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR 772; and UDOT, 2004b.

*Reflects UDOT's approach criteria levels since a noise impact occurs at this level. Either L_{eq} (h) or L_{10} (h) (but not both) may be used on a project.

Note: Tabulated sound levels are threshold values used to define impact and where abatement will be considered. Noise abatement will be designed to achieve a substantial noise reduction - not necessarily achieving the noise abatement criteria.

Category B, C, and E receptors were analyzed for this project and include recreation areas, parks, residences, churches, and commercial properties. Multi-family residences were identified using a single representative receptor but were counted as separate dwelling units.

The following sections identify sensitive receptors that have sound levels that approach, equal, or exceed the UDOT criteria in the existing year, as well as for the No Build and Build Alternatives using the design year (2030) noise environments. **Appendix A** (specifically, Figure 2 and Appendix A of the Noise Analysis) identifies the location of each receptor and sound levels for the existing year (2005) and design year (2030) noise environments. Please note that these sound levels have been rounded.

3.7.1 Existing Noise Environment

As shown in **Table 3.7-2**, there are seven receptors that have sound levels that approach, equal, or exceed the UDOT criteria in the existing year. These include one single family residence (2 Rosalie Court), two motels (Days Inn and Adventure Inn), and four commercial businesses (Slick Rock Cycles, Maverick, Poison Spider, and Century 21).

Table 3.7-2 Total Number of Receptors and Dwelling Units that Approach, Equal, or Exceed the Noise Abatement Criteria (NAC)

	Total Numbers by Alternative		
NAC Category	Existing Year 2005	Design Year 2030 No Build	Design Year 2030 Build Impacts*
B	3	4	5
C	4	4	4
E	0	0	0
Total	7	8	9

Source: Michael Baker Jr., Inc., 2006c.
*FHWA/UDOT NAC impacts only. There are no predicted UDOT substantial increase criteria impacts.

3.7.2 No Build Alternative

Eight receptors have sound levels that approach, equal, or exceed the UDOT criteria in the design year under the No Build Alternative. These include two motels, two single family residences, and four commercial businesses. In addition to the receptors impacted in the existing year, the single family residence at 3 Rosalie Court is also impacted under the No Build Alternative. On average, the increase over the existing condition is about 2 dBA (0-3 dBA range).

3.7.3 Build Alternative

Nine receptors have sound levels that approach, equal, or exceed the UDOT criteria in the design year with the Build Alternative. These include three motels, two single family residences, and four commercial businesses. In addition to the receptors impacted in the No Build Alternative, the Hampton Inn redevelopment is also impacted with the Build Alternative. There are no UDOT substantial increase criteria impacts, which is typical of most road widening projects.

The average sound level change is approximately 2 dBA (0-6 dBA range) over the No Build Alternative and approximately 4 dBA (0-8 range) over the existing year. These sound level changes are primarily the result of a combination of the following variables: minor alignment centerline shifts closer or farther away from noise sensitive sites, the reduction or increase of the posted speed limit (depending on the section), the addition of through lane capacity, existing shielding, and the added reflective surface where appropriate (e.g., additional lane, center turning lane, shoulders, bike trail).

Temporary increases in the sound level environment because of construction activities are expected to occur at the studied receptor sites. Although temporary, there will be occurrences where construction noise is perceptible to the general public. Construction noise levels would not be continuous for any given receptor but would be intermittent and vary by location. For example, a receptor may experience noise due to removal/excavation activities, drainage installations, pile driving, and paving operations at different timeframes during the construction. Furthermore, disruptions could occur while these activities are performed in a northbound direction, and then again for construction in the southbound direction. These individual disruptions should be for a limited period of time.

3.7.4 Mitigation Measures for Traffic Noise

In accordance with UDOT's Traffic Noise Abatement Policy (UDOT 08A2-1; revised March 8, 2004), there are no practical (reasonable and/or feasible) noise abatement measures which will eliminate the traffic noise impact and noise walls are not proposed. **Appendix A** (specifically, Section 11 of the Noise Analysis) provides further detail regarding each specific noise abatement measure considered.

Generally, the control, timing, and phasing of construction noise will be governed by UDOT construction specifications. The project falls within a "noise sensitive zone" (the land enclosed within a 1,500 foot radius circle of any receptor) as defined by UDOT construction standard specification Section 01355 (Environmental Protection)

Part 1.8 Noise and Vibration Control. This specification states that the contractor will be required to prohibit construction activity in a noise sensitive zone if the sound level within 10 feet of the nearest receptor exceeds 95 dBA in daytime (from 7 am to 9 pm) or 55 dBA in nighttime (from 9 pm to 7 am), as well as Sundays and state holidays.

For non-planned or non-permitted undeveloped land, it is suggested that commercial development be incorporated in a manner that would create a buffer zone between US-191 and sensitive areas. In an effort to help create a buffer zone for future planning purposes of undeveloped land, the worst-case 65 and 70 dBA contours were developed for the two sections of US-191 that are proposed to have different speeds. The approximated 65 dBA contour distance is 140 feet between 400 North and the Colorado River, and 270 feet north of the river. The respective 70 dBA contours are 60 feet and 130 feet. These distances are measured from the proposed roadway centerline, rounded to the nearest ten feet, varies slightly based on typicals. This is a straight-line estimate for planning purposes only and does not take into account for sound level variations as a result of numerous local sound wave changing dynamics such as building shielding, terrain, tree zones, and ground zone changes. It does, however, incorporate the effects of the additional noise reflective pavement proposed from the construction of center turning lanes, shoulders, and bike paths, as applicable.

3.8 Geology and Soils

The project corridor lies in the Spanish Valley at an elevation ranging between 3,960 and 4,030 feet. The Moab area is surrounded by major faults which are geologically young. As US-191 goes through the narrowest part of Moab Canyon, it crosses the Moab Fault, which is visible from the Arches Visitor Center. The project corridor itself lies between red rock canyons carved into layers of sedimentary rock formations that have been molded and eroded by a variety of uplifting and erosional processes (NPS, 2006c).

US-191 in the project corridor is offset from rock outcrops on the east side and there is limited soil substrate due to the rock outcrop. The west side of US-191 shows a range of soil types, two of which are hydric soils situated along the Colorado River (USDA, 2004). The depth to bedrock is about 60 inches and soil permeability ranges from no permeability on the east side to moderately rapid (two to six inches per hour) to rapid (six to 20 inches per hour) on the west side (NPS, 2006c). The use of retaining walls and incorporating erosion control measures into the project would limit encroachment into rock outcrops and other potential geologic hazards.

3.9 Water Resources

This section describes the current regulatory context, water resources, existing water quality, and project-related impacts. Water quality management and mitigation measures as they pertain to the project are also addressed. Water resources include surface water bodies such as rivers, streams, wetlands, lakes/ponds, and underground water bodies such as aquifers. Floodplains are discussed in **Section 3.10** and wetlands are discussed in **Section 3.12**. Aspects of water quality that pertain to threatened and endangered species are addressed in **Section 3.14**.

Policies of the relevant regulatory agencies were reviewed and discussions were held with the United States Army Corps of Engineers (USACE), EPA, Division of Water Quality (DWQ), Division of Drinking Water (DDW), Division of Water Rights, Grand County, and Moab to clarify the policies and permitting requirements that are relevant to the project. Data for this analysis were obtained from these agencies, as well as the Utah Geological Society (UGS), Utah State University, and the Geological Society of America (GSA).

The federal Clean Water Act (CWA) governs most aspects of water quality. Section 401 of the CWA requires a water quality certification that is issued by the DWQ when a project requires a federal license or permit and will result in a discharge to waters of the United States.

Under Section 402 of the CWA, a National Pollutant Discharge Elimination System (NPDES) permit for point discharge and stormwater is required if a proposed project disturbs more than a specific size of land. The DWQ implements Section 402 by requiring a Utah Pollutant Discharge Elimination System (UPDES) Stormwater General Permit for construction activities that disturb more than one acre of land, or when the project is part of a larger plan. A UPDES Construction Permit is also required for the development or expansion of a stormwater system that has an increased discharge of five cubic feet per second (cfs) or more or a new discharge point.

The USACE administers Section 404 of the CWA, as well as Section 10 of the Rivers and Harbors Act of 1899. Under Section 404, a permit is required for the discharge of dredged or fill material into waters of the United States. Under Section 10, a permit is required for work or structures in, over, or under navigable waters of the United States.

The Division of Water Rights, also known as the State Engineer’s Office, administers a Stream Alteration Program that requires individual planning activities that affect a natural stream to obtain a Stream Alteration Permit. Most proposals (e.g., bridge

construction) are covered by General Permit 40, which authorizes the State to have its Stream Alteration Permit also fulfill the requirements of Section 404 of the CWA. In some instances, however, a USACE individual permit is required.

The federal Safe Drinking Water Act Amendments of 1996 require states to establish Source Water Assessment programs for sources of drinking water. Utah has had a mandatory Drinking Water Source Protection (DWSP) program for ground water sources (e.g., wells and springs) since 1993. In 1998 and 1999, the Utah Source Water Assessment Program (SWAP) supplemented the existing DWSP ground water program with additional information regarding assessment and protection of surface water sources (e.g., lakes, reservoirs, and rivers).

Utah's rules regarding the protection of ground water sources require that each public drinking water supplier prepare a protection plan that is reviewed and approved by the DDW. The protection plan determines what areas or zones must be protected and the extent of protection that is necessary. Various activities or facilities within these protection zones may be restricted if they would jeopardize the purity of the drinking water source.

3.9.1 Surface Waters

As shown in **Figure 3-5,** the project is located in the upper Colorado Basin – Kane Springs Watershed (HUC 14030005), which is managed by the DWQ as part of the Colorado River Southeast Management Unit. Major features in the watershed include the Colorado River and its tributaries – Onion Creek, Professor Creek, Castle Creek, Salt Wash, Negro Bill Canyon Creek, Courthouse Wash, Mill Creek, Pack Creek, Kane Springs Creek, Indian Creek, and Salt Creek.

The mean annual water yield for the Colorado River Southeast Management Unit is approximately one inch (about 651,400 acre-feet), while the mean annual precipitation amounts to approximately 11.8 inches – or about 8.8 million acre-feet (Utah State University, 2006). The natural flow regime has been modified by reservoirs, irrigation, water diversions, and other hydrologic modifications. Stream flow in the basin is dominated by snowmelt runoff, with the majority of the runoff volume occurring during late spring and early summer. Low flow typically occurs from December through February.

The DWQ has identified that streams in the Colorado River Southeast Management Unit require protection for one or more beneficial use categories, including: drinking water source (Category 1C), secondary contact recreation (Category 2B), cold water game fish (Category 3A), warm water game fish (Category 3B), and agricultural use

including irrigation and stock watering (Category 4). Castle Creek is listed as a Category 5A, requiring a Total Maximum Daily Load (TMDL) (DWQ, 2004). The three primary surface waters in the project study area include the Colorado River, Lower Courthouse Wash, and Moab Canyon Wash. Wetlands also exist within the project study area (see **Section 3.12**).

The Colorado River, the prominent surface water feature in the project study area, is a navigable waterbody (USACE, 2006). The river enters Utah west of Grand Junction, Colorado, flows into the upper Colorado Basin-Kane Springs Watershed via the Westwater Canyon Watershed and then continues to the upper Lake Powell Basin. The river's natural flow has been greatly altered over the years by dams and diversions. Over the last century, the Colorado River at Cisco, Utah (31 miles upstream of Moab) has averaged 16.3 million acre-feet of water annually. Monthly mean streamflow averages are between 3,081 cfs and 21,520 cfs (as shown in **Table 3.9-1**).

Table 3.9-1 Monthly Mean Streamflow Averages for Colorado River (in cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,081	3,239	3,801	8,149	18,920	21,520	8,819	4,272	3,714	4,000	3,816	3,287

Source: USGS, 2006.
Note: Calculation period is from 1913 to 2004 at USGS gage 09180500 near Cisco, Utah.

The portion of Courthouse Wash that is within the project study area is also referred to as Lower Courthouse Wash. This wash flows from north to south and feeds into the Colorado River. US-191 spans this wash just north of its confluence with the Colorado River. Currently, the wash bank is improved with rip rap and has a few abandoned abutments within the channel under the bridge. The wash has a drainage area of 162 square miles at gage 09183000. Courthouse Wash is ephemeral and is dry much of the year (USDOE, 2005). Available historical monthly mean streamflow averages are shown in **Table 3.9-2**. The Utah State Water Plan shows the average annual flow is 1,270 acre-feet (averaged over years of 1950-55 and 1967-98).

Table 3.9-2 Monthly Mean Streamflow Averages for Courthouse Wash (in cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.47	0.77	1.8	2.0	1.3	0.62	1.7	2.5	2.1	3.6	0.92	0.50

Source: USGS, 2006.
Note: Calculation period is from January 1, 1970 to September 30, 1989 at gage 09183000 near Moab, Utah. Streamflow data not available beyond September 30, 1989.

Moab Canyon Wash is an ephemeral stream that flows north to south and vents into the Colorado River. The wash crosses under SR-287 (Potash Road) in a double barrel concrete box culvert near the US-191 intersection. Moab Canyon Wash is located 280 feet outside of proposed construction limits and is not affected by the project.

In general, springs, surface water, groundwater, direct precipitation, or a combination of these sources feed wetlands within the project study area. The hydrology of the wetlands within the Scott Matheson Wetland Preserve is driven by Colorado River flows, except during summer low-flows when springs, irrigation return, and groundwater discharge are primary water sources. **Section 3.12** provides further information regarding wetlands.

3.9.2 Groundwater

Groundwater aquifers are a major source of drinking water in the region. In the Moab area, an upper system of eight unconsolidated aquifers provides an important source of groundwater, mostly for irrigation, but also for some domestic water supply (UGS, 1999). This shallow valley fill predominantly consists of stream alluvium and alluvial-fan deposits that extend to 400 feet below the surface near the Colorado River at an average thickness of 70 feet. A lower hydrologic system, also known as the Lower Paleozoic aquifer, underlies most of Grand County. This system has high quality water and acts as a large groundwater source for San Juan County. The system is too deep (>3,900 feet) in Grand County to be an economically feasible water source (UGS, 1999).

The Glen Canyon Aquifer group (**Figure 3-6**) is comprised of both the lower and upper hydrologic systems and includes the Navajo Sandstone aquifer, which is the principal source of drinking water in the Moab Valley. Pursuant to Section 1424(e) of the Safe Drinking Water Act, the EPA has determined that the Glen Canyon Aquifer and the immediately adjacent recharge area is the sole or principal source of drinking water for approximately 6,000 permanent residents in the Moab area. The recharge area extends throughout the Colorado Plateau and encompasses approximately 76,000 acres within Grand County. No viable alternative sources are available in the area that would have a sufficient supply of drinking water. The aquifer is exposed at the surface within its service area and is moderately to very vulnerable (EPA, 2002b).

3.9.3 Current Status of Surface Water Quality

Streams are assessed by the DWQ against State water quality standards and pollution indicators to determine if designated beneficial uses are being met. The quality of

water is assessed as "fully supporting" (good to excellent water quality), "partially supporting" (meets the standards most of the time), and "not supporting" (frequently the water quality standards are not met). Of the 566 stream miles in the Colorado River Southeast Management Unit assessed by DWQ in 2004, 76.2 percent were found to fully support all the beneficial uses, 18.2 percent were partially supporting, and 5.6 percent were not supporting at least one designated beneficial use (DWQ, 2004). Pursuant to Section 303(d) of the CWA, stream segments that do not meet water quality standards are considered to be "water quality limited" and are included on the state's 303(d) List of Impaired Waters. Once on the 303(d) list, a TMDL analysis is undertaken to identify the necessary measures and parties responsible for meeting water quality standards. Once a stream segment has a TMDL that is approved by EPA, it is removed from the 303(d) List of Impaired Waters.

