Draft Supplemental Environmental Impact Statement/Reevaluation and Draft Section 4(f), 6(f) Evaluation

December 2004

Legacy Parkway

I-215 at 2100 North in Salt Lake City to I-15 and US-89 near Farmington in Salt Lake and Davis Counties, Utah

FHWA-UT-EIS-98-02-DS

Submitted pursuant to 42 U.S.C. 4332(2)(c), 49 U.S.C. 303, and 33 C.F.R. 325, App B, by the U.S. Department of Transportation Federal Highway Administration and U.S. Army Corps of Engineers

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Cooperating Agencies: U.S. Department of the Interior Fish and Wildlife Service, U.S. Environmental Protection Agency, and Federal Transit Administration

State Highway Agency/Section 404 Permit Applicant: Utah Department of Transportation

December 2004

11/16/04
Date of Approval

For the Federal Highway Administration

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Date of Approval

For the U.S. Army Corps of Engineers

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Abstract

Based on the results of the reevaluation of alternatives considered in the Final EIS, the Utah Department of Transportation proposes the construction of a four-lane, limited-access, divided highway extending 22.5 kilometers (14 miles) from Interstate 215 (I-215) in Salt Lake City north to I-15 and U.S. Highway 89 (US-89) in Farmington. The primary purpose of this Legacy Parkway project is to help meet existing and projected travel demand through 2020 in the North Corridor by providing additional north-south transportation capacity. Five alternatives are considered in detail in the Supplemental EIS: the No-Build Alternative; Modified Alternatives A, B, C; and Alternative E. Alternative E follows the same alignment as the Final EIS Preferred Alternative, Alternative D, but has a narrower right-of-way width than Alternative D and includes features to integrate it with mass transit. Updated information is provided on environmental impacts in over 20 categories. As described in the Final EIS, key impacts remain wetlands, wildlife habitat, developable lands, relocations, farmland, and cost. Mitigation measures to reduce the levels of impacts are also described herein.

Comments on the Draft Supplemental EIS are due by February 1, 2005, to Gregory Punske (FHWA) at the above address.

DRAFT

Legacy Parkway Supplemental Environmental Impact Statement/Reevaluation and Draft Section 4(f), 6(f) Evaluation

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Jones & Stokes. 2004. *Draft Legacy Parkway supplemental environmental impact statement/reevaluation and draft Section 4(f), 6(f) evaluation*. December. (J&S 03-076.) Sacramento, CA.

Summary

Summary

This section of the supplemental environmental impact statement/reevaluation (Supplemental EIS) provides a summary of new information presented in the Supplemental EIS as a result of reevaluation of the June 2000 *Legacy Parkway Final Environmental Impact Statement and Section 4(f), 6(f) Evaluation* (Final EIS) (FHWA-UT-EIS-98-02_F) (Federal Highway Administration et al. 2000). The Supplemental EIS includes a presentation of results of evaluations arising from the remand handed down by the U.S. Court of Appeals for the Tenth Circuit, as well as reevaluation of the purpose and need for the action, the alternatives screening process, and the environmental impact analysis and proposed mitigation measures. This chapter presents a summary of that information and a discussion of areas of controversy, including major issues yet to be resolved, and a listing of federal actions required to implement the Legacy Parkway project. The organization and content of the Supplemental EIS are explained in the *Foreword/Introduction* section of this document in the subsection titled "Organization of Draft Supplemental Environmental Impact Statement."

This Supplemental EIS is a supplement to the Final EIS. The Federal Highway Administration (FHWA) and the U.S. Army Corps of Engineers (Corps), as joint lead agencies, issued a notice of intent to prepare the Supplemental EIS in April 2003. It incorporates updated information as a result of the comprehensive reevaluation of the Final EIS. In some sections, information that is still valid from the Final EIS is repeated herein for context. This Supplemental EIS also contains detailed information addressing issues identified in the decision of the U.S. Court of Appeals for the Tenth Circuit (*Utahns for Better Transportation et al. v. U.S. Department of Transportation et al*. [305 F.3d 1152 10th Cir. 2002]). The appellate court determined that the following five specific issues were in need of further review.

- Practicability of a narrower right-of-way.
- Elimination of the Denver & Rio Grande (D&RG) regional alignment as a feasible alternative based on cost and substantial impacts on existing development.
- Integration of Legacy Parkway with expansion of mass transit.
- Alternative sequencing of components of the Shared Solution.
- Impacts on wildlife.

As a result of the appellate court decision, all construction work for Legacy Parkway has been halted, with the following exceptions: right-of-way acquisition, design work, certain activities related to the implementation of the Legacy Nature Preserve mitigation sites, and construction activities associated with the upgrade of the Park Lane (formerly Burke Lane) interchange in Farmington. This work has continued consistent with an agreement of the parties as entered by the court.

The Federal Highway Administration (FHWA) and the U.S. Army Corps of Engineers (Corps), as joint lead agencies, issued a notice of intent to prepare the Supplemental EIS in April 2003. Consistent with FHWA-specific National Environmental Policy Act (NEPA) guidance, a reevaluation of the Final EIS was conducted because construction of the project was halted as a result of the appellate court decision and over 3 years have passed since FHWA filed the Final EIS. The reevaluation process was used to determine whether any issues, in addition to the limited deficiencies identified in the appellate court decision, warranted attention in the Supplemental EIS. Concurrent with the release of this Supplemental EIS, the Utah Department of Transportation (UDOT) is applying for a modification to its Section 404 permit to address the reduced right-of-way width proposed for all build alternatives analyzed in this Supplemental EIS.

In preparing the Supplemental EIS, FHWA and the Corps conducted the reevaluation and developed technical memoranda to address issues identified in the appellate court decision. Public participation in developing the Supplemental EIS has included NEPA scoping, meetings of a community planning and information committee (CPIC), small group meetings, and public review of this Draft Supplemental EIS. Interagency consultation and coordination has been accomplished through meetings with the cooperating agencies, involving the U.S Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and the Federal Transit Administration (FTA). EPA and USFWS also provided representatives to participate on the science technical team, which assisted in the reevaluation of wildlife impacts. State, regional, and local agencies have also been consulted.

Reevaluation of Purpose of and Need for Action

The purpose of and need for the action has not changed since publication of the Final EIS. Growth projections and traffic data supporting the purpose and need have been updated, however. The purpose of the Legacy Parkway project remains as stated in Chapter 1 of the Final EIS (page 1-41). The primary purpose of the project is to provide capacity to relieve traffic congestion through the year 2020 in the North Corridor, located in Salt Lake and Davis Counties, Utah. An additional purpose of the project is to provide an alternate north-south route through the North Corridor.

Legacy Parkway is proposed, as one part of the Shared Solution, to provide part of the transportation facilities needed in the North Corridor to accommodate the safe and efficient movement of people and goods through 2020. The Shared Solution, of which Legacy Parkway is one of three major components, was developed by Utah's state, local, and regional officials as the transportation infrastructure needed to meet future transportation demand in the North Corridor. The Shared Solution includes the following primary components.

- **Interstate 15 (I-15) improvements**. Reconstruction of I-15 in the North Corridor to address design deficiencies and widen the facility from eight to ten lanes.

- **Mass transit expansion**. Expansion of mass transit in the North Corridor, including new commuter rail or other transit technology.

- **Legacy Parkway**. Construction of a four-lane, divided, limited-access highway, including a trail for pedestrian, bicycle, and equestrian uses.

The need for Legacy Parkway remains as explained in the Final EIS. However, travel demand data for existing and future traffic conditions have been examined based on the 2004 WFRC travel demand model (version 3.2), and the updated analysis confirmed that all three of the Shared Solution components are

needed to meet projected transportation demand in the North Corridor through 2020 and beyond. Environmental documentation is proceeding on each of the three main components of the Shared Solution. An EIS for proposed commuter rail is being prepared by the Federal Transit Administration (FTA) and the Utah Transit Authority (UTA); the Draft EIS was released for public comment between April 30, 2004 and June 15, 2004 (Utah Transit Authority 2004). An EIS/reevaluation for I-15 improvements is being conducted by FHWA and UDOT. And this Supplemental EIS for Legacy Parkway is being prepared by FHWA and the Corps.

The updated transportation analysis presented in the Supplemental EIS is consistent with the Final EIS findings that Legacy Parkway, in combination with other projects of the Shared Solution, is needed to relieve congestion on I-15 and achieve acceptable levels of traffic operating conditions throughout the North Corridor. The transportation analysis updated for the Supplemental EIS similarly reaffirms the need documented in the Final EIS to accommodate through-corridor traffic, promote local street traffic safety and emergency vehicle response times, and provide an alternate route during reconstruction of I-15 and emergency situations.

Summary of Court Ruling Analysis

As stated above, the U.S. Court of Appeals for the Tenth Circuit determined that five specific issues presented in the Final EIS were in need of further review. Those issues are described below.

Narrower Right-of-Way

The appellate court remanded in part the Legacy Parkway Final EIS for further review to consider the practicability of a narrower right-of-way than that considered in the Final EIS. After conducting a technical analysis on right-of-way issues documented in *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a), it was concluded that the median width of the proposed facility could be reduced by 5 meters (m) (16 feet [ft]), resulting in a reduction in the total right-of-way width from 100 m (328 ft) to 95 m (312 ft). It was determined that this narrower median width could be used without substantially compromising the safety of the facility or the water quality function of the vegetated median. The narrower 95-m (312-ft) right-of-way width would be used for most portions of the mainline right-of-way. However, in areas where wetlands, residences, or Section 4(f) properties could be completely avoided by further reducing the width of the roadway footprint within the right-of-way, the footprint could be reduced to 80 m (264 ft). The Legacy Parkway build alternatives evaluated in this Supplemental EIS have been modified to reflect this narrower right-of-way width as the modified proposed action. Alternative E follows the same alignment as the Preferred Alternative in the Final EIS (referred to as Alternative D in this Supplemental EIS) but includes the narrower right-of-way.

Denver & Rio Grande Railroad Regional Corridor Alternatives

The appellate court also remanded in part the Legacy Parkway Final EIS for further review of elimination of the D&RG Railroad regional corridor as a feasible alternative based on substantial impacts on existing development and high costs. Cost data for all regional corridors was updated, and then five specific alignment options within the D&RG Railroad regional corridor were evaluated to determine whether a reasonable alternative within the D&RG regional corridor could be developed. As part of this evaluation, planning-level cost estimates for the D&RG regional corridor and all the other regional corridors considered were updated. In addition, more detailed cost estimates for the specific alignments within the D&RG corridor were developed. Impacts related to residential, commercial, and industrial property

displacements were quantified for each D&RG alignment alternative. In addition, impacts on wetlands and communities were analyzed. The results of the more detailed reevaluation of this regional corridor, which are documented in *Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation* (HDR Engineering, Inc. 2004b), reaffirm the conclusion from the Final EIS that this alternative is not reasonable for the following reasons.

- The D&RG alignments would require an extraordinary number of displacements compared to Alternative E.
- The D&RG alignments would have considerably more impacts on community cohesion.
- The D&RG alignments would bisect service areas of two elementary schools (compared to none for Alternative E).
- The D&RG alignments would have far greater noise and visual impacts on local neighborhoods.
- The D&RG alignments would eliminate a large portion of the tax base for the City of North Salt Lake by displacing or altering access routes to businesses.
- The D&RG alignments would cost between $99 and $195 million more than Alternative E.

Integration of Legacy Parkway with Expansion of Mass Transit

The appellate court also addressed the integration of Legacy Parkway and mass transit as a possible reasonable alternative. In response to the court's holding, the lead agencies evaluated ways to integrate Legacy Parkway with expansion of mass transit, with the analysis documented in *Legacy Parkway Technical Memorandum: Integration of Mass Transit with Legacy Parkway* (Fehr & Peers 2004). A fully integrated "robust transit scenario" (referred to as *maximum future transit*) was developed as part of this analysis and used for the basis of the transit assumptions in evaluating all the build alternatives; the No-Build Alternative incorporates only those mass transit improvements included in the *Wasatch Front Urban Area Long Range Transportation Plan Update, 2004–2030* (WFRC long range plan) (Wasatch Front Regional Council 2003a). For evaluating the need for any of the other alternatives recommended, the robust transit scenario, or Maximum Future Transit Alternative, was included as part of the future baseline assumptions. The Maximum Future Transit Alternative includes physical and program-level transit improvements, such as bus rapid transit, commuter rail, and coordinated arrival times at stations for various services and modes; substantial increases in downtown parking fares; and changes in local development patterns to more transit-supportive land use patterns.

The results of the travel demand model analysis conducted as part of the reevaluation show that, even with all these transit-supportive projects, programs, and land use changes in place, an alternate highway route through the North Corridor would still be needed to meet the transportation demand through 2020. Federal, state, and local transportation officials embrace many of the concepts and improvements included in the Maximum Future Transit Alternative (as developed for the integration analysis), most of which are also included in current and future plans. However, this integration analysis concludes and officials recognize that the Maximum Future Transit Alternative alone would not meet the project purpose and need. The exploration of the robust transit alternative also provides a common point of departure for state and local planners to examine other mechanisms for integrating roadways and transit.

The integration analysis also analyzed the opportunities to physically integrate the construction of the Legacy Parkway project with construction of mass transit improvements. As a result, several opportunities for integrating the construction of Legacy Parkway with expansion of mass transit have been implemented as part of the construction work completed to date or are planned for implementation in the future. Since publication of the Final EIS, the Utah Transit Authority (UTA) commuter rail project has advanced to the point that more specific information is available about the commuter rail plans, including station locations, and it is now feasible to coordinate planning efforts between the two projects.

Sequencing of Shared Solution

The appellate court remanded in part the sequencing, or order, of construction of the various components of the Shared Solution. The sequencing issues relate to reasonableness of reconstructing I-15 before building Legacy Parkway, delaying construction of Legacy Parkway and reconstruction of I-15 until all or part of mass transit expansion is in place, and determining whether mass transit could alleviate the immediacy of the need for I-15 reconstruction or implementation of Legacy Parkway. UDOT and the lead agencies have analyzed these questions, and the results are documented in the *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution* (HDR Engineering, Inc. 2004c). For this analysis, various construction sequencing scenarios were developed. Scenario 1 evaluates the impacts of constructing maximum future transit first, reconstructing I-15 second, and constructing Legacy Parkway third to determine whether maximum future transit would provide sufficient congestion relief in the North Corridor to alleviate the need for Legacy Parkway or I-15 reconstruction. Scenarios 2, 3, and 4 evaluate the relative impacts of constructing maximum future transit either before or concurrently with Legacy Parkway and undertaking I-15 reconstruction last in the sequence. The sequencing analysis resulted in the following conclusions.

- Constructing maximum future transit in the North Corridor prior to building Legacy Parkway or reconstructing I-15 prior would delay the direct impacts on wetlands that would result from construction of Legacy Parkway for 3 to 7 years, respectively.

- Maximum future transit does not alleviate the immediacy of need for Legacy Parkway or I-15 reconstruction. Even with maximum future transit fully implemented by 2008 (and assuming transit-oriented development land use changes), delaying construction of Legacy Parkway (Scenario 2) would fail to meet demand from 2005 to 2015. Delaying Legacy Parkway further so that maximum future transit provides the only corridor-length alternative to I-15 during its reconstruction (Scenario 1) would substantially fail to meet demand during the I-15 reconstruction period, 2008 to 2012.

- Because of high costs to the traveling public, it is not reasonable to delay construction of Legacy Parkway or reconstruction of I-15 until maximum future transit is in place. Delaying Legacy Parkway construction or I-15 reconstruction would incur additional costs to the traveling public of between $48 million and $498 million from the combined loss of time and additional energy cost in the morning and evening peak periods.

- Consistent with the Final EIS findings, it is not reasonable to reconstruct I-15 prior to building Legacy Parkway. The results indicate that I-15 would experience extreme congestion without Legacy Parkway to absorb the displaced traffic during I-15 reconstruction. Scenarios 3 and 4, which sequence Legacy Parkway construction prior to I-15 reconstruction, provide faster travel times on balance over the 10-year construction period, resulting in $498 million in lower costs to the traveling public.

The conclusions regarding sequencing were based on comparison of the impacts of the full range of sequencing combinations of the Shared Solution components. Impacts were evaluated using a range of variables, including timing of direct impacts on wetlands, costs to the traveling public, travel speeds and travel times for users of each of the Shared Solution components, air quality, construction costs, and operating and maintenance costs.

Wildlife Impacts

The appellate court's remand also stated that the lead agencies failed to adequately consider impacts on wildlife in the Final EIS by limiting the impact evaluation to habitat within a 305-m (1,000-ft) area and failing to consider impacts on migratory bird populations that use the larger Great Salt Lake Ecosystem (GSLE). In response to the court's holding, the lead agencies conducted a reanalysis of the project impacts on wildlife that expanded on the Final EIS analysis of impacts on wildlife by considering direct, indirect, and cumulative impacts on wildlife, particularly migratory species, within and beyond a 305-m (1,000-ft) project study area in the GSLE. Project impacts on wildlife were analyzed using a three-level study area: the project study area (for direct and indirect effects), a larger regional study area (for indirect and cumulative effects), and the entire GSLE area (for context and cumulative effects analysis). The following impacts were evaluated: direct habitat loss, changes in habitat loss when combined with the natural effects of lake level change, habitat fragmentation, changes in habitat quality, habitat modification, wildlife highway mortality, human disturbance, effects on special-status wildlife, and cumulative effects.

The findings of the wildlife impact analysis, which are documented in *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum* (Jones & Stokes 2004) and Section 4.13 of this Supplemental EIS, include the following.

- All the Legacy Parkway build alternatives would result in adverse direct and indirect effects and contribute to cumulative habitat loss, habitat fragmentation, and noise effects on local wildlife populations, including migratory birds.
- These impacts alone, however, would not likely affect the long-term viability of any wildlife species in the GSLE.
- Mitigation for these impacts is incorporated into the project through implementation of the Legacy Nature Preserve.

Although the right-of-way width of the proposed action has been reduced, and the amount of wetlands impact has therefore been reduced since publication of the Final EIS, the amount of acreage proposed for mitigation as part of the Legacy Nature Preserve has increased from 506 hectares (ha) (1,251 acres [ac]) to 849 ha (2,098 ac). A portion of that additional acreage was added specifically to address impacts on wildlife.

Alternatives Considered

Chapter 3, *Alternatives*, of this Supplemental EIS contains the descriptions of the following related to the analysis of alternatives.

- **Alternatives considered in the Final EIS**. Includes alternatives that were screened out and dropped from further consideration, the No-Build Alternative, and the four proposed build alternatives (A, B, C, and E), as well as Alternative D (Final EIS Preferred Alternative).

- **Additional alternatives rigorously evaluated in this Supplemental EIS process.** Includes those alternatives evaluated herein and eliminated from detailed study and further consideration.

- **Alternative ways of implementing Legacy Parkway.** Includes using a narrower right-of-way width, integrating the construction with mass transit improvements, alternative construction sequences for Legacy Parkway with the other Shared Solution components, and alternatives without the trail component.

- **Modified build and no-build alternatives.** Includes those alternatives analyzed in detail in Chapter 4, *Supplemental Environmental Analysis*, of this Supplemental EIS.

The initial alignment screening process presented in the Final EIS considered five regional corridor alignments for Legacy Parkway: Antelope Island, Trans-Bay, Farmington Bay, Railroad (D&RG and Union Pacific Railroad [UPRR]), and Great Salt Lake. Based on the analysis in the Final EIS, five alternatives within the Great Salt Lake regional alignment were carried forward for detailed study: No-Build, Alternatives A, B, and C, and D (Final EIS Preferred Alternative). All the build alternatives analyzed in the Final EIS included a trail system for pedestrian, bicyclist, and equestrian use.

This Supplemental EIS contains detailed supplemental analysis of modified Alternatives A, B, C, and E, and the No-Build Alternative. Alternative E follows the same alignment as Alternative D (Final EIS Preferred Alternative) but includes the narrower right-of-way.

Two primary modifications have been made to the alternatives since the Final EIS: (1) the right-of-way width has been reduced to 95 m (312 ft), and (2) the project features have been designed and implemented to allow better integration with mass transit. Alternative D (Final EIS Preferred Alternative) has been dropped from further consideration. However, the impacts of Alternative D (Final EIS Preferred Alternative) are presented in some sections of Chapter 4 for comparison purposes to illustrate changes in impacts on resources between the Final EIS and the Supplemental EIS. The alignments of Alternatives A, B, C, and E are centered on a 95-m (312-ft) right-of-way and are depicted in Figure 3-2 in Chapter 3. Maximum future transit assumptions and additional components of the WFRC long range plan were included as part of the baseline for each build alternative considered in the Supplemental EIS.

This Supplemental EIS evaluated additional alternatives and reconsidered alternatives addressed in the Final EIS. The criteria used in the Supplemental EIS to evaluate alternatives that were considered but subsequently eliminated from detailed study included the ability of the alternatives to meet project purpose and need and the consideration of environmental factors such as impacts on wetlands; farmland; hazardous wastes sites; Section 4(f)/6(f) resources; and socioeconomic factors, including utility, business and residential displacements, other community impacts and cost.

The following alternatives were evaluated but subsequently eliminated from further detailed study in the Supplemental EIS.

- D&RG Railroad Alternatives.

- Parkway Facility Adjacent to Redwood Road Alternative.

- Redwood Road Arterial Alternatives.
- Maximum Future Transit Alternative.
- Ten-Lane I-15 with Reversible Lanes.
- I-15 Improvements Beyond Ten Lanes Alternative.
- Legacy Parkway Beyond Four Lanes.

In addition, the following alternative ways of implementing Legacy Parkway were evaluated.

- Legacy Parkway with a Narrower Right-of-Way.
- Integrating Construction of Legacy Parkway with Expansion of Mass Transit.
- Alternative Construction Sequences for the Shared Solution.
- Alternatives without Trail Component.

Revised Proposed Action

Based on the results of the reevaluation of previously considered alternatives, evaluation of newly recommended alternatives, and studies in response to the court remand, the proposed action has been modified. The modified proposed Legacy Parkway would be a four-lane, limited-access, divided highway extending 22.5 kilometers (km) (14 miles [mi]) from Interstate 215 (I-215) in Salt Lake City north to I-15 and U.S. Highway 89 (US-89) in Farmington. A multi-use trail for pedestrians, bicyclists, and equestrians would parallel the highway throughout its entire length. The proposed trail would connect to the Jordan River Trail at the southern end and the Davis County Trail system at the northern end. Alternative D (Final EIS Preferred Alternative) proposed a right-of-way width of 100 m (328 ft), which includes a 20-m (66-ft) wide median. The new proposal includes a reduced right-of-way width of 95 m (312 ft), which includes a 15-m (50-ft) wide median. The proposed action also includes program elements (funding) and physical design features to enhance the integration of construction of Legacy Parkway with expansion of mass transit.

Modified Legacy Nature Preserve

The proposed Legacy Nature Preserve, which is included as mitigation for impacts on wildlife and wetlands, has been modified since publication of the Final EIS. Although the impacts on wetlands and other wildlife habitats would be reduced from those disclosed in the Final EIS as a result of the narrower right-of-way now being proposed, the size and condition of the Legacy Nature Preserve has been enhanced. As of fall 1999, the Legacy Nature Preserve as conceptualized in the Final EIS encompassed 506 ha (1,251 ac) to mitigate impacts on wetlands. In May 2000, in consultation with USFWS, 128 ha (317 ac) of mitigation lands were added to the preserve to mitigate impacts on wildlife. In November 2000, in consultation with the EPA, 214 ha (530 ac) of mitigation land were added to the preserve. With these additions, the Legacy Nature Preserve conceptualized in this Supplemental EIS encompasses 849 ha (2,098 ac) and mitigates impacts on wetlands and wildlife. Even though the direct impacts on wetlands

would be less under Alternatives A, B, C, and E than the direct impacts identified as part of the permit application for Alternative D (Final EIS Preferred Alternative), UDOT is still recommending the same size nature preserve to ensure that all indirect impacts would be adequately mitigated.

Habitat restoration and enhancement activities that have taken place on the Legacy Nature Preserve since the Final EIS include removing roads, reseeding upland areas, leaving berms in certain areas in the southern portion of the preserve, plugging tile drains, removing interior fences, and removing utilities. Although the Final EIS mitigation plan did not recommend wetland creation to mitigate loss of wetlands, wetland creation was discussed in concept in the mitigation plan for the Record of Decision (ROD). These wetlands were to be created by using artesian wells to develop additional wetland hydrology in the mitigation preserve. These wells have been established, and approximately 5 ha (12 ac) of groundwater slope wetlands have been created. Other activities to be implemented that would enhance the habitat quality in the preserve include controlling human disturbance such as disallowing grazing, developing and implementing an invasive weed control plan, and managing water flows.

Identification of Preferred Alternative

Alternative D, the Final EIS Preferred Alternative, has been eliminated from further consideration in favor of alternatives that have a narrower right-of-way. No Preferred Alternative has been identified in this Draft Supplemental EIS. The lead agencies will review public comments on this Draft Supplemental EIS before identifying a Preferred Alternative. After review and consideration of the public comments on the Draft Supplemental EIS analysis, a Preferred Alternative will be identified and presented in the Final Supplemental EIS.

Reevaluation of Final EIS

Chapter 4 of this Supplemental EIS presents the results and updates of technical analyses completed as part of the reevaluation. The reevaluation process is explained in the *Foreword/Introduction* and the results of the studies in response to the court remand are presented in Chapter 2, *Court Ruling Analysis*. The Supplemental EIS incorporates information obtained during the reevaluation process in Chapter 4, *Supplemental Environmental Analysis*. Table S-1 summarizes major environmental impacts for each build alternative analyzed in detail in the Supplemental EIS. Modified versions of Alternatives A, B, and C from the Final EIS are considered in the Supplemental EIS, as well as Alternative E. Alternative D (Final EIS Preferred Alternative) was eliminated from further consideration; however, impacts for Alternative D are shown in the Supplemental EIS to facilitate comparison of the Final EIS Preferred Alternative with the modified alternatives.

Table S-1 Summary of Major Environmental Impacts by Alternative

Impact Category	Alternative A (312-ft ROW)	B (312-ft ROW)	C (312-ft ROW)	D* (328-ft ROW)	E (312-ft ROW)
Wetlands Affected, hectares (acres)					
Filled	44 (108)	76 (187)	60 (148)	46 (114)	45 (113)
Indirectly Affected	218 (539)	409 (1,011)	367 (907)	233 (575)	233 (575)
Relocations					
Residences	7	14	5	4	4
Businesses	16	10	9	14	14
Farmsteads	0	2	0	0	0
Horse Paddocks	15	16	8	10	10
Noise (Receptors Affected)	23	27	26	25	25
Archaeological Resources	2	3	2	2	2
Historic Resources	2	2	2	2	2
Section 4(f)/6(f) Impact Area, hectares (acres)					
4(f) Area	6.4 (15.9)	20.5 (50.7)	7.6 (18.7)	6.8 (16.8)	6.8 (16.8)
6(f) Area	0.3 (0.8)	1 (2.5)	0.3 (0.8)	0.3 (0.8)	0.3 (0.8)
Farmland Lost, hectares (acres)					
Prime	9 (23)	36 (88)	11 (28)	13 (31)	12 (29)
State-important	0 (0)	1 (2)	0 (0)	0 (0)	0 (0)
Cost	$420,780,000	$533,070,000	$453,190,000	$429,880,000	$425,890,000

Note:
* Previously proposed Alternative D is presented for comparison purposes only.

Areas of Controversy

Definition of *Integration of Mass Transit*

The appellate court remand stated that the Legacy Parkway Final EIS failed to consider the integration of Legacy Parkway with the expansion of mass transit. While the court specified that the Final EIS should provide information on the timing and feasibility of integrating Legacy Parkway with mass transit, the court did not define *integration*. The lead agencies define *integration* as how the roads and transit system can be built together, how they function with one another, and how the usage of both systems can be optimized.

Consideration of Non-Highway Alternatives

Differences of opinion expressed during the preparation and subsequent litigation on the Final EIS were discussed during the Supplemental EIS scoping process, including at CPIC meetings and small group meetings. Local Davis County elected officials and agency representatives spoke in favor of implementing Alternative D (Final EIS Preferred Alternative). Contrasting opinions were expressed by individuals and non-governmental organizations, including Utahns for Better Transportation (UBT), who have called for reconsideration of expediting nonroadway alternatives, in favor of prioritizing mass transit and promoting transit-oriented development solutions in the North Corridor.

Major Unresolved Issues

Extensive public and agency input was solicited during the preparation of this Supplemental EIS. Some disagreement remains with cooperating agencies concerning the secondary purpose of the project: “To provide a single, continuous alternate north-south route through the North Corridor to improve safety when I-15 is closed, congested, or under construction and to provide an alternate north-south route for emergency service vehicles throughout the North Corridor.” EPA has expressed concern that this purpose forces the consideration of new roadways on new alignments. Given the limited availability of land between the Wasatch Front and Great Salt Lake, this secondary purpose may lead to unavoidable impacts on special aquatic sites. The lead agencies’ view remains that the North Corridor Shared Solution represents the result of a public planning process that has concluded that increased capacity on I-15, a new facility on a parallel north-south alignment, and substantially expanded mass transit are all needed as part of a multi-modal solution to meet transportation needs in the North Corridor. It should be noted, however, that no alternatives were screened out based on not meeting the “alternate route” secondary purpose alone.

Required Federal Actions

The lead agencies and cooperating agencies will use this Supplemental EIS to support subsequent approvals and permitting actions. Based on information presented in the Draft Supplemental EIS and the identification of the Preferred Alternative in the Final Supplemental EIS, FHWA will make a decision on the request to connect the proposed action to I-215 and I-15. Once the Final Supplemental EIS is filed, FHWA will publish a Record of Decision on the proposed action.

Concurrent with the release of this Draft Supplemental EIS, UDOT is applying for a modification to its Section 404 permit related to the narrower right-of-way of the proposed action. The Corps intends to evaluate the request to modify the Section 404 permit based on the updated and additional information presented in the Draft Supplemental EIS.

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Foreword/Introduction

Foreword/Introduction

Introduction

This supplemental environmental impact statement/reevaluation (Supplemental EIS) serves as a supplement to the June 2000 *Legacy Parkway Final Environmental Impact Statement and Section 4(f), 6(f) Evaluation* (Final EIS) (FHWA-UT-EIS-98-02-F) (Federal Highway Administration et al. 2000), as required by the National Environmental Policy Act (NEPA). The Supplemental EIS incorporates the results of a comprehensive reevaluation of the Final EIS. In accordance with Federal Highway Administration (FHWA) NEPA regulations 23 Code of Federal Regulations (CFR) 771.129, the comprehensive reevaluation was used to determine whether any project information should be updated and revised as part of the Supplemental EIS process.

This Supplemental EIS also contains detailed information addressing issues identified in the court decision of the U.S. Court of Appeals for the Tenth Circuit (*Utahns for Better Transportation et al v. U.S. Department of Transportation et al.* [305 F.3d 1152 10th Cir. 2002]). The appellate court determined that the following specific issues were in need of further review.

- Alternative sequencing of the Shared Solution.
- Integration of Legacy Parkway with mass transit.
- Elimination of the Denver & Rio Grande (D&RG) regional alignment as a feasible alternative based on cost.
- Elimination of the D&RG regional alignment as a feasible alternative based on substantial impacts on existing development.
- Practicability of a narrower right-of-way.
- Impacts on wildlife.

FHWA and the U.S. Army Corps of Engineers (Corps) are the federal agencies with primary approval authority over the Utah Department of Transportation's (UDOT's) proposed Legacy Parkway project. FHWA and the Corps have prepared this Supplemental EIS as joint lead agencies. UDOT retained Jones & Stokes, an independent consulting firm based in California, to prepare the supplemental environmental impact statement (Supplemental EIS)/reevaluation under the direction of the federal lead agencies. The following sections describe the background and status of the proposed Legacy Parkway project; the purpose of the Supplemental EIS; the approach to preparing the Supplemental EIS, including

the public involvement and interagency coordination processes; the roles of the lead and responsible agencies and the required approvals and permits; and the organization of this document.

Background and Status of Legacy Parkway Project

Shared Solution

To address future transportation demands related to projected population growth in the North Corridor (northern Salt Lake County and Davis County), UDOT, the Utah Transit Authority (UTA), and the local communities have planned for a "Shared Solution" consisting of the following main components.

- Expansion of the mass transit system.
- Improvement and expansion of Interstate 15 (I-15).
- Construction of the proposed Legacy Parkway project.

Additional components of the Shared Solution include implementation of intelligent transportation systems (ITS), transportation systems management (TSM), and transportation demand management (TDM) measures. Components of the Shared Solution would be implemented over a 20 to 30 year timeframe. All these components are intended to meet the projected transportation demand in the North Corridor. More detailed descriptions of the North Corridor, the Shared Solution, and the purpose of and need for the proposed Legacy Parkway project are included in Chapter 1, *Purpose of and Need for Action*.

Final EIS and Preferred Alternative

The Final EIS addressed one component of the Shared Solution, the Legacy Parkway project. The Preferred Alternative for the Legacy Parkway project, as described in the Final EIS, would be a four-lane, limited-access, divided highway in Salt Lake and Davis Counties, Utah, beginning at I-215 and 2100 North in Salt Lake City and extending northward approximately 22.5 kilometers (km) (14 miles [mi]) to the junction of I-15 and U.S. Highway 89 (US-89) near Farmington. The Final EIS Preferred Alternative would include a 100-meter (m) (328-foot [ft]) right-of-way, which included a multi-use trail for pedestrians, bicyclists, and equestrians parallel to the highway to link communities in the North Corridor.

Final EIS and Court Ruling

FHWA, the Corps, and UDOT completed the Final EIS for the proposed Legacy Parkway project in June 2000. FHWA and the Corps issued separate Records of Decision (RODs) approving the Legacy Parkway project in October 2000 and January 2001, respectively. The Corps issued a Section 404 permit pursuant to the federal Clean Water Act (CWA), authorizing the fill of 46 hectares (ha) (114 acres [ac]) of wetlands resulting from construction of the proposed action.

Subsequent to the issuance of the RODs, Utahns for Better Transportation (UBT), the Sierra Club, and the Mayor of Salt Lake City (litigants) filed a lawsuit in federal district court challenging the adequacy of the Final EIS and the issuance of the Section 404 permit. The federal district court upheld both federal agencies' RODs in August 2001. In September 2001, the litigants filed a motion for injunctive relief with the federal court; the federal court denied the motion in October 2001. The litigants then filed an appeal

for injunctive relief with the U.S. Court of Appeals for the Tenth Circuit in November 2001. Later in November 2001, the appellate court granted a temporary injunction pending the resolution of appeals. In September 2002, the appellate court issued an opinion affirming in part and remanding in part the district court's decision to uphold the RODs and Section 404 permit. The appellate court ruled in favor of FHWA and the Corps on the majority of the issues, but it ruled that the Final EIS was arbitrary and capricious in the following areas, based on NEPA requirements.

- Elimination of the D&RG regional alignment as a feasible alternative based on cost.
- Elimination of the D&RG regional alignment as a feasible alternative based on substantial impacts on existing development.
- Practicability of a narrower right-of-way.
- Alternative sequencing of the Shared Solution.
- Integration of Legacy Parkway and mass transit construction plans.
- Impacts on wildlife.

The appellate court also ruled that the Corps' issuance of the Section 404 permit was arbitrary and capricious on the following grounds.

- Insufficient information to determine whether the D&RG regional alignment was a practicable alternative.
- Insufficient information to determine whether a narrower median was a practicable alternative.
- Insufficient information to determine whether a right-of-way without a future utility corridor or berm was a practicable alternative.
- Insufficient information on the impacts on wildlife.

As a result of the appellate court decision, all construction work on Legacy Parkway has been halted, with the following exceptions: right-of-way acquisition, design work, certain activities related to the implementation of the Legacy Nature Preserve mitigation sites, and construction activities associated with the upgrade of the Park Lane (formerly Burke Lane) interchange in Farmington. This work has continued consistent with an agreement of the parties as entered by the court. In April 2003, FHWA and the Corps issued a notice of intent to prepare a Supplemental EIS.

Table 1 below provides key dates and events in the history of the Legacy Parkway project.

Table 1 Legacy Parkway Project History

Date	Event
March 1997	FHWA issues a notice of intent to prepare an EIS for Legacy-West Davis Highway.
1998	Governor Leavitt changes the name from Legacy-West Davis Highway to Legacy Parkway. Legacy Parkway Nature Preserve concept is unveiled.
September 1998	FHWA publishes the Draft EIS.
June 2000	FHWA files Final EIS for Legacy Parkway.
October 2000	FHWA issues its ROD approving Legacy Parkway.
December 2000	UDOT awards design and construction contract, pending Section 404 permit and notice to proceed.
January 2001	Corps issues its ROD and Section 404 permit.
	UDOT issues notice to proceed to the contractor to begin limited work.
	Lawsuits are filed in the federal district court challenging the issuance of the permit and ROD.
April 2001	Plaintiffs and UDOT enter into agreement to limit construction activities to certain locations until August 2001.
May 2001	Construction begins in the north interchange area, particularly Park Lane (formerly Burke Lane), the Burke (Park) Lane extension west of I-15, and the intersection of the Burke (Park) Lane overpasses with I-15 and US-89.
August 2001	Heavy construction begins throughout the Legacy Parkway project area.
	Federal district court dismisses the plaintiffs' lawsuit, ruling in favor of UDOT and the federal lead agencies.
September 2001	Plaintiffs file a motion of injunctive relief with the federal district court.
October 2001	Federal district court denies the plaintiffs' motion for injunctive relief.
November 2001	Plaintiffs file an appeal for injunctive relief with the appellate court.
	Tenth Circuit grants a temporary injunction pending resolution of appeals. Construction is put on hold pending the outcome of the appeal. Through the court, UDOT and the Plaintiffs agree on a stipulation to allow certain activities to continue. These activities include design work and right-of-way acquisition as well as work at Burke (Park) Lane in the north interchange.
March 2002	Tenth Circuit hears arguments on the Legacy Parkway case.
September 2002	Tenth Circuit publishes its ruling—affirming in part, reversing in part, and remanding the federal district court decision—finding that the Final EIS is inadequate and that issuance of the Section 404 permit was arbitrary and capricious.
April 2003	FHWA and the Corps, as joint lead agencies, issue a notice of intent to prepare a Supplemental EIS.

Purpose of this Draft Supplemental Environmental Impact Statement

The Legacy Parkway Draft Supplemental EIS is designed to meet the following requirements.

- Provide additional studies, as directed by the appellate court.
- Follow NEPA requirements regarding the preparation of a supplemental EIS.
- Follow FHWA-specific NEPA requirements regarding conducting a reevaluation of a final EIS.
- Follow Corps' Clean Water Act requirements for consideration of a Section 404 permit.

To ensure that the Draft Supplemental EIS satisfies all relevant legal requirements, this document addresses the specific issues of concern identified by the appellate court, updates any new significant project information identified during the reevaluation, satisfies NEPA requirements associated with preparing a supplemental environmental document, and presents new and updated information for the Corps to use in its review of the Section 404 permit for the Legacy Parkway project. Each of these requirements is described below.

Additional Analysis Required by Tenth Circuit Court

As described in the previous section, *Background and Status of Legacy Parkway Project*, the appellate court directed FHWA and the Corps to address several specific issues. The lead agencies reviewed all available information and conducted additional studies related to the issues identified by the court decision. The results of these studies are documented in the administrative record and in five technical memoranda, and are incorporated in this Supplemental EIS.

NEPA Requirements

NEPA regulations (40 CFR 1502.9 [c][1]) require a federal agency to prepare a supplemental EIS if:

- the agency makes substantial changes in the proposed action that are relevant to environmental concerns; or
- significant new circumstances or information relevant to environmental concerns have a bearing on the proposed action or its impacts.

FHWA regulations (23 CFR 771.129) are similar. The Supplemental EIS process also reflects significant new circumstances and information related to the proposed action that have changed since publication of the Final EIS. These new circumstances and information include any physical or environmental changes to the proposed action or mitigation, compliance with new or revised applicable environmental regulations, and any necessary revisions to the analysis of impacts based on the best current scientific methodology. A supplemental EIS, therefore, typically does not restate information presented in a final EIS, but rather incorporates unchanged information by reference to the final EIS.

Reevaluation of the Final EIS

Under the FHWA agency-specific NEPA regulations (23 CFR 771.129), FHWA is required to prepare a written evaluation of a final EIS whenever major events to advance a proposed action have not occurred within 3 years of approval of the final EIS. In the case of the Legacy Parkway project, a reevaluation was conducted because continued construction of the project was halted as a result of the appellate court decision, and over 3 years have passed since FHWA filed the Legacy Parkway Final EIS. The primary purpose of the reevaluation process is to determine whether any changes in the project; changes in the existing physical or regulatory environment, including project design, concept and scope; or changes in the affected environment, impact analysis, and proposed mitigation measures would result in the need to update technical information in the final EIS.

Typically, FHWA uses a reevaluation process to determine whether an existing EIS is valid or a supplemental EIS is required. In this case, however, the appellate court decision required the preparation of additional studies, which led to FHWA and the Corps' decision to prepare this Supplemental EIS for the proposed action. The reevaluation process, therefore, was not used to decide whether a supplemental EIS should be prepared. Rather, it was used to assess whether issues in addition to those addressed by the court ruling warranted attention in the Supplemental EIS given the time that had passed since the Final EIS. Therefore, the results of both the reevaluation and the analyses required by the court ruling comprise this Supplemental EIS, and this document serves as both the Supplemental EIS and the reevaluation report. Pursuant to NEPA and FHWA's regulation (23 CFR 771.129), this document is subject to the same distribution and public review requirements as the previously published Draft and Final EIS (23 CFR 771.130 [d]).

Review of the Section 404 Clean Water Act Permit Decision

The Corps issued a Section 404 permit for the Final EIS Preferred Alternative with its ROD in January 2001. As a result of analyses conducted for this Draft Supplemental EIS, UDOT has since reduced the width of the right-of-way of its proposed action. Therefore, concurrent with the release of this Draft Supplemental EIS, UDOT is applying for a modification to its Section 404 permit. The Corps intends to evaluate the request to modify the Section 404 permit based on the updated and additional information presented in the Draft Supplemental EIS. A detailed description of the Corps' responsibilities under the CWA is included in the section below titled *Lead Agencies and Required Permits and Approvals*.

Approach to Preparing the Draft Supplemental Environmental Impact Statement

The approach to preparing the Draft Supplemental EIS included the following main components, which occurred concurrently and in coordination with each other.

- Independent technical review of the Legacy Parkway Final EIS, supporting technical studies, and relevant parts of the administrative record to identify the need for updated information, studies, or analysis as required by FHWA NEPA reevaluation requirements (23 CFR 771.129).

- Analysis of the limited deficiencies identified by the appellate court with regard to the Final EIS and Section 404 permit (documented in five technical memoranda and the administrative record) to develop information necessary to support the Supplemental EIS process.

- Comprehensive public participation process.
- Coordination and consultation with cooperating agencies and other federal, state, and local agencies.

Each of these key components of the Supplemental EIS approach is described below.

Independent Technical Review and Reevaluation of the Final EIS

The independent technical review, part of the reevaluation process of the Final EIS, focused on determining the current validity of all the information presented in the Final EIS, including any environmental impacts that had not previously been identified or for which there was new information available. Jones and Stokes performed the independent technical review and provided a written evaluation to the lead agencies. The technical review of the Final EIS focused on determining whether:

- the proposed action and alternatives were substantially different or have changed from the Final EIS to the Supplemental EIS;
- the affected environment has changed, resulting in different or additional project impacts from the Final EIS to the Supplemental EIS;
- relevant regulations or laws have changed since publication of the Final EIS, resulting in new requirements that were not previously addressed;
- mitigation measures or other environmental commitments have changed; or
- the appellate court decision would result in a change to project alternatives, environmental impacts, and/or required mitigation measures, as described above.

The results of the technical review were used to develop recommendations on what technical information and analyses in the Final EIS needed to be updated and included in the Supplemental EIS to document the results of the reevaluation process. The results of the technical review/reevaluation process are documented in Chapters 1, 3, and 4 of this Draft Supplemental EIS.

An important aspect of the reevaluation was the use of an updated travel demand model developed and maintained by the Wasatch Front Regional Council (WFRC). Specifically, the Final EIS used a January 2000 version of the WFRC travel demand model, whereas the Draft Supplemental EIS and associated technical memoranda are based on version 3.2, which was developed in fall 2003 and revised in early 2004. Information derived from the updated model affected many of the technical analyses presented in this document, as well as the measures of effectiveness tied to the purpose and need for the proposed action and the analysis specific to the selection and screening of project alternatives.

The new travel demand model has several major differences compared to the 1999 version, which resulted in changes in the travel demand forecasts and traffic-based impact analyses. For example, the new model has been updated to incorporate new demographic data, based on the 2000 Census; the demographics in the old model were based on the 1990 Census. Additionally, the new model has an improved mode choice module that calculates the transit versus automobile mode split as part of the model output.

The version of the WFRC travel model used for the Supplemental EIS analysis also includes feedback loops that inform trip distribution of congested highway travel times resulting from assignment. Feedback to trip distribution accounts for the fact that, as highway travel times increase due to congestion, travelers shorten and/or direct their trips to avoid congestion points. A similar feedback mechanism affects mode choice, reflecting the extent to which travelers take highway congestion into account when deciding between driving and using transit. These factors influence the total number of automobile trips at any location that experiences congestion. The earlier version of the WFRC model used in the Final EIS included a very preliminary set of feedback capabilities, which have been refined in the current model.

Technical Memoranda Prepared to Address Issues Identified by Tenth Circuit Court

Five technical memoranda were developed to address the following concerns.

- Right-of-way issues, including discussion of the utility corridor, berm, and median widths (*Legacy Parkway Technical Memorandum: Right-of-Way Issues)*.
- Additional information about the D&RG regional alignment discussed in the Final EIS (*Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation*).
- Integration of the proposed Legacy Parkway with mass transit (*Legacy Parkway Technical Memorandum: Integration of Mass Transit with Legacy Parkway*).
- Alternative sequencing of certain projects that comprise the Shared Solution (*Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution*).
- Impacts of the proposed action on wildlife (*Legacy Parkway Wildlife Impacts Analysis Technical Memorandum*).

A description of the approach used for the analysis in each technical memorandum is summarized in Chapter 2, *Tenth Circuit Court Ruling Analysis*, of this document. The results of these analyses presented in the technical memoranda and administrative record were incorporated with the results of the reevaluation of the Final EIS and integrated together to develop this Draft Supplemental EIS.

Public Participation and Review

NEPA regulations (40 CFR 1501.7) and FHWA regulations (23 CFR 771.123[b]) require an early and open “scoping” process as part of the preparation of an EIS. *Scoping* is the process by which lead agencies solicit input from the public and interested agencies on the nature and extent of the actions, alternatives, and impacts to be addressed in the EIS, and on the methods by which they will be evaluated. Although NEPA does not require a formal scoping process for a supplemental EIS, the lead agencies decided to execute a comprehensive public scoping process for the Legacy Parkway Supplemental EIS because of the complexity of the issues, as well as the interest in and controversy surrounding the project.

The following sections describe the formal scoping period and scoping report, community planning and information committee meetings, small group meetings, and public review of the Draft Supplemental EIS.

Formal Scoping Period and Scoping Report

Because of the complexity of the issues and the interest in and controversy surrounding the project, FHWA, the Corps, and UDOT implemented a formal scoping process. Specific input was solicited from the public and regulatory community on the nature and extent of the proposed action, proposed action alternatives, potential impacts resulting from implementation of the proposed action, and the methodology used to evaluate and assess the impacts. The formal scoping process for the Supplemental EIS began with the publication of the notice of intent (NOI) in the Federal Register on April 1, 2003. Early and continuing public involvement opportunities have been provided, including:

- **Open House Public Meeting**. An open house was held on April 17, 2003 to provide an opportunity for the public to talk directly with FHWA, the Corps, UDOT, and UTA staff regarding the court injunction, the status of the project, the Legacy Nature Preserve, and the Supplemental EIS process. The public was also given the opportunity to provide written comments on the project at the open house. A court reporter was available at the open house to take oral comments from the public on the project.

- **Focus Group Meetings**. Four meetings were held, two on April 28 and two on April 29, 2003, to provide a forum for discussion of the specific issues identified by the appellate court. Agenda topics included the D&RG alternative alignment, a narrower right-of-way for the Legacy Parkway, sequencing of the Shared Solution, integration of Legacy Parkway and mass transit, and wildlife impacts.

- **Legacy Parkway Hotline**. A 24-hour telephone hotline (telephone number 801/951-1039) was established to provide updated project and schedule information as well as an additional opportunity to comment on issues relevant to the Supplemental EIS analysis.

A scoping report was published in August 2003 summarizing written and oral comments received during the formal scoping period. The report is available for review on the Corps' web site (http://www.spk.usace.army.mil/projects/regulatory/legacyparkway/index.html) and UDOT's web site (http://www.udot.utah.gov/legacy/legacy_SEIS_Summary.htm).

Community Planning and Information Committee Meetings

At the Legacy Parkway public scoping meetings held in April 2003, environmental groups and city officials expressed a desire to be more involved in the Legacy Parkway Supplemental EIS process. In response to that request, FHWA and the Corps hosted a series of community planning information committee (CPIC) meetings to provide a public forum for environmental groups and city officials to offer input. The series included four CPIC meetings and one meeting of a CPIC subcommittee. The comments of participants in the four CPIC meetings were summarized in minutes distributed to the participants.

Representatives of local jurisdictions, non-governmental organizations (including the plaintiffs), and cooperating agencies participated in the CPIC meetings. At the request of the plaintiffs, Utahns for Better Transportation, et al., the U.S. Institute for Environmental Conflict Resolution (USIECR) contacted the lead agencies to offer a conflict resolution process. The lead agencies agreed to use a facilitator on the USIECR roster to facilitate the CPIC meetings. CPIC meetings 2, 3, and 4 were facilitated by the USIECR facilitator, who was hired using public funds.

The CPIC meetings focused on collecting and sharing information critical to completing the five technical memoranda necessary to address the appellate court's concerns (see Chapter 2, *Tenth Circuit Court Ruling Analysis*). The CPIC had the following three primary goals.

1. Provide a vehicle for the federal agencies to gather and share information relevant to the development of the Draft Supplemental EIS and agency decision making.

2. Afford an opportunity for CPIC members to share ideas about information they want to see in the Draft Supplemental EIS and how to analyze that information.

3. Present updates on the I-15 expansion project, another component of the Shared Solution.

Below is a summary of the topics discussed at each CPIC meeting.

CPIC Meeting 1, July 10, 2003

The first meeting focused on potential Legacy Parkway alignment options within the D&RG regional corridor, the potential for a narrower right-of-way, and the inclusion of a trail within the proposed right-of-way.

CPIC Meeting 2, September 10, 2003

The second meeting focused on the sequencing of the Shared Solution and integration of mass transit with the proposed action. The group discussed the methodology proposed for analyzing potential transit scenarios, including selection of potential transit enhancements. The discussion was followed by a question-and-answer period.

CPIC Subcommittee Meeting, October 7, 2003

In response to comments received during CPIC meeting 2 (September 2003) and to ensure that the transit-oriented development (TOD) opportunities used for the sequencing and integration analysis accurately reflected local planning efforts, a subcommittee meeting was convened in October 2003. During this meeting, participants were asked to review proposed TOD opportunities and compare them to local general plans to determine potential feasibility. The information received during this meeting was used to develop robust transit scenarios that supported current and projected land use. The robust transit scenarios were used in both the integration and sequencing analyses.

CPIC Meeting 3, November 5, 2003

The third meeting focused on the preliminary results of the integration and sequencing analyses. The meeting included a presentation of two robust transit scenarios, which were developed using different combinations of the transit enhancements presented at the September 2003 CPIC meeting. The methodology used to develop the robust transit scenarios was discussed, followed by a question-and-answer period.

CPIC Meeting 4, November 6, 2003

The fourth and final meeting focused on the proposed methodology that would be used to evaluate potential wildlife impacts resulting from implementation of the proposed action. The agenda for this meeting was created in response to specific requests by the non-governmental organizations and interested individuals. Experts involved in the technical work discussed various elements of the analysis

as it related to the specific information requested. Each discussion topic was followed by a question-and-answer period.

Small Group Meetings

The lead agencies agreed to meet with individuals, organizations, and other interested parties as requested or on an as-needed basis. Specifically, FHWA, the Corps, and UDOT attended the following meetings.

- The federal lead agencies and the applicant met with representatives of UBT and their consultants in December 2002, April 2003, August 2003, October 2003, and January 2004. Transit and transit-related issues were the main topic of these meetings.

- The Davis County Council of Governments invited the federal lead agencies and the applicant to attend a meeting in May 2003. FHWA and the applicant attended the meeting, updating the Council of Governments members on the Supplemental EIS process.

- UDOT individually interviewed local community planners from five different cities and Davis County in July 2003. The interviews were intended to identify specific localized impacts of the potential Legacy Parkway alignment options within the D&RG regional corridor, the potential for a narrower right-of-way, and the inclusion of a trail within the proposed right-of-way.

- The Corps and UDOT invited CPIC members to attend a presentation providing an overview on the approach to the wildlife analysis in August 2003. FHWA did not particpate in this meeting.

- The federal lead agencies met with representatives of UBT, Future Moves, and the Sierra Club in July 2004 to update them on the status of the traffic modeling and environmental review process.

Public Review of Draft Supplemental EIS

This Draft Supplemental EIS is being circulated for public review and comment for 60 days. In conjunction with the public review and comment period, a public hearing on the Draft Supplemental EIS and Section 404 permit will be held. A mailer will be sent out with the time, date, and location of that hearing. A notice will be published in the local newspaper prior to the hearing date. Details of the public hearing will also be recorded on the Legacy Parkway hotline.

Interagency Consultation and Coordination

Cooperating Agency Meetings

To facilitate interagency participation in the preparation of the Draft Supplemental EIS, the U.S. Environmental Protection Agency (EPA), Federal Transit Administration (FTA), and U.S. Fish and Wildlife Service (USFWS) agreed to serve as cooperating agencies (sometimes referred to as “partners”) for the Draft Supplemental EIS. EPA, FTA, and USFWS are responsible for providing early and timely input to the federal lead agencies on the Draft Supplemental EIS and associated technical memoranda at regularly scheduled meetings. Individual agency roles are described below. A partnering meeting was held in February 2003 to initiate the Draft Supplemental EIS process, and the lead agencies have met with these agencies throughout the development of the technical review and technical memoranda. Cooperating agency meetings were held in April, May, June, August, and September 2003, and in January, March, and May 2004. The meetings focused on gathering agency input on public participation

efforts, gaining consensus on the technical approach to the Draft Supplemental EIS, and discussing agency concerns.

U.S. Environmental Protection Agency

The statement of responsibilities (SOR) signed by EPA, FHWA, and the Corps sets forth EPA's responsibilities as a cooperating agency. These responsibilities include providing technical review and comment during preparation of the Draft Supplemental EIS on all environmental impacts of the proposed action and on any NEPA issues pursuant to EPA's Clean Air Act (CAA) Section 309 authorities, participating in development of mitigation measures considered for the Draft Supplemental EIS for impacts on wetlands and water quality, and reviewing and commenting on the Final Supplemental EIS in accordance with Section 309 of the CAA.

In addition to participating in the technical work described above, EPA attended the public meetings during the formal scoping period in April 2003 and the CPIC meetings in September and November 2003. At the request of the federal lead agencies, EPA also attended meetings with FHWA, the Corps, and UDOT engineers and biologists in June, October, August, and November 2003, and May 2004, during the development of the wildlife impacts analysis.

U.S. Fish and Wildlife Service

USFWS agreed to perform the following responsibilities (U.S. Fish and Wildlife Service May 20, 2003): consult on relevant technical studies; review project information and results; express USFWS views on subjects within its jurisdiction or expertise; participate in joint public involvement activities; and identify Draft Supplemental EIS content necessary to discharge USFWS' NEPA responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and or clearances.

In addition to participating in the technical work described above, USFWS attended the public meetings during the formal scoping period in April 2003 and the CPIC meetings in September and November 2003. At the request of the federal lead agencies, USFWS also attended meetings with FHWA, the Corps, and UDOT engineers and biologists in June, October, August, and November 2003, and May 2004, during the development of the wildlife impacts analysis.

Federal Transit Administration

As one of eleven modal administrations in the U.S. Department of Transportation, FTA is responsible for assisting transit agencies. Specific to this Draft Supplemental EIS process, FTA provided early focused review of information developed for the technical memoranda and other information related to the Draft Supplemental EIS pertaining to public transportation, including transit. FTA released the *Weber County to Salt Lake Commuter Rail Project: Draft Environmental Impact Statement and 4(f) Evaluation* for public review between April 30, 2004 and June 15, 2004. FTA coordinated with FHWA and the Corps on information concerning commuter rail transit for use in the analysis for this Draft Supplemental EIS.

In addition to the cooperating agency meetings, FTA attended the formal scoping period public meetings in April 2003.

State, Regional, and Local Agencies

To ensure that the issues and impacts were adequately addressed and to promote interagency cooperation, the following state, regional and local agencies participated in the preparation of information for the Draft Supplemental EIS.

State Agencies

Utah Department of Natural Resources, Division of Wildlife Resources

The mission of the Utah Department of Natural Resources (UDNR), Division of Wildlife Resources is to ensure the future of protected wildlife for its intrinsic, scientific, educational, and recreational values through protection, propagation, management, conservation and distribution throughout the State of Utah. (UDNR Division of Wildlife Resources 2002.) UDNR Division of Wildlife Resources participated in multiple meetings with FHWA, the Corps, and UDOT engineers and biologists throughout the Draft Supplemental EIS process to provide early focused review of and recommendation on specific scientific aspects of data and methods used to complete the wildlife impacts analysis, and on the results of the analyses as they were completed. These meetings were held in June, October, August, and November 2003, and May 2004. UDNR also attended meetings during the formal scoping period and the CPIC meeting in November 2004.

Additional State Agencies

During the course of preparation of technical information and permitting for this Draft Supplemental EIS, the following state agencies were consulted.

- Department of Environmental Quality, Division of Air Quality.
- Department of Natural Resources, Division of Water Rights.

Regional Agencies

Utah Transit Authority

As an important partner in the development of the Shared Solution, UTA participated in multiple meetings throughout the Draft Supplemental EIS process, including open house and focus group meetings in April 2003, meetings in May, June, July, August, September, October and December 2003 to develop information for the technical memoranda and other information related to the Draft Supplemental EIS, CPIC meetings in September and November 2003, and cooperating agency meetings in April, May, June, and September 2003. In addition, UTA provided applicable information concerning commuter rail transit use and the proposed Weber County to Salt Lake Commuter Rail project for use in the analysis for this Draft Supplemental EIS.

Wasatch Front Regional Council

The WFRC participated in multiple meetings held throughout the Draft Supplemental EIS process including open house and focus group meetings held in April, 2003, meetings held to develop information for the technical memoranda and other information related to the Draft Supplemental EIS held in May, June, July, August, September, October and December of 2003 and CPIC meetings held in July, October, September and November 2003. In addition, as described in the *Independent Technical Review and Reevaluation of the Final EIS*, WFRC provided an updated travel demand model for the analysis for this Draft Supplemental EIS.

Local Jurisdictions

Cities and Counties

Local jurisdictions that participated in the CPIC meetings described above included the Cities of North Salt Lake, Woods Cross, Bountiful, West Bountiful, Centerville, Farmington, Kaysville, and Fruit Heights. Salt Lake and Davis Counties also participated in the CPIC meetings. Community planners from the Cities of Woods Cross, North Salt Lake, Farmington, Centerville, and West Bountiful, and Davis County were individually interviewed to identify specific, localized impacts associated with potential alignments within the D&RG corridor in July 2003.

Salt Lake City and Envision Utah were invited to participate in the CPIC meetings but declined the invitation.

During the formal scoping period, comment letters were received from the Davis County Council of Governments and Davis County Commission. After the formal scoping period, comment letters were received from the Davis County Commission, Davis County Council of Governments, City of Centerville, City of Woods Cross, and City of Bountiful.

Lead Agencies and Required Permits and Approvals

As discussed earlier, FHWA and the Corps are the two federal lead agencies responsible for preparing the Draft Supplemental EIS and will comply with all applicable laws. UDOT is the project applicant and proponent of the Legacy Parkway project. Pursuant to 23 CFR 771.105(b), FHWA will ensure that alternative courses of action are evaluated and decisions are made in the best overall public interest based on a balanced consideration of the need for safe and efficient transportation; the social, economic, and environmental impacts of the proposed transportation improvement; and national, state and local environmental protection goals. Based on the information presented in the Draft Supplemental EIS, FHWA will make a decision on the request to connect the proposed action to I-215 and I-15. Once the Final Supplemental EIS is filed, FHWA will publish an ROD on the proposed action.

The Corps is responsible for ensuring compliance with NEPA (40 CFR 1500–1508) and the CWA (33 CFR 320–330 and 40 CFR 230). Section 404 of the CWA prohibits the placement of dredged or fill material into waters of the U.S., including wetlands, without first obtaining authorization from the Corps. In reviewing UDOT's request for a permit modification, among other important standards, the Corps will ensure that the proposed action is the least environmentally damaging practicable alternative relative to the aquatic ecosystem, does not significantly degrade aquatic resources, complies with the applicable requirements of other statutes, and is not contrary to the public interest. Additionally, the Corps cannot issue a permit for a project if there is a practicable alternative to the proposal that has less adverse impact on the aquatic ecosystem, as long as that alternative does not have other significant adverse environmental consequences. *Practicable* is defined as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." The Corps will require UDOT to demonstrate that it has taken steps to avoid wetland impacts where practicable, minimize potential impacts on wetlands, and provide compensation for any remaining unavoidable impacts. Once the Final Supplemental EIS is filed, the Corps will make a decision on the request for modification to UDOT's permit and prepare an ROD explaining how the permit decision was made.

As the project proponent, UDOT is responsible for supporting the lead agencies by providing technical information as necessary to help the lead agencies fulfill their objectives in developing the Draft Supplemental EIS and providing a project that complies with regulatory requirements of the CWA. While

Legacy Parkway is a fully state-funded project, it requires authorization from FHWA for connection to the interstate highway system and permit from the Corps to fill wetlands and waters of the U.S. At the same time, UDOT, as a state agency, is charged with meeting the transportation demands of travelers on Utah roadways and working to maintain the quality of life enjoyed by Utah citizens. As part of designing and implementing the project, UDOT endorses a context-sensitive solution that addresses transportation needs as well as safety concerns and scenic and environmental community values.

UDOT has prepared an application for modification to the CWA Section 404 permit. Alternative E is the alternative for which UDOT is seeking approval from the Corps under Section 404. The introduction to Chapter 1 and Section 3.4 of Chapter 3 describe the roadway features of the project that is the subject of UDOT's application for a Section 404 permit modification. In addition, UDOT has included in its application the mitigation that it is requesting that the Corps consider in its evaluation. The mitigation includes a preserve of approximately 850 ha (2,100 ac), and is an updated version of the mitigation that was included in the ROD for the Final EIS Preferred Alternative. UDOT is willing to provide the same level of mitigation, even though Alternative E, which has a reduced right-of-way width compared to the Final EIS Preferred Alternative, would result in fewer wetlands impacts. See Section 3.6, *Land Acquired to Date*, and Section 4.12, *Wetlands*, for a more detailed discussion of the Legacy Nature Preserve proposed mitigation. A complete detailed description of UDOT's proposed Legacy Nature Preserve is included in the modified Section 404 permit application.

Organization of Draft Supplemental Environmental Impact Statement

The organization of this Draft Supplemental EIS generally follows that of the June 2000 Final EIS (FHWA-UT-EIS-98-02-F). The Draft Supplemental EIS is organized in the following chapters.

- Foreword/Introduction
- Summary
- Chapter 1 *Purpose of and Need for Action*
- Chapter 2 *Tenth Circuit Court Ruling Analysis*
- Chapter 3 *Alternatives*
- Chapter 4 *Supplemental Environmental Analysis*
- Chapter 5 *Draft Sections 4(f) and 6(f) Evaluation*
- Chapter 6 *List of Preparers*
- Chapter 7 *Distribution*
- Chapter 8 *References*
- Acronyms and Abbreviations
- Index

- Technical Appendices
  - Appendix A *Consultation and Coordination*
  - Appendix B *Travel Demand Technical Appendix*
  - Appendix C *Noise Technical Appendix*
  - Appendix D *Wetlands Technical Appendix*

Chapter 1

Purpose of and Need for Action

Chapter 1

Purpose of and Need for Action

1.1 Introduction

The purpose of and need for the Legacy Parkway project have not changed since they were detailed in Chapter 1 of the Final EIS (page 1-41). This chapter of this supplemental environmental impact statement/reevaluation (Supplemental EIS) discusses the purpose of and need for the proposed action.

This chapter provides the following information.

- Introduction summarizing the project purpose and need for Legacy Parkway, and clarification that the purpose and need have not changed since publication of the Final EIS (Section 1.1).
- Summary of information presented in Chapter 1, *Purpose and Need*, of the Final EIS (Section 1.2.1).
- Summary of need for transportation improvements in the North Corridor, including a description of the "Shared Solution," which proposes a multimodal transportation solution involving multiple project proposals in the North Corridor (Sections 1.2.2 and 1.2.3).
- Clarification that the proposed action is only one component of the Shared Solution and that the proposed action would contribute to solving a portion of the capacity problems in the North Corridor (Section 1.2.3).
- Revised travel demand data based on the Wasatch Front Regional Council (WFRC) updated population and employment forecasts and revised 2004 travel forecasting methods (travel demand model version 3.2) and other updated relevant information supporting the project purpose and need (Section 1.2.4).
- Objectives for the proposed action (Section 1.3).

1.1.1 Proposed Action

Legacy Parkway, as described in the *Legacy Parkway Final Environmental Impact Statement and Section 4(f), 6(f) Evaluation* (Final EIS) (Federal Highway Administration et al. 2000), would be a four-lane, divided, limited-access, state-funded highway, with a pedestrian/bicycle and equestrian trail paralleling the highway. Legacy Parkway would be located in the region known as the North Corridor (described below in Section 1.2.1), and would extend from Interstate 215 (I-215) at 2100 North in Salt Lake City northward 22.5 kilometers (km) (14 miles [mi]) to the interchange of Interstate 15 (I-15) and U.S.

Highway 89 (US-89) in Farmington. Intermediate interchanges are proposed at 500 South in Woods Cross and at Parrish Lane in Centerville (Figure 1-1). Since publication of the Final EIS, some design aspects of the Legacy Parkway project (proposed action) have been modified, including a narrower right-of-way width and modifications to address integration with mass transit (see Chapter 3, *Alternatives*, Section 3.4). Five alternatives, including the No-Build Alternative, are being considered herein.

The Legacy Parkway project arose from local and regional transportation planning (in accordance with 23 Code of Federal Regulations [CFR] 450) for future predicted travel demand in the North Corridor, located in Salt Lake and Davis Counties (23 CFR 450.316[a][3]). Legacy Parkway, in conjunction with other transportation solutions, would help to meet future travel demand in the North Corridor. Like the Final EIS, this Supplemental EIS addresses the proposed Legacy Parkway project only. Information is provided about other transportation solutions planned for the North Corridor to provide context for understanding the regional transportation system capacity to handle current and future travel demand and for evaluating whether some or all of the other projects would be reasonable alternatives to Legacy Parkway, and to assure the public that decision makers are fully aware of the regional context. The distinction between the proposed Legacy Parkway project and other regional transportation solutions is maintained throughout this Supplemental EIS.

1.1.2 Project Applicant's Proposal

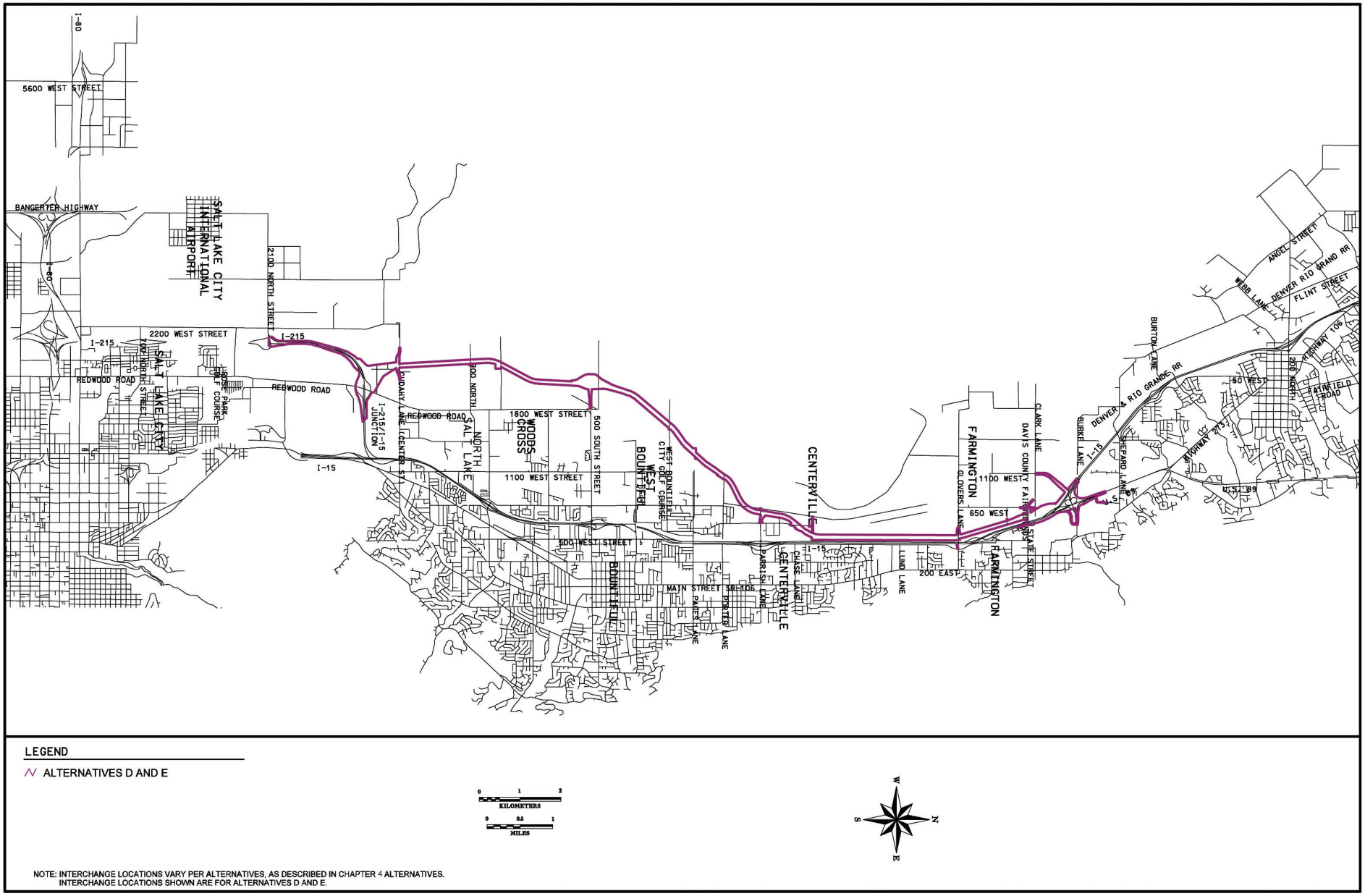
UDOT is the proponent of the Legacy Parkway project and the applicant for a Section 404 permit for the project. Since the Final EIS, UDOT has reevaluated the Legacy Parkway project in conjunction with the federal agencies' reevaluation and Supplemental EIS preparation. The Legacy Parkway project proposed by UDOT at this time differs from the project considered in the Final EIS. UDOT has modified the project to further reduce environmental impacts. These modifications are summarized below and are addressed more fully in subsequent sections of this Supplemental EIS.

- **Narrower right-of-way and footprint**. The Legacy Parkway project as currently proposed by UDOT would have a right-of-way width of 95 m (312 ft), rather than the 100-m (328-ft) width proposed in the Final EIS. UDOT has also proposed to further reduce the width of the project footprint to as low as 80 m (264 ft), where practicable, to avoid sensitive resources such as wetlands.

- **Fewer direct impacts on wetlands**. As reflected in the application for modification of the Section 404 permit, the Legacy Parkway project would affect approximately 40 ha (99 ac) of wetlands, rather than 46 ha (114 ac) as stated in the Final EIS. While there are 45 ha (113 ac) of wetlands within the maximum (reduced) right-of-way involved in the project, project modifications enable UDOT to avoid affecting approximately 6 ha (14 ac) of wetlands.

- **Further wetland avoidance**. In addition to the known reduction in direct impacts on wetlands, UDOT expects that additional wetland avoidance may be achieved through project design; UDOT intends to provide incentives for the design-build contractor to achieve additional reductions. The Draft Supplemental EIS takes a conservative approach in describing potential project impacts by evaluating the potential impacts of wetland fill in the same manner as the Final EIS, that is, by assuming that all wetlands within the right-of-way would be directly affected. The actual impacts on wetlands will be determined in the Section 404 permit review.

- **Proposed mitigation**. UDOT's proposal for Legacy Parkway reflects consideration of avoiding wetlands and sensitive resources in terms of selection of project corridors and other features. The project addressed in the Final EIS and the project currently proposed include many efforts to minimize impacts on wetlands and sensitive resources, as described more fully in this Supplemental



LEGEND

ALTERNATIVES D AND E

0 1 2 KILOMETERS

0 0.5 1 MILES

W S N E

NOTE: INTERCHANGE LOCATIONS VARY PER ALTERNATIVES, AS DESCRIBED IN CHAPTER 4 ALTERNATIVES.
INTERCHANGE LOCATIONS SHOWN ARE FOR ALTERNATIVES D AND E.

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Figure 1-1
Proposed Action

EIS. For wetland impacts that cannot be avoided or minimized, UDOT proposes robust compensatory mitigation in the form of the Legacy Nature Preserve, as developed under the current Section 404 permit.

- The Legacy Nature Preserve proposed as mitigation would constitute an 849-ha (2,098-ac) area that would be managed for wildlife and natural values, as currently provided in the Section 404 permit.

- The Legacy Nature Preserve includes approximately 315 ha (778 ac) of wetlands. Mitigation will include wetland preservation, restoration, enhancement, and creation, in accordance with a mitigation plan approved by the Corps.

- Since the Corps issued the 404 permit in 2001, UDOT has acquired most of the land for the Legacy Nature Preserve and commenced many efforts, summarized in Section 4.12.3.4 of this Supplemental EIS, to enhance and restore wetland and wildlife habitat.

- Although the current Legacy Parkway proposal involves fewer direct impacts on wetlands than the proposal addressed in the Final EIS, UDOT is not proposing changes to the Legacy Nature Preserve. While this may appear to overcompensate for impacts on wetlands, compensatory mitigation is not determined by strict formulas. In addition to mitigation for direct impacts, compensatory mitigation takes into account indirect impacts on wetlands on a qualitative as well as quantitative basis. The public and the federal agencies have also expressed concern about possible mitigation for impacts on wildlife habitat. UDOT believes that the current Legacy Nature Preserve provides appropriate mitigation for direct and indirect impacts on wetlands as well as for impacts on wildlife habitat.

- **Integration with transit**. FTA, in conjunction with UTA, has published a Draft EIS advancing a proposal for commuter rail from Weber County to Salt Lake City. The proposed commuter rail stations are located at intersections that would be served by Legacy Parkway. Integration of Legacy Parkway and the transit services included in the commuter rail EIS has already begun. Bridges to cross streets over Legacy Parkway were designed to span the UPRR tracks and have been expanded to accommodate the commuter rail tracks as well.

The analysis explaining some of the major changes since the Final EIS in UDOT's proposal for Legacy Parkway appears in other sections of this Supplemental EIS. Having worked with the lead federal agencies in the reevaluation and Supplemental EIS process, UDOT is now proposing that Legacy Parkway be approved with a narrower median, a narrower right-of-way, and a narrower footprint in certain locations, which would result in fewer direct impacts on wetlands and other sensitive resources. UDOT's proposal is described as Alternative E in this Supplemental EIS.

1.1.3 Purpose of Legacy Parkway Project

The proposed Legacy Parkway project would help meet a portion of the transportation and mobility needs in the North Corridor through 2020, in conjunction with the other planned improvements in the corridor. As described in the Final EIS, the primary purpose of the proposed action is to provide additional north–south capacity to relieve traffic congestion. The secondary purpose of the action is to provide a single, continuous alternate north-south route through the North Corridor to maintain circulation and access for emergency service vehicles and other traffic when I-15 is closed, congested, or under construction.