The Colorado River and Castle Creek are the only water bodies within the upper Colorado-Kane Springs Watershed remaining on the 303(d) List of Impaired Waters, as detailed in **Table 3.9-3** (DWQ, 2006). Mill Creek has an approved TMDL for total dissolved solids. Its confluence is located two miles downstream from the existing US-191 Colorado River Bridge. The Castle Creek sub-basin is located 14 miles upstream of Moab. The project study area crosses the third unit of the Colorado River, which exceeds chronic levels of selenium, the source of which is upstream in Colorado.

Table 3.9-3 Impaired Assessment Units in Upper Colorado-Kane Springs Watershed Requiring TMDL Analysis

Assessment Unit Name	Description	Impaired DWQ Beneficial Use Class	Stream Miles	Pollutant
Castle Creek	Castle Creek and tributaries from confluence with Colorado River to headwaters	3B	18.19	TDS
Colorado River-3	Colorado River from Green River confluence to Moab	3B	62.69	Selenium
Colorado River-4	Colorado River from Moab to HUE unit (14030005) boundary	3B	35.77	Selenium

Source: DWQ, 2006.

3B = Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.

Surface water quality in the project study area has been impacted by the Moab UMTRA site, which borders the Colorado River northwest of the US-191 Colorado River Bridge. Contamination levels exceed EPA standards in 40 CFR 192 and have

impacted both shallow alluvium groundwater and Colorado River water, mostly due to groundwater recharge, as discussed in **Section 3.9.4**. Contaminants of potential concern include ammonia, copper, manganese, sulfate, and uranium (USDOE, 2006). **Sections 3.1.1.7** and **3.17.3** provide further information on this site.

3.9.4 Current Status of Groundwater Quality

The GSA's groundwater quality classification for the Glen Canyon aquifer indicates that it contains mostly high-quality groundwater resources that warrant protection. Samples taken from wells in the aquifer revealed the existence of either Pristine (Class IA, total dissolved solids (TDS) less than 500 mg/L) or Drinking Water Quality (Class II, TDS ranging from 564 to 1,820 mg/L) water. Both Class IA and II waters are considered suitable for drinking water, provided concentrations of individual constituents do not exceed state and federal groundwater quality standards (GSA, 2003).

The Glen Canyon Aquifer System in the Moab area is of very high quality and is able to be used as a drinking water source with minimal treatment. As such, this system constitutes a limited resource, which if contaminated, would create a substantial hazard to public health and result in extensive economic, social, and environmental costs. Potential sources of contamination include: 1) petroleum, mineral exploration, and geophysical drilling; 2) poorly designed development; 3) accidental spills along roadways; 4) abandoned but unplugged petroleum, mineral and geophysical wells, and tunnels; and 5) non-sustainable agricultural and forestry practices (EPA, 2002b).

Contamination related to the Moab UMTRA site is detailed in the Environmental Impact Statement prepared by the USDOE for the remediation of the Moab UMTRA site (USDOE, 2005). Ammonia is the key contaminant driving proposed groundwater remediation due to its high concentrations in the tailings seepage and its toxicity to aquatic organisms. The USDOE's environmental controls to minimize impact on local water quality include stormwater management, dust suppression, pile dewatering activities, and placement of an interim cover on the tailings to prevent movement of contaminated windblown materials from the pile. Interim actions include restricting site access, monitoring groundwater and surface water, and managing and disposing of legacy chemicals to minimize the potential for releases. The pilot-scale groundwater extraction system implemented in 2003 continues to reduce groundwater contaminants such as ammonia and uranium that are discharging to the Colorado River (USDOE, 2005).

3.9.5 Existing Water Rights

Existing water rights are shown in **Figure 3-7**. Many of the water rights that originate from the perennial streams within the basin have been developed (Division of Water Resources, 2000). Some undeveloped surface water and groundwater in several aquifers still exists. These supplies are expected to be developed as the demand increases and it becomes economically feasible to do so.

Relatively few diversions are made directly from the Colorado River in this area. According to Division of Water Rights records, 30 claims to water rights exist on the Colorado River within 0.5 miles of the project (Division of Water Rights, 2006). The majority of water rights are used for stockwatering, irrigation or "other" uses, which include uses such as dairy, fish culture, industrial, dust control, commercial, and mining. Trapax, Inc. (aka. Canyonlands By Night) and the USDOE divert the Colorado River for domestic (culinary) water use directly downstream from the US-191 Colorado River Bridge. **Table 3.9-4** lists these and other surface water points of diversion within 0.5 miles of the project. Unless abandoned, these water rights must be protected.

Table 3.9-4 Surface Water Points of Diversion Within 0.5 Miles of the Project

Owner	Well Rights Number	Status	Uses	CFS	Acre-feet	Source
Canyonland Cattle Company Limited	01-1055	A	S	0.000	10.860	Colorado River and Courthouse Wash Sump
Aable Trucking	01-1082	A	O	0.000	20.000	Colorado River
Canyonland Cattle Company Limited	01-1055	P	OS	0.000	10.860	Colorado River
Grand County Road Department	01-1073	P	O	0.000	15.000	Colorado River
Grand County Water Conservancy District	05-1458	A	I	5.000	0.000	Colorado River
USDOE	01-40	A	O	3.030	0.000	Colorado River
USDOE	01-1121	P	O	0.000	31.000	Colorado River
USDOE	01-40	P	DO	3.268	2366.200	Colorado River
USDOE	01-1121	A	IO	0.000	31.000	Colorado River
Warren & Millie McClatchy	01-56	P	IO	0.123	0.000	Colorado River
Division of Wildlife Resources	05-629	A	IO	0.000	1858.400	Colorado River, UGW, Sewerage Effluent
Harold C. Stewart	05-753	P	DI	0.120	0.000	Perry Foy Spring
Division of Wildlife Resources	05-629	A	IO	5.000	0.000	See Source Comments

Owner	Well Rights Number	Status	Uses	CFS	Acre-feet	Source
City of Moab	05-2103	P	DIOS	0.625	0.000	Skakel Spring
City of Moab	05-2105	P	DIO	0.627	0.000	Skakel Spring
City of Moab	05-2740	A	DIMO	1.000	0.000	Skakel Spring
The Nature Conservancy	05-2762	A	I	1.250	0.000	Skakel Spring
Charles A. Steen	05-578	P	IS	0.070	0.000	Snyder Spring
Charles A. Steen	05-578	P	IS	0.070	0.000	Snyder Spring
J. S. Westwood	05-68	P	DS	0.006	0.000	Spring Area
Dale and Billie Jo Wilson	05-1281	P	DI	0.015	0.000	Stewart Spring
C. A. Hammond	05-24	P	D	0.028	0.000	Stocks Spring
Moab Lions Club	05-2689	A	I	0.000	5.724	Unnamed Spring
Perry E. Foy	05-51	P	I	0.029	0.000	Unnamed Spring
Robert R. Norman	05-2414	P	IO	0.002	1.435	Unnamed Spring
Cully Erdman And Lucy Wallingford	05-2283	P	IO	0.011	0.000	Unnamed Spring and Drain
Moab Lions Club	05-246	P	IO	0.017	0.000	Unnamed Spring Area
Club Utah Resort Group LLC	05-2102	P	IOS	0.321	104.218	Watercress Spring
Club Utah Resort Group LLC	05-2743	P	IOS	0.120	38.980	Watercress Spring
Club Utah Resort Group LLC	05-2744	P	IOS	0.120	38.980	Watercress Spring
Colin Fryer	05-2780	P	I	0.039	12.702	Watercress Spring

Source: Division of Water Rights, 2006.

A = Approved; P = Permanent; I = Irrigation; S = Stockwatering; D = Dairy; M = Mining; O = Other

Note: This table does not include temporary water rights as approved through 2007, or disallowed, lapsed, terminated, expired, rejected, unapproved, or withdrawn.

DDW records indicate that five public drinking water wells exist within 0.5 miles of the project, as shown in **Table 3.9-5**. Source protection zones applicable to the project corridor are shown in **Figure 3-7**. These zones identify the surface and subsurface area surrounding a well through which contamination would likely move toward and pollute the source if a contaminant source were present. They also represent the time before contaminants would likely reach the well. In the case of highway operations, potential contaminants of concern would include: roadway salting applications, the use of pesticides and herbicides, oil and grease droppings from vehicles, and hazardous materials spills from accidents.

Table 3.9-5 Public Drinking Water Supply

Number	System Name	Status	Water Rights
10003-12	Skakel Spring	In Use	05-2105
10016-01	Slickrock Campground	In Use	-
10018-01	Bucks Grill House	In Use	-
10021-01	Arches National Park Headquarters	In Use	-
10026-01	Matrimony Spring	In Use	-

Source: DDW, 2005.

The operational status and Public Drinking Water Source Protection Plan documentation for the five identified public wells indicates that:

- Two of these wells (10016-01 and 10018-01) have a protection Zone 2 (250-day travel time) that overlaps the project corridor.
- Three wells (10016-01, 10018-01, and 10026-01) have a maximum protection Zone 4 delineation (15-year travel timeframes) that overlaps the project corridor.
- One well (10021-01) has an optional two-mile radius delineation used to delineate the wellhead protection area that overlaps the project corridor.

In addition to wells used for public drinking water supplies, over 400 private wells are located within a two-mile radius of the project corridor (see **Figure 3-7**) that are used by private residences, agricultural, or industry. Approximately 25 of these wells have annual water rights greater than 1.0 cfs (724 acre-feet). The use classification for each of these wells is presented in **Table 3.9-6**. Some wells have multiple uses. The largest use of private wells is irrigation. The "other" classification is the next largest use. Government installations are included in the municipal classification even though they may not provide a public drinking water supply.

Table 3.9-6 Wells Within Two Miles of the Project

Use Classification	Number of Wells
Irrigation	282
Domestic	107
Stock Watering	65
Other	140
Municipal	13

Source: Division of Water Rights, 2006.

3.9.6 No Build Alternative

The No Build Alternative would not result in new direct impacts to water resources. However, the No Build Alternative is not likely to address unchecked sediment loading and contamination associated with roadway runoff. Also, growth in the Moab area will continue to tax the existing US-191 infrastructure, thus creating an environment where traffic accidents and highway spills may be more likely. These types of spills have the potential to impact surface waters.

3.9.7 Build Alternative

The following analysis was conducted based on construction methods outlined in **Section 2.3.2**. To assist with the water quality analysis, the project area was divided into nine discharge areas based on roadway high and low points (shown in **Figure 3-8**). Only the runoff associated with the increased impervious area (such as pavement) resulting from the project is considered. Among the nine drainage areas, increased runoff volume from a 10-year, 24-hour storm event ranges from 872 cubic feet per event in Area 9 to 23,087 cubic feet in Area 5. The total increased runoff volume per event was calculated conservatively at 76,925 cubic feet for the roadway and 6,534 cubic feet for the two structures.

Based on conceptual design, four detention ponds are expected to capture approximately 46 percent of the additional runoff. While peak flow from a 10-year, 24-hour event is expected to result in increases that range from 0.32 cfs in Area 9 to 4.89 cfs in Area 5, outflow from detention ponds are expected to be released at the historic rate. The remaining increases would be conveyed to existing or future city/county systems or through ditches and pipes to nearby surface waters as shown in **Table 3.9-7**.

Table 3.9-7 Drainage Areas along US-191 Project Corridor

Project Area	Detention Basin Location	Total Flow Increase (cfs)	Increase in Volume (cubic feet)	Proposed Detention Basin Size (in feet)	Outflow
1	NA	0.55	1,307	NA	Flow from high point down Main Street to catch basin at 300 North
2	STA 111+50	1.34	3,485	17 x 17	Release at historic rate
3	STA 121+00	2.49	6,970	29 x 29	Release at historic rate
4	STA 135+00	0.77	5,463	31 x 31	Release at historic rate
4	STA 155+00	2.71	19,367	58.5 x 58.5	Release at historic rate
5	NA	4.89	23,087	NA	Discharge to a depressed area within the wetland preserve via a piped system at approx. STA 214+00
6	NA	2.33	7,406	NA	Discharge through new ditch to Colorado River
7	NA	0.73	2,178	NA	Discharge through new ditch to Courthouse Wash
8	NA	2.19	6,970	NA	Discharge through new ditch to Courthouse Wash
9	NA	0.32	872	NA	Discharge to existing ditches and pipes
Colorado River Bridge	NA	2.10	5,227	NA	Open drains would be located across the structure. Additional drains located at corners of the approach slab would discharge to Colorado River through riprap and/or pipe
Courthouse Wash Bridge	NA	0.51	1,307	NA	Drains located at corners of the approach slab with discharge to Courthouse Wash through riprap

NA = Not applicable.

Note: Calculations account for increased impervious surfaces, not the existing roadway. Conceptual layout of detention basins has assumed a 3:1 side slope and a four-foot deep basin. Discharges through ditches do not reflect additional infiltration associated with the ditch.

Highway and bridge construction may result in short-term impacts on the Colorado River, the Scott Matheson Wetland Preserve, and Courthouse Wash in the form of temporary increases of sediment levels and pollutants associated with highway runoff and construction activities. Possible pollutants include nutrients, bacteria, lubricants, heavy metals from parts wear, trash, sediment, petroleum hydrocarbons, and synthetic organics. Heavy equipment in (or near) the waterways may disturb bank and riverbed

materials, temporarily increasing the suspended sediment load. Vehicle traffic, equipment and material staging, and construction waste stockpiles could impact vegetation, leading to increased erosion and decreased bank stability. Material and waste stored on site could enter surface waters as debris. Leakage of fuel or oil from machinery could load hydrocarbons into waterways directly or through overland flow or storm drains. Concrete work along the banks could induce a temporary and local caustic environment in the waterway. The existence of the Moab UMTRA site near the project corridor suggests a potential threat of radionuclide impacts, although very little subsurface construction is occurring at this site. Disturbance of contaminated soils, at the Moab UMTRA site or elsewhere, could result in a pollutant load to surface waters.

Urban stormwater discharges considered in this impact analysis include only those modified directly by increasing the impervious surface area of the highway. Stormwater discharges associated with the existing roadway surface are being reviewed separately along with other local drainage issues and would be jointly addressed by Moab, Grand County, and UDOT. Potential long-term or permanent impacts from the project mainly consist of additional runoff and pollutants associated with increased impervious surfaces and a larger bridge surface over the Colorado River and Lower Courthouse Wash. Under the Build Alternative, the impervious surface area of the highway is estimated to increase from approximately 21 acres to just over 33 acres. As impervious surface areas increase with highway widening, and curbs and gutters are installed, the road surface conveys the drainage water more rapidly and in a concentrated manner across the road, thus potentially increasing peak runoff flows. Increased impervious surfaces generally lead to difficulties with storm drainage control, stream channel maintenance, and stream-water quality. Additionally, the increased storm runoff is not available to recharge the groundwater. Detention basins are planned to alleviate the impacts associated with storm runoff.

Within the Colorado River and Lower Courthouse Wash, construction of abutments on the bank may result in a permanent loss of vegetation. Stream velocities have the potential to increase from constrictions at the abutments and piers. These higher velocities could produce scour, resulting in an increased suspended sediment load.

The potential for impacts is varied and depends on final bridge and roadway design, construction methods, BMPs, surrounding land uses, litter laws, auto-emission regulations, traffic characteristics, climatic conditions, maintenance practices, and other factors. Mitigation of potential impacts will be addressed through the permitting process and implementation of BMPs as described in **Section 3.9.8**.

Construction activities will generally be limited to the surface and extend only shallow depths into the subsurface. Potential for impacts to groundwater resources are expected to be limited. Excavation and trenching may require temporary dewatering of the shallow unconsolidated groundwater table, but this water would be recharged on site and groundwater depletion from dewatering would not impact water rights. Other potential impacts to shallow groundwater might result from spills of materials stored on site, or leakage of fuel or lubricants from heavy equipment. The Spill Prevention, Control, and Countermeasure (SPCC) plan will ensure that the risk of contamination to the site is minimized. Detention basins and other BMPs will help to filter out contaminants associated with the roadway before stormwater runoff reaches groundwater.

Based on early discussions with the EPA, the Build Alternative is not likely to impact the Glen Canyon Sole Source Aquifer (Guzzetti, June 13, 2006). However, the EPA will review the draft EA prior to making their final determination.

Potential impacts on surface water rights consist largely of short-term impacts, such as water depletion and temporary sediment and pollutant loading, related to construction of the Colorado River Bridge. Construction of the new bridge may require temporary diversion of the Colorado River, berms, baffles, a coffer dam and placement of bridge piers in the water. Suspended sediment is expected to increase temporarily in the river during construction, but implementation of BMPs mentioned in **Section 3.9.8** will diminish sediment loads. BMPs would be planned so that temporary increases in sediment loads do not exceed the capacity of downstream withdrawal systems. Diversions or coffer dams would be designed to prevent water depletion impacts for downstream points of diversion.

3.9.8 Mitigation Measures for Water Resources

Mitigation for impacts to water resources are addressed through several required permits and approvals. **Table 3.9-8** provides a summary of the permits and approvals that will be obtained prior to implementation of the project. Mitigation requirements and other conditions associated with these permits and approvals will be complied with.

Table 3.9-8 Required Permits and Approvals Pertaining to Water Resources

Permit/Approval Required	Associated Activity	Permitting/Approval Agency
Section 401 Water Quality Certification	Discharge to waters of the United States.	DWQ
Section 402 UPDES Stormwater General Permit	Control of pollutants associated with stormwater discharges from construction activities that disturb more than one acre of land.	DWQ. A Storm Water Pollution Prevention Plan (SWPPP) and Temporary Erosion and Sediment Control Plan and Notice of Intent (NOI) are required for this permit.
Section 402 UPDES Construction Permit	Development or expansion of a stormwater system that has an increased discharge of five cfs or more or a new discharge point.	DWQ
Section 404 Permit	Discharge of dredged or fill material into waters of the United States, including wetlands.	USACE. The USACE has concurred with the wetland delineation and identification of the waters of the United States (see letter dated September 26, 2006 in **Appendix D**).
Section 10	Work in, over, or under the Colorado River (a navigable water of the United States).	USACE and U.S. Coast Guard. The U.S. Coast Guard has determined that this project does not require their involvement (see response dated February 27, 2006 in **Appendix D**).
Stream Alteration Permit	Work associated with Lower Courthouse Wash and the Colorado River.	Division of Water Rights (State Engineer's Office).
Water Rights Permit	Appropriation and distribution of water (if additional water rights are needed for construction).	DDW
Approval	Discharge to existing stormwater system.	Grand County and Moab
Review	Construction within the designated Colorado River Floodplain (e.g., piers and abutments).	Utah Department of Public Safety, Emergency Services and Homeland Security, Grand County and/or Moab.
Review	Federal construction project that has the potential to contaminate a sole source aquifer (road construction and disposal of storm water).	EPA
Review	Construction within a wellhead protection zone.	DDW

The permitting process together with BMPs, as required under Section 402 of the CWA, provide a coordinated and comprehensive effort to mitigate for short-term (construction-related) and long-term impacts on receiving waters. An erosion control plan including the use of BMPs to control construction-related erosion and sedimentation impacts will be developed and incorporated in the design plans. This

plan will be reviewed by permitting agencies as part of the permitting requirements and included in the construction contract documents. During construction, the effectiveness of BMPs will be monitored. BMPs are "schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of waters of the United States" (40 CFR 122.2). BMPs include, but are not limited to, "treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage" (40 CFR 122.2). Specific BMPs for the proposed project are expected to include the following:

- Staging Areas – Where possible, materials and equipment will be staged away from river banks and located in areas that minimize impacts to existing vegetation. When necessary, precautions will be taken (i.e. BMPs).
- Preservation of Existing Vegetation – Existing vegetation will be protected by preventing disturbance beyond the specified limits of construction.
- Clearing Limits – The amount of bare soil exposed at one time shall be limited and the duration of bare soil exposure shall be minimized in accordance with the SWPPP and erosion control plan.
- Stabilization of Construction Entrance and Roads –Stabilized construction entrances will be used to prevent the tracking of mud and other construction debris on city and county roads.
- Access – Stream access points will be limited to those necessary for construction.
- Dust Control – Watering and/or compacting materials will be used as appropriate to minimize dust.
- Spill Prevention and Control – A SPCC plan will be prepared during final design. Fuel and other hazardous materials shall be stored and handled as far as possible from the waterway. Special consideration will be given to barges and cranes working in the river.
- Waste Management – Waste materials will be stockpiled away from the river bank, covered, and removed from construction areas promptly. Excess fill material shall not be placed in the waterway, wetlands, or floodplains. Contaminated soils will be handled and disposed of properly.

- Erosion Control Devices – Where applicable, erosion control devices (such as silt fence and fiber rolls) will be installed around exposed ground in active construction areas to reduce erosion from the site. The erosion control devices, in combination with other BMPs, will help prevent untreated runoff from exiting construction sites.
- In-line Water Quality Features – In-line water quality features (e.g., oil/sediment separators) will be installed, where appropriate, to reduce the level of contaminants prior to discharge.
- Dry Extended Detention Pond – Detention ponds will be used when necessary to detain runoff and allow for settling of sediment or other contaminants. **Table 3.9-7** provides conceptual information about drainage areas and the likely use of detention ponds. A routine maintenance schedule will minimize the build-up of sediment and other material, which could otherwise become an additional source of contaminants entering the groundwater.
- Coffer Dams – Depending on construction method, coffer dams may be used to divert flow around instream construction activities.
- Slope Stability – Disturbed slopes will be stabilized and revegetated in accordance with UDOT's Standard Specifications for Topsoil and Seeding. Decorative rock, boulder scatter, and shrub plantings may also be used in some locations.
- Break Periods – Construction may be temporarily suspended in an area, if necessary, to reduce temporary loading.

3.10 Floodplains

3.10.1 FEMA Designated Floodplains

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP). This program was established in accordance with the National Flood Insurance Act of 1968, as modified by the Flood Disaster Protection Act of 1973 and the National Flood Insurance Reform Act of 1994. Moab participates in the regular phase of FEMA's NFIP and the Flood Insurance Rate Map (FIRM) for Moab is included as **Figure 3-9**. The FIRM identifies base flood elevations, insurance risk zones, floodplain boundaries (e.g., 100-year), and floodway boundaries. Grand County does not participate in the NFIP; therefore, the only mapping available is the Flood Hazard Boundary Map (FHBM), as shown in **Figure 3-10**.

The project corridor includes the 100-year floodplain associated with the Colorado River. The current and beneficial value of the existing floodplain is to convey runoff from the 100-year storm events. Base elevations and flood hazard factors have not been determined for this area. The floodplain is confined to the Colorado River in the narrow canyon upstream of the US-191 Colorado River Bridge. The floodplain widens out into the Scott Matheson Wetland Preserve downstream of the bridge. The 100-year floodplain does not extend to the US-191 crossing of Courthouse Wash, but is relatively close.

Areas along US-191 in Moab have a moderate or minimal hazard and are subject to flooding from severe storm activity or local drainage problems. Drainage runs from the east side of US-191 (where the elevation is higher) to the west side (which is much lower). Property owners have expressed concerns about continuing to allow runoff from the east side of US-191 to impact properties on the west side. Because of these issues, Moab, Grand County, and UDOT are working jointly to address these drainage problems and flooding concerns independent of this project.

3.10.2 No Build Alternative

Encroachment into floodplains under the No Build Alternative would be the same as present day impacts. The current structure crosses the Colorado River at an angle. The southern abutment and seven piers are within the floodplain. These abutment and piers are perpendicular to the roadway and skewed to the flow of the river. Moab, Grand County, and UDOT would continue to work jointly to address drainage problems and flooding concerns south of the Colorado River.

3.10.3 Build Alternative

The new US-191 Colorado River Bridge would be designed so that it would not increase the base flood elevation of the Colorado River floodplain. The proposed structure would be at the same location as the existing structure and abutments, and the design would include three to six piers in the Colorado River floodplain. The fill in front of the abutments and piers of the new structure would be designed to parallel the flow of the river. This new configuration, although still within the floodplain, would be less restrictive to flows and debris because there would be fewer obstacles in the flow path than if piers were placed perpendicular to the roadway. This configuration would also potentially reduce the potential for scour and turbulence within the river channel. Stormwater runoff (discussed in **Section 3.9.7**) would have a negligible effect on the Colorado River floodplain.

3.10.4 Mitigation Measures for Floodplains

Since Moab City participates in the FIRM and work will be required within the designated 100-year floodplain of the Colorado River, coordination with the local floodplain coordinator (i.e., Moab City, Grand County, and/or the Utah Floodplain Coordinator) during design is required. The local floodplain coordinator will review the hydraulic/hydrology calculations and verify that there is no increase in the water surface elevation and that no further coordination is required.

3.11 Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers located within the project limits. Courthouse Wash in Grand County within Arches National Park is on the Nationwide Rivers Inventory and has the potential to be classified as a wild river. The US-191 structure over Courthouse Wash is outside the Arches National Park Boundary and the project would not alter the identified outstandingly remarkable values of Courthouse Wash. These values include notable or exemplary scenery, popular recreation opportunities, unique or rare geologic features, a producer of a nationally or regionally important fish and/or its habitat, contains nationally or regionally significant wildlife and/or unique habitat, and contains archaeological sites (NPS, 2006a).

The segment of the Colorado River within the project study area is not a designated Wild and Scenic River nor is it on the Nationwide Rivers Inventory. While only Congress can classify or designate a Wild and Scenic River, within the vicinity of the project, the segment of the Colorado River from its confluence with the Dolores River to River Mile 49 near Potash is tentatively considered by the BLM as eligible and suitable under the recreational classification (BLM, 2006). The Utah Rivers Council and the Southern Utah Wilderness Alliance are also advocating Wild and Scenic River eligibility and suitability of this same segment under the recreational classification (URC, 2006). The project would not alter the potential values that would qualify the Colorado River for designation as a Wild and Scenic River under the recreational classification.

3.12 Wetlands

Executive Order 11990 (1997) requires federal agencies to take action to minimize the loss of wetlands. The NEPA compliance process requires federal agencies to consider direct and indirect impacts to wetlands that may result from federally funded actions. The placement of fill or dredge material in waters of the United States,

including wetland areas, is regulated by the USACE under Section 404 of the CWA (42 CFR 7401 et seq.). This section discusses wetland areas. Other waters of the United States within the project study area include the Colorado River, Courthouse Wash, and Moab Canyon Wash, as discussed in **Section 3.9.1**.

3.12.1 Wetland Areas

Wetlands within the project study area were delineated based on field investigations conducted in December 2005 and methods described in the USACE Wetland Delineation Manual (1987). Wetlands were defined using the definition of 33 CFR 328.3(b) that requires the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. **Figure 3-11** illustrates the location of the five delineated wetland areas, totaling 1.523 acres. The USACE has jurisdiction over four of these wetland areas (1.143 acres). Wetland 1 (0.38 acres) is an isolated wetland and is non-jurisdictional.

In general, springs, surface water, groundwater, direct precipitation, or a combination of these sources provides a source of water for wetlands within the project study area. No wetlands within the Scott Matheson Wetland Preserve are located within the project study area. The following paragraphs provide additional details concerning wetlands evaluated during the wetland investigation activities.

- **Wetland 1:** This wetland is a retention area that parallels the east side of US-191. A natural spring and stormwater runoff provide the hydrology. This wetland occurs in a low spot and the directional water flow runs into the area from both ends and does not apparently flow out. As such, Wetland 1 is an isolated wetland and is non-jurisdictional.
- **Wetland 2:** This jurisdictional wetland is located in an agricultural field on the west side of US-191 and east of the Scott Matheson Wetland Preserve. The water source is provided by a natural spring (Watercress Spring) east of US-191 that runs through a culvert under the highway, and into a small man-made earthen ditch west of US-191. The small ditch is approximately one foot wide and parallels US-191. This ditch contained water and wetland vegetation. At the time of the field survey, the area south of the culvert was saturated by water overflowing from breeches in the unmanaged ditch.
- **Wetland 3:** This jurisdictional wetland is a two-foot wide area that runs parallel to SR-128 for about 50 feet and then percolates or leaches naturally under the road and vents to the north, into the Colorado River. There are no culverts or drainage pipes associated with this vent and there is no vegetation

present along this less than one foot wide drainage. A natural spring (Matrimony Spring) is piped down to the drainage area south of SR-128. The source of this spring is located on a rock shelf about 60 vertical feet above and south of SR-128. This drainage area has become overgrown or filled in to the point where water does not drain properly and wetland characteristics have appeared over time.

- **Wetland 4:** This jurisdictional wetland is a three to four-foot wide area that runs along the east side of US-191 before draining into a culvert under the highway, and continues to run along the west side of US-191. The water source is a natural spring located east of the project corridor.
- **Adjacent Wetland:** This jurisdictional wetland is parallel to and on the south side of the Colorado River, just north of the Scott Matheson Wetland Preserve. This area displayed characteristics consistent with seasonal flooding based on the flow regime of the river.

3.12.2 Wetland Functions and Values

FHWA Technical Advisory T 6640.8A (1987) recommends that when evaluating the impact of a proposed project on wetlands, the importance of the impacted wetland(s) must be evaluated. The guidance also states that in evaluating the importance of the wetlands, the analysis should consider factors such as: 1) the primary function of the wetlands (e.g., flood control, wildlife habitat, and groundwater recharge); 2) the relative importance of these functions to the total wetland resource of the area; and 3) other factors, such as uniqueness, which may contribute to the wetland importance (FHWA, 1987). As suggested by this FHWA guidance, in order to determine the relative importance of wetlands associated with a project, the functions of the wetlands must first be examined and understood.

Wetland functions consist of the physical, chemical, and biological interactions within a wetland (USDA, 1996). Wetland functions include processes such as surface and subsurface water storage, nutrient recycling, particulate removal, maintenance of plant and animal communities, water filtration or purification, and groundwater recharge. The function of a given wetland depends on multiple factors, including but not limited to the area extent/size, topographic positioning, hydrologic regime, local geology, and wetland type.

FHWA guidance (1987) recommends evaluating the importance of wetlands based on the primary functions of wetlands. Based on this FHWA guidance, knowledge of the wetlands in the project study area, and information available from the USACE,

NRCS, EPA, and the United States Geological Survey (USGS), wetland functions for purposes of this project were separated into the following six categories:

- **Water Filtration:** Potential pollutants (e.g., oil, grease, and heavy metals) tend to bind tightly to organic rich soils and sediments found in wetland areas. The absorption of these compounds to wetland sediments/soil particles reduces the quantity of pollutants in water while microbes and plant life residing within the wetland system break down many of these pollutants, removing them from the environment. Water quality is improved by removal of nutrients, pesticides, and bacteria from surface waters as they are absorbed or broken down by wetland plants, animals, and chemical processes.
- **Surface Water Storage:** Wetlands function like natural basins or sponges, storing water and slowly releasing it. This function helps prevent flooding by temporarily storing water and slowly releasing it. This function helps prevent flooding by temporarily storing water, allowing it to soak into the ground or evaporate. This temporary storage can help reduce peak water flows after a storm event by slowing the movement of water into tributary streams, allowing potential floodwaters to reach mainstream rivers over a longer period. This process reduces the water's velocity and, consequently, the erosive potential of the water. In addition to reducing flood heights, the stored water in a wetland facilitates groundwater recharge, which contributes to the base flow of surface water systems, particularly during dry periods or drought.
- **Groundwater Recharge:** Wetlands are reservoirs for rainwater and runoff. As this water is released into the ground, it recharges water tables and aquifers and in many cases extends the period of stream flows.
- **Nutrient Cycling:** Wetland plants and other microorganisms in wetland soil use nutrients from fertilizer application, manure, leaking septic tanks, and municipal sewage, which are often dissolved in water. Wetlands enhance the decomposition of organic matter, incorporating nutrients back into the food chain.
- **Sediment Retention:** Water flowing through the wetland system is slowed because of the presence of plant life, allowing suspended sediments to settle into the wetland substrate. By filtering out sediments and particles suspended in runoff water, wetlands help prevent lakes, reservoirs, and other resources from being impacted by downstream sediment loading. This filtering process improves water quality and extends the life of waterbodies by reducing sedimentation rates.