The primary purpose of the proposed action is to help meet existing and projected travel demand through 2020 in the North Corridor by providing additional north-south transportation capacity. The *primary purpose* is the same as the *overall project purpose* in the Clean Water Act regulations used to determine practicability of alternatives. Providing capacity to meet travel demand would help ensure that I-15 and local arterial roads remain at a minimum acceptable level of service during peak travel demand, which for I-15 is northbound in the p.m. peak period. The *peak period* evaluated is the 3-hour period that includes the peak hour and the hour before and the hour after the peak hour (also known as the peak "shoulder" hours). Level of service (LOS) is a measure of traffic flow efficiency and congestion and is represented by a letter "grade" ranging from LOS A for excellent conditions (free-flowing traffic well within the capacity of the system) to LOS F for failure conditions (extremely congested, stop-and-go traffic, generally exceeding the capacity of the system). LOS B through LOS E describe progressively worse traffic conditions. According to the American Association of State Highway and Transportation Officials (AASHTO), highway agencies should strive to provide LOS C, but LOS D is acceptable for urban and suburban areas if conditions and constraints make it infeasible to provide LOS C (American Association of State Highway and Transportation Officials 2001). The LOS D goal is also consistent with the WFRC Congestion Management System Plan (CMS) report for the region of the proposed action (Wasatch Front Regional Council 2004).

As part of the Shared Solution, the proposed Legacy Parkway project would help reduce traffic congestion and related impacts in the North Corridor. The criterion for reducing congestion is to maintain average *peak-period* travel conditions on the major facilities in the corridor at LOS D or better through 2020. An average LOS D for the full *3-hour peak period* means that a single hour may exhibit peak-direction traffic levels above LOS D, but the shoulder hours will remain sufficiently low so that the average for the 3-hour period does not exceed LOS D. This standard allows that, while peak-hour conditions may spread into adjacent hours in the future, the spread will not be substantial enough to raise the shoulder-hour level of service or the 3-hour average to worse than peak-period LOS D.

The Final EIS used a criterion of LOS D in the *peak hour* to assess traffic congestion impacts. Comments during the Supplemental EIS scoping process requested that the Supplemental EIS consider an average *peak period* criterion, rather than the *peak hour* criterion, to benefit transit mode share by creating more competitive travel times between highway and transit components of the Shared Solution. The change to an average LOS D condition for the 3-hour peak period allows that a single peak hour may have an operating conditions worse than LOS D, but that travelers have the opportunity to shift travel to immediately before or after the highest hour and travel under LOS D or better conditions. This phenomenon, known as peak spreading, balances traffic flow and capacity use during the full commute period.

The 2020 travel demand analysis shows that I-15 is predicted to operate at LOS F in both the peak hour and the 3-hour peak period in 2020. Although I-15 currently operates at a peak-hour LOS E and peak-period LOS D, it also regularly experiences failure conditions (LOS F) due to traffic accidents and incidents. Such conditions divert regional, long-distance, high-speed traffic onto lower-speed, local arterials with low levels of access control. This increases congestion, interferes with local traffic, and increases accident potential on local streets.

A secondary purpose of the project is to provide a single, continuous, alternate north-south route. Currently, the only continuous north-south route in the North Corridor is I-15. Portions of I-15 were constructed over 30 years ago, and the current traffic volume exceeds the original design volume. The pavement has also exceeded its design life and requires reconstruction. I-15 now requires reconstruction and more traffic lanes to meet current design standards and the growing travel demand in the North Corridor. A project objective related to this purpose is to minimize the amount of through-corridor traffic that gets diverted from I-15 onto local streets. An alternate route is a necessary part of an integrated

transportation network that would help reduce local congestion and associated impacts in the North Corridor communities during emergencies and other highway incidents as well as during construction on I-15. Congestion on I-15 and local streets increases emergency vehicle response times and accident potential. In addition, an alternate north-south route in the North Corridor is identified as necessary for mobility in the corridor in the federally mandated WFRC CMS report (23 CFR 500.109) (Wasatch Front Regional Council 2004).

1.2 Summary of Need for Transportation Improvements in North Corridor

This section provides an updated description of the North Corridor transportation needs and future traffic conditions, with and without Legacy Parkway as a component of the Shared Solution. It includes updated data on existing conditions and updated forecasts of future travel demand and traffic conditions based on the updated land use projections and methods (WFRC 2004 travel model [version 3.2]). A more complete description of the process used to update the traffic forecast information is provided in the *Foreword/Introduction* to this Supplemental EIS, in the travel demand technical appendix (Appendix B), and in Section 4.3.2.5, *Travel Patterns and Accessibility*, of this Supplemental EIS. The travel demand technical appendix also describes differences in the travel forecast between the Final EIS and this Supplemental EIS.

1.2.1 Summary of Final EIS Description of North Corridor Transportation Needs

Chapter 1, *Purpose and Need*, of the Final EIS included an extensive discussion of the analysis and rationale used to develop the concept of the Shared Solution, including the Legacy Parkway project, for meeting transportation needs in the North Corridor. In discussing transportation needs in the North Corridor, Chapter 1 included the following descriptions and definitions.

- Defined the “North Corridor” and described the history and background of the North Corridor transportation needs.
- Described the statewide, regional, corridor, and local planning studies that contributed to identifying needs and developing a shared vision for North Corridor transportation improvements.
- Described the existing facilities in the corridor, including freeways, highways, and local arterials, as well as railroads, rail passenger service, and public transit.
- Described intelligent transportation systems (ITS), transportation system management (TSM), and travel demand management (TDM) strategies for the corridor.
- Described the rationale for the Utah Department of Transportation’s (UDOT’s) level of service standard and existing traffic volumes and traffic operating conditions.
- Described existing roadway and safety deficiencies and the projected population and economic growth and projected increase in travel demand through 2020.

- Defined the concept of "latent demand" and "induced demand," whereby additional vehicle trips are generated as a result of reducing congestion and improving mobility.

The Final EIS purpose and need discussion (page 1-40) summarized the primary transportation problems in the North Corridor as lack of capacity for current travel demand, continuing growth in travel demand, lack of alternate routes for incident management and emergency services, and design deficiencies on existing facilities.

Based on then-current projections of travel demand, Chapter 1 of the Final EIS concluded that regional travel demand could not be satisfied without construction of additional travel lanes, such as the proposed Legacy Parkway. This conclusion has been reverified based on the updated travel demand model projections.

1.2.2 North Corridor Transportation Needs

The remainder of Section 1.2 describes the need for transportation improvements based on the current and updated information assembled for this Supplemental EIS.

The North Corridor is located in Salt Lake and Davis Counties, Utah. The corridor is constrained by Great Salt Lake to the west and the Wasatch Mountains to the east, and bounded by 400 South in Salt Lake City to the south and 200 North in Kaysville to the north. The corridor boundaries have not changed since the Final EIS.

The North Corridor area is experiencing rapid growth and is expected to continue to grow. Ongoing and projected population growth and projected growth in travel demand, which are summarized in Tables 1-1 and 1-2 below, have lead to the need to study alternative solutions to addressing the mobility needs of the North Corridor. An extensive body of information has been developed since the 1980s that has intensively considered the region's growth and the demand on existing and future transportation systems. This information includes many studies and plans, which are summarized in Chapter 1 of the Final EIS, that attribute the major transportation needs in the corridor to lack of an alternate route; deficiencies in the existing roadway network and the need to improve roadway safety, emergency response, incident management, and capacity; need for additional transportation choices; and physical/geographical constraints in the corridor that make it difficult to develop additional infrastructure (Parsons Brinckerhoff Quade and Douglas, Inc. [for Wasatch Front Regional Council] 1998; Carter Burgess [for Wasatch Front Regional Council, Mountain Association of Governments, Utah Transit Authority, and UDOT] 2002; and Wasatch Front Regional Council 2004).

Five regional plans, three corridor plans, and 14 local plans have supported transportation improvements in the North Corridor and demonstrated the need for transportation investment in the area.[1] Notable recent studies include the *Weber County to Salt Lake City Commuter Rail Project: Draft EIS and 4(f) Evaluation* (Utah Transit Authority 2004); the *Inter-Regional Corridor Alternatives Analysis* (IRCAA) (Wasatch Front Regional Council et al. 2002); *Wasatch Front Urban Area Long Range Transportation Plan Update, 2004–2030* (long range plan) (Wasatch Front Regional Council 2003a), Envision Utah's *Quality Growth Strategy and Technical Review* (2000); the *I-15 North Corridor Draft Environmental Impact Statement (Kaysville to Salt Lake City)* (Federal Highway Administration and Utah Department of Transportation 1998); the Legacy Parkway Draft EIS and Final EIS (Federal Highway Administration et al. 1998 and 2000, respectively); and the South Davis County Transit Needs Analysis (Wasatch Front

[1] These investments are identified in the Utah Transit Authority's *Weber County to Salt Lake City Commuter Rail Project: Draft Environmental Impact Statement and 4(f) Evaluation*, 2004.

Regional Council in preparation a).[2] These studies reflect the evolution of the proposed solution to the issues of congestion and alternative routes in the North Corridor. They adopted common sources for estimates of future population and employment, used the most recent WFRC traffic model available at the time to determine travel demand and impacts, assumed similar mode splits between transit and vehicles, and generally arrived at similar conclusions. The studies determined that the most practical solution to the North Corridor's traffic problems is a multi-modal approach featuring transit, improvements to I-15, and Legacy Parkway (or its equivalent) to provide traffic congestion relief and an alternative route.

These studies have culminated in the development of the Shared Solution, which is a combination of improvements to I-15, expanded mass transit, implementation of Legacy Parkway, and other elements of WFRC's long range plan. The Shared Solution is recognized in all four of Envisions Utah's quality growth strategies for the Wasatch Front, each of which contains a highway in the vicinity of Legacy Parkway (Envision Utah 2000). It is also recognized in WFRC's IRCAA study, which includes commuter rail, reconstruction of I-15, and Legacy Parkway in its Locally Preferred Alternative (LPA). WFRC adopted the IRCAA's LPA and incorporated it into the long range plan in 2001. The summary statement of purpose and need for the transportation projects identified in the IRCAA study includes the following six key factors.

- Population and employment in the Wasatch Front region are growing rapidly.
- Population and employment development patterns are increasingly dispersed, with a greater number of activity centers and employment areas.
- Regional growth and an increase in inter-regional travel are creating additional travel demand for both roadways and transit.
- Travel demand exceeds the capacity of existing transportation infrastructure.
- Physical constraints in the corridor limit opportunities for physical expansion of existing infrastructure.
- There is a need for an integrated, multimodal approach to regional transportation improvements.

The commuter rail project Draft EIS (Utah Transit Authority 2004) assumes that the I-15 improvements and Legacy Parkway will be constructed, as per the long range plan, and focuses on the transit element of the regional solution. The South Davis County Transit Needs Analysis (Wasatch Front Regional Council 2004) addresses additional transit improvements that are not in the long range plan, including bus rapid transit and land use initiatives.

The South Davis County Transit Needs Analysis Study is essentially complete, with the final report expected to be complete by the end of 2004. The study suggests that a bus rapid transit (BRT), possibly a streetcar, is feasible and should be constructed in an exclusive lane along the US-89-Main Street-200 West alignment, at least up to Pages Lane in Centerville. Year 2030 ridership is anticipated to be around 7,000 to 8,000 passengers per day. These results are roughly consistent with a portion of the definition of robust transit, or maximum future transit, for the Legacy Parkway Supplemental EIS.

[2] This effort is led by WFRC and includes the cooperation of UTA, UDOT, Davis County, Davis Council of Governments, and the Cities of Farmington, Centerville, Bountiful, West Bountiful, Woods Cross, North Salt Lake, and Salt Lake.

1.2.3 Definition of the Shared Solution

Shared Solution Components

The "Shared Solution" is the term used to describe the combination of multimodal transportation solutions, in various stages of local and regional planning, that, together can meet the above-identified transportation needs in the North Corridor and accommodate the safe and efficient movement of people and goods. Legacy Parkway is one component of the Shared Solution.

The Shared Solution was developed by Utah's state, local, and regional officials to prepare the transportation infrastructure necessary to meet future transportation demand in the North Corridor. The Shared Solution calls for three major transportation infrastructure improvements: reconstructing and expanding I-15, constructing additional mass transit improvements, and constructing Legacy Parkway with a trail (Federal Highway Administration et al. 2000). The Shared Solution also comprises additional smaller but important projects that contribute to the overall strategy, including improving local arterials and implementing ITS, TSM, and TDM strategies. As described in the Final EIS, ITS, TSM, and TDM will be implemented as fully as practicable.

The three major construction projects in the Shared Solution are summarized in the following bullet list.

- **I-15 Improvements**. Regional plans contemplate proposed improvements to I-15 (from 100 South in Salt Lake City to 200 North in Kaysville), including reconstruction of the facility to correct design deficiencies and expanding the highway from eight to ten lanes, including a high-occupancy vehicle (HOV) lane in each direction. This I-15 project is under review in a separate EIS.

- **Expanded Mass Transit**. This proposed component would include expanded bus service and new commuter rail, or some other transit technology, in the corridor. The Federal Transit Administration (FTA) and Utah Transit Authority (UTA) are preparing an EIS on proposed commuter rail from Salt Lake City to Ogden (the Draft EIS was published in April 2004 [Utah Transit Authority 2004]). Other possible transit improvements are in various stages of review and implementation by UTA.

- **Legacy Parkway**. The proposed Legacy Parkway, subject of this Supplemental EIS, would be a four-lane, divided, limited-access highway. To help provide an alternate means of transportation in the North Corridor and to help meet a portion of the 2020 transportation demand, Legacy Parkway would include a trail for pedestrian, bicycle, and equestrian use.

Other components of the Shared Solution include arterial improvements identified in the WFRC's long range plan and ITS, TSM, and TDM measures. The list of projects included in the WFRC long range plan has been updated since the Final EIS (see Appendix B). Improving local arterials is part of the Shared Solution. Some improvements would be made to local arterials, including expanding Redwood Road from two to five lanes (two lanes in each direction, separated by a left-turn lane). The Redwood Road widening project through the North Corridor (from 500 South in Woods Cross to 1000 North in Salt Lake City) is planned for construction in the 2013–2022 time frame.

ITS and TSM are operational strategies, and TDM reduces travel demand and improves the efficiency of the existing and proposed transportation systems. As described in the Final EIS, ITS strategies apply advanced technologies for communicating reliable, accurate, and up-to-date information to highway users and managers. Section 1.2.4 of the Final EIS describes ITS strategies that had been implemented or were planned for implementation at that time. Since publication of the Final EIS, UDOT has extended the fiber-optic cable from I-15 and State Street up US-89 (State Street in Farmington) to Nichols Road,

completing the telecommunications infrastructure needed for a computerized system of communicating real-time travel information. The fiber-optic cable was also extended up I-15 to Exit 334 in Layton where it connects to the existing cable. Two new variable message signs have been installed, one southbound on US-89 at Green Road and the other southbound on I-15 at Burton Lane in Kaysville. Closed-circuit television and traffic monitoring stations have been added along the same corridor as the fiber cable. All new traffic signals, as well as existing signals located along the fiber-optic cable, have had communications added to allow monitoring and improved signal coordination from the traffic operations center. Commitments were made to install these ITS improvements as part of the Legacy Parkway project construction contract.

TSM is intended to improve roadway efficiency and get the most out of the existing system through cost-effective improvements. Section 1.2.4 of the Final EIS describes TSM strategies that had been implemented or were planned for implementation at that time. Since publication of the Final EIS, new ramp meters have been installed on the newly rebuilt Park Lane (formerly Burke Lane) on the northbound I-15 ramp and the southbound US-89 ramps.

TDM comprises strategies to increase the number of people per vehicle and influence travel time and the need to travel. TDM strategies include implementing projects that reduce the number of vehicles using the road. Ongoing funded TDM strategies included as part of the Shared Solution are described in Section 1.2.4 of the Final EIS. Carpool incentives, which include components such as HOV lanes, are considered TDM measures. The I-15 initial (temporary widening) project has been completed since publication of the Legacy Parkway Final EIS and includes elements such as HOV lanes, ramp metering, and variable message signs.

The Shared Solution is a multi-component plan intended to address projected transportation demands in the North Corridor for 2020 and beyond. Not implementing particular components of the Shared Solution, especially the primary components, would result in insufficient capacity to meet projected demand. As noted in Chapter 2 of the Final EIS and addressed in Chapter 3 (as shown in Figure 3-3), even with a fully expanded I-15 (to ten lanes), substantially expanded mass transit (robust mass transit scenario), expanded arterials, demand reduction, and system efficiency improvements, there would still be insufficient capacity on I-15 to meet projected 2020 travel demand in the North Corridor without Legacy Parkway, and level of service on I-15 would still be worse than LOS D.

Environmental Documentation for Shared Solution Projects

The Shared Solution contains many separate projects that would help satisfy regional transportation concerns. Separate project-level environmental documents are being or will be prepared for each action, if required. As detailed in the bullet list below, three environmental documents are currently underway to evaluate projects that would address the three main components of the Shared Solution.

- **Commuter Rail**. An EIS is being prepared by FTA and UTA.
- **I-15 Improvements**. An EIS/Reevaluation is being conducted by FHWA and UDOT.
- **Legacy Parkway**. This Supplemental EIS/Reevaluation was prepared by FHWA and the Corps.

The Shared Solution components are part of the WFRC CMS required by 23 CFR 500.109 to alleviate congestion and enhance mobility of people and goods to levels that meet state and local need (Wasatch Front Regional Council 2004). Individually, each component would help reduce the travel problems in the North Corridor, and each component could serve its transportation purpose regardless of whether the

other projects are built. This Supplemental EIS analyzes the environmental consequences of only the Legacy Parkway project.

The Legacy Parkway project would serve an important role in helping address the regional transportation needs. The Legacy Parkway project would have its own independent utility, serve its own logical termini, and satisfy its own discrete transportation needs while contributing to the achievement of the greater regional goals of the Shared Solution. Legacy Parkway would serve its own function and transportation purposes even if the other components of the Shared Solution were not built (23 CFR 450 and 23 CFR 771.111[f]). This Supplemental EIS is being prepared for the Legacy Parkway project.

FHWA, FTA, UDOT, and UTA are coordinating and cooperating with each other to develop these transportation improvements. UDOT and UTA developed a charter to lay out the objectives—teamwork, cost-effectiveness, safety, quality, schedule, communication, issue resolution, and environmental awareness—that the agencies will work together to achieve in developing, implementing, and integrating these transportation improvements. See Appendix A for a copy of the charter.

Other Regional Studies

There are five other relevant studies in the general vicinity of the Legacy Parkway.

Mountain View Corridor. Preparation of an EIS was started in early 2003 for a proposed Mountain View corridor project south of the Legacy Parkway project. The Mountain View corridor project is a multi-modal analysis of a corridor from northern Utah County along the west side of Salt Lake County, to I-80. A decision on an alternative is expected in 2006. There is currently no timeframe for implementation

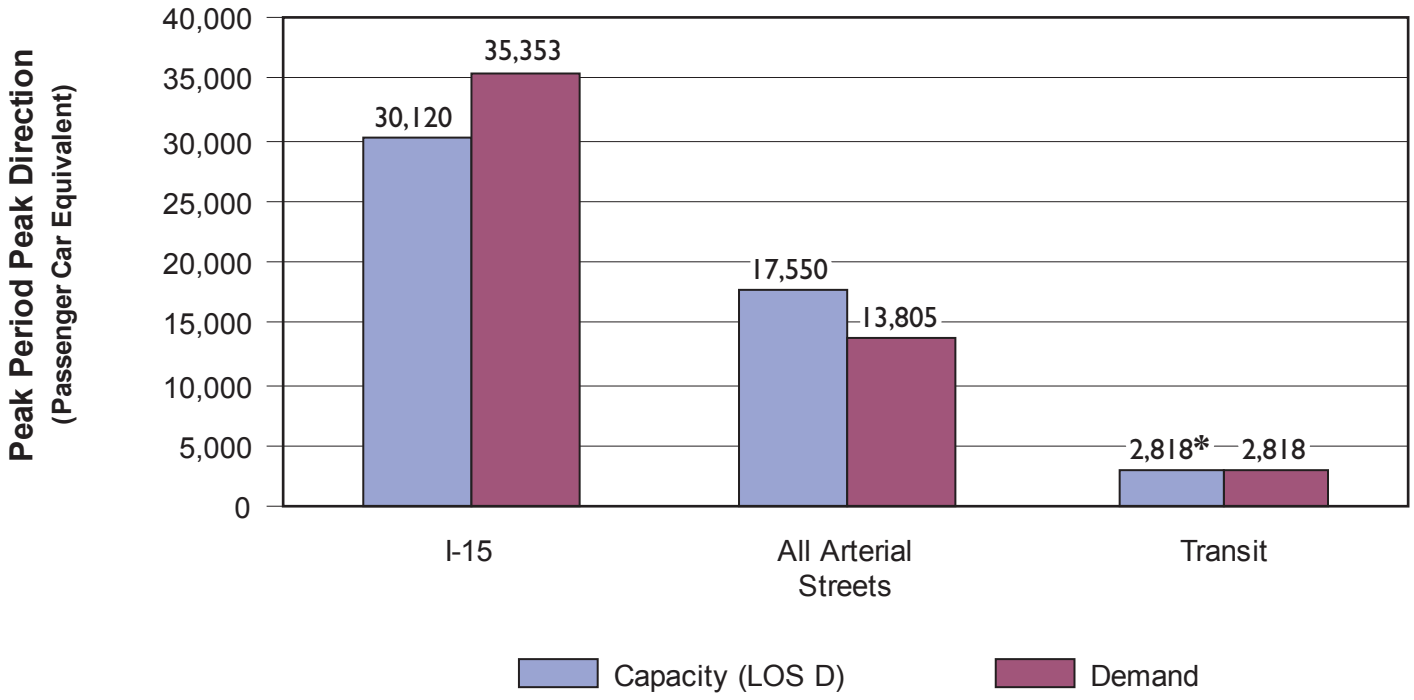
South Davis County Transit Study. WFRC and UTA have been managing this transit feasibility study, which began in 2003 and will finish by yearend 2004. The project covers the area from downtown Salt Lake City to Farmington. The recommendations from the study are for a BRT route between the Salt Lake City inter-modal terminal to the Farmington commuter rail station and planned transit development area. It will generally follow the surface streets through the communities of south Davis County. The timeframe for implementation is for the first phase of the WFRC long range plan.

North Legacy Terminus Analysis. Farmington City is reviewing a connection between Legacy Parkway, I-15, and the proposed North Legacy project. This is at the concept level and will ultimately allow for preservation of the corridor. The analysis is planned to begin by the end of 2004.

UDOT Managed Lanes Study. This is a statewide study that looks at potential corridors where HOV, high-occupancy toll (HOT), reversible lanes, and tolling might be appropriate in 2030 on the state and federal highway system. This study is planned for completion in early 2005.

I-15 Kaysville to Ogden Corridor Plan. This is a UDOT corridor study to analyze future needs and make recommendations for improvements to the I-15 mainline, the interchanges, and surface streets in the study area. The study is from the 200 North interchange in Kaysville to the 31st Street interchange in Ogden. The study began in July 2004 and is expected to end in June 2005.

WFRC is currently preparing a planning study to analyze additional South Davis County transit improvements, including some that are not included in the current long range plan. Some of those improvements, such as bus rapid transit, are included in the North Corridor Shared Solution.



* Effective transit capacity. Transit capacity is variable and can rise to meet or exceed transit demand.

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Figure 1-2
2020 Shared Solution without Legacy Parkway

1.2.4 Needs Addressed by Legacy Parkway Project

This section describes updated information to support the needs that were described in the Final EIS. The proposed action is primarily designed to help meet the future capacity needs of the rapidly growing travel demand in the North Corridor. However, as demonstrated by the most recent travel demand data, it would also address the existing primary transportation problems related to congestion/lack of capacity and the existing secondary need for an alternate route through the North Corridor.

Capacity to Accommodate Growing Travel Demand (Primary Need)

There are currently strains on the capacity of the transportation system. As shown below in Tables 1-1 and 1-2, projected growth in population, number of households, and employment will result in an increase in future travel demand in the North Corridor. As the travel demand increases, the capacity of the existing transportation system will continue to be exceeded, and I-15 will become increasingly more congested. The current lack of capacity is due to the large amount of existing traffic as well as a lack of lanes on I-15 and other roadway facilities in the corridor. The lack of capacity will be exacerbated in the future as the traffic volume continues to increase, as projected in the Final EIS and the current WFRC travel demand model. Even with expansion of I-15 to ten lanes, arterial improvements, maximum future transit, and other improvements included in the long range plan, I-15 traffic volume would still exceed the LOS D capacity without Legacy Parkway.

System Capacity Discontinuity

The proposed Legacy Parkway would be an important element in improving the functionality of the regional highway network. Without Legacy Parkway, the North Corridor is, and will remain unless other improvements are undertaken, a system capacity bottleneck. Several highways funnel into I-15 at both the north and south ends of the North Corridor. From the north, four lanes of US-89 join six lanes of I-15 and channel into an eight-lane section of I-15. From the south, four lanes of I-215 join six lanes of I-15 and channel into an eight-lane section of I-15. This eight-lane segment of I-15 does not have the capacity to accommodate I-15 traffic and the additional traffic from these other highways, and a bottleneck is created.

Without Legacy Parkway, this capacity discontinuity, or “bottleneck,” would continue to cause congestion in the future. Under the WFRC long range plan, the planned combined capacity of I-15, US-89, and Legacy Parkway north of the corridor would be 14 lanes, and the planned combined capacity of I-15 and I-215 south of the corridor would be 14 lanes (Wasatch Front Regional Council 2003a). Without the proposed action, however, the maximum capacity through this section would remain at a 10-lane I-15, which is about 29 percent less capacity than corridor segments immediately to the north and south. Thus, the bottleneck would remain, and worsen, in the future.

Such capacity discontinuity results in inefficient use of the highway system. During periods of high demand, the bottleneck segment causes queuing of upstream traffic and delay. Constrained traffic flow through the bottleneck results in underutilization of available downstream capacity and causes off-loading of high-speed through-corridor traffic from I-15 onto local streets.

With implementation of the proposed action, the North Corridor would experience continuity of system capacity, with 14 highway lanes available throughout the corridor, reducing upstream congestion and efficiently using available capacity downstream.

Growth in Demographics and Travel Demand

The Final EIS presented a population growth projection along the Wasatch Front of approximately 60 percent between 1995 and 2020 (from 1,211,000 to 1,941,000), or 1.9 percent annually. Based on population forecasts updated since publication of the Final EIS, population growth between 2001/2002 and 2020 is still expected to cause increased travel demand. Table 1-1 shows the existing and projected demographic changes in Salt Lake, Davis, and Weber Counties and the resulting increase in travel demand in the North Corridor. Growth in population, number of households, and employment in Salt Lake, Davis, and Weber Counties is expected to increase by 40 percent, 51 percent, and 42 percent, respectively, between 2002 and 2020. The 40 percent increase in population from 2001/2002 to 2020 (from 1,374,000 to 1,918,000) is also a 1.9 percent annual increase in population. This is the same annual rate of population increase reported in the Final EIS and reflects that there has been little change in forecasted demographic conditions between the Final EIS and the Supplemental EIS (see Table B-1 in Appendix B). According to the 2004 WFRC travel forecasts, this population growth will result in a 41 percent increase in North Corridor home-based work trips (travel between residence and job site) and in total vehicle trips between 2001 and 2020.

Table 1-1 Projected Demographic and Travel Demand Changes between 2001/2002 and 2020

Item	Current (2001/2002)	Projected 2020[3]	Overall % Change	Annual % Change
Population[1]	1,374,000	1,918,000	+40	+1.9
Population[2]	88,000	104,000	+18	+0.9
Households[1]	450,000	678,000	+51	+2.3
Households[2]	28,000	37,000	+32	+1.6
Employment[1]	696,000	987,000	+42	+2.0
Employment[2]	31,000	47,000	+52	+2.3
Home-Based Work Trips (person trips)[1]	764,000	1,097,000	+44	+2.0
Home-Based Work Trips (person trips)[2]	68,000	96,000	+41	+1.9
Total Vehicle Trips (average weekday)[1]	5,058,000	7,181,000	+42	+2.0
Total Vehicle Trips (average weekday)[2]	382,000	522,000	+37	+1.7

Notes:

1 Demographic data includes all of Salt Lake, Davis, and Weber Counties.

2 Data is for the North Corridor, which is bounded by Great Salt Lake to the west, the Wasatch Mountains to the east, the I-215/I-15 interchange to the south, and the I-15/US-89 interchange in Farmington to the north.

3 Source: WFRC Travel Demand Model, February 2004, (version 3.2), which depicts 2002 data and projected 2020 data.

The build alternatives would increase roadway capacity and reduce travel time in the North Corridor. Reducing travel time is analogous to reducing transportation cost. The result of a reduction in transportation cost might be twofold. First, reduced transportation costs may be associated with changes in land use and land development patterns, often called “induced growth.” Because the future land use

inputs to the WFRC model are based on plans that include Legacy Parkway and on input from the planner for each community in the corridor, induced growth is not a likely outcome of the Legacy Parkway project. The pace of land development, however, may be influenced by the location of transportation facilities.

Second, reduced transportation costs might result in a potential shift in travel routes for some drivers and a potential shift in mode choice. This shift in travel demand is often called “induced demand,” “latent demand,” or “suppressed demand.” The route and mode shifts associated with induced demand from Legacy Parkway are measurable, although generally less than 4 percent of total screenline volume, and are accounted for in the WFRC travel model. Section B3.4.4 of the travel demand technical appendix (see Appendix B) provides further details on this issue.

Measures of I-15 Existing and Projected Future Traffic Operating Conditions

For this Supplemental EIS, a level-of-service criterion of LOS D or better in the peak period, peak-direction was used to analyze the current and future operating conditions of I-15 in the North Corridor. This criterion was used to evaluate how well potential alternatives would meet the primary project purpose of relieving traffic congestion on I-15 through 2020. For screening purposes, alternatives were evaluated to see whether they would provide peak-period, peak-direction LOS D or better.

As described above, the peak period, peak direction conditions for I-15 and the North Corridor consider the northbound traffic volume and capacity during the 3-hour evening peak period. The peak period includes a peak hour (generally 5 p.m. to 6 p.m.) and two “shoulder” hours just before and after the highest peak hour (generally from 4 p.m. to 5 p.m. and from 6 p.m. to 7 p.m.) during which volumes approach but do not exceed the peak-hour levels.

For this project, the appropriate standard goal is average LOS D for the 3-hour peak period. “Average LOS D” means that although the peak hour may exhibit higher peak-direction traffic levels, the shoulder hours will remain sufficiently low that the 3-hour peak-period average will be LOS D. The LOS D standard allows for possible future spread of peak-hour conditions into adjacent hours without degrading the shoulder-hour level of service or the 3-hour average to worse than LOS D.

The Final EIS used peak-hour rather than peak-period level of service to measure the effectiveness of alternatives. Table 1-2 below shows that conditions under the No-Build Alternative (2020 future no-build scenario) are predicted to operate at LOS F not only in the peak hour, but also throughout the 3-hour p.m. peak period. LOS F is the flow rate of vehicles at failure conditions, and is highly unstable and can cause extended periods of breakdown conditions. The peak-period measure allows evaluation of the degree to which peak-hour conditions spill into the hours before and after the peak hour. This Supplemental EIS measures overall average level of service in the 3-hour peak period to indicate the degree to which failure conditions spread congested periods for longer than the conventional peak hour.

Table 1-2 presents the current and future traffic volumes and levels of service for I-15 through the North Corridor under the No-Build Alterative. The No-Build Alternative adds commuter rail and other transit improvements to the corridor, but does not add either Legacy Parkway or the widening of I-15 to ten lanes, because, as addressed in Section 2.4, *Sequencing of the Shared Solution*, it would be unreasonable to perform the construction on I-15 related to the widening without a continuous parallel route to which through-corridor traffic could be diverted. The No-Build Alternative reflects the WFRC long range plan without two of the major components of the Shared Solution—Legacy Parkway and expansion of I-15—but it includes commuter rail and expanding Redwood Road from two to five lanes (from 1000 North in Salt Lake City to 500 South in Woods Cross). It also includes mass transit improvements at the level described in the WFRC long range plan. The measures were developed for 2001 and 2020 traffic

conditions and were applied to the Woods Cross screenline. The Woods Cross screenline is a location on I-15, just south of the 2600 south interchange, that was chosen to be analyzed because it reflects representative traffic conditions in the corridor.

Table 1-2 I-15 Operating Conditions for 2001 and 2020 No-Build Alternative

Measure of Effectiveness	2001*	2020*
Peak hour, peak-direction LOS	2,210 pcphpl (LOS E)	2,840 pcphpl (LOS F)
Peak-period, peak-direction LOS	6,160 pcpl (LOS D)	7,890 pcpl (LOS F)

Notes:

Traffic volumes shown in the table represent actual volumes for 2001 and projected volumes for 2020.

pcphpl = passenger cars per lane, in total for full 3-hour period

pcpl = passenger cars per lane

* From *Highway Capacity Manual: 2000*, "LOS Criteria for Basic Freeway Segments," maximum service flow rate for 65 miles per hour, page 23–24 (Transportation Research Board 2000). LOS shown is for the Woods Cross screenline. The single-hour peak passenger-car equivalent per lane at LOS D is 2,090, and the 3-hour LOS D capacity is 6,270.

Current traffic volume counts at the Woods Cross screenline show that the current system operates at LOS E during the peak hour under existing conditions and meets the minimum LOS D standard on I-15 on average for the full 3-hour peak period, but only by a small margin—about 110 passenger cars per lane over the 3 hours, or about two percent. The 2020 forecasts show that level of service will continue to worsen as a result of projected growth and that the existing capacity in the corridor is not sufficient to accommodate the growth in travel demand.

Traffic operating conditions are predicted to continue to deteriorate into the future, reaching LOS F not only for the peak hour, but also for the full 3-hour peak period under the No-Build Alternative.

Table 1-3 provides an overview of the 2001 and 2020 levels of service on specific segments of I-15 during the peak period in the peak direction. As shown in the table, under the No-Build Alternative, seven segments currently operate at LOS D and one segment currently operates LOS E, and by 2020 all segments except one will operate below acceptable levels (i.e., LOS E or worse). Six of the eight segments would operate at LOS F for the full 3-hour period, and one would operate at LOS E for the full 3 hours.

Table 1-3 I-15 Levels of Service for 2001 and 2020 No-Build Alternative (Peak Period, Peak Direction)

	2001				2020			
I-15 Segment	Traffic Volume	Lanes per Direction *	Service Flow (pcpppl)	Level of Service	Traffic Volume	Lanes per Direction*	Service Flow (pcpppl)	Level of Service
600 North to Beck Street	17,890	3	6,020	D	21,330	3	7,180	F
Beck Street to I-215	15,600	3	5,250	D	18,310	3	6,170	D
I-215 to 2600 South	25,380	4	6,410	E	31,550	4	7,970	F
2600 South to 500 South	24,440	4	6,160	D	31,220	4	7,890	F
500 South to Parrish Lane	24,270	4	6,130	D	32,940	4	8,320	F
Parrish Lane to Lagoon Drive	23,710	4	5,990	D	33,260	4	8,400	F
Lagoon Drive to US-89 and Park Lane (formerly Burke Lane)	22,580	4	5,700	D	31,990	4	8,080	F
US-89 and Park Lane (formerly Burke Lane) to 200 North	16,090	3	5,420	D	20,830	3	7,010	E

Notes:

pcpppl = passenger-car equivalents per period per lane

* Includes I-15 initial phase improvements (expansion to eight lanes).

Source: WFRC 2004 travel demand model (version 3.2).

Alternate Route (Secondary Need)

Need to Accommodate Through-Corridor Traffic

The Wasatch Front Mountains to the east and Great Salt Lake/Farmington Bay to the west create a physically and geographically constrained north-south linear corridor. The corridor currently has limited transportation facilities; I-15 is the only continuous high-speed vehicular route through the corridor that directly links Salt Lake, Davis, and Weber Counties, and it serves as the primary link for people commuting between these areas. I-15 also serves as one of the main commercial transportation routes for truckers between Mexico and Canada because it is part of the CANAMEX corridor. (CANAMEX is a broad economic development concept that fosters trade between Mexico, the United States, and Canada, and promotes accelerated economic growth.) The north-south arterials that parallel I-15 are generally discontinuous and typically provide for local trips because of their design and operation characteristics. The local arterials primarily serve travel within the corridor (intra-regional), and cannot handle through-corridor traffic (inter-regional). No continuous route through the corridor exists as an alternative to I-15 to accommodate through-corridor trips.

To better service through-corridor (non-local) traffic and to help meet the 2020 travel demand, an alternate continuous north-south facility is needed in the North Corridor. Through-corridor traffic is traffic that travels through the North Corridor but does not have a start point or end point in the North Corridor (i.e., trips that originate and end on either side of the area from Farmington City to the southern Davis County line). It is predicted that about 65 percent of the 2020 traffic on I-15 in the North Corridor will be through-corridor traffic. As I-15 becomes more congested, the ability of the highway to accommodate both through-corridor traffic and local traffic decreases. A large percentage of the current and future travel demand is composed of trucks and non-local traffic, which cannot be effectively carried on the discontinuous local streets that do not run the length of the North Corridor. A continuous, access-controlled facility would be safer and more efficient for handling through-corridor traffic (Wasatch Front Regional Council 2004). Congestion effects of a shortage of through-corridor traffic capacity are described above, and safety implications are described in the following sections.

Need to Limit Diversion of Through-Corridor Traffic onto Local Streets

As travel demand continues to grow in the North Corridor, safety on local streets is affected. As I-15 becomes increasingly congested or is closed or under construction, motorists will seek other routes to minimize delays, causing them to exit onto local discontinuous north-south arterials. Because the local road network for north-south travel through the corridor is limited, motorists detouring from I-15 onto the local arterials create local congestion and disrupt the primary use of these arterials, which is to serve the local communities. When the local arterials are congested, emergency vehicle response time is affected. In addition, congestion on local arterials would create higher potential risk for motorists to be involved in accidents, because the arterials cannot handle high volumes of through traffic that would occur when incidents or congestion on I-15 cause vehicles to divert to local surface streets. Even under normal circumstances, as shown in Table 1-4, local arterials with multiple access points and signalized intersections have a higher average rate of accidents than limited-access freeways such as I-15. According to UDOT traffic accident statistics for large urban areas, arterials experience about four times the accident rates and similar degrees of accident severity as freeways at the same traffic volume (Utah Department 2001). For all traffic volume ranges, arterials experience about 3.3 times the accident rate as interstates and other limited access facilities, as indicated below.

Table 1-4 Average Accident Rates by Roadway Classification for Urbanized Areas

Roadway Classification	Accident Rate per Million Vehicle-Miles Traveled
Collector	3.8
Local	4.5
Minor arterial	7.2
Principal arterial	5.1
Interstate (limited-access facility)	1.5

Notes:

Urbanized areas are defined as having a population greater than 200,000.

While population in the North Corridor is under 200,000, the population in the three-county area will reach almost 2 million in 2020, and travel includes motorists from outside the North Corridor.

Source: Utah Department of Transportation 2003a.

A limited-access facility, such as the proposed Legacy Parkway, in which ramps providing access from local streets to the highway are provided only at certain grade-separated locations, can limit the

interactions between local traffic and through-corridor traffic. In addition, a limited-access facility provides safer travel conditions for through-corridor traffic than conventional highways with signalized intersections. Statistics show that crash, injury, and fatality rates on access-controlled highways are 30 to 76 percent of the comparable rates on conventional highways (American Association of State Highway and Transportation Officials 2001).

One factor that affects the relative safety of the limited-access versus local facilities is the amount of truck traffic in the corridor. I-15 presently carries over 18,000 trucks a day, including over 8,000 large multiple-units, according to UDOT permanent count station 315 in Farmington (May 2004). Trucks represent about 14 percent of the current traffic on 1-15, and about half of these (or 6 percent of overall traffic) are semi-trailers over 9 m (30 ft) long. North Corridor truck traffic, both from in-state and inter-state sources, is projected to grow substantially by 2020, exceeding the growth rate in general traffic and increasing the truck mix in the total traffic stream. Interstate truck traffic (neither beginning nor ending in Utah) is predicted to more than double, contributing to a doubling of total truck traffic on I-15. Through-corridor interstate trucks alone are predicted to total over 10,000 a day by 2020, representing about one-fourth of all trucks in the corridor. (Federal Highway Administration Office of Field Management and Operation 2002.) These interstate trips neither begin nor end in the North Corridor. The remaining three-fourths include intra-regional truck trips that travel entirely through the corridor, as well as trips that begin or end in the corridor.

If Legacy Parkway were not built, incidents and congestion on I-15 could divert trucks to parallel arterials. Because of their size and mass, reduced maneuverability and visibility, and effects on speed differentials, trucks affect accident frequency and severity on arterials at higher levels than general traffic. UDOT data indicates that truck accident rates (per million vehicle miles) on urban divided arterials are more than 7 times the rates on urban freeways. Accident severity for trucks on divided multi-lane arterials is also higher than for trucks on freeways, with the most severe accidents (major injury or fatality) being 6 to 10 times more likely on major divided arterials than on freeways.

Growth in Travel Demand and Department of Defense Alternate Routes

I-15 is part of the Strategic Highway Network (STRAHNET), which is a system of public highways that provide access, continuity, and emergency transportation routes for military personnel and equipment between Department of Defense (DoD) priority locations in times of peace and war. The 98,170-km (61,000-mi) system, designated by FHWA in partnership with DoD, includes about 72,420 km (45,000 mi) of interstate highways. The DoD-designated agent for public highway matters, the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA), is the proponent for STRAHNET. Federal oversight ensures optimum maintenance levels for STRAHNET highways, ensuring the roads can support emergency deployment. The primary concern regarding highway connectivity is to ensure access and connectivity for Priority 1 facilities such as Hill Air Force Base in Ogden, Utah, which is accessed from I-15. On highways that provide access to Priority 1 facilities, bridge capability, pavement condition, and congestion are specific issues that should be addressed (Global Security.Org 2003). Legacy Parkway would relieve congestion on I-15 and therefore would help to ensure access and connectivity for military sites that depend on I-15.

Need for Alternate Route during Future I-15 Reconstruction

Design deficiencies on I-15 contribute to increased congestion, slower traffic speeds, and reduced safety. Specific design deficiencies on I-15 in the project corridor include the following.

- Substandard inside and outside shoulder widths at certain locations.
- Obsolete or structurally deficient bridges.
- Improper lane balance on I-15 southbound at I-215.
- Pavement has exceeded its design life.

Because I-15 was constructed in the North Corridor over 30 years ago and has exceeded its design life, the facility has existing design deficiencies and requires reconstruction. However, since the construction of I-15 in the North Corridor, the communities surrounding the freeway have grown, constraining reconstruction options in the area. In accordance with the UDOT policy for context-sensitive solutions, which seeks to minimize impacts on communities by ensuring that transportation facilities are integrated within the overall community structure, I-15 reconstruction is planned to occur mainly within the existing I-15 right-of-way and lanes are planned to be added in the existing median.

Because of the right-of-way constraints on the I-15 reconstruction project, highway lanes will need to be closed during I-15 reconstruction, which will reduce capacity in the corridor. With one lane closed for construction, the total traffic capacity on I-15 in that direction would be reduced by about 30 percent; with two lanes closed, traffic capacity in that direction would be reduced by about 50 percent (Transportation Research Board 2000). Assuming that no alternate route is available, north-bound travel time in the peak hour for through-corridor traffic in the North Corridor would increase to 52 minutes with I-15 reduced to two lanes in each direction compared to 12.8 minutes in 2001 with all lanes open. To avoid such extreme delays in the North Corridor, an alternate route is needed during the 4 years of I-15 reconstruction. The Final EIS, Appendix G, identified these circumstances in addressing the appropriate sequence of construction of Legacy Parkway and I-15 improvements. This Supplemental EIS relies on the Final EIS sequencing analysis and the updated sequencing analysis presented in Chapter 2, Section 2.4, of this document, with respect to the appropriate sequence of construction of Legacy Parkway and I-15 improvements. (See Chapter 2, Section 2.4, of this document for a discussion of construction sequencing of the components of the Shared Solution.)

Need for Alternate Route during Emergencies

A reliable network of roadways plays a major role in the success of traffic management during emergencies or other highway incidents such as maintenance, construction, or disabled vehicles stranded on the road. In overseeing the state transportation system to ensure a reliable network, UDOT must consider specific and often simultaneous functions of the transportation facilities, including the mobility of people and goods in the transportation network and the ability of rescue personnel and equipment to access emergency zones. The existence of an alternate route to relieve traffic congestion during accidents or construction or other incidents is a crucial element in maintaining a reliable transportation network.

One recent incident underscores the need for an alternate route in the North Corridor. An accident occurred on a Saturday morning in November 2000 in which a tanker truck carrying 26,497 liters (7,000 gallons) of gasoline crashed and burned for several hours. Reports of the accident indicate that the northbound lanes of I-15 were closed for 16 hours, during which time vehicles were diverted to local surface streets. Because of the lack of a continuous alternate north-south route, mobility in Davis County was severely limited, which resulted in regional congestion and more accidents. The *Salt Lake Tribune* reported that rescue teams got caught in traffic and that many drivers were running out of gas as they waited for traffic flow to resume. An analysis of the accident reports for November 4, 2000, revealed that

the tanker incident and subsequent diversion of traffic onto the local street system resulted in additional traffic accidents.

1.3 Objectives for Proposed Action

In implementing the proposed action, UDOT, the project proponent, seeks to achieve the following objectives.

- Meet the transportation need and achieve the project purposes as described above.
- Minimize environmental impacts to the maximum extent practicable.
- Provide a project that is an asset to the community and incorporates context-sensitive solutions into the project design.

FHWA and UDOT are evaluating Legacy Parkway in terms of the travel demand considerations described above as well as in the context of minimizing environmental impacts as much as possible and providing a project that is a desirable asset to the community. FHWA policy requires consideration of the need for safe and efficient transportation; the social, economic, and environmental impacts of the proposed transportation improvement; and national, state, and local environmental protection goals. Public involvement and a systematic interdisciplinary approach are necessary to mitigate adverse impacts and are incorporated into the action (23 CFR 771.105). In addition, the Corps is reviewing UDOT's request for a permit modification. The Corps is responsible for ensuring that a scientifically sound analysis is completed in compliance with NEPA and the CWA. (See discussion of "Lead Agencies and Required Permits and Approvals" in the *Foreword/Introduction* of this Draft Supplemental EIS.)

Transportation projects are not developed or evaluated in a vacuum. Comments received during the scoping processes for the Final EIS and the Supplemental EIS, information in local and regional land use and transportation plans, and the stated desires of the local public and community officials addressed various environmental concerns. To meet these environmental and community objectives, UDOT has adopted a context-sensitive solution (CSS) philosophy for transportation projects. CSS approaches are endorsed and encouraged by FHWA (Federal Highway Administration 2001). The CSS philosophy guides UDOT, wherein safe transportation solutions are planned, designed, constructed, and maintained in harmony with the community and the environment.

The CSS approach addresses the need, purpose, safety, and service of a transportation project, as well as the protection of scenic, aesthetic, historic, environmental, and other community values. To satisfy the purpose and need of an action as set forth by the project stakeholders, UDOT uses the CSS approach to ensure that multimodal transportation facilities are integrated within the overall community structure, existing and proposed transportation system, and the defined need. Some of the strong community interests identified in the North Corridor include a trail system (non-motorized), a berm to screen out visual and noise effects, and landscaping. The CSS approach includes integrating the proposed action with other modes of transportation, including existing and future transit, trails, and park-and-ride lots so that the overall system benefits the community.

Reflecting CSS principles of balancing community needs with resource protection, UDOT intends to design and place the trail and berm within the right-of-way in a footprint that further avoids wetlands and maintains the natural habitat to the maximum extent practicable. As described more fully in Chapter 3, *Alternatives*, UDOT has reduced the proposed right-of-way from the 100 m (328 ft) proposed in the Final

EIS to 95 m (312 ft) for this Supplemental EIS, by reducing the median width. Within that 95-m (312-ft) right-of-way width, the footprint for construction would be modified where possible to preserve and protect additional natural habitat, including wetlands, by applying CSS principles.

1.3.1 Local Community Interests

The local community support for Legacy Parkway has not changed since the Final EIS. During the Supplemental EIS scoping process, the local communities reiterated their strong views that Legacy Parkway should be built, and provided information concerning alternate locations for Legacy Parkway.

As described above in Section 1.2.2, in addition to five regional plans and three corridor plans, 14 local plans have supported additional transportation investments in the North Corridor. These studies all arrived at similar conclusions. The studies determined that the most practical solution to the North Corridor's traffic problems is a multi-modal approach featuring expansion of transit, improvements to I-15, and construction of Legacy Parkway (or its equivalent). Legacy parkway is also included in Envision Utah's quality growth strategy, and was adopted by WFRC and incorporated into its long range plan in 2001.

As mentioned above, the communities in the North Corridor also expressed strong interest in a parkway-type facility during the Final EIS process; this interest was reiterated during the Supplemental EIS process. This interest is also conveyed in planning documents and specific comments received from local officials and citizens as described below.

For example, the *Woods Cross City General Plan* (City of Woods Cross 2003) notes that the city is experiencing considerable growth to the west that could ultimately be limited by Legacy Parkway. Representatives of the City of Woods Cross stated: "It would be a shame to trade Legacy Parkway with its trail/berm for a ribbon of concrete through a community. Transportation facilities should be a benefit to communities and include amenities that soften the impact. A trail also provides multimodal options for transportation." (HDR Engineering, Inc. 2003a.) Representatives of the City of West Bountiful also expressed a need for a parkway-type facility: "The landscaped berm and trail facilities adjacent to residential areas are very important to the City." (HDR Engineering, Inc. 2003b.) Farmington City also expressed a need for a parkway facility: "Farmington is very aesthetically minded and prefers a landscaped berm for noise mitigation." (HDR Engineering, Inc. 2003c.)

According to the local communities, a parkway-type facility is needed to help mitigate visual impacts and soften the look of the highway by blending it with the surrounding landscape. The parkway concept includes landscaping that would incorporate the use of grasses, a raised berm, and trees and shrubs to buffer the view of the roadway. A highway design without these features would be less aesthetically pleasing and would not serve the needs of the local communities.

1.3.2 Trails

In addition to serving transportation purposes, the Legacy Parkway Trail is consistent with the CSS approach. UDOT has developed a statewide policy that provides for planning of pedestrian and bicycle facilities (Utah Department of Transportation 2003b). UDOT is responsible for evaluating the benefits of incorporating bicycle and pedestrian trails into the transportation system. This responsibility includes defining where facilities are appropriate on the highway system; determining any additional right-of-way requirements; and incorporating facilities as they become economically, environmentally, and functionally feasible. The state long-range transportation plan provides a statewide perspective of the

overall network that is a useful guide for community efforts. As part of the CSS, UDOT considers walking and cycling in its system planning and during project design (Utah Department of Transportation 2003b).

There are numerous existing and proposed trails in the North Corridor that would benefit from a continuous north-south trail to link them with developments and communities. Every city in the North Corridor along the proposed alignments has expressed support for a trail system to add amenities and recreation opportunities to the area. In addition, many community plans show the need for a Legacy Parkway Trail to link with other communities in the area. Without a continuous north-south trail, the proposed community trails would not provide the necessary link to other communities and would thus be inconsistent with community plans.

The plans for the Foxboro development in North Salt Lake rely on the Legacy Parkway Trail to link this community to other communities in the area. Woods Cross City is planning to develop a trail that would tie into the Legacy Parkway Trail, with access at about 2425 South (Woods Cross City 2003). There are two equestrian centers in West Bountiful that are planned to access the Legacy Parkway Trail. West Bountiful City shows about 30 percent of its trails consisting of the proposed Legacy Parkway Trail, which would provide the needed overall link between trail systems in the city (HDR Engineering, Inc. 2003b). Centerville City's master plan shows the Legacy Parkway Trail, along with several trail access points and parking facilities (HDR Engineering, Inc. 2003d).

Further, the City of Farmington's trail master plan reflects the need for a Legacy Parkway trail (HDR Engineering, Inc. 2003c). Farmington expressed its support for the trail within the Legacy Parkway right-of-way, which would serve a new high school, developing residential areas, the Davis County Fairgrounds, and a new park, as well as tying into the extensive Farmington trails system (see Chapter 4, Section 4.7, *Pedestrian and Bicyclist Considerations*, for more information). Farmington pointed out that the proposed Legacy Parkway Trail would offer an effective alternative mode of transportation to Farmington residents looking for an alternative way to travel south to work in the Centerville and Bountiful areas. Farmington noted that other trail locations would not work as well (HDR Engineering, Inc. 2003c).

Chapter 2

Tenth Circuit Court Ruling Analysis

Chapter 2

Tenth Circuit Court Ruling Analysis

2.0 Introduction

2.0.1 Background

This chapter of the Supplemental EIS summarizes the information assembled in relation to the limited deficiencies of the Legacy Parkway Final EIS and the Clean Water Act Section 404 permit, as identified by the U.S. Circuit Court of Appeals for the Tenth Circuit. This chapter summarizes the approach, methodology, results, and conclusions of the technical analysis of the issues raised by the court decision.

As part of the environmental scoping process for the Supplemental EIS, a public open house was held to inform the public about the issues to be analyzed in the technical memoranda. Specific focus-group meetings and community planning information committee (CPIC) meetings were also held to gather public and agency input on the approach to conducting the analyses to address the court's concerns. In addition to the scoping process, the following measures were undertaken.

- The lead agencies requested that UDOT and the technical consultants prepare five preliminary draft technical memoranda, in collaboration with and under the direction of the lead agencies, to address each of the subjects covered in the court ruling.
- The lead agencies provided all the preliminary draft technical memoranda to the cooperating agencies for review and comment.
- The lead agencies considered and responded to cooperating agency comments.
- CPIC meetings on specific topics were held to advise interested parties of the ongoing evaluation and to seek input on the agency approaches and preliminary findings.
- When requested, the lead agencies met with outside organizations, including their consultants and experts, to hear additional comments and suggestions on the approaches and preliminary findings.
- UDOT and the consultants incorporated revisions and prepared the final technical memoranda.
- The lead agencies independently reviewed the results presented in the five technical memoranda and the administrative record and, in conjunction with applied expertise and professional judgment,

determined that the information was sufficient to utilize in this Supplemental EIS and support initial determinations for the Supplemental EIS.

2.0.2 Technical Memoranda

As described above, five technical memoranda were prepared. The analysis and results of the studies contained in the technical memoranda are hereby incorporated by reference into this Supplemental EIS. The five technical memoranda are listed below.

- *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a).
- *Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation* (HDR Engineering, Inc. 2004b).
- *Legacy Parkway Technical Memorandum: Integration of Mass Transit with Legacy Parkway* (Fehr & Peers 2004).
- *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution* (HDR Engineering, Inc. 2004c).
- *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum* (Jones & Stokes 2004).

The technical memoranda and their results are summarized in Sections 2.1 through 2.5 of this chapter.

Section 2.1

Right-of-Way Issues

2.1.1 Summary of Approach for Supplemental EIS

The Preferred Alternative identified in the Final EIS, and the least environmentally damaging practicable alternative identified in the CWA Section 404(b)(1) evaluation, was based on a 100-m (328-ft) right-of-way that followed the proposed Alternative D (Final EIS Preferred Alternative) alignment. The right-of-way for Alternative D, as well as for all the other build alternatives evaluated in the Final EIS, included a 20-m (66-ft) wide median, which was based on UDOT design standards at the time the Final EIS was published, and a 27-m (84-ft) buffer area, including a trail.

Following the court decision, the lead agencies reviewed information related to the components in the right-of-way to assess whether narrower widths were practicable. Specific components of the right-of-way that were at issue in the court case were the median, berm, and trail. In particular, the court questioned whether the median width was selected, in part, to provide for additional travel lanes in the future, and whether a right-of-way without a berm or future utility corridor was practicable. Concerns related to the median and berm are addressed below. For a description of the trail component, see Chapter 1, *Purpose of and Need for Action*, and Section 3.3.4, *Alternatives without a Trail Component or Separate Trail Facility*.

To determine the practicability of a narrower right-of-way, the federal lead agencies reviewed information presented in the Final EIS relative to the selection of the right-of-way width for Alternative D (Final EIS Preferred Alternative). The federal lead agencies also reviewed new and intervening information that has been developed since publication of the Final EIS and requested that UDOT provide detailed information on design standards and guidelines for all components within the right-of-way of the build alternatives. In addition, the federal lead agencies requested that UDOT analyze alternative right-of-way widths based on reductions in both the median and buffer area widths. This supplemental information is contained in the *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (right-of-way technical memorandum) (HDR Engineering, Inc. 2004a) and will be used to determine the least environmentally damaging practicable alternative that would be feasible to serve the basic project purpose.

2.1.2 Summary of Analysis Presented in Technical Memorandum

As a result of the analysis in the right-of-way technical memorandum, the proposed overall right-of-way width for the build alternatives evaluated in this Supplemental EIS has been reduced from 100 m (328 ft) to 95 m (312 ft). This overall reduction results from narrowing the open median from 20m (66 ft) presented in the Final EIS to 15 m (50 ft), consistent with recent research on roadway geometrics. Under

UDOT standards, reducing the median to less than 15 m (50 ft) would require the placement of a median barrier[1] and an alternative water quality treatment method to replace the water quality control functions of the vegetation in the open median. Consistent with the Final EIS, the 95-m (312-ft) right-of-way includes a 27-m (84-ft) buffer area in areas with a berm and a 25-m (81-ft) buffer area in areas without a berm. A reduced 11-m (36-ft) buffer area is proposed in specific areas of the alignment (i.e., where no berm or interchange is present) to avoid sensitive resources, which would reduce the roadway footprint to 80 m (264 ft) within the proposed 95-m (312-ft) right-of-way in these areas. The right-of-way technical memorandum found that further reductions in the buffer area, even substantial reductions, resulted in only minor savings in overall wetland impacts and would not provide a safe separation between the roadway facility and the multiuse trail users.

The following sections summarize the analysis in the right-of-way technical memorandum particular to the median and buffer area components of the proposed build alternatives. Additional information (e.g., design standards and guidelines) regarding the other components of the proposed right-of-way is provided in Section 3.0 of the right-of-way technical memorandum.

2.1.2.1 Supplemental EIS Right-of-Way Cross-Section Components

For the reasons discussed below, all the build alternatives evaluated in the Supplemental EIS are based on a 95-m (312-ft) right-of-way. Tables 2.1-1 and 2.1-2 below provide the applicable design standards and references used for each component within the right-of-way. These tables also identify which components rely on fixed-dimension widths and which fall within a range of acceptable widths. Where a range of widths could be used, rationale is proved for the dimensions selected.

Figure 2.1-1 illustrates the proposed right-of-way cross section with the berm in place (Table 2.1-1), and Figure 2.1-2 illustrates the proposed right-of-way cross section without the berm in place (Table 2.1-2).

Table 2.1-1 Legacy Parkway Proposed Right-of-Way Cross-Section Components and Dimensions (with Berm)

Component (Left to Right)	Dimension, m (ft)	Fixed or Variable	Standard/ Reference	Notes
Side slope to right-of-way line	16 m (53 ft)	Variable	UDOT[2]	• Area required to safely transition from clear zone to existing grade. • Side slope varies and depends on height of embankment—1:6 for fill heights less than 1.5 m (5 ft); 1:4 for fill heights between 1.5 m (5 ft) and 3 m (10 ft); and 1:3 for fill heights above 3 m (10 ft). The maximum height of fill that can be accommodated with the 95-m (312-ft) right-of-way without using a retaining wall is 6.5 m (21.4 ft). The minimum height of fill that can be used while allowing for cross pipes is 1.0 m (3.3 ft). (Embankment fill height brings roadway facility above 1,285 m [4,215 ft].) • Side slope must meet UDOT minimum requirements for maintenance and access.

[1] A median barrier refers to a longitudinal system, such as a concrete barrier, used to minimize the possibility of an errant vehicle crossing into the path of traffic traveling in the opposite direction.

Component (Left to Right)	Dimension, m (ft)	Fixed or Variable	Standard/ Reference	Notes
Clear zone (includes shoulders)	9 m (30 ft)	Fixed	AASHTO[1, 3] UDOT[2]	• *Clear zone* is the unobstructed area beyond the edge of the traveled way that allows for recovery of errant vehicles. • Area includes 3-m (12-ft) paved (outside) shoulder. • 1:6 maximum slope.
Travel lanes (southbound)	7 m (24 ft)	Fixed	UDOT[2] AASHTO[1]	• Provides two southbound 3.7-m (12-ft) travel lanes.
Median	15 m (50 ft) (minimum UDOT standard for open medians)	Variable	UDOT[2] AASHTO[1, 3]	• Provides safe separation distance for opposing travel lanes, given an open median. • Includes 1.2-m (4-ft) paved (inside) shoulder. • UDOT's standard follows AASHTO[1], which recommends a range of 15 m to 30 m (50 ft to 100 ft) for open medians on rural freeways.[5]
Travel lanes (northbound)	7 m (24 ft)	Fixed	AASHTO[1] UDOT[2]	• Provides two northbound 3.7-m (12-ft) travel lanes.
Clear zone (includes shoulders)	9 m (30 ft)	Fixed	AASHTO[1, 3] UDOT[2]	• *Clear zone* is the unobstructed area beyond the edge of the traveled way that allows for recovery of errant vehicles. • Area includes 3-m (12-ft) paved (outside) shoulder. • 1:6 maximum slope.
Buffer area	27 m (84 ft)	Variable	AASHTO, safety, visual screening, noise attenuation	• Buffer width based on height of berm (2.7 m [9 ft] to provide screening). Berm side slopes (1:2 maximum) meet UDOT standards for maintenance. • Berm location: East side between 500 South and Porter Lane (Woods Cross), west side between Glover's Lane and State Street (Farmington). • Berm length: 5.1 km (3.2 mi) of overall alignment.
Trail	5 m (17 ft)	Variable	AASHTO[4]	• Provides a 2.4-m-wide (8-ft-wide) paved bicycle/pedestrian path with adjacent 1.8-m-wide (6-ft-wide) unpaved equestrian trail. There would be 0.9 m (3 ft) between the trail and right-of-way line.
Total right-of-way width	**95 m (312 ft)**			

Sources:

1 *A Policy on the Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials 2001).

2 UDOT Standard Drawing DD 4 (Utah Department of Transportation 2004).

3 *Roadside Design Guide* (American Association of State Highway and Transportation Officials 2002).

4 *Guide for Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials 1999)

5 Rural freeway is defined as an arterial highway with full control of access in an area outside an urban setting (American Association of State Highway and Transportation Officials 2001).

Table 2.1-2 Legacy Parkway Roadway Components and Dimensions (without Berm)

Component (Left to Right)	Dimension, m (ft)	Fixed or Variable	Standard/ Reference	Notes
Buffer area	25 m (81 ft)	Variable	AASHTO,[4] safety, visual screening, noise attenuation	• Buffer area provides safe separation between vehicle traffic on the parkway and pedestrians, bicyclists, and equestrians on the trail.
Trail	6 m (20 ft)	Variable	AASHTO[d]	• Provides a 2.4-m-wide (8-ft-wide) paved bicycle/pedestrian path with adjacent 1.8-m-wide (6-ft-wide) unpaved equestrian trail. There would be 0.9 m (3 ft) between the trail and right-of-way line. • Includes 1-m (3.3-ft) trail fill slope where there is no berm.
Total right-of-way width	**95 m (312 ft)**			

Sources:

1 *A Policy on the Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials 2001).

2 UDOT Standard Drawing DD 4 (Utah Department of Transportation 2004).

3 *Roadside Design Guide* (American Association of State Highway and Transportation Officials 2002).

4 *Guide for Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials 1999).

(Note: Only buffer area and trail dimensions are provided; all other dimensions are the same as Table 2.1-1.)

The following sections summarize the analyses used to determine the minimum median and buffer area widths and to ensure that they were the minimum necessary to meet the basic project purpose.

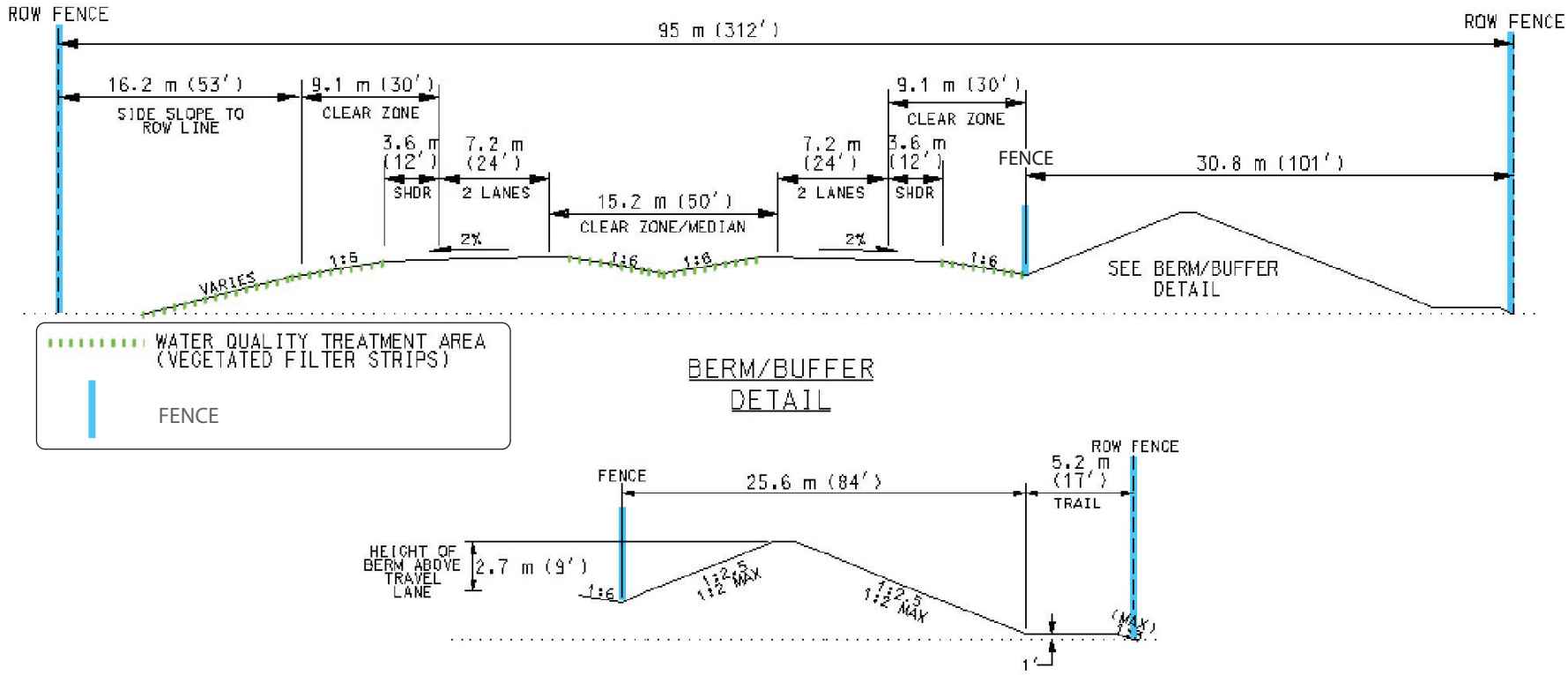
2.1.2.2 Median Width Evaluation

Median Width: Approach

To determine whether a narrower median could be proposed that would still meet the project purpose, the following approach was used.

- Review state and national design standards and guidelines.
- Review recent and relevant safety studies.
- Evaluate alternative water quality control methods to replace the stormwater treatment functions of vegetated filter strips in the 15-m (50-ft) open median. (Vegetated filter strips are described in Section 4.103.2, *Surface Water Quality*, of this Supplemental EIS.)

See Section 2.1.2.4 for additional information on the impacts associated with a variety of median widths.



Note: Figure 2.1-1 corresponds to Table 2.1-1

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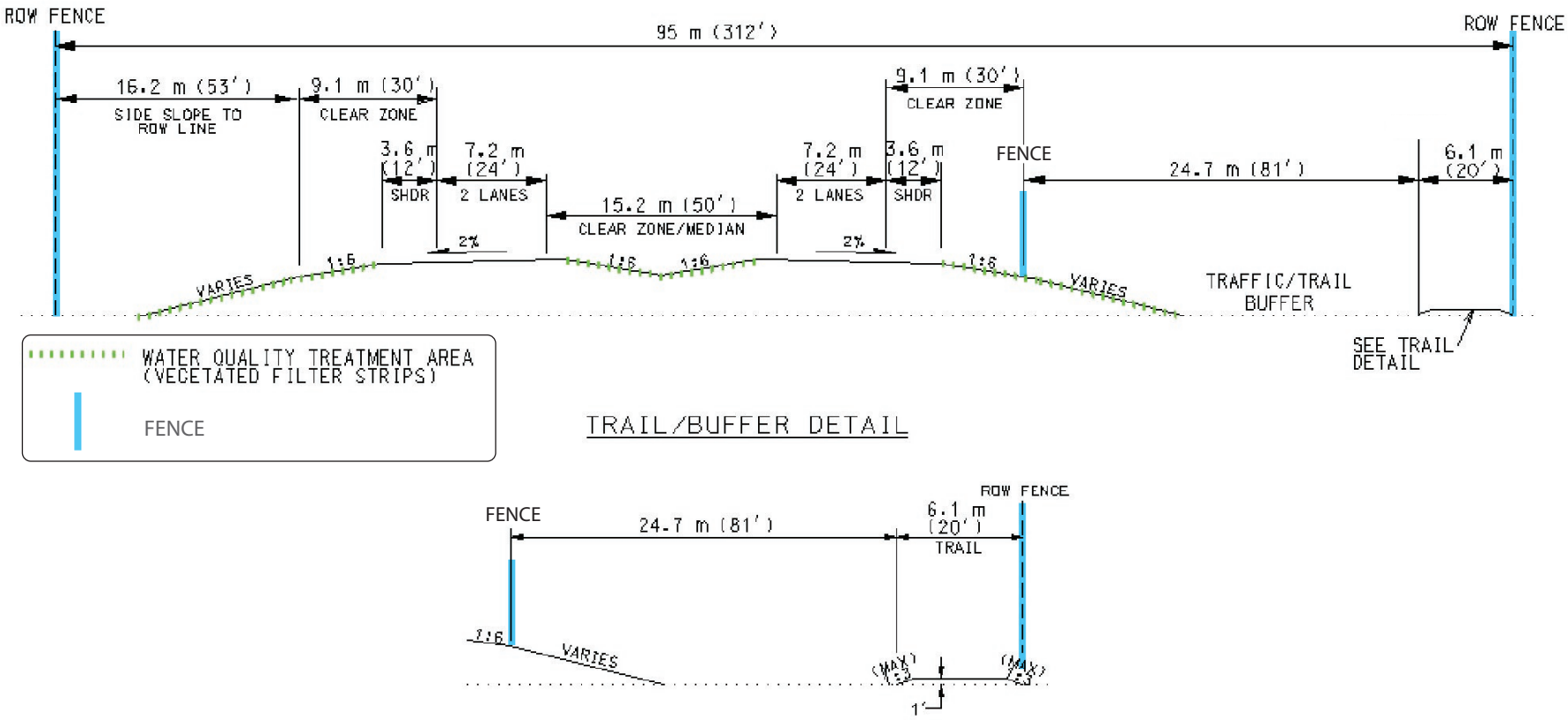
Figure 2.1-1
Legacy Parkway Supplemental EIS
Right-of-Way Cross Section with Berm



Note: Figure 2.1-2 corresponds to Table 2.1-2

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Figure 2.1-2
Legacy Parkway Supplemental EIS
Right-of-Way Cross Section without Berm

As a related matter, the right-of-way width evaluation considered whether the 20-m (66-ft) median width of Alternative D (Legacy Parkway Preferred Alternative) might be used to accommodate future travel lanes that were mentioned in the Corps's 404(b)(1) evaluation report. Future travel lanes are not proposed nor reasonably foreseeable for the Legacy Parkway project. (See Section 3.2.2 for a discussion of the Legacy Parkway Beyond Four Lanes Alternative that was evaluated and eliminated from further consideration.)

Design Standards and Guidelines Review

Review of State of Utah and national design standards and guidelines for roadway facilities similar to Legacy Parkway published after the Final EIS (2000) revealed that there were some changes in the professional standards recommended for a minimum median width without the use of a median barrier. In October 2003, after publication of the Final EIS, UDOT updated its standard drawing DD 4 (Geometric Design for Freeways) to show a narrower 15-m (50-ft) width for open medians to reflect recent research on roadway geometrics.[2] The 15-m (50-ft) open median is supported by guidelines in *A Policy on the Geometric Design of Highways and Streets* (Green Book) from the American Association of State Highway and Transportation Officials (AASHTO) (2001) and the *Roadside Design Guide* (American Association of State Highway and Transportation Officials 2001 and 2002) and several safety studies.

The Green Book provides guidance to the designer by referencing a recommended range of values for critical highway dimensions, including median width. Recommending a range of values provides designers with the flexibility to use best professional judgment in determining the appropriate dimensions for a highway, taking into consideration the context, location, and setting of the project. The Green Book recommends that median widths on rural freeways (similar to Legacy Parkway) be between 15 m and 30 m (50 ft and 100 ft). The 15-m (50-ft) median provides for 1.2-m (4-ft) shoulders, 1:6 foreslopes, and a 1-m (3-ft) median ditch, all of which provide adequate space for vehicle recovery. The determination of open median width is based on safety and the best professional judgment, using AASHTO guidance.

The *Roadside Design Guide* presents the most recent state-of-the-practice information on roadway safety based on current accident and research studies.[3] The intent of the *Roadside Design Guide* is to present the concepts of roadway safety to the designer to facilitate selection of the most practical, appropriate, and beneficial roadside design for an individual project. The Roadside Design Guide indicates that "a roadside free of fixed objects with stable, flattened slopes enhances the opportunity for reducing accident severity (American Association of State Highway Transportation Officials 2002) and that median barriers should be installed only if the consequences of striking the barrier are expected to be less severe than if no barrier existed. It states that, on high-speed, controlled-access roadways with average daily traffic greater than 20,000 vehicles per day (similar to Legacy Parkway), the need for a median barrier should be evaluated at median widths less than 15 m (50 ft).

Safety Data Review

To further evaluate the guidance in the *Roadside Design Guide* in light of the lack of site-specific data for Legacy Parkway (as it is a new facility), recent research and relevant safety studies were reviewed to analyze the relationship among median width, median characteristics (open median versus median barriers), and safety. The following sources of information were used for the safety data analysis.

[2] The standard drawing in the Final EIS used a 20-m (66-ft) open median.
[3] The guidelines for determining median width and/or median barrier application presented in the *Roadside Design Guide* are based on limited analysis of median crossover and research studies. For this reason, UDOT reviewed additional recent research and relevant safety studies to gather information.

- Highway Safety Information System (HSIS) study, *The Association of Median Width and Highway Accident Rates* (Federal Highway Administration 1993). This study is based on a multi-state safety database with accident, roadway inventory, and traffic volume data for a select group of states, including Utah.

- National Cooperative Highway Research Program (NCHRP) study *Improved Guidelines for Median Safety Report* (National Cooperative Highway Research Program 2004).

- Public Roads "Low-Cost Solutions Yield Big Savings" (Zeits 2003).

- Utah Accident Data, UDOT Maintenance Division database (Highway Reference System Volume 1 and 2 1995).

- New Jersey Accident Data (New Jersey Department of Transportation 2003).

The 1993 FHWA study (Association of Median Width and Highway Accident Rates) stated, "...the total accident rate appears to decline steadily with increasing median width." The study also mentions that medians that are 15 m (50 ft) wide are much safer than a narrower median. The study states, "…in the design of new highways, our findings would support medians considerably wider than 30 to 40 ft (9.2 to 12.2 m)."

The NCHRP study currently underway (Improved Guidelines for Median Safety [NCHRP 2004]) provides improved guidelines for using median barriers and selecting median widths on newly constructed and reconstructed high-speed roadways as referenced in the *Roadside Design Guide*. The draft report evaluated median safety using cross-section data, roadway inventory data, and data on crashes that involved medians. The draft study states that, although median width designs vary from state to state, they are based on safety studies indicating that medians narrower than 13.7 to 15 m (45 to 50 ft) are not safe without a barrier. One of the conclusions drawn from the draft NCHRP study is that increasing median widths on divided, limited-access highways decreases crash frequency.

The FHWA publication *Public Roads* featured an article on fatality rates on South Carolina's interstates (Zeits 2003). The article, "Low-Cost Solutions Yield Big Savings," examined South Carolina's approach to addressing median-related traffic fatalities. Based on the article, the South Carolina Department of Transportation (SCDOT) decided to install barriers on medians less than 18 m (60 ft). SCDOT determined that wider medians were safer than narrow medians.

UDOT also reviewed safety data collected on existing freeway systems in Utah (Interstates 15, 215, 70, and 80). Data from the UDOT Maintenance Division database and the UDOT roadway photo log were reviewed, and a visual inspection of the urban freeways in the Salt Lake area was performed to determine the locations of concrete barrier medians. The accident reports described the accident type, number of vehicles involved, accident severity, object struck, collision type, date, and other accident information. The findings of this study indicate that the average total accident rate (1997–2001) is 1.29 accidents per million vehicle-miles traveled (VMT) for roadway sections with a barrier and 0.67 accidents per million VMT for sections without a barrier.