- **Biological Production:** Wetland provide suitable habitat for a variety of plant and animal species, which depend on them for food and shelter. Abundant vegetation and shallow water provide diverse habitats for fish and wildlife. Aquatic plant life thrives in the nutrient rich waters and wetland substrates. Both coastal and inland wetlands provide breeding, nesting, and feeding habitat for millions of waterfowl, birds, fish, and other wildlife. Freshwater wetland vegetation can provide valuable forage for livestock, particularly during drought years.

The value of a wetland is an estimate of the importance or worth of one or more of its functions (EPA, 2002a) or beneficial characteristics (USDA, 1996). Although large-scale benefits of functions can be valued monetarily fairly easily, determining the value of individual wetlands is difficult because they differ widely and do not all perform the same functions or perform functions equally well (EPA, 2002a). Given the difficulties associated with assigning a specific value to individual wetland plots, a generalized hierarchical value system was developed for this project as follows:

- **Low Value:** The wetland is dominated by non-native, invasive plant life, is less than 0.1 acres in size, provides minimal water storage and filtering capacity, and provides little to no wildlife habitat. The wetland was unintentionally created by grading, poor maintenance of drainage structures, or other unnatural causes;
- **Moderate Value:** The wetland exhibits a mixture of both non-native, invasive plant life, is less than 0.1 acres in size, provides minimal water storage and filtering capacity, and provides suitable habitat for at least a few wildlife species. The wetland is the result of a combination of natural and unnatural causes; and
- **High Value:** The wetland is dominated by native vegetation, is greater than or equal to 0.1 acres in size, provides substantial water storage and water filtering capacity, and provides suitable habitat for a variety of wildlife species. The wetland occurs naturally with little or no unnatural influences.

Table 3.12-1 summarizes the functions and values of the wetlands identified within the project study area. The type, size, and comments related to each wetland plot are also included in the table.

Table 3.12-1 Wetland Functions and Values Summary

Wetland Area	Wetland Type	Wetland Functions	Comments	Wetland Value
Wetland 1 (0.38 acres)	Isolated Wet Meadow and Emergent Marsh	Surface Water Storage, Groundwater Recharge, Nutrient Cycling, Biological Production	Retention area; provides some wildlife habitat	Low/Moderate
Wetland 2 (0.14 acres)	Wet Meadow	Surface Water Storage, Water Filtration, Sediment Retention, Biological Production, Groundwater Recharge, Nutrient Cycling	Open space; result of poor ditch maintenance	Low/Moderate
Wetland 3 (0.003 acres)	Emergent marsh	Surface Water Storage, Sediment Retention	Result of poor ditch maintenance	Low
Wetland 4 (0.12 acres)	Emergent marsh	Surface Water Storage, Sediment Retention, Water Filtration, Groundwater Recharge	Drainage channel for Natural Spring	Low/Moderate
Adjacent Wetland (0.88 acres)	Riverine floodplain wetland adjacent to waters of the United States	Surface Water Storage, Water Filtration, Sediment Retention, Biological Production	Adjacent to the Colorado River during low water levels	High

Note: Wetland 2 and 4, as well as the Adjacent Wetland, extended beyond the project study area. Acreage shown is the portion of the wetland within project study area.

3.12.3 No Build Alternative

The No Build Alternative would include on-going bridge and roadway maintenance activities that may require dredging or filling of wetlands or other waters of the United States.

3.12.4 Build Alternative

The Build Alternative would result in permanent and temporary impacts to wetland areas, as shown in **Table 3.12-2**.

Table 3.12-2 Wetland Impacts

Wetland	Wetland Type	Wetland Value	Acres within Project Study Area	Acres of Impact
Wetland 1	Isolated Wet Meadow and Emergent Marsh	Low/Moderate	0.38	0.0
Wetland 2	Wet Meadow	Low/Moderate	0.14	0.0
Wetland 3	Emergent marsh	Low	0.003	0.0
Wetland 4	Emergent marsh	Low/Moderate	0.12	0.03 (Permanent)
Adjacent Wetland (0.88 acres)	Riverine floodplain wetland adjacent to Waters of the United States	High	0.88	0.04 (Permanent) 0.17 (Temporary)
		TOTAL WETLANDS	1.523	0.07 (Permanent) 0.17 (Temporary)

Note: Wetland 2 and 4, as well as the Adjacent Wetland, extended beyond the project study area. Acreage shown is the portion of the wetland within project study area.

Wetland 4 is located just south of the intersection of North MiVida Drive and US-191. This wetland is a three to four-foot wide area that runs along the east side of US-191 before draining into a culvert under the highway, and continues to run along the west side of US-191. This area is a drainage channel for a natural spring. Dominant vegetation consisted of Reed canary grass *(Phalaris arundinacea)*, Kochia *(Kochia scoparia)*, Cattail *(Typha latifolia)*, and Rush *(Juncus sp.)*. Given the wetland is a result of a combination of natural and unnatural causes, provides some water storage, and little wildlife habitat, this wetland was rated as having low/moderate value. A maximum of 0.03 acres of permanent impacts would result from dredge/fill within this wetland area. The function and value of the remaining wetland could be increased by the project because a detention basin is planned west of US-191 adjacent to the existing wetland.

The Adjacent Wetland is located parallel and adjacent to the Colorado River beneath the south end of the existing US-191 Colorado River Bridge. This area displayed characteristics consistent with seasonal flooding based on the flow regime of the river. Dominant vegetation consisted of Goodding willow *(Salix gooddingii)*, Yellow nutsedge *(Cyperus esculentus)*, Common cocklebur *(Xanthium strumarium)*, and Salt cedar *(Tamarisk ramosissima)*. Given the proximity of the wetland to the Colorado River, the natural cause of the wetland, and that it provides suitable habitat for a variety of wildlife species, this wetland was rated as having high value. Up to 0.04 acres of permanent impacts are anticipated, representing the area that would be displaced by a new pier. Up to 0.17 acres of temporary impacts are anticipated as a

result of construction activities associated with the placement of the new pier and the removal of the old pier.

3.12.5 Mitigation Measures for Wetlands

An alignment shift was incorporated into the Build Alternative to avoid impacts to Wetland 2. A Section 404 Permit will be obtained prior to discharging dredged or fill materials into waters of the United States, including wetlands. Mitigation requirements and other conditions outlined in the Section 404 Permit will be complied with. Because permanent impacts to wetlands are only 0.07 acres, creation of a wetland area is not expected to be economically feasible. Conceptually, wetland mitigation is expected to consist of clearing litter from wetland areas and enhancing wetlands temporarily impacted by equipment or other construction activities. Replanting this disturbed area along the Colorado River corridor that currently consists of monotypic stands of tamarisk with a native cottonwood and willow complex will increase habitat value and may encourage residency for migratory birds. Native willow and cottonwood cuttings will be used rather than containerized stock.

3.13 Vegetation and Wildlife

3.13.1 Description of Vegetation and Wildlife

Moab is located in a high desert climate in the Colorado Plateau and is extremely dry. The project corridor is characterized by grasslands, shrubs, sagebrush, cacti, and yucca. North of the Colorado River Bridge, extensive areas of vegetation were recently removed along the highway by the USDOE in association with the removal of contaminated soil at the Moab UMTRA site. The most dominant upland vegetation community is the blackbrush/ shadscale/ sagebrush complex, which exists in moderate to low densities. The community is sporadically dotted with a variety of cacti and yuccas and the under story is characterized by Indian rice grass and big galleta (NPS, 2002). The Colorado River supports a xeroriparian gallery consisting primarily of cottonwoods and willows and the exotic species of Salt Cedar. Greasewood, four-wing saltbush, and rabbitbrush are found in the uplands adjacent to the river corridor. Wetland vegetation is discussed in **Section 3.12**, and water resources and erosion control are discussed in **Section 3.9**.

The term wildlife refers collectively to mammals, birds, fish, amphibians, and reptiles. The project corridor contains aquatic, riparian, and terrestrial habitats and species that utilize these habitats. Mammals identified during a December 2005 field visit were mice, beaver, rabbits, raccoon, and Desert big horn sheep. Desert big horn

sheep use this area throughout the year and were observed foraging along US-191 just north of the bridge.

Aquatic wildlife in this stretch of the Colorado River includes several federally listed species. In addition to native fish, introduced species of smallmouth bass, common carp, and green sunfish are known to exist. Amphibian species of native leopard frogs and the exotic bullfrog make their home along the river. The project corridor also contains reptilian species consisting of a variety of lizards and turtles that are common to the region. Federally listed species and their designated critical habitat, as well as state sensitive species and migratory birds are addressed in **Section 3.14**.

Neotropical migratory birds utilize the riparian habitat along the Colorado River corridor on their seasonal treks to and from their wintering areas. The river and canyon habitats offer nesting and foraging opportunities for shore birds, wading birds, ducks, passerines, raptors, and game birds.

The Scott Matheson Wetland Preserve provides habitat for a number of species. Abundant non-native fish are present in the wetlands including carp, mosquito fish, green sunfish, fathead minnows, and red shiners. A large variety of bird species use the preserve, although not in high concentrations. Some 165 species have been sighted and recorded, including bald eagles and peregrine falcons. A great blue-heron rookery, located on the southern end of the preserve, has been active for many years. Several observed mammal species include mule deer, coyote, beaver, muskrat, rock squirrel, bats (unknown species), mountain lion, raccoon, and river otter. Hunting is allowed on the northern end of the preserve and the southern portion is managed as a wildlife resting area (Division of Wildlife Resources, 1994).

3.13.2 No Build Alternative

On-going bridge and roadway maintenance activities may temporarily disturb vegetation and wildlife. Since BMPs would be used, permanent impacts would not be anticipated under the No Build Alternative.

3.13.3 Build Alternative

Direct impacts on vegetation could result from the removal of vegetation, soil compaction, and increased soil erosion. Much of the vegetation along the project corridor has been highly disturbed and altered. The construction of this project would require the removal of monotypic stands of tamarisk along the Colorado River corridor that are impacted by equipment or other construction activities. Replanting these exposed areas with a native cottonwood and willow complex would increase habitat value and may encourage residency for migratory birds, a potential benefit to

wildlife species. Although roadside vegetation and urban landscaping provide wildlife habitat, changes in these vegetation types would not alter the presence or absence of existing wildlife species.

Construction activities could result in some wildlife mortality, primarily to species with limited mobility and/or those that could be occupying burrows or nests at the time of construction. More mobile species, including aquatic and riparian species, would be able to move into adjacent habitat. Aquatic species may be indirectly affected by the temporary turbidity increases, increased sedimentation, or decreased water quality due to construction associated with the Colorado River Bridge. These disruptions may indirectly affect the species immunity abilities from the stress associated with these impacts and may create indirect mortality. The Desert big horn sheep habitat would not be directly affected by the project.

Because of the lack of biodiversity of the vegetation communities within the construction limits, the current degraded habitat functions and values of these communities for wildlife, and the low density of residential wildlife within the project area, the impacts to vegetation and wildlife are expected to be minimal.

3.13.4 Mitigation Measures for Vegetation and Wildlife

Mitigation for impacts to vegetation and wildlife will be addressed through the measures outlined in **Sections 3.9.8**, **3.12.5**, and **3.14.6**. Additionally, potential for conflict between vehicles and Desert big horn sheep will be minimized by erecting signs as part of the project to cautions drivers that sheep frequent the area. Signing will also be used during construction to minimize potential accidents that could result from travelers stopping in the travel lane or pulling over to observe the sheep.

3.14 Threatened, Endangered, and Other Sensitive Species

The Endangered Species Act (ESA) of 1973 (16 USC 1531-1543) declares the intention of Congress to protect federally listed threatened and endangered species and designated critical habitat of such species. Section 7 of the ESA requires federal agencies, such as FHWA, to ensure that any action is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat.

The ESA defines an endangered species as a species that is in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Species listed as candidate species are currently being reviewed to determine if they should also be protected under the ESA. Generally, impacts potentially jeopardizing a listed species

or impacts to critical habitat of such species must be avoided and/or mitigated, in accordance with the ESA. The United States Fish and Wildlife Service (USFWS) is the primary regulatory agency responsible for ESA compliance.

The Fish and Wildlife Conservation Act (16 USC 2901-2911) encourages states to develop conservation plans for nongame fish and wildlife of ecological, educational, aesthetic, cultural, recreational, economic, or scientific value. Utah relies upon federal legislation to protect vertebrate, invertebrate, and plant species. The Utah Department of Natural Resources (UDNR) maintains the Natural Heritage Program database with the known locations of federally listed threatened and endangered species, as well as state sensitive species. The database does not contain any records of occurrence for any threatened, endangered, or sensitive species within the project corridor. However, within a one-mile radius of the project corridor, there are known occurrences for four species which are included on the Utah Sensitive Species list (see letter dated March 14, 2006 from the Division of Wildlife Resources in **Appendix D**).

3.14.1 Threatened, Endangered, and Candidate Species

On April 11, 2006, a meeting was held with the USFWS, BLM, and the Division of Wildlife Resources to determine the effect, if any, the project might have on the 10 federally listed and two candidate species identified by the USFWS for Grand County, Utah (see **Table 3.14-1**). From this meeting, it was determined that the project, as proposed, had the potential to affect seven federally listed and one candidate species. Additionally, designated critical habitat for fish species associated with the aquatic habitat of the Colorado River occurs within the project limits. Four species were excluded from further analysis because constituent elements of suitable habitat to sustain the species does not exist within or adjacent to the project study area.

Table 3.14-1 Federally Listed and Candidate Species for Grand County, Utah

Common/Scientific Name	Status	Habitat	Potential in Project Area
Bonytail chub *(Gila elegans)*	E	Warm-water, riverine aquatic habitat	Suitable habitat present. Project occurs in listed critical habitat for this aquatic species.
Colorado pikeminnow *(Ptychocheilus lucius)*	E	Warm-water, riverine aquatic habitat	Suitable habitat present. Project occurs in listed critical habitat for this aquatic species.
Humpback chub *(Gila cypha)*	E	Swift-water, rocky bottom, riverine aquatic habitat	Suitable habitat present at Courthouse Wash. Project occurs in listed critical habitat for this aquatic species.
Razorback sucker *(Xyrauchen texanus)*	E	Warm-water, riverine aquatic habitat	Suitable habitat present. Project occurs in listed critical habitat for this aquatic species.
Black-footed ferret *(Mustela nigripes)*	E	Grasslands/plains in association with prairie dog colonies	Habitat not present. No impacts anticipated.
Southwestern willow flycatcher (SWWF) *(Empidonax trailii extimus)*	E	Mixed canopy of cottonwood, willow, and tamarisk vegetation communities along rivers and streams	Transient species, riparian habitat to support species does exist along the Colorado River.
California condor *(Gymnogypes californianus)*	E Exp.	High desert canyon lands and plateaus	Experimental, nonessential population listing. No impacts anticipated.
Bald eagle *(Haliaeetus leucocephalus)*	T	Large trees or cliffs near water with abundant fish prey	Transient species, riparian habitat to support species does exist along the Colorado River.
Mexican Spotted Owl *(Strix occidentalis lucida)*	T	Nests in canyons and dense, mature forests with multi-layered structure, range 4,100 to 9,000 feet	Listed suitable habitat outside and adjacent to study area. Dense, forest structure not present. Canyon vegetation structure fragmented.
Jones Cycladenia *(Cycladenia humilis var. jonesii)*	T	Occurs on gypsiferous soils in canyon lands above 4,000 feet	Suitable soils to support species do not exist and project elevation is out of species range. No impacts anticipated.
Gunnison sage grouse *(Centrocercus minimus)*	C	Big sagebrush steppes with grassy understory	Fragmented, marginally suitable habitat present. No impacts anticipated.
Yellow-billed cuckoo *(Coccyzus americanus)*	C	Larger stands of riparian woodlands of cottonwood, willow, and tamarisk	Transient species. Riparian habitat to support species does exist along the Colorado River.