The safety studies and median-related accident data analyzed resulted in the following conclusions regarding the relationship among median width, median characteristics, and safety. For more detailed information regarding these studies, see Section 3.0 and Appendices B and C of the right-of-way technical memorandum (HDR Engineering, Inc. 2004a).

- Total accident rate appears to decline steadily for open medians on divided, limited access highways as the median width increases.
- Increasing the width of an open median reduced certain types of accidents (e.g., head on collisions).
- While the use of a median barrier can reduce the required median width, safety data indicate that the use of median barriers generally increases overall accident rates because of the reduced recovery area for errant vehicles.
- Research on median safety does not definitively identify 15 m (50 ft) as preferable over other widths. Rather, the research supports an open median width of 15 m (50 ft) or greater for new facilities rather than a median barrier.

Alternative Water Quality Control Methods Evaluation

The effectiveness of alternative water quality control methods was analyzed to determine the consequences of reducing the proposed 15-m (50-ft) open median, which provides some of the required water quality treatment for compliance with state water quality standards (as a vegetated filter strip, as described in Section 4.103.2, *Surface Water Quality*, of this Supplemental EIS and referenced in Figures 2.1-1 and 2.1-2). Although the original Final EIS and CWA 404(b)(1) evaluation was contingent on treating stormwater runoff on a 20-m (66-ft) open vegetated median (vegetated filter strips), the analysis showed that a narrower 15-m (50-ft) open vegetated median (vegetated filter strips) could still provide adequate stormwater retention to meet required water quality standards. Within the 15-m (50-ft) median, water would be retained for an average of 3 minutes as it travels to the center of the median, and an additional 10 minutes as it travels to catch basins that would be located every 100 m (328 ft). This detention time (approximately 13 minutes) would provide for removal of 80 percent of the total suspended solids (TSS) in the stormwater runoff, which is required to ensure that state numeric water quality standards were not exceeded. (See Section 3.0 of the right-of-way technical memorandum for a more detailed discussion). Some water quality control treatment is also provided by side slopes as shown on Figures 2.1-1 and 2.1-2 of this section.

Any median less than 15 m (50 ft) would require a median barrier as determined by UDOT for a new facility. Replacing this open median (vegetated filter strip) with a median barrier (8 m [26 ft]) in order to reduce the overall median width would require implementation of alternate water quality treatment methods to provide the same level of water quality treatment for stormwater runoff. The following alternative water quality control methods were evaluated.

- Detention basins with oil/gas skimmers.
- Retention basins.
- Sediment traps/basins.

These alternative water quality treatment methods were evaluated for their ability to adequately treat stormwater runoff (80 percent removal of TSS) to ensure state numeric water quality standards were not violated. Other factors considered in evaluating the viability of detention and retention basins were the required acreage of the basin and long-term maintenance requirements, as well as potential impacts on groundwater and hydrology. The purpose of the evaluation was to determine the water quality control

implications of replacing the 15-m (50-ft) open median (vegetated filter strip) with an 8-m (26-ft) median barrier, thus potentially allowing the right-of-way width to be further reduced.[4]

Table 2.1-3 summarizes the alternative water quality treatment methods evaluated in the right-of-way technical memorandum, including their treatment efficiency, total land required, maintenance requirements, and additional potential impacts. In summary, while removal of 80 percent of TSS could be met by either detention or retention basins, these methods would require additional lands in the vicinity of the proposed action comparable in acreage required for the 15-m (50-ft) open median, as well as additional long-term maintenance and could result in additional detrimental environmental impacts. Detention and retention basins result in direct impacts on approximately 0.8 ha (2 ac) of wetlands (see Section 2.1.2.4, *Alternative Right-of-Way Widths and Wetlands Impact Evaluation*), which is as much, if not more than, the wetland impacts associated with the proposed 15-m (50-ft) open median. Sediment traps/basins would not meet the 80 percent of TSS necessary to ensure that state water quality standards are not exceeded and would have environmental impacts similar to detention basins.

Summary of Results of Median Width Evaluation

As a result of the median width analysis, the proposed median width for the build alternatives evaluated in the Supplemental EIS has been reduced from the Final EIS median width of 20 m (66 ft) to 15 m (50 ft) based on updated UDOT standard drawings DD 4 (Geometric Design for Freeways). This 15-m (50-ft) median is the minimum UDOT standard for open medians, which is consistent with state and national design standards and guidelines. The safety studies analyzed were consistent with median width guidance and design standards used by AASHTO and relied on by UDOT in selecting a 15-m (50-ft) open median width for the proposed build alternatives. This median width is intended to provide a safe separation (without a barrier) of traffic, an adequate vehicle recovery area consistent with UDOT standards, and a median width within AASHTO's recommended range. Any median less than 15 m (50 ft) would require a median barrier according to UDOT design standards. The 15-m (50-ft) median is based on safety study findings indicating that, although employing a median barrier can reduce the median width, median barriers generally increase overall accident rates compared to open medians. Safety study review showed that, in general, accident rates decrease as median width increases. The alternative water quality control method evaluation determined that reducing the median below 15 m (50 ft) would require the use of detention or retention basins, which could result in 0.8 ha (2 ac) or more of wetlands impacts. In effect, reducing the median further such that a median barrier and alternative water quality method is necessary would result in environmental impacts similar to or greater than the proposed 15 m (50 ft) open median. The wetland impacts associated with reducing the median width are described in Section 2.1.2.4, *Alternative Right-of-Way Widths and Wetlands Impact Evaluation*.

[4] The 8-m (26-ft) width was selected for the analysis because it is the narrowest width for a median with a barrier as determined by UDOT standards, and therefore the narrowest median possible for Legacy Parkway.

Table 2.1-3 Summary of Impacts of Alternative Water Quality Control Methods

Water Quality Treatment Method	Hydraulic System	Average Treatment Efficiency for Total Suspended Solids Removal	Total Land Required[1]	Other Impacts[2]
Open, vegetated median (vegetated filter strip)	Sheet flow	Meets water quality treatment objectives of 80 percent	900 ac	None
Detention Basins (applicable only for use with median barrier)	Concentrated discharges	Meets water quality treatment objectives of 80 percent	898 ac • Detention basins could be no deeper than 1 m (3 ft) because of high groundwater table in area • Assumes 45 basins (e.g., one detention basin every 305 m [1,000 ft] along the length of the roadway)	Would require additional piping and ditchwork to collect and convey stormwater to detention basins. Would require use of open channel ditches that could: • result in draining surface and near surface (shallow) groundwater, which could drain wetlands and lower the groundwater table in the vicinity of the ditches. • encourage the growth and dispersal of invasive species.
Retention Basins (applicable only for use with median barrier)	No discharge (water remains in retention basins)	Exceeds water quality treatment objectives of 80 percent (no discharges associated with retention basins)	More than 898 ac • Retention basins could be no deeper than 1 m (3 ft) because of high groundwater table in area • Assumes more than 45 basins (number of detention basins necessary) because of capacity requirements and retention of all stormwater runoff	
Sediment Traps/Basins	Discharges after water is retained for a period of time to allow sediment to settle.	Does not meet water quality treatment objectives of 80 percent	898 ac (similar requirements to detention basins)	See detention basin impacts

Notes:

[1] Includes acreage for right-of-way and additional acreage for detention or retention basins, as applicable. Acreage calculations for the open vegetated median are based on a 95-m (312-ft) right-of-way, which includes the 15-m (50-ft) open median, and acreage calculations for the detention and retention basins are based on an 87-m (285-ft) right-of-way, which includes an 8-m (26-ft) closed median.

[2] Wetlands impacts are described in Section 2.1.2.4, *Alternative Right-of-Way Widths and Wetlands Impact Evaluation.*

2.1.2.3 Buffer Area Width Evaluation

To determine whether a narrower buffer area, capable of meeting the basic project purpose, could be incorporated into the proposed right-of-way, the following approach was used.

- Describe and clarify the purpose of the buffer area.
- Review design standards and guidelines.
- Consider public scoping comments regarding buffer area.

Description and Clarification of Buffer Area Purposes

For purposes of this section, it is important to identify the distinct purposes of the buffer and berm. The federal lead agencies requested that UDOT evaluate and clarify the purpose of the buffer and berm area to facilitate selection of an appropriate width, particularly given variable design guidance relative to buffer areas (see *Design Standards and Guidelines Review* below). As described in the right-of-way technical memorandum, the buffer area would provide a buffer between the trail and the roadway's clear zone outside the travel lanes and is proposed for the full length of the proposed build alignments. As such, the purposes of the buffer area are to

- provide a safe separation between the roadway and pedestrians, bicyclists, and equestrians on the trail; and
- provide a visual and acoustic buffer between the roadway and the adjacent trail and land uses.

Within this buffer area, two separate berms (totaling 5.1 km [3.2 mi]) are proposed to provide additional visual and acoustic buffering along the east side between 500 South and Porter Lane in West Bountiful, and along the west side between Glovers Lane and State Street in Farmington. (See Figure 2.1-3 for berm locations along Alternative E.) The berm is intended to provide visual buffering for future planned development in Farmington, and for existing and future planned development in West Bountiful. It is also intended to provide acoustic buffering for future planned development at both locations. Berms are included in the proposed right-of-way to address the desires of the Cities of Farmington and West Bountiful for a landscaped, natural visual and acoustic barrier at the above noted locations as an alternative to noise walls. Public comments expressed a desire for the proposed parkway project to provide these benefits to their communities during the public comment periods for both the Final EIS and the Supplemental EIS. Providing a berm in these locations along with a parkway type setting would compensate the local communities for impacts of the project.

Providing for a future utility corridor is not a purpose of the buffer area. In response to the court's concern as to the practicability of a right-of-way without a future utility corridor (assumed to be within the buffer area), the right-of-way technical memorandum states that no utility corridor is proposed or planned as part of the Legacy Parkway project, and the dimensions of the buffer area were not selected to accommodate the placement of utilities in the right-of-way. Although Figure 2-9 in the Final EIS identified the buffer area as a "potential future utility corridor," the dimensions of the buffer area were established to accommodate the berm rather than a utility corridor. (Administrative Rule R930-6 requires UDOT to

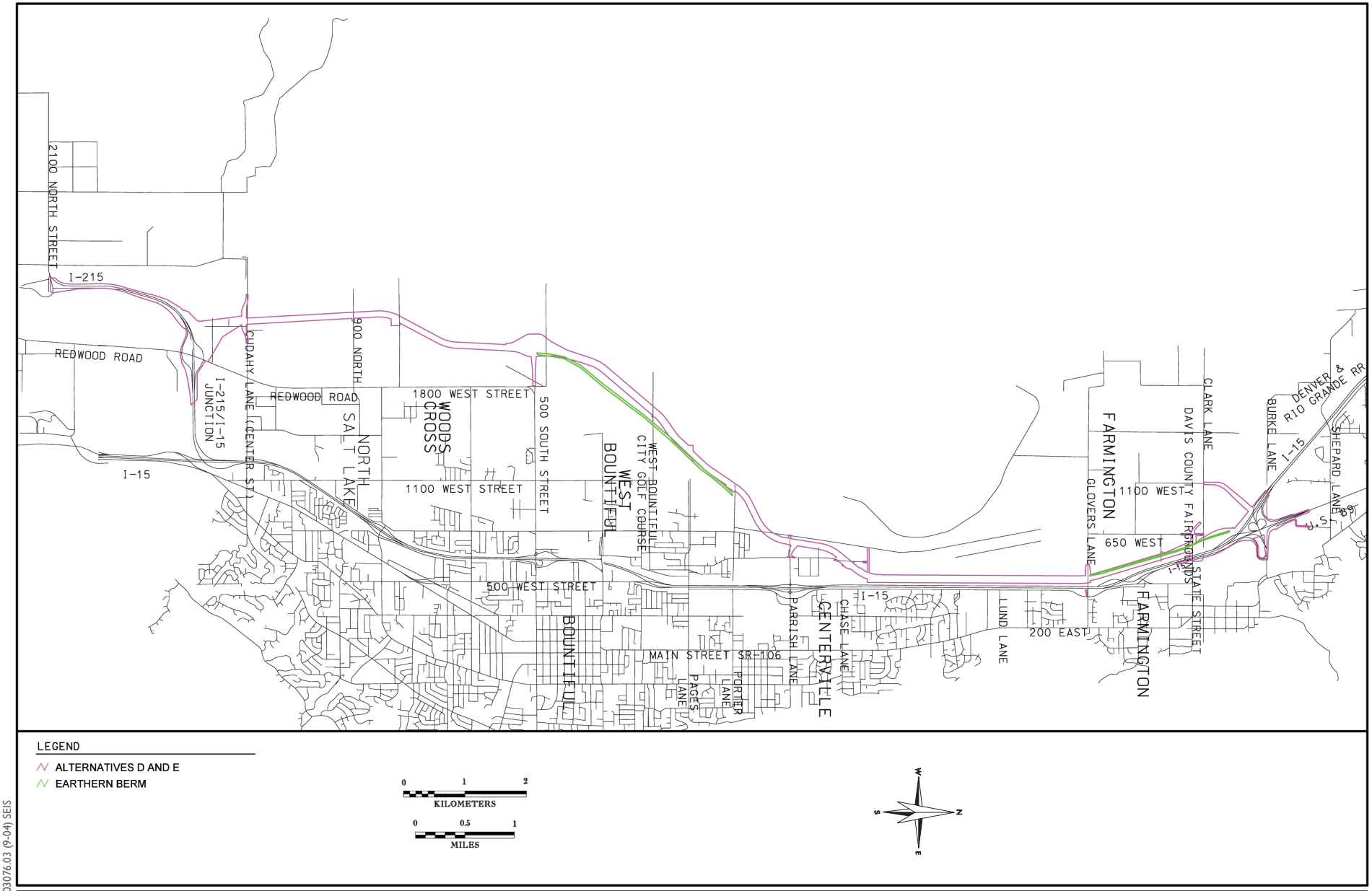

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Figure 2.1-3
Berm Locations along Proposed Right-of-Way

allow utility lines on public rights-of-way.)[5] Further, the dimensions of the buffer area would not be affected by the inclusion of a utility corridor if one were proposed. In fact, a utility corridor could be placed within almost any component of the right-of-way (clear zone, median, trail, etc.) and would not affect the overall right-of-way width.

Buffer Area Width: Evaluation

AASHTO's *Guide for Development of Bicycle Facilities* (1999) was referenced for guidance regarding the appropriate buffer width between the proposed Legacy Parkway and multi-use trail. AASHTO recommends a "wide separation" between shared-use paths and adjacent highway facilities but does not provide a fixed minimum dimension design standard for an acceptable separation. Similarly, neither UDOT nor other state departments of transportation consulted during preparation of the right-of-way technical memorandum have specific numeric design standards or guidelines for separating trails from adjacent highways.

In the absence of fixed or variable numeric design standards, the appropriate minimum buffer area width was selected by UDOT using best professional judgment and accepted by the lead agencies to attain the following goals.

- Provide a safe separation between the roadway facility and multiuse trail.
- Provide adequate visual screening and acoustic (traffic noise) buffering.
- Contribute to a "parkway" type project in keeping with the desires of local communities and with UDOT's commitment to CSS principles. (See Chapter 1 for discussion of CSS.)
- Use CSS principles to provide the trail as an asset to the community while minimizing impacts on sensitive resources.

For all build alternatives evaluated in the Supplemental EIS, the proposed buffer area would be

- 25 m (81 ft) in areas without a berm (17.4 km [10.2 mi] of the alignment);
- 26 m (84 ft) in the remaining 5.1 km (3.2 mi) of the alignment where a berm would be located; and
- a minimum 11-m (36-ft) buffer area in areas where the roadway facility crosses sensitive resources (and where there is no berm or interchange). [6]

All cross sections use a 4-foot chain-link fence between the buffer area and roadway facility to separate the buffer area and trail from motorists. A reduced buffer of a minimum of 11 m (36 ft) would be used to

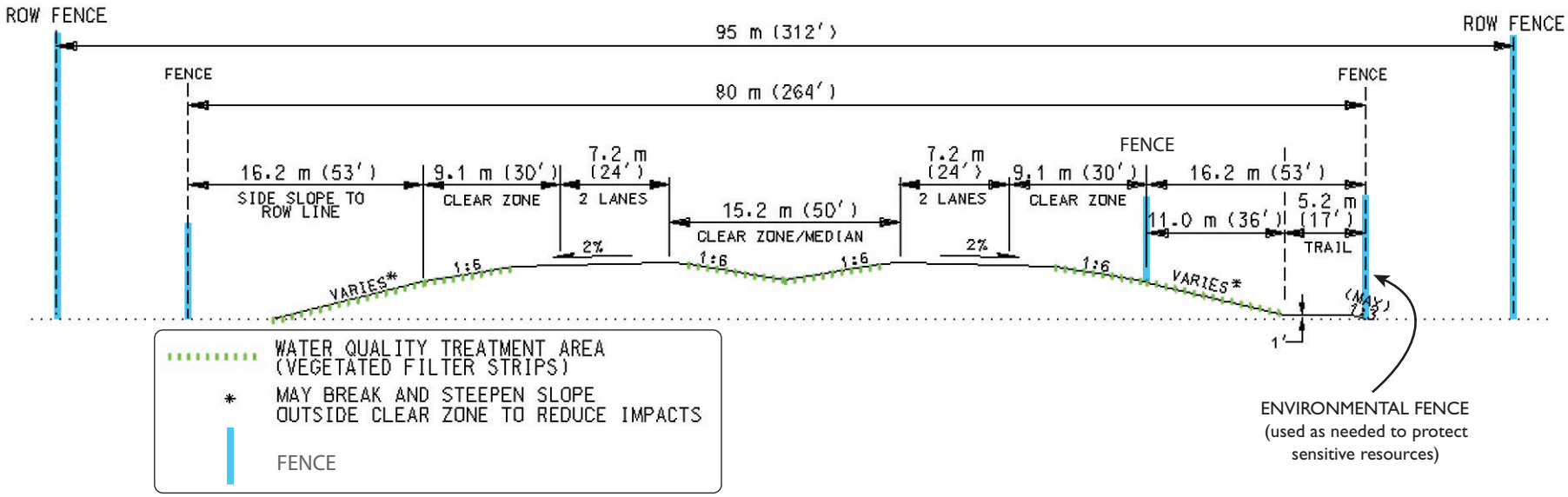
[5] Administrative Rule R930-6 requires UDOT to allow utility lines on public rights-of-way. The Jordan Valley Water Conservancy District and the Weber Basin Water Conservancy District have identified a 64-km (40-mi) pipeline in their long-range plan (to be completed in 15–20 years). However, there is currently no proposal or formal request to build this pipeline, and this pipeline is not considered to be part of the Legacy Parkway project. If a utility corridor were proposed in the future for placement in the right-of-way, the impacts of the action would be fully disclosed and analyzed. This issue is discussed at length in Responses to Comments in the Final EIS (Letter 842, comments 201 and 206).

[6] In the Great Salt Lake and the D&RG regional corridor alternatives analysis, this reduced footprint was used to avoid impacts on wetlands, Section 4(f) resources, and homes.

position the footprint within the 95-m (312-ft) right-of-way to avoid sensitive resources where engineering and design constraints allow (estimated to be used on up to 3.2 km [2 mi] of right-of-way based on locations of berms and interchanges). Figure 2.1-4 illustrates the reduced footprint that results from reducing the buffer area width. This reduced footprint is part of a proposed design-build approach that is consistent with UDOT's policy on CSS. Even though the use of an 11-m (36-ft) buffer lessens the advantages of the buffer described above, this tradeoff minimizes impacts on sensitive resources to the greatest extent practicable. Many of the advantages of the buffer area would remain, although slightly reduced. A similar approach would be applied to construction of the trail, placing the footprint of the trail outside and around the edges of wetlands. It is important to note that while the right-of-way would not be reduced in these areas (i.e., it would remain at the 95-m (312-ft) right-of-way analyzed in this Supplemental EIS), the footprint impacts would be reduced to an 80-m (264-ft) footprint. As a result of this design-build approach, direct impacts on wetlands associated with Alternative D and E right-of-way options could be reduced by approximately 0.8 ha (2 ac) with the limited application of this reduced 11-m (36-ft) buffer width (see Section 2.1.2.4 below).

2.1.2.4 Alternative Right-of-Way Widths and Wetlands Impact Evaluation

As described in Sections 2.1.2.2 and 2.1.2.3, the proposed right-of-way width for Alternative E evaluated in the Supplemental EIS is 95 m (312) ft. This width reflects a 5-m (16-ft) reduction from the right-of-way width of Alternative D (Final EIS Preferred Alternative). Wetland impacts associated with the right-of-way have been reduced from 46 ha (114 ac) for Alternative D (Final EIS Preferred Alternative) to 45 ha (113 ac) for Alternative E in the Supplemental EIS. To determine whether wetland impacts could be reduced by further narrowing the median and/or buffer areas, the federal lead agencies requested that UDOT evaluate four additional right-of-way widths, as described in Table 2.1-4. Cross sections for these alternative right-of-way widths are provided in the right-of-way technical memorandum. It should be noted that the wetland impacts presented in this section are based on the Alternative D and E alignment, which is described in Chapter 3 of this document.



Note: This 80m (264 ft) reduced footprint will be used where the roadway crosses sensitive resources. The reduction is the result of a 11m (36 ft) reduced buffer area.

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Figure 2.1-4
Design Flexibility Cross Section Used to Minimize Impacts:
Reduced Footprint 80m (264ft) within 95m (312ft) Right-of-Way

Table 2.1-4 Alternative Right-of-Way Widths Evaluated for Impacts on Wetlands

Right-of-Way Width	Right-of-Way Component: Median	Right-of-Way Component: Buffer Area	Wetlands Located in Right-of-Way, in ha (ac)	Wetland Impacts, in ha (ac)[1]	Comment
100 m (328 ft) Alternative D (Final EIS Preferred Alternative)	20 m (66 ft)	26 m (81 ft) in areas without a berm 27 m (84 ft) in areas with berm	46 (114)	41 (100)* Avoids 14 ac in the interchange areas.	Alternative D (Final EIS Preferred Alternative) right-of-way width, using previous UDOT standard drawing for open median widths. *An additional 0.8 ha (2 ac) of wetlands impacts could be avoided by using an 80-m (264-ft) footprint in areas with wetlands, bringing wetland impacts to 40 (98).
95 m (312 ft) Alternative E	15 m (50 ft)	26 m (81 ft) in areas without a berm 27 m (84 ft) in areas with berm	45 (113)	40 (99)* Avoids 14 ac in the interchange areas.	Right-of-way width based on updated UDOT standard drawing DD 4 for open median widths (Utah Department of Transportation 2004). *An additional 0.8 ha (2 ac) of wetlands impacts could be avoided by using an 80-m (264-ft) footprint in areas with wetlands, bringing wetland impacts to 39 (97).
87 m (285 ft)	8 m (26 ft)	26 m (81 ft) in areas without a berm 27 m (84 ft) in areas with berm	45 (112)	40 (98) Avoids 14 ac in the interchange areas.	Analyzes the impacts of using the minimum median width allowed under UDOT standards for a “closed” median (e.g., uses pavement with a median barrier). This right-of-way width reflects an increase of 0.8 ha (2 ac) of wetland impacts associated with the construction of alternative water quality control facilities to treat stormwater runoff, which offsets the additional 0.8 ha (2 ac) of wetland impacts that could be avoided by using an 80-m (264-ft) footprint in areas with wetlands.

Right-of-Way Width	Right-of-Way Component		Wetlands Located in Right-of-Way, in ha (ac)	Wetland Impacts, in ha (ac)[1]	Comment
	Median	Buffer Area			
80 m (264 ft)	8 m (26 ft)	3 m (10 ft)	44 (110)	39 (96) Avoids 14 ac in the interchange areas.	Analyzes the impacts of using the minimum median width allowed under UDOT standards for a “closed” median (e.g., uses pavement with a median barrier) in addition to a substantially reduced buffer area that incorporates 3-m (10-ft) landscaped area. This right-of-way width reflects an increase of 0.8 ha (2 ac) of wetland impacts associated with the construction of alternative water quality control facilities to treat stormwater runoff, which offsets the additional 0.8 ha (2 ac) of wetland impacts that could be avoided by using the 80-m (264-ft) right of way.
71 m (234 ft)	8 m (26 ft)	Trail and buffer area eliminated	43 (106)	38 (94)* Avoids 14 ac in the interchange areas.	Analyzes the impacts of using the minimum median width allowed under UDOT standards for a “closed” median (e.g., uses pavement with a median barrier) in addition to eliminating the buffer area and multi-use trail. This right-of-way is presented for comparative purposes only (to illustrate the wetland impacts of the trail and buffer area). Eliminating the trail is not consistent with the primary project purpose and does not meet the transportation and community interest objectives for the proposed action. (See Chapter 1 for project purpose.) *This right-of-way width reflects an increase of 0.8 ha (2 ac) of wetland impacts associated with the construction of alternative water quality control facilities to treat stormwater runoff.

Right-of-Way Width	Right-of-Way Component		Wetlands Located in Right-of-Way, in ha (ac)	Wetland Impacts, in ha (ac)[1]	Comment
	Median	Buffer Area			

Notes:
This table refers to wetland impacts associated with Alternatives D and E only. Wetland impacts associated with Alternatives A, B, and C of the Final EIS were 44 ha (108 ac), 76 ha (187 ac), and 60 ha (147 ac), respectively. Taking into account the 1–2 ha (2–4 ac) savings associated with a reduced 95-m (312-ft) right-of-way for these build alternatives and 1 ha (2 ac) savings from the 80-m (264-ft) reduced footprint would result in revised wetlands impacts of 41 ha (102 ac) under Alternative A, 73 (180 ha) under Alternative B, and 58 ha (143 ac) under Alternative C. It would be expected that reductions associated with final design for these build alternatives would be similar to those associated with Alternatives D and E (i.e., an additional 6 ha [14 ac]).

1 Figures in this column reflect that the actual roadway facility does not occupy the entire right-of-way, and that as a result, not all the wetlands in the proposed rights-of-way would be directly affected. All alternatives reflect the fact that through final detailed design, UDOT determined that approximately 5.7 ha (14 ac) of wetlands within the right-of-way, primarily in the north and south interchanges, could be avoided by design-build flexibility.

All the evaluated alternative right-of-way widths represent a reduction in the median width, the buffer area width, or a combination thereof. Slight changes in the side slope dimensions are also included in the alternative right-of-way widths because they are contingent on the median and berm widths in many cases. In addition, one of the alternative right-of-way widths evaluates the wetlands impacts savings that would be associated with eliminating the multi-use trail, although this alternative would not meet the transportation and community interest objectives for the proposed action. (See Section 1.3.2 and Section 3.3.4 in this document for discussions of the trail and how it is consistent with the primary project purpose). The lead agencies requested that UDOT present the impacts of this alternative for comparative purposes only because the trail meets the primary part of the purpose and need of the project. Based on the court ruling upholding the trail as part of the project purpose and need, the Corps and FHWA can describe the trail as a feature of the parkway design without needing to further evaluate alternate alignments without a trail.[7]

The wetland impact evaluation determined that additional reductions in the median and buffer area result in minor reductions in overall direct wetland impacts and result in a loss of safety, visual and acoustic buffering, and additional adverse environmental impacts. Replacing the 15-m (50-ft) open median (vegetated filter strip) with an 8-m (26-ft) median barrier and reducing the buffer area from 25/27 m (84/81 ft) to a 3-m (10-ft) landscaped area (refer to the 80-m [264-ft] right-of-way alternative right-of-way width in Table 2.1-4) would reduce direct wetland impacts by approximately 1.2 ha (3 ac) (0.4 ha [1 ac] associated with the median, 0.8 ha (2 ac) associated with the buffer area). However, detention and retention basins and associated channels (alternative water quality control methods needed to replace the open median function as a vegetated filter strip) result in up to an estimated 0.8 ha (2 ac) of direct impacts on wetlands, with additional environmental impacts on hydrology.

2.1.3 Conclusions

As a result of the analysis in the right-of-way technical memorandum, the proposed overall right-of-way width for the build alternatives evaluated in this Supplemental EIS has been reduced from 100 m (328 ft) to 95 m (312 ft). The right-of-way technical memorandum proposes a 15-m (50-ft) open median, which represents the minimum open median width allowable under UDOT standards, and is consistent with AASHTO guidelines for open medians on rural freeways. This median width provides three things: a safe separation between opposing traffic lanes, an adequate recovery area for errant vehicles, and adequate stormwater treatment to ensure that state water quality standards are not violated. Research on median safety supports use of an open median that is at least 15 m (50 ft) wide, rather than a median barrier.

Replacing the 15-m (50-ft) open median with an 8-m (26-ft) narrower median and median barrier would reduce impacts on wetlands by 0.4 ha (1 ac). However, reducing the median would require replacement of the water quality treatment functions associated with the vegetated filter strips through construction of detention or retention basins. Given the topography and shallow groundwater table in the area, it is likely that construction of detention or retention basins could affect up to approximately 0.8 ha (2 ac) of wetlands, which would offset any reduction in wetlands impacts achieved by reducing the median width. In addition, the construction of open drainage channels typically associated with detention basins could affect local hydrology by removing additional amounts of surface water, potentially causing a reduction

[7] The Corps Record of Decision for the Final EIS Preferred Alternative contains an extensive discussion regarding the need for the trail. Page 64 of the court opinion clearly states: “The COE reasonably concluded that removing the trails was not practicable in light of the project’s overall purpose of meeting the transportation needs of the Northern Corridor in 2020, thus the issuance of the permit is not arbitrary and capricious on this basis.”

in the groundwater table and adversely affecting additional acres of wetlands not directly affected by construction of the basins. As a related matter, UDOT does not currently propose or have future plans to propose additional travel lanes in the median of the proposed highway corridor, and additional travel lanes were not a consideration in the selection of the median width for the Final or Supplemental EIS proposed alignments.

A 26-m (81-ft) buffer area in areas where a berm is not located, and an 11-m (36-ft) buffer area in areas where the roadway crosses environmental resources and neither a berm nor an interchange is located, is proposed for the project. These widths are based on the best professional engineering judgment of UDOT considering local engineering environmental factors such as temperature and precipitation to provide a reasonable, safe separation between the roadway and the trail users, particularly given the lack of definitive numeric national or state guidance on appropriate buffer widths. The use of an 11-m (36-ft) buffer area in areas where sensitive resources are present minimizes potential impacts on wetland resources by up to 0.8 ha (2 ac).

A 27-m (84-ft) buffer width in locations where the berm is proposed (e.g., east side of the roadway between 500 South and Porter Lane, and along the west side of the roadway between Glover's Lane and State Street) is proposed for the project. This width is based on a berm height of 2.7 m (9 ft) (the height necessary to visually screen the roadway from a person outside the roadway corridor, fill requirements, and UDOT requirements for side slopes). Construction of a natural vegetated berm is consistent with local jurisdictions expectations and input received from the public and would contribute to a parkway-type facility. The berm provides visual buffering for existing and future planned development and for future planned development in the locations noted. The proposed buffer area width was not influenced or dictated by the potential to use Legacy Parkway as a future utility corridor, although, as referenced earlier, Administrative Rule R930-6 requires UDOT to allow utility lines on public rights-of-way. If a utility corridor were proposed in the future for placement in the right-of-way, the impacts of the action would be fully disclosed and analyzed.

The results of the right-of-way technical memorandum show that substantial reductions in the median and buffer area result in minor reductions in overall direct wetland impacts and result in a reduction of safety, visual and acoustic buffering, as well as additional adverse environmental impacts. Reducing the median to the minimum closed median width of 8 m (26 ft) and reducing the buffer area to a 3-m (10-ft) noise wall and landscaped buffer area would reduce impacts on wetlands by approximately 1.2 ha (3 ac). However, detention and retention basins and associated channels (alternative water quality control methods needed to replace the open median function as a vegetated filter strip) result in approximately 0.8 ha (2 ac) of direct wetland impacts, with additional environmental impacts on hydrology. When the approximately 0.8 ha (2 ac) of wetland savings associated with the use of the reduced 80-m (264-ft) footprint is taken into consideration, the end result is that the 95-m (312-ft) right-of-way and the 80-m (264-ft) right-of-way have approximately the same direct wetland impacts. Therefore, the wetlands savings of reducing the median and buffer area would be minimal, if any.

This Supplemental EIS incorporates the following finding of the right-of-way technical memorandum.

- The median can be reduced by 5 m (16 ft), resulting in a reduction in the total right-of-way width from 100 m (328 ft), as presented in the Final EIS, to 95 m (312 ft). This 95-m (312-ft) right-of-way width is used except in areas where wetlands, residences, or Section 4(f) properties can be completely avoided by further reducing the footprint to 80 m (264 ft). Legacy Parkway build alternatives evaluated in this Supplemental EIS have been modified to reflect this narrower right-of-way width as the proposed action.

Section 2.2

Denver & Rio Grande Corridor Evaluation

2.2.1 Summary of Approach for Supplemental EIS

The appellate court remand of the Legacy Parkway Final EIS stated that the elimination of the Denver & Rio Grande Railroad (D&RG) Corridor Alternative based on high costs and substantial impacts on existing development was insufficiently substantiated under NEPA and the federal Clean Water Act (CWA). The court held that the lead agencies failed to verify the cost estimates used to eliminate the D&RG regional corridor and to select the Great Salt Lake regional corridor. The court also held that there was insufficient information in the administrative record regarding the project's cost-estimating methodology to meet NEPA goals of informed decision-making and meaningful public comment. Regarding the CWA in particular, the court stated that the Corps's issuance of the Section 404 permit was arbitrary and capricious because the administrative record lacked quantifiable evidence regarding the "high impacts on existing development" cited as part of the rationale for eliminating the D&RG regional corridor. In addition, although not directed specifically at the elimination of the D&RG regional corridor, the court found that the Corps failed to consider whether a narrower right-of-way was a practicable alternative.

The lead agencies requested that UDOT reexamine the right-of-way needed for all alignments considered in the Final EIS, including the D&RG regional corridor alignment alternative, to ensure that the cost estimates are based on the right-of-way width necessary at that location. For more information, see the *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a). The lead agencies also requested that UDOT provide updated cost estimates and documentation of the cost-estimating methodology for all five regional corridors initially evaluated in the Final EIS. To provide quantitative information on the impacts of the D&RG regional corridor in particular, the lead agencies requested that UDOT further refine the D&RG regional corridor by creating five specific conceptual alignments within this corridor and evaluating them using a methodology similar to the one used to evaluate the regional corridors in the Final EIS, but at a much greater level of detail.[1] The cost estimates and methodology documentation were then reviewed by lead agency staff, their independent consultants, and the cooperating agencies. As part of the review, public comments received during the public scoping process and the July 2003 community planning information committee (CPIC) meeting regarding conceptual highway alignments within the D&RG regional corridor were incorporated into the evaluation. In addition to participating in the CPIC meetings, local community planners from Davis County and the Cities of Woods Cross, North Salt Lake, Farmington, Centerville, and West Bountiful were individually

[1] Agencies do not normally develop alignments with this level of detail to evaluate regional corridors at the planning stage. However, because of the court's concerns and public interest, the D&RG regional corridor was evaluated at a greater level of detail herein than the other regional corridors that were rejected in the Final EIS.

interviewed to identify specific, localized impacts associated with potential alignments within the D&RG regional corridor.

The information contained in this section is based on the *Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation* (D&RG technical memorandum) (HDR Engineering, Inc. 2004b).

2.2.2 Summary of Analysis Presented in D&RG Technical Memorandum

In the Final EIS, five regional alignments (Great Salt Lake, Antelope Island, trans-bay, Farmington Bay, and the railroad regional alignment) were evaluated at a corridor-planning level and compared by cost, impacts on wetlands, and impacts on existing developed areas. The regional corridors were labeled as having high, medium, and low impacts in these three categories. Based on the Final EIS evaluation, the Great Salt Lake regional alignment was selected because it balanced medium impacts on environmental resources (wetlands) and impacts on local communities and businesses (existing development) with a reasonable estimated cost. The Antelope Island, trans-bay, and Farmington Bay regional alignments were eliminated because of their high costs and impacts on wetlands. The railroad regional alignment was eliminated in the Final EIS because of its high impacts on local communities and businesses and costs. The Supplemental EIS updates the information contained in the Final EIS regarding the following topics.

- Cost estimates for the five regional corridors evaluated in the Final EIS.
- Development of five conceptual alignments within the D&RG regional corridor to allow more detailed evaluation of the high impacts on existing development and the costs relied on in the Final EIS.
- Quantification of impacts on existing development, which include relocation impacts; impacts on community cohesion (including impacts on schools and churches); impacts on travel patterns, accessibility, and walkability; noise and visual impacts; and impacts on environmental justice populations.
- Quantification of impacts on wetlands.
- Refinement of cost estimates for the D&RG regional corridor and conceptual alignments based on the appropriate and necessary right-of-way width.

2.2.2.1 Development of D&RG Conceptual Alignments

To evaluate the reasonableness and practicability of a highway within the D&RG corridor, UDOT developed five specific conceptual alignments within the corridor: DRG1 through DRG5. These conceptual alignments are shown in Figure 2.2-1. These alignments represent attempts to find a technically feasible, reasonable, practicable alignment through the D&RG corridor that avoids or minimizes wetlands and development impacts. All the D&RG conceptual alignments include the multi-use trail as a component of the right of way for reasons discussed in Section 3.3.4 of the Supplemental EIS.

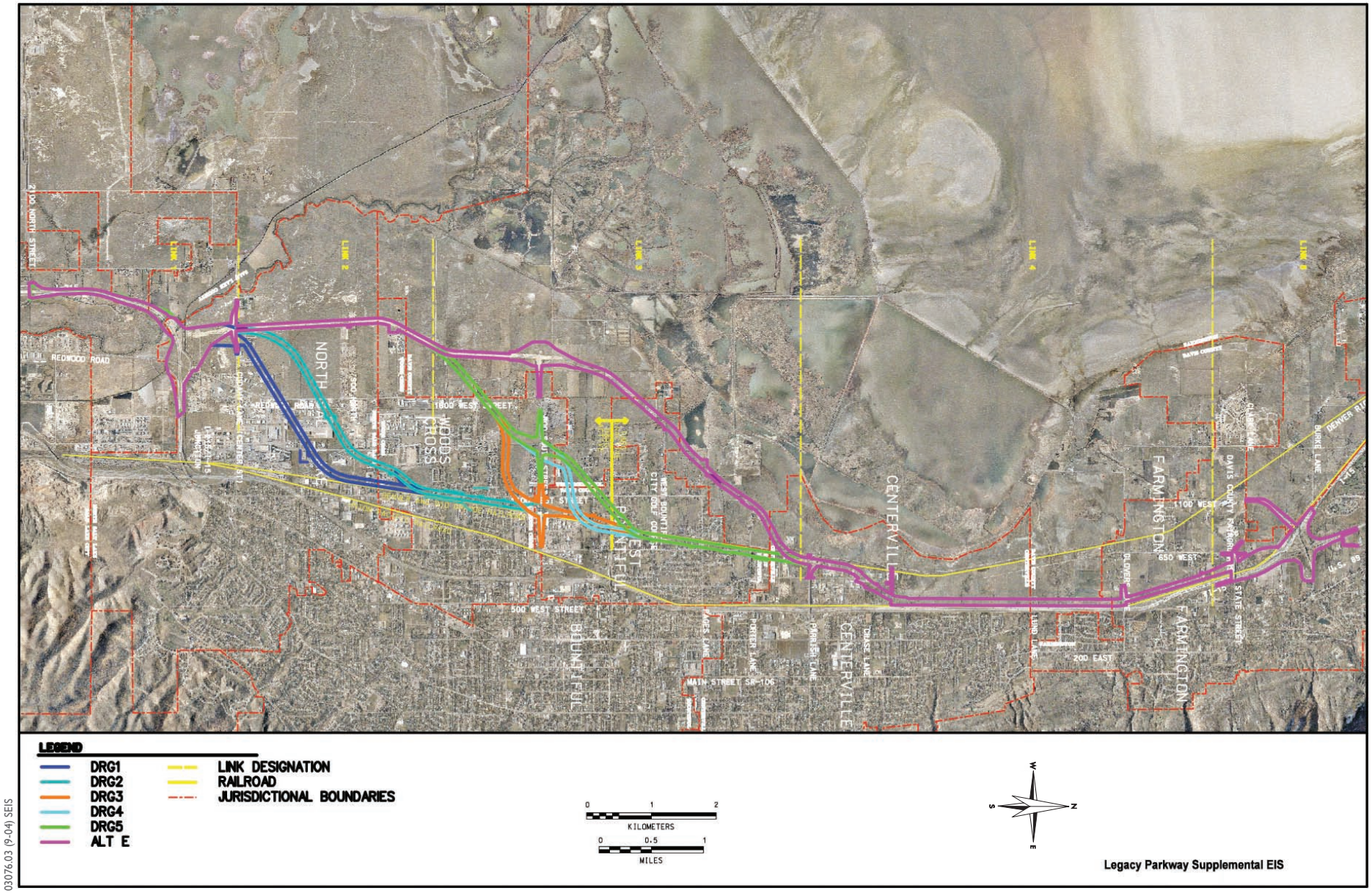

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Figure 2.2-1
D&RG Conceptual Alignments

To accommodate the D&RG conceptual alignments, the D&RG regional corridor depicted in the Final EIS needed to be expanded. The corridor was expanded to the west through North Salt Lake, Woods Cross, and West Bountiful to meet the eastern boundary of the Great Salt Lake regional corridor.

Criteria for D&RG Conceptual Alignments

The following criteria and methodology were used to develop the five D&RG conceptual alignments.

- Avoid properties that are eligible for the National Register of Historic Places (NRHP).

  The existing D&RG railroad right-of-way is eligible for the NRHP. Therefore, the D&RG alignments cannot lie within the D&RG right-of-way; they must be placed adjacent to the right-of-way (except at rail crossings, where the alignments could lie within the right-of-way). The D&RG is also protected under Section 4(f) of the U.S. Department of Transportation Act of 1966[2] because of its eligibility as an NRHP historic resource.

- Avoid the most densely developed residential and commercial areas to ensure that the impacts on existing development within the corridor are accurate and up to date.

- Avoid direct impacts that would require relocating an oil refinery.

  UDOT assumed that the impacts from taking an oil refinery would make the alignment unreasonable and impracticable because of the high cost of relocation and because the site would likely require extensive cleanup of hazardous materials.

- Avoid properties that would likely be subject to Section 4(f) such as the Lakeside Golf Course (also called the West Bountiful Golf Course), which is a publicly owned recreation facility.

  Conceptual alignments DRG1 and DRG2 traverse the farthest south before cutting west to link back with I-215. DRG1 and DRG2 avoid all identified parks (Hatch, Hogan Memorial, Clover Dale, Mills, and West Bountiful City) by going around them on the south. DRG3, DRG4, and DRG5 traverse east of the Lakeside Golf Course. Any alignments that would traverse northeast on the northern side of Lakeside Golf Course would essentially be located in the Great Salt Lake regional corridor. Alternative D (Final EIS Preferred Alternative) is located in the Great Salt Lake regional corridor; Alternative E, which has the same alignment as Alternative D but has a narrower right-of-way, is used in this analysis as a comparison for the D&RG conceptual alignments

- Avoid active rail lines.

  The rail lines considered in the Final EIS and the Supplemental EIS include those that are actively being used. The D&RG rail line is still active from the southern end of the North Corridor to 400 North in West Bountiful, and provides a freight transportation link to the petroleum refineries in North Salt Lake, Woods Cross, and West Bountiful. UDOT assumed that taking this active rail line would require relocating it to continue to serve these industrial users. Therefore, in active areas, the roadway was located alongside the rail right-of-way to avoid relocating an active rail corridor. The average width of the rail right-of-way through this area is 18.3 m to 30.5 m (60 ft to 100 ft). If an alignment used the railroad right-of-way, UDOT would need to purchase an

[2] Section 4(f) of the U.S. Department of Transportation Act of 1966 requires the selection of an alternative that avoids designated public parks, recreation areas, wildlife refuges, and historic sites if a prudent and feasible alternative exists.

additional 48.8 m to 76.8 m (160 to 252 ft) of right-of-way to accommodate a roadway within the rail corridor.

- Have a variable right-of-way width that is only as wide as necessary.

  The standard right-of-way width for the D&RG conceptual alignments is 95 m (312 ft). A right-of-way width of 80 m (264 ft), which is described in detail in the *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a), is used to reduce impacts in areas with wetlands or existing development. Therefore, the right-of-way width varies between 80 m and 95 m (264 ft and 312 ft). In addition to a variable right-of-way, the highway footprint within the right-of-way also varies depending on the height of the roadway embankment. This varying width is referred to as the variable footprint. UDOT used the variable right-of-way and variable footprint to determine impacts of the alternative alignments on wetlands and existing development. (See Figure 2.1-4 of Section 2.1 for cross section of variable footprint.)

- Follow the Alternative E alignment from about Parrish Lane north to the northern project terminus.

  Through this portion of the study area, a relatively narrow strip of land between Farmington Bay and the existing developments on the foothills of the Wasatch Mountains is the only land corridor available for a highway alignment west of I-15. In this area, the Great Salt Lake and Railroad corridors overlap. The Final EIS found that the Alternative D (Final EIS Preferred Alternative) alignment was the least environmentally damaging practicable alternative because of its location relative to the lakeshore and the associated wetlands. The Alternative E alignment analyzed in this Supplemental EIS is the same as the Alternative D alignment, except that Alternative E has a narrower right-of-way.

Description of D&RG Conceptual Alignments

As originally conceived and in its purest form, a D&RG alignment would follow a route through the D&RG right-of-way beginning at I-215 near the I-15 interchange. However, the engineering analysis performed by HDR for UDOT indicated that a southern interchange where the D&RG tracks meet I-215 would be impracticable and unreasonable because of impacts, poor functionality, and physical constraints. Therefore, the southern terminus of the D&RG conceptual alignments is at I-215 to the west and south of the D&RG tracks. All D&RG conceptual alignments follow the same alignment as Alternative E north of Parrish Lane (through Centerville and Farmington [Parrish Lane to I-15/US-89]), and use a northern terminus that provides a system-to-system connection between I-15, US-89, and the proposed alternative at the northern end.[3]

Except at rail crossings, none of the D&RG conceptual alignments lies within the D&RG right-of-way. South of 400 North, the rail line is active and the conceptual alignments parallel the tracks on the west. North of 400 North, the conceptual alignments cross the tracks to avoid the Lakeside Golf Course, a Section 4(f) property. DRG1 and DRG2 follow the tracks for the longest length—from North Salt Lake to Parrish Lane in Centerville. DRG3, DRG4, and DRG5 follow the tracks through West Bountiful and Centerville only. Figure 2.2-1 shows the five conceptual alignments.

The five D&RG conceptual alignments and the locations where they would vary from Alternative E are described below.

[3] The Final EIS examined four locations for a northern terminus. See page 2-24 of the Final EIS for the locations and rationale behind the selection of the locations.

- **DRG1**. From the southern interchange at I-215 to the west and south of the D&RG tracks, DRG1 runs north past Center Street and northeast to cross Redwood Road at 200 North. The alignment continues northeast to the D&RG tracks, where it runs along the western side of the D&RG tracks to avoid refineries and the active portions of the D&RG line that extend north to 400 North. At 400 North, DRG1 crosses the tracks to avoid the Lakeside Golf Course, a Section 4(f) property, and runs parallel to the tracks on the east, where it then meets and follows the Alternative E alignment through the remaining northern portion of the study area. DRG1 is the alignment that follows the D&RG right-of-way for the greatest distance.

- **DRG2**. From the southern interchange at I-215 to the west and south of the D&RG tracks, DRG2 runs north past Center Street then northeast to cross Redwood Road between 200 North and 900 North (farther north than DRG1), continuing northeast until it intersects with 2600 North. At 2600 North, the alignment turns north and travels along the western side of the D&RG tracks. Like DRG1, this alignment runs on the western side of the D&RG tracks to 400 North, then crosses the tracks to avoid the Lakeside Golf Course and parallels the tracks on the east, where it then meets and follows the Alternative E alignment.

- **DRG3**. DRG3 follows Alternative E from the southern interchange at I-215 to the west and south of the D&RG tracks through North Salt Lake into Woods Cross. The alignment diverges from the Alternative E alignment just south of 1500 South in Woods Cross and runs east then north toward the 500 South interchange. DRG3 follows the D&RG tracks on the west to 400 North before crossing the tracks to avoid the Lakeside Golf Course. The alignment then turns north to parallel the D&RG tracks on the east, where it then meets and follows the Alternative E alignment.

- **DRG4**. DRG4 is identical to DRG3 through North Salt Lake where it crosses into Woods Cross. DRG4 diverges from Alternative E just south of 1500 South in Woods Cross and continues northeast to the 500 South interchange (on a more westerly alignment than DRG3), before turning to head east to intersect the D&RG tracks. This alignment then turns north to parallel the D&RG tracks on the east, where it then meets and follows the Alternative E alignment.

- **DRG5**. DRG5 follows the same alignment as DRG4 to the 500 South interchange. Unlike DRG4, this alignment continues northeast to intersect the D&RG tracks north of 400 North. DRG5 then turns north just past where the D&RG tracks become inactive, and goes around the Lakeside Golf Course. The alignment parallels the D&RG tracks on the east, where it meets and follows the Alternative E alignment.

2.2.3 Evaluation of D&RG Conceptual Alignments

To be consistent with the Final EIS, UDOT evaluated the alignments according to the following criteria.

- Impacts on existing development.
- Impacts on wetlands.
- Costs.

The findings of this evaluation are presented on two levels. First, each of the five D&RG conceptual alignments was evaluated in its entirety—from terminus to terminus—and the impacts of those

alignments were compared to the impacts of Alternative E. Second, because the D&RG alignments and Alternative E are the same through much of the North Corridor, the study area was divided into five segments or "links" to help identify where impacts actually occur and where they differ along the conceptual alignments. This approach was similar to the process used in Section 2.4.1 of the Final EIS for the Great Salt Lake Regional corridor. The five links are described below. As discussed below, the conceptual alignments are identical to the Alternative E alignment in Links 1, 4, and 5, but differ in Links 2 and 3.

- Link 1 encompasses the southern interchange north through and including Center Street. All five of the D&RG conceptual alignments and Alternative E are identical in Link 1.
- Link 2 covers North Salt Lake and about half of Woods Cross. The boundary between Link 2 and Link 3 is located where conceptual alignments DRG3, DRG4, and DRG5 diverge from Alternative E.
- Link 3 extends from the northern end of Link 2 to just south of Parrish Lane in Centerville. Its location was intended to highlight the segments where all the D&RG alignments differ from Alternative E.
- Link 4 goes through Centerville to just south of State Street in Farmington. All the alternatives alignments are identical in Link 4.
- Link 5 encompasses the northern interchange. All the alternative alignments are identical in Link 5.

Each alignment was then evaluated link by link to compare the similarities and differences between the conceptual alignments and Alternative E. Information on all the quantitative impacts of each link of the various alignments is summarized at the end of this section. However, only the impacts of Links 2 and 3 are discussed in detail because the impacts of the alignments and Alternative E are identical in Links 1, 4, and 5.

2.2.3.1 Impacts on Existing Development

In the Final EIS, the D&RG regional corridor was rejected due in part to the "high impact on existing land development." This section documents the impacts of the D&RG conceptual alignments on existing development and defines the high impact that lead agencies found to be unreasonable. All the numbers and analysis in this section are based on the refined D&RG conceptual alignments and reflect a more detailed level of analysis than was conducted for the Final EIS.

"Impacts on existing development" essentially means impacts on the built environment, which in turn means impacts on people, communities, utilities, and public and social institutions. To fully ascertain those impacts, the scoping process for this Supplemental EIS gathered information on both quantifiable and non-quantifiable impacts associated with D&RG alignment alternatives. Through public scoping, the communities in the study area identified specific community impacts associated with alignments in the D&RG regional corridor. In general, the communities did not support building Legacy Parkway along any alignment in the D&RG regional corridor because of the following impacts.

- Severe residential and business displacements.
- Loss of community cohesion and quality of life.
- Inconsistency with general plans.

- Loss of tax base.
- Visual and noise impacts and vehicle emission pollution.
- Negative impacts on travel patterns and accessibility (longer trips for emergency vehicles to access existing development west of the DR&G alignments and longer trips for daily activities).

In particular, communities were concerned that a major new roadway in the D&RG corridor would create a physical and social barrier in the area that would sever neighborhoods and communities west of the alignments and negatively affect community cohesion. (See the D&RG technical memorandum for additional details on the impacts of specific D&RG conceptual alignments.) Based on these community concerns, UDOT conducted a community cohesion analysis to more accurately quantify these community impacts. The results of the community cohesion analysis are incorporated into this section.

Impacts on existing development include the following impacts, which are discussed at length below.

- Relocation impacts (residential, business, and utilities).
- Impacts on community cohesion, including impacts on schools and churches.
- Impacts on travel patterns, accessibility, and walkability.
- Noise and visual impacts.
- Impacts on Section 4(f) and historic properties.
- Impacts on environmental justice populations.

Relocations

Table 2.2-1 identifies relocation impacts associated with each of the D&RG conceptual alignments on residences, businesses, and major utilities.[4] Table 2.2-1 presents the impacts for the municipalities that would be most affected by the D&RG alignments (North Salt Lake, Woods Cross, and West Bountiful). Impacts on the two other municipalities in the study area (Centerville and Farmington) would be the same under the D&RG alignments as under Alternative E.

The relocation impacts on existing development under the D&RG conceptual alignments range from 149 to 279 residential and business relocations and from 13 to 28 major utility relocations. The relocation impacts on existing development under Alternative E range would be 18 residential and business relocations and 21 major utility relocations (see Figure 2.2-2). All D&RG alignments would result in an approximate 10 percent reduction in the total number of existing households in West Bountiful; DRG1 and DRG2 would result in a 3.5 percent reduction in the total number of households in Woods Cross. These relocation impacts would have corresponding negative impacts on the local tax base and remaining neighborhoods.

[4] Buildings within an alignment's right-of-way were included in the calculations of the number of relocations. Relocation impacts were determined using aerial imagery, Davis County parcel information, tax records, and field surveys to distinguish between residential and industrial/business structures and between a main building and an ancillary feature such as a barn or shed. A full description of the methodology for determining relocation impacts is presented in Section 5.4 of the D&RG technical memorandum.

Table 2.2-1 Comparison of D&RG Alignment Relocations with Alternative E Relocations

Alignment (right-of-way width)	Relocations	Residential Relocations as a Percentage of Total Households[1]			Major Utility Impacts
		North Salt Lake	Woods Cross	West Bountiful	
Alternative E (95 m)	Residential–4 Business–14 **Total–18**	NA[2]	NA[2]	NA[2]	Petroleum–5 Water–6 Power–5 Gas–5 **Total–21**
DRG1 (80–95 m)	Residential–193 Business–86 **Total–279**	0	3.5	9.3	Petroleum–13 Water–15 **Total–28**
DRG2 (80–95 m)	Residential–196 Business–46 **Total–242**	<1	3.5	9.3	Petroleum–9 Water–13 **Total–22**
DRG3 (80–95 m)	Residential–129 Business–39 **Total–168**	0	<1	9.5	Petroleum–4 Water–9 **Total–13**
DRG4 (80–95 m)	Residential–128 Business–21 **Total–149**	0	1	8.9	Petroleum–4 Water–10 **Total–14**
DRG5 (80–95 m)	Residential–139 Business–20 **Total–159**	0	1	9.8	Petroleum–4 Water–9 **Total–14**

Notes:

[1] Percentages are based on the population distribution in the 2000 U.S. Census. The percentage is calculated based on the number of residential relocations relative to the number of existing residences in the city.

[2] Alternative E would not displace populations in North Salt Lake, Woods Cross, or West Bountiful.

Additional information is presented for Links 2 and 3 only in this and following sections because the impacts of the D&RG alignments vary from Alternative E in these two links only. Table 2.2-2 compares the relocations in Links 2 and 3.

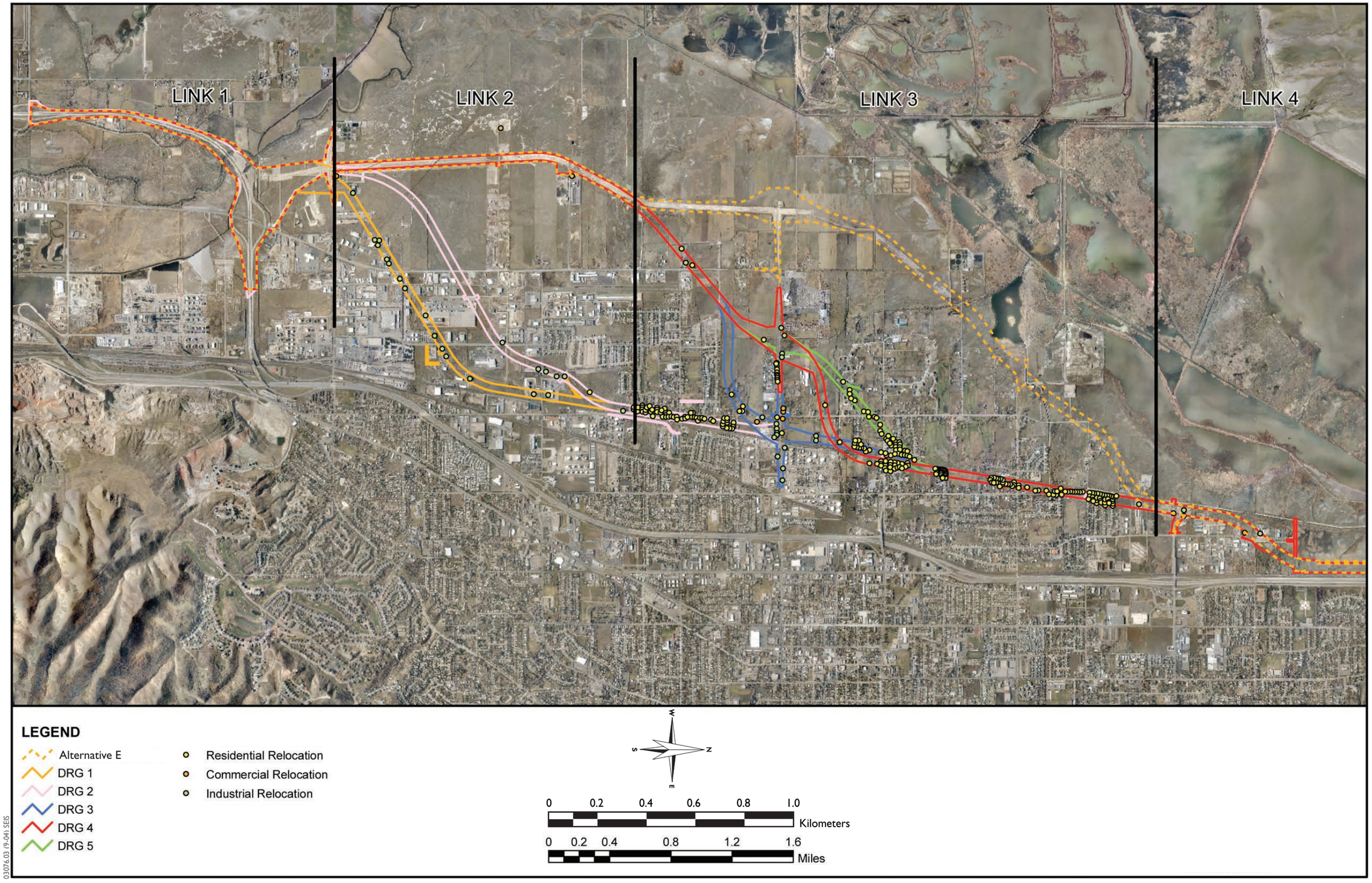


Figure 2.2-2
Relocations

Table 2.2-2 Relocations in Links 2 and 3

Alignment	Residential Displacements in Link 2	Residential Displacements in Link 3	Business Displacements in Link 2	Business Displacements in Link 3
Alternative E	0	0	2	1
DRG1	0	189	51	24
DRG2	3	189	11	24
DRG3	0	125	2	26
DRG4	0	124	2	8
DRG5	0	135	2	7

Community Cohesion

According to FHWA (Technical Advisory T 6640.8A, 1987), changes in neighborhoods, or community cohesion, can include splitting neighborhoods, isolating a portion of a neighborhood or an ethnic group, generating new development, changing property values, or separating residents from community facilities.[5] All the D&RG conceptual alignments would place a four-lane freeway through established residential and commercial developments. In many locations, these alignments would need to be elevated on bridges to cross surface streets and railroad tracks, and ramps with embankments and possibly elevated bridges would be required at locations with interchanges. Where surface streets are not routed over or under the alignment, they would be terminated with cul-de-sacs or frontage roads running parallel to the freeway, which would cut off movements across the alignment.

Because the alignments would be in close proximity to residential areas, UDOT's Noise Abatement Policy (UDOT 08A2-1) would likely require the installation of noise walls. Because Legacy Parkway is proposed as a high-speed, controlled-access facility, the entire right-of-way would be fenced to keep pedestrians and bicyclists from crossing at unsafe locations. In some cases, the alignments would make it more difficult for residents to access schools, places of worship, community centers, and businesses, which would disrupt the residents' sense of community cohesion. Table 2.2-3 quantifies the physical barriers that would be created under each D&RG conceptual alignment and under the Alternative E alignment. These physical barriers would result in substantial adverse impacts on community cohesion in North Salt Lake, Woods Cross, and West Bountiful. See Table 2.2-4 for population proportions of communities divided by these alignments.

[5] FHWA is required to look at community impacts in accordance with 23 USC 109 (h).

Table 2.2-3 Community Cohesion Impacts: Physical Barriers Created by Alignment

Alignment	Number of Bridges (Cross Streets)	Number of Cul-de-Sacs and Cut-Off Roads	Length of Noise Wall, m (ft)*	Length of Retaining Wall not Including Termini Interchanges, m (ft)*
Alternative E	4	4	0 (0)	500 (1,640)
DRG1	12	14	10,270 (33,694)	4,921 (16,145)
DRG2	12	17	11,990 (39,337)	4,921 (16,145)
DRG3	10	9	5,930 (19,455)	3,829 (12,562)
DRG4	10	8	5,600 (18,373)	3,773 (12,379)
DRG5	10	8	6,120 (20,079)	3,149 (10,331)

Note:
* Estimates only. More detailed design would be required to calculate the exact lengths.

Table 2.2-4 Population Proportions of Communities*

Alignment	West of Alignment	Between Roadway and D&RG	Between D&RG and UPRR	Between UPRR and I-15
North Salt Lake				
Alternative E	<1%	<1%	1%	19%
DRG1	<1%	<1%	1%	19%
DRG2	<1%	<1%	1%	19%
DRG3	<1%	<1%	1%	19%
DRG4	<1%	<1%	1%	19%
DRG5	<1%	<1%	1%	19%
Woods Cross				
Alternative E	2%	35%	6%	55%
DRG1	37%	0%	6%	55%
DRG2	33%	4%	6%	55%
DRG3	8%	29%	6%	55%
DRG4	4%	33%	6%	55%
DRG5	4%	33%	6%	55%
West Bountiful				
Alternative E	0%	35%	53%	12%
DRG1	28%	6%	53%	12%
DRG2	28%	6%	53%	12%
DRG3	28%	6%	53%	12%
DRG4	24%	11%	53%	12%
DRG5	17%	18%	53%	12%

Alignment	West of Alignment	Between Roadway and D&RG	Between D&RG and UPRR	Between UPRR and I-15

Note:

* Proportions are based on the population distribution in the 2000 U.S. Census. Numbers do not add up to 100% because there are portions of these populations that are east of I-15 and outside the study area.

Public School Service Area Impacts

The D&RG conceptual alignments divide the service areas of two schools in the Davis County School District: West Bountiful Elementary and Woods Cross Elementary. Alignments DRG1 and DRG2 divide the service areas of both schools; DRG3, DRG4, and DRG5 primarily divide the service area of West Bountiful Elementary. Alternative E passes west of most development on the western edge of the service area of West Bountiful Elementary. There is currently no housing west of Alternative E, except five houses in West Bountiful. The planned Legacy Nature Preserve would take up most of the land west of Alternative E, so future residential development west of Alternative E would be limited, and few future students would be affected.

Church Impacts

There are several buildings west of I-15 affiliated with the Church of Jesus Christ of Latter-day Saints (LDS). Congregations of this church, called wards, are defined by geographic boundaries. General conclusions regarding the community cohesion impacts on church members were based on the geographic relationships between D&RG alignments, church locations, and residential areas.

The D&RG conceptual alignments would likely divide several established LDS wards. Members of these wards would experience minor adverse impacts because they would need to follow major streets to cross the highway. The LDS church leadership could possibly redraw the ward boundaries so that the highway did not divide wards. There would be no impacts on church buildings associated with Alternative E.

Travel Patterns, Accessibility, and Walkability

The D&RG conceptual alignments would divide communities, school districts, and LDS church wards, and would create cul-de-sacs, dead-end streets, and bridges with ramps on earthen embankments. These changes would have a major impact on local travel patterns. Trips that currently are relatively direct on gridded street patterns would instead require circuitous routes to access an overpass or underpass to cross the highway.

All the D&RG conceptual alignments would adversely affect community walkability by introducing another physical barrier to pedestrians in a corridor that is already divided by the UPRR tracks and I-15. Because Alternative E mostly traverses the edge of existing and proposed future development where there are fewer reasons for residents to cross the alignment, it would have little effect on local travel patterns.

Visual and Noise Impacts

The D&RG conceptual alignments would intersect established residential areas, causing major impacts on local viewsheds and increasing ambient noise levels in residential neighborhoods adjacent to the alignments. Areas with adjacent residential properties would likely qualify for noise walls according to UDOT's Noise Abatement Policy (UDOT 08A2-I). The noise walls would add to the height of the overall

facility and would increase the visual impacts. The earthen ramps, elevated bridges, and fences would also cause visual impacts along the alignment (Table 2.2-3).

Table 2.2-5 identifies the number of residential properties adjacent to the various alignments and the length of noise walls and retaining walls that would be constructed. These measurements are an indicator of the level of noise and visual impacts that could be anticipated. A higher number of residential properties adjacent to the alignment indicates a greater number of people directly affected by noise and visual impacts. A longer noise wall indicates a higher level of visual impacts and a longer portion of the alignment that is likely to experience noise impacts. A longer retaining wall indicates a longer portion of the alignment that would be raised and subject to visual impacts.

Table 2.2-5 Noise and Visual Impacts

Alignment	Residential Properties Adjacent to the Alignment	Length of Noise Wall, m (ft)*	Length of Retaining Wall not Including Termini Interchanges, m (ft)*
Alternative E	7	0 (0)	500 (1,640)
DRG1	125	10,270 (33,694)	4,921 (16,145)
DRG2	129	11,990 (39,337)	4,921 (16,145)
DRG3	115	5,930 (19,455)	3,829 (12,562)
DRG4	89	5,600 (18,373)	3,773 (12,379)
DRG5	114	6,120 (20,079)	3,149 (10,331)

Note:
* Estimates only. More detailed design would be required to calculate the exact lengths.

Environmental Justice

Environmental justice addresses the proportionality of impacts of a project; that is, whether the adverse impacts of a project's construction and operation are disproportionately borne by minority or low-income households (Executive Order 12898). Conversely, environmental justice also considers whether these households share the positive impacts of a project. The D&RG alternatives and Alternative E were analyzed for environmental justice issues using FHWA-recommended procedures. No environmental justice issues were identified.

2.2.3.2 Impacts on Wetlands

This section summarizes the wetlands impacts associated with the D&RG conceptual alignments and Alternative E in the Great Salt Lake regional corridor. As part of this analysis, the D&RG alignments were surveyed in July 2003 for wetlands not previously delineated for the evaluation in the Final EIS.[6] Based on more refined wetland identification, the wetland impacts of the D&RG regional corridor and the Great Salt Lake regional corridor would now both be characterized as *medium* rather than *low* and *medium*, respectively, as stated in the Final EIS. The analysis identifies 42.5–46.1 ha (105–114 ac) of

[6] Reference materials used included National Wetlands Inventory mapping, aerial photography, and the *Intermountain (Region 8) List from the National List of Plant Species That Occur in Wetlands* (Reed 1988). Field surveys of the general composition of vegetation and hydrology were conducted on and adjacent to the right-of-way for the five D&RG conceptual alignments.

wetlands within the D&RG conceptual alignment rights-of-way, as compared to 45.7 ha [113 ac] for Alternative E, and 34.8–37.6 ha (86–93 ac) of wetlands impacts within the footprints of the D&RG conceptual alignments, as compared to 39.3 ha [97 ac] for Alternative E). Acreage of wetlands impacts were calculated by determining the acreage in the alignment right-of-way and the acreage that would likely fall within the footprint of the roadway. Through final detailed design for Alternative E, UDOT determined that 5.7 ha (14 ac) of wetlands within the right-of-way—primarily in the north (Link 5) and south (Link 1) interchanges, where all the D&RG alignments and Alternative E are the same—would not be affected during construction. These interchange areas would be similar under all alternatives because the design of the interchanges is based on the area needed to accommodate the ramps that connect to the roadway, not the right-of-way of the roadway itself. Therefore, this 5.7-ha (14-ac) reduction of wetlands impacts applies to all alternatives. Considering just the highway footprint (80 m [264 ft]) and not the entire right-of-way width for Alternative E, an estimated 0.8 ha (2 ac) of wetlands impacts can be avoided in addition to the wetland impacts avoided at the interchanges.

Table 2.2-6 below identifies direct impacts on wetlands within the D&RG conceptual alignments and the Alternative E alignment. Direct impacts on wetlands associated with each D&RG alignment ranged from about 42.5 ha to 46.1 ha (105 ac to 114 ac), compared to about 45.7 ha (113 ac) under Alternative E. See Figure 2.2-3 for wetland impacts in each link for each alternatives. See Table 2.2-7 for wetlands impacts in Links 2 and 3. Wetlands impacts in Links 1, 4, and 5 are the same under all alternatives.

Table 2.2-6 Wetland Impacts (in Acres)

Alignment	Wetland Acres within ROW	Difference from Alt. E Based on ROW	Wetland Acres within Footprint*	Difference from Alt. E Based on Footprint
Alternative E	113	—	97	—
DRG1	105	–8	86	–11
DRG2	114	+1	93	–4
DRG3	111	–2	90	–7
DRG4	110	–3	89	–8
DRG5	106	–7	86	–11

Note:

* This includes the 5.7-ha (14-ac) reduction in wetland impacts identified by the design-builder plus the savings associated with the use of the variable 80-m (264-ft) footprint width in wetland areas.

Table 2.2-7 Acres of Wetlands Impacts in Right-of-Way in Links 2 and 3

Alignment	Link 2	Link 3	Total of Link 2 and Link 3
Alternative E	9.2	28.5	37.7
DRG1	7.2	22.9	30.1
DRG2	18.0	21.1	39.1
DRG3	9.2	26.0	35.2
DRG4	9.2	25.0	34.2
DRG5	9.2	21.4	30.6

2.2.3.3 Regional Corridor Costs and D&RG Alignment-Specific Costs

The Final EIS evaluated five regional corridors, including the D&RG regional corridor, based on costs, wetland impacts, and impacts on existing development. The planning level approach evaluation, assumed a four-lane freeway within a 100-m (328-ft) development corridor. Costs were based on a 100-m right-of-way and generalized bridge requirements (see page 2-26 of the Final EIS). To ensure that all relevant information was updated for the Supplemental EIS, the lead agencies also requested that the cost estimates for all five regional corridors evaluated in the Final EIS be updated and provided below in Table 2.2-8. The revised regional cost estimates show that the costs of the regional corridors have increased since June 2000 when the Final EIS cost estimates were prepared. The increase in the regional alignment cost estimates can be attributed primarily to inflation between 2000 and 2004 and to refining the cost-estimating assumptions and applying a consistent cost-estimating methodology.

Table 2.2-8 Updated Cost Estimates for Regional Alignments

	Estimated Cost (in millions)[1]	
Regional Alignment	Final EIS 2000[2]	Supplemental EIS 2004[3]
Antelope Island	$1,400	$1,525
Trans-Bay	$1,460	$1,868
Railroad		
Denver & Rio Grande	$460	$589
Union Pacific[4]	$1,900	$1,702
Great Salt Lake	$300	$439
Farmington Bay	$520	$830

Notes:

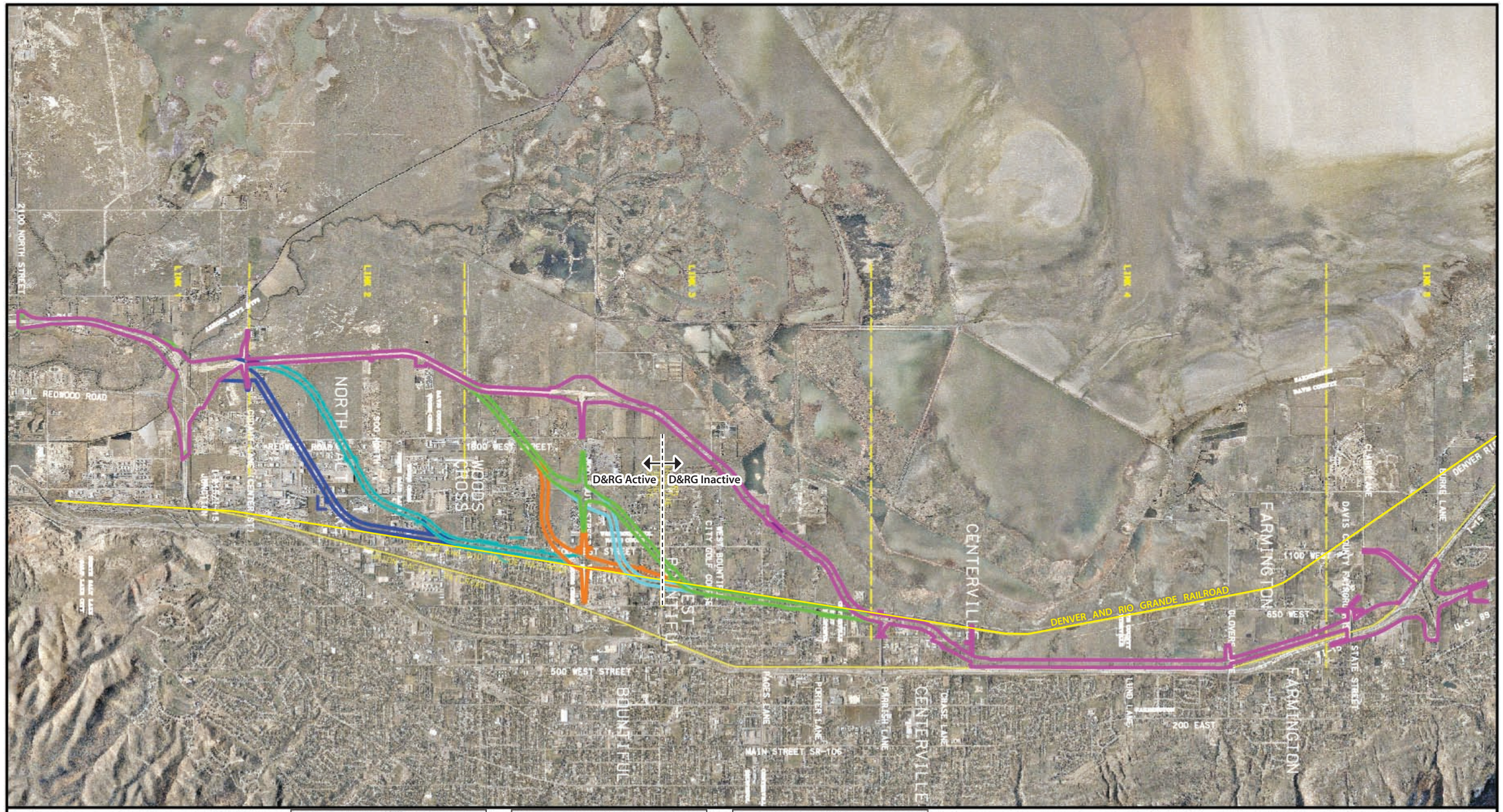
1 These cost estimates are essentially the base costs of the regional alignments (including mitigation). Actual contracting involves additional costs such as pre-award engineering, stipends, and incentives. It is standard practice to compare the base costs because the actual contracting expenditures can vary widely and cannot be accurately predicted (i.e., actual contract for Legacy Parkway was $451, up from an estimated $300 million in the Final EIS)

2 Source: Federal Highway Administration et al. 2000.

3 Source: HDR Engineering, Inc. 2004. These cost estimates were calculated on the basis of an overall length and width of a highway within the various regional corridors and on rough quantity estimates including earthwork, right-of-way, and bridges.

4 The cost estimate for the Union Pacific Railroad regional alignment was reduced since the Final EIS. This is because the estimate for this regional alignment was done at a different level of detail for the Final EIS due to the fact that it was an active line and alternatives within that regional alignment would require relocating a major refinery. Therefore, a macro-scale (less detailed) calculation was appropriate.