Source: USFWS (at April 11, 2006 meeting).

E = Endangered; T = Threatened; C = Candidate

Note: Bold text indicates species was carried forward into further analysis in the BA.

3.14.2 Sensitive Species

The Division of Wildlife Resources provided a list of state sensitive plant and wildlife species known to occur within a one mile radius of the project corridor (see letter dated March 14, 2006 in **Appendix D**). Based upon a review of this list and the species of special concern for Arches National Park (NPS, 2004a), the species included in **Table 3.14-2** have the potential to occur within the project corridor.

Table 3.14-2 Sensitive Species

Common/Scientific Name	State Status	Habitat
Allen's big-eared bat *(Idionycteris phyllotis)*	SPC	Preferred habitats include rocky and riparian areas in woodland and scrubland regions, insectivore, nocturnal, roosting in caves or rock crevices during the day.
Spotted bat *(Euderma maculatum)*	SPC	Habitats range from deserts to forested mountains, insectivore, nocturnal, roosts and hibernate in caves and rock crevices.
Corn snake *(Elaphe guttata)*	SPC	Isolated population occurs in western Colorado and eastern Utah, found near streams, or in rocky or forest habitats, more active at night, particularly during hot summer months.
Roundtail chub *(Gila robusta)*	CS	Large rivers in pools near strong currents in the main-stem Colorado River, and in the river's large tributaries. Roundtail chub eat terrestrial and aquatic insects, mollusks, other invertebrates, fishes, and algae.
Flannelmouth sucker *(Castostomus latipinnis)*	CS	Colorado River, and in the river's large tributaries, prefer large rivers in deep pools of slow-flowing, low gradient reaches, benthic forage for algae and invertebrates.
Bluehead sucker *(Castostomus discobolus)*	CS	Upper Colorado River system, the Snake River system, and the Lake Bonneville basin, spawn in streams during the spring and summer, flowing water in high gradient reaches of mountain rivers has been identified as important habitat for bluehead sucker.
Western toad *(Bufo boreas)*	SPC	Slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands, inactive during cold winter months, utilize burrows, feed on invertebrates, such as ants, beetles, and grasshoppers, whereas larvae (tadpoles) filter algae from the water or feed on detritus.
Lewis's woodpecker *(Melanerpes lewis)*	SPC	Cavity nester in tall trees, often dead, utility poles, or stumps, but prefers ponderosa pine, cottonwood, or sycamore. Insectavore.
American White pelican *(Pelecanus erythrorhynchos)*	SPC	Located in Utah Lake/Great Salt Lake ecological complex, diurnal and nocturnal foragers for fish.

Source: Division of Wildlife Resources (March 14, 2006 letter); NPS, 2004a.

SPC = Wildlife species of concern; CS = Species receiving special management under a Conservation Agreement in order to preclude the need for federal listing.

3.14.3 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 provides for the protection of birds classified as migratory by the USFWS. The MBTA prohibits any action or future actions that may harm migratory birds. "Harm" is described such as destroying active nests or roosts, or disturbing or interrupting nesting birds. Specific protection for bald and golden eagles is authorized under the Eagle Protection Act (16 USC 668) which provides additional protection to these species from intentional or unintentional harmful conduct. To establish consistent raptor management, the USFWS developed the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (USFWS, 2002).

The project corridor contains suitable habitat that may provide opportunities for forage, roosts, and nesting to migrating birds, such as raptors, eagles, wading and shore birds, and passerines, to name a few. The cliff walls located just east of the US-191 Colorado River Bridge provide suitable nesting and roosting habitat, especially for raptor species. Whitewash, or evidence of scat from roosting birds, is located on outcrops on the cliffs along the edge of the river corridor within the project study area. This area is a historic roosting and nesting area for raptors and a pair of Peregrine falcons who have resided in the area in past years. Arches National Park biologists have not recorded a nesting pair of Peregrines in recent years; however, the potential to attract these species is likely (Sloan, March 6, 2006).

3.14.4 No Build Alternative

Temporary disturbances similar to those experienced with past maintenance and rehabilitation projects would be expected under the No Build Alternative.

3.14.5 Build Alternative

A Biological Assessment (BA) was prepared to evaluate the effects of the project on seven federally listed and one candidate species (Michael Baker Jr., Inc., 2006). FHWA entered into Section 7 consultation with the USFWS on July 20, 2006 (see letters in **Appendix D**), and the USFWS issued their Final Biological Opinion on October 10, 2006 (included as **Appendix B**). The USFWS concurred with the findings of the BA that the proposed action may affect, but would not likely adversely affect the humpback chub, bald eagle, Mexican spotted owl, Southwestern willow flycatcher, and the candidate Western yellow-billed cuckoo. The biological opinion of the USFWS is that the US-191 Colorado River bridge project is not likely to jeopardize the continued existence of the Colorado pikeminnow, bonytail chub, or the

razorback sucker and is not likely to result in destruction or adverse modification of critical habitat.

The bald eagle, southwestern willow flycatcher, and western yellow-billed cuckoo have been reported near the project area, but their presence is seasonal and likely infrequent due to their migratory nature. Potential habitat exists for the Mexican spotted owl west of the site, although not close to the site. Therefore, potential effects on these species would be considered discountable (USFWS, 2006).

The proposed bridge construction activity will be located within critical habitat for the Colorado pikeminnow, bonytail chub, and the razorback sucker. Primary constituent elements have been identified as necessary for survival and recovery of the endangered fishes, including water quality, physical habitat, and the biological environment. Construction activities may affect physical habitat and water quality.

Aquatic and riparian habitat would be temporarily disturbed in the construction areas in association with the installation of cofferdams, equipment access, bridge construction, and removal of the existing bridge. The construction of either cofferdams or placement of steel casings would alter flows while forms are built and piers are poured, and could strand fish in isolated pools. Bridge foundations would be a permanent change which alters the channel bottom and flow pattern.

Spawning has been known to occur upstream from the project area and there is a potential for any life stage (larval, juvenile, and adult) to be present in the construction site area immediately following the spawning season (late June through August). Young juveniles and adults could occur in the project area any time of the year. Although activities detrimental to spawning and hatching would be avoided, other activities occurring after the spawning period may negatively affect the young of the year.

Construction associated with the building of the new bridge and removal of the old bridge would cause disturbance to the soil and could affect water quality. Fugitive dust and run off carrying silt loads from rainstorms could increase the turbidity of the water in this area and downstream. Construction combined with the use of heavy equipment would disturb the river bed and surrounding soil adjacent to the river, adding sediment to the water when runoff occurs. However, the Colorado River fish are relatively tolerant of increases in suspended sediments. Possible contamination could result from concrete when poured into pier forms. Care would be taken by the contractor to minimize spillover during concrete pouring. If water is taken directly from the Colorado River, fish that reside within this area, including the endangered fish, may be affected. Water depletion can negatively affect larval and small fish if

pumps are not located in a proper area of the water column and correct screening is not used. Impacts to sensitive species may occur from construction activities. Bat species may be impacted if they are present under the existing US-191 Colorado River Bridge during construction. The western toad and the corn snake could possibly be associated with habitat along the Colorado River or Lower Courthouse Wash. The state sensitive fish and bird species have the ability to flee from direct impacts from construction and can move to adjacent habitat. If sensitive fish are present during construction of the US-191 Colorado River Bridge, these species may be indirectly affected by the temporary turbidity increases, increased sedimentation, or decreased water quality. These disruptions may indirectly affect the species immunity abilities from the stress associated with these impacts and may create indirect mortality.

3.14.6 Mitigation Measures for Threatened, Endangered, and Other Sensitive Species

Mitigation will comply with the conditions of the USFWS Final Biological Opinion dated October 10, 2006 (see **Appendix B**). BMPs and other mitigation measures used for federally listed species will limit potential impacts to other sensitive species as well. The following actions and protective measures will be taken by construction contractors and crews, in compliance with the Final Biological Opinion, to minimize impacts:

- Install silt fencing to prevent material from entering the river or side drainages.
- Install erosion control barriers and bank stabilization techniques to reduce possible erosion of riverbanks during construction.
- Minimize large equipment access in the river and adjacent floodplains.
- Replace monotypic stands of tamarisk along the Colorado River bridge corridor that are impacted by equipment or other construction activities with a native cottonwood and willow complex, which are historical substrates for nesting and foraging for the southwestern willow flycatcher and the yellow-billed cuckoo.
- Native willow and cottonwood cuttings will be used for revegetation rather than containerized stock.
- Implement soil stabilization and erosion control devices to ensure river banks and drainages are stable.

- Use native grasses and forbs to re-seed disturbed soils.
- The potential for accidental spills of hazardous materials will be identified, minimized, and avoided through implementation of BMPs and measure specified in the SWPPP. A SPCC will be developed and followed during construction. This plan will identify riparian zones and drainages and outline conservation measures to ensure protection. UDOT will implement a plan to identify and protect sensitive resources through applicable BMPs. The SPCC and SWPPP will address:
    - Refueling of construction equipment near riparian zones and drainages will be done in accordance with applicable state and county codes.
    - Riparian zones and drainages will be defined by staking and flagging in appropriate areas.
    - Equipment near aquatic habitat, as defined, will contain a hazardous materials response kit to prevent impacts to aquatic habitat.
- Obtain fill materials from a validated clean source. In areas of contact with water, use clean fill materials where possible rather than concrete or other artificial materials.
- Confine construction activities and equipment to the designated construction work areas. These areas will be surveyed by a qualified biologist for sensitive resources and defined by lathes and flagging. Construction activities will be contained in these areas. New areas will need approval.
- Areas of important resources will be restricted and no access will be identified and marked “restricted.”
- The installation of cofferdams will be completed outside the spawning season of the Colorado River endangered fishes (May – August). During operation of cofferdam pumps, May – August, a qualified biologist will monitor pumps for impacts to these species.
- Construction activities within the Colorado River during the spawning period for the endangered Colorado River fish will be limited to within the cofferdams.
- Prohibit construction activities within the water channel of Lower Courthouse Wash. Place riprap, if necessary, from the bank and anchor riprap outside of water channel.

- If construction activities extend into the Southwestern willow flycatcher breeding season (May- August), and these activities will be conducted within 1,000 feet of suitable habitat, a qualified biologist will conduct preconstruction surveys in accordance with approved survey protocols. If present, a 1,000 foot "No disturbance" buffer zone will be established around this site and no construction activities will be allowed within the buffer zone during the breeding season.
- Construction workers will attend environmental awareness training on the protective measures to ensure compliance.
- Photographs and documentation of existing environment will be taken to assist in restoring habitat alterations and degradation from construction activities to preconstruction baseline levels.
- Locate pumps for water depletion at cofferdam locations (if applicable) in the water column where chance of larval fish entrainment is minimized. Monitoring will be needed to ensure location and screening is correct.
- A UDOT Certified Environmental Control Supervisor (ECS) will monitor all environmental sensitive areas in addition to BMPs and erosion control devices.
- Perform monitoring by a qualified biologist during construction in areas of potential impact to the species or breeding habitat to monitor and record any incidental take.
- Construction activities that involve any disturbance to river waters or associated drainages will not take place during spawning, post-spawning, incubation, and fry stages of the Colorado pikeminnow, bonytail chub, and razorback sucker (May – August).
- Construction activities will span no more than two consecutive endangered fish spawning seasons.
- Construction activities that involve any disturbance to the river waters or associated drainages will avoid creation of isolated pools or stranding fish within microhabitats.
- Where isolated pools are formed, the Division of Wildlife Resources or qualified personnel approved by the USFWS will be contacted to remove and seine any entrapped endangered fish.

- Provisions to maintain Division of Wildlife Resources or qualified biologists on-site must be made prior to commencement of construction activities.
- FHWA/UDOT, the applicant, and contractor will ensure that construction equipment is not leaking hazardous substances. Any spills or leaks will be immediately cleaned up.
- Upon completion of the project, FHWA/UDOT will provide the USFWS with a report documenting how the reasonable and prudent measures and the terms and conditions were implemented and numbers of any fish taken.

3.15 Invasive Species

3.15.1 Invasive Species or Noxious Weeds

Executive Order 13112 requires federal agencies to combat the introduction or spread of invasive species. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." The Utah Noxious Weed Act, Title 04 Chapter 17 of the Utah Code and Constitution requires each county to formulate and implement a countywide noxious weed control program designed to prevent and control noxious weeds.

The United States Department of Agriculture (USDA) and the Utah State Department of Agriculture and Food (UDAF) are responsible for officially designating noxious weeds. Noxious weeds are invasive species that by federal and state law must be controlled. The UDAF lists 18 species that are officially designated as noxious and each county lists additional species. Several UDAF noxious weed species were identified during field investigations including bermudagrass, field bindweed, perennial pepper weed, and purple loostrife.

Utah has several species listed as invasive (ISSG, 2006). Invasive species include not only noxious weeds, but also other plants and animals that are not native to the country. Species are considered invasive if they have been introduced into an environment where they did not evolve. As a result, invasive species generally do not have natural predators to limit their reproduction and spread rampantly. Invasive species can produce significant changes to vegetation, composition, structure, or ecosystem function. Invasive species other than noxious weeds that were identified during field investigations include tamarisk, cheatgrass, and Russian olive.

3.15.2 No Build and Build Alternative

Invasive species or noxious weeds could be introduced or spread via vehicles and soil disturbance activities. This includes on-going bridge and roadway maintenance, as well as construction activities associated with the Build Alternative.

3.15.3 Mitigation Measures for Invasive Species or Noxious Weeds

UDOT's Special Provision Section 0294S: Invasive Weed Control, identifies BMPs that will be used to prevent invasions of noxious weeds on disturbed sites along the right of way.

UDOT will specify on construction contract documents that seed mixes used for landscaping and/or erosion control must be free of noxious weeds and other invasive plant species.

In compliance with the Executive Order 13112, the Utah Noxious Weed Act, and subsequent guidance from FHWA, the landscaping and erosion control included in the project will not use species listed as noxious weeds. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or adjacent to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur.

3.16 Paleontological, Archaeological, and Historic Resources

3.16.1 Paleontological Resources

The paleontological inventory conducted by Montgomery Archaeological Consultants (MOAC) (2006a) identified two previously documented fossil localities (42Gr206 and 42Gr207) situated just beyond the inventory area. Neither of these resources would be affected by the project.

3.16.2 Archaeological and Historic Resources

The Area of Potential Effect (APE) was inventoried for cultural resources by MOAC (2006a). An Intensive Level Survey (ILS) of architectural historic standing structures was also completed (MOAC, 2006b). Documented sites were evaluated for NRHP eligibility in accordance with 36 CFR 800.4(a-d). The 26 archaeological sites or segments of sites identified within the current APE include 17 historic sites, seven prehistoric sites, and two multi-component historic/prehistoric sites. Of these, 17 are eligible for the NRHP. Architectural properties identified within the APE include 19 buildings and one bridge. Of these, the Arthur Taylor House is listed on the NRHP,

and nine additional properties are eligible for the NRHP, including the US-191 Colorado River Bridge.

3.16.3 Finding of Effect

Tables 3.16-1 and **3.16-2** present the finding of effect for each of the NRHP eligible or listed sites. The only archeological site that cannot be avoided is 42GR3627, a prehistoric lithic scatter, hence it is adversely affected by the project. The only architectural property adversely affected is the Colorado River Bridge.