Cost estimates also were developed and refined for the five conceptual alignments within the D&RG regional corridor and for Alternative E, based on a variable right-of-way of between 80 m and 95 m (264 ft and 312 ft). Table 2.2-9 presents the cost estimates for each specific D&RG conceptual alignment. The table shows that the refined alignment-specific estimates are lower than the estimates developed using the corridor-level approach. This difference is attributable to fewer unknowns and therefore fewer contingencies. However, the corridor-level costs should not be directly compared with the more refined



LEGEND

- DRG1
- DRG2
- DRG3
- DRG4
- DRG5
- ALT E
- LINK DESIGNATION
- RAILROAD

LINK1	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	COST (MILLIONS)
ALTERNATIVE				
DRG1	0	0	19.7	66.63
DRG2	0	0	19.7	66.63
DRG3	0	0	19.7	66.63
DRG4	0	0	19.7	66.63
DRG5	0	0	19.7	66.63
ALT E	0	0	19.7	66.63

LINK2	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	COST (MILLIONS)
ALTERNATIVE				
DRG1	0	51	7.2	103.51
DRG2	3	11	18.0	100.71
DRG3	0	2	9.2	22.21
DRG4	0	2	9.2	22.21
DRG5	0	2	9.2	22.21
ALT E	0	2	9.2	22.21

LINK3	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	COST (MILLIONS)
ALTERNATIVE				
DRG1	189	24	22.9	190.25
DRG2	189	24	21.1	190.25
DRG3	125	26	26.0	192.62
DRG4	124	8	25.0	177.11
DRG5	135	7	21.4	175.57
ALT E	0	1	28.5	77.11

LINK4	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	COST (MILLIONS)
ALTERNATIVE				
DRG1	2	5	41.4	86.25
DRG2	2	5	41.4	86.25
DRG3	2	5	41.4	86.25
DRG4	2	5	41.4	86.25
DRG5	2	5	41.4	86.25
ALT E	2	5	41.4	86.25

LINK5	RESIDENTIAL RELOCATIONS	BUSINESS RELOCATIONS	WETLANDS (ACRES)	COST (MILLIONS)
ALTERNATIVE				
DRG1	2	6	14.2	164.14
DRG2	2	6	14.2	164.14
DRG3	2	6	14.2	164.14
DRG4	2	6	14.2	164.14
DRG5	2	6	14.2	164.14
ALT E	2	6	14.2	164.14

0 1 2
KILOMETERS

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Legacy Parkway Supplemental EIS

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Figure 2.2-3
D&RG Conceptual Alignments: A Link-by-Link Impact Summary

costs because the assumptions, methodology, and associated contingencies used to develop the estimates are different and such a comparison would not be valid.

Table 2.2-9 D&RG Alignment-Specific Costs

Alignment	Length Variation from Alternative E (miles)[1]	Length along D&RG Railroad (miles)	Alignment-Specific Cost Estimate (millions)	Cost Difference Alternative E (millions)	Percent Cost Increase over Alternative E
Alternative E	—	—	$416 [2]	—	—
DRG1	6.2	4.5	$611	$195	47%
DRG2	6.2	3.6	$608	$192	46%
DRG3	4.5	2.5	$532	$116	28%
DRG4	4.4	2.2	$516	$100	25%
DRG5	4.3	1.5	$515	$99	24%

Note:

1. Length variation is the length, in miles, that the D&RG alternatives differ from Alternative E. For the remainder of the total 14 miles of the North Corridor, the alternative alignments are identical.
2. The estimated cost for Alternative E is less than the estimates prepared for the Great Salt Lake Regional Alignments, shown in the table above, because a more detailed alignment location was used to prepare the estimates. This provided more accurate material quantities, information on potential impacts, and right-of-way requirements and, therefore, lowered the contingencies that were applied to the estimates.

Because costs are identical in Links 1, 4, and 5, the primary cost differences between alignments occur in Links 2 and 3. Table 2.2-10 provides the estimated costs of Link 2 and 3 for a comparison between D&RG alignments and Alternative E.

Table 2.2-10 Alignment-Specific Costs for Links 2 and 3 (millions)

Alignment	Link 2	Link 3	Total Cost of Links 2 and 3
Alternative E	$22.21	$77.11	99.32
DRG1	$103.51	$190.25	293.76
DRG2	$100.71	$190.25	290.96
DRG3	$22.21	$192.62	214.83
DRG4	$22.21	$177.11	199.32
DRG5	$22.21	$175.57	197.78

2.2.3.4 Summary of Impacts

Table 2.2-11 summarizes the quantifiable impacts of the D&RG evaluation for all D&RG conceptual alignments and Alternative E. The D&RG analysis determined that the impacts of the D&RG conceptual alignments and Alternative E differ only in Links 2 and 3 because the alignments and Alternative E share much of the same alignment in the North Corridor in Links 1, 4, and 5. Figure 2.2-3 provides an overview of the links and all impacts by alignment and link. Table 2.2–12 identifies the impacts for all alignments

and Alternative E in Links 2 and 3 for comparative purposes. The differences in Links 2 and 3 are summarized below.

Table 2.2-11 Summary of Quantitative Impacts by Alignment

				Impacts on Existing Development								
		Wetlands		Relocations				Travel Patterns		Noise and Visual Impacts		
Alignment	Total Cost (millions)	Footprint (acres)	ROW (acres)	Residential (parcels)	Business (parcels)	Total Relocations	Major Utility Impacts (Total)	Bridges (Cross Streets)	Cul-de-Sacs and Cut-Off Roads	Residential Properties Adjacent to ROW	Length of Noise Wall, m (ft)	Length of Retaining Wall not Including Termini Interchanges, m (ft)
Alternative E	$416	97	113	4	14	18	21	4	4	7	0 (0)	500 (1,640)
DRG1	$611	86	105	193	86	279	28	12	14	125	10,270 (33,694)	4,921 (16,145)
DRG2	$608	93	114	196	46	242	22	12	17	129	11,990 (39,337)	4,921 (16,145)
DRG3	$532	90	111	129	39	168	13	10	9	115	5,930 (19,455)	3,829 (12,562)
DRG4	$516	89	110	128	21	149	14	10	8	89	5,600 (18,373)	3,773 (12,379)
DRG5	$515	86	106	139	20	159	14	10	8	114	6,120 (20,079)	3,149 (10,331)

Table 2.2-12 Summary of Costs, Wetlands Impacts, and Impacts on Existing Development for Links 2 and 3*

	Estimated Costs (millions)		Wetlands Right-of-Way (acres)		Impacts on Existing Development			
					Link 2 Relocations		Link 3 Relocations	
Alignment	Link 2	Link 3	Link 2	Link 3	Residential (parcels)	Business (parcels)	Residential (parcels)	Business (parcels)
Alternative E	$22.21	$77.11	9.2	28.5	0	2	0	1
DRG1	$103.51	$190.25	7.2	22.9	0	51	189	24
DRG2	$100.71	$190.25	18	21.1	3	11	189	24
DRG3	$22.21	$192.62	9.2	26	0	2	125	26
DRG4	$22.21	$177.11	9.2	25	0	2	124	8
DRG5	$22.21	$175.57	9.2	21.4	0	2	135	7

2.2.4 Conclusions

As shown in Table 2.2-11, all D&RG alignments would have substantially greater impacts on existing development and higher costs than Alternative E. The D&RG alignments would require relocating between 149 and 279 residential and commercial properties, compared to a total of 18 relocations under Alternative E. The relocations for the D&RG alignments would account for about 3 and 10 percent of the total residences in Woods Cross and West Bountiful, respectively. Alternative E would not affect any residential properties in those communities. The D&RG alignments would also have substantially greater impacts on properties that would not be relocated but would remain along the alignments. Because the D&RG alignments pass directly through developed, established neighborhoods (as opposed to Alternative E, which skirts the western edge of development), they would have considerably more impacts on community cohesion, such as requiring between eight and 17 cut-off roadways compared to four under Alternative E. In addition, the D&RG conceptual alignments would have far greater noise and visual impacts than Alternative E. Between 89 and 129 residential properties would remain fronting the freeway under the D&RG alignments compared to seven under Alternative E. The length of noise walls and retaining walls—two additional indicators of noise and visual impacts on remaining development—would likewise be substantially greater under the D&RG alignments. The costs of the D&RG alignments range between $515 million and $611 million, which is between $99 million and $195 million more than Alternative E.

The analysis shows that highway facilities in both regional corridors would likely result in similar levels of impacts on wetlands. There would be approximately 43 ha to 46 ha (105 ac to 114 ac) of wetland impacts within the D&RG alignment rights-of-way compared to 46 ha (113 ac) under Alternative E (estimated footprint impacts within the rights-of-way are approximately 35 ha to 38 ha [86 ac to 93 ac] of wetlands impacts within the D&RG alignments and 39 ha [97 ac] under Alternative E). (See Section 2.1, *Right-of-Way Issues*, for explanation of footprint versus right-of-way.) As shown in Table 2.2-12, wetland savings would be realized under Alternative E in only two links (Links 2 and 3), because Links 1, 4 and 5 would have identical wetland impacts on Alternative E. In Link 2, DRG1 would impact 0.8 ha (2 ac) fewer wetlands than Alternative E, but would require 51 relocations as compared to 2 relocations under Alternative E, and have costs of approximately $81 million more than Alternative E. In Link 2, all other

D&RG alignments have the same or more wetland impacts than Alternative E. In Link 3, Alternative E would have the greatest number of wetland impacts (11.5 ha [28.5 ac]). The D&RG alignments would affect between 1.0 ha and 2.9 ha (2.5 ac and 7.4 ac) fewer wetlands than Alternative E but would require between 124 and 189 residential relocations and seven to 26 business relocations as compared to zero residential relocations and one business relocation under Alternative E, with costs of approximately $98 million to $116 million more than Alternative E.

For all the reasons described above, and primarily because of significant adverse impacts on existing communities and high costs, the D&RG regional corridor is eliminated from further consideration as a reasonable alternative.

Section 2.3

Integration of Legacy Parkway with Mass Transit

2.3.1 Summary of Approach for Supplemental EIS

The appellate court remanded the Legacy Parkway Final EIS for further consideration of integration of Legacy Parkway with mass transit. To address this issue and to assist in the development of a comprehensive "integration alternative," the federal lead agencies used the Supplemental EIS scoping process to gather public input on the approach to analyzing the integration of mass transit with Legacy Parkway. Based on input received during the scoping meetings, *integration* was defined as how the roads and transit system can be built together, how they function with one another, and how the usage of both systems can be optimized (see the *Areas of Controversy* section of the *Summary* chapter of this document).

In response to the public comments, a technical team was formed to help identify and evaluate alternative ways of integrating the transportation network through the Shared Solution. This technical team consisted of representatives from the lead agencies, UDOT, the Utah Transit Authority (UTA), and the Wasatch Front Regional Council (WFRC). As discussed in detail in Section 1.2.3, *Definition of the Shared Solution*, the Shared Solution is a multi-modal approach to solving the transportation needs of 2020 and beyond in the North Corridor. The Shared Solution consists of transportation system management (TSM) and intelligent transportation system (ITS) measures, travel demand management (TDM), an expanded mass transit system, reconstruction and expansion of I-15 to ten lanes, and construction of a four-lane Legacy Parkway. In addition to input from the technical team, the community planning information committee (CPIC) was consulted at strategic milestones in the development of the *Legacy Parkway Technical Memorandum: Integration of Mass Transit with Legacy Parkway* (integration technical memorandum) (Fehr & Peers 2004) for review and input on the integration analysis and results. CPIC participants included representatives of local jurisdictions, non-governmental organizations, and cooperating agencies. (CPIC members and goals are discussed in detail in the *Foreword/Introduction* of this document.)

Currently, the north corridor is developing regional mass transit that includes bus service and a planned commuter rail. UDOT initiated a study in August 2004 to look at the integration of expanded I-15 and commuter rail. Conceptual designs for each project were proposed in their respective environmental documentation, the I-15 Draft EIS and the commuter rail Draft EIS (Federal Transit Administration and Utah Transit Authority 2004). In light of this desire to work toward system integration, the lead agencies developed maximum future transit scenarios that maximized (added to) the planned mass transit in the WFRC long range plan. In effect, the integration and sequencing analysis assumes that transit-supportive land use is developed concurrently with implementation of commuter rail; this assumption includes

transit-oriented development (TOD), transit service integration, and transit mode coordination, as well as distribution of transit service to within close walking proximity of most of the developed land use in the corridor. This approach allowed the lead agencies to assess whether and under what circumstances mass transit could carry a greater share of the travel demand and thus be more aggressively integrated with roads and the complete transportation system. The maximum future transit scenario used in the integration and sequencing analysis is robust transit package B, which was developed for this integration analysis and is referred to throughout this Supplemental EIS as "maximum future transit."

2.3.2 Summary of Analysis Presented in Integration Technical Memorandum

To ensure consistency in results, analysis procedures and measures of effectiveness used for the integration analysis were consistent with those used in the Final EIS, except where new analysis methods or updated information were available. Consistent with the Final EIS, the integration analysis uses a 2020 p.m. peak-hour, peak-direction travel demand volume at the Woods Cross screenline, expressed as passenger-car equivalents (PCEs), as a measure of typical traffic patterns and flow in the corridor. However, the integration analysis uses updated WFRC socio-economic projections and WFRC 2004 travel model (version 3.2) to predict the year 2020 baseline travel numbers. New modeling and new population projections were available for the integration analysis. Because approximately 5 years of the 20-year period (to 2020) have elapsed, the modeling utilized levels of population growth 25 percent lower than the FEIS modeling, and levels of total corridor travel demand approximately 20 percent lower than used in the FEIS. The total population growth and travel demand projected for 2020 have not changed significantly since the FEIS. [check with Christy and F&P] The WFRC long range plan and UTA current forecast reflect transit ridership of 4.6 percent in the p.m. peak-hour, peak-direction compared to the 12 percent peak-hour transit ridership estimates in the Final EIS. See Appendix B Section B3.5.1 for a description of the basis of the Final EIS transit ridership estimates. In addition, this integration analysis uses updated figures for total person trips and a sophisticated analysis of a full array of transit enhancements to develop aggressive transit scenarios. Under the robust transit packages used in this integration analysis and described below, the transit component of the Shared Solution is projected to carry 5.0 to 5.3 percent of the p.m. peak-hour, peak-direction travel demand in the North Corridor.

The information described in the following sections is a summary of the technical analysis prepared for the integration technical memorandum (Fehr & Peers 2004) used to reach these conclusions. Section 2.3.2.1 below describes the development of two robust transit packages, and Section 2.3.2.2 describes the results of the analysis regarding the integration of maximum future transit with Legacy Parkway.

2.3.2.1 Development of Integrated Transit Enhancement Packages

The integration analysis approach involved the following process.

- Use public and agency scoping comments to identify a comprehensive list of potential transit enhancements, including transit-supportive land use and TDM.
- Confirm that the travel forecasting models are capable of accurately accounting for changes in transit use resulting from changes in land use, transit service, and TDM variables.
- Establish maximum level of transit-supportive land use considered feasible in cooperation with local jurisdictions, federal, state, and regional agencies, and non-governmental organizations.

- Screen transit enhancements based on evaluation of effectiveness, recommendations, costs, funding, land use policies, and recommendations of affected jurisdictions.
- Prioritize and package measures into two robust transit packages that assume that the transit enhancements in each package are implemented early in the period between 2005 and 2020, and are fully effective for year 2020 projections, thus capturing the effect of giving transit the necessary time to have an effect on transit ridership.
- Conduct transit ridership analysis to determine performance of integrated robust transit packages.
- Incorporate robust transit packages into analysis of the sequencing of transportation improvements planned for the North Corridor.
- Assess physical design and coordination efforts for planned roadways to integrate road, park and ride, bus, rail, and other features.

A separate analysis evaluated alternative construction sequencing of mass transit, I-15 improvements, and Legacy Parkway as part of the Shared Solution. The analysis is described and documented in the *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution* (HDR Engineering, Inc. 2004c). See Section 2.4 of this document for a description of the sequencing analysis and results.

The integration analysis looked at a full range of factors that can influence the success of transit within the transportation system (measured by transit mode capture rates). The literature concerning transit within transportation systems suggests that a transit system should be planned and implemented in a holistic way, considering not only modes and routes but also other features that affect how people choose to travel. Therefore, the integration and sequencing analyses incorporate maximum future transit deployed in a manner to maximize transit ridership. The resulting ridership numbers are higher than those projected in the current long range plan. The following transit-related enhancements were tested at a general category level as well as individually to determine their effect on transit ridership.

- Improved quality and quantity of transit service.
  - Commuter rail, express bus, and bus rapid transit (BRT).
  - Feeder bus and local bus.
  - Seamless transfers and service frequencies.
- Increased proximity and access to transit.
  - Land use intensification along corridors.
  - Expanded bus service coverage.
  - Transit access efficiency.
  - Route deviation bus service.
- Transit-oriented development (TOD).

- Land use intensification at rail stations.
- Urban design: development density and diversity.

- Travel demand management (TDM)
  - Parking pricing.
  - Transit fare structure.
  - Employer incentives.

To test the effectiveness of the integration scenarios, the highest practicable level of change for each component above the level of change projected in the long range plan was evaluated in the travel demand model and compared with experience (empirical evidence) from comparable existing systems. Effectiveness testing was performed to assess the maximum transit potential of each element. Table 2.3-1 summarizes the findings with respect to increases in transit ridership from category-level and individual transit/land use enhancements.

The analysis determined that the WFRC model performed reliably with respect to measuring ridership changes associated with changes in commuter rail, bus services, seamless transfer, transit access, fares, and parking costs. However, for several components not ordinarily addressed in conventional travel models, the model review found that additional off-model adjustments would be needed to improve the forecasts. The integration analysis, therefore, supplemented the WFRC model with empirically based off-model adjustments to forecast the effects of changes deemed reasonable and foreseeable by the responsible local jurisdictions and regional agencies in regard to TOD design, proximity of transit stations, and incentive-based TDM policies other than parking costs and transit fares. Table 2.3-1 identifies which transit enhancement components were measured using the WFRC model, and which were subject to off-model adjustments based on empirical evidence. The analysis found that the transit enhancements with the most significant effects on increases to transit ridership (corridor mode-split percentages) were commuter rail service increase, transit-supportive land use and TOD, express bus services, seamless transit transfers, and parking cost increases. Based on these results, local representatives recommended using a robust transit approach that included commuter rail, BRT, and transit-supportive land use.

The next step in the integration analysis was to determine the level of transit-supportive land use considered achievable by local plans and visions. The lead federal agencies held a planning meeting with CPIC representatives to identify the highest level of transit-oriented land use that the jurisdiction, community members, property owners, and future real-estate market could support in areas surrounding commuter rail stations and prospective BRT stops. The intent of the planning session was to gather information on aggressive transit-supportive land use changes that could be used in the integration analysis.[1] Non-governmental representatives of the CPIC attended, observed, and participated in this planning session. The land use changes identified for this analysis represent the professional judgment of senior staff at the involved jurisdictions. Planning staff in local jurisdictions consider these aggressive transit-supportive land uses and land use intensifications achievable. Participants in the planning session relied on commuter rail station location information contained in the FTA/UTA commuter rail Draft EIS (Federal Transit Administration and Utah Transit Authority 2004).

[1] These aggressive transit assumptions differ from the transit component of the current WFRC long range plan. It is important to note that these transit assumptions are for analysis purposes only and would require the passage of ordinances, the support and actions of local elected officials, and the reaction of the real estate market for actual implementation.

Table 2.3-1 Increases to Transit Ridership Resulting from Individual Transit/Land Use Enhancements Based on WFRC Model Response and Empirical Evidence

Transit Enhancement	Range of Variability Tested[1]	Model Response[2]	Empirical Evidence[3]
Commuter Rail	Double train frequency (from 30 to 15 minutes)	Ridership up 47%	NA
Bus Rapid Transit (BRT)	Five BRT routes added on US-89 (increased total BRT routes from zero to five)	Ridership up 40%	Ridership up 20–50%
Express Bus	Increase frequency 50–100% (from 15 or 20 minutes to 10 minutes)	Ridership up 84%	Ridership up 28%
Local Bus	Double frequency (from 30 to 15 minutes, or from 20 to 10 minutes)	Ridership up 4%	Ridership up 33%
Seamless Transfer	Reduce from 15 to 5 minutes	Ridership up 29%	Ridership up 33%
Transit Access	90% of all people within walking distance (0.25 mi) of any type of transit service	Area transit share up 2%	Area Transit Share up <5%
Transit-Oriented Design (TOD)	Double walkability, connectivity (placing transit-oriented development within 0.25 mile of stations)	**Negligible**	*Auto Trip Gen down 3%*
Proximity to Transit Stations	Double 0.5 mile density (varied by station)	**Ridership up 7%**	*Ridership up 20–25%*
Transit Fares	Reduce current fare by 50%	Transit share up 10%	Transit share up 10% –20%
Parking Costs	Increase current parking costs in the Salt Lake City central business district 50%	Central business district transit share up 2%	Central business district Auto Trips Down 15%
Travel Demand Management (TDM)	Available to 15% to 20% of employees (up from zero)	**NA**	*Screenline Share up 5%*

Notes:

1 Range of variability tested was the highest level that could reasonably be considered possible relative to the current long range plan; i.e. if long rang plan stated that commuter rail would run every 30 minutes, analysis doubled it to run every 15 minutes. The range of variability is not the level used in the maximum future transit packages; instead, it is a level used to provide the study team with the maximum potential effectiveness of each element to serve as a starting point for the development of robust transit packages.

2 In several respects not ordinarily addressed in conventional travel models, the model review found that additional off-model adjustments would be needed to improve the forecasts. Italicized text indicates that the WFRC model is not sufficiently sensitive to changes to the land use/transit enhancement being tested, and therefore the analysis includes off-model adjustments based on empirical findings.

3 Empirical findings used were published by the Transportation Research Board, *Traveler Response to Transportation System Chang*, TCRP Project B12, Third Edition, USDOT, 1999–2003.

4 Italicized text indicates off-model adjustments will be used to incorporate this empirical evidence into forecasting.

NA = Not applicable.

Representatives recommended land use shifts in terms of numbers of residents (population) and employment opportunities (jobs) within 0.8 km (0.5 mi) of all planned transit stations, with the largest recommended changes at Farmington (400 percent increase), 500 South (28 percent increase), and Woods Cross (39 percent increase). In addition, interviews were held with representatives of cities with transit station sites north of the corridor to identify land use shifts recommended for their jurisdictions. Figure 2.3-1 summarizes the land use shifts recommended by the CPIC subcommittee. For land use shifts in the corridor, the subcommittee representatives recommended shifting population and employment totaling about 5,250 people to locations within 0.8 km (0.5 mi) of transit stations. For land use shifts north of the corridor, the Cities of Pleasant View, Ogden, Roy, Clearfield, and Layton suggested shifting population and employment totaling about 3,360 people to areas within 0.8 km (0.5 mi) of planned transit stations. These land use shifts total approximately 8,600 more residents and employees that would be within a 0.8-km (0.5-mi) radius of transit stations than indicated in the current long range plan projections.

Based on the transit-enhancement effectiveness results, recommended land use shifts, capital and operating costs, reasonably foreseeable funding,[2] and land use policies, two robust transit packages were created for the integration analysis: robust transit package A (Package A) and robust transit package B (Package B). For purposes of analysis, both robust transit packages assume that all the highway components of the WFRC long range plan and the Shared Solution, as well as specific additional transit enhancements, are in place and working by 2020. Consistent with the long range plan and Shared Solution, the transit packages include the planned express bus service designed to take advantage of the planned I-15 HOV lanes. The primary difference between the two packages is that Package B includes all the elements of Package A, but assumes more aggressive TOD/TDM policies. It is important to note that both robust transit packages cost more than transit enhancements currently planned by UTA, WFRC, or local communities, and were developed for the purposes of this integration analysis only, not for adoption.

Robust Transit Package A

Package A includes transit investment above the long range plan levels to allow increased commuter rail service, several BRT lines and improved local bus service, transit access systems, transfer synchronization, and reduced transit fares. This transit package assumes a 50 percent increase in downtown parking costs in addition to inflation adjustments. This represents an aggressive assumption given the recent downtown employment decline and proposals to reduce parking prices or increase supply, but it is consistent with WFRC and the City of Salt Lake projected increase in downtown development densities by 2020. Package A consists of the following the primary elements.

- Commuter rail: 15-minute headways.
- BRT: premium service.
- East/west bus lines with seamless transfers.

[2] Reasonably foreseeable funding availability includes the potential for funds in addition to those funds allocated to transit under WFRC's December 2003 regional transportation long range plan aggressive funding program, which assumes $100 million per year in state general fund revenues for highway projects and additional local tax revenue for transit projects equivalent to a 0.25-cent sales tax increase and a 30-percent contribution from joint development and community participation. The State of Utah could elect to use a percentage of the state's federal apportionment for highway projects to support the additional measures of robust transit in the Shared Solution. To accomplish the integration robust transit packages would require regional consensus to divert additional flexible funds from other facilities, modes, or jurisdictions to further enhance the transit component of the North Corridor Shared Solution.

- Local bus service distributed widely enough so that 95 percent population and employment is located within 0.4 km (0.25 mi) of transit.
- Premium transit fares reduced 50 percent.
- Downtown Salt Lake City and University of Utah parking costs increased 50 percent.

Robust Transit Package B

Package B includes all the transit elements in Package A and further strengthens the transit-supportive policy or "software" components. The following elements differ from or are in addition to Package A.

- Maximum encouragement of TOD at transit station sites, as defined by the CPIC land use subcommittee.
- Increased land use density within 0.4 km (0.25 mi) of premium transit by 24 percent in South Davis County.
- Downtown Salt Lake City and University of Utah parking costs increased by 100 percent to maximize the incentive to use mass transit.

The land use and parking-pricing strategies included in Package B are aggressive and represent the upper end of the reasonably foreseeable range. Robust transit package B is referred to as "maximum future transit" throughout the Supplemental EIS because it represents the most aggressive future mass transit scenario.

Table 2.3-2 presents a comparison of the packages to one another and to the 2020 future baseline conditions, which are referenced from the transit improvements included in the current WFRC long range plan.

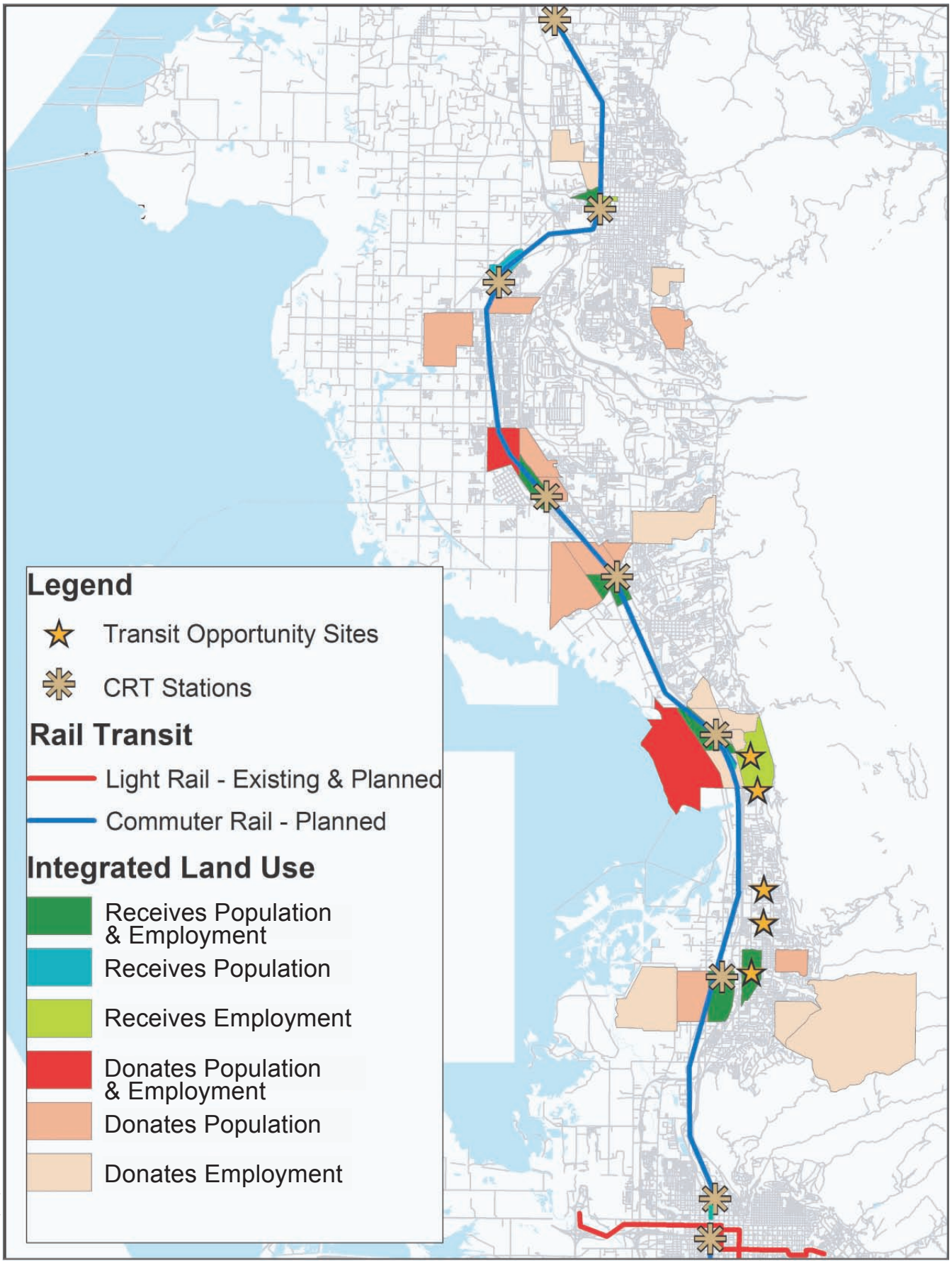

Figure 2.3-1
Recommended Land Use Shifts

Table 2.3-2 Comparison of Robust Transit Packages A and B with Baseline Conditions Set by WFRC Long Range Plan

	Robust Transit Package	
Baseline	A—Robust Transit with Moderate TDM Policy Change	B—Robust Transit with Transit-Supportive Land Use and Aggressive TDM Policies
Land use per long range plan	Long range plan land use	Transit-supportive land use
Highway improvements per long range plan*	Highway improvements per baseline	Highway improvements per baseline
Commuter rail operating per 2020 long range plan	Increased commuter rail frequency	Increased commuter rail frequency
Express bus, I-15 and US-89	Express bus, I-15 and US-89	Express bus, I-15 and US-89
Local bus per long range plan	Increased local bus service—designed to feed line-haul transit	Increased local bus service—designed to feed line-haul transit
Bus rapid transit—Farmington to Salt Lake	BRT re-aligned through all TOD opportunity sites	BRT re-aligned through all TOD opportunity sites
Transfers—15 to 20 minutes	Seamless transfer at BRT and CRT stations	Seamless transfer at BRT and CRT stations
Parking costs per long range plan	Parking costs further increased by 50%	Parking costs doubled
Transit access—Baseline	Improved transit access	Improved transit access
Transit fares—Premium	Reduced fares for premium transit	Reduced fares for premium transit

Note:

* Includes Legacy Parkway and other components of North Corridor Shared Solution. Assumptions differ from 2020 LRP in that they include 10-lane I-15 and do not include the Legacy North project.

2.3.2.2 Integration Analysis Results

Figures 2.3-2 and 2.3-3 present the results of the integration analysis of the two robust transit packages A and B Shared Solution scenarios compared to the auto, transit, and bike/walk/local numbers for the 2020 WFRC long range plan baseline.[3] The comparisons illustrated in Figures 2.3-2 and 2.3-3 show, based ona consistent modeling base (2004 WFRC model with 2020 transit as defined in the current WRFC long range plan), the degree by which integrating a robust transit package would increase transit ridership in the north corridor. This is measured in terms of transit riders translated into passenger-car equivalents.

Compared to the Shared Solution with current WFRC long range plan transit, integration Package A increases the 2020 p.m. peak-hour, peak-direction transit ridership by about 75 passengers (equivalent to 58 PCEs). This increase in transit ridership increases the corridor mode share from about 4.6 percent to about 5.0 percent. Package B increases the 2020 p.m. peak-hour, peak-direction transit ridership by about 148 passengers (equivalent to 114 PCEs). Package B also increases the number of people traveling shorter distances primarily by bike and walking, as a result of more clustered land uses (i.e., compact land uses

[3] The analysis presented in Figure 2.3-2 assumes completion of Legacy Parkway (by 2020) and improvements to I-15 (up to ten lanes), but excludes construction of separate Legacy project north of North Corridor.

would reduce trip lengths, thereby encouraging people to travel without an automobile). As a result, Package B reduces automobile demand at the screenline by shortening trips and converting trips to transit, bike and walk modes. In total, integration package B decreases auto traffic at the screenline by approximately 204 PCEs, from 18,046 PCEs to 17,842 PCEs.[4] The increase in transit ridership raises the corridor mode share from 4.6 percent to about 5.3 percent.

The integration analysis transit mode-share findings are consistent with transit mode shares found in corridors elsewhere in the Salt Lake region (approximately 4 to 5 percent mode shares in the TRAX/I-15 corridor south of downtown Salt Lake City at 4000 South). The integration analysis results are reasonable considering the linear nature and multiple functions of the North Corridor and the small percentage of commuter travel oriented to downtown Salt Lake City. The North Corridor serves multiple travel needs, including long-distance, interstate, international travel and dispersed travel in the Salt Lake region, as well as a small percentage of commute travel to downtown Salt Lake City. On a daily basis, only about 53 percent of the trips crossing the southern boundary of the North Corridor are generated within the North Corridor, and less than 10 percent of those are oriented to downtown Salt Lake City. The percentages are similar for peak-hour travel. This usage pattern limits the ability of a downtown-focused transit system to attract a high percentage of corridor travel.

2.3.2.3 Integration of Physical Construction of Legacy Parkway with Mass Transit Improvements

Since publication of the Final EIS, commuter rail planning has advanced to the stage that the commuter rail Draft EIS was released to the public in April 2004 (Federal Transit Administration and Utah Transit Authority 2004). (See Appendix A of this Supplemental EIS for a copy of the charter created by UTA and UDOT for coordination and cooperation in development of the Shared Solution transportation improvements.) Now that more detailed planning and environmental compliance processes are underway for the commuter rail project, UTA is taking advantage of the integration options offered by the Legacy Parkway project.

The integration analysis presents and evaluates opportunities already realized and those with future potential to integrate the construction of physical elements of the proposed Legacy Parkway with planned mass transit improvements in a way that provides efficient interfaces and service coordination of highway and transit travel. The Legacy Parkway project includes the following physical construction integration components.

- Placing interchanges at locations of future planned commuter rail stations.

  The FTA/UTA commuter rail Draft EIS (Federal Transit Administration and Utah Transit Authority 2004) confirms that the proposed Legacy Parkway interchanges are located at or near the locations of future planned commuter rail stations (one in Farmington near the I-15/US-89/Legacy Parkway interchange and one in Woods Cross at 500 South near I-15). The proposed interchange locations of Legacy Parkway also allow for providing convenient park-and-ride facilities to facilitate carpooling and feeder-bus access to commuter rail stations.

[4] Integration of Package B, before off-model adjustments were made, showed 17,905 PCEs in auto, 959 PCEs in transit, and 123 PCEs in bike/walk. The results were modified with off-model adjustments to reflect changes in travel characteristics resulting from the land use changes that the travel model is not designed to capture. The off-model adjustments were to the proximity to BRT and CRT stations (within 0.8 km [0.5 mi] of BRT stops and commuter rail stations) as well as TOD design (TOD within 0.8 km [0.5 mi] of commuter rail stations). Off-model adjustments were made only to Package B.

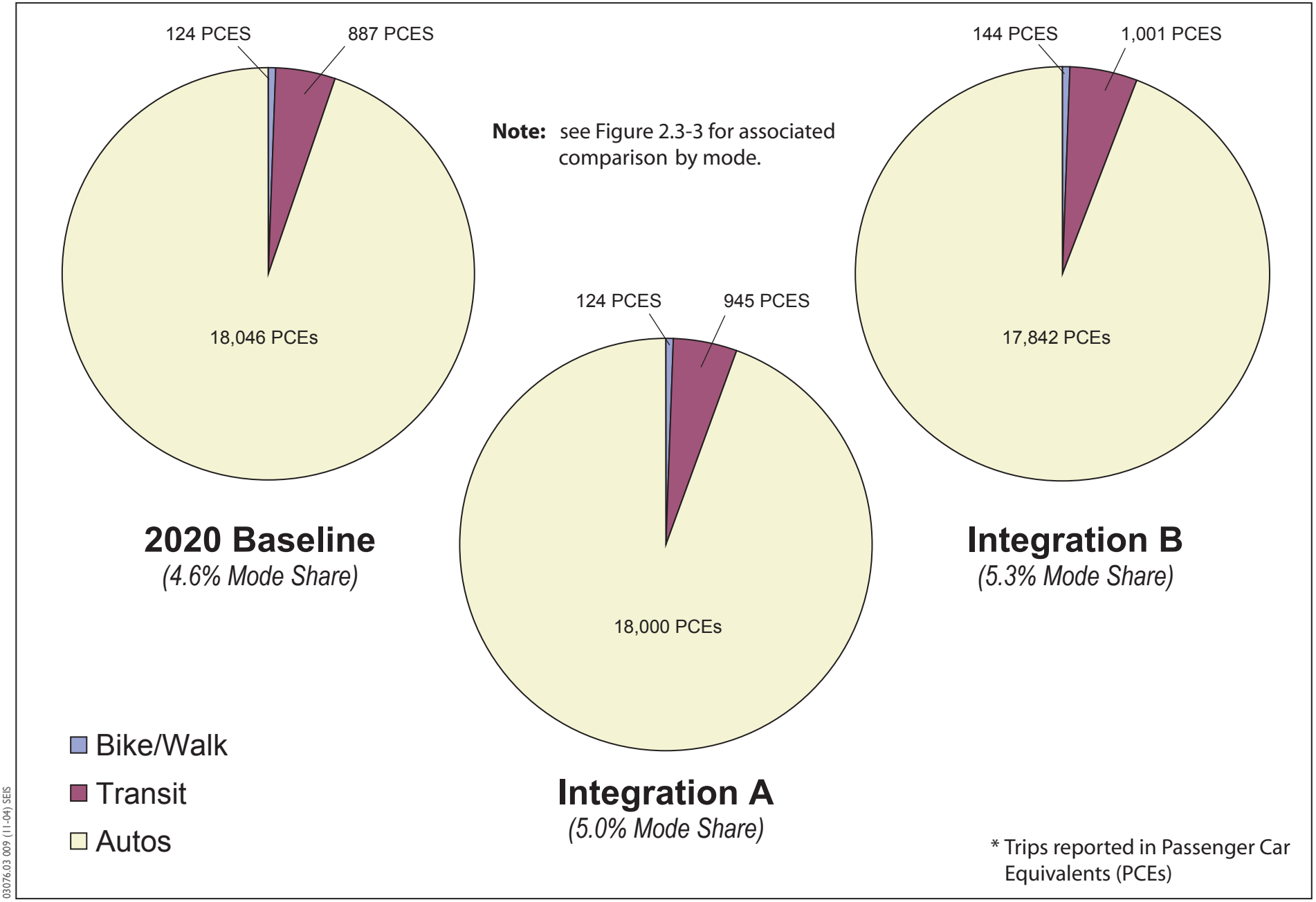

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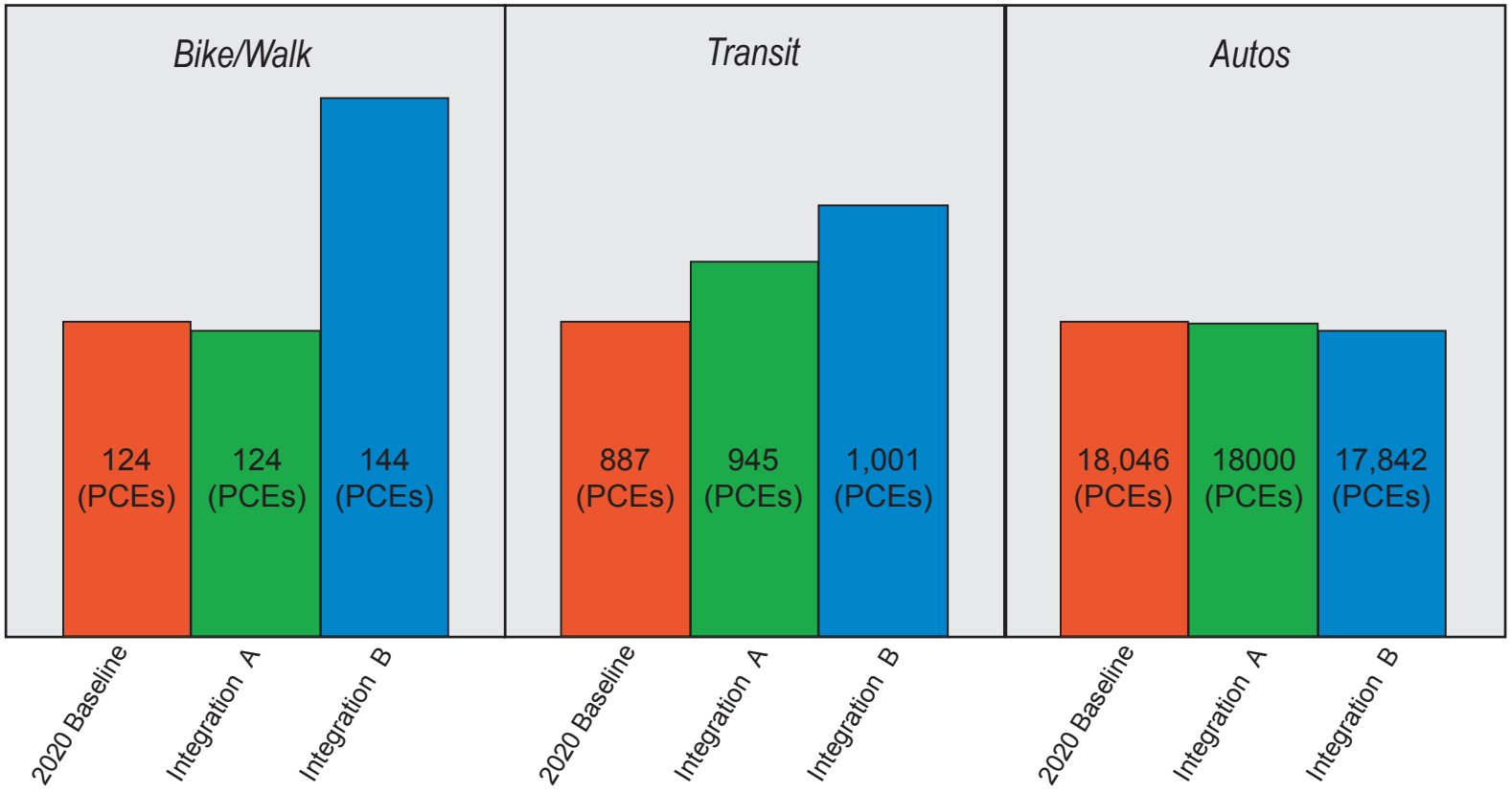
Figure 2.3-2
Comparison of Measures of Effectiveness of 2020 Baseline with Robust Transit Package A and Robust Transit Package B



* Trips reported in Passenger Car Equivalents (PCEs)

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Figure 2.3-3
Comparison of Measures of Effectiveness by Mode of 2020 Baseline with Robust Transit Package A and Robust Transit Package B

- Changing the project design to lengthen structures to accommodate the physical integration of the commuter rail component of mass transit with Legacy Parkway and I-15.

  As a result of the work completed under the current design-build contract since the Final EIS, UDOT incurred an additional $6.8 million in design and construction costs to allow for the physical integration of commuter rail in the following structures: Park Lane (formerly Burke Lane) (construction completed), I-15 southbound to Legacy Parkway southbound, Legacy Parkway northbound to I-15 northbound, US-89 southbound to Legacy Parkway southbound, Legacy Parkway northbound to US-89 northbound, State Street, and Glovers Lane. (Figure 2.3-4 identifies the location of all bridges.)

- Providing funding ($10 million) to UTA to aid in the purchase of commuter rail right-of-way that passes directly beneath a portion of the proposed Legacy Parkway and adjacent to I-15. These funds provided by UDOT were originally allocated for the design and construction of the Legacy Parkway project.

2.3.3 Conclusions

The integration technical memorandum evaluates how the roads and transit system of the Shared Solution can be built together and function with one another, as well as how the usage of both systems can be optimized, taking into consideration the extent to which enhancements to future transportation and land use patterns are feasible, reasonably foreseeable, and practicable. The federal lead agencies believe that analyzing the robust transit packages offered a reasonable way to describe how transit could be more fully integrated into the transportation system. The analysis used state-of-the-practice methods and a cooperative process through the CPIC meetings to involve local, regional, state, federal, and non-governmental agencies to develop and present findings. Package B represents maximum future transit, which is an aggressive but feasible improvement on the transit usage called for in the long range plan that could be achieved through incorporation of transit-supportive land uses along the corridor.

With the transit plan contained in the current WFRC long range plan, which was used by FTA/UTA in the commuter rail Draft EIS (Federal Transit Administration and Utah Transit Authority 2004), transit as part of the Shared Solution would capture 4.6 percent of the peak-hour, peak-direction travel demand. The integration analysis results show that by integrating additional transit enhancements and modeling the effect of those features maximum future transit could capture approximately 5.3 percent of the 2020 peak-hour, peak-direction travel demand (Package B).

2.3.4 Updated Information for Supplemental EIS

For purposes of evaluating alternatives, this Supplemental EIS incorporates the following findings of the mass transit integration analysis.

- Updated baseline travel forecast for the Shared Solution for the corridor screenline (Woods Cross) (reduced by about 20% from 24,110 PCEs reported in the Final EIS to about 19,060 PCEs in the peak hour and peak direction due to updates in land use forecasts and modeling procedures). Purchase of the commuter rail right-of-way.

- Design changes to the Legacy Parkway bridge and interchange structures to accommodate the integration of mass transit.

- The maximum future transit travel modeling assumptions (robust transit package B) for purposes of evaluating alternatives.

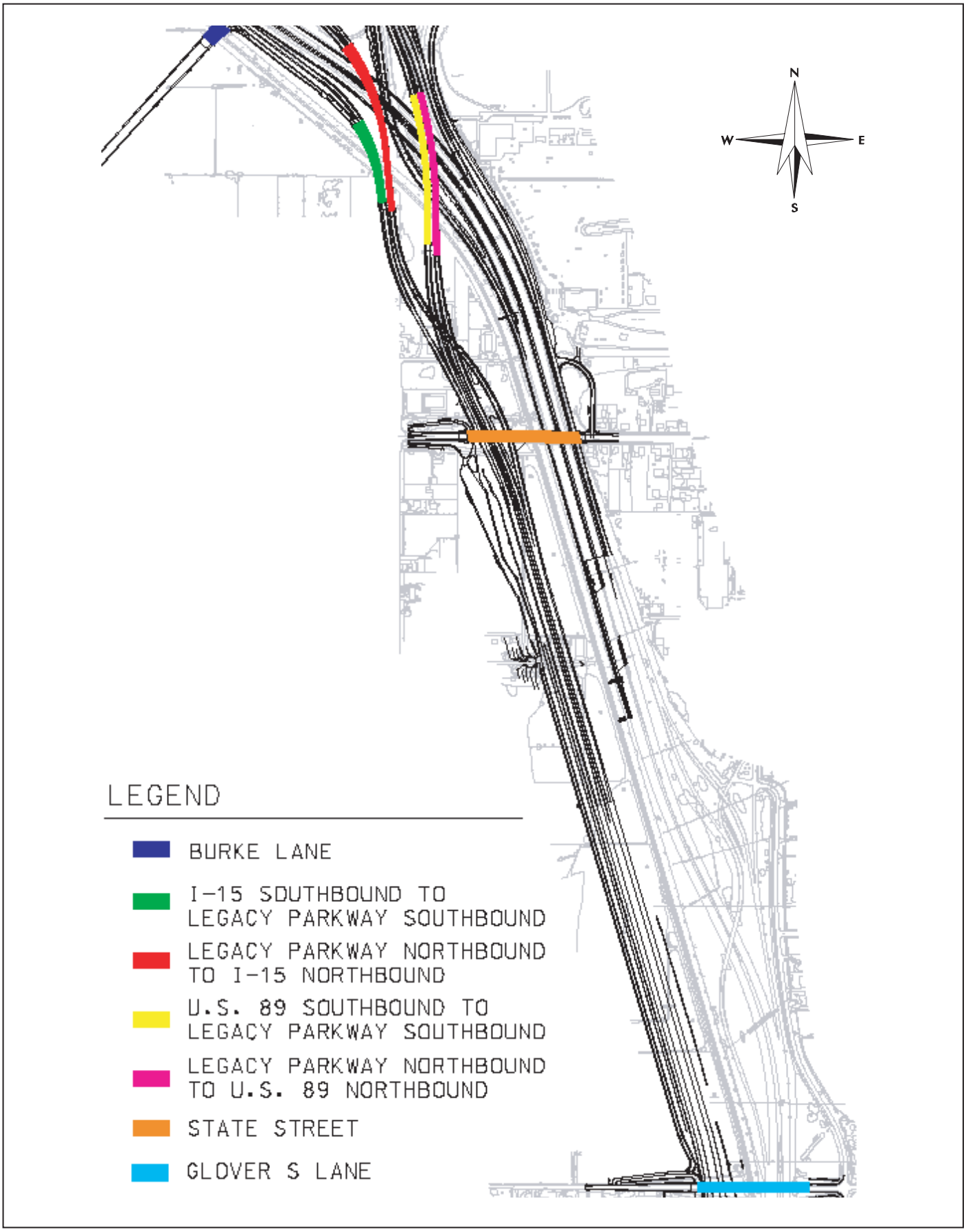

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Figure 2.3-4
Legacy Parkway Bridge Structures Designed to Accommodate Integration of Mass Transit

Section 2.4

Sequencing of the Shared Solution

2.4.1 Summary of Approach for Supplemental EIS

The term *sequencing* in this Supplemental EIS refers to the sequence, or order, in which the various major components of the Shared Solution (i.e., mass transit expansion, I-15 reconstruction, and Legacy Parkway) are constructed.

The Final EIS analyzed the following two sequencing scenarios.

- Construct Legacy Parkway prior to reconstructing I-15.
- Reconstruct I-15 prior to constructing Legacy Parkway.

These two scenarios were analyzed primarily to evaluate the ability of the sequencing scenario to provide capacity while deferring other impacts, including direct impacts on wetlands that would result from the construction of Legacy Parkway. The sequencing analysis in the Final EIS assumed that transit could carry 12 percent of the corridor mode share after Legacy Parkway and I-15 were in place. (See Section 2.3, *Integration*, for detailed discussion of new transit projections used in the Supplemental EIS analysis.) As a result of the analysis, the lead agencies determined in the Final EIS that reconstructing I-15 prior to constructing Legacy Parkway was not a practicable alternative because of the unacceptable level of congestion that would result on I-15. Because the Final EIS did not evaluate a sequencing scenario that included mass transit, the appellate court remand stated that the Legacy Parkway Final EIS failed to consider alternative sequencing of the three major components of the Shared Solution (mass transit, I-15 improvements, and Legacy Parkway). Specifically, the court posed the following questions.[1]

- Is the [lead agencies'] conclusion [in the Final EIS] that it is not reasonable to reconstruct I-15 before building Legacy Parkway still valid?
- Is it reasonable to delay construction of Legacy Parkway and I-15 reconstruction until all or part of the mass transit expansion is in place?
- Can mass transit alleviate the immediacy of need for I-15 [reconstruction] or Legacy Parkway?

UDOT and the lead agencies used the Supplemental EIS scoping process to gather input on a full range of alternative construction sequencing scenarios that evaluated the timing of mass transit in relation to I-15

[1] These questions are posed on pages 25 and 26 of the appellate court decision (*Utahns for Better Transportation et al. v. U.S. Department of Transportation et al*. [305F.3d1152 10th Cir. 2002]).

and Legacy Parkway in the *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution* (sequencing technical memorandum) (HDR Engineering, Inc. 2004c). In addition to incorporating scoping comments, the approach to the sequencing analysis and the evaluation of impacts was presented to the CPIC in November 2003 to allow local, state, and federal agency and nongovernmental organization representatives to review and provide input.

Based on agency and public comments provided during the public scoping process for the Supplemental EIS, the lead agencies selected four sequencing scenarios that cover the reasonable range of alternative construction sequencing options.[2] Scenario 1 reevaluates the validity of the Final EIS findings that reconstructing I-15 prior to constructing Legacy Parkway is not a practicable alternative, and Scenarios 2, 3, and 4 evaluate the comparative impacts of the sequence of constructing mass transit relative to Legacy Parkway construction and I-15 reconstruction. While the sequencing analysis uses the WFRC long range plan for other inputs and information, the sequencing analysis substitutes "maximum future transit" (robust transit package B, described in detail in Section 2.3, *Integration*), which was developed for the integration analysis for the actual planned transit component of the WFRC long range plan. Maximum future transit includes additional transit improvements above and beyond what is set forth in the WFRC long range plan for the 2020 transportation system.

The lead agencies used the maximum future transit scenario to respond to scoping comments concerning whether increasing transit could affect the need for or the sequence of the construction of Legacy Parkway. Maximum future transit is used for sequencing and integration analysis purposes only in this Supplemental EIS; the transit enhancements assumed in the maximum future transit scenario would need to be funded and adopted by each local, state, and federal participating/implementing agency for actual implementation. Because such additional funding commitments are very uncertain, it is important to note that the sequencing and integration analyses may overestimate the share of travel demand that mass transit could carry during the study period.

Each of the four sequencing scenarios was analyzed for its relative impact on specific environmental and economic variables. These results were used to determine whether an alternative sequencing scenario would be a reasonable alternative requiring further evaluation in this Supplemental EIS.

2.4.2 Summary of Analysis Presented in Sequencing Technical Memorandum

The analysis conducted for the sequencing technical memorandum shows the following results.

- Constructing maximum future transit prior to building Legacy Parkway or reconstructing I-15 prior to building Legacy Parkway would delay the direct impacts on wetlands that would result from construction of Legacy Parkway for 3 to 7 years, respectively.

- Mass transit, even when analyzed with maximum future transit assumptions in place, does not alleviate the immediacy of the need for Legacy Parkway or I-15 reconstruction.

[2] Public comments were received requesting that additional alternatives be evaluated in the sequencing scenarios, including a Redwood Road expressway or a "robust" Redwood Road expanded arterial, similar to Bangerter Highway. These alternatives were evaluated and eliminated from detailed evaluation in this Supplemental EIS because they did not meet the purpose of and need for the project. The sequencing analysis focused on the major components of the Shared Solution, not all possible alternatives to constructing Legacy Parkway (such as varied alignment locations or configurations). See Chapter 3 for a detailed discussion of the evaluation of alternatives.

- Because of the high cost to the traveling public, it is not reasonable to delay construction of Legacy Parkway or reconstruction of I-15 until all or part of maximum future transit is in place.

- Consistent with the Final EIS findings, it is not reasonable to reconstruct I-15 prior to building Legacy Parkway.

The analysis also shows that while direct impacts on wetlands would be delayed under Scenarios 1 and 2 (maximum future transit first), completing Legacy Parkway prior to reconstructing I-15 and prior to or concurrently with maximum future transit would have substantially lower costs to the traveling public, because there would be faster travel times, higher travel speeds, and improved level of service on I-15. In addition, completing Legacy Parkway prior to reconstructing I-15 and prior to or concurrently with maximum future transit would meet the project purpose and need by relieving traffic congestion on I-15 and providing an alternate north south route in the North Corridor.

The information described in the following sections is a summary of the technical analysis prepared for the sequencing technical memorandum used to reach these conclusions. Section 2.4.2.1, *Sequencing of the Shared Solution*, describes the approach to evaluating impacts of the four sequencing scenarios, and Section 2.4.2.2, *Results of Construction Sequencing Scenarios*, describes the results of the analysis.

2.4.2.1 Approach to Analysis of the Sequencing of the Shared Solution

The following four construction sequencing scenarios were developed for the Supplemental EIS analysis. Each scenario incorporates the three major components of the Shared Solution. As described above, Scenario 1 reevaluates the validity of the Final EIS findings that reconstructing I-15 prior to construction of Legacy Parkway is not a reasonable alternative, and Scenarios 2, 3, and 4 evaluate the comparative impacts of the sequence of constructing maximum future transit first, relative to Legacy Parkway construction and I-15 reconstruction. Comments were received from the cooperating agencies requesting that the sequencing analysis consider building maximum future transit and allowing time for transit facilities to function prior to undertaking Legacy Parkway construction or I-15 reconstruction. Although in reality the full range of transit supportive changes would take up to 20 or more years to be fully implemented, the modeling assumptions assume that transit-supportive changes, including seamless transfers, additional transit services, transit-oriented development, and denser populations within walking distance of transit, would take effect early in the period between 2005 and 2020, and are fully effective for year 2020 projections. They are assumed to be in place in 2005, rather than taking until 2020 to materialize, in order to demonstrate the highest level of transit mode share early and throughout the sequencing analysis time frame.

The four construction sequencing scenarios are as follows.

- Scenario 1.
  - Construct maximum future transit first.
  - Reconstruct I-15 second.
  - Construct Legacy Parkway third.
- Scenario 2.

- Construct maximum future transit first.
- Construct Legacy Parkway second.
- Reconstruct I-15 third.

- Scenario 3.
  - Construct maximum future transit and Legacy Parkway concurrently.
  - Reconstruct I-15 last.
- Scenario 4.
  - Construct Legacy Parkway first.
  - Construct maximum future transit second.
  - Reconstruct I-15 third.

The scenarios cover the timeframe 2005 through 2015 and assume the continuous construction of transportation improvements, unless otherwise noted in the analysis. The sequencing analysis assumes that, following a 3-year construction period, the first component of the Shared Solution becomes available for use in 2008 and that all three components are completed by 2014. The analysis accordingly assumes the impacts of all alternatives are the same before 2008 and after 2014. For each scenario, it was assumed that maximum future transit and Legacy Parkway would require approximately 3 years each to complete, and I-15 reconstruction would require 4 years to complete. For a construction schedule, see the *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution*, Volume 2 (HDR Engineering, Inc. 2004c). Within this 10-year period, the analysis addresses three phases of project construction and operation: 2005 through 2007, 2008 though 2011, and 2012 through 2014. Two different traffic volume threshold years are included in the analysis (2007 and 2012) to account for the growth in travel demand in the 2005 to 2015 period.

Consistent with the Final EIS, the geographic area is bounded by the 1-15/I-215 interchange on the south and the US-89/I-15 interchange on the north. The following variables were used in evaluating the comparative impacts of the four scenarios. The rationale for selecting each of the variables is explained in detail in Section 3.4, *Description of the Analysis*, of the sequencing technical memorandum.

- Timing of direct impacts on wetlands.
- Costs to the traveling public.
- Travel speeds on I-15.
- Travel times on I-15, transit, and Legacy Parkway.
- Level of service on I-15 and Legacy Parkway.
- Capacity compared to demand on I-15, Legacy Parkway, and parallel arterials.

- Peak period energy usage under each scenario.
- Total peak-period air pollutants emitted under each scenario.
- Costs of construction under each scenario, expressed in 2003 dollars.
- Operating and maintenance costs.

Upon further evaluation of the impacts of constructing Legacy Parkway concurrent with or prior to maximum future transit (Scenarios 3 and 4, respectively), it was determined that the impacts of the two scenarios were so similar that only one, Scenario 3, was used in performing the comparative analysis. Results reported for Scenario 3 are similar to or the same as those that would occur with Scenario 4. Therefore, the sequencing analysis discusses the impacts of the following two comparisons.

- **Comparison of Scenarios 1 and 3.** The comparison of Scenarios 1 and 3 analyzes the impacts of reconstructing I-15 prior to constructing Legacy Parkway to determine whether maximum future transit would provide a sufficient level of congestion relief in the North Corridor to make it feasible to reconstruct I-15 before constructing Legacy Parkway.
- **Comparison of Scenarios 2 and 3.** The comparison of Scenarios 2 and 3 analyzes the relative impacts of constructing maximum future transit either before construction of Legacy Parkway or concurrently with construction of Legacy Parkway, when I-15 reconstruction occurs last in the sequence.

The results of the comparison of the impacts of these construction sequence scenarios are presented in the following section.

2.4.2.2 Results of Construction Sequencing Scenarios

In both scenario comparisons, the following variables showed the most significant difference in impacts.[3]

- Timing of direct impacts on wetlands associated with the construction of Legacy Parkway.
- Costs to the traveling public.
- Average travel speeds and travel times
- Level of service on I-15.[4]

Impacts associated with all scenarios for key variables are presented in Figures 2.4-1 through 2.4-5. A discussion of the results of comparing Scenario 3 with Scenarios 1 and 2 follows.

[3] Only key results for the variables with the most significant differences in impacts are presented in this section. For figures comparing all results for each of the four scenarios, as well as a detailed discussion of these results, see Sections 5.2 and 5.3 of the sequencing technical memorandum.
[4] Level of service on Legacy Parkway is not a key result with which to compare alternatives because under Scenarios 1 and 2, Legacy Parkway is not operational until 2015 and 2011, respectively.

Timing of Wetland Impacts

Wetland impacts were analyzed because wetlands are a resource of primary interest to the Corps under the Section 404 permit. For purposes of this analysis, delaying direct impacts on wetlands in the project right-of-way was assumed to be environmentally beneficial because delays would allow the wetlands to continue their existing functions until the project is constructed. For simplicity, this analysis assumes that none of the impacts on wetlands and none of the mitigation associated with Legacy Parkway have occurred. Existing wetlands functions include wildlife use, flood storage benefits, and water quality benefits.

The direct wetland impacts estimated for each component of the Shared Solution (Legacy Parkway, reconstruction of I-15, maximum future transit) represent the estimated amount of wetlands within the project right-of-way as reported in the studies conducted for this Supplemental EIS, the I-15 North Corridor draft EIS (Federal Highway Administration and Utah Department of Transportation 1998), and the commuter rail draft EIS (Federal Transit Administration 2004). For this analysis, it was assumed that physical impacts on all the wetlands within the right-of-way would occur during the first year of a project's construction. There is insufficient information on the BRT component of maximum future transit from which to determine all wetland impacts of maximum future transit. Therefore, while the direct wetland impacts associated with maximum future transit may be underestimated, wetland impacts are likely to be minor and would not change significantly from this estimate.

Scenarios 1 and 2 would result in the net delay of impacts on approximately 46 ha (113 ac)[5] of affected wetlands associated with the construction of Legacy Parkway for 7 and 3 years, respectively. This means that although the total direct impacts on wetlands from all the components of the Shared Solution would be the same under all scenarios (7.2 ha [18 ac] for maximum future transit, 6.1 ha [15 ac] for I-15 reconstruction, and 46 ha [113 ac] for Legacy Parkway) for a total of 59 ha [146 ac], the wetlands in the Legacy Parkway right-of-way would continue their existing functions until commencement of construction. For Scenario 1, this would be in 2012, and for Scenario 2, this would be in 2008. (See direct impacts on wetlands associated with each scenario in Figure 2.4-1.)

Costs to the Traveling Public and Average Travel Speeds and Times on I-15

Costs to the traveling public were analyzed for each scenario because they directly reflect the efficiency of travel (travel speeds and travel times). For this analysis, the costs to the traveling public for I-15 and Legacy Parkway are assumed to consist of the value of time spent traveling through the corridor and the cost of energy (fuel) used to accomplish this. The value of travel time during the peak period was estimated by multiplying the time it takes to travel through the corridor by the volume of traffic (or transit ridership) and by the value of the travelers' time, expressed in dollars per hour. For the cost of energy usage, a representative dollars-per-gallon[6] value of fuel was multiplied by the energy usage estimate. In the case of maximum future transit, the cost was assumed to be the value of time spent traveling through the corridor plus the cost of fares. Because the fares assumed for maximum future transit were reduced

[5] The 46-ha (113-ac) figure refers to the acreage of wetlands located within the Alternative E right-of-way in this Supplemental EIS. However, the design of interchanges and design flexibility used for the actual footprint of the roadway facility within the right-of-way would subject fewer actual acres of wetlands to direct impacts. See Section 2.1, *Right-of-Way Issues*, for a detailed discussion of wetlands impacts for each alternative.

[6] The average price of gasoline and diesel used in the analysis is $1.58 and $1.64 per gallon, respectively. This was the average price on November 11 and 17, 2003, as provided by the American Automobile Association (AAA). Gasoline prices can fluctuate, and have risen in 2004, but the 2003 costs remain reflective of long-term historic prices. Higher or lower gasoline prices would raise or lower an element of the costs to the traveling public.

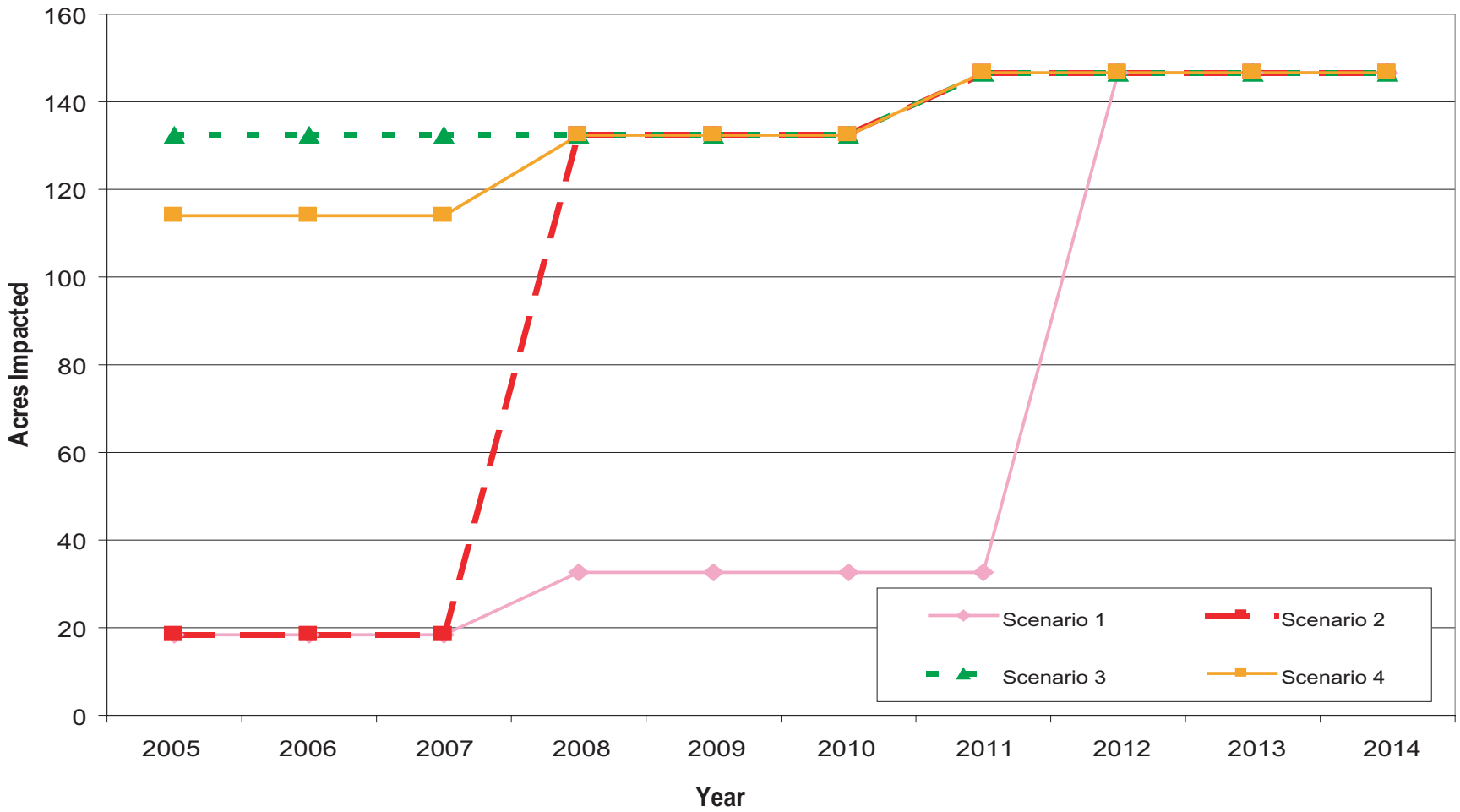

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Figure 2.4-1
All Scenarios
Wetlands Impacts

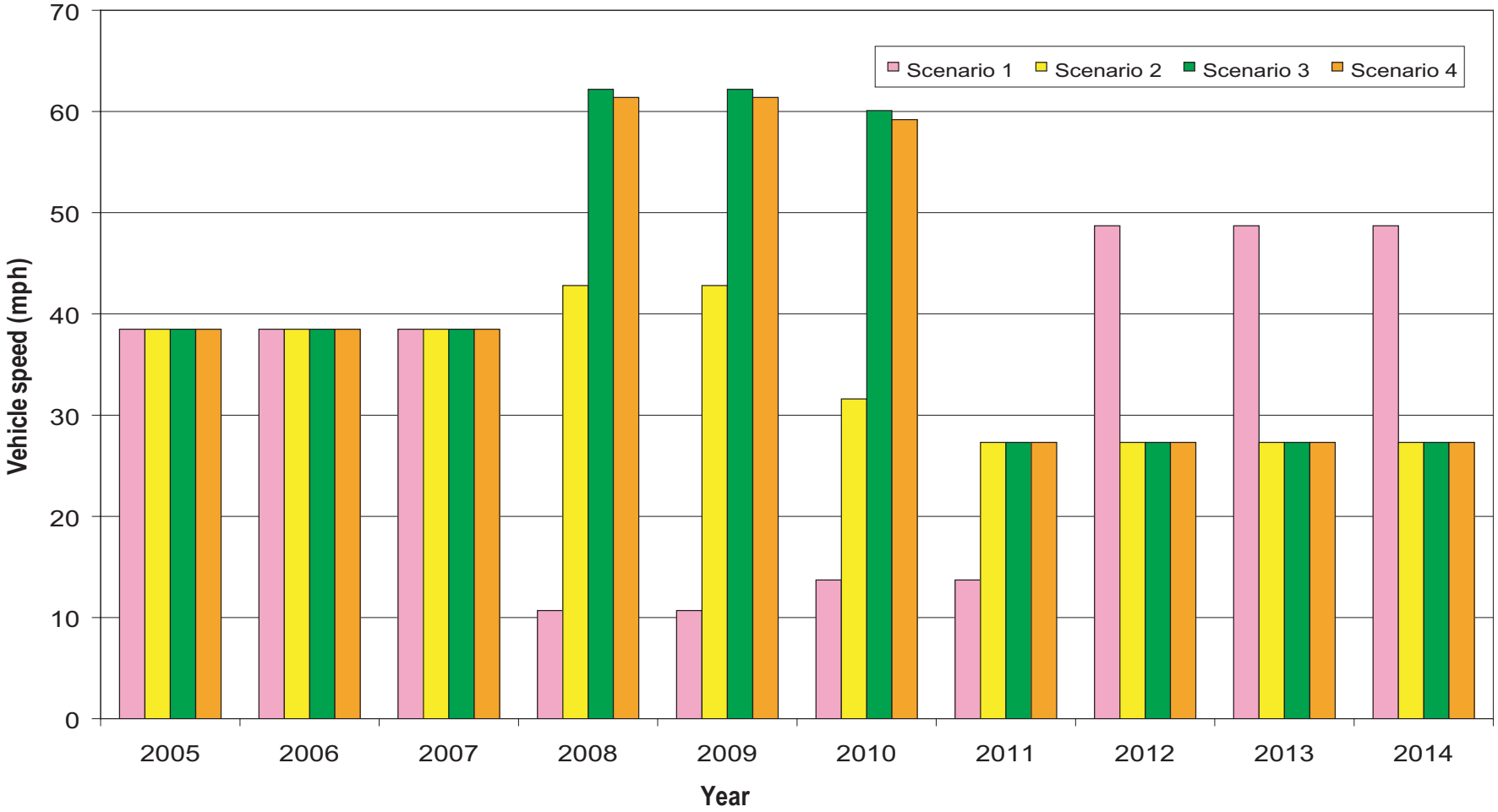

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Figure 2.4-2
All Scenarios
Travel Speed on I-15 between US-89/I-215 Interchange

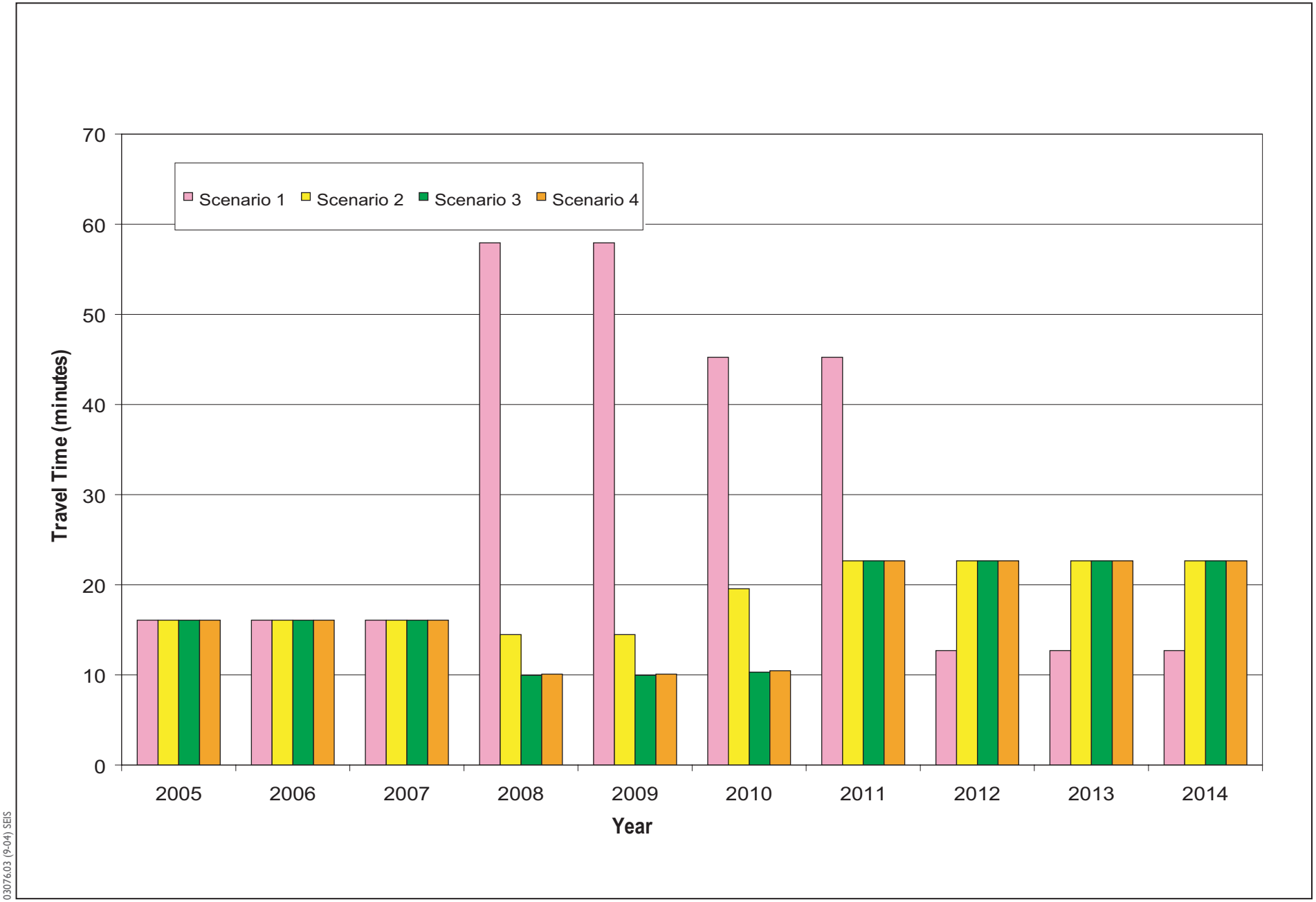

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Figure 2.4-3
All Scenarios
Average I-15 Travel Times between US-89/I-215 Interchange

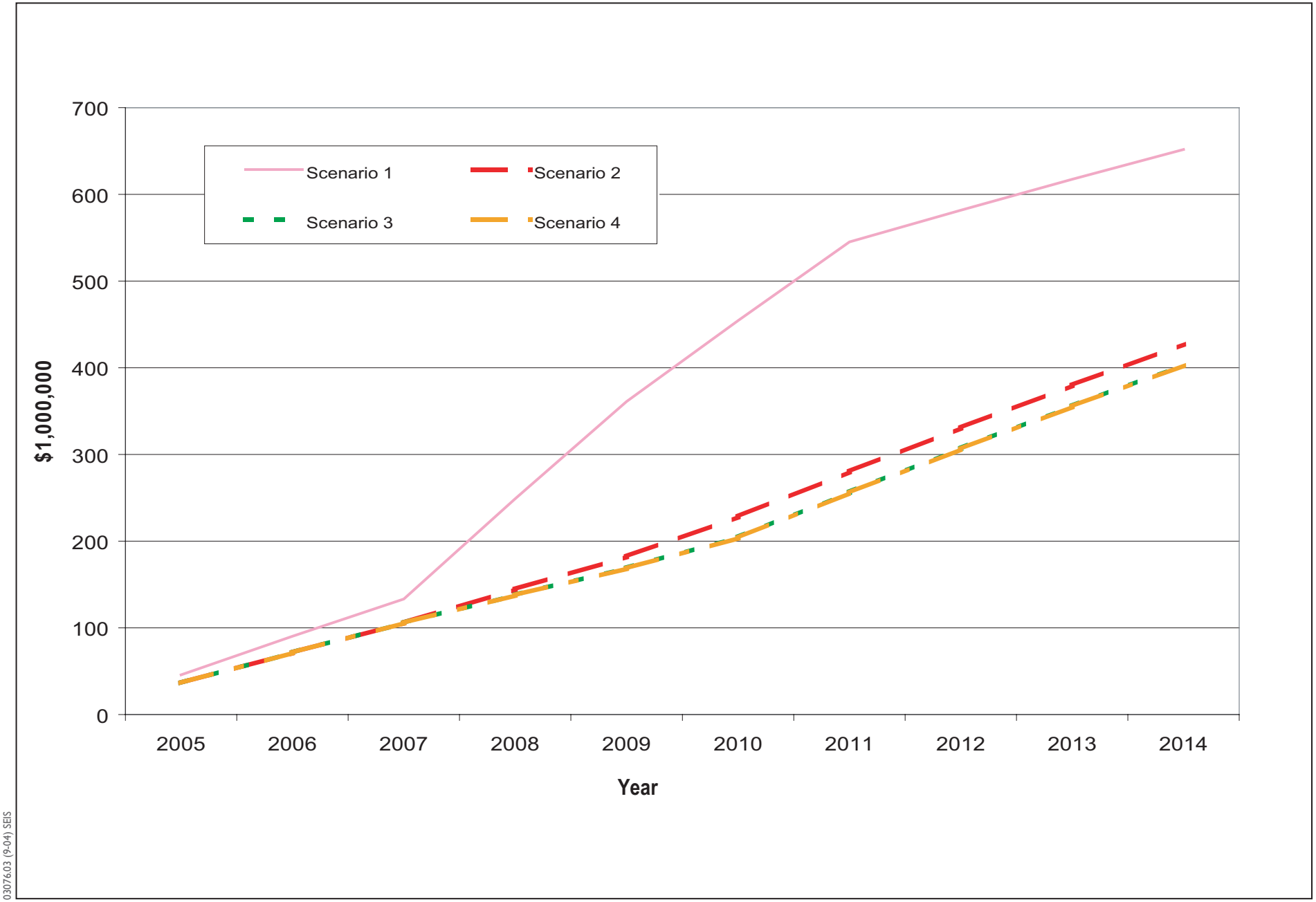

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Figure 2.4-4
All Scenarios
Cumulative Cost to the Traveling Public

relative to UTA's current policy of charging premium fares for premium service, actual transit user cost is likely to be higher than indicated in this analysis.