Table 3.16-1 NRHP Eligible Archaeological Sites

State Site Number	Ownership	Site Type	NRHP Eligibility	Finding of Effect	Mitigation
42Gr190	UDOT/Private	Prehistoric Habitation/Historic Spring Development	Eligible C and D	No Effect	NA
42Gr2565.14	UDOT/Private/USDOE	Historic US-160	Eligible A & C	No Effect	NA
42Gr2565.15		Destroyed bridge/road	Non-contributory	No Effect	NA
42Gr2565.16		Part destroyed/isolated	Non-contributory	No Effect	NA
42Gr2565.17		Historic US-160	Eligible A	No Effect	NA
42Gr2710.15	UDOT/Private	Central Stock Driveway	Eligible A	No Effect	NA
42Gr2813 (2 segments)	UDOT/Private	Moab to Thompson Wagon Road	Eligible A & D	No Effect	NA
42Gr2923	UDOT/Private	Telephone Line	Eligible A	No Effect	NA
42Gr3223	Private	Rock Shelter/Trash Scatter	Eligible D	No Effect	NA
42Gr3626	Private	Lithic Scatter	Eligible D	No Effect	NA
42Gr3627	**UDOT/Private**	**Lithic Scatter**	**Eligible D**	**Adverse Effect**	**Data Recovery**
42Gr3628	UDOT/Private	Lithic Scatter	Eligible D	No Effect	NA
42Gr3630	UDOT/Private	Historic Sandstone Quarry	Eligible A	No Effect	NA
42Gr3632	UDOT/Private	Historic Inscription	Eligible A	No Effect	NA
42Gr3634	UDOT/Private	Prehistoric Petroglyph Panel	Eligible D	No Effect	NA
42Gr3667	Private	Bridge Abutment, Historic Inscription, Petroglyphs	Eligible A, C & D	No Effect	NA

Source: UDOT, 2006b.

Note: Bold text indicates sites with an Adverse Effect.

Table 3.16-2 NRHP Eligible/Listed Architectural Structures

Property Name/Address	Building Style/Type	Finding of Effect	Section 4(f) Use	Mitigation
1 Rosalie Ct.	Modern Contemporary	No Effect	No	NA
St. Pius X Catholic Church 122 West 400 North	Vernacular	No Effect	No	NA
Arthur Taylor House (Desert Bistro Restaurant) 1266 North Highway 191	Two-Story T-plan Farmhouse (NRHP-Listed)	No Effect	No	NA
Bridge Over Colorado River (Structure 0C-285-0)	**Multi-span Steel Plate Girder/ Concrete Piling with Concrete Deck**	**Adverse Effect**	**Yes**	**ILS**
Farabee's Jeep Rental 401 North Main	Vernacular	No Effect (Temporary construction easement)	No	NA
Elks Lodge 611 North Cermak	Vernacular	No Effect	No	NA
646 North MiVida	Modern Contemporary	No Effect	No	NA
654 North MiVida	Modern Contemporary	No Effect	No	NA
Sunset Grill 900 North Highway 191	Modern Contemporary	No Effect (Temporary construction easement)	No	NA
999 North 500 West	Vernacular	No Effect	No	NA

Source: UDOT, 2006b.

Note: Bold text indicates properties with an Adverse Effect.

3.16.4 Consultation

Appendix C includes the Determination of Eligibility and Finding of Effect (DOE/FOE) (UDOT, 2006b) and the draft Memorandum of Agreement (MOA). Consultation letters are included in **Appendix D**. Potential tribal government consulting parties contacted included the White Mesa Ute Council, the Ute Mountain Ute, Paiute Indian Tribe of Utah, the Southern Ute Tribe, the Uintah Ouray Ute, and the Hopi Tribe. The Southern Ute Tribe declined to participate, and the Hopi Tribe and Paiute Indian Tribe of Utah requested consulting party status. The inventory report and draft DOE/FOE were provided to these latter two tribes. The Paiute Indian Tribe of Utah concluded that the project is out of the area of tribal interest. Other potential consulting parties contacted include the Grand County Historic Preservation

Commission and Certified Local Government, the Moab Chapter of the Utah Statewide Archaeological Society, and the Utah Historic Trails Consortium. Only the Trails Consortium replied, requesting consulting party status. Agencies that have jurisdiction within the APE are also participating as consulting parties in the Section 106 process. These parties were provided the draft DOE/FOE and inventory reports.

3.16.5 Section 4(f) Considerations for Historic Properties

Section 4(f) considerations for parks and other recreation resources are discussed in **Section 3.3.3**. Consideration for protection under Section 4(f) of the USDOT Act was also applied to 12 of the 17 eligible archaeological sites and/or segments of sites and the 10 architectural properties. The Build Alternative incorporates several measures that resulted in avoiding eligible sites, including minor adjustments to the vertical and horizontal roadway profile, steepening cut or fill slopes, and/or the use of retaining walls (see **Section 3.16.6**).

Of the 12 archaeological sites, 10 are completely avoided. Site 42GR2565.15 is a short, isolated segment of historic US-160 roadway and a destroyed abutment of the previous Courthouse Wash Bridge that was replaced in 1990. It has lost significant physical integrity and is determined not contributory to the NRHP eligibility of site 42GR2565. The project will fill over this segment (see map in **Appendix C**), but will have no effect on the historic qualities of the overall site. Site 42GR2565.16 is a 60 foot isolated segment of historic US-160 that has minimal asphalt and has been impacted by an access road to private property, and buried utilities. This segment is non-contributory to the site's eligibility for the NRHP. The project will fill over half of the site adjacent to the highway (see map in **Appendix C**), but will have no effect on the historic qualities of the overall site. Both of these segments occur within the UDOT highway easement (FHWA, 2004). Therefore, there is no Section 4(f) use of these two archaeological sites.

Seven of the 10 architectural properties are completely avoided. Construction easements are associated with Farabee's Jeep and Mi Vida Estate (now the Sunset Grill) at 900 North, but these easements are temporary and have no effect on these two historic properties. Therefore, there is no Section 4(f) use of these two architectural properties. The Colorado River Bridge is the only cultural Section 4(f) property that is adversely affected through direct impacts. A Section 4(f) Evaluation for this property is included in **Chapter 4**.

3.16.6 Mitigation Measures for Cultural Resources

Table 3.16-3 identifies avoidance and other protection measures included in the Build Alternative. In those cases where avoidance is not possible, it is because safety for the traveling public would be unacceptably compromised, or moving the roadway would impact other or even a greater number of historic properties.

Table 3.16-3 Avoidance and Protection Measures Included in the Build Alternative

Site/Property Description	Avoidance or Protection Measure
42GR2565.14 Historic US-160	Use 2:1 slope Fence during construction
42GR2813 (2 segments) Moab to Thompson Wagon Road	Use retaining wall Fence northern segment during construction
Arthur Taylor House*	Set roadway vertical and horizontal profile to match existing driveway Reconstruct modern wall in UDOT right of way Reconstruct modern path in UDOT right of way Protect Cottonwood Tree near UDOT right of way Use retaining wall near spring (north of site)
Farabees Jeep Rental*	Use temporary construction easement to re-establish sidewalk
Mi Vida Estate/Sunset Grill*	Use temporary construction easement to re-establish driveway

Source: UDOT, 2006b.
*Detailed map located in **Appendix C**.

Mitigation will be conducted in accordance with the MOA. The draft MOA is included in **Appendix C**. The FHWA has invited the State Historic Preservation Officer (SHPO), UDOT, and consulting parties to participate in the development of the MOA that stipulates archeological data recovery of site 42GR3627, and Intensive Level Survey (ILS) archival documentation of the Colorado River Bridge. In accordance with 36 CFR 800.5-6, FHWA will notify the Advisory Council on Historic Preservation (ACHP) of the finding of an adverse effect, and the ACHP will decide if they will participate in the execution of the MOA.

To ensure the contractor does not encroach into any site areas not specified for construction use, UDOT will include a special provision in the construction contract that explicitly identifies areas needing protection by roadway stationing and erecting temporary fencing as a barrier to unaffected site portions. Standard Specifications governing the contract require that damage incurred by the contractor be mitigated at contractor expense.

UDOT Standard CSI 01355 Environmental Protection Part 1.10 - Discovery of Historic, Archaeological, and Paleontological Resources applies to this project and

stipulates instructions to the contractor for the protection of any archaeological, historical, or paleontological resource discovered in the course of construction. Should a discovery occur, UDOT will consult with the SHPO and relevant consulting parties toward developing and implementing an appropriate treatment plan prior to resuming construction.

3.17 Hazardous Materials or Waste

3.17.1 Identified Hazardous Materials and Waste Facilities

This section summarizes known hazardous or regulated material sites along the project corridor. These sites have the potential to impact construction of the project depending on the type of facility, distance from the proposed construction, soil types, and surface and groundwater elevation gradients. Hazardous or regulated material sites could increase costs associated with highway improvements and/or present future risk to UDOT as the new property owner. Most importantly, these sites can present risks to human health and ecological receptors exposed to the materials or contaminated media. To identify sites along the project corridor, an Environmental Data Resources (EDR) report was obtained and several independent online searches were conducted through available EPA and State of Utah databases, including:

- EPA's National Priority List (NPL) of confirmed Federal Superfund sites (1.0-mile radius search),
- EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list of potential Federal Superfund sites (1.0-mile radius search),
- EPA's list of Resource Conservation and Recovery Act (RCRA) hazardous waste generators and Treatment, Storage, and Disposal Facilities (TSDFs) (1.0-mile radius search),
- Utah Department of Environmental Quality (UDEQ), Division of Environmental Response and Remediation's (DERR) inventory of State Hazardous Waste Sites (SHWS) (1.0-mile radius search),
- Utah's list of Underground Storage Tanks (UST) (1.0-mile radius search), and
- Utah's list of Leaking Underground Storage Tanks (LUST) (1.0-mile radius search).

In addition to the EDR report and online database searches, the Solid Waste Section of the UDEQ, Division of Solid and Hazardous Waste (DSHW) was contacted for information regarding landfills in or near the project corridor.

The EPA's online NPL database indicated that there are no NPL sites within one mile of the project. One CERCLIS site was listed (the Moab UMTRA site discussed in **Section 3.17.3**). Because this site is now owned and managed by a federal agency (the USDOE), this property is now exempt from CERCLA and other similar federal regulatory programs. There were no other CERCLIS sites identified within one mile of the project.

The EPA's RCRA Enviro-Mapper database indicated that three RCRA hazardous waste regulated facilities are located within one mile of the project. These facilities include the Atlas Minerals – Moab Mill (located at Moab UMTRA site), TWD (455 Andrea Court), and Earth Studio (745 Kane Creek Boulevard). As part of the on-going remedial activities taking place at the Moab UMTRA site, the USDOE has removed the RCRA regulated materials historically stored on site. No violations pertaining to hazardous materials or wastes were reported at the remaining two facilities.

The DERR database and interactive map showed that 30 properties within one mile of the project have had registered USTs at some point in time. Of these properties, 21 are also sited on the LUST list. Currently, nine properties have operating USTs, and four of these are also on the LUST list.

The EDR report identified 26 individual properties within one mile of the project corridor, including properties listed on one or more of the databases identified above, as well as databases for Dry Cleaners, Above Ground Storage Tanks, or the Facility Index System (FINDS). The FINDS source provides an inventory of over one million facilities regulated by the EPA. The EDR report provided general information about each of the properties it listed such as the property address, the regulatory database it is listed on, and basic information about the regulated material associated with a particular property. Additionally, the EDR report included a topography map of Moab showing the extent of the area searched and location of each property listed.

3.17.2 No Build Alternative

The No Build Alternative would not adversely impact the identified hazardous materials or waste sites. However, existing contamination would remain, unless cleaned up by others (e.g., USDOE).

3.17.3 Build Alternative

Each of the sites mentioned in **Section 3.17.1** were evaluated to determine whether they were a potential concern for the project. The type of facility and the location of the hazardous material and/or waste in relation to the project were considered during this evaluation. The 41 identified hazardous materials or hazardous waste sites of potential concern to the project are included in **Table 3.17-1**. The approximate locations of these sites are shown in **Figure 3-12**. Sites with moderate or high potential for concern are further described in the paragraphs that follow this table. It is unlikely the release from the remaining sites of low concern would adversely affect the project based on historic use, elevation, local soil type, groundwater flow direction, and the property's location relative to the project.

Table 3.17-1 Hazardous Materials or Waste Sites of Potential Concern

Map ID	Facility ID #	Facility Name	Facility Location	Type	Potential Concern
1	NA	Moab UMTRA Site	Between Colorado River and Intersection of US-191 and SR-279	Exempt	High
2	UTD980804421	Ore Buying Station	158 North 400 East	NPL	Low
3	UTR000002477	TWD	455 Andrea Court	RCRA	Low
4	UTR000003780	Earth Studio	745 Kane Creek Blvd	RCRA	Low
5	5000246	Moab Service Center	500 West and Main Street	LUST	Moderate
6	5000319	Vacant Lot	634 North Main Street	UST	Moderate
7	5000035	Maverick #238 (Former #34)	435 North Main Street	LUST	Moderate
8	5000375	Tag-A-Long Expeditions	452 North Main Street	UST	Moderate
9	5000039	Maverick #337	397 North Main Street	LUST	Moderate
10	5000234	Utah Power and Light Company	320 North 100 West	LUST	Low
11	5000315	North Main Service	284 North Main Street	UST	Low
12	5000257	Jimbo's Country Market	400 North 495 West	LUST	Low
13	5000022	North Side Texaco	220 North Main Street	UST	Low
14	5000076	Crawford Service Center	211 North Main Street	LUST	Low
15	5000436	Bowen Motel	169 North Main Street	UST	Low
16	5000318	Old Robertson's Gas Station	126 North Main Street	LUST	Low
17	5000309	Citizens Telecom Company Of Utah Moab Central Office	15 North 100 East	UST	Low

Map ID	Facility ID #	Facility Name	Facility Location	Type	Potential Concern
18	5000389	Grand County Maintenance Yard	128 East 100 North	UST	Low
19	5000262	Canyon County Sinclair	Center Street and Main Street	LUST	Low
20	5000060	Farabee Adventures Inc.	83 South Main Street	LUST	Low
21	5000259	Walker's #22	299 South Main Street	LUST	Low
22	5000142	Former Moab Stars Food Store	301 South Main Street	LUST	Low
23	5000089	La Sal Oil Company	356 South Main Street	LUST	Low
24	5000094	Auto-Tire	391 South Main Street	LUST	Low
25	5000272	Former MCA Thrift Store (Present City Market)	491 South Main Street	LUST	Low
26	5000271	Certified Ford & Mercury Sales	500 South Main Street	LUST	Low
27	5000183	Canyonlands Campground	555 South Main Street	LUST	Low
28	5000456	Old State Road Department	301 East 400 South	UST	Low
29	5000484	Moab Chevron	817 South Main Street	UST	Low
30	5000321	National Park Service Maintenance	250 Kane Creek Blvd	UST	Low
31	5000311	UDOT Maintenance Yard and UHP Pump	424 Kane Creek Blvd on Southeast Corner of UDOT Yard	UST	Low
32	5000211	UDOT Station #4424	424 Kane Creek Blvd	LUST	Low
33	5000100	City of Moab	470 Kane Creek Blvd	LUST	Low
34	5000292	Moab Truck Center	90 North 200 East	LUST	Low
35	5000467	Black Oil Distributing	995 North Main Street	AST	Moderate
36	NA	Towne House Cleaners	200 North 100 West	Drycleaner	Low
37	NA	Holiday Inn Express	1500 North Highway 191	FINDS	Low
38	NA	Ferrell North America Moab	1431 North Highway 191	FINDS	Low
39	NA	Anasazi Realty	755 North Main Street	FINDS	Low
40	NA	Century 21 Red Rocks Real Estate	505 North Main Street	FINDS	Low
41	NA	Moab Realty	550 North Main Street	FINDS	Low

Sources: EDR, 2005; EPA, 2006a/2006b/2006c; DERR, 2006a/2006b.

Low = Sufficient distance from construction activities and/or site has been identified as cleaned or closed.

Moderate = Partial property acquisition and excavation, earthwork, or demolition is required.

High = Full acquisition or known contamination within roadway section and excavation, earthwork, or demolition is required.

NA = Not Available.

1 – Moab UMTRA Site: The Moab UMTRA site is located about three miles northwest of the city of Moab, in close proximity to the Colorado River and its confluence with Moab Wash. The site is a former uranium-ore processing facility that was owned and operated by the Uranium Reduction Company and later by Atlas Minerals Corporation (Atlas) under a license issued by the Nuclear Regulatory Commission (USDOE, 2005). Facility operations resulted in a 130-acre unlined pile containing approximately 10.5 million tons of uranium mill tailings. The tailings contain several naturally occurring radioactive elements including uranium, thorium, radium, polonium, and radon. The tailings at the site contain contaminants that exceed the EPA standards in 40 CFR 192.

In 1984, the mill ceased operations and decommissioning began in 1988. An interim soil cover was placed on the tailings between 1989 and 1995. It has been noted by the USDOE that approximately six to 12 inches of residual radioactive material exists within UDOT highway easement between Courthouse Wash and the intersection of SR-279. Although the Moab UMTRA site overlaps the existing UDOT highway easement, the tailings pile itself would not be encountered. Remediation of the soils under US-191 is planned for by the USDOE over the next few years; however, it is considered low level radioactive material and does not pose a short term risk to the general public. In 2006, the USDOE conducted excavation activities to address contamination on the north side of US-191 and within the UDOT highway easement. The contaminated material associated with the UMTRA site is planned to be relocated to the Crescent Junction disposal site north of Moab. Other current remedial action taking place on the Moab UMTRA site includes a dewatering system in the tailings pile as well as along the northern bank of the Colorado River where it flows adjacent to the property.

One 4,000 gallon diesel UST, one 4,000 gallon gasoline UST, and one 1,000 gallon used oil UST were located on-site, but were all removed in March of 1996. During tank removal, stained soil was noted around the perimeter of both the diesel and gasoline tanks. A release report was filed with the UDEQ in 1996 and was subsequently closed the next month with no note of soil or groundwater having been treated. No further information was available on the database search or on the USDOE UMTRA project website related to the LUSTs previously located on this property. USDOE personnel currently report that no known petroleum or hydrocarbon have been found within the UDOT ROW as part of their on-going remediation (Metzler, November 2, 2006).

The Build Alternative would construct within the UDOT highway easement (FHWA, 2004) along USDOE property adjacent to the Moab UMTRA site, and a high

potential for encountering contaminants exists. This site will be monitored during construction for hydrocarbon, uranium, thorium, radium, polonium, radon, and petroleum impacted soils.

5 - Moab Service Center: Located at 500 West and Main Street, this property, currently a Denny's restaurant, is listed on the Utah DERR, UST and LUST databases. Four registered USTs were located at this property. Two 8,000 gallon gasoline USTs and two diesel USTs (1,000 and 8,000 gallons respectively) were installed in 1971 and removed in 1990. Spill notification was received in 1990 following tank removal, and between 1990 and 1995, 30 cubic yards of gasoline contaminated soil were treated. Given the long duration of time the USTs were in the ground, the presence of contaminated soil when the tanks were finally removed from the ground, a soil matrix made up of silty sands, and a flow direction to the west, it is possible that contaminated soils from historic activities that took place on this property could adversely impact the project. Given the project will require a strip of right of way, as well as a permanent easement and temporary construction easement along the front of this property, a moderate potential for encountering contaminants exists. This site will be monitored for petroleum-impacted soils during construction.

6 - Vacant Lot: This property located at 634 North Main Street, which used to be a Husky gas station, had three 8,000 gallon registered diesel USTs on site from 1910 through 1988. No spill report was filed following the tank removal, and the site visit revealed it to be a vacant lot with no structures remaining on it. However, given the long duration of time the tanks were in the ground, its proximity to the US-191 project corridor, and a groundwater flow direction to the west, it is possible that historic activities that took place on this property could adversely impact the project, despite the lack of a spill report having been filed. Given the project will require a permanent easement and temporary construction easement along the front of this property, a moderate potential for encountering contaminants exists. This site will be monitored for petroleum-impacted soils during construction.

7 - Maverick #238: Located at 435 North Main Street, this facility is an active gasoline station and convenience store. According to the DERR, UST and LUST databases, one 12,000 gallon and three 8,000 gallon USTs containing gasoline are in use at the facility. One 12,000 gallon, one 10,000 gallon, and one 6,000 gallon gasoline USTs were installed in 1979 and subsequently removed in 1992 and 1993. Following tank removal, in 1993 this facility was placed on the LUST list. Fifteen cubic yards of gasoline contaminated soil were treated following the tank removal and subsequently the site was closed by the Utah DERR in 1995. Given the project would require a temporary construction easement along the front of this property, a

moderate potential for encountering contaminants exists. This site will be monitored for petroleum-impacted soils during construction.

8 - Tag-A-Long Expeditions: Located at 452 North Main Street, this property is listed on the DERR UST list. From 1978 through 1990, a 10,000 gallon gasoline tank was located on site. The tank was removed from the ground in 1990 and no report of staining or leaking was filed with the DERR. The DERR closed their file for this tank in 1991. Given the project would require a temporary construction easement along the front of this property, a moderate potential for encountering contaminants exists despite the lack of a LUST report having been filed. This site will be monitored for petroleum-impacted soils during construction.

9 - Maverick #337: Located at 397 North Main Street, this property is listed on the DERR LUST list. Two 10,000 gallon and one 6,000 gallon gasoline USTs were located on site until 2001, when they were pulled from the ground. One of the 10,000 gallon tanks and the 6,000 gallon tank were installed in 1970, while the other 10,000 gallon tank was not installed until 1975. Release reports were filed with the UDEQ in 1993, 1998, and 2000. Another was filed in 2001, but had a "No Release" note in it and was subsequently closed on the same day. The release filed in 1993 followed a Tank Tightness Test (TTT) in which the tank leaked at a rate of 0.85 gallons per hour. No soil or water was noted as having been treated following this report; however, the UDEQ file was closed just a few months later that same year. An EA done in 1998 revealed the second release. No water, but 1,570 cubic yards of soil were treated as a result and the file was closed in 2001. The 2000 release was discovered following a failed TTT Test. No leak rate was provided, and no soil or water was indicated as having been treated following the failed tank integrity results. Given the existing right of way runs adjacent to the front of this property, a moderate potential for encountering contaminants exists. This site will be monitored for petroleum-impacted soils during construction.

35 - Black Oil Distributing: Located at 995 North Main Street, this property is on the DERR AST list. One 15,000 gallon gasoline tank, one 15,000 gallon diesel tank, two 10,000 gallon gasoline tanks, and two 8,000 gallon gasoline tanks are currently in use on the property. No further information is available regarding this property on the databases searched. Given the unfinished driving surfaces and location of the pump islands relative to the project corridor, it is possible that fueling activities that have taken place on this property could have adverse impacts on the project. Given the project will require a temporary construction easement and a small amount of right of way from the corner of this property that is adjacent to US-191, a moderate

potential for encountering contaminants exists. This site will be monitored for petroleum-impacted soils during construction.

3.17.4 Other Potential to Encounter Hazardous Materials or Waste

Soil excavation would occur in areas near former and existing pump islands. Several organic compounds associated with gasoline are known or suspected carcinogens (e.g., benzene, toluene, ethyl benzene, xylenes). At high concentrations, many of these constituents are also acutely toxic causing respiratory distress, nausea, etc.

In addition to these volatile organic compounds, another toxic constituent commonly associated with gasoline contamination is lead. According to the EPA, lead causes a variety of effects at low dose levels (EPA, 1999). Brain damage, kidney damage, and gastrointestinal distress are seen from acute (short-term) exposure to high levels of lead in humans. Chronic (long-term) exposure to lead in humans results in effects on the blood, central nervous system, blood pressure, kidneys, and Vitamin D metabolism. Children are particularly sensitive to the chronic effects of lead, with slowed cognitive development, reduced growth, and other effects reported. Reproductive effects, such as decreased sperm count in men and spontaneous abortions in women, have been associated with high lead exposure. The developing fetus is at particular risk from maternal lead exposure, with low birth weight and slowed postnatal neurobehavioral development noted. Human studies are inconclusive regarding lead exposure and cancer. Depending upon concentration and exposure route (e.g., inhalation, ingestion, direct contact) constituents of gasoline can have either acute and/or chronic effects on human health.

Similarly, gasoline constituents can affect ecological receptors, particularly when contaminants migrate into a waterbody. Effects on wildlife include low growth rates in plants; developmental, reproductive and nervous system problems in mammals, birds, and fish; and, in severe cases, death (Environment, Health and Safety Online, 2004). Lead is highly toxic to aquatic life, particularly in soft water. Since lead bioaccumulates in the tissues of living organisms, it can result in secondary toxicity in animals and humans at the top levels of the food chain. In addition to threatening human health and the environment, acquiring contaminated property also presents future risks to UDOT as the new property owner.

In addition to the regulated UST facilities identified through the database search, USTs used for heating oil storage could be associated with structures that are located along the highway. Any such USTs represent potential sources of environmental contamination and future UDOT liabilities. Contaminated sites can pose a threat to human health and/or ecological receptors exposed to contaminated environmental

media. Clean up of contaminated environmental media is costly and can take several years to complete in some cases.

3.17.5 Construction Related Impacts

The project would construct on land associated with the following sites of potential concern: Moab UMTRA site, Moab Service Center, vacant lot at 634 North Main Street, Maverick #238, Tag-A-Long Expeditions, Black Oil Distributing, Holiday Inn Express, Ferrell North America Moab, Anasazi Realty, Century 21 Red Rocks Real Estate, and Moab Realty. Construction may also uncover contaminants that have migrated into the right of way from nearby hazardous waste generators. Contaminants migrating to the right of way from source areas outside the right of way are the responsibility of the source area owner. Upon discovery of contamination, the DERR would be contacted immediately.

Uncovering or disturbing contaminated media during construction could cause the volatilization of organic compounds associated with petroleum products, which can cause adverse health effects to workers exposed to the compounds as discussed. In addition, asbestos-containing materials (ACMs) must be removed according to all applicable federal, state, and local regulations prior to demolition activities.

Construction and demolition activities could affect properties with ACMs. Building construction materials containing asbestos are found in a variety of types and uses. Common types of ACMs used in building construction include vinyl floor tile, linoleum flooring, mastic, ceiling tile, spray-applied acoustical/decorative ceiling materials and fireproofing, plaster, wallboard and wallboard joint compound, pipe and boiler insulation, roofing and flashing, and many other materials in common use prior to 1978. ACMs may also be present in debris piles containing discarded building construction materials. Certain asbestos-containing building construction materials such as roofing, roofing tar, and adhesives were still commonly used after 1978. In addition to ACMs, many buildings constructed prior to 1978 were painted with lead-based paint. Because of the construction date of the buildings along the corridor, the presence of lead-based paint cannot be precluded.

3.17.6 Mitigation Measures for Hazardous Materials or Waste

Specific mitigation plans will be developed and implemented to contain hazardous materials encountered during construction and to eliminate contamination after construction. If warranted, further mitigation will be developed following additional investigation of those sites. The UDOT Specification 08A2-3 includes provisions in the event that additional hazardous waste sites are discovered during construction.

Should workers encounter contamination during construction in these or any other locations, they should clear the area and contact the DERR immediately. Other mitigation measures include the following:

- The contractor will be required to provide written notification to the Division of Air Quality (DAQ) at least ten working days before the demolition of any structure, including buildings with no asbestos. DAQ indicates that Regulated Asbestos-Containing Materials (RACM), which include friable ACMs and previously non-friable ACMs that may become friable as a result of demolition activities, must be identified by a certified asbestos inspector and removed by a certified asbestos abatement contractor prior to demolition. If the amount of asbestos to be removed is greater than the National Emission Standard for Hazardous Air Pollutants (NESHAP) size, then notification and payment of the appropriate fee is due ten working days prior to the asbestos removal project. The NESHAP size is defined as 260 linear feet of asbestos from pipes, 160 square feet, or 35 cubic feet from other facility components. Written notification is due at least one working day before the less-than-NESHAP-size amount of RACM is disturbed on any renovation project. No fee is charged for less-than-NESHAP-size renovation projects.
- During demolition activities, the contractor will ensure that workers follow Occupational Safety and Health Administration (OSHA) regulations regarding potential exposure to airborne lead and asbestos. In addition, representative samples of any construction waste derived from commercial structures should be tested by the Toxic Characteristic Leaching Procedure (TCLP) to determine if the waste is hazardous. According to the EPA, construction debris derived from residential structures constructed prior to 1978 is exempt from lead characterization requirements. However, individual landfills often require lead characterization (TCLP analysis) prior to acceptance of construction debris derived from residential structures constructed prior to 1978. Pre-demolition coordination with the landfill responsible for accepting the demolition wastes derived from this project is recommended.
- The contractor will properly remove and dispose of asbestos and lead contaminated materials according to all federal, state, and local regulations. The contractor will also be advised of the potential of encountering petroleum hydrocarbon contamination.

- The contractor will monitor and properly handle and dispose of petroleum or other contaminant-impacted soils during construction. At a minimum, the following sites require monitoring:
  - 1 – Moab UMTRA site, between the Colorado River Bridge and SR-279,
  - 5 - Moab Service Center, 500 West and Main Street,
  - 6 - Vacant Lot, 634 North Main Street,
  - 7 - Maverick #238, 435 North Main Street,
  - 8 - Tag-A-Long Expeditions, 452 North Main Street,
  - 9 - Maverick #337, 397 North Main Street, and
  - 35 - Black Oil Distributing, 995 North Main Street.
- Should full property acquisition or the disposal of surplus property from the following sites be necessary, the UDOT Environmental Division will be consulted to determine the extent of further investigation applicable to each site. When permission to conduct this investigation can be obtained from the existing property owner, UDOT should conduct this investigation prior to acquisition of the property:
  - 1 – Moab UMTRA site, between the Colorado River Bridge and SR-279,
  - 5 - Moab Service Center, 500 West and Main Street,
  - 6 - Vacant Lot, 634 North Main Street,
  - 7 - Maverick #238, 435 North Main Street,
  - 8 - Tag-A-Long Expeditions, 452 North Main Street,
  - 9 - Maverick #337, 397 North Main Street
  - 35 - Black Oil Distributing, 955 North Main Street,
  - 37 - Holiday Inn Express, 1500 North Highway 191,
  - 38 - Ferrell North America Moab, 1431 North Highway 191,
  - 39 - Anasazi Realty, 755 North Main Street,
  - 40 - Century 21, 505 N Main Street, and
  - 41 - Moab Realty, 550 N Main Street.

3.18 Visual Quality

3.18.1 Visual Setting

Photos representing the visual setting are included in **Figure 3-13**. The visual experience in the project corridor is characterized by the diversity provided by four landscape components:

- **Landform:** Red rock canyons and tan ridgelines, and the La Sal Mountains.
- **Water:** Colorado River, Lower Courthouse Wash, Moab Canyon Wash, small ditch, and constructed stormwater structures.
- **Vegetation:** Semi-arid and arid upland plants, wetland and riparian areas, and urban landscaping.
- **Man-Made Development:** Residential areas, industrial areas, commercial areas, historic sites, roadways, trails, utility lines, bridges, and billboards/signs.

Views from the project corridor are dominated by red rock formations in the foreground and the La Sal Mountains in the background. The rugged red rock landforms and snow capped peaks are considered the most important scenic assets of the region. These views "are spectacular and contribute substantially to the quality of life and economic viability of Moab" (Moab, 2001).

The project corridor includes a variety of water landscape components. The bridge over the Colorado River is considered a "distinct focal point" and is the gateway into Moab (Moab, 2001). However, local officials note that this gateway currently lacks distinct visual or aesthetic features that provide for a sense of place. This section of the Colorado River is often used for recreational purposes such as rafting and kayaking. Additionally, Lions Park is located upstream and users have a view of the historic bridge. Views from the Colorado River of the bridge are characterized by a multi-span steel plate girder bridge with grey concrete pilings and deck within a dramatic red rock canyon. The edge of the Colorado River is lined with riparian vegetation.