The main difference between Scenarios 1 and 3 with respect to average speeds and travel time is that average speeds on I-15 are 80 kph (50 mph) faster under Scenario 3 than under Scenario 1 from 2008 to 2010, and 74 kph (46 mph) faster in 2011, and average travel times on I-15 range from 35 to more than 45 minutes slower in the evening peak hour under Scenario 1 than under Scenario 3 from 2008 to 2011. This is because maximum future transit does not provide sufficient congestion relief on I-15 when I-15 is being reconstructed (with no Legacy Parkway in place).

The main difference between Scenarios 2 and 3 with respect to average speeds and travel times is that average speeds on I-15 are over 31 kph (19 mph) faster under Scenario 3 than under Scenario 2 in the years 2008 and 2009, and 47 kph (29 mph) faster in 2010 and average travel times on I-15 are 5 minutes slower in 2008 and 2009, and 10 minutes slower in 2010 under Scenario 2 than under Scenario 3. This is because maximum future transit does not provide sufficient congestion relief while Legacy Parkway is under construction (when I-15 reconstruction has not occurred).

These longer travel times and slower average speeds associated with Scenarios 1 and 2 would result in higher costs to the traveling public. (See average travel speeds and travel times associated with all scenarios presented in Figures 2.4-2 and 2.4-3.) Under Scenarios 1 and 2, there would be approximately $249 million and $24 million in additional costs to the public for the evening peak period, respectively, compared to Scenario 3. With the inclusion of the morning peak period, the cost doubles to an additional $500 million and $48 million, respectively, compared to Scenario 3. (Costs to the traveling public associated with all scenarios are presented in Figure 2.4-4.)

Low travel speeds on I-15 under Scenario 1 from 2008 through 2011 are also an indirect reflection of roadway safety effects. The very low speeds (10 to 13 miles per hour) and greater levels of congestion on I-15 will divert more traffic to the arterial streets. According to UDOT traffic accident statistics for large urban areas, arterials experience about four times the accident rates and similar degrees of accident severity as freeways at the same traffic volume.

Summary of Results for Scenario 1 versus Scenario 3

The comparison of Scenario 1 to Scenario 3 indicated that each scenario would result in certain benefits over the other, as described below.

- Benefits under Scenario 1 (maximum future transit first, I-15 reconstruction second, Legacy Parkway third).
  - Delays impacts on 46 ha (113 ac) of wetlands for 7 years.
  - Provides alternative travel mode options for the North Corridor that do not exist today.
  - Provides a more efficient commute through the North Corridor from 2012 to 2015 by improving travel speeds from about 28 mph under Scenario 3 to about 49 mph for Scenario 1 for the 3-year period
- Benefits under Scenario 3 (construction of Legacy Parkway concurrently or prior to maximum future transit).

- Saves approximately $249 million in costs to the traveling public for the evening peak period ($403 million in costs to the traveling public for the evening peak period under Scenario 3 compared to $652 million under Scenario 1). Saves approximately $498 million when considering travel during both the morning and evening peak periods.

- Provides faster travel speeds through the North Corridor by about 50 mph (from 10–13 mph to about 60 mph) for the 4-year period from 2008 to 2011.

- Reduces travel times through the North Corridor by about 35 minutes for the 4-year period from 2008 to 2011.

- Provides for a safer and less stressful commute through the North Corridor for the 4-year period from 2008 to 2011, by reducing likelihood that through traffic would divert to local-access serving arterial streets.

Summary of Results for Scenario 2 versus Scenario 3

The comparison of Scenario 2 to Scenario 3 indicated that each scenario would result in certain benefits over the other.

- Benefits under Scenario 2 (maximum future transit first, Legacy Parkway second, I-15 reconstruction third).

  - Delays impacts on 46 ha (113 ac) of wetlands for 3 years.

  - Provides alternative travel mode options for the North Corridor that do not exist today.

- Benefits under Scenario 3 (concurrent construction of maximum future transit and Legacy Parkway, I-15 reconstruction last).

  - Saves approximately $24 million in costs to the traveling public for the evening peak period ($403 million in costs to the traveling public for the evening peak period under Scenario 3 compared to $427 million under Scenario 2). Saves approximately $48 million when considering travel during both the morning and evening peak periods.

  - Provides faster travel speeds through the North Corridor by about 40 kph (25 mph) for the period from 2008 to 2011 with Legacy Parkway in place during reconstruction of I-15.

  - Reduces travel times through the North Corridor by 5 to 10 minutes for the period from 2008 to 2011, with Legacy Parkway in place during reconstruction of I-15.

  - Provides for a safer and less stressful commute through the North Corridor by reducing likelihood that through traffic would divert to local-access serving arterial streets from 2008 to 2011.

2.4.3 Conclusions

The sequencing scenarios selected for analysis address the full range of alternative construction sequencing of major components of the Shared Solution and respond directly to the questions posed by the court and stated above in Section 2.4.1.

The results of this sequencing analysis with regard to those questions are as follows.

- Maximum future transit does not alleviate the immediacy of need for Legacy Parkway or I-15. It is not reasonable to delay construction of Legacy Parkway or I-15 reconstruction until all or part of maximum future transit is in place.

- Consistent with the findings in the Final EIS, it is not reasonable to reconstruct I-15 prior to building Legacy Parkway.

Delaying Legacy Parkway construction or I-15 reconstruction is not reasonable because doing so would incur additional costs to the traveling public of between $48 million and $498 million (combined morning and evening peak period loss of time and energy cost). The $48 million additional cost results from delaying both Legacy Parkway and I-15 until maximum transit improvements are completed, but still building Legacy before reconstructing I-15. The $498 million additional cost results from delaying Legacy until after I-15, so that I-15 reconstruction is done without the benefit of an alternate route for freeway traffic. Additional impacts associated with delaying construction of one or both highway projects include increased congestion delays and increased diversion of long-distance traffic and trucks to local streets resulting in potential for increases in accidents.

The results of the analysis of Scenarios 1 and 2 also show that maximum future transit would not reduce the immediacy of the need for Legacy Parkway or I-15 reconstruction because travel demand exceeds capacity in both scenarios. Comments received during the public scoping period requested that the Supplemental EIS determine whether constructing mass transit and reconstructing I-15 would meet travel demand such that Legacy Parkway would not be necessary. The results of Scenario 1 illustrate that mass transit and I-15 reconstruction alone would not meet travel demand. All components of the Shared Solution are needed to meet the travel demand. Even with maximum future transit implemented by 2008, delaying construction of Legacy Parkway (Scenario 2) would fail to meet demand from 2005 to 2015. Delaying Legacy further so that maximum future transit provides the only corridor-length alternative to I-15 during its reconstruction (Scenario 1) would substantially fail to meet demand during the I-15 reconstruction period, 2008 to 2012.

The results indicate that it is more reasonable to build Legacy Parkway first because I-15 would experience extreme congestion without Legacy Parkway to absorb the displaced traffic during I-15 reconstruction. Effects would include substantially slower travel speeds and higher travel times. Scenarios 3 and 4, which sequence Legacy Parkway construction prior to I-15 reconstruction, further strengthen the reasonableness of constructing Legacy Parkway first because both scenarios provide faster travel times on balance over the 10-year construction period, resulting in almost $500 million in lower costs to the traveling public.

Both Scenarios 3 and 4 meet the purpose of and need for the project related to providing an alternative north-south route during I-15 reconstruction. Scenarios 3 and 4 indicate that there are no additional benefits of sequencing maximum future transit before Legacy Parkway, and no negative impacts of building maximum future transit concurrently with Legacy Parkway.

This supplemental EIS incorporates the following findings of the sequencing analysis.

- Constructing maximum future transit prior to building Legacy Parkway, and reconstructing I-15 prior to building Legacy Parkway would delay the direct impacts on wetlands that would result from construction of Legacy Parkway for 3 to 7 years, respectively.

- Mass transit, even when analyzed with maximum future transit assumptions in place, does not alleviate the immediacy of the need for Legacy Parkway or I-15 reconstruction.

- Because of the high cost to the traveling public, it is not reasonable to delay construction of Legacy Parkway or reconstruction of I-15 until all or part of maximum future transit is in place.

- Implementation of either Scenario 3 or Scenario 4 would more effectively meet the project purpose and need for an alternate route.

Section 2.5

Wildlife Issues

2.5.1 Summary of Approach for Supplemental EIS

The proposed Legacy Parkway project is located in the Great Salt Lake Ecosystem (GSLE), which is internationally important to millions of migratory birds as a major stopover, staging, and breeding area. The court remand stated that by limiting the impact evaluation to habitat within a 305-m (1,000-ft) area, the federal lead agencies had failed to consider impacts on migratory bird populations that use the larger GSLE. In response to the court's holding, UDOT updated and expanded on the Final EIS analysis of impacts on wildlife by considering direct, indirect impacts, and past and possible future land use change effects on wildlife, particularly migratory species, within and beyond the 305-m (1,000-ft) project study area in the GSLE. The following impacts were identified for evaluation in the preparation of the *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum* (Jones & Stokes 2004) (wildlife technical memorandum).

- Direct habitat loss.
- Combined effects of changes in lake level and direct habitat loss from project alternatives.
- Habitat fragmentation.
- Changes in habitat quality (e.g., from changes in air and water quality).
- Habitat modification (e.g., from changes in hydrology and impacts associated with proposed landscaping).
- Wildlife highway mortality.
- Artificial light disturbance.
- Highway noise disturbance.
- Human disturbance.
- Effects on special-status wildlife.
- Cumulative impacts (including effects of historic, present, and reasonably foreseeable future actions).

To ensure that the best available scientific information was acquired and appropriately analyzed for this analysis, a two-tiered technical review process was established. For the first tier of the analysis, a wildlife

technical team (WTT) was formed, consisting of ecologists and biologists from FHWA, the Corps, and UDOT, and their representative technical consultants. The WTT was responsible for reviewing and making recommendations on the general technical analysis approach and the methods used to identify technical issues requiring a higher level of review. For the second tier, a science technical team (STT) was formed, consisting of the WTT members and wildlife biologists and technical experts from the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), and Utah Department of Natural Resources (UDNR). The STT provided focused review of and recommendations on specific scientific aspects of data and methods used, and on the results of analyses as they were completed. (See Chapter 5, *List of Preparers*, of the wildlife technical memorandum for a complete list of the members of the WTT and the STT.) This review process was designed to provide an efficient and comprehensive approach for completing the technical analysis and ensuring quality control of the results presented in the wildlife technical memorandum.

2.5.2 Summary of Analysis Presented in Wildlife Technical Memorandum

The detailed results of the technical memorandum analysis can be found in Section 4.13, *Wildlife*, of this Supplemental EIS, and therefore are only briefly summarized here. The proposed Legacy Parkway project would result in the direct loss of between 252 ha (624 ac) and 350 ha (864 ac) of wildlife habitat within the project study area, depending on the alternative. These losses are summarized by alternative in Table 2.5-1

Table 2.5-1 Direct Wildlife Habitat Loss

Alternative	Wetland/Riparian Habitats	Upland Habitats	Total Habitat Loss
No Build	0 ha (0 ac)	0 ha (0 ac)	0 ha (0 ac)
Alternative A	44.4 ha (109.8 ac)	214 ha (531.2 ac)	258.4 ha (641 ac)
Alternative B	79.4 ha (196.2 ac)	270.2 ha (667.8 ac)	349.6 ha (864 ac)
Alternative C	63.4 ha (156.7 ac)	198.1 ha (489.5 ac)	261.5 ha (646.2 ac)
Alternative E	52.3 ha (129.3 ac)*	200.2 ha (494.8 ac)	252.5 ha (624.1 ac)

Note:
* Wetland habitat acreage includes Final EIS delineated wetland area 46 ha (114 ac) in addition to non-delineated riparian areas classified within this wildlife habitat type.

The analysis results show that all the Legacy Parkway build alternatives would have adverse direct and indirect effects and contribute to overall historic and future land use change effects on local wildlife populations, including migratory birds. Direct effects include not only habitat loss and degradation but also habitat fragmentation, highway related mortality and noise disturbances. Indirect effects include artificial light disturbance, human disturbance, changes in hydrology, changes in air and water quality and ecological changes from highway landscaping. These adverse effects could potentially contribute to declines in the local density and diversity of wildlife species in the project area. The area of wildlife habitat affected by direct habitat loss is small, approximately 0.1 percent of the total amount of wildlife habitat available throughout the regional study area. Highway noise effects would affect approximately 1.3 percent of existing wildlife habitat in the regional study area. Loss or degradation of these areas and

biological functions (reproductive capacity of birds affected by noise) would add to the historic and foreseeable future habitat loss and associated impacts on wildlife in the GSLE.

2.5.3 Conclusions

The wildlife technical memorandum was prepared in cooperation with ecologists and biologists from FHWA, the Corps, UDOT, and their representative technical consultants, as well as wildlife biologists and technical experts from USFWS, U.S. EPA, and UDNR. The analysis used the best available scientific information and appropriately analyzed direct and indirect impacts, and the historic and future land use change effects on wildlife that occur, or could potentially occur within the project study area..

This supplemental EIS incorporates the following findings of the wildlife analysis.

- All the Legacy Parkway build alternatives would result in adverse direct and indirect effects and contribute to cumulative habitat loss, habitat fragmentation, and noise effects on local wildlife populations, including migratory birds.
- These impacts alone, however, would not likely affect the long-term viability of any wildlife species in the GSLE.
- Mitigation for these impacts is being incorporated into the project through implementation of the Legacy Nature Preserve.

Chapter 3

Alternatives

Chapter 3
Alternatives

This section of the Supplemental EIS provides a brief summary description and update of the alternatives that were analyzed and presented in Chapter 2 of the Final EIS, as well as information on alternatives that have been evaluated since publication of the Final EIS.

3.1 Summary of Alternatives Presented in Final EIS

In the Legacy Parkway Final EIS (Federal Highway Administration et al. 2000), the analysis of alternatives presented in Section 2.1 identified all non-highway and highway alternatives that might reasonably meet the project purposes. The following sections summarize the evaluation of these alternatives as presented in Section 2.1 of the Final EIS.

3.1.1 Non-Highway Alternatives

Non-highway alternatives were evaluated to identify which were reasonable for additional consideration and review. The alternatives were evaluated based on factors that allowed determination of their feasibility/reasonableness and their potential to address the purpose and need. These factors included operational features, cost, constructability, safety, capacity, geography, and demographic characteristics. The following non-highway alternatives were evaluated in the Final EIS.

- Arterial roads.
- Transportation management strategies.
- Mass transit.

The analysis in the Final EIS determined that none of the non-highway alternatives provided enough capacity alone to meet the anticipated transportation demand in 2020. Although the non-highway alternatives provided some capacity, none (alone or even combined) was a reasonable alternative to evaluate further on a stand-alone basis. The Final EIS concluded that, if these alternatives were implemented, there would still be an unmet demand of 34 percent in the North Corridor in 2020 that would require additional high-capacity roadway improvements. Therefore, a need was identified to either widen I-15 or construct an additional high-capacity roadway such as Legacy Parkway, or both (see Section 2.1.5 and Figure 2-2 of the Final EIS). Nevertheless, the Final EIS assumed that all the non-highway alternatives would be implemented, and their contribution to meeting the capacity needs of the North Corridor was subtracted from the total corridor capacity demand to determine the need for additional highway improvements.

Based on updated travel demand modeling, this Supplemental EIS explains the future travel demands and capacity needs without using the concept of "unmet demand" that was useful for the Final EIS (see Appendix B). Based on the results of the updated travel demand analysis conducted for this Supplemental EIS, the conclusions reached in the Final EIS have not changed. As described in Section 3.2.2 of this Supplemental EIS, even with full implementation of arterial road improvements, transportation management strategies, and an expanded mass transit scenario developed for this Supplemental EIS, I-15 would still operate at LOS F in 2020.

3.1.2 Expansion of I-15

The Final EIS alternatives analysis also considered widening I-15 in the North Corridor from its current eight-lane configuration to meet the remaining demand not met by the non-highway alternatives. An analysis was performed to determine how many additional lanes could be added to I-15 before the efficiency of the highway diminished. The analysis determined that widening I-15 to more than ten lanes was not reasonable (see Section 2.1.6 of the Final EIS). The ten-lane I-15 option considered in both the Final EIS and the Supplemental EIS would include one high-occupancy vehicle (HOV) lane in each direction, and eight general-use lanes. This ten-lane I-15 alternative was then combined with the non-highway alternatives to determine how these options together would accommodate the anticipated capacity needs in the North Corridor. As shown in Figure 2-3 in the Final EIS, the analysis found that this combination would meet only 74 percent of the total anticipated demand in 2020 before exceeding peak-hour LOS D. The Final EIS therefore concluded that there was a need for an additional high-capacity highway, such as Legacy Parkway, in the North Corridor.

3.1.3 Development of the Shared Solution Concept for the North Corridor in the Final EIS

The Final EIS analysis concluded that there was a need for Legacy Parkway as part of the multi-component Shared Solution for the North Corridor as planned by regional authorities (see Section 2.1.7 of the Final EIS). The Shared Solution for the North Corridor as presented in the Final EIS included the following elements.

- Transportation management strategies (intelligent transportation systems [ITS], transportation systems management [TSM], and transportation demand management [TDM]).
- Improvements to various arterial roadways (considered as part of the future baseline).
- Additional transit service.
- Expansion of I-15.
- Legacy Parkway.

ITS, TSM, and TDM are operational and demand management strategies that reduce travel demand and improve the efficiency of the existing and proposed transportation systems without adding roadway capacity. At the time the Final EIS was prepared, the additional transit service portion of the Shared Solution was not allocated to particular modes, such as commuter rail or express bus, but rather left the transit mode allocations to the then on-going UTA evaluation. In addition to the elements listed above, build-out of arterial roads in accordance with the WFRC long range plan was also considered as part of the future baseline for the Shared Solution.

3.1.4 Legacy Parkway Alternatives Analyzed in Final EIS

Regional Alignments Considered

As part of the alternatives evaluation process in the Final EIS, regional alignments were developed for Legacy Parkway. A *regional alignment* is a broad geographic corridor in which specific project alternatives could be located. The Final EIS considered the following five regional alignments for Legacy Parkway (see Section 2.3 of the Final EIS). These alignments are shown in Figure 3-1.

- Antelope Island—from Salt Lake City to Antelope Island and north to I-15 near Kaysville.
- Trans-Bay—from Salt Lake City to Farmington Bay, with a bridge across the bay and a connection to I-15 near Kaysville.
- Farmington Bay—from Salt Lake City to Farmington Bay, with a causeway across the bay between West Bountiful and Farmington.
- Railroad—within the corridor of the Denver & Rio Grande Railroad (D&RG) or the Union Pacific Railroad (UPRR) from Salt Lake City to I-15 near Kaysville.
- Great Salt Lake—from Salt Lake City to I-15 near US-89, skirting the eastern side of Great Salt Lake.

These five regional alignments were evaluated at a corridor-planning level and compared by cost, impacts on wetlands, and environmental impacts on existing developed areas (see Section 2.3.2 of the Final EIS for detailed analysis). Based on the Final EIS evaluation, the Great Salt Lake regional alignment was selected. The Antelope Island, Trans-Bay, and Farmington Bay regional alignments were eliminated because of their high costs and impacts on wetlands. The railroad regional alignment was eliminated in the Final EIS because of its high costs and impacts on existing development. A detailed reevaluation of the D&RG regional corridor is presented in Section 2.2 of this Supplemental EIS.

Cost estimates for each of the regional alignment alternatives were developed as part of the Final EIS analysis. As part of the Supplemental EIS process, the cost estimates for the regional alignments were revised and updated. The revised, updated cost estimates are provided below in Table 3-1. The revised regional corridor cost estimates show that the costs associated with a highway in these corridors have increased since June 2000 when the cost estimates were prepared for the Final EIS. This increase can be attributed primarily to inflation between 2000 and 2004, refining the assumptions used for estimating costs, and applying a consistent methodology for estimating costs.

As shown in Table 3-1, the cost estimate for the UPRR regional alignment has decreased since the Final EIS. The costs for this regional alignment were estimated at a different level of detail for the Final EIS because the UPRR line was active, it was surrounded by petroleum processing plants, and alternatives within that regional alignment would require relocating a major refinery. Therefore, a macro-scale (less detailed) calculation was appropriate. For the Supplemental EIS, FHWA required a more detailed estimate for all the regional alignments.

Table 3-1 Updated Cost Estimates for Regional Alignments

Regional Alignment	Estimated Cost (in millions)	
	Final EIS 2000[1]	Supplemental EIS 2004[2]
Antelope Island	$1,400	$1,525
Trans-Bay	$1,460	$1,868
Railroad		
D&RG	$460	$589[3]
UPRR	$1,900	$1,702
Great Salt Lake	$300	$439[3]
Farmington Bay	$520	$830

Notes:

[1] Source: Federal Highway Administration et al. 2000.

[2] Source: HDR Engineering, Inc. 2004.

[3] Detailed cost estimates of specific alignments within the D&RG regional corridor and Alternative E within the Great Salt Lake regional corridor are presented in Chapter 2, Section 2.2, of this Supplemental EIS.

Estimates shown in Table 3-1 include construction materials, right-of-way, and approximated wetland mitigation. Preliminary engineering, stipends, and incentives are items specific to the construction contracts for Legacy Parkway and were not included in the estimates listed above or the estimates in the Final EIS. However, these items were included in the total cost of the Legacy Parkway project ($451 million) that was documented after the Final EIS was published.

Logical Termini

An evaluation was performed for the Final EIS to determine the logical termini for the proposed Legacy Parkway. Based on that evaluation, the Final EIS concluded that the southern terminus should be at I-215 at 2100 North in Salt Lake City, and the northern terminus should be at the US-89/I-15 interchange in Farmington (see Section 2.2.1 of the Final EIS). The basic study area for developing potential alternatives has not changed since the Final EIS. Although the broad study area for the Final EIS included regional options west of the Salt Lake City airport, the Final EIS was clear that there were no plans in connection with Legacy Parkway to study or build such a road. That conclusion still applies for this Supplemental EIS. The decision not to have any transportation improvements in the vicinity of the Salt Lake City airport still stands.

3.1.5 Project Alternatives Analyzed in Detail in Final EIS

The Final EIS considered in detail the No-Build Alternative and four alignment alternatives within the Great Salt Lake regional alignment: Alternative A, Alternative B, Alternative C, and Alternative D (Final EIS Preferred Alternative). The four build alternatives are shown in Figure 3-2. All build alternatives analyzed in the Final EIS included a trail system for pedestrian, bicyclist, and equestrian use. In its 404(b)(1) alternatives evaluation, the Corps determined that removing the trail was not practicable, and the court decision upheld the Corps evaluation (*Utahns for Better Transportation et al v. U.S. Department of Transportation et al.* [305 F.3d 1152 10th Cir. 2002 p. 64]). The five project alternatives, including the No-Build, are summarized below.

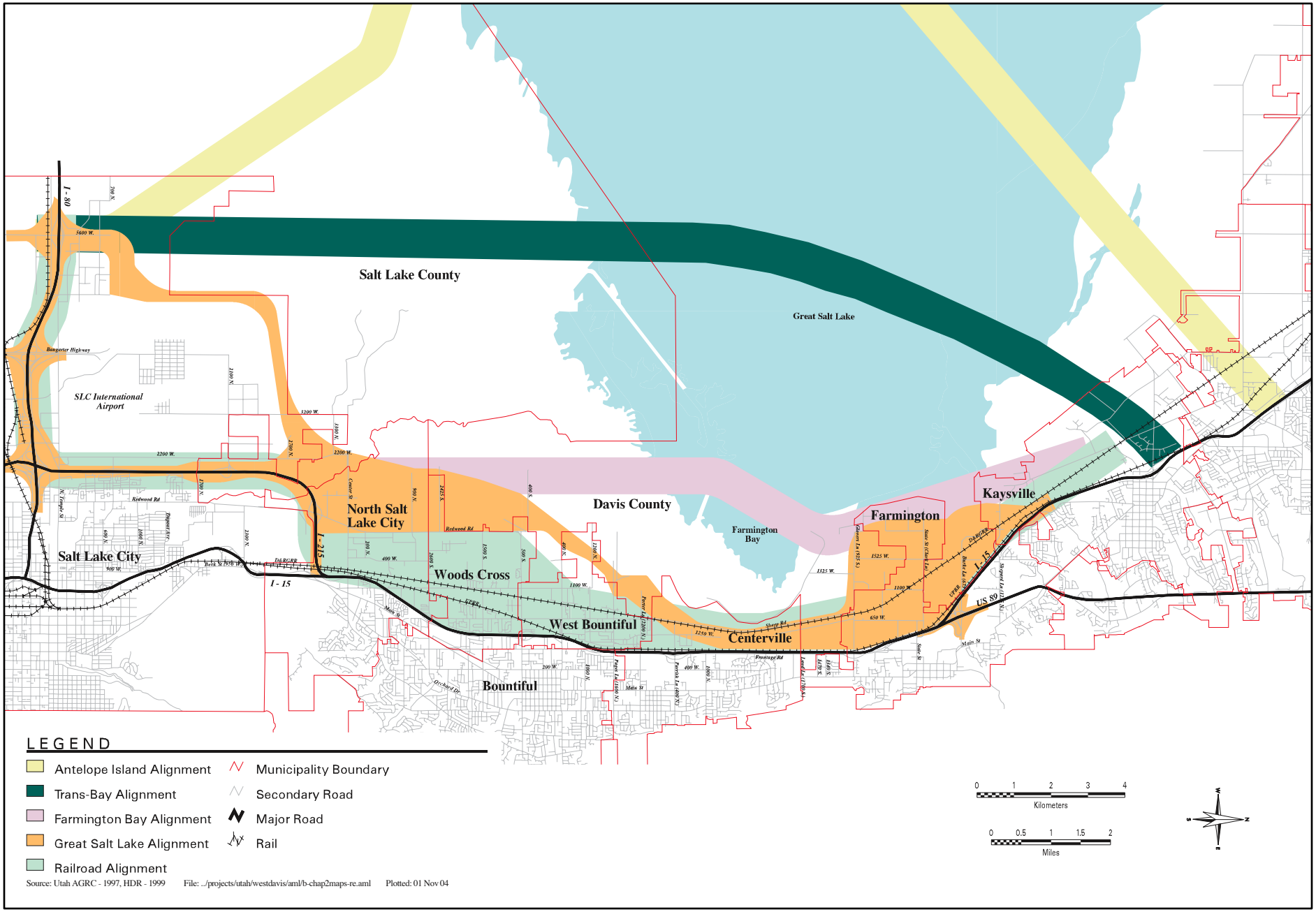

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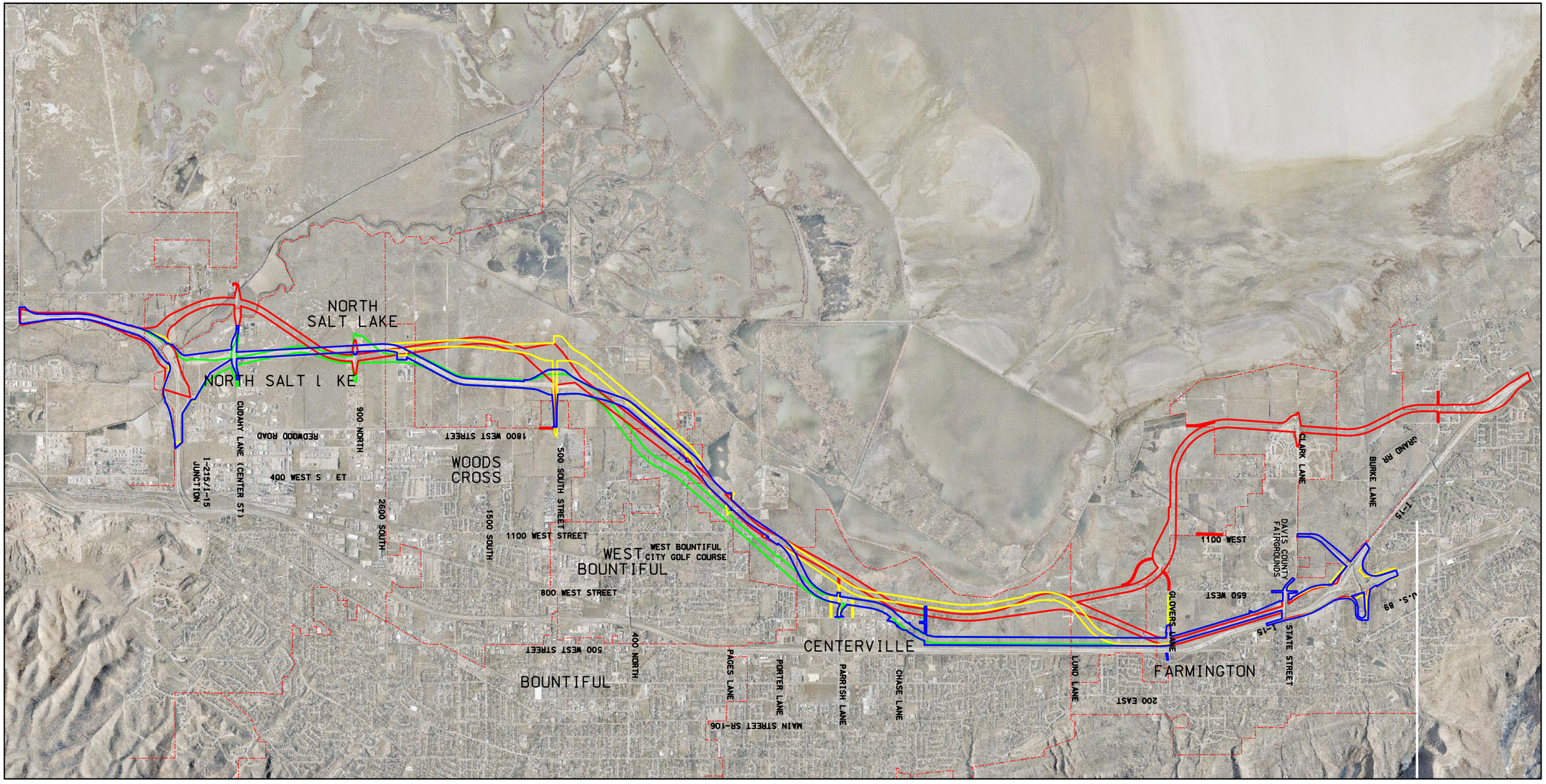
Figure 3-1
Regional Alignments Evaluated in the Final EIS



LEGEND

- Alternative A
- Alternative B
- Alternative C
- Alternatives D & E
- Municipality Boundary

0 1 2 KILOMETERS

0 0.5 1 MILES

W S N E

Figure 3-2
Build Alternatives Evaluated in the Final EIS and Reevaluated in the Supplemental EIS

No-Build Alternative

The No-Build Alternative in the Final EIS included the I-15 North initial project, which added two general-use lanes in the median of I-15 from I-215 in North Salt Lake to US-89 in Farmington. The lanes were added to temporarily relieve congestion on I-15 until a permanent transportation solution is constructed. Construction of the I-15 North initial project was completed in 2001. The No-Build Alternative in the Final EIS also included I-15 South project, which was under construction at the time of publication of the Legacy Parkway Final EIS; the 600 North interchange was the northern boundary of the I-15 South project. Construction of the I-15 South project, including the 600 North interchange, was completed in 2002. However, the No-Build Alternative did not include either the Legacy North project or the full I-15 North expansion project, which would widen I-15 to ten lanes from 100 South in Salt Lake City to 200 North in Kaysville.

The No-Build Alternative also included various improvements to US-89 and existing arterials that were already included in the WFRC long range plan at the time of the Final EIS, additional programmed transit, and local transportation projects that were planned by local governments. The No-Build Alternative analyzed in the Final EIS included only the programmed commitments to transit. (See page 2-38 of the Final EIS.) Some of these improvements have been constructed since publication of the Final EIS. The No-Build Alternative assumed that Legacy Parkway would not be built.

Alternative A

Alternative A was the easternmost Legacy Parkway alternative presented in the Final EIS. It included two frontage roads. The southern terminus was located at the I-215/2100 North interchange in Salt Lake City. From the I-215 interchange, Alternative A proceeded north, crossed Center Street and 900 North in North Salt Lake, and proceeded to a point 0.6 km (0.3 mi) west of the intersection of 500 South and Redwood Road. The alignment then turned northeast for approximately 4.5 km (2.8 mi) before crossing the D&RG railroad tracks 0.5 km (0.3 mi) south of Parrish Lane in Centerville. The alignment then turned north and crossed Parrish Lane, then turned northeast and crossed 1250 West and continued to the UPRR tracks. Alternative A paralleled the UPRR tracks on the western side until its terminus at the I-15/US-89 interchange in Farmington.

Alternative B

Alternative B was the westernmost alternative for the segments in North Salt Lake and Farmington. It included four frontage roads. As with Alternative A, the southern terminus was at the I-215/2100 North interchange in Salt Lake City. A new interchange would have been constructed 0.9 km (0.6 mi) west of the existing Redwood Road interchange. The Alternative B alignment then proceeded northwest and then northeast across Center Street and 900 North in North Salt Lake, and then proceeded to a point 0.6 km (0.3 mi) west of the intersection of 500 South and Redwood Road. The alignment then proceeded northeast to Parrish Lane and continued northeast and across the D&RG tracks and Sheep Road, turned north and paralleled the D&RG tracks along the eastern side. Near Lund Lane in Farmington, Alternative B split into two legs, creating two northern termini locations, one at the I-15/US-89 interchange in Farmington and one at I-15 near the Kaysville rest area.

Alternative C

Alternative C was the westernmost alternative for the segment in Centerville. It included three frontage roads. As with Alternatives A and B, the southern terminus was at the I-215/2100 North interchange in Salt Lake City. The alignment followed Alternative A to 900 North in North Salt Lake, at which point it

followed the Alternative B alignment to 500 South. Alternative C then became the westernmost alignment through West Bountiful, and then rejoined the Alternative B alignment just south of Pages Lane. Through Centerville, it ran along the west side of the D&RG tracks and Sheep Road until it crossed the tracks approximately 0.6 km (0.4 mi) south of Lund Lane. The Alternative C alignment continued northeast for about 1.0 km (0.6 mi) before turning north to parallel the UPRR tracks until its terminus at the I-15/US-89 interchange in Farmington.

Alternative D (Final EIS Preferred Alternative)

Alternative D, the Preferred Alternative presented in the Final EIS, was a combination of portions of segments of Alternatives A and C. Alternative D (Final EIS Preferred Alternative) followed the Alternative C alignment south of 900 North in Woods Cross, and then transitioned to the Alternative A alignment just north of 900 North. The Preferred Alternative continued on the Alternative A alignment to a point just north of 500 South in West Bountiful, then transitioned to an alignment about 80 m (264 ft) east of and parallel to Alternative C. It then rejoined Alternative C just south of Pages Lane in West Bountiful and followed Alternative C to Porter Lane in Davis County. At this point, the Preferred Alternative transitioned east and coincided with Alternative A just south of Parrish Lane in Centerville. From there to the I-15/US-89 interchange, the Final EIS Preferred Alternative followed Alternative A. The Preferred Alternative included three frontage roads.

3.1.6 Reevaluation of Project Alternatives Using Revised Travel Demand Model

As part of the Supplemental EIS process, revised travel demand modeling was conducted using the WFRC 2004 regional travel demand model (version 3.2). Table 3-2 and Figure 3-3 show the results of the updated travel demand modeling. Table 3-3 provides a summary description of some of the major roadway network assumptions used in evaluating the alternatives presented in Figure 3-3.

Table 3-2 I-15 and Legacy Parkway Operating Conditions in 2020 at Woods Cross Screenline under No-Build Alternative and Shared Solution Scenarios

Measure of Effectiveness	No-Build Alternative[1]	Shared Solution[2]
I-15		
Peak period, peak direction LOS[3]	7,890 pcpl (LOS F)	6,020 pcpl (LOS D)
Legacy Parkway		
Peak-period, peak-direction LOS[3]	—	5,120 pcpl (LOS D)

Notes:

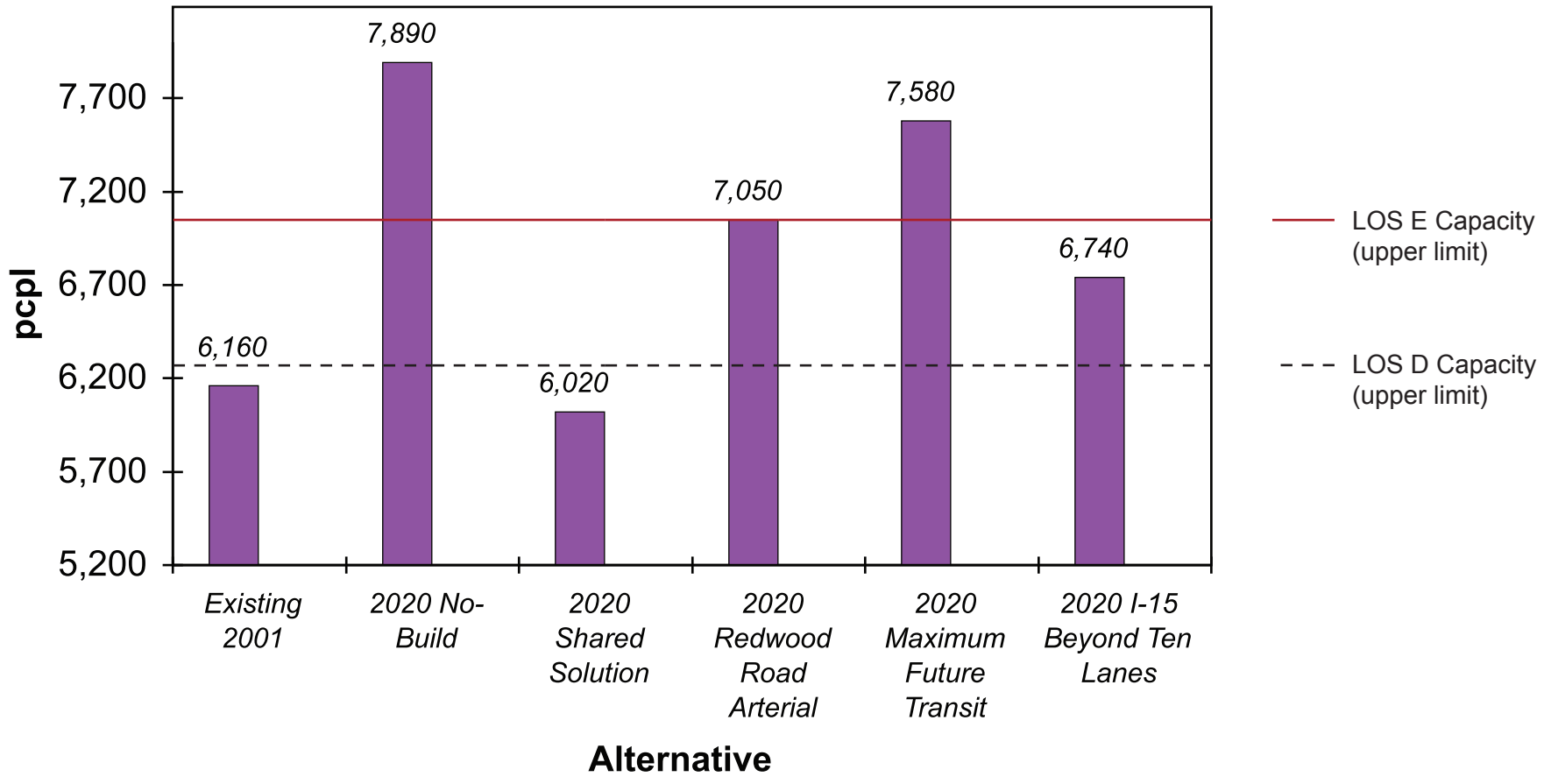
1 The No-Build Alternative includes all elements in the WFRC long range plan for 2020, except for Legacy Parkway and the Legacy North project. The long range plan in 2020 does not include full widening of I-15 in the North Corridor. It includes transit mode share of 4.8 percent.

2 The Shared Solution includes a ten-lane I-15; four-lane Legacy Parkway; projected maximum future transit mode share of 5.3 percent; improved arterials; and TSM, ITS, and TDM.

3 The peak-period LOS is the average condition during the 3-hour p.m. period, which includes the peak hour and the hour immediately before and the hour immediately after the peak hour.

Pcpl = passenger-car equivalents per lane.

Source: WFRC 2004 travel demand model (version 3.2).



pcpl = passenger car equivalents per lane

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Figure 3-3
I-15 Traffic Volume, Peak Period Peak Direction

Table 3-3 Summary Description of Network Assumptions for Evaluating Alternatives

Alternatives	I-15 Configuration	Legacy Parkway	Transit	Redwood Road	Arterial Street Plans	Demand Year
Existing 2001	Highway and transit network as they exist in 2001 per the calibrated WFRC model	Highway and transit network as they exist in 2001 as per the calibrated WFRC model	Highway and transit network as they exist in 2001 per the calibrated WFRC model	Highway and transit network as they exist in 2001 per the calibrated WFRC model	Highway and transit network as they exist in 2001 per the calibrated WFRC model	2001
No-Build	8 lanes	Not built	WFRC long range plan	5 lanes	WFRC long range plan	2020
Shared Solution	10 lanes (includes 2 HOV lanes)	4 lanes	maximum future transit	5 lanes	WFRC long range plan	2020
Redwood Road Arterial	8 lanes	Not built	maximum future transit	8 lanes (with limited access control)	WFRC long range plan	2020
Maximum Future Transit	10 lanes	Not built	maximum future transit	5 lanes	WFRC long range plan	2020
I-15 Improvements Beyond Ten Lanes	12 lanes	Not built	maximum future transit	5 lanes	WFRC long range plan	2020

Notes:

Although the Legacy North project is in the WFRC long range plan, it was not included in the future network for the alternatives evaluation analysis in this Supplemental EIS.

The WFRC travel demand model (version 3.2), February 2004 includes TSM, ITS, and TDM.

As shown in Table 3-2 and Figure 3-3, I-15 would operate at LOS D during the peak period, peak direction under the Shared Solution with a four-lane Legacy Parkway. The combined total volume on I-15 plus Legacy Parkway under the Shared Solution exceeds the volume on I-15 under the No-Build Alternative because traffic accommodated on Legacy Parkway and widened I-15 under the Shared Solution is forced onto local streets under the No-Build Alternative. The higher total volume is also a result of the latent or suppressed demand created by the LOS F condition under the 2020 No-Build Alternative, which is discussed in Section 1.2.4 of this Supplemental EIS. Based on the results of the updated travel model as shown in Table 3-2, the decision in the Final EIS to carry forward Legacy Parkway to be studied in detail is still valid to meet projected regional travel demand needs. The Legacy Parkway alternatives under the Shared Solution scenario were therefore carried forward for detailed study and reevaluation in this Supplemental EIS. See Appendix B for detailed documentation of the travel demand modeling process. Although the total population percentage increases shown in this Supplemental EIS are lower than those reported in the Final EIS, the annual rate of population growth (1.9 percent) is the same for both analyses. The difference is due to the change in the number of years for the projections; the Final EIS projected growth from 1997 to 2020, while this Supplemental EIS is based on 2001/2002 to 2020.

As shown in Table 2-9 in the Final EIS, the level of service predicted for I-15 under the Shared Solution was LOS E (2,030 passenger-car equivalents per hour per lane [pcphpl]) in the peak hour, peak direction.

Since publication of the Final EIS, the *Highway Capacity Manual* (Transportation Research Board 2000) has increased the maximum vehicle flow that determines LOS D for a travel lane from 1,985 pcphpl (used in the Final EIS) to 2,090 pcphpl. LOS E, as used in the Final EIS, would now be defined as LOS D under today's highway capacity definition. The 3-hour peak period capacity per lane is three times the 2,090 peak hour capacity, or 6,270 passenger-car equivalents per lane (pcpl).

3.2 Additional Project Alternatives Evaluated in This Supplemental EIS but Eliminated from Detailed Study

This section presents results of new evaluations performed for this Supplemental EIS of two alternatives that were considered in the Final EIS (D&RG Regional Corridor Alternative and I-15 Beyond Ten Lanes Alternative) and five other alternatives (Parkway Facility Adjacent to Redwood Road Alternative, Redwood Road Arterial Alternative, I-15 with Reversible Lanes Alternative, Legacy Parkway Beyond Four Lanes Alternative, and a newly defined scenario for a Maximum Future Transit Alternative) developed for this Supplemental EIS. The two alternatives already analyzed in the Final EIS were reevaluated in this Supplemental EIS, as described below in Section 3.2.2. Two new alternatives were also developed and analyzed in response to input received from the public during the Supplemental EIS scoping process. To analyze these alternatives, evaluation measures were developed based on the purpose and need and other evaluation criteria.

Mass transit solutions were reviewed using the updated WFRC 2004 travel demand model (version 3.2) as part of the Supplemental EIS process, and a new robust transit scenario (maximum future transit) was developed as part of the analysis for integrating Legacy Parkway with mass transit. The updated WFRC travel model predicts that, with the transit system defined in the adopted current WFRC long range plan (adopted in December 2003), transit will carry 4.8 percent of the travel demand in the North Corridor in 2020. The Maximum Future Transit Alternative analyzed in this Supplemental EIS presents a scenario under which transit could be refined and enhanced in the corridor such that transit would carry 5.3 percent of demand in 2020. According to the model results, the Maximum Future Transit Alternative scenario alone would not meet the capacity demand in the North Corridor. For all alternatives evaluated in the Final EIS and Supplemental EIS, the lead agencies considered that a portion of the travel demand need in the corridor would be met by transit. For the Supplemental EIS, that transit component was based on maximum future transit, the robust transit scenario developed as part of the integration analysis, as summarized in Section 2.3.

3.2.1 Criteria for Evaluating Additional Alternatives

The primary purpose of the Legacy Parkway project is to provide capacity to help relieve existing and projected travel demand in the North Corridor through 2020, and the secondary purpose is to provide an alternate north-south route through the North Corridor (see Chapter 1, *Purpose of and Need for Action*). The purpose and need statement summarizes the issues in the corridor and was used to develop criteria for evaluating potential project alternatives. The criteria are measures of effectiveness by which potential alternatives are evaluated to determine how well they meet the project purpose and need, and which are reasonable to carry forward for further detailed and specific evaluation.

Ability to Meet Project Purpose and Need

As part of the Supplemental EIS alternatives screening process, measures were developed to evaluate the ability of the potential alternatives to address capacity and alternate route deficiencies (project purpose and need). The primary criterion for screening alternatives is the ability of the alternative to relieve congestion through 2020, such that I-15 can operate at a minimum LOS D. The peak-period level of service was used as the measure of effectiveness for reducing congestion and for screening alternatives. The peak period is the 3-hour period that includes the single peak hour (hour with the worst level of service) and the peak shoulders (the peak shoulders are the hour before and the hour after the peak hour). The level of service during the peak period is the average of the 3-hour peak period. Alternatives were evaluated to determine whether they would relieve traffic congestion during this peak 3-hour period by providing at least a minimum LOS D capacity on I-15.

Level of service (LOS) is a measure of traffic flow efficiency and congestion, and is represented by a letter "grade" ranging from LOS A for excellent conditions (free-flowing traffic) to LOS F for failure conditions (extremely congested, stop-and-go traffic). LOS B through LOS E describe progressively worsening traffic conditions. In urban areas, LOS E is typically considered a poor operating condition. LOS D is acceptable for urban and suburban conditions where constraints make it unreasonable to reach the desired LOS C (American Association of State Highway and Transportation Officials 2001). The LOS D goal is also consistent with the WFRC Congestion Management System (CMS) report (Wasatch Front Regional Council 2004). The Final EIS used LOS D in the *peak hour* to test the effectiveness of potential alternatives. The Supplemental EIS uses a standard of average LOS D for the 3-hour *peak period*. Although a single hour may exhibit higher peak-direction traffic levels, the shoulder hours will remain sufficiently low that the 3-hour average will be LOS D. This standard allows that, while peak-hour conditions may spread into adjacent hours in the future, the spread will not be substantial enough to raise the shoulder hour LOS, nor the 3-hour average, to worse than peak-period LOS D. The flow rate of vehicles at failure conditions (LOS F) is highly variable and can create breakdown (stop and go) conditions. The peak period measure allows evaluation of the degree to which peak-hour failure conditions will erode conditions in the hours before and after the peak hour. Therefore, evaluation of alternatives for the Supplemental EIS is based on a threshold of average LOS D in the full 3-hour peak period, to measure each alternative's effectiveness at meeting the project purpose of reducing congestion.

Another evaluation criterion for screening alternatives, relative to their ability to meet purpose and need, is the ability to provide a single, continuous, north-south alternate route to I-15. Currently, the only continuous north-south route in the North Corridor is I-15, which has capacity and design deficiencies. The alternate route is a necessary part of an integrated transportation network that would help reduce local congestion in the communities along the North Corridor during emergencies or other highway incidents or when I-15 is closed, congested, or under construction.

None of the alternatives evaluated was screened out based solely on its inability to meet the secondary purpose of providing an alternate route.

Other Alternatives Screening Criteria

In addition to meeting purpose and need, other factors were also considered when evaluating whether an alternative was reasonable to carry forward for detailed analysis in this Supplemental EIS. These evaluation criteria included environmental factors such as impacts related to wetlands, farmland, hazardous waste sites, and Section 4(f)/6(f) resources; socioeconomic factors such as utility, business, and residential relocations, as well as community impacts; and cost. This approach is consistent with the evaluation criteria applied as part of the evaluation of alternatives analysis presented in the Final EIS (see Table 2-11 in the Final EIS). These factors are an appropriate subset of the full range of factors

considered in a detailed impact analysis because they were most frequently raised as important issues during Supplemental EIS scoping, as well as in comments on the Final EIS.

3.2.2 Results of Additional Alternatives Evaluation

D&RG Railroad Corridor Alternative

Based on the analysis presented in the D&RG technical memorandum as summarized in Section 2.2, the D&RG regional corridor was eliminated from further consideration in the Supplemental EIS as a reasonable or practicable alternative for the following reasons.

- The D&RG alignments would require substantial relocations compared to Alternative E. (Alternative E is a revised version of Alternative D, the Final EIS Preferred Alternative; Alternative E is described in detail below under *Proposed Alignments and Project Features*.)
- The D&RG alignments would have considerably more impacts on community cohesion.
- The D&RG alignments would have far greater noise and visual impacts.
- The D&RG alignments would eliminate a large portion of the local tax base for the City of North Salt Lake by displacing or altering access routes to businesses.
- The D&RG regional corridor alternatives would cost between $100 million and $195 million more than Alternative E.

Parkway Facility Adjacent to Redwood Road Alternative

This alternative would place the proposed Legacy Parkway highway alignment parallel to Redwood Road on the west side through North Salt Lake and Woods Cross in the southern portion of the study corridor. The alignment for this alternative would merge with the Alternative D/E alignment about 1.6 km (1.0 mi) north of 500 South in Woods Cross. It is essentially a more easterly variation of Alternative A considered in the Final EIS. The Supplemental EIS analysis assumes that this alternative would be implemented in addition to widening I-15 to ten lanes, projected robust transit of 5.3 percent, and other improvements identified in the WFRC long range plan such as TSM, TDM, and improved arterials, except for Legacy Parkway and the Legacy North project. This alternative was considered during the development of the 1998 Major Investment Study (MIS) (Page 2.21, Section 2.3.4 Central Roadway Alternative), and was suggested again during the scoping meetings for the Supplemental EIS. However, the 1998 MIS recommended the West Roadway Alternative in the southern portion of that study area, which corresponds to the current Legacy Parkway corridor.

Section 4(f) of the of the UDOT Act of 1966 sets the requirements for considering park and recreation lands, wildlife and waterfowl refuges, and historic and archeological sites when developing transportation projects. FHWA has to consider the impacts from any transportation project on these types of Section 4(f) properties. FHWA cannot select an alternative that would use a 4(f) property unless it can demonstrate that there is no prudent and feasible option to using the property and that the alternative minimizes harm to the property. If there is a prudent and feasible alternative that avoids 4(f) properties, it must be selected. From I-215 to 1.6 km (1.0 mi) north of 500 South, the Parkway Facility Adjacent to Redwood Road Alternative would affect eight historic residential structures eligible for the National Register of Historic Places that are afforded protection under Section 4(f) (see Figure 5-3). The structures are on the west side of Redwood Road just south of where it becomes 500 South. They could be avoided by shifting the

alignment west to avoid Section 4(f) impacts, but that would place the alignment essentially on the same alignment as Alternative E. Shifting the alignment east would put it on top of Redwood Road, and Redwood Road is needed to accommodate local traffic in the corridor currently accessing Redwood Road (see Table 4.3-9 in Section 4.3.3.4 *Travel Patterns and Accessibility*). Moving the alignment east would also cause conflicts with Skypark Airport, including impacts on the airport's entrance, offices, hangars, and aircraft and automobile parking areas. The entire airport would likely have to be relocated. Because Alternatives A, B, C, and E are feasible and prudent alternatives that avoid these 4(f) impacts in the area from I-215 to north of 500 South, this alternative is not feasible and prudent under Section 4(f) and is therefore eliminated as a reasonable alternative. See Chapter 5, *Section 4(f) and 6(f) Evaluation*, of this Supplemental EIS for a detailed discussion of Section 4(f)/6(f) resources.

Redwood Road Arterial Alternative

The Redwood Road Arterial Alternative, sometimes referred to as the "Robust Redwood Road Alternative," would widen Redwood Road to an eight-lane, partially-controlled (includes signalized intersections) facility from I-215 in North Salt Lake to 500 South in Woods Cross, at which point it would follow the Alternative D/E alignment and then connect to the I-15/US-89 interchange in Farmington. This alternative would include widening I-15 to ten lanes, projected maximum future transit, and other improvements identified in the WFRC long range plan such as improved arterials, TSM, ITS, and TDM. It does not include either Legacy Parkway or the Legacy North project (see Table 3-3).

Capacity Issues

As shown in Table 3-4 and Figure 3-3, under the Redwood Road Arterial Alternative, even with an expanded I-15 and maximum future transit, I-15 would operate between LOS E and LOS F in the peak direction for the full 3-hour peak period. This does not meet the evaluation criteria of achieving a minimum peak period LOS D standard on I-15. Therefore, this alternative would not reasonably meet the project purpose and need and was not carried forward for detailed study.

Data from the travel demand model show that almost 65 percent of the 2020 demand on I-15 is for peak-direction travel in the p.m. peak period from south of Davis County to north of Farmington, which is considered through-corridor travel. The improvements to Redwood Road under the Redwood Road Arterial Alternative would only draw 13 percent of the through-corridor traffic in the North Corridor, leaving I-15 in an unreasonably congested state, which would not meet the project purpose and need.

One reason the Redwood Road Arterial Alternative would not result in the needed reduction in congestion on I-15 is because it would still have at-grade intersections and other access points that would slow traffic and increase travel times through the North Corridor compared to travel times on Legacy Parkway or even on a still congested I-15. Because of the volume of cross traffic, traffic signals would be required at intersections approximately every 0.8 km (0.5 mi). Although these signalized intersections would provide access to businesses and local cross streets, they would impede north-south traffic flow.

Another reason this alternative would result in failure of I-15 is because it represents only three additional arterial lanes beyond the capacity of the planned five-lane Redwood Road in the baseline conditions. Redwood Road is an existing roadway, and its widening to five lanes is accounted for in the WFRC long range plan. Therefore, the net gain in capacity would be less than under the highway alternatives that provide additional (new) lanes. Even though it assumes widening I-15 to ten lanes, converting Redwood Road to a larger arterial would not provide enough additional new capacity compared to baseline conditions to provide acceptable level of service on I-15.

Table 3-4 I-15 Operating Conditions in 2020 for Alternatives Evaluated at Woods Cross Screenline

Measure of Effectiveness	No-Build Alternative[1]	Shared Solution[2]	Redwood Road Arterial Alternative[3]	Maximum Future Transit Alternative[4]
I-15				
Peak-period, peak-direction LOS	7,890 pcpl (LOS F)	6,020 pcpl (LOS D)	7,050 pcpl (LOS E/F)	7,580 pcpl (LOS F)
Legacy Parkway				
Peak-period, peak-direction LOS	–	5,120 pcpl (LOS D)	–	–

Notes:

[1] The No-Build Alternative includes all elements in the WFRC long range plan for 2020, but it does not include Legacy Parkway and the Legacy North project. The long range plan does not include the full 10-lane widening of I-15 in the North Corridor in 2020.

[2] The Shared Solution is based on the same network assumptions as the No-Build, except that it includes a ten-lane I-15, four-lane Legacy Parkway, and maximum future transit.

[3] The Redwood Road Arterial Alternative is based on the same network assumptions as the No-Build, except that it includes an eight-lane, limited-access Redwood Road; ten-lane I-15; and maximum future transit.

[4] The Maximum Future Transit Alternative is based on the same network assumptions as the No-Build, except that it includes maximum future transit and a ten-lane I-15.

pcpl = passenger-car equivalents per lane during the 3-hour p.m. peak period.

Source: WFRC 2004 travel demand model (version 3.2).

Safety Concerns

The Redwood Road Arterial Alternative does not limit the diversion of through-corridor traffic onto local streets. The resulting local congestion would inhibit Redwood Road from serving the basic arterial function of providing accessibility to local communities. In addition, the risk of accidents would increase compared to a full-access-controlled facility. Principal arterials that are similar to this alternative have an accident rate of 5.1 per million vehicle miles traveled, compared to an accident rate of 1.5 per million vehicle miles traveled for full-access-controlled facilities similar to I-15 (see Table 1-4 in Chapter 1 of this Supplemental EIS). The higher accident rate means there would be a greater risk of accidents for through-corridor traffic and potential to cause associated congestion. It is therefore undesirable from a safety standpoint to have long-distance through-corridor traffic on signalized arterial streets when a freeway alternative is available. Traffic model analysis results show that congestion levels on I-15 must reach failure conditions before the slower speeds of a signalized arterial street, even an eight-lane arterial with improved access control, would provide a benefit.

Section 4(f) Impacts/Displacements

In addition to operational deficiencies, this alternative would have several negative effects. With respect to potential impacts on Section 4(f) properties as well as displacement of residential and commercial structures, the Redwood Road Arterial Alternative is similar to the Parkway Facility Adjacent to Redwood Road Alternative. Given the location and setting of the eight Section 4(f) properties (historic residential structures) on Redwood Road, the right-of-way required for widening the existing Redwood

Road to provide an eight-lane facility would also likely affect these structures. Since these properties are protected under Section 4(f), avoidance must be considered. The existing development along Redwood Road restricts possible shifts to avoid the Section 4(f) properties, as discussed above under the Parkway Facility Adjacent to Redwood Road Alternative. Because of the proximity of these two alternatives to each other, the number of residential and commercial structures displaced would be expected to be comparable.

Community Impacts

As a local arterial, the existing Redwood Road currently accommodates easy access to residential and commercial properties. The Redwood Road Arterial Alternative would expand Redwood Road to an eight-lane, partially controlled facility, thereby changing the nature of the roadway. Physical barriers such as medians and wider pavements to cross would alter the character of the surrounding communities. In addition, pedestrians and bicyclists would have more difficult crossings at more limited locations. Because Redwood Road would be greatly expanded, it might act as a natural divider for community development, especially with developable land located west of Redwood Road. These changes would adversely affect the sense of community cohesion in North Salt Lake, Woods Cross, and West Bountiful.

Conclusion

The Redwood Road Alternative would not meet criteria identified in Section 3.2.1 related to congestion relief on I-15. It would leave I-15 operating at LOS F throughout the peak period. Furthermore, this alternative would not be a reasonable solution because of its impacts on Section 4(f) properties and displacement of residential and commercial structures, as well as its impacts on pedestrian, bicycle, and other modes, safety, and other community interests. The Redwood Road Arterial Alternative would not meet the North Corridor demand for through-corridor traffic.

Boulevard Sub-Alternative

A variation on the configuration of the Redwood Road Arterial Alternative was recommended during the Supplemental EIS public scoping phase. The recommended alternative was conceived of as a boulevard-type facility. This alternative would widen Redwood Road through North Salt Lake and Woods Cross, and then extend a new arterial road north of 500 South in Woods Cross to the west side of the power utility corridor. This alternative alignment parallels the power lines in a northeasterly direction through West Bountiful and into Centerville, and then turns east and terminates at Parrish Lane in Centerville. This alternative was evaluated assuming a full build-out of the other components of the Shared Solution, including widening I-15 to ten lanes, maximum future transit, and other improvements identified in the WFRC long range plan. The Redwood Road Arterial Boulevard-Concept Alternative was eliminated from further analysis for all the same reasons as the Redwood Road Arterial Alternative. It would require similar or greater right-of-way than the Redwood Road Arterial Alternative, it would have similar environmental and Section 4(f) impacts, and it would not draw enough of the through-corridor trips off I-15 to meet the peak-period LOS D criteria.

Maximum Future Transit Alternative (No Legacy Parkway)

Like the Final EIS, the Supplemental EIS evaluated whether transit alone (i.e., without Legacy Parkway but with other elements of the WFRC long range plan) could meet projected travel demand. The key difference in the evaluations is that the Supplemental EIS used the maximum future transit scenario for this evaluation, rather than the lower transit share projected by the WFRC travel demand model for the long range plan.

The Maximum Future Transit Alternative includes a set of enhancements to the long range plan 2020 transit program similar to the robust transit packages identified through the integration analysis (see Chapter 2, *Integration of Legacy Parkway with Mass Transit*, Section 2.3). Like integration packages A and B described in Section 2.3, the Maximum Future Transit Alternative includes the following components.

- Bus rapid transit.
- Increased commuter rail frequencies.
- Increased parking prices in the Salt Lake City central business district and at the University of Utah.
- Land use concentrations that reflect transit-oriented development.
- All other transit improvements included in the WFRC long range plan.

The Maximum Future Transit Alternative also includes widening 1-15 to ten lanes through the corridor, but it does not include construction of Legacy Parkway or the Legacy North project (see Table 3-3). As a result of the corridor capacity constraint and congestion resulting from the absence of a Legacy Parkway, travel demand model results show that transit would attract a slightly higher share of corridor travel, about 5.9 percent. While maximum future transit considered as part of the Shared Solution can attract approximately 5.3 percent, the transit share increases slightly if it is assumed that Legacy Parkway is not built and I-15 is expanded to 10 lanes. See Appendix B (Section B3.5.1) for a discussion of the different methods used to determine transit mode share for the Final EIS and the Supplemental EIS.

While enhanced transit would capture a moderate-to-high percentage of certain travel markets, the North Corridor serves a wide array of travel markets that are difficult for transit to attract. A high percentage of travel at the Woods Cross screenline has no relationship to the Salt Lake City central business district or other transit centers. Only about 5 percent of the travelers crossing the screenline in the p.m. peak period originate in the central business district and have destinations in south Davis County. About 22 percent of these travelers use transit. However, the vast majority of trips crossing the screenline originate at dispersed employment centers throughout the region or are long-distance inter-regional trips or non-commute trips made for purposes such as school, shopping, and entertainment, which have a very low transit mode share. As a result, the Maximum Future Transit Alternative would not substantially alleviate traffic on I-15.

As shown above in Table 3-4 and Figure 3-3, I-15 would operate at LOS F under this alternative in the peak direction for the entire 3-hour peak period. This does not reasonably meet the purpose and need evaluation criteria of achieving a minimum peak-period standard of LOS D in 2020. It also would provide a substantially lower level of service on I-15 than the Shared Solution (LOS D in the peak period, peak direction). Further, it would not meet the need for an alternate route. For these reasons, this alternative alone was not carried forward for detailed study in this Supplemental EIS.

Ten-Lane I-15 with Reversible Lanes Alternative (No Legacy Parkway)

The Ten-Lane I-15 with Reversible Lanes Alternative would include widening I-15 to ten lanes with reversible flow lanes, robust transit, and other improvements identified in the WFRC long range plan such as improved arterials, TSM, ITS, and TDM. It would not include Legacy Parkway and the Legacy North project. Under this alternative, I-15 would have six lanes in the peak direction and four lanes in the off-peak direction. One of the two reversible lanes would also be designated as an HOV lane.

Analysis in the I-15 North Corridor Draft EIS (Federal Highway Administration and Utah Department of Transportation 1998) suggested that the existing 60/40 p.m. peak-hour directional split on I-15 would likely flatten to 55/45 in the year 2020 based on continued dispersion of employment locations away from the central business district. This trend was based on output from the WFRC travel demand model as well as national data from cities with similar conditions to Salt Lake City. While the total directional split in the North Corridor would generally flatten, the 2004 WFRC travel demand model (version 3.2) and regional data indicate that the directional split in the p.m. peak hour would remain close to 60/40.

The design of a reversible lane facility generally limits access to the reversible lanes in order to serve longer trips through the corridor. This results in the mixed-flow lanes providing access to the interchanges along the facility and accommodating more local trips. Since access between the reversible and mixed-flow lanes typically only occurs at the termini, one disadvantage of this alternative is the reduced flexibility of the traffic distribution, resulting in an unbalanced distribution of traffic across the reversible and mixed-flow lanes (American Association of State Highway and Transportation Officials 2001).

From a capacity perspective, with the reversible lanes I-15 would have six lanes in the peak direction, which is similar to the I-15 Beyond Ten Lanes Alternative. As the travel demand modeling results for that alternative show in Figure 3-3, six lanes on I-15 in the peak period, peak direction result in LOS E. Operational inefficiencies associated with the combination of reversible and mixed-flow lanes would further limit the effectiveness of the Ten-Lane I-15 with Reversible Lanes Alternative. Due to the inadequate level of service in the peak direction on I-15, the Ten-Lane I-15 with Reversible Lanes Alternative would not provide sufficient traffic congestion relief along I-15 to eliminate the need for Legacy Parkway (see Figure 3-3). This alternative also does not meet the secondary purpose of providing an alternate north-south route through the North Corridor. Further, without an alternate north-south route, this alternative does not provide congestion relief for the sequencing of construction activities along I-15. For all these reasons, the Ten-Lane I-15 with Reversible Lanes Alternative is not reasonable for further consideration.

I-15 Improvements Beyond Ten Lanes Alternative (No Legacy Parkway)

The Legacy Parkway Final EIS evaluated how many additional lanes could be added to I-15 before the efficiency of the highway was diminished. AASHTO states, “typically there are no more than four through lanes in one direction” (American Association of State Highway and Transportation Officials 2001). The Final EIS discussed unusual cases that could warrant consideration of more than eight total lanes. The report concluded that reconstructing I-15 to more than ten lanes was not reasonable because of operational uncertainties associated with large traffic volumes, frequent interchanges along I-15 in the North Corridor, the lack of high-volume feeder routes, safety and snow removal problems, and substantial relocation impacts.

The I-15 North Draft EIS includes the following statements (Federal Highway Administration and Utah Department of Transportation 1998).

> Ten-lane highways are not common; however, their operational and performance characteristics have been proven in several corridors throughout the United States. The same is not true, however, for highways with 12 to 16 lanes. Facilities with 12 lanes over an extended distance are very rare, and there are only a few examples of such highways in the United States… Where facilities larger than 10 lanes do exist (Washington, D.C., Chicago, and southern California), they include a barrier separating the interior lanes from the exterior lanes for each direction of travel. AASHTO classifies these highways as “dual-divided” and recommends their use when the number of lanes on a highway becomes too great to efficiently handle the volume of traffic.

Since the analysis in the I-15 North Draft EIS, revisions to the AASHTO *Green Book* and the *Highway Capacity Manual* (Transportation Research Board 2000) have both been adopted. Methods in the *Highway Capacity Manual* have increased the capacity of a single freeway lane from a maximum service flow rate of a 70-mph freeway under ideal conditions from 2,000 passenger cars per lane per hour in 1985 to 2,400 passenger cars per lane per hour. Furthermore, the *Highway Capacity Manual* 2000 assumes mainline free-flow speed adjustments that increase as the number of freeway lanes decreases (below five in each direction).

The evolving evidence suggesting greater per-lane capacities on I-15 is supported by the improved sensitivity of the WFRC travel demand model to reflect increases in travel demand based on increases in travel supply. The feasibility of expanding I-15 beyond ten lanes was reevaluated for this Supplemental EIS. This alternative includes expanding I-15 to 12 lanes, robust transit, and other improvements identified in the WFRC long range plan such as improved arterials, TSM, ITS, and TDM. No alternative north-south highway route would be constructed under this alternative. Studies completed for this Supplemental EIS forecast travel demand on I-15 in the year 2020 in the peak hour, peak direction at approximately 7,890 passenger-car equivalents per lane under the No-Build Alternative and 6,740 passenger-car equivalents per lane with six travel lanes in the peak period, peak direction on I-15. This results in LOS E on I-15 throughout the peak period in the peak direction, even under the assumption that all the lanes would offer ideal traffic-handling capabilities. As the ability of all traffic to use all lanes diminishes as the number of lanes increases, it is unlikely that this ideal condition would prevail, and conditions may become worse than LOS E.

The I-15 North Draft EIS (Federal Highway Administration and Utah Department of Transportation 1998) concluded that a dual divided freeway, comprising two one-way roadways for each direction of travel, would be necessary to serve the peak travel demand. This conclusion remains valid for alternatives that involve more than ten travel lanes on I-15. Given the need for a dual divided freeway, the inefficiencies suggested in the I-15 North Draft EIS related to balancing the demands for both through-corridor traffic and traffic entering or exiting the facility within the corridor would continue to exist.

A dual divided freeway would require additional right-of-way along I-15 to accommodate the horizontal expansion. Costs associated with a vertical expansion of I-15 would be extraordinary. Although the specific costs and impacts of these design considerations were not reevaluated, the underlying analysis is still valid. The design considerations of vertical structures and right-of-way requirements for horizontal expansion have not changed since the Final EIS.

The factors listed above confirm that a dual, divided, 12-lane (or more) I-15 facility could not effectively eliminate the need for Legacy Parkway. Thus, the reevaluation supports the conclusions of the Final EIS and the I-15 North Draft EIS that the I-15 Beyond Ten Lanes Alternative is not reasonable.

Legacy Parkway Beyond Four Lanes Alternative

For the Supplemental EIS, a six-lane Legacy Parkway was evaluated. The modeling of the six-lane Legacy Parkway resulted in a reduction of the peak-period, peak-direction demand on I-15 of less than 10 percent of the per lane demand on I-15 in 2020. This reduction equates to approximately 540 passenger-car equivalents per lane in the 3-hour peak period. Because the right-of-way needed for a six-lane facility would be larger than the area required for a four-lane facility, the impacts of this alternative would be expected to be similar in type but greater in magnitude compared to the four-lane Legacy Parkway alternatives. Given the additional costs and environmental impacts associated with this limited benefit in travel conditions on I-15, the Legacy Parkway Beyond Four Lanes Alternative is not reasonable. Also, because a four-lane Legacy Parkway facility would result in an acceptable level of service on I-15 in 2020, the addition of two more lanes would not be necessary for meeting the project purpose and need.

As noted in the Final EIS, if an expansion of Legacy Parkway is proposed at some point in the future (beyond 2020), it would be subject to environmental analysis and review at that time.

3.2.3 Summary of Alternatives Eliminated

As part of the Supplemental EIS process, the D&RG Regional Corridor Alternative (including the specific-alignment alternatives), Parkway Facility Adjacent to Redwood Road Alternative, Redwood Road Arterial Alternative, Maximum Future Transit Alternative, Ten-Lane I-15 with Reversible Lanes Alternative, I-15 Improvements Beyond Ten Lanes Alternative, and Legacy Parkway Beyond Four Lanes Alternative were evaluated to determine whether they were reasonable alternatives to building the proposed Legacy Parkway. In summary, these alternatives were eliminated for the following reasons.

- Each of the D&RG specific alignment alternatives was eliminated because of high community disruption impacts, a large number of relocations, and high costs.
- The Parkway Facility Adjacent to Redwood Road Alternative was eliminated due to Section 4(f) impacts
- The Redwood Road Arterial and Maximum Future Transit Alternatives alone (without Legacy Parkway) were eliminated because they did not result in I-15 operating at LOS D and therefore would not achieve the project purpose and need of providing capacity to relieve existing and projected travel demand in the North Corridor through 2020.
- The Ten-Lane I-15 with Reversible Lanes Alternative was eliminated because operational inefficiencies associated with the combination of reversible and mixed-flow lanes would limit the effectiveness of the alternative. In addition, it would not provide sufficient traffic congestion relief on I-15 to eliminate the need for Legacy Parkway, and it would not provide congestion relieve for the sequencing of construction activities along I-15.
- The I-15 Improvements Beyond Ten Lanes Alternative was eliminated because the design considerations and costs associated with right-of-way acquisition for a horizontal expansion or construction of a vertical expansion would be extraordinary.
- The Legacy Parkway Beyond Four Lanes Alternative was eliminated because additional capacity on Legacy Parkway beyond four lanes does not result in sufficient additional congestion relief on I-15, given the additional costs and environmental impacts, compared to a four-lane Legacy Parkway.

3.3 Alternative Ways of Implementing Legacy Parkway

3.3.1 Legacy Parkway with a Narrower Right-of-Way

Based on the results of the technical memorandum on narrower right-of-way issues as summarized in Section 2.1, it was concluded that the median could be reduced by 5 m (16 ft), resulting in a reduction in the total right-of-way width from 100 m (328 ft), as presented in the Final EIS, to 95 m (312 ft). This 95-m (312-ft) right-of-way width is used for most portions of the mainline right-of-way. However, in areas where wetlands, residences, or Section 4(f) properties can be completely avoided by further reducing the width of the footprint within the right-of-way, the footprint is reduced to 80 m (264 ft) with a reduced

buffer width. The Legacy Parkway build alternatives evaluated in this Supplemental EIS have been modified to reflect this narrower right-of-way width as the proposed action.

In considering reduction in total right-of-way width, an important distinction should be noted between the right-of-way width and the actual roadway footprint. The proposal analyzed in this Supplemental EIS involves not only a narrower right-of-way, but also context-sensitive design features within the right-of-way that allow for a more flexible roadway footprint. A more flexible footprint allows for further avoidance of sensitive resources, including wetlands, because it offers options: place the footprint of the road, the berm, and the trail to minimize impacts within the right-of-way and maintain natural habitats; further narrow the footprint in segments along the right-of-way; and curve the footprint of the roadway around sensitive resources. To reduce the right-of way width any further would constrain the footprint alignment more and eliminate this flexibility to avoid wetlands and other sensitive resources.

3.3.2 Integrating Construction of Legacy Parkway with Mass Transit

Based on the results of the integration technical memorandum as summarized in Section 2.3, it was concluded that there are opportunities for integrating the construction of Legacy Parkway with mass transit improvements, and that some of these opportunities have already been implemented as part of the construction work completed to date (see Section 3.4.2). As part of the integration analysis, which was conducted in coordination with FTA, UTA, and representatives from the planning departments of local governments, a robust transit scenario was developed. In addition, since publication of the Final EIS, the UTA commuter rail project has advanced to the point that the Draft EIS for the project was released in April 2004 (Utah Transit Authority 2004). It is now more feasible to coordinate planning efforts between the two projects because more specific information is available about the commuter rail plans, including station locations. The analysis of alternatives evaluated in this Supplemental EIS has been modified to account for the opportunities for construction.

3.3.3 Alternative Construction Sequences for the Shared Solution

Based on the analysis presented in the Final EIS, it was assumed that the construction sequence for the major project components of the Shared Solution would be as follows: construct Legacy Parkway first, reconstruct I-15 second, and construct maximum future transit third.

Based on the analysis conducted for the Supplemental EIS and the sequencing technical memorandum as summarized in Section 2.4, it was concluded that the above construction sequence would still meet the project purpose and need and that an alternative construction sequence would also meet the project purpose and need as follows: construct maximum future transit and Legacy Parkway concurrently, and then reconstruct I-15.

3.3.4 Alternatives without Trail Component or Separate Trail Facility

In light of meeting the primary project purpose of helping to meet the existing and projected travel demand in the North Corridor through 2020, one of the functions of the proposed trail is to provide an alternative means of transportation. Parties that challenged the Final EIS argued that Legacy Parkway did not have to include a trail. The court found, however, that the Corps had “reasonably concluded that removing the trails was not practicable in light of the project’s overall purpose of meeting the transportation needs of the Northern Corridor in 2020” (*Utahns for Better Transportation et al. v. U.S Department of Transportation et al.* [305F.3d1152 10th Cir. 2002]).

During the scoping processes for and the preparation of the Final EIS and Supplemental EIS, several communities and members of the public emphasized the desire for a trail along Legacy Parkway. The commenters indicated that the trail is important to their communities and would provide a pathway for pedestrians, bicyclists, and equestrians that connects to the Jordan River Trail and that would be integrated into the current and proposed trail system within the corridor. Therefore, after publication of the Final EIS, the federal agencies concluded that failure to include the trail would eliminate a benefit that some public opinion has identified as necessary. The Legacy Parkway Trail would be consistent with local land use plans for the cities in the study area. The appellate court considered and rejected arguments that had challenged the Legacy Parkway Trail as an integral part of the project that contributes to achievement of the project purpose. The court upheld the federal agency conclusions that the trail constituted part of the overall purpose of meeting the expected transportation needs in 2020. During the scoping process for the Supplemental EIS, the local communities again stressed their desire for a continuous trail. An alternative without a trail was therefore not carried forward for detailed study in this Supplemental EIS because it would not achieve the project purpose and need to the degree that alternatives with a trail would, would not be acceptable to the local communities, and would not be consistent with local plans.

In the Final EIS, the Legacy Parkway Trail was included within the project right-of-way. FHWA and UDOT consider trails within the proposed project right-of-way of a new facility such as Legacy Parkway to meet the intent of the Transportation Equity Act for the 21st Century. This act notes that features such as landscaping and bicycle, equestrian, and pedestrian trails should be considered in conjunction with highway projects. In addition, there are several existing and proposed trails in the North Corridor that would benefit from a continuous north-south trail to link them to each other and to developments and communities. Every city in the North Corridor along the proposed alignments has expressed support for a trail system as part of Legacy Parkway to help meet multi-modal transportation needs and to add amenities and recreation opportunities to the area. Without the continuous north-south trail associated with Legacy Parkway, the community trails would not link to other communities and would be inconsistent with community plans. UDOT, the project proponent, still proposes to construct a trail within the Legacy Parkway right-of-way. Alternative locations for a trail have not been pursued in this Supplemental EIS because, as explained above, the trail is an integral part of Legacy Parkway. The trail component of the proposed parkway facility is one feature of the project that addresses each of the three key goals of UDOT's policy on context-sensitive solutions (CSS): address the transportation need, be an asset to the community, be compatible with the natural and human environment. The trail provides additional capacity for alternate modes (walking and bicycling), which contributes to the project's ability to address the transportation need. Also, according to the input received by the local communities, the trail would be an asset to the communities. Finally, the trail is an important component of the project that contributes to the "parkway" feel of the project, making it a transition between the natural and human environments, and softening the hard aspects of the highway facility. See Section 1.3.2 of Chapter 1, *Purpose of and Need for Action*, for additional discussion of the proposed trail component and context-sensitive solutions.

An alternative without a trail as part of the proposed action was eliminated from further consideration and detailed analysis because the trail is a component of the project that contributes to a multi-modal aspect of meeting the local transportation needs. For informational purposes, differences in wetlands impacts from elimination of the trail and buffer area were calculated and presented in Table 2.1-4.

3.4 Alternatives Analyzed in Detail in this Supplemental EIS

The Final EIS describes the development of the Legacy Parkway roadway alignments that make up each build alternative (see Section 2.4 of the Final EIS). Each alignment was evaluated according to certain criteria, including impacts on wetlands and farmland, displaced homes and businesses, utility conflicts, and how far west the alignment was located from each community. The basic alignments of these alternatives have not changed since publication of the Final EIS.

Based on the evaluation of alternatives in this Supplemental EIS analysis, two important changes have been made that resulted in physical modification of the build alternatives that were considered reasonable in the Final EIS. The first change is that the alternatives have been modified to reflect a proposed narrower right-of-way width and a modified footprint within the right-of-way. The second is that modifications have been made to the physical configuration of the proposed Legacy Parkway to allow physical integration with construction of the commuter rail project.

In addition to the physical modifications to the project design, modifications have been made to the base assumptions concerning transit and mode choice that are applied to all alternatives analyzed. The following sections summarize the modifications to the alternatives carried forward for detailed study in this Supplemental EIS.

3.4.1 Modified Definition of the No-Build Alternative

The Council on Environmental Quality (CEQ) NEPA regulations (1986) require that an EIS include a “no-action” (or “no-build”) alternative that consists of not implementing a proposed action. Consistent with the Final EIS, the No-Build Alternative considered in this Supplemental EIS consists of the WFRC long range plan but without Legacy Parkway, without the Legacy North project, and without full reconstruction of I-15. The long range plan components included in the No-Build Alternative are commuter rail, widening Redwood Road from two to five lanes from south of I-215 to 500 South, enhanced bus service, and various local road improvements. The No-Build Alternative in the Supplemental EIS is different from the No-Build Alternative in the Final EIS in that the WFRC long range plan has since been updated to include commuter rail and other capacity-enhancing projects that have been added to the updated WFRC long range plan. In contrast to the build alternatives, the No-Build Alternative does not include the maximum future transit scenario because some of the more aggressive elements of the robust transit concept are not included in the current WFRC long range plan (see Appendix B). Table 3-5 shows the planned capacity-increasing projects at the Woods Cross screenline that were included in the 1998–2020 WFRC long range plan compared to the 2004–2030 WFRC long range plan. The phases are slightly different, but all are planned to occur prior to 2022.

Table 3-5 Comparison of Planned Capacity Improvements at Woods Cross Screenline for Updated WFRC Long Range Plan

Project	Segment (To/From)	Capacity Addition	1998 Plan Phase	2004 Plan Phase
Legacy Parkway	I-215 to US-89	From 0 lanes to 4 lanes	2010	2012
Redwood Road	Salt Lake County line to 500 South	From 2 lanes to 4 lanes	2020	2022
I-15	I-215 to 500 South	From 8 lanes to 10 lanes	2010	2022

Except in the stand-alone transit analysis described in Section 3.2.2 (Maximum Future Transit Alternative), full widening of I-15 to ten lanes is not included in the No-Build Alternative because, as detailed in the Final EIS (Appendix G) and based on the sequencing analyses in Section 2.4, *Sequencing of the Shared Solution*, of this Supplemental EIS, it would not be reasonable to proceed with the additional I-15 improvements without an alternate route in place, such as Legacy Parkway. The lack of an alternate route would cause an unacceptable level of congestion on I-15 when lanes are closed for construction, which would result in lost productivity for highway users and other adverse impacts described in Chapter 4, *Supplemental Environmental Analysis*, of this Supplemental EIS.

The No-Build Alternative analysis presented in Chapter 4 for each resource topic includes two scenarios: existing conditions and a future no-build scenario. The future no-build scenario considers the implications of reasonably foreseeable future build out, without Legacy Parkway, that could be in place by 2020.

3.4.2 Modified Build Alternatives A, B, C, and D/E

The build alternatives have been modified since publication of the Final EIS in relation to right-of-way width and integration of mass transit, as described below.

Modified Right-of-Way Width

As discussed in Section 2.1.2.2, in October 2003, after the Final EIS was completed, UDOT revised its design standards for new freeways and changed the minimum median width criteria. Based on this new information and the analysis from the technical memorandum on right-of-way issues, the median width of all alternatives has been reduced from 20 m (66 ft) to 15 m (50 ft). As a result, it was determined that the median width for the proposed Legacy Parkway could be reduced by 5 m (16 ft), without substantially compromising the safety of the facility. This change reduced the overall right-of-way width for Legacy Parkway from the 100-m (328-ft) width proposed in the Final EIS to 95 m (312 ft) for this Supplemental EIS (see Figure 2.1-1 in Chapter 2 of this Supplemental EIS). The impact analysis presented in this Supplemental EIS is based on the revised (narrower) right-of-way width of 95 m (312 ft) for all build alternatives. UDOT evaluated the revised median width in *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a). Section 2.1 of this Supplemental EIS, *Narrower Right-of-Way Issues*, summarizes the results of that analysis.

Context-sensitive design solutions are included in the project design. As noted above in Section 3.3.1, the actual footprint of the roadway would be narrower than the 312-foot right-of-way in areas where it could be narrowed (to 80 m [264 ft]) to avoid environmental concerns, a residence, or a Section 4(f) property. In areas where wetlands could be avoided, the footprint of the roadway would be curved around wetlands, where feasible, but the right-of-way width would remain at 95 m (312 ft) so UDOT could provide protection for the wetland within the right-of-way. A similar approach would be applied to construction of the trail, placing the footprint of the trail outside and around the edges of wetlands. With this context-sensitive design approach, the 95-m (312-ft) right-of-way provides some flexibility within the right-of-way to avoid impacts on wetlands or other sensitive resources.

Modifications to Address Integration with Mass Transit

The *Legacy Parkway Technical Memorandum: Integration of with Mass Transit with Legacy Parkway* (Fehr & Peers 2004) presents and evaluates opportunities already realized and those that have future potential to integrate the construction of physical elements of the proposed Legacy Parkway with planned mass transit improvements in a way that provides efficient interfaces and service coordination of highway and transit travel. Because construction and design of portions of the project had already begun before

construction was halted by the court, some physical integration components with mass transit were implemented as part of that work under the design-build contract. The Legacy Parkway project includes the following physical construction integration components.

- Placing interchanges at locations of future planned commuter rail stations: The UTA Commuter Rail Draft EIS (Utah Transit Authority 2004) confirms that the proposed Legacy Parkway interchanges are located at or near the locations of future planned commuter rail stations (one in Farmington near the I-15/US-89/Legacy Parkway interchange and one in Woods Cross at 500 South near I-15). The proposed interchange locations of Legacy Parkway also allow for providing convenient park-and-ride facilities to facilitate carpooling and feeder-bus access to commuter rail stations.

- Changing the project design to lengthen structures to accommodate the physical integration of the commuter rail component of mass transit with Legacy Parkway and I-15: As a result of the work completed under the current design-build contract since the Final EIS, UDOT incurred an additional $6.8 million in design and construction costs to allow for the physical integration of commuter rail in the following structures: Park Lane (formerly Burke Lane) (construction completed), I-15 southbound to Legacy Parkway southbound, Legacy Parkway northbound to I-15 northbound, US-89 southbound to Legacy Parkway southbound, Legacy Parkway northbound to US-89 northbound, State Street, and Glovers Lane.

- Providing funding ($10 million) to UTA to aid in the purchase of commuter rail right-of-way that passes directly beneath a portion of the proposed Legacy Parkway and adjacent to I-15.

For a detailed description of the analysis of interactive effects of pursuing multiple transit enhancement activities in combination as part of the Shared Solution, see Sections 7.0 and 8.0 of the *Legacy Parkway Technical Memorandum: Integration of with Mass Transit with Legacy Parkway* and Section 2.3 of this Supplemental EIS. Above and beyond the physical integration components of Legacy Parkway with mass transit, the integration technical memorandum analysis is based on the most current literature on how transit could be successful in an integrated way with other transportation system components. The analysis describes a full menu of integrated transit packages that would work in conjunction with the roadway system to provide a multi-modal approach to addressing transportation demand in the North Corridor. The integrated transit packages analyzed included physical improvements such as commuter rail, rail, and bus feeder stations; service improvements such as adding bus rapid transit; program and policy changes such as increased parking fees in the downtown Salt Lake City area; and land use plan changes to direct growth in a more transit-oriented development direction.

The maximum future transit approach used to evaluate integration does not result in physical modifications to the build alternatives analyzed in detail in this Supplemental EIS beyond those presented in the bullet list above. The approach changed since the Final EIS to evaluate how regional transportation components relate to each other, but the detailed physical impacts of each alternative alignment were evaluated in the same way. This maximum future transit approach included assumptions in the modeling of potential reasonable alternatives that would provide mass transit with the best chance for full effective implementation, before addressing the need for Legacy Parkway.

UDOT has coordinated with UTA (in conjunction with FTA) as UTA has proceeded with its planning and EIS for the commuter rail project. Since publication of the Final EIS, commuter rail planning has advanced to the stage that a Draft EIS was released to the public in April 2004 (Utah Transit Authority 2004). See Appendix A of this Supplemental EIS for a copy of the charter created by UTA and UDOT for coordination and cooperation in development of the Shared Solution transportation improvements. Now

that more detailed planning and environmental compliance processes are underway for the commuter rail project, UTA is taking advantage of the integration options offered by the Legacy Parkway project.

Proposed Alignments and Project Features

The alignments for Alternatives A, B, C, and D/E have remained basically the same as those identified in the Legacy Parkway Final EIS, as shown in Figure 3-2 and as described in Section 3.1.4 above, although the right-of-way widths have been modified, as mentioned above, and modifications have been made to address integration with mass transit. In addition, many of the key project features (frontage roads, four-lane roadway, trail, and berm in selected areas) have not changed since the Final EIS. Consistent with the opinion of the appellate court, this Supplemental EIS includes a multi-use trail as part of the proposed Legacy Parkway project. Parties that challenged the Final EIS argued that Legacy Parkway did not have to include a trail. The court found, however, that the Corps had "reasonably concluded that removing the trails was not practicable in light of the project's overall purpose of meeting the transportation needs of the Northern Corridor in 2020, thus the issuance of the permit is not arbitrary and capricious on this basis" (*Utahns for Better Transportation et al. v. U.S Department of Transportation et al.* [305F.3d1152 10th Cir. 2002]). See Section 3.3.4 *Alternatives without a Trail Component or Separate Trail Facility*, for additional discussion of the proposed trail component.

Table 3-6 below summarizes the key features of the Legacy Parkway build alternatives as identified in the Final EIS. For a detailed description of the build alternatives, except for the changes noted above, see Section 2.5 of the Final EIS. Alternative E is a new alternative considered in this Supplemental EIS. Alternative E follows the same alignment as Alternative D (Final EIS Preferred Alternative) except that Alternative E has a narrower right-of-way width, 95 m (312 ft) as opposed to 100 m (328 ft). Alternative D is no longer under consideration; it is presented in Table 3-6 for comparison purposes only.

Table 3-6 Summary of Features of Modified Build Alternatives

Feature	Modified Alternative A	Modified Alternative B	Modified Alternative C	Final EIS Preferred Alternative D (Dropped)	Supplemental EIS Alternative E (New)
Right-of-Way Width	95 m (312 ft)	95 m (312 ft)	95 m (312 ft)	100 m (328 ft)	95 m (312 ft)
Structures – Overpasses					
Center Street in North Salt Lake	✓	✓	✓	✓	✓
900 North in North Salt Lake	✓				
1250 West in Centerville				✓	✓
Glovers Lane in Farmington	✓	✓	✓	✓	✓
State Street in Farmington	✓	✓	✓	✓	✓
Park (formerly Burke) Lane in Farmington[1]	✓	✓	✓	✓	✓
Structures – Underpasses					
Sheep Road in Centerville	✓	✓			

Feature	Modified Alternative A	Modified Alternative B	Modified Alternative C	Final EIS Preferred Alternative D (Dropped)	Supplemental EIS Alternative E (New)
D&RG Railroad in Centerville	✓	✓	✓		
1250 West in Centerville[2]	✓			✓	✓
1250 West in Centerville/ 650 West near Farmington			✓		
Glovers Lane in Farmington (western leg)		✓			
Shepard Lane in Farmington (western leg)		✓			
Interchanges					
I-215 in Salt Lake City (southern terminus)	✓	✓	✓	✓	✓
500 South in Woods Cross	✓	✓	✓	✓	✓
Parrish Lane in Centerville	✓	✓	✓	✓	✓
I-15/US-89 in Farmington (northern terminus)	✓		✓	✓	✓
I-15 in Kaysville (western terminus)		✓			
US-89 in Farmington (eastern terminus)		✓			
Trail	✓	✓	✓	✓	✓
Berm[3]	✓	✓	✓	✓	✓
Frontage Roads	2	4	3	3	3

Feature	Modified Alternative A	Modified Alternative B	Modified Alternative C	Final EIS Preferred Alternative D (Dropped)	Supplemental EIS Alternative E (New)

Notes:

[1] Although connected to this project, the reconstruction of the Park Lane (formerly Burke Lane) interchange in Farmington was allowed to continue and has since been completed. (See *Foreword/Introduction* page 3 for a discussion of the activities the court allowed to continue.)

[2] Alternative A and Alternative D (Final EIS Preferred Alternative that was modified to create Alternative E) now cross Sheep Road, the D&RG railroad tracks, and 1250 West at grade. 1250 West will be on an overpass over Legacy Parkway. The D&RG tracks and Sheep Road will be permanently bisected. There will be cul-de-sacs at both ends of Sheep Road.

[3] The berm feature applies to all alternatives. It would run along the east side between 500 South and Porter Lane in West Bountiful, and along the west side between Glovers Lane and State Street in Farmington. Even though the alignments differ in these areas, the berm would run along the same locations adjacent to the mainline. The purpose of the berm is to provide visual and acoustical buffering between the highway and existing and future planned development. Throughout the planning process, the surrounding communities have expressed their preference for the landscaped buffer area to separate the trail from the roadway. The berm is proposed only in those areas where adjacent land uses require greater visual and acoustic buffering than that provided by the separation between the roadway and the trail. Public comments received through the public involvement process demonstrated a preference for an earthen berm as a more natural visual and acoustic barrier rather than a common noise wall.

Modified Alternative A

The modified Alternative A would be a four-lane, limited-access, divided highway and trail, constructed within a narrower right-of-way than the Final EIS right-of-way (95 m [312 ft] vs. 100 m [328 ft]). Additional right-of-way would be needed in areas where the two frontage roads would be located. A multi-use trail for pedestrians, bicyclists, and equestrians would be provided from south of I-215 connecting to the Jordan Parkway Trail to State Street (Clark Lane) in Farmington. An earthen berm would be included at some locations between the highway and the trail.

The southern terminus of Alternative A would be at the I-215/2100 North interchange in Salt Lake City. I-215 would be widened between 2100 North and a new (Legacy Parkway) interchange 0.5 km (0.3 mi) west of the I-215/Redwood Road interchange in North Salt Lake. The existing ramps at Redwood Road would be reconstructed and realigned to accommodate the new ramps for Alternative A, but the interchange would continue to function as a diamond interchange and all existing movements would be preserved. New ramps would be constructed in the future to connect I-215 to I-15 east of Redwood Road. As part of the I-15 North expansion project, ramps would be completed connecting Legacy Parkway to I-15 south of I-215.

North of I-215, Alternative A would be an entirely new highway. From the I-215 interchange, Alternative A would proceed north, cross Center Street and 900 North in North Salt Lake, and proceed to a point 0.6 km (0.3 mi) west of the intersection of 500 South and Redwood Road in Woods Cross. It then would turn northeast for about 4.5 km (2.8 mi) before crossing the D&RG Railroad about 0.5 km (0.3 mi) south of Parrish Lane in Centerville. The alignment would then turn north, cross Parrish Lane, and parallel the D&RG tracks on the eastern side for 1.0 km (0.6 mi), and then turn northeast, cross 1250 West in Centerville, and continue to the UPRR.

From Centerville to Farmington, Alternative A would parallel the existing UPRR and I-15 adjacent to and west of the power lines on the western side of the railroad. Alternative A would cross under Glovers Lane

and State Street (Clark Lane) and terminate at the interchange of I-15 and US-89 at Park Lane (formerly Burke Lane) in Farmington. The entire I-15/US-89 interchange would be reconstructed to provide connections from US-89 to both I-15 and the new Legacy Parkway. Burke Lane has been reconstructed as Park Lane and extended across I-15 and the UPRR to connect with State Street (Clark Lane) at 1100 West in Farmington.

Modified Alternative B

The modified Alternative B would be a four-lane, limited-access, divided highway and trail constructed within a narrower right-of-way than the Final EIS right-of-way (95 m [312 ft] vs. 100 m [328 ft]). Additional right-of-way would be needed in areas where the four frontage roads would be located. The southern terminus of Alternative B would be at the I-215/2100 North interchange in Salt Lake City. I-215 would be widened between 2100 North and a new (Legacy Parkway) interchange about 0.9 km (0.6 mi) west of the I-215/Redwood Road interchange in North Salt Lake. Alternative B would proceed northwest and then northeast, cross Center Street and 900 North in North Salt Lake, and then proceed to about 0.6 km (0.3 mi) west of the intersection of 500 South and Redwood Road in Woods Cross. From 500 South in Woods Cross, Alternative B would proceed northeast to Parrish Lane in Centerville. It would continue northeast, cross the D&RG Railroad and Sheep Road, and then turn north, parallel to and just east of the D&RG right-of-way.

At Lund Lane in Farmington, Alternative B would split into two legs. The western leg would continue along the D&RG for 1.1 km (0.7 mi), cross the railroad and Glovers Lane, and then parallel Glovers Lane for about 2.0 km (1.2 mi). The alignment then would turn north for about 4.5 km (2.8 mi) and cross State Street (Clark Lane) and Shepard Lane. This alignment would be about 3.0 km (1.9 mi) west of I-15 and would provide two lanes in each direction. The northern terminus would connect with I-15 near the Kaysville rest area, about 3.2 km (2 mi) north of the I-15/US-89 interchange (Reference Post [RP] 329).

From Lund Lane in Centerville, the eastern leg would connect directly with US-89 at Park Lane (formerly Burke Lane). This leg would cross Glovers Lane and State Street (Clark Lane) and provide one lane in each direction. At the US-89 connection, this leg would run parallel to and just west of the UPRR. The existing I-15/US-89 interchange would be completely reconstructed. Burke Lane has been reconstructed as Park Lane and extended across I-15 and the UPRR to connect with State Street (Clark Lane) at 1100 West in Farmington

Modified Alternative C

The modified Alternative C would be a four-lane, limited-access, divided highway and trail constructed within a narrower right-of-way than the Final EIS right-of-way (95 m [312 ft] vs. 100 m [328 ft]). Additional right-of-way would be needed in areas where the three frontage roads would be located. The southern terminus would be at the I-215/2100 North interchange in Salt Lake City. I-215 would be widened between 2100 North and a new (Legacy Parkway) interchange about 0.45 km (0.3 mi) west of the I-215/Redwood Road interchange in North Salt Lake. Alternative C would proceed north, cross Center Street and 900 North in North Salt Lake, and then proceed to about 0.6 km (0.3 mi) west of the intersection of 500 South and Redwood Road in Woods Cross. From 500 South, Alternative C would proceed northeast for about 5.6 km (3.5 mi) to Parrish Lane in Centerville. The alternative would then turn north for about 3.5 km (2.2 mi), paralleling the D&RG on the western side. It would then turn northeast, cross the railroad, and continue for about 1.0 km (0.6 mi) before it turns north (parallel to and just west of the UPRR), then terminate at I-15 and US-89 at Park Lane (formerly Burke Lane) in Farmington.

The entire I-15/US-89 interchange would be reconstructed to provide connections from US-89 to both I-15 and the new Legacy Parkway. Burke Lane has been reconstructed as Park Lane and extended across I-15 and the UPRR to connect with State Street (Clark Lane) at 1100 West in Farmington.

Alternative E (Modified from Final EIS Preferred Alternative D)

Alternative E follows the same alignment as Alternative D (Final EIS Preferred Alternative) but has a narrower right-of-way width than Alternative D and includes features to integrate it with mass transit.

The Preferred Alternative as proposed in the Final EIS was described as a four-lane, limited-access divided highway and trail constructed within a 100-m (328-ft) right-of-way. Description and analysis of the Preferred Alternative as proposed in the Final EIS is presented in this Supplemental EIS impact analysis for comparison purposes only, and is referred to as Alternative D. It has been modified, and the modified version is referred to as Alternative E in this Supplemental EIS.

As described in the Final EIS, this alternative would follow the Alternative C alignment South of 900 North in Woods Cross. Just north of 900 North, it would transition to the Alternative A alignment. It would continue on the Alternative A alignment to just north of 500 South in Woods Cross, then transition to an alignment about 80 m (264 ft) east of and parallel to Alternative C. It would then rejoin Alternative C just south of Pages Lane in West Bountiful and follow Alternative C to Porter Lane. At that point, it would transition east and follow Alternative A just south of Parrish Lane in Centerville. From there to the I-15/US-89 interchange, it would follow the Alternative A alignment.

The modified version of this alternative as proposed in this Supplemental EIS (Alternative E) would be a four-lane, limited-access, divided highway and trail constructed within a narrower right-of-way—or footprint—than the Final EIS right-of-way (95 m [312 ft] vs. 100 m [328 ft]). Like the modified Alternatives A, B, and C, Alternative E would be integrated with mass transit, as described above in Section 3.4.2. The proposed alignment remains the same as described above for Alternative D, with features as listed in Table 3-4 above for Alternative E.

3.4.3 Updated Project Cost Estimates

The cost estimates presented in Appendix N of the Final EIS have been updated for all four build alternatives. The changes to the estimates are based on the revised 95-m (312-ft) right-of-way. The estimates also reflect inflation between the June 2000 Final EIS and 2004. The cost estimates are based on the specific proposed alignments for each alternative. Table 3-7 below presents a comparison of the Final EIS and updated Supplemental EIS costs.

Table 3-7 Updated Project Cost Estimates

Alternative	Final EIS Cost Estimate	Updated Cost Estimate
Alternative A	$372,490,000	$420,780,000
Alternative B	$450,613,493	$533,070,000
Alternative C	$377,782,911	$453,190,000
Alternative D/E	$369,200,000	$425,890,000

Estimates shown in Table 3-7 include construction materials, right-of-way, and approximated wetland mitigation. Preliminary engineering, stipends, and incentives are items specific to the construction

contracts for Legacy Parkway and were not included in the estimates listed above or the estimates in the Final EIS. However, these items were included in the total cost of the Legacy Parkway project ($451 million) that was documented after the Final EIS was published.

The estimated cost for the build alternatives (which represent proposed alignments within the Great Salt Lake corridor) is less than the estimate prepared for the Great Salt Lake regional corridor estimate shown in Table 3-1 and higher than the corridor estimate used for comparison purposes in the D&RG regional corridor evaluation (Table 2.2-8), because a more detailed alignment location was used to prepare the Table 3-7 estimates. This refinement provided more detailed estimates of material quantities, information on potential impacts, and right-of-way requirements, resulting in lower contingencies being applied to the estimates.

3.5 Summary of Alternatives Evaluated

This section and Table 3-8 summarize the alternatives evaluation information presented in this chapter. The chapter presents discussions of alternatives

- analyzed in the Final EIS and reevaluated in the Draft Supplemental EIS;
- evaluated for ability to meet the project purpose and need and against the reasonableness criteria, and eliminated from further consideration in the Draft Supplemental EIS;
- evaluated for alternative ways of implementing Legacy Parkway; and
- described and analyzed in full detail in Chapters 1–5 of this Draft Supplemental EIS.

Table 3-8 is organized by the following categories of alternatives.

- Non-highway alternatives.
- Expansion of I-15 alternatives.
- No-Build Alternative.
- Legacy Parkway alternatives.

3.6 Land Acquired to Date

Land acquired to date has included land for the roadway and land for mitigation. Legacy Parkway, as approved after the Final EIS and permitted by the Corps (Final EIS Preferred Alternative D), included terms for mitigation. To mitigate direct and indirect effects on wetlands and wildlife habitat, UDOT proposes mitigation (the Legacy Nature Preserve) consisting of 849 ha (2,098 ac) of land adjacent to Great Salt Lake. Within the Legacy Nature Preserve are 315 ha (778 ac) of existing wetlands that would be preserved from the impacts of future development. In addition to preserving these wetlands, their functions would be enhanced by removing land uses that currently affect these wetlands, and, in limited areas, restoring hydrology to areas where wetlands historically existed but no longer exist.

The property purchased to date was acquired for mitigation and for the Final EIS approved alternative (Alternative D); this property includes portions of Alternatives A, B, C, and E, as well as portions of the Legacy Nature Preserve, which was established as part of adopted mitigation in the ROD and the Section 404 permit. Property acquisition has continued during preparation of this Supplemental EIS. In total, UDOT has purchased 192 parcels (272 ha [671 ac]) of the 217 parcels (357 ha [881 ac]) located within the proposed Alternative D/E right-of-way. In addition, as of June 2004, of the total 849 ha (2,098 ac) in the Legacy Nature Preserve, only 67.6 ha (167 ac) (in five parcels) have not yet been purchased. Section 4.4, *Relocations*, of this Supplemental EIS lists additional properties that have been acquired since publication of the Final EIS.

The potential direct impacts of the 95-m (312-ft) right-of-way for Alternative E would be within the limits of the 100-m (328-ft) right-of-way of the Preferred Alternative analyzed in the Final EIS (Alternative D). UDOT will evaluate the property that has been purchased to date and, based on the transportation need of the alternative that may be selected in the ROD for this Supplemental EIS, UDOT will determine what property is no longer required for right-of-way. Excess property could be sold, transferred, or retained by UDOT. Alternatively, UDOT could have to acquire additional property for the alternative that is selected in the ROD. A more detailed update of land acquired to date in presented in Section 4.4, *Relocations*, of this Supplemental EIS.

Table 3-8 Summary of Alternatives Evaluated for Legacy Parkway Project

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
Regional Alignment Alternatives				
Great Salt Lake Regional Alignment		Several specific alignment alternatives within the Great Salt Lake regional alignment were analyzed in detail (Alternatives A, B, C, and D).		In addition to the alternatives within the Great Salt Lake regional alignment analyzed in the Final EIS, Alternative E was developed for the Supplemental EIS.
Antelope Island Regional Alignment	This regional alignment corridor was eliminated because of extraordinarily high costs and high impacts on wetlands.			
Trans-Bay Regional Alignment	This regional alignment corridor was eliminated because of extraordinarily high costs and high impacts on wetlands.			
Farmington Bay Regional Alignment	This regional alignment corridor was eliminated because of high costs and high impacts on wetlands.			
Union Pacific Railroad Regional Alignment	This regional alignment corridor was eliminated because of extraordinarily high costs and high impacts on existing land development.			
Denver &Rio Grande Railroad Regional Alignment	This regional alignment corridor was eliminated because of high costs and high impacts on existing land development.		Specific alignments were developed and evaluated based on cost, impacts on wetlands, and impacts on existing land development. See D&RG Railroad Alternatives below.	

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
Non-highway Alternatives				
Expand Existing Arterial Roads	This alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. These improvements were, however, included as part of the future baseline conditions.		Based on updated traffic modeling, this alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. These improvements are, however, included as part of the Shared Solution.	
Redwood Road Arterial			This alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. It does not meet the purpose of providing an alternate route. Expansion of Redwood Road to five lanes is included as part of the WFRC long range plan and in the Shared Solution and No-Build Alternative.	
Transportation Management Strategies	This alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. It does not meet the purpose of providing an alternate route. TSM and TDM improvements were, however, included as part of the Shared Solution.		Based on updated traffic modeling, this alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. These improvements are, however, included as part of the Shared Solution.	

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
Mass Transit Only	This alternative alone does not meet the primary project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. WFRC long range plan mass transit improvements were, however, included as part of the Shared Solution.		A robust transit scenario was developed and included in the future baseline conditions for analysis of all Legacy Parkway alternatives.	
Expansion of I-15 Alternatives				
Ten-Lane I-15 with HOV Lanes	This alternative does not meet project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. It does not meet the project purpose of providing an alternate route. These I-15 improvements were, however, included as part of the Shared Solution.		Based on updated traffic modeling, this alternative does not meet the project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. It does not meet the purpose of providing an alternate route. These improvements are, however, included as part of the Shared Solution.	
Ten-Lane I-15 with Reversible Flow Lane			This alternative does not meet the project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. It does not meet the purpose of providing an alternate route. Operational inefficiencies would reduce effectiveness.	

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
I-15 Beyond Ten Lanes	Operational uncertainties, the number of interchanges involved, lack of high-volume feeder routes, safety and snow removal problems, and substantial relocation impacts make reconstructing I-15 beyond 10 lanes unreasonable.		The relocations and right-of-way costs for a horizontal expansion and the design and construction costs for a vertical expansion would be extraordinary. Operational inefficiencies would exist for a facility beyond 10 lanes.	
Maximum Future Transit (Plus Expansion of I-15 to Ten Lanes)	This alternative does not meet project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D.		Even with I-15 expanded to 10 lanes but no Legacy Parkway, maximum mass transit is projected to capture only 5.9 percent of demand. Based on updated traffic modeling, this alternative does not meet the project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D. These improvements are, however, included as part of the future baseline conditions for evaluating all Legacy Parkway alternatives.	
No-Build Alternative				
No-Build with WFRC Long Range Plan		This alternative does not meet project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D or providing an alternate route. However, it was analyzed in detail in the Final EIS.		This alternative does not meet project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D or providing an alternate route. However, it is analyzed in detail in the Supplemental EIS
Legacy Parkway Alternatives				

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
Alternative A		This alternative was analyzed in detail in the Final EIS.		This alternative was modified to a narrower right-of-way and analyzed in detail in the Supplemental EIS.
Alternative B		This alternative was analyzed in detail in the Final EIS.		This alternative was modified to a narrower right-of-way and analyzed in detail in the Supplemental EIS.
Alternative C		This alternative was analyzed in detail in the Final EIS.		This alternative was modified to a narrower right-of-way and analyzed in detail in the Supplemental EIS.
Alternative D (Final EIS Preferred)		This alternative was analyzed in detail in the Final EIS. It was the lead agency and project proponent Preferred Alternative.		This alternative was dropped from further consideration. However, the impacts of Alternative D are presented in the Supplemental EIS for comparison purposes.
Alternative E				This alternative was developed for the Supplemental EIS and analyzed in detail. It follows the Alternative D alignment, but has a narrower right-of-way.

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
Legacy Parkway Integrated with Mass Transit				This alternative was developed for the Supplemental EIS and is analyzed in detail.
Alternative Construction Sequence of Legacy Parkway with the Shared Solution			Sequencing Scenarios 1 and 2 were analyzed and eliminated because they do not meet the project purpose and need as reflected by failure to reduce congestion on I-15 to LOS D.	Sequencing Scenarios 3 and 4 are consistent with the project purpose and need.
Parkway Facility Adjacent to Redwood Road			This alternative was eliminated based on high number of impacts on Section 4(f) properties that could be avoided by other alternatives.	
Six-Lane Legacy Parkway			This alternative was eliminated because the additional capacity is not warranted to meet the project purpose and need. Given the additional costs and environmental impacts, it would not provide much additional relief to I-15.	
Legacy Parkway without a Trail	The trail component of Legacy Parkway was included to support the project purposes of reducing congestion and providing an alternate route with an alternative transportation mode.		This alternative was eliminated because the trail component of the project contributes to achievement of the purpose and need as a multi-modal option of meeting the local transportation needs.	

Alternative/Category	Screened Out in Final EIS and Reverified in Supplemental EIS Process	Analyzed in Detail in Final EIS and Reevaluated in Supplemental EIS Process	Evaluated and Screened Out in Supplemental EIS Process	Analyzed in Detail in Supplemental EIS
D&RG 1			This alternative was considered unreasonable based on community impacts, very high impacts on existing development, and cost.	
D&RG 2			This alternative was considered unreasonable based on community impacts, very high impacts on existing development, and cost.	
D&RG 3			This alternative was considered unreasonable based on community impacts, very high impacts on existing development, and cost.	
D&RG 4			This alternative was considered unreasonable based on community impacts, very high impacts on existing development, and cost.	
D&RG 5			This alternative was considered unreasonable based on community impacts, very high impacts on existing development, and cost.	

Chapter 4

Supplemental Environmental Analysis

Chapter 4

Supplemental Environmental Analysis

4.0 Introduction

This chapter provides updated information on the affected environment, environmental consequences, and mitigation measures associated with the resource topics discussed in Chapters 3 and 4 of the Final EIS. Each section in this chapter includes a summary of the approach and methodology used to obtain updated and supplemental information and a discussion of the environmental consequences associated with the proposed build alternatives and the No-Build Alternative, as well as an assessment of a future no-build scenario. This chapter only presents supplemental and updated information based on changes that have occurred since publication of the Final EIS. Information presented in the Final EIS that did not change has not been reproduced in this document.

The following provides a brief discussion of the study area and the project alternatives evaluated in this chapter.

4.0.1 Study Area

The study area is located in the Great Salt Lake Valley region of Utah. The two dominant geologic formations of this area are the northern Wasatch Range and Great Salt Lake. The limited land resources between these two formations support developed suburban cities, highways and arterial streets, railroad tracks, major utility corridors, industrial and commercial development, refineries, mining operations, agricultural, and recreation opportunities.

More specifically, and as described in the Final EIS, the study area for the proposed action is located in Salt Lake and Davis Counties, and includes portions of Salt Lake City, North Salt Lake, Woods Cross, West Bountiful, Centerville, Farmington, and Kaysville (Figure 4.0-1). In general, the study area is bounded on the east by I-15 and the Denver & Rio Grande (D&RG) and Union Pacific Railroad (UPRR) tracks, and on the west by Great Salt Lake and the associated wetland complexes. The northern limit of the study area lies just north of the I-15/US-89 interchange in Kaysville, and the southern limit extends just beyond I-80. However, to facilitate complete evaluation of environmental impacts, the study area boundary for the following resource areas was modified. Specific modifications to the study area boundary are described in the *Affected Environment* subsection for each resource area.

- Section 4.1, *Land Use*.
- Section 4.3, *Social*.
- Section 4.5, *Economics*.

- Section 4.8, *Air Quality*.
- Section 4.9, *Noise*.
- Section 4.12, *Wetlands*.
- Section 4.13, *Wildlife*.
- Section 4.16, *Historic and Archaeological Resources*.
- Section 4.18, *Visual Resources*.
- Section 4.19, *Energy*.
- Section 4.21, *Cumulative Impacts*.

It should be noted that the southern limit of the study area extended to I-80 in the Final EIS to allow for evaluation of project alternatives in and around the Salt Lake City International Airport.[1] Although none of the project components associated with the alternatives evaluated in the Supplemental EIS extend south of I-215, the southern boundary of the study area remains at I-80 to facilitate comparison with the data presented in the Final EIS (see Chapter 1, *Purpose of and Need for Action*).

4.0.2 Great Salt Lake Ecosystem

The proposed action is located on the southeast shore of Great Salt Lake. Technically, the Great Salt Lake Ecosystem (GSLE) encompasses the full drainage basin of Great Salt Lake, including the ancient lakebed and drainages of Lake Bonneville and the complete watersheds of the Bear, Ogden/Weber, and Jordan Rivers. However, for this Supplemental EIS, the geographic extent of the GSLE is defined as Great Salt Lake and the wetlands/wildlife habitats surrounding its shoreline.

As described in the Final EIS, the GSLE provides important habitat for a variety of birds, reptiles, amphibians, and mammals, some of which are rare and have small geographical distributions. The wetlands of Great Salt Lake account for 75 percent of all wetlands in Utah, and the shores of Great Salt Lake are internationally important because they are a link in the Pacific Flyway for migratory waterfowl, and a link of the Western Hemisphere Shorebird Reserve Network. Between 2 million and 5 million birds use the lake yearly, including a wintering bald eagle population of approximately 500 birds. Great Salt Lake also provides extensive recreational opportunities in the area, including waterfowl hunting, birdwatching, and boating opportunities.

Great Salt Lake is also one of the four largest terminal saline lakes in the world and supports an economically viable brine shrimp industry. Salinity is decreasing in the southern half of the lake, adjacent to the proposed location of Legacy Parkway, and increasing in the northern half. Development encroaching towards the lake has also played a role in diminishing and stressing the function and hydrology of the ecosystem surrounding the lake.

[1] In August 2004, the Utah Transportation Commission (UTC) confirmed that the decision disclosed in the Final EIS to eliminate from consideration a highway west of the Salt Lake City International Airport, designed to connect the proposed Legacy Parkway to the Western Transportation Corridor, was still valid (Abeggien pers. comm.). In addition, it should be noted that the WFRC long range plan does not include a highway west of the Salt Lake City International Airport.

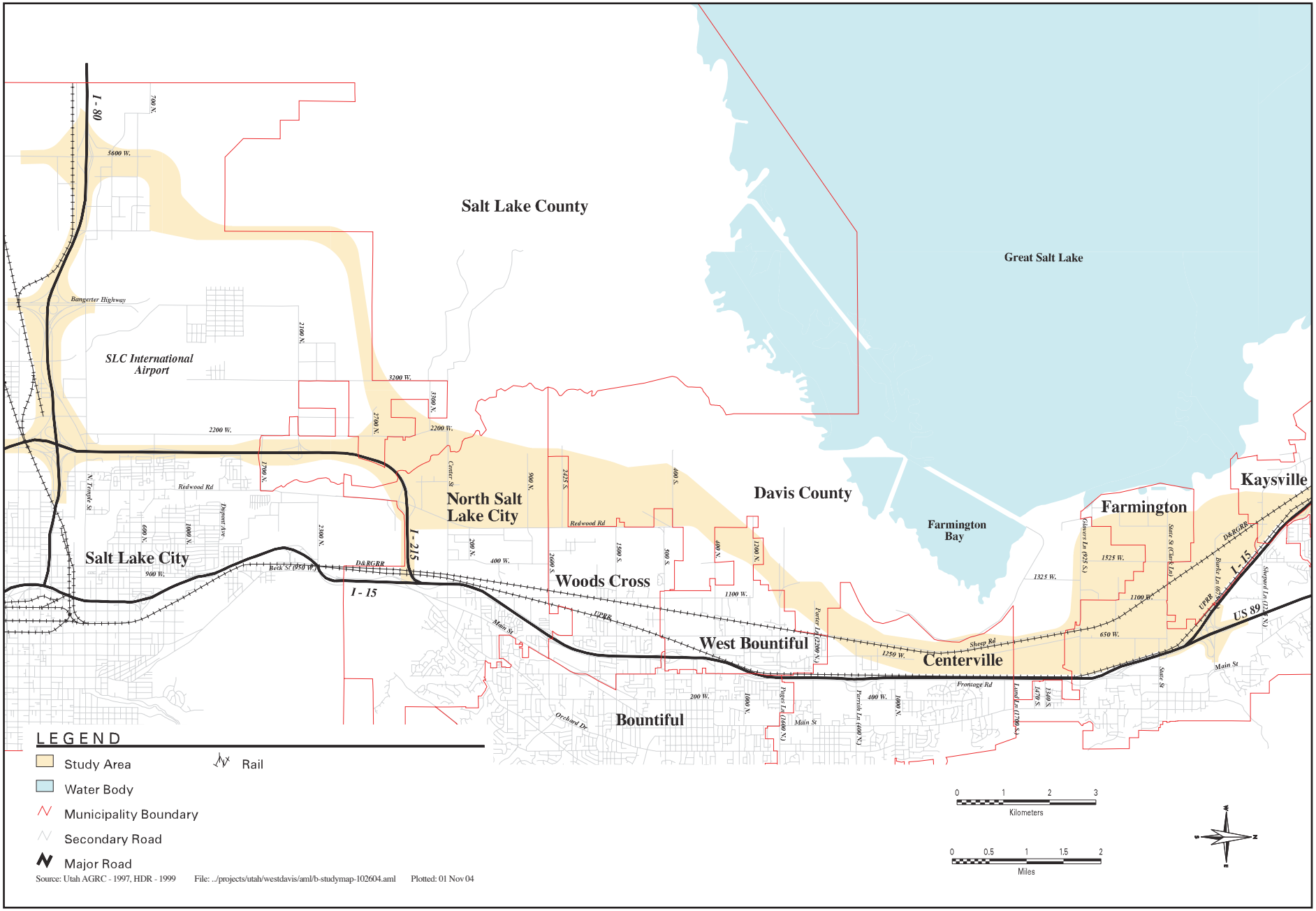

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Figure 4.0-1
Legacy Parkway Study Area

4.0.3 Alternatives Evaluated

As described in Chapter 3, *Alternatives*, the Supplemental EIS presents detailed impacts of the following six alternatives.

- **No-Build Alternative**. NEPA requires evaluation of a no-build alternative to illustrate what would happen if a proposed action were not taken. For this Supplemental EIS, the federal lead agencies have determined to present information in two ways for the No-Build assessment.

  - Existing conditions.

    Under existing conditions, the No-Build Alternative consists of transportation improvements detailed in the *Wasatch Front Urban Area Long Range Transportation Plan Update, 2004–2030* (long range plan) (Wasatch Front Regional Council 2003a), but does not include the Legacy Parkway project, the Legacy North project, or I-15 reconstruction (i.e., full widening of I-15 to 10 lanes). The long range plan components included in the existing conditions No-Build Alternative are commuter rail, widening Redwood Road from two to five lanes from south of I-215 to 500 South, enhanced bus service, and various local road improvements. This alternative is different from the No-Build Alternative evaluated in the Final EIS in that the WFRC long range plan has since been updated to include commuter rail and other capacity-enhancing projects.

  - Future conditions.

    The future conditions No-Build Alternative is presented to illustrate roadway and infrastructure improvements that might occur if Legacy Parkway were not constructed, in addition to those accounted for under the existing conditions No-Build Alternative. Impacts associated with the future conditions No-Build Alternative are described qualitatively in this chapter because the nature and timing of these improvements are not known at this time.

    The future conditions No-Build Alternative was not noted as a separate discussion in the Final EIS; instead, it was combined with discussion of the existing conditions No-Build Alternative under the No-Build Alternative discussion. The future conditions No-Build Alternative has been separated out in this Supplemental EIS to better distinguish between project-related impacts and impacts associated with future actions that are independent of the proposed action and that may or may not occur.

- **(Modified) Alternative A**. (Modified) Alternative A, hereafter referred to as Alternative A, follows the same alignment described for Alternative A in the Final EIS (Figure 3-2). However, the right-of-way width evaluated in the Supplemental EIS has been reduced from 100 m (328 ft) to 95 m (312 ft), and potential footprint modifications would further reduce impacts within the right-of-way.

- **(Modified) Alternative B**. (Modified) Alternative B, hereafter referred to as Alternative B, follows the same alignment described for Alternative B in the Final EIS (Figure 3-2) and is evaluated at the narrower 95-m (312-ft) right-of-way width, and potential footprint modifications would further reduce impacts within the right-of-way.

- **(Modified) Alternative C**. (Modified) Alternative C, hereafter referred to as Alternative C, follows the same alignment described for Alternative C in the Final EIS (Figure 3-2) and is evaluated at the narrower 95-m (312-ft) right-of-way width, and potential footprint modifications would further reduce impacts within the right-of-way.

- **Alternative D (Final EIS Preferred Alternative)**. Alternative D, which was the Final EIS Preferred Alternative, follows the alignment described for the Preferred Alternative in the Final EIS (Figure 3-2) and is evaluated at the 100 m (328-ft) right-of-way, the original right-of-way width evaluated in the Final EIS. Although it has been dropped from further consideration, analysis of this alternative is presented in this chapter for some resource topics to illustrate changes in impacts between the Final EIS and the Supplemental EIS. It has been included in this chapter for comparative purposes only.

- **Alternative E**. Alternative E follows the same alignment as Alternative D (Figure 3-2), but is evaluated at the narrower 95-m (312-ft) right-of-way width, and potential footprint modifications would further reduce impacts within the right-of-way.

Section 4.1
Land Use

This section discusses land use in the study area. It provides an update on current land use in the study area, as well as information on local land use plans that have been updated since publication of the Final EIS. Supplemental information on regional land use planning studies is also provided. The environmental consequences associated with both the No-Build and build alternatives have been updated to reflect changes in current land use and local land use plans.

4.1.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with land use in the study area, Sections 3.1 and 4.1 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The southern, western, and eastern boundaries of the study area for this section are described in Section 4.0.1, *Study Area*. However, to evaluate potential growth impacts beyond the North Corridor, the northern boundary of the study area for this section was extended to southern Weber County, up to and including the City of Ogden.[1]

The following documents, many of which were referenced in the Final EIS, were reviewed for this analysis.

- *Salt Lake City Downtown Plan* (Salt Lake City 1995).
- *Salt Lake City Transportation Master Plan* (Salt Lake City 1996).
- *Salt Lake City Transportation Action Plan Update* (Salt Lake City 2000).
- *Salt Lake City Visionary Gateway Plan* (Salt Lake City 1994a).
- *Gateway Specific Plan, Draft* (Salt Lake City 1998a).
- *Gateway Development Master Plan* (Salt Lake City 1998b).
- *Beck Street Gateway Vision Plan* (Salt Lake City 1994b).

[1] The study area boundary for the Land Use section was extended to the north to evaluate potential growth impacts in southern Weber County and the City of Ogden. However, because much of the land use south of the study area is currently developed or is planned for development, it was assumed that areas south of the study area would experience full build-out, with or without construction of the proposed action. As a result, this section does not evaluate growth impacts south of the study area.

- *Northwest Jordan River/Airport Master Plan* (Salt Lake City 1992).
- North Salt Lake Land Use Development and Management Act (City of North Salt Lake 2001).
- *Woods Cross City General Plan* (City of Woods Cross 2003).
- *West Bountiful City Master Plan, 1990–2010* (City of West Bountiful 1992).
- *City of West Bountiful General Plan, Draft Transportation Element* (City of West Bountiful 1997a).
- *Planning District #6 Plan* (City of West Bountiful 1997b).
- *General Plan for Centerville City, Utah* (City of Centerville 1996).
- *Comprehensive General Plan, Farmington, Utah* (City of Farmington 1993).
- *Farmington City Master Transportation Plan* (City of Farmington 1998).
- *Envision Utah Quality Growth Strategy and Technical Review* (Envision Utah 2000).
- *Davis County Shorelands Comprehensive Land Use Plan* (Davis County Council of Governments 2001).
- *Inter-Regional Corridor Alternatives Analysis* (Carter Burgess 2002).

A series of meetings was held with representatives from each of the jurisdictions in the study area—North Salt Lake City, Woods Cross, West Bountiful, Centerville, Farmington, and Davis County—to discuss topics pertaining to the Supplemental EIS, including current land use and updates to local plans that had occurred since publication of the Final EIS. The meetings were held in July and September 2003. Table 4.1-1 provides information on the dates and attendees of these meetings. Minutes from these meetings were reviewed for this analysis (HDR Engineering, Inc. 2003a–k).

As described in Chapter 2 (Section 2.3, *Integration of Legacy Parkway with Mass Transit*), a planning meeting with Community Planning and Information Committee (CPIC) representatives was also held to identify land use changes that would represent the highest level of transit-oriented land use that the local jurisdictions, community members, property owners, and future real estate market could support. The intent of the planning session was to gather information on aggressive, but achievable, transit-supportive land use changes that could be used for the analysis.

Table 4.1-1 Public and Agency Coordination Meetings

Jurisdiction	Meeting Dates	Attendees
West Bountiful	July 10, 2003	Wendell Wild, City Manager, City of West Bountiful
	September 16, 2003	Bill Flanders, Engineer & Supervisor, City of West Bountiful
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR
		Bryan Adams, UDOT
Farmington	July 8, 2003	David Peterson, City Planner, City of Farmington
	September 16, 2003	Max Forbush, City Manager, City of Farmington
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR Engineering
Centerville	July 8, 2003	Randy Randall, Director of Public Works, City of Centerville
	September 15, 2003	Fred Campbell, Engineer, City of Centerville
		Aric Jensen, Community Development Director, City of Centerville
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR Engineering
Woods Cross	July 10, 2003	Gary Uresk, City Administrator, City of Woods Cross
	September 15, 2003	Tim Stephens, Community Development Director, City of Woods Cross
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR Engineering
		Bryan Adams, UDOT
Davis County	July 11, 2003	Barry Burton, Assistant Director, Community & Economic Development, Davis County
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR Engineering
North Salt Lake	July 15, 2003	Mayor Kay Briggs, City of North Salt Lake
	September 15, 2003	Rod Wood, Public Works Director, City of North Salt Lake
		Paul Otteson, City Engineer, City of North Salt Lake
		Collin Wood, City Engineer, City of North Salt Lake
		Bethany Shingleton, HDR Engineering
		Terry Warner, HDR Engineering

4.1.2 Affected Environment

4.1.2.1 Current Land Use and Development Trends in the Study Area

This section describes land use changes that have occurred since publication of the Final EIS, including development and changes in planned land use that have occurred since 1999. As illustrated in Figure 4.1-1, which updates Figure 3-1 in the Final EIS, much of the study area is now either planned for development or is already developed. Section 4.1 of the Final EIS stated that up to 283 ha (700 ac) of low-intensity land uses (i.e., agricultural, grazing, idle) were being converted to urban uses each year in Davis County; planned development in the study area has occurred as disclosed in the Final EIS. The WFRC population growth projections for 2020 have been revised downward (from 1,941,000 to 1,918,000) since publication of the Final EIS; however, according to Davis County planners, the development trends disclosed in the Final EIS are still accurate, with approximately 243 ha (600 ac) per year being converted to residential development and 40 ha (100 ac) per year being converted to non-residential development (Sommerkorn pers. comm. a).

Table 4.1-2 illustrates that the number of construction permits for new residential units issued per year in Davis County increased overall between 1998 and 2002, despite slight decreases in 1999 and 2000. This increase indicates that projected development in the study area has continued to occur since publication of the Final EIS. These economic indicators further illustrate that, although the WFRC population projections for 2020 have been revised downward slightly, the pace of growth in Davis County has kept up with the rate anticipated in the Final EIS.

Table 4.1-2 Economic Indicators for Davis County, 1998–2002

Construction Permits Authorized	1998	1999	2000	2001	2002
New Dwelling Units (number)	2,363	2,294	1,832	2,571	2,564
Value of Total Construction (thousands of dollars)*	375,022	341,336	321,401	390,724	430,955

Notes:

* Represents value of new residential and non-residential construction.

Sources: University of Utah, Bureau of Economic and Business Research, 2004.

Notable development in the study area since publication of the Final EIS is described below.

In North Salt Lake, a new housing development, the Foxboro development, is currently being built west of Redwood Road between Center Street and 900 North. This 110-ha (272-ac) mixed-use development, which was platted in 2003, includes homes, parks, commercial zoning along Redwood Road, a planned elementary school, and a church. A total of 1,250 residential units are planned, including about 240 low- to moderate-income housing units and 12 Department of Housing and Urban Development- (HUD-) supported transitional housing units.

Woods Cross and Farmington are also experiencing considerable residential growth in the western parts of their jurisdictions. According to Woods Cross planners, many of the currently vacant and undeveloped parcels west of Redwood Road (Figure 4.1-1) will likely be rezoned for residential, recreation, and commercial land uses (HDR Engineering, Inc. 2003k). Farmington Ranches, a planned unit development located west of the Davis County Fairgrounds at 1525 W. Clark Lane in the City of Farmington, includes large lots, a new elementary school, and a proposed church. In addition, rural residential and single-

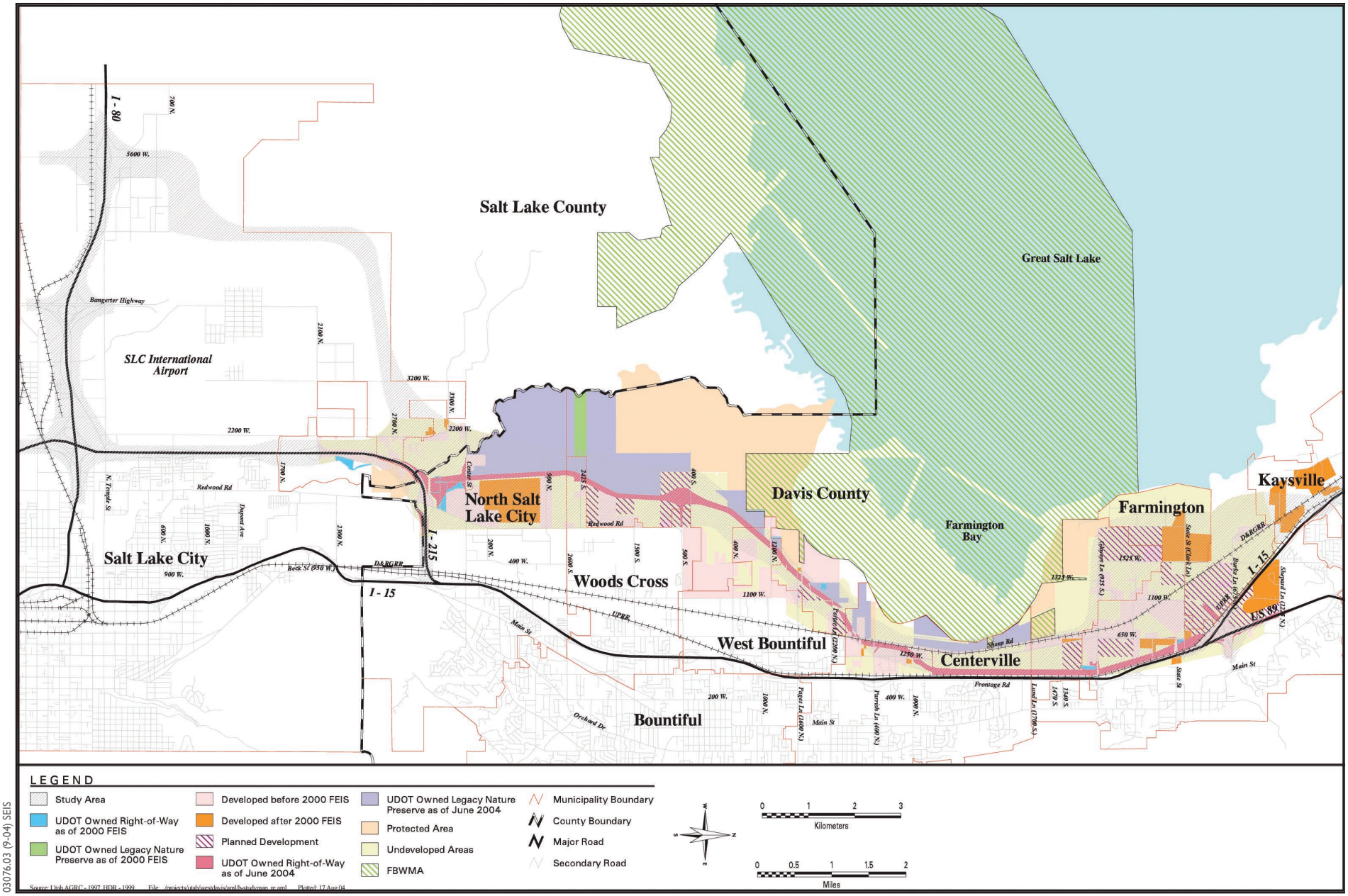

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Figure 4.1-1
Existing and Planned Development in the Study Area

family residential growth is continuing south of Farmington Ranches, south of Shepard Lane, and north of Glovers Lane (HDR Engineering, Inc. 2003g).

There has been no change in development or planned land use since publication of the Final EIS for the portions of Salt Lake County, Salt Lake City, Davis County (unincorporated), West Bountiful, and Centerville located in the study area. Development in these jurisdictions has proceeded as anticipated in the Final EIS.

4.1.2.2 Local Land Use Plans

There have been no changes or updates to the following land use plans since publication of the Final EIS.

- *Salt Lake City Downtown Plan* (Salt Lake City 1995).
- *Salt Lake City Transportation Master Plan* (Salt Lake City 1996).
- *Salt Lake City Visionary Gateway Plan* (Salt Lake City 1994a).
- *Gateway Specific Plan, Draft* (Salt Lake City 1994a).
- *Gateway Development Master Plan* (Salt Lake City 1998b).
- *Beck Street Gateway Vision Plan* (Salt Lake City 1994b).
- *Northwest Jordan River/Airport Master Plan* (Salt Lake City 1992).
- *General Plan for Centerville City* (City of Centerville 1996).
- *West Bountiful City Master Plan 1990–2000* (City of West Bountiful 1992).
- *West Bountiful City General Plan Draft Transportation Element* (City of West Bountiful 1997a).
- *West Bountiful City Planning District No. 6 Plan* (City of West Bountiful 1997b).
- *Comprehensive General Plan, Farmington, Utah* (City of Farmington 1993).
- *Farmington City Master Transportation Plan* (City of Farmington 1998).

There have been some new plans and updates to certain other plans since publication of the Final EIS, as described below.

Transportation Advisory Board Salt Lake City Transportation Action Plan Update

The *Transportation Advisory Board Salt Lake City Transportation Action Plan* (transportation action plan) (Salt Lake City 2000) is designed to appropriately direct Salt Lake City's transportation future. It is based on the guiding principles and direction statements adopted in the 1996 *Salt Lake City Transportation Master Plan*. The transportation action plan was prepared to report on the progress of the master plan. The transportation action plan specifically states the following regional planning guidelines.

- Salt Lake City will actively participate in the WFRC Inter-regional Corridor Alternatives Analysis.
- Salt Lake City will work with other local jurisdictions and WFRC on regional efforts to include bicycle trails in land use plans.
- Salt Lake City will participate in Envision Utah regional land use planning studies.
- Salt Lake City will work with UDOT to resolve transportation issues.
- Salt Lake City's Transportation Division will work with regional transportation agencies to explore and develop regional rail service.

North Salt Lake Land Use Development and Management Act

The North Salt Lake Land Use Development and Management Act outlines zoning regulations for various land use designations in North Salt Lake (City of North Salt Lake 2001). These zoned boundaries will be determined by general development plans adopted by the City of North Salt Lake at a later time.

Woods Cross General Plan

The *Woods Cross General Plan* offers specific recommendations for land use and transportation improvements in Woods Cross and discusses Legacy Parkway, as summarized below (City of Woods Cross 2003).

- The construction of Legacy Parkway or an equivalent highway would help to decrease traffic volumes on I-15 and lessen the spillover impact in Woods Cross.
- The City of Woods Cross has proposed to work with the City of West Bountiful to jointly plan and develop the 500 South/Legacy Parkway interchange area. As disclosed in the Final EIS, this is one of the areas in which land uses are anticipated to change in response to the project. The plan proposes to create a mixed-use development zone on land adjacent to the proposed Alternative E alignment at the 500 South interchange in which residential, commercial, recreational, entertainment, office, and transit-oriented development uses are supported. However, the city is proposing this development zone more in response to the transit element of the Shared Solution, which also includes I-15 widening and commuter rail development, than in response to the Legacy Parkway project itself. This development zone would be close to a proposed transit station and would likely be developed regardless of whether Legacy Parkway is constructed.
- Several residential developments along the Legacy Parkway corridor are planned, including the Legacy Estates, which is envisioned as an "executive home" planned-unit development with an 18-hole golf course. Legacy Estates would be located on a 61-ha (150-ac) parcel along the eastern edge of the Alternative E alignment, between 500 South and 2600 North. No interchange for the proposed Legacy Parkway is planned in this area; it is likely that most residents of Legacy Estates would use I-215 and I-15 rather than Legacy Parkway for regional travel.
- A 91-m (300-ft) minimum open buffer is planned on the east side of the Alternative E alignment. According to the city, this buffer zone is intended to moderate the direct impact of the highway on the natural surroundings to the west and to act as a buffer between the proposed highway and residential and commercial development between the highway and Redwood Road (City of Woods Cross 2003). The buffer, which would be located between approximately 1900 South and 500 South, and between

500 South and the city's northern border, is proposed in addition to the buffer area included as a component of the proposed Legacy Parkway build alternatives (see Chapter 3, *Alternatives*).

In addition, the City of Woods Cross is working with UTA to develop a commuter rail station at 800 West and 500 South in Woods Cross. UTA has not acquired any land for this station to date.

4.1.2.3 Regional Land Use Planning Studies

Envision Utah Quality Growth Strategy and Technical Review

Envision Utah is a partnership between public and private entities that was formed in 1997 to study and address the effects of long-term growth in the Greater Wasatch Front area.[2] It is sponsored by the Coalition for Utah's Future and includes representatives from state and local governments, business leaders, developers, conservationists, landowners, academicians, church groups, and independent citizens. Its goal is to create a publicly supported growth strategy that will preserve Utah's high quality of life, natural environment, and economic vitality (Envision Utah 1999).

Through the involvement of the public, local and state elected officials, businesses, civic organizations, religious communities, and other stakeholders, Envision Utah has gathered information about what Greater Wasatch Area residents value and how they think growth should be accommodated. Envision Utah has also sponsored the *Envision Utah Quality Growth Strategy and Technical Review* (January 2000). Based on this information, Envision Utah has identified the following six primary goals that need to be addressed in the Greater Wasatch Area if these communities are to protect the environment and maintain their economic vitality.

1. Enhance air quality.
2. Increase mobility and transportation choices.
3. Preserve critical lands, including agricultural, sensitive, and strategic open lands and address the interaction between these lands and developed areas.
4. Conserve and maintain the availability of water resources.
5. Provide housing opportunities for a range of family and income types.
6. Maximize efficiency in public and infrastructure investments to promote the other goals.

The following transportation goals are associated with the second primary goal (Increase mobility and transportation choices).

- Advocate an increase in the capacity of east-west transportation links, recognizing that some communities may have a greater need for additional north-south arterial capacity. Improve traffic flow and provide better access. Work with UDOT and local governments to identify the corridors of greatest need.

[2] The Greater Wasatch Front area, as defined by Envision Utah, extends from Brigham City on the north to Nephi on the south.

- Promote the building of a region-wide transit system to make transit more convenient and reliable. Work with UTA, UDOT, railroad companies, and local governments to find ways to identify and purchase right-of-way in the near term for future transit.
- Foster transit-oriented development.
- Foster and promote walkable community development where feasible.
- Promote the creation of a network of bikeways and trails, especially commuter trails linking daytime destinations.
- Encourage the addition of carpool lanes and promote incentives for use.
- Encourage reversible lanes where feasible to reduce peak-hour congestion and take advantage of unused road capacity.

In October 2000, Envision Utah released the *Urban Planning Tools for Quality Growth* report. Changes and updates specific to Centerville include joint funding, by Envision Utah and the Quality Growth Commission,[3] of local quality growth demonstration projects, including a proposed mixed-use development that integrates affordable housing, open space, and compact, high-density development. There has been no change to the sections with regard to Woods Cross, West Bountiful, and North Salt Lake.

In 2002, Envision Utah also released the *Wasatch Front Transit-Oriented Development Guidelines* (Envision Utah 2002), which provide a framework for understanding, designing, and implementing transit-oriented development in the greater Wasatch Front Region. These guidelines generally are designed to serve as a tool for implementing a region-wide transportation and land use opportunities strategy.

Envision Utah supports adoption of the Shared Solution, and in particular, the transit component of the Shared Solution.

Inter-Regional Corridor Alternatives Analysis

The Inter-Regional Corridor Alternatives Analysis (IRCAA) (Carter Burgess 2002) was initiated as a collaborative effort in October 1999 by four sponsor agencies: WFRC, Mountainland Association of Governments (MAG) UTA, and UDOT. The analysis was conducted to develop a comprehensive plan for the best mix of transportation solutions to meet long-term (30-year) inter-regional mobility needs.

IRCAA Study Area

The IRCAA study area covers a 120-mile corridor between the communities of Brigham City on the north and Payson on the south, encompassing most of the urbanized areas in Utah, as well as the primary

[3] The Quality Growth Commission was established by the Quality Growth Act of 1999. The commission has 13 members, each appointed by the governor and confirmed by the state senate. Membership is required to consist of two state representatives, six elected officials from local government, one representative from the construction industry, one representative from the real estate industry, two representatives from the farming community, and one at-large individual. The commission's purpose is to develop balances between quality of life and economic development with respect to growth issues.

commercial, business, and education institutions. The corridor is linear and relatively narrow, located between the Wasatch Range on the east and Great Salt Lake, Utah Lake, and the Qquirrh Mountains on the west. More than 50 cities and towns in the counties of Box Elder, Weber, Davis, Salt Lake, and Utah are part of the study area.

Locally Preferred Alternative

The IRCAA identified a Locally Preferred Alternative (LPA) that included commuter rail, roadway improvements (including the proposed Legacy Parkway), new interchanges, HOV lanes, and bus rapid transit as necessary transportation improvements. The IRCAA determined that commuter rail should operate between Brigham City and Payson, using either locomotive-hauled coaches or self-propelled diesel multiple units (DMU). The analysis recommended that trains operate in the UPRR corridor from Ogden to Salt Lake City, and in the D&RG corridor from Salt Lake City to Provo.

As a result of the IRCAA, UTA had acquired 282 km (175 mi) of railroad corridor between Payson and Brigham City as of 2002, as well as a rail maintenance facility adjacent to Beck Street in North Salt Lake (Utah Transit Authority 2003). These facilities will be components of the future rail system.

The Davis County Shorelands Comprehensive Land Use Plan

The *Davis County Shorelands Comprehensive Land Use Plan* is a plan for conserving and preserving the land along Great Salt Lake (Davis County Council of Governments 2001). It presents a balanced approach to managing land use while preserving Great Salt Lake Shorelands,[4] a regionally important resource. The Davis County Shorelands Steering Committee, created by the Davis County Council of Governments, implemented an inclusive and informed public input process that included input from landowners, residents, city and county officials, developers, conservationists, and other concerned citizens. The plan addressed the following local issues:

- **North Salt Lake**. The lands west of the proposed Legacy Parkway will be preserved as a Legacy Nature Preserve as part of the mitigation required to construct Legacy Parkway.

- **Woods Cross**. Although a small portion of the land at the proposed Legacy Parkway/500 South interchange will be developable, the land west of the highway corridor will not be developed. Duck clubs currently use most of this land; due to the sensitivity of the land, this is unlikely to change.

- **West Bountiful**. There will be no development west of the Alternative E alignment with the exception of an access road to a treatment plant and the Bountiful City Landfill.

- **Centerville**. The City of Centerville plans a future development between the Alternative E alignment and the Denver & Rio Grande rail corridor to the west. Wetland mitigation will likely be necessary in this area due to the nature of the site. Centerville's Master Plan explains that the southern part of the site will be mitigation land for developing the northernmost part of the site.

- **Farmington**. Because a lot of land is available for development near the Federal Emergency Management Agency (FEMA) Flood Line, the City of Farmington has approved a new conservation plan that will preserve open space and farmland.

[4] The Davis County Shorelands Plan considers shorelands those lands located west of the proposed Legacy Parkway corridor (Davis County 2001).

Although the Davis County Shorelands Plan was finalized after publication of the Final EIS, the concepts presented in the plan were generally captured in the Final EIS. Specifically, during development of the Final EIS, local jurisdictions in the study area stated that Legacy Parkway would represent a western boundary for future growth, primarily due to the lack of available access on the western side of the proposed highway. See Section 4.1.1 of the Final EIS for a more detailed explanation of this discussion.

4.1.3 Environmental Consequences and Mitigation Measures

4.1.3.1 Impacts on Cities and Counties

No-Build Alternative

Following is a discussion of the No-Build Alternative, both under existing conditions (2004) and future conditions (2020). Under both of these scenarios, land use development in the study area would continue as described in Section 4.1.2.2, *Local Land Use Plans*. However, several of the local land use plans that incorporate the Alternative E alignment would have to be changed if one of the build alternatives is not selected, as described in Section 4.1.3.2, *Consistency with Plans and Policies*.

Existing Conditions and Future Conditions (2020)

As described in the Final EIS and verified by local planners during preparation of the Draft Supplemental EIS, land uses would continue to change from a rural character (a combination of farmland, open space, industrial, commercial, low-density residential, and wetlands) to more of an urbanized, developed land use under the No-Build Alternative. Since neither the proposed Legacy Parkway nor the I-15 improvements would be constructed, local jurisdictions would be required to resolve growth and traffic problems, through individual or collective actions, over the course of the next 15 years.

Based on the number of Davis County building permits issued since 1999, approximately 280 ha (700 ac) of undeveloped land, much of which is farmland, are being developed per year in Davis County (Sommerkorn pers. comm. b) (see Section 4.1.2.1, *Current Land Use and Development Trends in the Study Area*, and Table 4.1-2). This planned development will likely continue. In addition, wetlands that would otherwise be preserved in the Legacy Nature Preserve would be available for permitted development.

For the City of North Salt Lake, current land use and zoning will continue in the study area under the No-Build Alternative. Community planners believe that, without Legacy Parkway, it would take longer for two undeveloped parcels of land in North Salt Lake to develop, although both would likely be developed by 2020 (Wood pers. comm. a). The first parcel of land (18 ha [45 ac]) is located northwest of I-215 and Redwood Road and south of Center Street. The second parcel of land (about 8 ha [20 ac]) is located directly south of I-215 and west of Redwood Road. Both of these properties are currently zoned as commercial land use and would remain as such under the No-Build Alternative.

Growth in Woods Cross under the No-Build Alternative would continue according to current trends. According to community planners, Legacy Parkway would provide a boundary for the city's westward development (HDR Engineering, Inc. 2003k). If Legacy Parkway is not built, the city will need to reexamine the western edge of the city and determine where the western city boundary should be located (City of Woods Cross 2003). The city planners believe that without the proposed highway, development will continue to the west, and that if Legacy Parkway is not built, the *Woods Cross General Plan* will need to be updated to address this growth issue.

Based on meetings with City of West Bountiful land use planners, under the No-Build Alternative, development of residential lots of between 0.4 ha (1 ac) and 2 ha (5 ac) would continue as planned north of 500 South (HDR Engineering, Inc. 2003j).

In Centerville, the current land use in the study area is zoned as business park. If Legacy Parkway is not built, the land will remain under the same zoning designation. Similarly for Farmington, land uses will be the same with or without the Legacy Parkway. However, improvements to Park (formerly Burke) Lane to provide access to western portions of the city would have occurred, even if plans for the proposed highway had not been put forward.

Build Alternatives

As describe above, local community planners and city administrators in Davis County continue to state that, in general, current development patterns would not substantially change if Legacy Parkway is built, but several local changes could occur. Types of land use near the two interchanges may change from residential to commercial, and the overall pace of development in the corridor might slightly accelerate as a result of constructing any proposed Legacy Parkway build alternative (HDR Engineering, Inc. 2003a–f). However, the rate of growth to the west, as indicated in several of the revised land use plans of these communities, and the types of development that would occur around the Legacy Parkway interchanges, would likely be different from what would occur without the proposed highway. Since publication of the Final EIS, several of the cities in the study area have made changes to land use zoning and plans in anticipation of the eventual construction of Legacy Parkway and the Legacy Nature Preserve. Specific changes made by each city are discussed in the following paragraphs.

Overall, the right-of-way width of Legacy Parkway identified in the Final EIS has changed from 100 m (328 ft) to 95 m (312 ft) due to design changes that decreased the width of the center median of the roadway (see Chapter 3, *Alternatives*). As a result, 2.4 m (8 ft) on either side of the roadway may become available for other uses, depending on specific circumstances. It is doubtful, however, that the addition of a 2.4-m (8-ft) parcel of land would result in significant changes to the possible land uses of property adjoining Legacy Parkway.