The Lower Courthouse Wash spans a narrow water body and the view from the bridge is of a small red rock canyon lined with riparian vegetation. The view of the Moab Canyon Wash is of a typical ephemeral waterway in an arid setting, with relatively flat topography and sagebrush vegetation paralleling the dry, red channel bed.

Views of vegetation along the project corridor are typical for arid climates and include sparse sagebrush complex uplands, riparian corridors of the Colorado River and Courthouse Wash, and landscaping associated with development.

Man-made development visually conflicts with the spectacular red rock formations. The North Corridor Gateway Plan identifies the industrial uses, the Moab UMTRA site, billboards, and high voltage power lines as visual intrusions (Four Corners Planning, 2001). Other man-made development such as trails, kiosks, historic structures, and commercial development provide local visual character.

Visual impacts can occur when there is a detrimental effect on the perceived beauty of a place or structure. Views of and from US-191 were considered for potential visual impacts to users of the roadway, residents, and tourists.

3.18.2 No Build Alternative

The No Build Alternative would not alter views of or from US-191. Commercial development would continue to occur on developable private land along the project corridor. Local plans and regulations encourage a visually appealing built environment complementing the natural scenery. Because of local restrictions on development along ridgelines, the visual integrity of the red rock land forms should remain intact. Aesthetic improvements to make the approaches to the Colorado River Bridge a more visually distinct gateway may be identified, funded, and implemented by local organizations.

3.18.3 Build Alternative

The visual impacts of the Build Alternative are not expected to change the overall character of the setting since the project is replacing and widening an existing facility and the roadway and bridge alignment and elevation would be very similar to existing conditions. Views from US-191 of landforms, water, vegetation, and man-made development are not anticipated to be dramatically altered. Alterations to visual views include the widened roadway and structure cross sections, the addition of retaining walls, cut/fill slopes, and stormwater features. Additionally, construction equipment and stockpiled materials used for roadway construction could temporarily affect both foreground and background views either from visually sensitive sites or from US-191. Temporary construction activities would be visually unappealing for roadway users, residents, and tourists.

Design features such as retaining walls and detention basins are expected to be designed to be visually consistent with existing features and not restrict foreground

and background viewsheds. Street lights would be designed to minimize light pollution and the affect to the night sky.

Many visitors' first impression of the Moab area is from their vehicle while driving along US-191. The Build Alternative would provide an opportunity for a more relaxed viewing experience. The median would provide a physical separation of traffic, increasing driver comfort and expanding the viewshed from the road. With reduced congestion, drivers and passengers would be able to more easily enjoy the stunning scenery instead of focusing on a queue of traffic.

The Build Alternative would not visually improve unappealing land uses along the project corridor such as the Moab UMTRA site, billboards, or high voltage power lines, but would provide opportunities for coordination with local government to develop distinct gateway features such as flags, signage, and landscaping at the Colorado River Bridge.

The Build Alternative would maintain or improve views of US-191. The most visually outstanding element of the Build Alternative is the crossing of the Colorado River. The bridge type and aesthetic treatments would be determined during final design, but the structure is expected to be a new steel or concrete girder bridge with four to seven spans. Architectural treatments would result in a visually pleasing structure that complements and blends with the natural surroundings. Given that the Build Alternative involves replacing the existing bridge on essentially the same alignment, the new bridge would not introduce a substantially different visual element to river users in the area.

North and south of the Colorado River, the Build Alternative would allow for uniform visual conditions including open or landscaped medians, paved shoulders, and south of the river, curb and gutter. These design features will aesthetically match into the roadway cross-sections at the northern and southern project termini.

3.18.4 Mitigation Measures for Visual Quality

UDOT's Context Sensitive Solution (CSS) principles have been examined and measures that have been incorporated into the Build Alternative to reduce visual impact include:

- Match the existing alignment and vertical grade as much as possible,
- Incorporate retaining walls to minimize cut sections,

- Use the bikepath on the east side south of the Colorado River Bridge for non-motorized uses (instead of having both a sidewalk and bikepath along the east side), and
- Provide consistency with roadway design elements at both project termini.

Aesthetic treatments and visual enhancements of design features will be finalized during design through an aesthetic committee consisting of participants from Moab City, Grand County and/or the Trail Mix Committee for Non-Motorized Trails. The design will consider the cost and practicality associated with architectural treatments (e.g., form liners, concrete staining, decorative lighting, decorative rock, boulder scatter, shrub plantings, and/or other native landscaping) of design features such as retaining walls, structures, lighting, cut/fill slopes, and medians. Betterments may require local funding partners.

3.19 Cumulative Effects

Cumulative impacts can result from individually minor but collectively substantial actions taking place over a period of time. As such, this section addresses the cumulative impacts on resources at risk that may result from the incremental impact of this project when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions.

The cumulative effects analysis should be limited through scoping efforts to identify resources and effects that are truly meaningful. In accordance with CEQ guidance, the NEPA scoping process (outlined in **Chapter 6**) was the first step in identifying resources of concern that should be included in the cumulative impact analysis. Resources of concern identified during project scoping were cross referenced with the potential impacts of the project and the potential for additional impacts resulting from other contributing actions (as identified in **Section 3.19.2**). On the basis of this approach, three resources of concern were identified:

- Sustainability of the tourism-based economy
- Bicycle and pedestrian facilities
- Drainage

As explained in **Section 3.1.3**, secondary effects such as induced growth or altered development patterns are not anticipated as a result of this project because future land development is already severely constrained. Improvements are also not projected to induce traffic or alter development plans when compared to the No Build Alternative.

3.19.1 Baseline, Geographic, and Temporal Boundaries

The following baseline conditions, geographic (spatial) boundary, and temporal (time) boundary were established for this cumulative impact analysis, as suggested by CEQ guidance:

- **Baseline:** Conditions in the 1970s were chosen as the baseline for this study because it represents the beginning of the Moab area's transition from a mining and agricultural based community to a tourism based community.
- **Geographic Boundary:** Sustainability of the tourism-based economy and bicycle pedestrian facilities was considered at the county-level. Drainage was was considered using the upper Colorado Basin – Kane Springs Watershed.
- **Temporal Boundary:** Past (1970-1999), present (2000-2007), and reasonably foreseeable future (2008-2030).

3.19.2 Contributing Actions

The identification of contributing actions potentially affecting the chosen resource is critical to the cumulative impact analysis process. For the purposes of this project, the contributing actions identified in **Table 3-19.1** have been identified and considered in the cumulative impact analysis.

Table 3-19.1 Contributing Actions

Time Frame	Contributing Action	Status
1900-1969 (History of Moab, 2006).	Farming (fruit) and ranching dominate the area's economy from 1900 to the 1950's	Completed
	Expansion of natural resource extraction – Uranium, oil, and potash	
	Grand County's first bridge across Colorado River completed in 1912	
	Existing US-191 – Colorado River Bridge constructed in 1955	
	Moab designated as a city in 1936	
	Designation of Arches National Monument in 1929	
	Establishment of Canyonlands National Park in 1964	
1970-1999	In the 1970s, I-70 was completed between Floy Wash and Crescent Junction, improving access to the Moab area	Completed
	Designation of Arches as a National Park in 1971	
	Shift in use of BLM lands to accommodate growing demand for recreation opportunities including extensive network of off-road (bicycle and vehicular) trails	
	Establishment of Scott Matheson Wetland Preserve	
	Tourist-oriented commercial development along US-191 in project area and in downtown Moab including campgrounds, hotels, and recreation outfitters	
2000-2007	Continued expansion of a non-motorized trail network (such as the establishment of additional bike lane segments and the construction of the Colorado River Pedestrian Bridge Project) and outdoor recreation opportunities on BLM lands and around Moab.	Ongoing
	Continued expansion of tourism-related commercial development along US-191	Ongoing
	Moab initiates efforts to begin annexing properties from Grand County, from Moab city limits northward to the Colorado River	Initiated in 2006
	Moab extends sewer lines from city limits northward to the Colorado River (North Trunk Sewer Line)	Initiated in 2006
	Reconstruction of US-191 Moab Main Street	2005-2006
	Widening of US-191 Moab to I-70 at Crescent Junction	Initiated in 2005
	DOE initiates study and begins clean-up of Moab UMTRA site	Clean-up initiated in 2005 with site monitoring until 2080
2008 - 2030	Ongoing expansion of non-motorized trail network and outdoor recreation opportunities on BLM lands and around Moab	Ongoing
	Tourism and outdoor recreation will continue to dominate area economy	Planned
	Expansion of commercial and service sector to support year-round employment and economic diversity within Moab area	Planned
	Arches National Park to implement a transportation plan to address traffic congestion at attractions – will result in improvements to traffic flow within Moab area. A concessionaire-operated motorized tour would originate in Moab, and make intermediate stops between Moab and Arches, in locations such as Lions Park.	Study underway
	BLM to implement its revised Resource Management Plan. Plan will likely focus on providing additional recreation opportunities, services, and facilities within Moab area	Plan implementation expected in 2008
	Continued upgrades to storm management system (Grand County, Moab, UDOT, and/or private development)	Ongoing

3.19.3 Cumulative Effects to the Sustainability of the Tourism-based Economy

The Moab area has become an important, world-renowned tourist and recreation destination for activities such as river-running, mountain biking, off-road vehicle driving, climbing, and hiking. A majority these activities and attractions are located on public lands managed for multiple uses (i.e. NPS, BLM, and state land holdings). In fact, 96 percent of Grand County is within public land ownership.

These extensive public land holdings are both a blessing and curse to the regional economy. While these public lands allow for extraction (mining), use (farming and recreation), and some employment opportunities; they do not provide local property or sales tax revenues. Private and taxable land is limited within Grand County and, as such, local plans encourage a maximization of use. Based on the limited amount of commercial land available for development, it is assumed that this land will be developed as zoned to provide employment, property tax, and sales tax revenues. Amenities that can maximize the economic success and sustainability of the local tourist-based economy include aesthetics that provide a "sense of place." Local plans note that a "scenic community that protects its environment attracts more visitors and hence brings in more income" (Moab, 2001). The Moab region is unique and local plans stress that the built environment should complement the natural environment.

Current and future contributing actions add to the "sense of place" and the tourism-based economic sustainability of the region. Moab has a vibrant Main Street with a mix of uses. The current Moab Main Street Project allows for improved traffic conditions downtown and includes a construction schedule that minimizes disruption during peak tourism periods. Local plans and requirements encourage a visually appealing built environment complementing the natural scenery. Trail connections are planned to provide a non-motorized network for both transportation and recreation. Together, these actions coordinate to provide a unique "sense of place" with amenities attractive to both residents and tourists.

From a cumulative standpoint, the project provides additional opportunities to solidify this vision. The project would provide a uniform streetscape and alleviate congested traffic conditions. Continued local coordination during design through an aesthetic committee consisting of participants from Moab City, Grand County and/or the Trail Mix Committee for Non-Motorized Trails is planned to identify aesthetic features that can be incorporated into the project design to reinforce the existing and desired "sense of place."

As discussed in **Section 3.4.3**, the project would result in potential business displacements, but it is estimated that this would result in a minimal loss of local sales

tax and transient room tax revenues, and other future actions are not expected to contribute to this loss. Construction-related impacts to the economy would be limited by implementing measures similar to those that were effectively used for the Moab Main Street Project. For example, major construction activities would be limited to minimize impacts during the peak tourist season.

As such, the overall effects of the project, in conjunction with other ongoing actions, are expected to support Moab's tourism-based economy.

3.19.4 Cumulative Effects to Bicycle and Pedestrian Facilities

Recreational resources such as non-motorized bicycle and pedestrian facilities are the cornerstone to sustaining a successful tourist-based economy in the Moab region. The management and development of local bicycle and pedestrian facilities involves multiple parties completing different projects in different locations which may or may not work as a system. Because of this dynamic, the Grand County/City of Moab's Trail Mix Committee for Non-Motorized Trails is a grass-roots group dedicated to preserving and developing non-motorized trails in Grand County. The group is working closely with federal, state, and mobilizing volunteers to achieve their goal. As such, bicycle and pedestrian trail systems are planned to expand independent of the proposed project.

As discussed in **Section 3.3.3**, the project interacts with multiple existing and planned bicycle and pedestrian facilities or trails. **Section 3.3.7** summarizes the project's potential impacts to these facilities. Other independent on-going system improvements include a new non-motorized bicycle and pedestrian bridge across the Colorado River, new paved paths along US-191 and US-128, and sporadic sidewalk and bike lane development in Moab.

Cumulative effects to bicycle and pedestrian facilities incorporating other actions and project-related enhancements would allow for non-motorized travel from 400 North on the east side of US-191, across separate Colorado River Pedestrian Bridge, then along the enhanced trail between Courthouse Wash and the Colorado River Bridge Trail, and then continuing on the existing Moab Canyon Bike Path from the Courthouse Wash kiosk to Arches National Park. With the project, US-191 would also include continuous five to eight-foot paved shoulders and plans for future sidewalks south of the bridge in locations where a bike path is not planned. The project has the potential for temporary construction impacts to some existing and planned trails, but UDOT is committed to restoring disturbed trails to provide the same activities, features, and functions.

Without the project, improvements to the informal footpath between Courthouse Wash and the Colorado River Bridge Trail may be delayed until local funding becomes available and continuous widened paved shoulders would not occur. Intermittent widening of shoulders and sidewalks would be expected only where additional development occurs.

In summary, bicycle and pedestrian facilities are expected to be enhanced over time with or without the project. These improvements are expected to provide a continuous trail network along the project corridor. Enhancements associated with the Courthouse Wash and the Colorado River Bridge Trail may occur sooner with the project, and continuous widened shoulders would only occur with the project.

3.19.5 Cumulative Effects to Drainage

Figure 3-9 shows areas along US-191 in Moab that are subject to flooding from severe storm activity or local drainage problems, an issue of concern that was identified during the scoping process. Aspects of water quality that pertain to the potential for cumulative effects to threatened and endangered species have been addressed separately as part of the Section 7 consultation process (see **Appendix B**).

The scarcity of vegetation and abundance of rock at or near the surface can result in rapid runoff and surface flooding during major storm events. The runoff and flooding is aggravated by impervious surfaces related to development. In the past, potential drainage problems were not required to be addressed as US-191 and adjacent commercial properties in this area developed.

New development is now subject to the storm water management practices enforced by the DWQ, Grand County Storm Water Management Plan, and Moab. One of the city's stated goals is to provide an adequate storm drainage system through expansion and upgrading of the existing system. Moab is also requiring that storm water runoff from developed sites not exceed predevelopment conditions. Before a property is annexed, the city is requiring that it has safe and adequate drainage. Parcels that cannot provide or accommodate drainage are not allowed to be developed. Discharge of wastewater to surface waters, including storm drains, now requires a permit prior to beginning operation. With these added enforcement measures, new development should improve overall drainage conditions.

The project is also subject to storm water management practices. As impervious surface areas increase with highway widening, and curbs and gutters are installed, the road surface conveys the drainage water more rapidly and in a concentrated manner across the road, thus potentially increasing peak runoff flows. This situation can lead

to difficulties with storm drainage control, stream channel maintenance, and stream water quality. BMPs, detention basins, and the conveyance of storm water runoff to existing or future city/county systems or through ditches and pipes to nearby surface waters are proposed to manage increased peak runoff flows resulting from the project.

Additionally, Moab, Grand County, and UDOT are working jointly to address existing drainage problems and flooding concerns along US-191 independent of this project.

In summary, cumulative impacts to drainage are anticipated to be managed by implementing storm water management practices, and over time, drainage within the study area should improve. Storm water management systems along US-191 could be implemented sooner with the project, except that funding is not yet in place for this section of roadway.

3.19.6 Mitigation for Cumulative Effects

On-going coordination with Grand County and Moab City, as well as other public land managers and regulatory agencies, will occur during design and construction to help ensure that the project design and construction schedule is coordinated with the implementation of future actions.