North Salt Lake

Since publication of the Final EIS, the City of North Salt Lake has made several changes in its land use designations west of Redwood Road between Center Street and 2600 South. Previously, the city's general land use plan identified land use west of Redwood Road as manufacturing-distribution. Since then, the city has stated that it will revise its general plan to rezone approximately 312 ha (772 ac)[5] west of the Alternative E alignment as natural open space, if the proposed action is implemented (Wood pers. comm. b). This area has already been purchased by UDOT as part of the proposed Legacy Nature Preserve, and would be rezoned to be consistent with the purpose of the preserve.

In the area east of the Alternative E alignment and west of Redwood Road, between Center Street and 2600 South, the City of North Salt Lake rezoned 231 ha (570 ac) of manufacturing-distribution to commercial/general (Wood pers. comm. b). Private developers approached the city in late 2001 to rezone 110 ha (272 ac) of the 231 ha (570 ac)[6] to residential and commercial, 97 ha (240 ac) to residential, and 12.9 ha (32 ac) to commercial (Wood pers. comm. b). This land is being used to construct the Foxboro residential development, which is described in Section 4.1.2.1, *Current Land Use and Development*

[5] HDR Engineering, Inc. used GIS and 2003 aerial photography to determine approximate acres in area described by Rod Wood, North Salt Lake.
[6] Acres provided by Rod Wood, North Salt Lake.

Trends in the Study Area, above. The Foxboro development includes provisions for connecting recreational facilities in the development to the Legacy Parkway Trail associated with the build alternatives (see Section 4.7, *Pedestrian and Bicyclist Considerations*).

In addition to the above land use changes, two existing undeveloped parcels of land in North Salt Lake, an 18.2-ha [45-ac] parcel located northwest of I-215 and Redwood Road, south of Center Street, and an 8.1-ha (20-ac) parcel located directly south of I-215, west of Redwood Road, would likely develop more rapidly with exposure and visibility from the proposed Legacy Parkway build alternatives (Wood pers. comm. b). North Salt Lake has refocused its land use management within this area of the community because of the proposed Legacy Parkway (Wood pers. comm. b).

The City of North Salt Lake reiterated that Legacy Parkway would act as a natural barrier, preventing development west and protecting the city from urban growth (Wood pers. comm. b). The city prefers that areas west of the proposed Legacy Parkway, which have flat terrain subject to drainage concerns, a lack of infrastructure, and sensitive environmental conditions, continue to be a part of the Legacy Nature Preserve (Wood pers. comm. b).

Woods Cross

The 1990 version of the *Woods Cross General Plan*, which was completed before Legacy Parkway was proposed, designated approximately 752.7 ha (1,860 ac) of land west of Redwood Road (1800 West) as high-density industrial and commercial use (Stephens pers. comm.). In 2003, the *Woods Cross General Plan* was updated to reflect changes in land use designations that would result from implementation of the proposed Legacy Parkway. The city, planning that Legacy Parkway—specifically the Alternative E alignment—would be built, rezoned the undeveloped land west of Redwood Road for a combination of commercial, residential, and open-space uses (Stephens pers. comm.). The following represent some of the notable land use designation changes:

- 52.6 ha (130 ac) of land on the eastern edge of the Alternative E alignment adjacent to 500 South are planned for high-density urban commercial use.

- 62.7 ha (155 ac) of land on the west side of the Alternative E alignment, near 500 South, are now zoned for commercial and office use. This area is referred to as the Land's End Neighborhood.

- 77.3 ha (191 ac) of land are planned for parks and recreation, including a 9.44-m (300-ft) open-space buffer zone on the east side of the Alternative E alignment (City of Woods Cross 2003). As described above, the buffer zone was planned by the city to moderate the direct impact of the proposed highway on the natural surroundings to the west and on the residential and commercial development between the proposed highway and Redwood Road. This buffer is in addition to the buffer proposed as a component of the build alternatives.

- 60.7 ha (150 ac) of land are designated for the Legacy Estates, which is envisioned as an "executive home" planned-unit development along the eastern edge of the Alternative E alignment, between 500 South and 2600 South in Woods Cross.

- 43.3 ha (107 ac) of land located east of the Alternative E alignment, along 2600 South, are zoned for future business park development.

The City of Woods Cross will continue to restrict development in the areas west of the proposed highway because of sensitive environmental conditions. The updated *Woods Cross General Plan* also reflects

connections between the proposed Legacy Parkway Trail and the trail system in the city (see Section 4.9, *Pedestrian and Bicyclist Considerations*) (City of Woods Cross 2003).

West Bountiful

Before Legacy Parkway was proposed, the *West Bountiful General Plan* included residential lots of between 0.4 ha (1 ac) and 2 ha (5 ac) north of 500 South. Under all proposed build alternatives, the size of the city's planned lots would be reduced to between 0.2 ha (0.5 ac) and 0.4 ha (1 ac). In addition, the city would change the current residential zoning to residential/commercial land use. This land use change is in response to the potential for transit-oriented development afforded by the North Corridor roadway projects, including the proposed Legacy Parkway, and the mixture of proposed future commercial and residential land uses. The City of West Bountiful supports limiting development near the shoreline of Great Salt Lake to protect sensitive environmental conditions (HDR Engineering, Inc. 2003j). Community planners have stated that the proposed Legacy Parkway build alternatives would act as a barrier to this development. In addition, with West Bountiful's future bicycle and pedestrian trail system, the city proposes to purchase surplus properties east of the Alternative E alignment, develop them as small neighborhood parks, and tie them into the Legacy Parkway Trail system. Specifically, the *West Bountiful General Plan* includes connections between the proposed Legacy Parkway Trail and existing equestrian centers and the city's planned trail system (see Section 4.7, *Pedestrian and Bicyclist Considerations*) (City of West Bountiful 1997a).

Centerville

The City of Centerville's master plan continues to project the development of all land north of the current Centerville Business Park to Lund Lane; this area encompasses about 125.4 ha (310 ac)[7] of land zoned as high-density industrial (Jensen pers. comm.). Under Alternatives A and E, all of this undeveloped land would be directly affected; 26.3 ha (65 ac) of the 125.4 ha (310 ac) would be used for right-of-way and the remaining 99.1 ha (245 ac) would be isolated from the rest of the city (Jensen pers. comm.).

According to community planners, the city anticipates continuing its business park development northwest to the old D&RG railroad alignment (Jensen pers. comm..). However, in December 2003, because of the proposed Legacy Parkway, the city rezoned this area from high-density industrial to medium-density industrial (Jensen pers. comm.). This rezoning affects the types of development that would occur in this area if Legacy Parkway were built.

Alternatives B and C would be located farther west. This eventuality would provide more land for the city to pursue future industrial development and continue current business park development (Jensen pers. comm.).

The City of Centerville's *Trail Master Plan*, which is part of the city's general plan (City of Centerville 1996), reflects the proposed Legacy Parkway Trail as part of the city's trail system (see Section 4.7, *Pedestrian and Bicyclist Considerations*).

Farmington

In Farmington, Alternatives A, C, and E parallel the I-15 alignment and terminate at the I-15/US-89 interchange. The area surrounding Park (formerly Burke) Lane is zoned for mixed-use development. The

[7] HDR Engineering, Inc. used GIS and 2003 aerial photography to determine approximate acres in area described by Aric Jensen, City of Centerville.

city believes that the proposed Legacy Parkway build alternatives would cause this area to develop more quickly than it would without the proposed highway (HDR Engineering, Inc. 2003h).

Because the amount of right-of-way needed for Alternative B is greater than that needed for the other build alternatives, Alternative B would have a greater impact on existing land uses in Farmington. Currently, Alternative B would affect the newly opened Farmington Eagle Bay Elementary School in Farmington Ranches, described in Section 4.1.2.1, *Current Land Use and Development Trends in the Study Area*, above.

The *Farmington Master Trails Map* (City of Farmington 2003) reflects the proposed location of the (see Section 4.7, *Pedestrian and Bicyclist Considerations*).

4.1.3.2 Consistency with Plans and Policies

No-Build Alternatives

Existing Conditions (2004) and Future Conditions (2020)

Since publication of the 2000 Final EIS, there has been no change to this section.

Build Alternatives

Construction of any proposed build alternative would include an interchange at 500 South. The *Woods Cross General Plan* proposes to create a mixed-use development zone adjacent to the Legacy Parkway /500 South interchange in which residential, commercial, recreational, entertainment, office, and other transit-oriented development uses will be supported. Therefore, Legacy Parkway and the other components of the North Corridor Shared Solution (I-15 improvements and commuter rail) are consistent with the city's updated general plan.

All proposed build alternatives would be consistent with *Davis County Shorelands Comprehensive Land Use Master Plan* because the Legacy Nature Preserve associated with each alternative would ensure that a large part of the area designated by the county for protection would be acquired as a preserve, thus removing the threat of future development in those sensitive habitat areas.

Development that occurs in the study area under the proposed build alternatives would be consistent with local land use plans governing future growth, including the following plans

- *General Plan, City of North Salt Lake.*
- *Woods Cross City General Plan*.
- *West Bountiful City Master Plan.*
- *General Plan for Centerville City*.
- *Comprehensive General Plan, Farmington, Utah.*

4.1.3.3 Impacts on Growth within and beyond the North Corridor

The following potential effects of the proposed Legacy Parkway related to population growth and land development were disclosed in the Final EIS.

- Changes in land use around the proposed interchanges.
- Acceleration of planned residential development in the corridor.
- Shifts in the location of development from west of the proposed Legacy Parkway alignment to other portions of the region, most of it likely occurring in the study area, and with more lands designated for open space and habitat preservation on the west side of the highway.

The issue of induced growth resulting from the proposed action in the south Weber County/Ogden area is of interest as both a regional land use and a regional economic issue.[8] Planning officials in the study area interviewed after publication of the Final EIS stated that the proposed action, when combined with other North Corridor improvements (i.e., other components of the Shared Solution), could *accelerate* the pace of planned growth in the study area (HDR Engineering, Inc. 2003a–f). Although it appears that the proposed action would not substantially affect the land use plans of the Davis County jurisdictions (see Section 4.1.3.1 above), the impacts on unincorporated Weber County and the City of Ogden are more difficult to quantify. To evaluate these potential impacts, the project team examined whether the Legacy Parkway build alternatives and the cumulative impacts of the North corridor transportation improvements would induce growth to a northern boundary that included southern Weber County, up to and including Ogden. The WFRC travel demand model, (version 3.2), which was used to project operating conditions in 2020 under the No-Build Alternative (see Chapter 3, *Alternatives*), indicates that these improvements would increase traffic on I-15 in southern Weber County, near Ogden. However, the models provide little insight regarding induced growth in land use, specifically residential land use in the areas between Salt Lake City and Ogden, making it difficult to determine if these increased volumes would be attributable to induced growth in the corridor, or would simply reflect the different transportation choices available to motorists. Modeling for land use (e.g., using the UrbanSim model) is still under consideration and evaluation by WFRC, and was consequently not available for use for this Supplemental EIS.

A recent study entitled *Highways and Sprawl in North Carolina* (Hartgen 2003) concluded that although development often follows major road investment, major road investment follows growth with equal frequency. The study concluded that many factors outside of highways and roads can affect growth, including the region's economic health, prior growth and available land, site suitability, zoning, sewer and water provisions, other utilities, income, tax rates, crime, schools, housing policies, and race and other demographics.

Although it is possible that increases in highway capacity (and corresponding reductions in travel time) between Salt Lake City and the Farmington area could spur additional residential development in Ogden or other parts of Weber County beyond what will occur without the project, it is unlikely. There is still a significant distance to travel between Farmington and south Weber County or Ogden. As discussed in Section 4.1.4 of the Final EIS, families choose where to live based on a range of economic, demographic,

[8] As stated in Footnote 1, under Section 4.1.1, *Approach and Methodology*, growth impacts south of the study area (e.g., in Salt Lake County) were not evaluated because much of the land use south of the study area is currently developed, or planned for development. As a result, it was assumed that areas south of the study area would experience full build-out, with or without construction of the proposed action.

and aesthetic factors. The proposed Legacy Parkway would not likely change any of these factors families use to choose where to live.

Under the proposed build alternatives, approximately 324 ha (800 ac) of developable land in North Salt Lake, Centerville, Farmington, Woods Cross, Bountiful, and West Bountiful would be set aside within the Legacy Parkway right-of-way and the proposed Legacy Nature Preserve. Planners from the cities with jurisdiction over this land have stated that, under the No-Build Alternative, this land would be available for development and would be developed in a manner similar to adjacent areas and/or consistent with current zoning designations (HDR Engineering, Inc. 2004a–e).

These planners also stated that if none of the proposed build alternatives is implemented, development of those 324 ha (800 ac) will increase rather than dilute the total development levels in their communities. Because the official 2020 regional economic projections do not include the additional 324 ha (800 ac) of development, developing an additional 324 ha (800 ac) in the North Corridor would likely displace development that would otherwise occur elsewhere in the region. The following sections discuss the transportation impacts of relocating up to 324 ha (800 ac) of 2020 growth from the Legacy right-of-way and preserve to north Davis and Weber Counties, Ogden, and other parts of the region. See Appendix B (Section B5.1) for further discussion of possible land use shifts under the No-Build Alternative.

Weber County

According to conversations with Weber County community planners (Gentry pers. comm. a.), growth and land use patterns in the unincorporated areas of Weber County would not change substantially with the proposed Legacy Parkway build alternatives. As indicated by Jim Gentry of the Weber County Planning Commission:

> There seems to be very little area that has not been filled in between Salt Lake and Weber Counties. Over the last several years, the development of housing north of Salt Lake City has not been because of urban growth; instead the growth appears to be more a result of expansion of communities and jobs in the Weber County area. With Great Salt Lake on the west and the Wasatch Range on the east, urban growth in Ogden will continue to expand northward as the population grows, regardless of whether or not any of the North Corridor projects are completed (Gentry pers. comm. a).

Weber County planners believe that the population along the Wasatch Front will migrate towards Weber County as building sites to the east and south become scarcer and as housing costs in Salt Lake City rise, regardless of whether the proposed action is built. As noted by Jim Gentry, development in the county will be somewhat limited until wastewater and other infrastructure improvements in unincorporated Weber County are further developed (Gentry pers. comm. a).

Table 4.1-3 below, which updates, in part, Table 3-3 in the Final EIS, illustrates that the population, number of households, and employment in Weber County are projected to increase at an annual rate of 2.0 percent, 2.2 percent, and 2.4 percent, respectively, through 2020. This outcome represents an increase over similar projections in the Final EIS, which projected an annual growth rate of 2.0 percent for all of these measurements (Wasatch Front Regional Council 1997). It should be noted that these projections do not necessarily take into consideration transportation improvements in the north corridor (e.g., Legacy Parkway) but are, instead, based on current growth trends.

Table 4.1-3 Projected Annual Increases in Population, Households, and Employment in Salt Lake, Davis, and Weber Counties, 2002 to 2020

	Population			Households			Employment		
	2002	2020	% Annual Increase	2002	2020	% Annual Increase	2002	2020	% Annual Increase
Salt Lake County	923,900	1,283,784	1.8	306,767	458,900	2.3	521,930	733,665	1.9
Davis County	250,000	347,412	1.8	75,923	119,094	2.5	89,427	124,346	1.8
Weber County	199,825	286,919	2.0	67,032	99,700	2.2	84,100	128,904	2.4

Source: Wasatch Front Regional Council 2003b.

Ogden

Between 1990 and 2000, Weber County's population grew at a rate of nearly 2.2 percent per year, with Ogden comprising the majority of this growth (U.S. Census Bureau 1990, U.S. Census Bureau 2000). The city is currently dealing with a variety of growth concerns, including the possibility that the "big box" retailers described above will establish outlets outside its boundaries and pull businesses away from downtown Ogden. Ogden is considered a regional commerce center with little room left for in-fill. WFRC population estimates project Ogden to grow at a rate of 1.1 percent per year between 2003 and 2020, a decrease over historical growth caused by the lack of area available for expansion within the city limits (Wasatch Front Regional Council 2003b).

Residential growth is already occurring in the western parts of Weber County due to local social and economic factors, irrespective of growth pressures from Davis and Salt Lake Counties. The proposed Legacy Parkway (and its contribution to the Shared Solution) could increase the desirability of the Ogden area and southern Weber County to families or individuals working in Davis County and Salt Lake City, although this is unlikely (Gentry and Montgomery pers. comms.). In fact, Ogden is expected to grow to full build-out, with or without implementation of the proposed Legacy Parkway.

Section 4.2
Farmland

This section discusses farmland in the study area. It provides an update on prime, unique, state-important, and locally important farmland, and discusses newly designated Agricultural Protection Areas. This section also updates the environmental consequences of the proposed build alternatives on farmland. The discussion of environmental consequences takes into consideration development since publication of the Final EIS, including construction activities associated with Alternative D (Final EIS Preferred Alternative) and unrelated development in the study area, revisions in the policy on designating special farmland within municipal boundaries, and the reduction in the right-of-way width associated with all proposed build alternatives.[1]

4.2.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with farmland in the study area, Sections 3.2 and 4.2 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for farmland is described in Section 4.0.1, *Study Area*, of this document.

Updated information on the types of crops and irrigation systems associated with all farmland in the study area was obtained from a map titled *Water-Related Land Use Data Inventory*, from the Utah Department of Natural Resources (UDNR), Division of Water Resources (UDNR Division of Water Resources 2003). Erin Bell of the Natural Resources Conservation Service (NRCS) was contacted in October 2003 for updated information on prime and unique farmland and farmland of state and local importance in the study area. Susan Yoshinaga of the Salt Lake County Assessor's Office and Barry Burton of Davis County were also contacted regarding potential Agricultural Protection Areas in the study area. The data provided by these sources were also verified during review of recent (2003) orthophotographs and limited field surveys.

Farmland impacts were reassessed based on the updated data to determine whether the narrower right-of-way (i.e., 95 m [312 ft] versus 100 m [328 ft]) proposed for all build alternatives (see Chapter 3, *Alternatives*, of this document) would change the acreage or type of farmland impacts disclosed in the Final EIS.

[1] Section 4.13, *Wildlife*, describes impacts on several different wildlife habitat types, including pasture habitat and cropland habitat. Those wildlife habitat types are different from the farmland described in this section in that they are defined differently and described according to a larger wildlife study area. As a result, impacts on pasture and cropland identified in Section 4.13 are different from the farmland impacts disclosed in this section.

4.2.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to farmland. The Final EIS described production of irrigated crops in the study area, including alfalfa, corn, and pasture, as well as prime, unique, state-important, and locally important (i.e., farms under the "Century Farm and Ranch" program) farmland. This section provides an update on the area of land currently associated with these farmland categories in the study area, as well as information on Agricultural Protection Areas.

4.2.2.1 Current Agricultural Production

Information on farmland in the Final EIS was obtained from the 1988 version of the UDNR Division of Water Resources map titled *Water-Related Land Use Data Inventory*. Because this version of the map was over 10 years old when the Final EIS was published, other sources were also used in the Final EIS for information on farmland in the study area, including data from field reconnaissance, tax assessor parcel information, and project orthophotographs. Based on these sources, crops in the Final EIS were divided into three categories of irrigated crops: alfalfa, corn, and pasture. The Final EIS did not provide information on non-irrigated croplands.

The 2003 UDNR Division of Water Resources map, which was used to assess agricultural production in the study area for the Supplemental EIS, includes six categories of irrigated crop types—alfalfa, grain, corn, vegetables, grass hay, and pasture-irrigated—and three categories of non-irrigated crop types—pasture-non-irrigated, pasture-sub-irrigated, and farmsteads.

Table 4.2-1 and Figure 4.2-1 present updated information on both irrigated and non-irrigated cropland in the study area. A loss of 32 ha (80 ac) of cropland in the study area since publication of the Final EIS is attributable to construction activities associated with Alternative D (Final EIS Preferred Alternative).

Table 4.2-1 Area of Irrigated and Non-irrigated Cropland in Study Area

	Hectares (Acres)[1]	
Crop Type	Final EIS	Supplemental EIS
Irrigated Crops[2]		
Alfalfa	301 (743)	204 (504)
Grain	NA	71 (175)
Corn	194 (479)	32 (78)
Vegetables	NA	1 (2)
Grass hay	NA	92 (228)
Pasture, irrigated	1,091 (2,695)	673 (1,665)
Total	1,586 (3,917)	1,073 (2,652)
Non-Irrigated Crops[3]		
Pasture, non-irrigated	NA	296 (733)
Pasture, sub-irrigated	NA	224 (554)
Farmsteads	NA	21 (51)
Total	NA	541 (1,338)

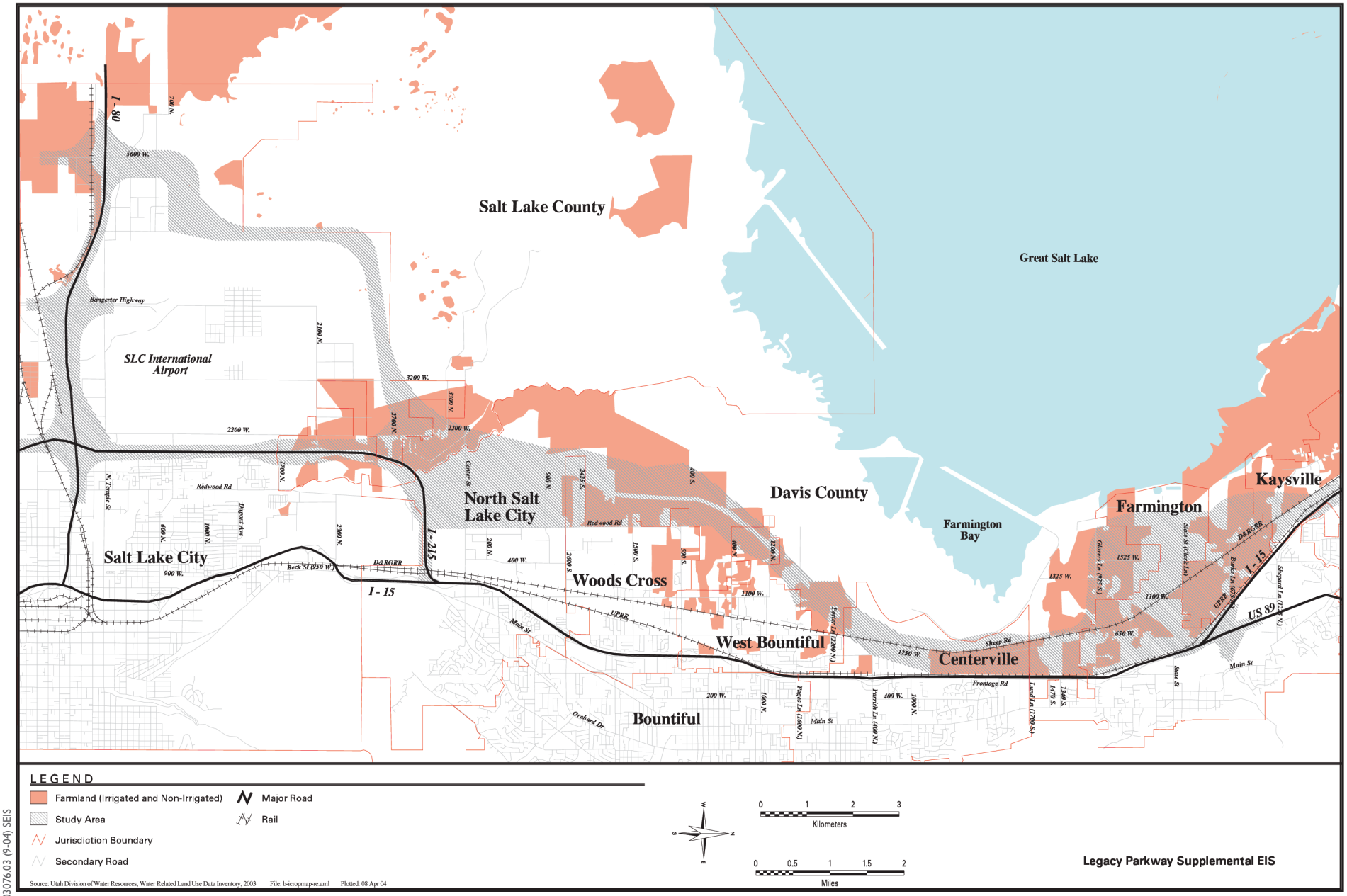

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Figure 4.2-1
Farmland in Study Area

	Hectares (Acres)[1]	
Crop Type	Final EIS	Supplemental EIS

Notes:

[1] Conversions are from acres to hectares. Conversions have been rounded.

[2] Cropland in the Final EIS was divided into three crop types (alfalfa, grain, and corn). The additional crop types presented in this table are based on UDNR's Division of Water Resources 2003 map, *Water-Related Land Use Data Inventory*, which further subdivides croplands in the study area.

[3] The total area of non-irrigated cropland was not disclosed in the Final EIS.

Source: UDNR Division of Water Resources 2003.

4.2.2.2 Prime Farmland

As described in the Final EIS, NRCS classifies certain farmland as prime farmland based on specific physical criteria (e.g., water availability, soil temperature, pH); however, since publication of the Final EIS, NRCS has adopted a new policy that does not allow for designation of prime, unique, or state-important farmland within the boundaries of a municipality (Bell pers. comm., Weber pers. comm.). An updated NRCS CPA 106 form, Farmland Conversion Impact Rating for Corridor Type Projects, is included in Appendix A. As a result of this policy change, some of the farmland identified in the Final EIS as prime and state-important farmland is not included as prime and state-important farmland in this section of the Supplemental EIS.

The acreage of prime farmland outside municipal boundaries was updated through field reconnaissance and consultation with NRCS. No prime farmland in the study area was lost as a result of construction activities associated with Alternative D.

No additional farmland has been designated as prime farmland since publication of the Final EIS. Table 4.2-2 presents updated information on prime farmland in the study area, and Figure 4.2-2 provides location information.

Table 4.2-2 Area of Prime and State-Important Farmland

	Hectares (Acres)*	
Farmland Designation	Final EIS	Supplemental EIS
Prime	359 (888)	166 (409)
State-Important	25 (62)	7 (17)

Note:

* Conversions are from acres to hectares. Conversions have been rounded.

Sources: Bell pers. comm., Federal Highway Administration et al. 2000.

4.2.2.3 Unique Farmland

As described in the Final EIS, no unique farmland is located in the study area (Bell pers. comm.).

4.2.2.4 Farmland of State Importance

As stated in the Final EIS, farmland of state importance is classified by NRCS based on certain physical criteria similar to those required for designating prime farmland. The acreage of farmland of state importance in the study area has decreased since publication of the Final EIS because of development and the new NRCS policy described above. None of this loss is attributable to construction activities associated with Alternative D. Table 4.2-2 above presents updated information on farmland of state importance in the study area, and Figure 4.2-2 provides location information.

4.2.2.5 Farmland of Local Importance

As described in the Final EIS, Utah initiated a "Century Farm and Ranch" program in 1996 that allowed for recognition of farms that have been operated continuously by the same family for at least 100 years. One farm in the study area has Century Farm status, and several other farms represent multigenerational farming operations (see Section 3.2.5 of the Final EIS). The status of these properties has not changed since publication of the Final EIS. Figure 4.2-2 illustrates the location of these properties in the study area.

4.2.2.6 Agricultural Protection Areas

Since publication of the Final EIS, the Utah Legislature has enacted a new law—Utah Code Title 17 (Counties), Chapter 41 (Agricultural Protection Area)—to better protect certain agricultural areas. The law requires each county in Utah to create an Agriculture Protection Area Advisory Board to evaluate proposals for Agriculture Protection Areas. Owners of land in agricultural production (crops or livestock) can petition their local municipality for an Agriculture Protection Area designation. Agriculture Protection Areas are protected from state and local laws that restrict farm practices unless the regulations are required for public safety or are required by federal law. Agriculture Protection Areas also cannot be condemned for highway purposes unless there is no reasonable and prudent alternative for the project.

Based on consultation with representatives from Davis and Salt Lake Counties, there are no designated Agricultural Protection Areas in the study area (Burton pers. comma., Yoshinaga pers. comm.).

4.2.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, all proposed build alternatives would have an impact on farmland in the study area. Since publication of the Final EIS, construction activities associated with Alternative D and development unrelated to the proposed action have affected farmland in the study area. In addition, because of a new NRCS policy, farmland within municipal boundaries is no longer designated as prime, unique, or state-important farmland (see Section 4.2.2.2 above). As a result, the acreage of farmland in the study area has decreased.

The updated environmental consequences and mitigation measures associated with farmland are summarized below.

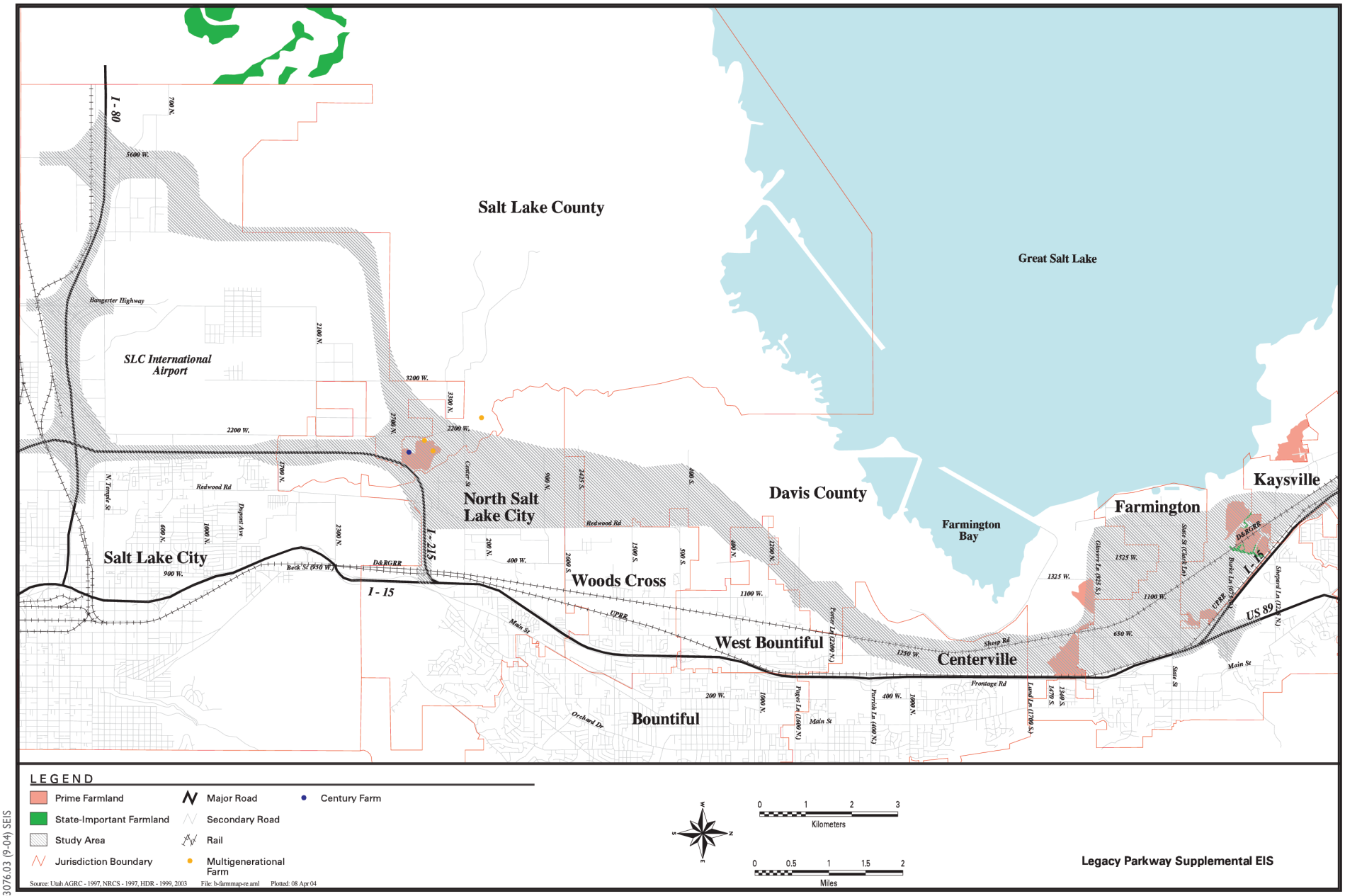

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Figure 4.2-2
Prime and State/Local - Important Farmland

4.2.3.1 All Farmland (Cropland)

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions (2004) No-Build Alternative, no farmland would be affected by the proposed action.

Future Conditions (2020)

If none of the build alternatives is implemented, development in the study area will likely continue at its current rate. Based on the number of building permits issued in Davis County since 1999, between approximately 240 ha (600 ac) and 320 ha (800 ac) of land are being developed per year in Davis County (Sommerkorn pers. comm. c). Because a large portion of the undeveloped land in the study area is farmland, it is likely that farmland will be converted at a similar rate in the future. The exact nature and timing of the future conversion of farmland are not known at this time.

Build Alternatives

As described in the Final EIS, all the proposed build alternatives would directly and indirectly affect farmland in the study area. Direct impacts would occur on farmland in the right-of-way of a build alternative; indirect impacts would occur if the right-of-way created farmland parcels smaller than 2 ha (5 ac) and not contiguous with other farmland, or if the right-of-way resulted in farmland that is no longer accessible.

Table 4.2-3 and Figure 4.2-3 provide updated information relative to impacts of the proposed build alternatives on farmland. Farmland impacts associated with all the proposed build alternatives, except Alternative A, have decreased from those presented in the Final EIS because of unrelated development activities in the study area and the proposed narrower right-of-way associated with the build alternatives. The increase in farmland impacts under Alternative A relative to the Final EIS is attributable to the revised methodology used for the Supplemental EIS to determine the acreage of farmland in the study area (see Section 4.2.2.1, *Current Agricultural Production*). Specifically, the 2003 UDNR Division of Water Resources map, which was used to calculate the farmland in the study area for the Supplemental EIS, shows an area of farmland near 400 South west of Redwood Road that was not shown as farmland in the Final EIS. Alternative A would affect some of the farmland in that area.

Mitigation Measures

As described in the Final EIS, owners of farmland within the proposed right-of-way of a build alternative (i.e., farmland subject to direct impacts) would be compensated according to the requirements of Uniform Relocation Assistance and Real Property Acquisition Policies Act (URAA), as amended, and other state and federal guidelines. For indirect impacts, UDOT would determine, based on cost comparison, whether to restore access to the parcel or purchase the remainder of the farmland.

Table 4.2-3 Impacts on Farmland

Crop	Hectares (Acres) Affected by Alternative[1]					
	No-Build Alternative	Alternative A[2]	Alternative B	Alternative C	Alternative D	Alternative E
Direct Impacts						
Irrigated Crops						
Alfalfa	0 (0)	2 (4)	27 (66)	3 (7)	3 (7)	2 (5)
Grain	0 (0)	0 (0)	18 (44)	0 (0)	0 (0)	0 (0)
Corn	0 (0)	0 (0)	5 (12)	0 (0)	0 (0)	0 (0)
Vegetables	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Grass Hay	0 (0)	4 (9)	6 (14)	3 (8)	4 (11)	4 (11)
Pasture, irrigated	0 (0)	59 (145)	82 (201)	61 (151)	40 (100)	40 (100)
Non-Irrigated Crops						
Pasture, non-irrigated	0 (0)	4 (10)	14 (34)	7 (18)	8 (20)	8 (20)
Pasture, sub-irrigated	0 (0)	35 (87)	48 (120)	20 (49)	36 (89)	35 (87)
Farmsteads	0 (0)	1 (3)	4 (10)	3 (7)	3 (8)	2 (4)
Construction Impacts[3]	0 (0)	32 (80)	2 (5)	0 (0)	32 (80)	32 (80)
Total Direct Impacts	0 (0)	137 (338)	204(501)	97 (240)	126 (315)	123 (307)
Indirect Impacts[4]						
Total Indirect Impacts	0 (0)	17 (43)	3 (7)	4 (10)	7 (17)	6 (16)
TOTAL IMPACTS (Direct & Indirect)	0 (0)	154 (381)	207 (508)	101 (250)	133 (332)	129 (323)
TOTAL IMPACTS FROM FINAL EIS (Direct & Indirect)[5]	0 (0)	133 (328)	286 (706)	146 (362)	136 (337)	NA

Notes:

1 Conversions are from acres to hectares. Conversions may vary because of rounding.

2 The increase in farmland impacts under Alternative A, relative to the Final EIS, is attributable to the revised methodology used for the Supplemental EIS to determine the acreage of farmland in the study area.

3 Construction impacts represent direct impacts associated with construction of Alternative D (Final EIS Preferred Alternative). Because these impacts have already occurred, it is not possible to attribute them by crop type. These impacts would also be associated with Alternatives A and E, and Alternative B in part, because they follow the same or partially the same alignment as Alternative D where the impacts occurred.

4 Indirect impacts would occur if the right-of-way created farmland parcels smaller than 2 ha (5 ac) and not contiguous with other farmland, or if the right-of-way resulted in farmland that is no longer accessible.

5 Impact measurements taken from Table 4-2 in the Final EIS. Impacts representative of direct and indirect impacts within the 100-m (328-ft) right-of-way.

Source: UDNR Division of Water Resources 2003.

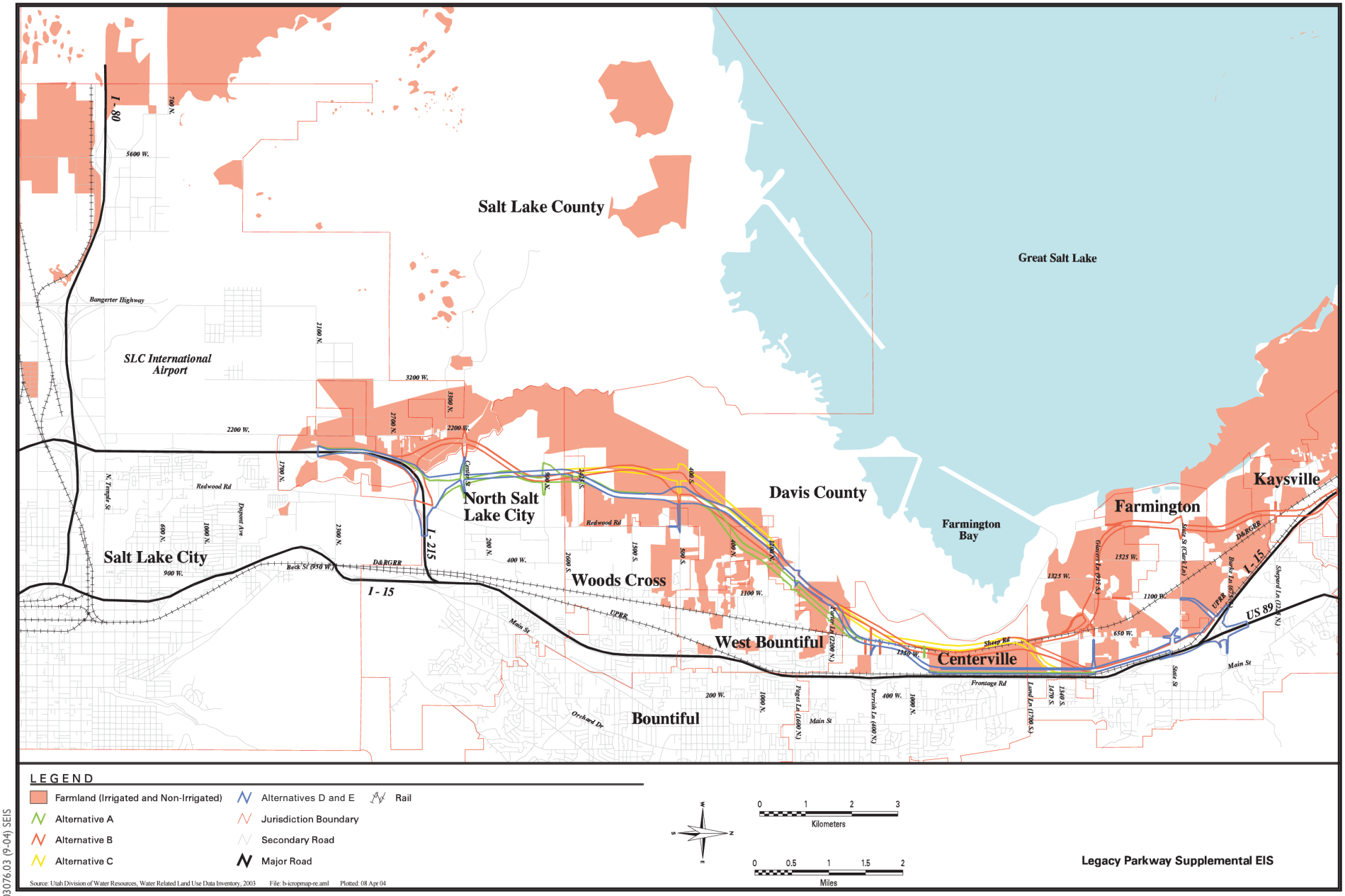

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Figure 4.2-3
Farmland Impacts

4.2.3.2 Prime Farmland

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related impacts on prime farmland.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the existing roadways in the study area. It is possible that these future projects would encroach on prime farmland in the study area, although the nature and timing of these projects are not known at this time.

Build Alternatives

As described in the Final EIS, all the proposed build alternatives would have direct impacts on prime farmland in the study area. Farmland impacts associated with all proposed build alternatives have decreased from those presented in the Final EIS as a result of unrelated development activities; the new NRCS policy of not designating prime, unique, and state-important farmland within municipal boundaries; and the proposed narrower right-of-way associated with the build alternatives. None of the decrease in prime farmland in the study area is attributable to completed construction activities associated with Alternative D. Table 4.2-4 and Figure 4.2-4 provide updated impact information relative to prime farmland in the study area.

Table 4.2-4 Impacts on Prime and State-Important Farmland

	Hectares (Acres) Affected by Alternative*					
Designation	No-Build Alternative	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Prime Farmland						
Final EIS	0 (0)	34 (84)	72 (178)	36 (90)	26 (64)	NA
Supplemental EIS	0 (0)	9 (23)	36 (88)	11 (28)	13 (31)	12 (29)
Farmland of State Importance						
Final EIS	0 (0)	3 (7)	2 (5)	3 (7)	0(0)	NA
Supplemental EIS	0 (0)	0 (0)	1 (2)	0 (0)	0(0)	0 (0)

Note:
* Conversions are from acres to hectares. Conversions have been rounded.
Source: Bell pers. comm.

Mitigation Measures

The mitigation measures for prime farmland are the same as those described above in Section 4.2.3.1 for all farmland.

4.2.3.3 Unique Farmland

There is no unique farmland located in the study area. Therefore, unique farmland would not be affected by the No-Build Alternative (existing or future conditions) or the proposed build alternatives.

4.2.3.4 Farmland of State Importance

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related impacts on farmland of state importance.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would encroach on farmland of state importance in the study area, although the nature and timing of these projects are not known at this time.

Build Alternatives

The Final EIS stated that all the proposed build alternatives would have direct impacts on farmland of state importance. However, impacts on farmland would decrease from those shown in the Final EIS such that only Alternative B would impact farmland of state importance. This decrease is due to unrelated development activities in the study area; the new NRCS policy of not designating prime, unique, and statewide important farmland within municipal boundaries; and the proposed narrower right-of-way associated with the build alternatives. None of the noted decrease in farmland of state importance is attributable to completed construction activities associated with Alternative D. Table 4.2-4 and Figure 4.2-4 above provide updated impact information relative to farmland of state importance in the study area.

Mitigation Measures

Only Alternative B would impact state-important farmland. If Alternative B were chosen as the proposed build alternative, the mitigation measures identified in Section 4.2.3.1 for all farmland would be adopted to mitigate adverse impacts on farmland of state importance.

4.2.3.5 Farmland of Local Importance

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related impacts on other farmland of local importance.

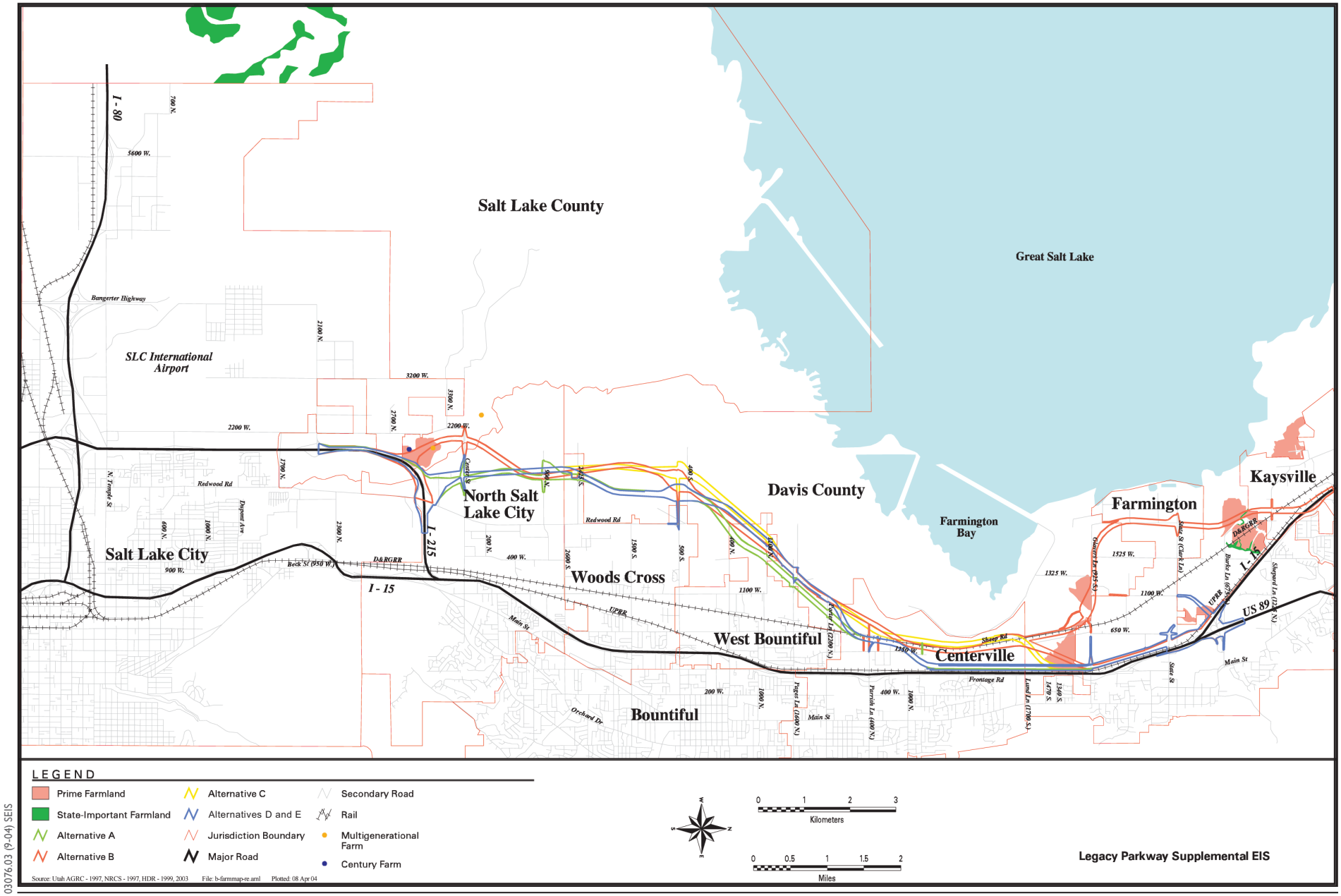

Figure 4.2-4
Prime and State/Local - Important Farmland Impacts

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would encroach on designated Century Farm or multigenerational farms in the study area, although the nature and timing of these projects are not known at this time.

Build Alternatives

As stated in the Final EIS, all the proposed alternatives would affect the designated Century Farm in the study area, although none would alter the farm's operation or its Century Farm designation. Alternative B would also affect the two multigenerational farms in the study area. These impacts have not changed since publication of the Final EIS (see Section 4.2.5 of the Final EIS). Impacts associated with Alternative E would be identical to those disclosed for Alternative D in the Final EIS.

Mitigation Measures

The mitigation measures for locally important farmland would be the same as those described above for all farmland.

4.2.3.6 Agricultural Protection Areas

There are no Agricultural Protection Areas in the study area. Therefore, none would be affected by the No-Build Alternative or the proposed build alternatives.

Section 4.3
Social

This section discusses the social environment in the study area. The section includes updated population information based on the 2000 Census. In addition, as described in the Final EIS, the discussion of the social environment includes a discussion of the social composition, community cohesion, travel patterns and accessibility, public facilities, public services and utilities, recreation resources, public health and safety, and the overall quality of life in the study area.

Information on community structures and resources (i.e., schools, recreational resources) that have been constructed in the study area since publication of the Final EIS are also presented, as is updated information on travel patterns and accessibility in the study area, based on the 2004 WFRC travel demand model (version 3.2). This section also includes an updated assessment of potential impacts on minority and low-income populations.

4.3.1 Approach and Methodology

This section presents information specific to the Wasatch Front region (i.e., Salt Lake, Davis, Weber, Tooele, and Morgan Counties), as well as pertinent to the State of Utah, to assess the social environment in the study area relative to the larger region and state. To update the affected environment and environmental consequences information associated with the social environment in the study area, Sections 3.3 and 4.3 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for evaluating the social environment is described in Section 4.0.1, *Study Area*, of this document. However, because much of the analysis in this section is based in large part on the 2000 Census tract and block groups boundaries, the study area represented in this section is actually larger in some discussions than that defined in Section 4.0.1.

The population data presented in the Final EIS was based, in part, on the 1990 Census, which was updated by the U.S. Census Bureau in 2000 (U.S. Census Bureau 2000). The updated 2000 Census data was reviewed at the state, county, and city levels, and a demographic analysis at the census tract and block group levels for minority and low-income populations was completed using a geographic information systems (GIS) overlay.[1]

The *Wasatch Front Region Small Area Socioeconomic Projections: 2002–2030* technical report (Wasatch Front Regional Council 2003b) and the *Demographic and Economic Analysis 2003 Economic Report to*

[1] Year 2000 Census data for census tracts, block groups, and blocks, were assembled in a GIS framework using an overlay technique that allowed project impacts on areas of high concentrations of minority and/or low-income populations to be assessed. The census tract and census block group boundaries changed between the 1990 and 2000 censuses. As a result, population and social trends based on census tracts and/or block group boundaries could not be determined.

the Governor (Utah Governor's Office of Planning and Budget 2003) were also reviewed to determine population demographics and trends in the study area. The Salt Lake County Board of Realtors and the Salt Lake and Davis County Assessor's offices were contacted to obtain information on housing costs and indigent households in the study area.

4.3.2 Affected Environment

The following subsections provide a summary of information relative to the social environment that has been updated since publication of the Final EIS. Since publication of the Final EIS, the 2000 Census was updated with new statistics on population growth, social composition, and environmental justice populations. Boundaries of the census tracts used in the 1990 and 2000 Census are not identical.

In addition, the 2004 WFRC travel demand model (version 3.2) was used to reevaluate travel patterns and accessibility in the study area. Updated information on public facilities and utilities, recreation resources, and public health and safety is also presented below.

4.3.2.1 Population Growth

Between 1990 and 2000, the population of Utah grew by 29.6 percent. State growth projections estimate a 2.1 percent rate of annual population growth between 2000 and 2020 (Utah Governor's Office of Planning and Budget 2003). Table 4.3-1, which updates Table 3-3 in the Final EIS, summarizes population statistics for Utah, counties in the Wasatch Front region, and census tracts in the study area, to show how expected population growth in the study area compares to population growth in the Wasatch Front region and in the state. Figure 4.3-1 shows the boundaries of the census tracts referenced in Table 4.3-1.

Compared to the previous population estimates and projections presented in the Final EIS, the year 2000 population was higher than anticipated in most areas; however, the estimated rates of growth between 2000 and 2020 are somewhat lower. For Salt Lake, Davis, and Morgan Counties, the estimated 2020 populations are slightly lower than that shown in the Final EIS, but the estimated 2020 populations for Tooele and Weber Counties are slightly higher.

Tables 4.3-2a and 4.3-2b summarize respectively the population density statistics for Utah, Davis, and Salt Lake Counties and the census tracts in the study area. These tables update Table 3-4 in the Final EIS. Between the 1990 and 2000 Censuses, the average population density of the two-county area (Davis and Salt Lake Counties) increased from 800 to 1,104 people per square mile. The average population density of the census tracts in the study area also increased (i.e., from 15 to 226 people per square mile). Trend determinations based on Census tracts are not possible, however, because the boundaries of the 2000 Census tracts were different than those for the 1990 Census tracts. The population density increases were particularly notable in the Centerville and Farmington areas, which correspond to census tracts 1262.02 and 1263.01 in the 1990 Census and tracts 1262.03 and 1263.04 in the 2000 Census.

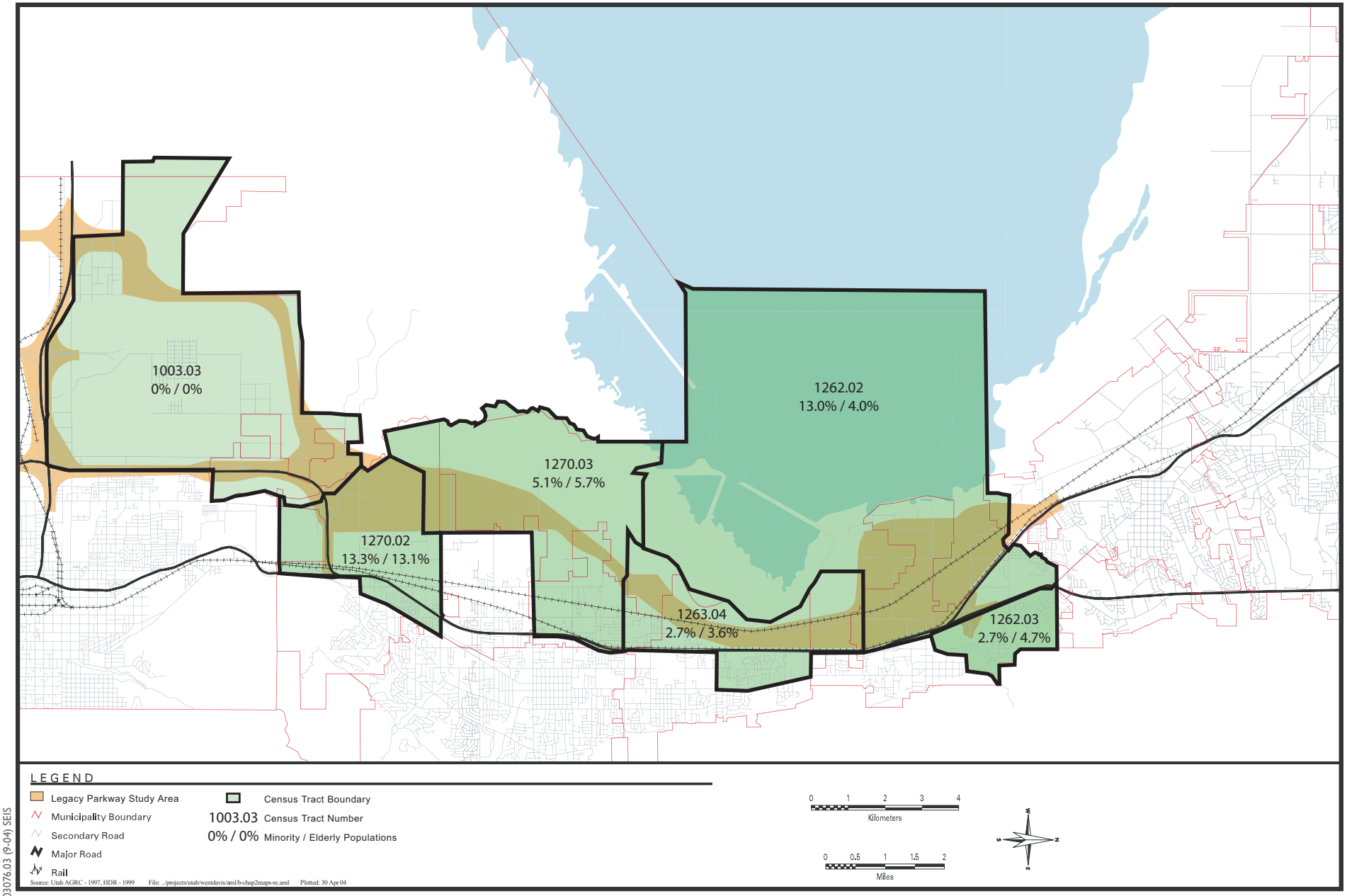

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Figure 4.3-1
Census Tract Boundaries

Table 4.3-1 Population Statistics for State of Utah, Wasatch Front Region, and Study Area

	Year							Projected Annual Growth Rate
Area	1980	1990	2000	2005	2010	2015	2020	2000 to 2020
Utah	1,461,037	1,722,850	2,233,169	2,464,633	2,787,670	3,126,736	3,371,071	2.08%
Wasatch Front								
Davis County	147,509	190,709	238,994	262,241	292,201	323,992	347,412	1.89%
Morgan County	4,917	5,528	7,129	7,506	8,329	9,250	9,981	1.70%
Salt Lake County	637,091	733,906	898,387	967,390	1,077,556	1,195,554	1,283,784	1.80%
Tooele County	26,033	26,601	40,735	50,119	59,780	70,338	79,539	3.40%
Weber County	139,890	160,388	196,533	211,207	237,877	265,905	286,919	1.91%
Wasatch Front Total	955,440	1,117,132	1,381,778	1,498,463	1,675,743	1,865,039	2,097,635	1.89%
Cache County	57,176	70,183	91,391	101,811	115,697	130,246	137,966	2.08%
Box Elder County	33,222	36,485	42,745	46,928	53,224	59,433	63,391	1.99%
Study Area by Traffic Analysis Zone and Census Tract Boundaries*								
1003.03	NA	NA	563	678	1,020	1,676	2,018	6.59%
1262.02	NA	NA	1,847	2,088	2,727	3,499	4,644	4.72%
1262.03	NA	NA	1,054	1,119	1,329	1,552	1,805	2.73%
1263.04	NA	NA	6,163	6,298	6,451	6,778	7,190	0.77%
1270.02	NA	NA	2,229	2,567	4,414	5,369	5,380	4.50%
1270.03	NA	NA	4,269	4,325	4,464	4,909	5,467	1.24%

Note:

* These census tracts encompass a larger area than the study area. Year 2000 Census tract populations are reflected as 2002 population taken from the WFRC Technical Report No. 42 (Wasatch Front Regional Council 2003b) and present a more detailed picture of population in these areas than data from the 2000 Census.

Sources: Utah Governor's Office of Planning and Budget 2003; Wasatch Front Regional Council 2003b.; U.S. Census Bureau 2000.

Table 4.3-2a Population Densities for State of Utah and Davis and Salt Lake Counties

	Persons Per Square Mile	
Area	1990	2000
State of Utah	21.0	27.2
Davis County	617.2	784.9
Salt Lake County	984.5	1,218.4

Source: U.S. Census Bureau 2000.

Table 4.3-2b Population Densities for Census Tracts in or Adjacent to Study Area

Census Tracts	Cities Located Adjacent to the Tract	Persons per Square Mile
1990 Census Tracts		
1262.01	Farmington	3.5
1262.02	Kaysville, Farmington	10.4
1263.01	Centerville	1.6
1270.01	Woods Cross, West Bountiful	1.8
1270.02	North Salt Lake	2.1
1003.03	Salt Lake City	0.20
1003.04	Salt Lake City	85.9
2000 Census Tracts*		
1262.02	Kaysville, Farmington	101.1
1262.03	Kaysville, Farmington	1,658.0
1263.04	Centerville	1,028.8
1270.02	North Salt Lake	545.5
1270.03	Woods Cross, West Bountiful	293.7
1003.03	Salt Lake City	6.8

Note:
* Census tracts were redistricted in 2000.
Source: U.S. Census Bureau 2000

4.3.2.2 Social Composition

Information from the 2000 Census and the Utah Governor's Office of Planning and Budget was used to update information presented in the Final EIS on blind, ethnic, minority, and elderly populations in the study area, average household incomes and housing values, indigent households, and transportation issues.

Population Characteristics

The study area is sparsely populated, containing less than 2 percent of the total combined populations of Salt Lake and Davis Counties. Table 4.3-3, which is a partial update of Table 3-8 in the Final EIS, presents census information on minority and low-income populations in the study area. It should be noted that minority populations can be classified by either race or ethnicity, or both (U.S. Census Bureau 2000). The estimates provided in Table 4.3-3 have been evaluated to ensure that individuals listed under both minority categories are not counted twice.

Approximately 6.4 percent of the population in the study area is considered minority, and 2.2 percent is considered low-income. In the total two-county area, 17.2 percent of the population is considered minority, and 7.2 percent is considered low-income. Figure 4.3-2, which updates Figure 3-10 in the Final EIS, illustrates the ethnic and racial composition of the study area.

Census tract 1003.04 from the 1990 Census contained a relatively high number of minorities (see Table 3-8 in the Final EIS). Census tract boundaries were redistricted for the 2000 Census, splitting tract 1003.04 into two tracts, 1003.5 and 1003.6. Both of these tracts now lie entirely south and east of I-215, outside the study area. Because the Supplemental EIS bases its study on the 2000 Census, these populations are no longer considered in this document.

The Final EIS presented information on elderly populations. Table 4.3-4, which also partially updates Table 3-8 in the Final EIS, presents updated information on elderly populations in the study area based on the 2000 Census.

Finally, as described in Section 4.3.6 of the Final EIS, there are two households with blind residents in the study area in Davis County.

Table 4.3-3 Minority and Low Income Populations

	Minority (Racial & Ethnic)		Low-Income Households	
Area	Number	Percentage of Total Population	Number	Percentage of Total Households
Utah	328,904	14.7%	62,280	8.9%
Salt Lake County	171,190	19.1%	22,754	7.7%
Davis County	24,358	10.2%	3,597	5.1%
Census Tract*				
1003.03	0	0.0%	0	0.0%
1262.02	397	13.0%	14	2.1%
1262.03	96	2.7%	0	0.0%
1263.04	151	2.7%	33	2.3%
1270.02	360	13.3%	37	3.6%
1270.03	153	5.1%	28	5.7%
Total	1157	6.4%	112	2.2%

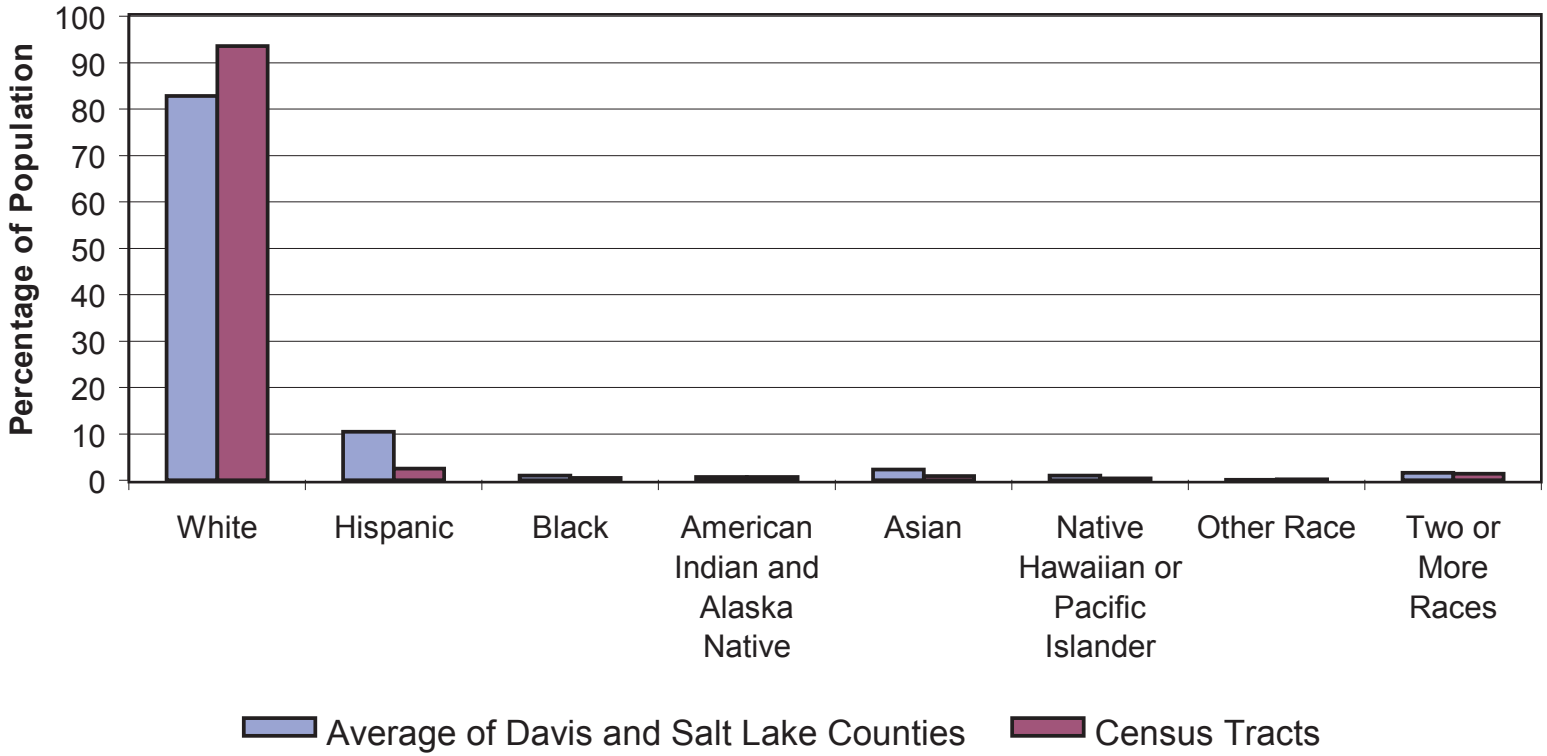
Area	Minority (Racial & Ethnic) Number	Minority (Racial & Ethnic) Percentage of Total Population	Low-Income Households Number	Low-Income Households Percentage of Total Households
Block Groups				
Block Group 3, Census Tract 1003.03	0	0.0%	0	0.0%
Block Group 1, Census Tract 1262.02	397	13.0%	14	2.1%
Block Group 1, Census Tract 1262.03	57	3.7%	0	0.0%
Block Group 2, Census Tract 1262.03	39	2.0%	0	0.0%
Block Group 1, Census Tract 1263.04	58	3.8%	19	4.2%
Block Group 2, Census Tract 1263.04	93	2.3%	14	1.5%
Block Group 1, Census Tract 1270.02	151	10.3%	22	3.4%
Block Group 2, Census Tract 1270.02	209	16.8%	15	3.9%
Block Group 1, Census Tract 1270.03	109	7.7%	18	4.6%
Block Group 2, Census Tract 1270.03	21	2.4%	10	3.9%
Block Group 3, Census Tract 1270.03	23	6.9%	0	0.0%
Block Group 4, Census Tract 1270.03	0	0.0%	0	0.0%
Total	1157	6.4%	112	2.2%

Note:
* These census tracts encompass a larger area than the study area.
Source: U.S. Census Bureau 2000, Summary File 3.

Table 4.3-4 Elderly Populations

Census Tract*	Elderly (65 years and over) Number	Elderly (65 years and over) Percentage of Total Population
1003.03	0	0.0%
1262.02	123	4.0%
1262.03	165	4.7%
1263.04	203	3.6%
1270.02	354	13.1%
1270.03	174	5.7%

Note:
* These census tracts encompass a larger area than the study area.
Source: U.S. Census Bureau 2000.



Source: U.S. Census Bureau 2000 Census Count

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Figure 4.3-2
Ethnic Composition in Study Area

Household Income and Housing Values

Household income in the study area continues to be slightly higher than either that of Salt Lake and Davis Counties (Utah Governor's Office of Planning and Budget 2003). Figure 4.3-3, which updates Figure 3-10 in the Final EIS, presents information on the income characteristics of the study area.

According to the Salt Lake County Board of Realtors, the 2003 average market value of a single-family house was $182,521 in Salt Lake County and $167,726 in Davis County (Salt Lake County Board of Realtors 2003). In comparison, the 2003 average market value of a single-family house was $116,884 in Salt Lake City. These figures represent an increase in the housing values from those presented in the Final EIS.

Indigent Households

Salt Lake and Davis Counties and the State of Utah classify people as indigent when they are disabled or 65 or over and have an annual household income of less than $24,245, an increase over the $19,950 threshold used in the Final EIS (Utah State Tax Commission 2004). Twenty-two households in Salt Lake and Davis Counties between North Salt Lake and Kaysville receive indigent tax abatements, only two of which are located in the study area (Law pers. comm.). This represents a decrease from the Final EIS, which cited seven indigent households in the study area. All the indigent households in the study area also receive tax relief from the state under the tax category of "circuit breaker," as described in the Final EIS.

Transportation and Low-Income and Elderly Populations

As described in the Final EIS, a survey conducted by the Justice Economic Dignity and Independence (JEDI) for Women group identified two main issues associated with transportation in the Wasatch Front region that primarily affect low-income and elderly populations: the expense of owning and maintaining a vehicle and the lack of convenience and scheduling of transit. These variables are still considered barriers to self-sufficiency for these populations. Aside from the advancement of commuter rail, which would facilitate relatively inexpensive travel with the study area, there has been no change to this section since publication of the Final EIS.

4.3.2.3 Environmental Justice Populations

As described in the Final EIS, Title VI of the Civil Rights Act and Executive Order 12898 (regarding environmental justice populations) requires federal agencies to identify minority and low-income populations in areas where the effects of a proposed federal action on human health and the environment would be disproportionately high or adverse. Information from the 2000 Census and the Utah Governor's Office of Planning and Budget was used to update information presented in the Final EIS on environmental justice populations.

Table 4.3-3 and Figures 4.3-2 and 4.3-3 disclose the percentages of minority and low-income populations in the study area, as well as those in Salt Lake County, Davis County, and the State of Utah. In the study area, approximately 6.4 percent of the population is minority, and 2.2 percent is low income (Table 4.3-3). Comparatively, in Salt Lake and Davis Counties and the state, 19.1 percent, 10.2 percent, and 14.7 percent of the populations are minority, and 7.7 percent, 5.1 percent, and 8.9 percent are low income, respectively. These numbers illustrate that the study area as a whole has a lower proportion of minority and low-income populations than Salt Lake County, Davis County, and the state. This trend is reflected in all the census tracts in the study area except two: census tract 1262.02, block group 1 and census tract 1270.2, block group 2.

Census tract 1262.02, block group 1 has a minority population of 13.0 percent (which is higher than the Davis County average of 10.2 percent), indicating that there is a higher potential for impacts on environmental justice populations in this block group. All development in this block group occurs north of the I-15/US-89 divergence, except for a small residential development of high-end custom homes off Shepard Lane west of the D&RG railroad tracks. It is highly likely that any low-income populations in this census tract are concentrated in the developed areas north of the I-15/US-89 divergence rather than in the custom-home development off Shepard Lane. Minority populations could live in either the area north of the I-15/US-89 divergence, or in the custom-home development off Shepard Lane.

Census tract 1270.2, block group 2 contains a minority population of 16.8 percent, which is higher then the Davis County average (10.2 percent) and the state average (14.7 percent). This indicates that an environmental justice population may also exist in this area. Residential development in this block group occurs east of Redwood Road.

4.3.2.4 Neighborhood and Community Cohesion

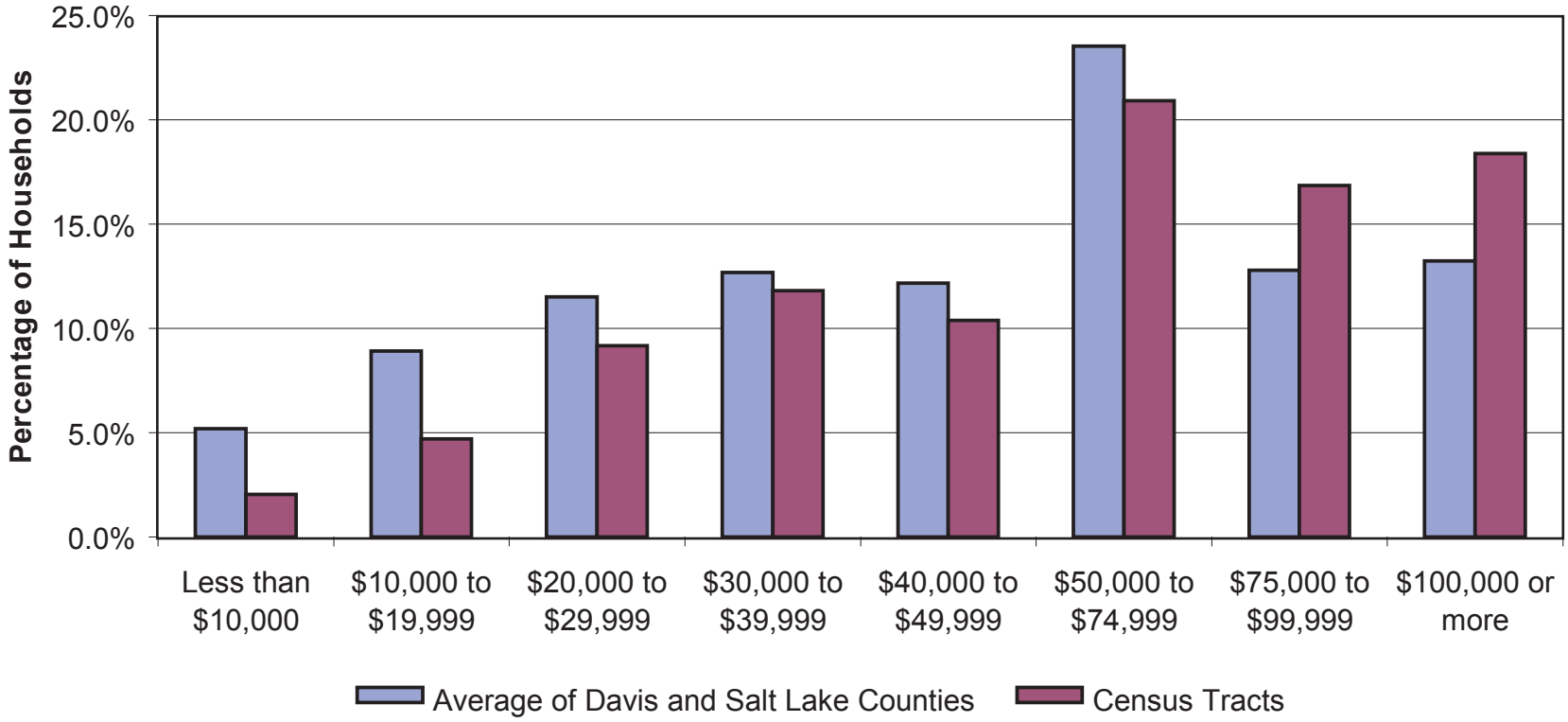
The Final EIS defined *community cohesion* as the attribute of a geographic area where its segmentation or division would reduce its desirability to current and future residents. Six communities are located in the study area: North Salt Lake, Woods Cross, West Bountiful, Centerville, Farmington, and Kaysville. Each seeks to develop and maintain its community in a cohesive fashion. Achievement of this goal is currently limited by I-15, existing power line corridors, gas lines, and railroad rights-of-way.

Since publication of the Final EIS, construction has begun on the Foxboro residential development, which is located near the southern terminus of the proposed Legacy Parkway, adjacent to Redwood Road in North Salt Lake. The City of North Salt Lake hopes to assimilate this development as a cohesive member of the city (City of North Salt Lake 2001).

Notably, the federal lead agencies hosted a series of Community Planning Information Committee (CPIC) meetings focused specifically on the technical memorandum topics summarized in Chapter 2, *Tenth Circuit Court Ruling Analysis*. The first CPIC meeting, held in July 2003, focused specifically on discussing the potential Legacy Parkway alignment options within the D&RG regional corridor (see Chapter 3, *Alternatives*), which were developed as a result of public comments during project scoping. The majority of the local jurisdictions in the study area expressed concerns that a major new road facility in the D&RG corridor would create a physical and social barrier in the area that would sever neighborhoods and communities and affect community cohesion. These concerns were reiterated during individual interviews also held in 2003 with each of the local jurisdictions in the study area. In general, the majority of the communities in the study area felt that a highway alignment in the Great Salt Lake Corridor, and in particular Alternative E, would be less disruptive to their communities than a highway alignment in the D&RG corridor. Section 4.3.3.3, *Neighborhood and Community Cohesion,* provides an assessment of how the proposed build alternatives would affect neighborhood and community cohesion in the study area.

4.3.2.5 Travel Patterns & Accessibility

Section 3.3.2 of the Final EIS described the study area as primarily undeveloped, with limited existing travel patterns. It was noted that access to the study area was limited from the east by the existing interchanges and overpasses crossing I-15. Although access to the study area remains limited, development occurring in and around the southern termini (e.g., Foxboro development) and northern termini (e.g., residential development and school near the intersection of Clark Lane and 1525 West), as



Source: U.S. Census Bureau 2000 Census Count

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Figure 4.3-3
Household Income in Study Area

well as development north and south of the corridor, is causing traffic volumes and travel patterns to increase in the study area.

The Final EIS also described 15 major east-west and north-south routes in the study area that could be affected by the proposed Legacy Parkway. To reevaluate the substantive travel patterns and accessibility effects that would be associated with the proposed action, the 2004 WFRC travel demand model (version 3.2) was used to evaluate three interstates/major state highways (I-15, US-89, and I-215) and two local roadways that would provide direct connections to the proposed Legacy Parkway (Parrish Lane in Centerville and 500 South/Redwood Road in Woods Cross). The location of these roadway facilities in the study area is shown in Figure 4.3-4. The following provides a description of the existing configurations of these facilities and their current and future levels of service.

Interstates/Major State Highways

I-15

I-15 is an essential element of the local, regional, and national transportation system. As part of the national interstate system, it provides a north-south link between southern California and the Canadian border. I-15 provides the only continuous major north-south roadway for travel within Utah and is the only major highway that directly links Utah's three largest urban areas of Provo, Salt Lake City, and Ogden.

In Weber County (north of Ogden), I-15 transitions from four to six lanes, then continues south as a six-lane facility to the proposed I-15/US-89/Legacy Parkway interchange in Farmington. I-15 becomes an eight-lane facility through Farmington to the I-15/I-215/US-89 interchange in North Salt Lake. South of this interchange, I-15 is a six-lane facility to 600 North in Salt Lake City. South of 600 North, I-15 becomes an eight-lane facility with two high-occupancy vehicle (HOV) lanes.

US-89

US-89 is a north-south major arterial that is not continuous through the North Corridor; some segments of US-89 are separate roadways, and other segments follow I-15 and local roadways. US-89 is a separate roadway from Harrison Boulevard in South Ogden south to the I-15/US-89/Legacy Parkway interchange in Farmington, a distance of 20 km (12.5 mi). This segment of US-89, which connects I-15 and I-84, is planned to be upgraded to a six-lane, controlled-access expressway. FHWA issued a Record of Decision (ROD) for this improvement in 1996, and the upgrade is being constructed as funding becomes available. In addition, the segment of US-89 between Park (formerly Burke) Lane and Cherry Hills is currently being reconstructed and the improvements will be completed in 2004.

South of the proposed I-15/US-89/Legacy Parkway interchange, there is no separate US-89 facility. The I-15 facility carries both the I-15 and US-89 route designations through Farmington and Centerville. From the I-15/500 West interchange, US-89 follows 500 West southward into Bountiful. From the 500 West/Main Street intersection in Bountiful, US-89 follows Main Street south through Bountiful and North Salt Lake. At the I-15/I-215/US-89 interchange in North Salt Lake, US-89 becomes a separate roadway again and runs parallel to I-15 south into downtown Salt Lake City.

I-215

I-215 is a limited-access interstate highway that functions as a beltway around three-quarters of Salt Lake City. North of the airport, I-215 is on an east-west alignment and connects with I-15 immediately south of Center Street in North Salt Lake. In addition to providing an alternate high-speed travel route to I-15, I-215 north of I-80 links the airport to the northern Salt Lake City metropolitan area and Davis and Weber

Counties. I-215 is a four-lane facility between the I-15/I-215/US-89 interchange and 2100 North in Salt Lake City and transitions to a six-lane facility south of 2100 North.

Local Roadways

Parrish Lane

Parrish Lane is an east-west collector street in Centerville and has an existing interchange with I-15. It is a four-lane road east of I-15 and a two-lane road west of I-15. The area east of I-15 at Parrish Lane is more developed than the area west of I-15, although the area to the west is planned for further development. In addition, arterial roads on the east side of I-15 connect Centerville to Bountiful, West Bountiful, and Farmington. The interchange on- and off-ramps for northbound traffic are on the east side of I-15, and the on- and off- ramps for southbound traffic are on the west side of I-15.

500 South and Redwood Road

The 500 South/Redwood Road intersection connects these two roadways so that they function as a continuous arterial. Redwood Road is a north-south arterial that extends through the southern portion of the North Corridor, from an interchange and crossing of I-215 at the south end of the corridor to a northern terminus at 500 South. Traffic on Redwood Road continues on 500 South, an east-west arterial. Redwood Road serves western North Salt Lake and Woods Cross, an area with existing commercial and industrial development and additional planned future development, including major residential development.

500 South has an existing interchange with I-15. West of the interchange, 500 South is essentially the boundary between Woods Cross and West Bountiful. East of the interchange, 500 South is part of the Bountiful street system. 500 South is a four-lane road east of I-15 and a two-lane road west of I-15. Future plans for 500 South include converting it to a tree-lined parkway with wide sidewalks, wide park strips, bicycle lanes, street furnishings, and pedestrian-scale lighting.

Existing Traffic Operating Conditions

As defined in Chapters 1 and 3 of this document, level of service is represented in a letter grading system that describes different levels of traffic congestion, ranging from level of service (LOS) A for excellent conditions (free-flowing traffic) to LOS F for failure conditions (extremely congested stop-and-go traffic). LOS B through LOS E describe progressively worse traffic conditions. The following analysis describes conditions for both the 3-hour p.m. peak period and, within that period, the single highest traffic hour of the day: the p.m. peak hour. The *peak period* consists of the single p.m. peak hour and the peak shoulder hours, which are the hour immediately before and the hour immediately after the peak hour. The peak period LOS is the average condition during the full 3-hour period.

Table 4.3-5 shows the maximum vehicle capacity per lane during the peak period with respect to the following three roadway classifications.

- **Arterials**. An arterial is a signalized street that primarily serves through-traffic and that secondarily provides access to abutting properties. For the purposes of this analysis, Parrish Lane, 500 South, and Redwood Road are considered arterials.

- **Expressways**. An expressway is an arterial highway with limited access control. Expressways can carry less traffic at any given level of service than freeways. For the purposes of this analysis, the segment of US-89 evaluated in this section is considered an expressway.

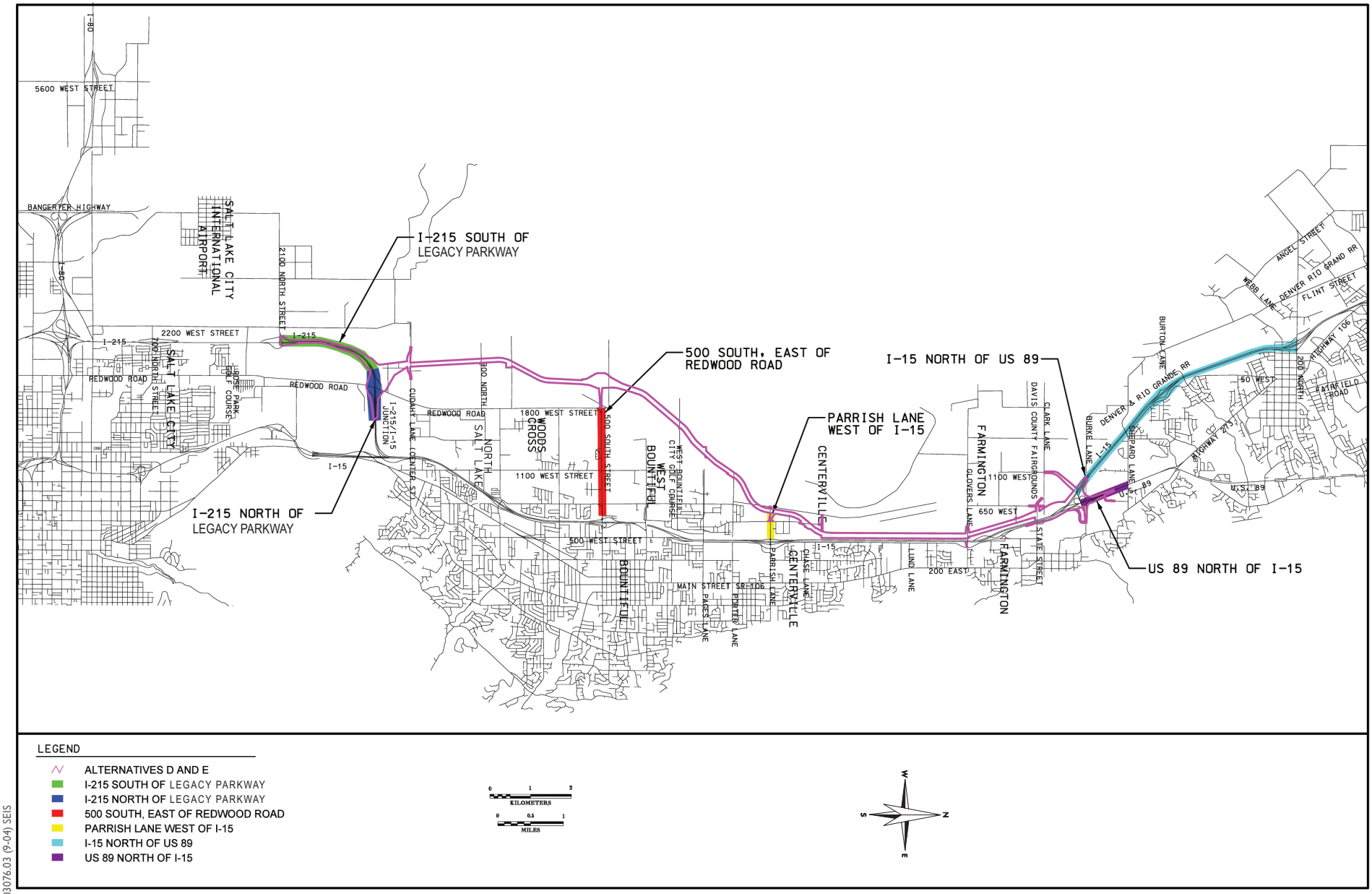

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Figure 4.3-4
Major Arterials and Local Roadways

- **Freeways**. A freeway is an arterial highway with full access control. Freeways are intended to provide high levels of safety and efficiency in the movement of large volumes of traffic at high speeds. For the purposes of this analysis, the segments of I-15 and I-215 evaluated in this section are considered freeways.

Typically, in urban areas, UDOT strives to maintain LOS D or better operating conditions on interstate freeways.

Table 4.3-5 Level of Service Criteria

	Maximum Capacity (vehicles per lane per peak period)		
Level of Service	Arterial[1]	Expressway[2]	Freeway[3]
A	540	1,335	2,130
B	1,110	2,310	3,510
C	1,650	3,345	5,040
D	1,920	4,095	6,270
E	2,190	4,620	7,050

Notes:

1 Arterial capacities estimated based on WFRC travel demand model and engineering judgment. Regional model uses LOS E capacity during the peak hour.

2 Expressway capacity estimated midway between freeway and arterial.

3 Freeway capacity estimated based on *Highway Capacity Manual* 2000 for 65-mph freeway.

The following analysis describes levels of service for the primary streets and highways identified above for the 3-hour p.m. peak period. Table 4.3-6 shows existing (2001) levels of service based on peak-period capacities for the interstates and major state highways that would be affected by the proposed action. Table 4.3-7 shows existing (2001) levels of service based on peak-period capacities for the local roadways that would be affected by the proposed action.

Table 4.3-6 Existing Levels of Service on Interstates and Major State Highways in Study Area

	Existing Conditions (2001)				
Segment	Lanes per Direction	Total Daily Traffic	Peak-Hour, Peak-Direction Volume	Peak-Period, Peak-Direction Volume	Peak-Period Level of Service
US-89 North of I-15 Interchange in Farmington	2	40,885	2,780	7,710	C
I-15 North of US-89 Interchange in Farmington	3	77,880	5,790	16,090	D
I-215 East of Legacy Parkway	2	54,775	3,720	10,340	D
I-215 South of Legacy Parkway	2	54,775	3,720	10,340	D

Notes:

Total daily traffic values (two-directional) were derived from the UDOT 2001a *Traffic on Utah Highways*.

Peak-period, peak-direction volumes taken from Interplan Co. 2004 travel demand model, which was run based on the WFRC travel demand model (version 3.2). Peak-hour, peak-direction values computed as a factor (36 percent) of peak-period volumes, based on approximate peak flows.

Level of service for the peak period is estimated based on the average hourly vehicles per lane per hour during the 3-hour peak period. Level of service represents conditions in the peak direction (p.m. northbound).

Source: InterPlan Co., 2004.

Table 4.3-7 Existing Levels of Service on Local Roadways in Study Area

			Existing Conditions (2001)		
Roadway	Lanes per Direction	Total Daily Traffic	Peak-Hour, Peak-Direction Volume	Peak-Period, Peak- Direction Volume	Peak-Period Level of Service
Parrish Lane (west of I-15)	1	7,860	400	1,100	B
500 South (east of Redwood Road)	1	10,545	320	880	B
Redwood Road (500 South to 1500 South)	1	10,545	300	840	B
Redwood Road (1500 South to 2600 South)	1	8,290	320	890	B
Redwood Road (2600 South to Center Street)	1	9,139	370	1,020	B
Redwood Road (Center Street to I-215)	1	9,139	640	1,780	D

Notes:

Total daily traffic values (two-directional) were derived from the UDOT 2001 *Traffic on Utah Highways*.

Peak-period, peak-direction volumes taken from Interplan Co. 2004 travel demand model, which was based on the WFRC travel demand model (version 3.2). Peak-hour, peak-direction values computed as a factor (36%) of peak-period volumes, based on approximate peak flows.

Level of service for the peak period is estimated based on the average hourly vehicles per lane per hour during the 3-hour peak period. Level of service represents conditions in the peak direction (p.m. northbound).

Source: InterPlan Co. 2004

4.3.2.6 Public Facilities

As described in the Final EIS, all the cities in the study area fall within either the Davis or Salt Lake City School Districts. At the time the Final EIS was published, the only school in the study area was Meadowlark Elementary School, part of the Salt Lake City School District. In 2003, after publication of the Final EIS, construction on the Farmington Eagle Bay Elementary School, located at 1933 West Clark Lane in the Farmington Ranch subdivision in the Davis School District, was completed. The Davis School District is planning to build the additional schools in the study area, both of which are depicted in Figure 4.3-5 and listed below.

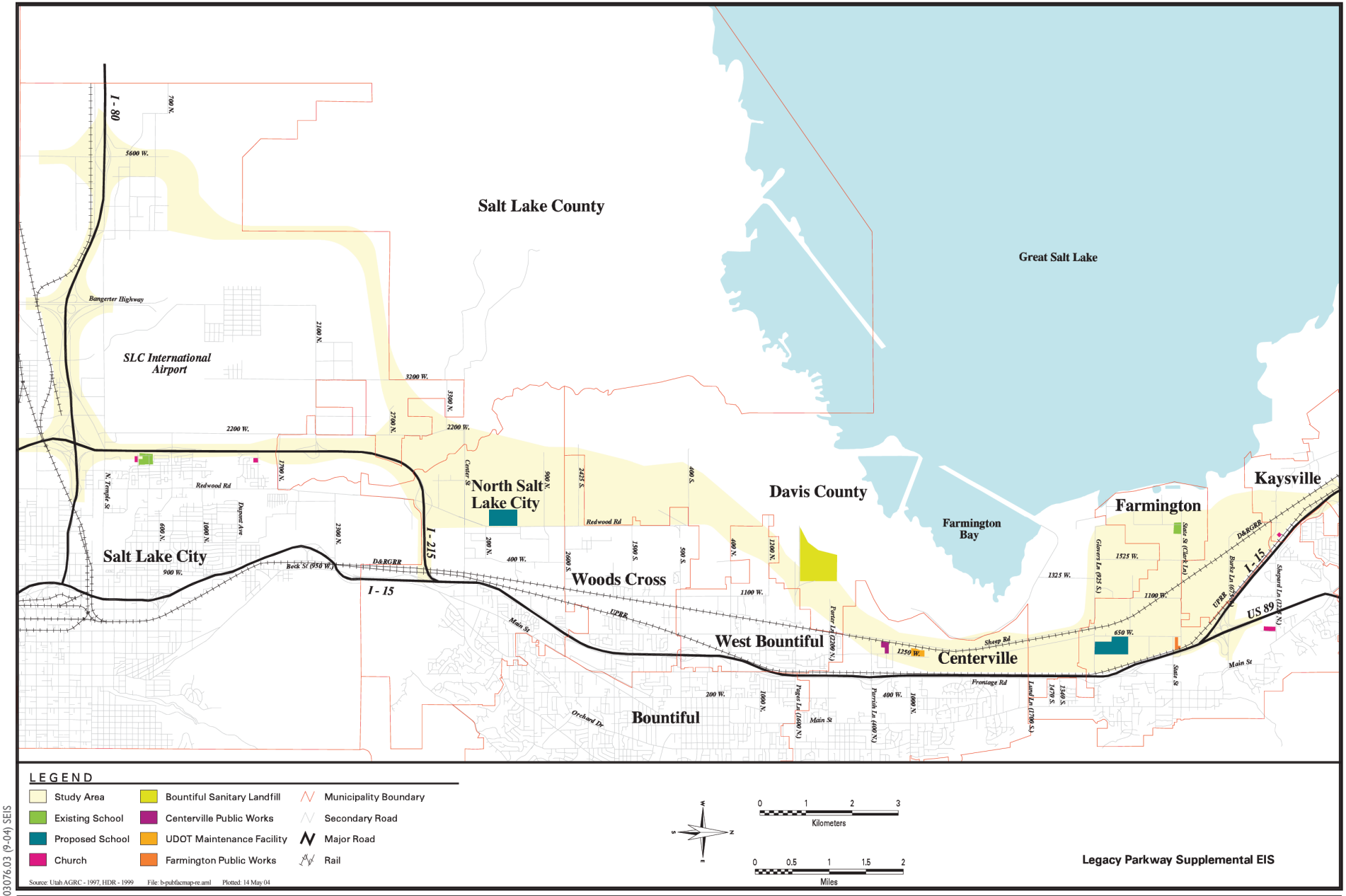

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Figure 4.3-5
Public Facility Locations

- A high school near the intersection of Glovers Lane and 650 West (Clark Lane), slightly west of the Alternatives D and E, next to Glovers Lane Park.
- An elementary school in North Salt Lake, west of Redwood Road, between Center Street and 900 North. Slated to be completed in 2005, this school will accommodate new development in the Foxboro and North Salt Lake areas.

The other existing public facilities described in the Final EIS include four churches and their facilities, the Farmington Public Works facility, the Centerville Public Works facility, a UDOT maintenance facility, and the Bountiful Sanitary Landfill (Bay Area Refuse Disposal [BARD]). These facilities are also shown in Figure 4.3-5. No other public works facilities have been constructed in the study area and no other new facilities have been planned in the study area since publication of the Final EIS.

4.3.2.7 Public Services and Utilities

The Final EIS described four primary types of public services that are provided in the study area: fire protection and ambulance service, response to hazardous materials incidents, police protection and highway patrol, and water and sanitation services. Utilities in the study area include electrical, water, natural gas, petroleum, telecommunications, sewer, and storm drainage.

Public Services

Fire Protection and Ambulance Service

As described in the Final EIS, fire protection and paramedic and ambulance service in the study area are typically provided by combined jurisdictions (see Table 3-5 in the Final EIS). Local fire chiefs consider current access to I-15 from fire stations to be adequate. However, local officials also indicate that emergency response times will likely increase if additional access is not provided in the future. There have been no changes to this section since publication of the Final EIS.

Response to Hazardous Materials Incidents

As described in the Final EIS, the presence of I-15, railroad corridors, and refineries in the study area allows for the possibility for hazardous material incidents to occur. Such incidents could result in the closure of I-15, depending on the location and severity of the incident. The responsible party, with oversight from the Utah Department of Environmental Quality (UDEQ), would be responsible for immediate action after an incident. There have been no changes to this section since publication of the Final EIS.

Police Protection and Highway Patrol

As described in the Final EIS, each city in the study area maintains its own police department. Additional police assistance can be obtained from the sheriff's offices of Davis and Salt Lake Counties, as well as the state highway patrol. There have been no changes to this section since publication of the Final EIS.

Water and Sanitation Services

As described in the Final EIS, each municipality in the study area provides its own water and sewer (see Table 3-7 in the Final EIS). Residents and commercial interests outside each jurisdiction use domestic

wells to supply their own water. Irrigation water is supplied by the Weber Basin Water Conservancy District. There have been no changes to this section since publication of the Final EIS.

Utilities

Figures 3-8a through 3-8e in the Final EIS illustrate the location of the major utilities in the study area. Major utilities described in the Final EIS include electrical utilities, water utilities, natural gas utilities, petroleum utilities, telecommunications utilities, sewer utilities, and storm drainage utilities. There have been three minor changes to the description of utilities in the study area since publication of the Final EIS. These three changes are described below.

- **Electrical Utilities**. The existing transmission corridors in the study area are depicted in Figure 3-8a in the Final EIS. UDOT has arranged with Utah Power to increase the existing transmission corridor easement by 75 feet on the west side of Alternative E to accommodate one additional transmission line. Currently, there are five transmission lines in the corridor and the expanded easement would accommodate six. The alignment of the existing transmission corridor would not change.

- **Water and Wastewater Utilities**. A trunk line and minor lateral owned by the South Davis County Sewer Improvement District were relocated from the proposed Legacy Nature Preserve to the east side of Alternative E alignment.

- **Natural Gas Lines**. Two Questar natural gas lines have been relocated from the proposed Legacy Nature Preserve to the east side of the Alternative E alignment. It should be noted that Figure 3-8c in the Final EIS depicted one of these lines as a Kern River pipeline; however, when UDOT negotiated to relocate this line, it was owned by Questar.

All other information presented in the Final EIS relative to utilities has not changed.

4.3.2.8 Recreation Resources

Three different types of recreation resources in the study area were described in the Final EIS: wildlife recreation areas (i.e., the Farmington Bay Waterfowl Management Area [FBWMA]), public recreation facilities, and private recreation facilities. The following provides updated information on these resources.

Wildlife Recreation Areas

As described in the Final EIS, the FBWMA is the only wildlife recreation area in the study area. It is managed by the UDNR Division of Wildlife Resources and comprises 4,856 ha (12,000 ac). The main entrance is from Glovers Lane in the north, and the recreation area is open year round. Access can also be obtained from 1250 West and Pages Lane at certain times of the year. The Final EIS estimated annual visits to the FBWMA to be approximately 50,000. In 2003, visits had increased to 72,000 annually. There have been no changes to this section since publication of the Final EIS.

The Final EIS stated that, under all the proposed build alternatives, an overpass would be constructed at Pages Lane to provide pedestrian, equestrian, and bicycle access to the FBWMA. Since publication of the Final EIS, the City of West Bountiful has decided not to construct this access due to feasibility and cost concerns (HDR Engineering, Inc. 2003j). This eliminates a direct access point to both the FBWMA and Bountiful Pond (see *Public Recreation Facilities*, below). As a result, motorized vehicles would have access to the FBWMA by taking the 500 South exit off Legacy Parkway and the corresponding frontage

road. Non-motorized access would also be provided by the frontage roads that run along the west side of the proposed alignments. Access to the frontage roads would be provided at 500 South.

There have been no other changes to this section since publication of the Final EIS.

Public Recreation Facilities

As described in the Final EIS, many different public recreation facilities are located in the study area, including several golf courses, bike paths, trails, and parks, as well as Bountiful City Pond, the Davis County Fairgrounds, and the Model Airport and Jordan River Off Highway Center (Jordan River OHV Center). Lagoon Drive, which provides access to Lagoon Park, a large amusement park located east of I-15 in Farmington, is also located in the study area. Since publication of the Final EIS, one additional park, which would be located adjacent to the Davis County Fairgrounds south of the Davis County Justice Complex, has been planned in the study area.

As described above, the non-motorized overpass that would provide access to Bountiful City Pond is no longer being considered. Motorized vehicles would access Bountiful City Pond by taking the 500 South exit and the frontage road along the west side of the proposed Legacy Parkway. Non-motorized access would be provided by the frontage roads that run along the west side of the proposed alignments. Access to the frontage roads would be provided at 500 South and the State Street pedestrian overpass.

There have been no other changes to this section since publication of the Final EIS.

Private Recreation Facilities

The Final EIS described several private recreation facilities in the study area, including equestrian centers in West Bountiful, three private duck hunting clubs, a private gun club at 200 South on the west side of Redwood Road, facilities for private bicycle touring (see Section 4.7, *Pedestrians and Bicycles*, of this document), and a planned golf course near Woods Cross. There has been no change in the status of these facilities since publication of the Final EIS.

4.3.2.9 Public Health and Safety

As described in the Final EIS, air quality, fog, lake-effect snow, and congestion-related aggression are public health and safety considerations in the study area. In particular, Salt Lake and Davis Counties are maintenance areas for ozone, and Salt Lake County is a moderate non-attainment area for particulate matter (PM10) (see Section 4.8, *Air Quality*), which is a public health concern. Great Salt Lake can cause localized fog and lake-affect snow that can create adverse travel conditions and a reduced level of safety to the traveling public. Given the proximity of the build alternatives to Great Salt Lake, and the fact that the proposed action is a highway, these factors are relevant to the discussion of public health and safety in the study area. Finally, increased congestion on roadways can lead to congestion-related aggression (e.g., road-rage). The continued increase in traffic volume in the study area could lead to aggressive driving incidents.

There has been no change to any of these discussions since publication of the Final EIS.

4.3.2.10 Quality of Life

The Final EIS stated that residents throughout the region consider their quality of life fairly high because of the nearby location of the Great Salt Lake ecosystem and the Wasatch Mountains. The quality of life,

however, has been changing as growth and development in the valley increases. This growth and development threatens many of the area characteristics that residents enjoy.

To address growth issues that extend beyond individual local jurisdictions, efforts have been made since publication of the Final EIS to deal with growth-related transportation issues at a regional level. Envision Utah, a partnership between public and private entities aimed at addressing the effects of long-term growth in the greater Wasatch Front Area, has sponsored several regional studies that, among other things, address transportation and land use at a regional level. These studies, which include the *Envision Utah Quality Growth Strategy and Technical Review* (Envision Utah 2000) and the *Envision Utah Transit Oriented Development Guidelines* (Envision Utah 2002) endorse integration of land use and transportation through transit and transit-oriented land uses, improving the "walkability of communities," reducing traffic congestions, and otherwise promoting regional transportation options that maximize quality of life.

Similarly, the *Inter-Regional Corridor Alternatives Analysis* (IRCAA) (Wasatch Front Regional Council et al. 2002) was initiated as a collaborative effort in October 1999 by WFRC, the Mountainland Association of Governments (MAG), UTA and UDOT to address inter-regional mobility (e.g., mobility within the Wasatch Front region). As summarized in Section 4.1, *Land Use*, this study attempted to determine a desirable mix of transportation modes and transit-oriented land uses that would reduce traffic congestion and promote quality of life. This study recommended integration of a strong transit and commuter/passenger rail component into future transportation infrastructure improvements.

4.3.3 Environmental Consequences and Mitigation Measures

The following subsections provide a summary of the environmental consequences and mitigation measures for social effects in the study area. As described in the Final EIS, the proposed build alternatives would affect, to differing degrees, social composition, community cohesion, public facilities, services and utilities, recreation resources, public health and safety, and quality of life in the study area. Although the proposed build alternatives would impact minority and low-income populations, these impacts would not be disproportionately high or adverse compared to the same impacts on the population as a whole.

4.3.3.1 Socially Disadvantaged Groups

As described in the Final EIS, socially disadvantaged groups include blind, low-income, minority, and elderly persons. As described in Section 4.3.2.2 above, the number of indigent households in the study area has decreased from seven to two since publication of the Final EIS; both indigent households are located in Davis County. Figure 4.3-6, which updates Figure 4-6 of the Final EIS, illustrates the location of affected socially disadvantaged groups in the study area.

Section 4.3.3.2 below provides a discussion of environmental justice, which is related to this discussion of socially disadvantaged groups.

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on socially disadvantaged groups would occur under the existing conditions (2004) No-Build Alternative.

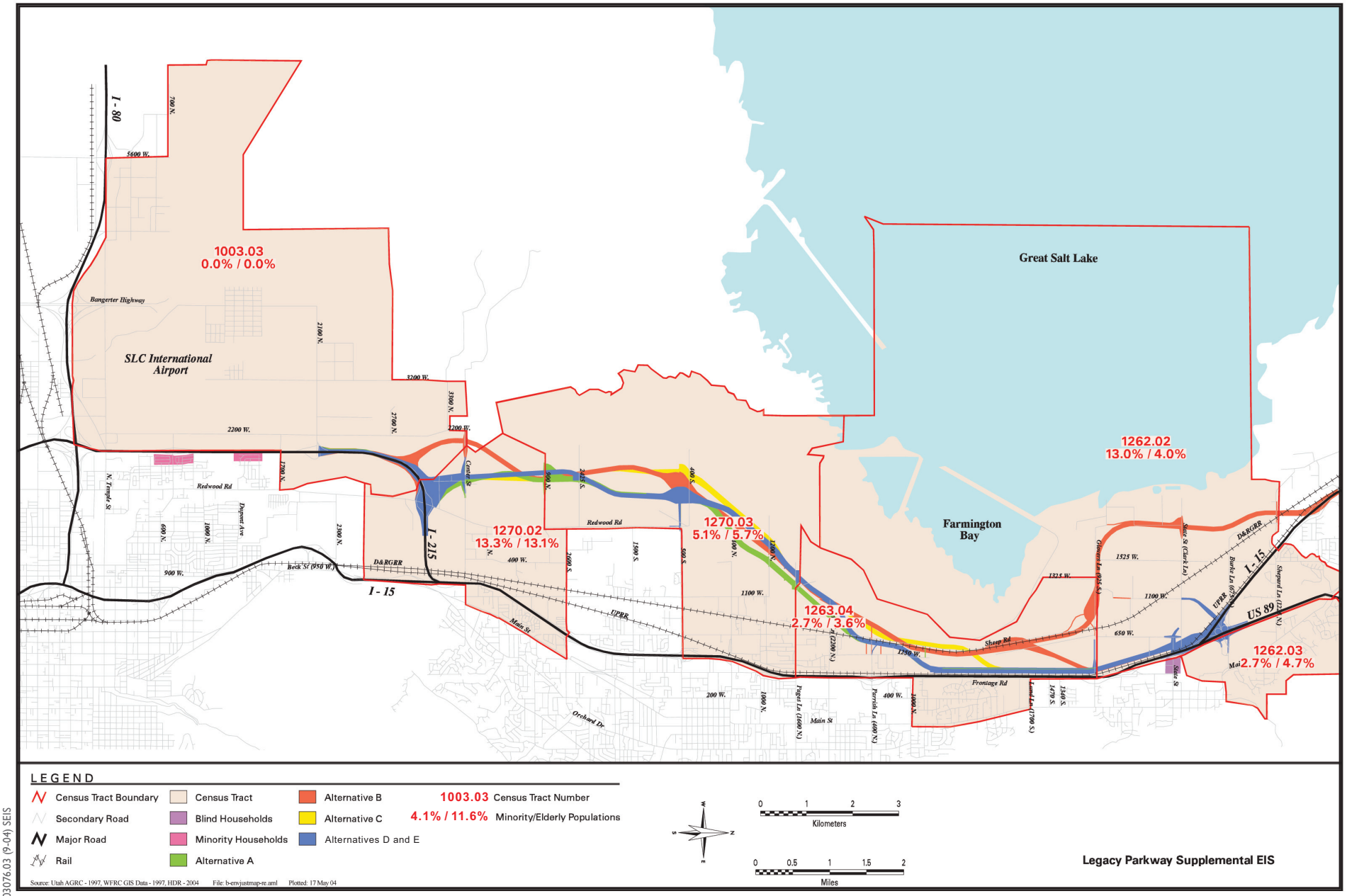

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Figure 4.3-6
Minority, Elderly, and Blind Populations

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would impact socially disadvantaged groups, although the nature and timing of these projects are not known at this time.

Build Alternatives

There have been no changes to the impact discussion in the Final EIS relative to socially disadvantaged groups. As described in the Final EIS, all the build alternatives would indirectly affect the two households with blind residents in Davis County. After publication of the Final EIS, Commercial Coatings, a company employing 75 percent minority persons, was relocated to a new facility within 2 miles of the previous facility. The new facility is more accessible for employees and there are no adverse impacts associated with this relocation.

All the proposed build alternatives would facilitate movement and transportation of persons in all social groups, including socially disadvantaged groups. However, funding for North Corridor projects would come in part from gas taxes, which could affect low-income populations.

Mitigation Measures

As described in the Final EIS, business displacement assistance would be provided to Commercial Coatings pursuant to the eligibility and other requirements of the URAA (see Section 4.4, *Relocations.*)

4.3.3.2 Environmental Justice Population

As described in 4.3.2.2 above, information from the 2000 Census and the Utah Governor's Office of Planning and Budget was used to identify environmental justice populations (i.e., minority and low-income populations) in the study area. Project impacts, including relocations, noise, and construction-related impacts, were then examined in relation to these populations to determine whether the environmental, social, or economic effects associated with the proposed build alternatives would be disproportionately high or adverse on these populations. The impact conclusions presented in the Final EIS have not changed. The following supplemental information is presented to support the analysis disclosed in Section 4.3.7 of the Final EIS, and to present an updated analysis based on information collected from the 2000 Census.

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on environmental justice populations would occur under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would impact environmental justice populations, although the nature and timing of these projects are not known at this time.

Build Alternatives

Potential impacts on minority and low-income households resulting from implementation of the build alternatives were evaluated using two steps. The first step used census tract, block group, and block data to determine where concentrations of minority or low-income populations were located in the study area. The second step examined whether minority or low-income populations would be disproportionately affected by the environmental, social, or economic impacts of the proposed build alternatives. Impacts considered included relocations, noise, and construction-related impacts.

As mentioned above in Section 4.3.2.3, census tract 1262.02, block group 1 has a higher proportion of minorities than the Davis County average (13.0 percent versus 10.2 percent), which indicates the possible existence of an environmental justice population in this area. Alternatives A, C, D, and E stop at the proposed northern terminus, which is south and well east of the I-15/US-89 divergence, where the majority of the development in this census tract is located. Although Alternative B would extend north and east of the I-15/US-89 divergence, the alignment would not affect any development in that area.

In addition, Alternative B is the only build alternative that would likely affect the high-end residential development near Shepard Lane. However, given the type of development near Shepard Lane, it is unlikely that Alternative B would have a disproportionate adverse effect on low-income populations. It is not known whether there are minority populations living in the development near Shepard Lane.

As described in Section 4.3.2.3 above, census tract 1270.2, block group 2 contains a minority population of 16.8 percent, which is higher then the Davis County average (10.2 percent) and the state average (14.7 percent). This indicates that an environmental justice population may also exist in this area. However, because all the proposed build alternative alignments are located west of Redwood Road in primarily undeveloped areas, it is unlikely that the environmental justice populations in this block group would be affected by the build alternatives.

As of September 2003, UDOT has acquired four residential properties, all of which are necessary for construction of all the build alternatives (see Subsection 4.4.3.1, *Residential Properties*). Of these four properties, one is considered an environmental justice household due to a combination of low-income and elderly residents. Although this household would be affected, this impact is not considered disproportionate to impacts on other residential populations.

In summary, taking into consideration the 2000 Census data and residential relocations to date, it does not appear that any proposed build alternative would have a disproportionate adverse impact on minority or low-income populations.

4.3.3.3 Neighborhood and Community Cohesion

Community Concerns

The Final EIS provides an in-depth discussion of local community concerns and preferences relative to construction of the proposed Legacy Parkway (see Section 4.52 of the Final EIS). These concerns and preferences have not changed since publication of the Final EIS. Issues identified by community leaders as important in their respective jurisdictions include relocations, visual impacts, noise impacts, air quality impacts, public safety, and community cohesion. Communities in the study area favor constructing a roadway as far west as reasonably possible to maximize the contiguous area available for development and to minimize community division. At the same time, the communities want to prevent growth in environmentally sensitive and difficult-to-serve areas west of the proposed corridor.

The following sections provide more specific discussion of community concerns relative to the No-Build and build alternatives. These concerns were reiterated during the public scoping period for the Supplemental EIS, as well as during CPIC meetings, which were held during the summer and fall of 2003 to solicit input from local jurisdictions and interested parties on, among other things, potential community impacts that could result from implementation of the proposed build alternatives. In addition to the concerns listed below, communities have expressed concern over the economic costs associated with further delays in construction of the proposed action.

Community Concerns about No-Build Alternative

As described in the Final EIS, local jurisdictions and the public are primarily concerned about traffic congestion, safety, and emergency service delays under the No-Build Alternative. These impacts are discussed in detail in this section, as well as in Section 4.5.2 of the Final EIS.

Community Concerns about Build Alternatives

Local jurisdictions and the public continue to have a number of general concerns regarding the proposed build alternatives, as described below. Concerns specific to each local jurisdiction have not changed since publication of the Final EIS, and are presented in Section 4.5.2 of the Final EIS. All the local jurisdictions have stated that they would prefer that Legacy Parkway be located along the western edge of their developable lands to minimize the concerns described below.

- **Displacement and relocation of current businesses and residents**. Section 4.4, *Relocations*, of this document provides details on the number and location of potential residential, business, and farmsteads that would be displaced under each of the build alternatives. As described in that section, because UDOT has already purchased much of the right-of-way associated with Alternative D (Final EIS Preferred Alternative) and Alternative E, many of these impacts have already occurred.

- **Loss of Developable Upland**. Section 4.5.2 and Tables 4-10a through 4-10f in the Final EIS quantify the acreage of developable upland that would be lost with implementation of any proposed build alternative. Since publication of the Final EIS, the proposed right-of-way width for the build alternatives has been narrowed from 100 m (328-ft) to 95 m (312-ft) (see Chapter 3, *Alternatives*). This 5-m (16-ft) reduction in the right-of-way could decrease the acreage of developable upland lost under the proposed build alternatives; however, because this reduction is minimal and it may not be possible for UDOT to sell back this limited area to affected property owners, it is assumed for the purposes of the Supplemental EIS that the impacts on developable land are the same as those presented in the Final EIS.

- **Loss of tax base**. The loss of tax base is defined in the Final EIS as the loss of current tax revenues from the undeveloped lands purchased for the proposed build alternative plus the foregone tax revenues that might be realized if that land were developed under the No-Build Alternative. The loss of tax base under the build alternatives remains a concern for communities in the study area.

- **Fragmentation of Remaining Developable Land**. As described in the Final EIS, local communities are concerned that the proposed build alternatives would affect additional developable lands in the study area by either dividing them (i.e., leaving lands on both sides of the proposed highway) or by acquiring a portion of a given parcel (i.e., reducing the parcel size).

- **Emergency Services**. As described in the Final EIS, local communities are also concerned that the proposed highway would adversely affect emergency service access to the west side of the proposed highway. See Section 4.3.3.6 for a discussion of impacts associated with emergency services.

- **Neighborhood and Community Cohesion**. Local communities are also concerned that the proposed build alternatives would physically divide their communities, affecting future neighborhood and community cohesion. These concerns are exacerbated by current highway (I-15) and railroad (UPRR and D&RG) infrastructure in their communities.

Property Purchased by UDOT

Section 4.5.2 in the Final EIS and Figure 4.1-1 list and graphically depict the location of parcels in the study area that had been acquired by UDOT to facilitate construction of Alternative D (Final EIS Preferred Alternative). Since publication of the Final EIS, UDOT has continued to acquire land in the proposed Alternative D right-of-way and the Legacy Nature Preserve. Section 4.4, *Relocations*, lists additional properties that have been acquired since publication of the Final EIS. In total, UDOT has purchased 192 (272 ha [671 ac]) of the 217 (357 ha [881 acres]) property parcels that lay in the proposed Alternative D right-of-way (West pers. comm. [a]). In addition, as of June 2004, of the 849 ha (2,098 ac) in the Legacy Nature Preserve, only 67.6 ha (167 ac) (in 5 parcels) remain to be purchased.

4.3.3.4 Travel Patterns and Accessibility

As described in Section 4.3.2 of the Final EIS, both the No-Build Alternative and build alternatives would result in impacts on the travel patterns and accessibility of arterials and local roadways in the study area. The Final EIS evaluated more generically traffic flow and post construction access issues for a wide range of arterials and local roadways in and around the study area. The impact assessment presented in this Supplemental EIS supplements that analysis by providing more detailed and up-to-date analysis of the four locations on major corridor highways (I-15, US-89, and I-215) and 12 locations on three local roadways (Parrish Lane, 500 South, Redwood Road) described in Section 4.3.2.5, above. This section addresses the projected post construction level of service in 2020 under the No-Build Alternative and build alternatives. Construction-related access issues are described in Section 4.20, *Construction Impacts*. The following describes the impacts that the No-Build Alternative and build alternatives would have on the interstates/major highways and local roadways described above. The impact analysis differentiates the between the build alternatives and No-Build Alternative (future conditions). As described in Section 4.0.3, *Alternatives Evaluated*, the future conditions (2020) No-Build Alternative represents the WFRC long range plan in the year 2020, without Legacy Parkway and without improvement of I-15 improvements to 10 lanes. In 2020, the long range plan includes commuter rail, expanding Redwood Road from two to four lanes (from south of I-215 to 500 South), and no expansion of I-15.

No Build Alternative

Existing Conditions

As presented in section 4.3.2.5, level of service is represented in a letter grading system used to describe different levels of traffic congestion, ranging from LOS A for excellent conditions (free-flowing traffic) to LOS F for failure conditions (extremely congested stop-and-go traffic). In urban areas, UDOT strives to maintain LOS D or better operating conditions on interstate freeways. Existing p.m. peak-period level of service for the primary facilities in the corridor are described above in Tables 4.3-6 and 4.3-7. All the listed freeways, expressways, and arterials operate at acceptable peak-period ratings of LOS D or better.

Future Conditions (2020)

As shown in Tables 4.3-8 and 4.3-9 (below), under the future conditions (2020) No-Build Alternative, levels of service would deteriorate to LOS E or worse at many locations, including those listed below.

- US-89 north of I-15 interchange in Farmington (LOS F).
- I-15 north of US-89 interchange in Farmington (LOS E).
- I-215 east of Legacy Parkway (LOS F).
- I-215 south of Legacy Parkway (LOS F).
- Parrish Lane from I-15 to 400 West (LOS E).
- 500 South from Redwood Road to 1100 West (LOS D).
- Redwood Road from 2600 South to Center Street (LOS E).
- Redwood Road from Center Street to I-215 (LOS F).

Table 4.3-8 Projected 2020 Levels of Service on Interstate and Major State Highway Segments in Study Area

	No-Build Alternative					Build Alternatives				
Roadway Segment	Lanes per Direction	Total Daily Traffic	Peak-Hour Peak-Direction (Northbound) Volume	Peak-Period Peak-Direction (Northbound) Volume	Peak-Period LOS	Lanes per Direction	Total Daily Traffic	Peak-Hour Peak-Direction (Northbound) Volume	Peak-Period Peak-Direction (Northbound) Volume	Peak-Period LOS
US-89 north of I-15 interchange in Farmington	2	98,140	5,570	15,480	F	2	97,850	5,210	14,470	F
I-15 north of US-89 interchange in Farmington	3	122,780	7,500	20,830	E	5	127,920	8,290	23,040	C
I-215 east of Legacy Parkway	2	102,990	5,370	14,910	F	2	42,650	2,630	7,300	C
I-215 south of Legacy Parkway	2	102,987	5,370	14,910	F	3	114,440	6,290	17,460	D

Notes:

The No-Build Alternative represents WFRC long range plan in the year 2020, without Legacy Parkway or I-15 improvements to ten lanes. The build alternatives represent complete Shared Solution, including I-15 improvements, Legacy Parkway, and maximum future transit.

Values represent direct model values using the 2004 WFRC travel demand model (version 3.2). Total daily traffic volumes are two-directional daily volumes.

Level of service provided based on planning-level volume-to-capacity comparisons in the p.m. peak-period direction.

Source: InterPlan Co., 2004.

Table 4.3-9 Projected 2020 Levels of Service on Local Roadways with Peak-Period Volumes

				2020 – No-Build Alternative				2020 – Build Alternatives			
Roadway	Lanes per Direction	From	To	Total Daily Traffic	Peak Period EB	Peak Period WB	LOS	Total Daily Traffic	Peak Period EB	Peak Period WB	LOS
Parrish Lane	2	Legacy	1250 West	NA	NA	NA	NA	8,760	270	470	A
	2	1250 West	I-15	11,150	2,190	1,150	B	11,860	1,610	1,630	B
	2	I-15	400 West	26,430	2,400	4,180	E	27,980	3,730	3,760	D
500 South	2	Legacy	Redwood Rd.	NA	NA	NA	NA	13,440	1,500	2,080	B
	2	Redwood Rd.	1100 West	14,970	3,330	1,420	D	6,640	920	850	A
	2	1100 West	800 West	13,990	2,530	1,310	C	6,800	980	900	A
	2	800 West	I-15	20,420	3,250	2,260	C	14,450	2,150	1,950	B
	2/3	I-15	200 West	17,090	2,850	3,490	D	17,540	3,100	3,680	C
				Total Daily Traffic	Peak Period SB	Peak Period NB	LOS	Total Daily Traffic	Peak Period SB	Peak Period NB	LOS
Redwood Road	2	500 South	1500 South	16,030	1,550	3,540	D	10,370	1,140	1,820	B
	2	1500 South	2600 South	18,110	2,010	3,730	D	11,870	1,570	1,780	B
	2	2600 South	Center St.	22,110	2,680	4,230	E	15,460	2,110	2,120	B
	2	Center St.	I-215	24,540	3,150	5,110	F	15,690	2,280	2,200	C

Notes:

The build alternatives represent the complete Shared Solution, including I-15 improvements to ten lanes, Legacy Parkway, and maximum future transit. The No-Build Alternative represents WFRC long range plan in the year 2020, without Legacy Parkway improvements and I-15 ten lane improvements.

Values represent direct model values using the 2004 WFRC travel demand model (version 3.2). Total daily traffic volumes are two-directional daily volumes.

Level of service provided based on planning-level volume-to-capacity comparisons in the p.m. peak period, peak direction.

500 South from I-15 to 200 West will have two lanes in each direction under 2020 No-Build and three lanes in each direction under 2020 build alternatives.

Source: InterPlan Co. 2004.

The level of service under the No-Build Alternative on I-15, I-215, and local arterials would be worse on most segments than under the proposed build alternatives. Tables 4.3-8 and 4.3-9 provide a complete comparison of future (2020) conditions under the No-Build and build alternatives.

Traffic projections for the 2020 conditions listed above and for the comparison of No-Build and build alternatives in Tables 4.3-8 and 4.3-9 are based on the same WFRC 2020 land use projections used in the current long range plan. While these projections represent the officially adopted land use projects and provide a consistent basis for comparing the future No-Build and build alternatives, it is also possible that some land use shifts could occur under the No-Build Alternative, although any such shifts would be minor in the corridor-wide and regional context. As discussed in Section 4.1.3.3, approximately 324 ha (800 ac) of developable land would become available for development in North Salt Lake, Centerville, Farmington, Woods Cross, Bountiful, and West Bountiful if the proposed Legacy Parkway were not built. The land is located in the Legacy Parkway right-of-way and proposed Legacy Nature Preserve, generally west of existing and developing areas. Under the future conditions No Build Alternative, UDOT would be legally obligated to relinquish the property to the developers from which it was acquired.[2]

Given this potential variation in land availability, the level of service projections for the 2020 No-Build Alternative presented above and in Tables 4.3-8 and 4.3-9 represent the low end of the range of potential 2020 traffic levels on I-15 and provide a potentially favorable assessment of the potential traffic conditions on surface streets in western areas of North Corridor communities. The land use shifts resulting from the additional 324 ha (800 ac) of developable land in the corridor would range between the following conditions on I-15 at the Woods Cross screenline.

- An increase of 1,100 p.m. peak-period, peak-direction passenger-car equivalents (or 4 percent) above the traffic projection for the official WFRC land use projection. This would occur if the 324 ha (800 ac) of new land use are drawn from development potential further north, in North Davis and Weber Counties.

- An increase of 1,500 p.m. peak-period, peak-direction passenger-car equivalents (or 5 percent) above traffic projections for the WFRC land use projection, if the new North Corridor land use is drawn from other parts of the region.

In both cases, the land use shift would worsen the 2020 level of service on I-15 at the Woods Cross screenline to a worse LOS F than reported in Table 4.3-8 and Chapters 1 and 3 for future No Build conditions. Also, in both cases, relinquishment of the land within the Legacy Parkway right-of-way and Legacy Nature Preserve would increase traffic generation and local street construction in the western portions of North Salt Lake, Woods Cross, Centerville, Bountiful, West Bountiful and Farmington.

Build Alternatives

Impacts on Interstates/Major Arterials

Table 4.3-8 shows the total daily traffic projections, the peak-hour and peak-period volumes, and the level of service on interstate and major state highway segments in the study area. As shown in Table 4.3-8, the build alternatives would result in improved traffic operating conditions for all the interstate and major highway segments analyzed, as well as reduced traffic volumes on all the analyzed interstate and major

[2] The Corps could require UDOT to maintain some of the mitigation land in the Legacy Nature Preserve because of the impacts on wetlands that have already occurred. However, most of the mitigation land and all the right-of-way land would be excessed according to Utah law.

highway segments except two (I-15 north of US-89 interchange in Farmington and I-215 south of Legacy Parkway). Although the volume of traffic would increase along these two segments, roadway improvements that would be implemented as part of the build alternatives would result in an improved level of service over the No-Build Alternative. In 2020, the level of service of the I-15 north of US-89 interchange segment would be at LOS E under the No-Build Alternative but would improve to LOS C under the build alternatives. The I-215 south of Legacy Parkway segment would be at LOS F under the No-Build Alternative but would improve to LOS D under the build alternatives.

I-15

About 65 percent of the existing and future traffic on I-15 in the North Corridor is estimated to be through-corridor traffic (Wasatch Front Regional Council 2003a). As I-15 becomes more congested, drivers will begin to divert to alternative routes, including local streets, or drivers will forego peak-period travel if they have the option. Comparison of the build alternatives and the No-Build Alternative in Table 4.3-8 indicates that drivers are likely to choose both options in the No-Build case. North of the corridor, travel on I-15 and US-89 combined will be about 2 percent lower on a daily basis under the No-Build Alternative. During peak periods, travel will be about 3 percent lower under the No-Build Alternative, reflecting higher influence of congestion during the traffic peaks than on average throughout the day. Under the No-Build Alternative, traffic on I-15 will be about 4 percent lower, reflecting a combination of trips foregone and trips diverted to US-89 and local routes. During the peak periods, this trip suppression and diversion would be more pronounced, with I-15 carrying 10 to 11 percent less traffic than under the build alternatives. The build alternatives would reduce trip suppression and diversion while providing improved traffic levels of service. The I-15 improvements that would be implemented as part of the Shared Solution would allow the build alternatives to operate at better levels of service than the No-Build Alternative on I-15 and slightly better operating conditions within the same LOS range on US-89.

US-89

The volume of traffic on US-89 north of the I-15 interchange in Farmington (northbound) would be similar under both the build alternatives and the No-Build Alternative, and the level of service in 2020 would be LOS F under both scenarios.

Because of improvements on I-15 that are part of the Shared Solution, US-89 is projected to experience a slight decrease in traffic volume under the build alternatives.

I-215

The amount of traffic on I-215 south of Legacy Parkway would be greater under any build alternative than under the No-Build Alternative. An additional travel lane is proposed as part of the build alternatives in the short section of I-15 between Legacy Parkway and 2200 North. Consequently, this segment would operate at LOS D under the build alternatives, which would be an improvement over the anticipated LOS F under the No-Build Alternative.

The section of I-215 east of Legacy Parkway would operate at LOS C and would carry substantially less traffic under the build alternatives. Legacy Parkway would improve the operation on this segment of I-215 relative to the No-Build Alternative, which would result in LOS F conditions.

Interstates/Major Arterials Outside Study Area

Additional increases in traffic volume of up to 4 percent can be expected on certain facilities both north and south of the Legacy Parkway termini as a result of the Shared Solution. The issue of suppressed demand is discussed further in Section B3.4.4 in Appendix B. Highway segments north of the North Corridor are expected to experience demand in excess of capacity in 2020, according to WFRC regional

transportation plans. Traffic volumes on I-15 north of both US-89 and 200 North are projected to increase if the proposed action is implemented. If no improvements are made to I-15 north of the North Corridor, I-15 is projected to reach LOS F by 2020 under both the No Build and build alternatives. UDOT and WFRC are currently conducting a study to identify solutions, but no improvements are presently included in the WFRC long range plan. US-89 north of the I-15 interchange is also projected to fail by 2020. The Legacy Parkway alternative included in the Shared Solution would reduce traffic volume on US-89, but LOS F is still projected. I-215 south of the Legacy Parkway interchange is also projected to experience increased traffic volumes due to the Shared Solution improvements in the North Corridor. Conditions on I-215 northeast of the Legacy interchange would improve with implementation of the Shared Solution, and the segment immediately southwest of the Legacy/I-215 would operate at LOS D. However, the volume increase further south on I-215, between 2100 North and I-80 may reach LOS E. I-215 from I-80 to I-15 is a recognized problem of the WFRC long range plan and an "Illustrative Project" is identified to solve the problem in the long range plan in case funding increases above the projected (financially constrained) amount. Detailed design analysis of the Legacy Parkway terminus interchanges would also address any operational traffic issues at connections to and from I-215 at the southern end of the corridor and to and from I-15 at the northern end.

Impacts on Local Roadways

Table 4.3-9 above shows the level of service on local roadways proposed to have interchanges with Legacy Parkway in the study area. The level-of-service determinations are based on peak-period volumes. On average, the level of service based on the 3-hour peak-period volumes would be expected to be one half to one full grade better than the peak-hour level of service.

As shown in Table 4.3-9, any build alternative would result in improved traffic operating conditions on all the analyzed local roadway segments. The build alternatives would result in reduced peak-period, peak-direction traffic volumes on all the local segments except two (Parrish Lane between 1250 West and I-15, and 500 South between I-15 and 200 West). Although the volume of traffic would increase along Parrish Lane and 500 South, future planned roadway improvements would result in an improved level of service over the No-Build Alternative.

Parrish Lane

Under the build alternatives, the volume of traffic would be slightly higher than under the No-Build Alternative. Traffic volumes on Parrish Lane immediately west of I-15 are projected to increase regardless of implementation of Legacy Parkway. Parrish Lane is included in the WFRC long range plan to be widened to four lanes from I-15 to the proposed Parrish Lane/Legacy Parkway interchange. Under the build alternatives, additional improvements to Parrish Lane associated with the interchange improvements would add additional capacity. With the planned improvements, even segments of Parrish Lane that are predicted to carry more traffic under the build alternatives would operate at equal or better level of service than under No-Build conditions because the volume of traffic flowing east and west would be better balanced thereby reducing west-bound congestion.

500 South and Redwood Road

Under the No-Build Alternative, the 500 South/Redwood Road roadway serves as a "relief valve" for congestion on I-15. Due to traffic diversion as well as development activity in the area, traffic levels under the No-Build Alternative are projected to increase, and the level of service would reach LOS F on the southern segments of Redwood Road. Redwood Road would not meet UDOT's policy for acceptable level of service.

Under the build alternatives, a substantial amount of this traffic would move to the more efficient Legacy Parkway, and the level of service would improve to LOS C or higher.

4.3.3.5 Public Facilities

As described in Section 4.3.2 of the Final EIS and Section 4.3.2.6 above, four churches, two existing schools, two planned schools, the Farmington Public Works facility, the Centerville Public Works facility, a UDOT maintenance facility, and the Bountiful Sanitary Landfill are located in the study area. The following provides a summary of potential impacts on these resources.

No-Build Alternative

Existing Conditions (2004)

As stated in the Final EIS, there would be no project-related impacts on public facilities in the study area under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would impact public facilities, although the nature and timing of these projects are not known at this time.

Build Alternatives

Table 4.3-10, which is based on Table 4-5 in the Final EIS, summarizes the public facilities that would be affected under each build alternative. Impacts on existing facilities have not changed, and a more detailed description of these potential impacts is presented in Section 4.3 of the Final EIS. For the new and planned schools described above in 4.3.2.6, impacts are as follows.

- Construction of Alternative B would physically displace the new Farmington Bay Elementary School in the Farmington Ranch subdivision.

- Alternatives A, C, D, and E would be adjacent to the proposed new high school at Glovers Lane. Given the proximity of the proposed high school to I-15 and these proposed alignments, it is possible that noise levels at the high school could exceed FHWA noise thresholds if any of these alignments were constructed. Alternative B would be west of the proposed high school and would not affect it.

- The proposed elementary school in North Salt Lake would be located considerably east of the build alternatives and would not be affected.

Mitigation Measures

As described in the Final EIS, impacts on public facilities would be mitigated by providing compensation for real property taken or damaged, or by functionally replacing the publicly owned real property with another facility that would provide an equivalent use to that lost.

Table 4.3-10 Impacts on Public Facilities

Facility	Build Alternative*				
	A	B	C	D	E
Bountiful City Landfill (BARD)		X	X	X	X
Centerville Public Works (at 1250 West Street)	X			X	X
Farmington Public Works (at 50 North 650 West)	X	X	X	X	X
UDOT Maintenance (at 1100 North and 1250 West, Centerville)	X	X		X	X
Church and associated Athletic Field near 350 West and Shepard Lane)		X			
Farmington Bay Elementary School (at 1933 W. Clark Lane)		X			
Proposed High School (near Glovers Lane and 650 West)	X		X	X	X
Proposed Elementary School (west of Redwood Road, North Salt Lake))					

Notes:

Shaded areas represent new public facilities in the study area identified since publication of the Final EIS.

* An "X" in the table indicates that there would be an impact on the facility. See Section 4.3 of the Final EIS for details on the nature of the impacts.

4.3.3.6 Public Services and Utilities

As described in Section 4.3.4 of the Final EIS, the two primary public services that could be affected by the proposed build alternatives are emergency services (i.e., fire protection, paramedic services, and law enforcement) and hazardous material incident response. Implementation of any proposed build alternative could also affect utility lines in the study area, but the impacts would be minor. The environmental consequences and mitigation measures associated with public services and utilities are summarized below.

Public Services

Fire Protection and Ambulance Service

No-Build Alternative

Existing Conditions (2004)

Is described in the Final EIS, traffic congestion on I-15 will continue to increase under the existing conditions (2004) No-Build Alternative. This congestion would make it more difficult for emergency response vehicles to respond to emergencies on and around I-15.

Future Conditions (2020)

If none of the build alternatives is implemented, I-15 congestion will continue as described under the existing conditions (2004) No-Build Alternative. Future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action, although the nature and timing of these projects are not known at this time. Impacts on

fire protection and ambulance services would be similar to those described for the existing conditions (2004) No-Build Alternative and build alternatives.

Build Alternatives

As described in the Final EIS, local emergency response officials indicate that construction of any proposed build alternative would improve emergency response times by relieving I-15-related traffic. In most cases, Alternative A would result in the most substantial improvements to response times; however in certain areas to the west of the proposed build alternatives, response time under Alternative A could increase because of limited crossings over the proposed highway. Alternative B would exacerbate response times in Farmington because the volunteer emergency response team would have to cover greater distances.

Response to Hazardous Material Incidents

No-Build Alternative
Existing Conditions (2004)

As described in the Final EIS, under the existing conditions (2004) No-Build Alternative, accidents involving hazardous materials could occur on the existing roadways in the study area. Such incidents could result in the closure of I-15, the only north-south route in the study area.

Future Conditions (2020)

If none of the build alternatives is implemented, the potential for hazardous materials incidents will continue as described under the existing conditions (2004) No-Build Alternative. Future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action, although the nature and timing of such projects are not known at this time. Response to hazardous materials incidents would be similar to those described for the existing conditions (2004) No-Build Alternative and build alternatives.

Build Alternatives

As with the No-Build Alternative, accidents involving hazardous material could occur on any roadway in the study area, including the proposed Legacy Parkway. However, it is unlikely that there would be an accident so severe that it would close both I-15 and the proposed highway. As stated in the Final EIS, construction of any proposed build alternative would ensure that at least one north-south route remains accessible during a potential spill.

Police Protection and Highway Patrol

The environmental consequences associated with the No-Build and build alternatives on police protection and highway patrol have not changed since publication of the Final EIS, and are similar to those described above under *Fire Protection and Ambulance Services*.

Water and Sanitation Service

Water and sanitation services located east of the proposed build alternative alignments would not be adversely affected by the build alternatives because existing water mains and sewer interceptors could be easily relocated to accommodate future growth or construction of the proposed highway. Providing water and sanitation services west of the proposed alignments would be more difficult because of the additional cost and logistics associated with crossing the new highway.

Mitigation Measures

No mitigation measures are proposed for impacts on public services.

Utilities

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on utility infrastructure or service would occur under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would impact utility service and infrastructure, although the nature and timing of these projects are not known at this time.

Build Alternatives

As described in the Final EIS, local utility service could temporarily be lost during relocation of utility lines in the rights-of-way of the build alternatives. Any disruption would be minimal, however, and comparable to that associated with maintenance during normal operating periods.

Several major utility lines in the study area would have to be relocated, and several have been relocated since publication of the Final EIS, including the two water and wastewater utility lines and two natural gas lines that were relocated to the east side of the Alternative E alignment (see Section 4.3.2.6 above). Relocated lines, as well as several existing lines, would be located in a transmission corridor easement which, as described in Section 4.3.2.6 above, has been widened 75-feet since publication of the Final EIS.

Existing telecommunication fiber-optic lines in the rights-of-way of the proposed build alternatives (which were summarized on Page 3-23 in the Final EIS) would be protected in place rather than relocated. This would minimize telecommunication service interruptions resulting from construction of the proposed action.

Mitigation Measures

No mitigation measures are proposed for impacts on utilities.

4.3.3.7 Recreation Resources

No-Build Alternative

Existing Conditions (2004)

There would be no project-related impacts on recreation resources under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

Recreation facilities in the study area are expected to experience increased use as the population and recreation demands in the study area expand. Recreation opportunities, however, are likely to decrease as development takes up more of the area's open space.

Build Alternatives

Table 4.3-11 summarizes the impacts on recreation resources in the study area that are described in detail in Section 4.3.5 of the Final EIS. It should be noted that Table 4.3-11 only lists the recreation resources that would be affected by the build alternatives; all other resources listed in Section 4.3.2.8 above, including the two newly identified planned parks, would not be affected by the build alternatives and are not listed in Table 4.3-11.

Table 4.3-11 Impacts on Recreation Resources in Study Area

	Alternatives[2]					
Recreation Resource[1]	No-Build (Existing Conditions 2004)	A	B	C	D	E
Wildlife Recreation Areas						
Farmington Bay Wildlife Management Area		X	X	X	X	X
Public Recreation Facilities						
Model Airport and Jordan River OHV Center		X	X	X	X	X
Access to Lagoon Park at Lagoon Drive		X	X	X	X	X
Bountiful City Pond		X	X	X	X	X
Private Recreation Facilities						
Planned Golf Course (2200 South, Woods Cross)		X	X	X	X	X
Equestrian Center (1450 West, 400 North, West Bountiful)		X				
Gun Club (200 South, Redwood Road)		X			X	X

Notes:

1 Recreation resources in the table only reflect those that would be affected by one of the proposed build alternatives. A complete description of the type and extent of these impacts is provided in Section 4.3.5 of the Final EIS.

2 An "X" in the table indicates that there would be an impact on the resources. See Section 4.3.5 of the Final EIS for details on the nature of the impacts.

Impacts on recreation resources have not changed since publication of the Final EIS, with two exceptions: the elimination of a proposed access location to the FBWMA and Bountiful City Pond and updated noise analyses for evaluation of impacts at the FBWMA and Bountiful City Pond. The following text summarizes these updates. Section 4.3.5 of the Final EIS should be consulted for a complete description of impacts on recreation resources. Refer to Section 4.7, *Pedestrians and Bicycle Considerations*, for a discussion of the potential recreational opportunities from the proposed trail associated with the build alternatives.

Access to Farmington Bay Wildlife Management Area and Bountiful City Pond

As described in Section 4.3.2.8, the non-motorized vehicle overpass at Pages Lane is no longer proposed, which eliminates a direct access point to both the FBWMA and the Bountiful City Pond. As a result, motorized vehicles would access the FBWMA by taking the 500 South exit off Legacy Parkway and the corresponding frontage road. Similarly, motorized vehicles would access Bountiful City Pond by taking the 500 South exit and the frontage road along the west side of the proposed Legacy Parkway. Non-motorized access would be provided to both FBWMA and the Bountiful City Pond by the frontage roads that run along the west side of the proposed alignments. Access to the frontage roads would be provided at 500 South. As stated in the Final EIS, travel time would increase for motorists visiting these areas.

Noise at Farmington Bay Wildlife Management Area and Bountiful City Pond

Noise impacts at the FBWMA and Bountiful City Pond are discussed in Section 4.9, *Noise*, of this document and Chapter 5, *Draft Section 4(f) and 6(f) Evaluations*.

Mitigation Measures

As described in the Final EIS, providing a frontage road along the western side of Legacy Parkway from Sheep Road to the eastern entrance of the FBWMA would mitigate the impact under Alternatives B and C on FBWMA's eastern entrance and parking lot. The parking lot and other land would be replaced with land of at least equal value and usefulness.

4.3.3.8 Public Health and Safety

As described in 4.3.2.9, air quality, fog, lake-effect snow, and congestion-related aggression are public health and safety considerations in the study area. The impacts on public health and safety have not changed since publication of the Final EIS. Air quality impacts are discussed in Section 4. 8, *Air Quality*, of the Supplemental EIS; other public health and safety impacts are summarized below.

Ice, Fog, and Lake-Effect Snow

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions (2004) No-Build Alternative, the public would continue to be subject to safety concerns associated with ice, fog, and lake-effect snow on existing roadways.

Future Conditions (2020)

Under the future conditions No-Build Alternative, traffic volumes on I-15 and side streets would likely increase, thereby increasing the time travelers are threatened by the effects of ice, fog, and lake effect snow. Exacerbated traffic congestion during periods of ice, fog, and lake-effect snow would also make it difficult for emergency vehicles to operate efficiently in the area.

Build Alternatives

As described in the Final EIS, the effects of ice, fog, and lake-effect snow would be essentially the same under all the proposed build alternatives as under the No-Build Alternative, except that the proposed Legacy Parkway would provide an alternate route that would reduce congestion and minimize time spent

on roadways. This could decrease the time the public is subjected to these hazards; however, increased travel speeds could increase the potential severity of accidents.

Congestion-Related Aggression

No-Build Alternative

Existing Conditions (2004)

As described in the Final EIS, increased traffic congestion on I-15 will result in traffic delays and increased potential for aggressive driving (i.e., road rage) incidents.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. However, until such projects are implemented, the increased potential for aggressive driving incidents would be similar to that described under the existing conditions No-Build Alternative.

Build Alternatives

As described in the Final EIS, construction of any proposed build alternative would provide an alternate north-south route in the study area. This would reduce traffic congestion and the likelihood of aggressive driving incidents.

4.3.3.9 Quality of Life

As described in the Final EIS, individuals in the study area have different opinions about how both the No-Build and build alternatives would affect the quality of life in the study area. Factors that affect this qualitative assessment include the rate and scope of development in the region and how that development affects open space, wetlands and wildlife habitats, agricultural land, and recreation opportunities, as well as accessibility, traffic congestion, and the local tax base. Other variables considered may include changes in noise levels, air quality, and utilization of the public transportation system.

The Final EIS discusses how the above factors could be viewed under both the No-Build Alternative and build alternatives; it does not determine which factors are preferable or provide a higher quality of life. There have been no changes to this section since publication of the Final EIS.

Finally, as described in Section 4.3.2.10, *Quality of Life*, Envision Utah and the IRCAA study emphasize developing multi-faceted solutions to traffic congestion problems caused by growth. These solutions, intended to maintain a high quality of life in the region, include the increased use of transit and promotion of transit-oriented development; expansion of existing roadways; and construction of new roadways. This philosophy is also part of the Shared Solution for the North Corridor, which includes a strong transit component, reconstruction of I-15, and construction of the proposed Legacy Highway (see Chapter 3, *Alternatives*). As a result, the proposed action, as part of the Shared Solution, is consistent with the regional transportation strategies described above.

These studies, which include the *Envision Utah Quality Growth Strategy and Technical Review* (Envision Utah 2000) and the *Envision Utah Transit Oriented Development Guidelines* (Envision Utah 2002) endorse integration of land use and transportation through transit and transit-oriented land uses, improving the “walkability of communities,” reducing traffic congestions, and otherwise promoting regional transportation options that maximize quality of life.

Section 4.4
Relocations

This section discusses the potential for the proposed action to result in relocations of residences, business, farmsteads and horse paddocks. This section provides information on the affected environment related to relocations, including one new business structure that has been constructed in the proposed right-of-way of Alternative B since publication of the Final EIS. This section also provides updated information on relocation impacts, including properties that have been acquired to date.

4.4.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with potential relocations in the study area, Sections 3.4 and 4.4 of the Final EIS were reviewed to determine the changes that had taken place since publication of the Final EIS. The study area for relocations is described in Section 4.0.1, *Study Area*, of this document.

Meetings were held with the appropriate city and county planning staff to discuss local land use changes in the study area and to determine whether those changes would affect relocation impacts disclosed in the Final EIS. Minutes of the meetings (HDR Engineering, Inc. 2003a–k) were reviewed in the preparation of this section. Table 4.1-1 in Section 4.1, *Land Use*, of this Supplemental EIS provides a summary of the dates and attendees at those meetings. In addition, Dave West, the UDOT Right-of-Way Manager for the Legacy Parkway project, was contacted to determine which properties within the Alternative D (Final EIS Preferred Alternative) right-of-way had been acquired since publication of the Final EIS (West pers. comm. a]).[1] Displacements were reassessed to determine whether the narrower typical cross section (i.e., 95 m [312 ft] versus 100 m [328 ft]) proposed for each of the build alternatives (see Chapter 3, *Alternatives*) would change the number or type of relocation impacts disclosed in the Final EIS (West pers. comm. b]).

4.4.2 Affected Environment

4.4.2.1 Existing Conditions

Several residential, business, farmstead, and horse paddock properties are located in the study area. As noted in the Final EIS, single-family housing is the predominant type of residence in the study area and the only type of residential property that could be affected by any proposed build alternative. Some land

[1] All land acquisitions described in this section are fee-simple title transfers in which UDOT owns the land under clear title. It should be noted, however, that there are other properties within the right-of-way of the build alternatives for which UDOT has a right or access, or is at an interim stage of the condemnation process. These additional properties are not described herein.

in the study area is zoned light industrial and currently supports businesses associated with auto repair, storage, and other nonretail enterprises. As described in Section 4,2, *Farmlands*, there are over 1,614 ha (3,990 ac) of irrigated and non-irrigated cropland in the study area. In addition, there are numerous horse paddocks and corral facilities in the study area, most of which are located on small parcels of between 1 ha and 3 ha (2 ac and 8 ac).

Although the types of residences, businesses, and farmsteads in the study area have not changed since publication of the Final EIS, one existing business in the study area, Pack Storage Units, has constructed an additional storage facility since publication of the Final EIS. Pack Storage Units was identified in the Final EIS as a business that would be displaced if Alternative B were implemented.

4.4.2.2 Uniform Relocation Assistance and Real Property Acquisition Act of 1970

The Uniform Relocation Assistance and Real Property Acquisition Act (URAA), as amended (42 USC 4601 et seq., as amended, 1989), requires that project applicants provide equitable and uniform treatment of all persons displaced from their homes, businesses, and farmsteads, without discrimination on any basis. The act requires that financial and technical relocation assistance be provided to residents displaced, and business and farmstead properties be purchased at fair market value. A more complete description of the requirement of the URAA is provided in Section 4.4 of the Final EIS.

4.4.3 Environmental Consequences and Mitigation Measures

The following subsections provide an update of the environmental consequences and mitigation measures associated with relocation impacts.

4.4.3.1 Residential Properties

As described in the Final EIS, all the residential properties that would be affected by the proposed build alternatives are occupied, single-family structures. There have been no changes to the number, type, or location of residential properties identified for displacement in the Final EIS. However, all four of the residential structures that fall within the Alternative D and E alignments have been acquired by UDOT since publication of the Final EIS (West pers. comm. a). Table 4.4-1 below lists the residential displacements that would occur for each of the alternatives.

The following provides a summary of the impacts on residential properties that would result from the No-Build Alternative and the build alternatives.

No-Build Alternative

Existing Conditions (2004)

No residential properties would be displaced under the existing conditions No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. These future projects could possibly displace residential properties, although the nature and timing of these projects are not known at this time.

Build Alternatives

As mentioned above, there have been no changes to the number, type, or location of residential properties that would be displaced by the proposed build alternatives since publication of the Final EIS. Table 4.4-1 provides a summary of the number of residences that would be displaced by each of the build alternatives. (The addresses of these residential properties are provided in Section 4.4.1 of the Final EIS.) The proposed narrower typical cross section would not affect the number of residential properties that would be displaced by the build alternatives because no additional residential properties would be included or excluded by this right-of-way width change (West pers. comm. b]).

Table 4.4-1 Number of Residential Displacements Associated with Build Alternatives*

Alternative	Number of Residential Displacements
No-Build Alternative	0
Alternative A	7
Alternative B	14
Alternative C	5
Alternative D	4
Alternative E	4

Note:

* Represents number of single-family residences that would be displaced in the proposed 95-m (312-ft) right-of-way. See Section 4.4.1 of the Final EIS for location information for residential structures.

Table 4.4-2 lists the residential properties that have been acquired by UDOT since publication of the Final EIS (West pers. comm. a]). Acquisition of these four properties would be necessary for construction of any proposed build alternative.

Table 4.4-2 Residential Property Acquired since Publication of Final EIS*

Residential Property Address	Associated Road Segment Triggering Acquisition
1395 W. Parrish Lane, Centerville	500 South Interchange (Woods Cross) to Parrish Lane (Centerville)
250 W. 1050 South, Farmington	Parrish Lane (Centerville) to Glovers Lane (Farmington)
562 West 100 North, Farmington	Glovers Lane (Farmington) to I-15/US-89 interchange (Farmington)
602 W. State Street, Farmington	

Note:

* Represents property acquired as of September 2003. Acquisition necessary for construction of any build alternative.

4.4.3.2 Businesses

As described in the Final EIS, several businesses in the study area would be displaced by the construction of the build alternatives. The number, type, location, and number of employees associated with business displacements is the same as presented in the Final EIS, except that Alternative B would displace one additional structure that was constructed since publication of the Final EIS. The new structure is associated with an existing business that the Final EIS indicated would be displaced. In addition, nine business properties required for constructing Alternative D have been purchased by UDOT or otherwise made available to the project applicant since publication of the Final EIS (West pers. comm. a]).

The following provides a summary of the impacts on businesses that would result from the No-Build Alternative and the build alternatives.

No-Build Alternative

Existing Conditions (2004)

No businesses would be displaced under the existing conditions No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would displace businesses in the study area, although the nature and timing of these projects are not known at this time.

Build Alternatives

Table 4.4-3 provides a summary of the number of businesses and employees that would be displaced by each build alternative. (The addresses of these businesses are provided in Section 4.4.2 of the Final EIS.) Although the number of businesses and employees displaced by the build alternatives would be the same as the number presented in the Final EIS, a new storage facility (owned by Pack Storage Units) constructed since publication of the Final EIS would also be displaced. This additional impact would not result in another business displacement because Pack Storage Units was already considered displaced in the Final EIS. However, if Alternative B were implemented, additional compensation to Pack Storage Units would be required for the new structure. The proposed narrower typical cross section would not affect the number of businesses that would need to be acquired for construction of any proposed build alternative (West pers. comm. b]).

Table 4.4-3 Number of Business Displacements Associated with Build Alternatives*

Alternative	Number of Business Displacements	Approximate Number of Employees Displaced
No-Build	0	NA
Alternative A	16	124
Alternative B	10	57
Alternative C	9	57
Alternative D	14	109
Alternative E	14	109

Note:

* Represents number of businesses that would be displaced within the proposed 95-m (312-foot) right-of-way. See Section 4.4.2 of the Final EIS for location information.

Nine business properties have been acquired since publication of the Final EIS (Table 4.4-4) (West pers. comm. a]). These properties were originally acquired to facilitate construction of Alternative D (Final EIS Preferred Alternative), but several of the properties would also be required for construction of the other build alternatives, as indicated in Table 4.4-4.

Table 4.4-4 Business Property Acquired since Publication of Final EIS[1]

Identity and Address	Road Segment Triggering Acquisition	Build Alternatives Requiring Acquisition of Property[2]				
		Alt A	Alt B	Alt C	Alt D	Alt E
B&M Concrete 1710 West 900 North North Salt Lake	I-215/2100 North interchange (North Salt Lake) to 500 South interchange (Woods Cross)		X	X	X	X
Phil's Automotive 1411 Parrish Lane Centerville	500 South interchange (Woods Cross) to Parrish Lane (Centerville)	X			X	X
Hogan and Associates 1398 Parrish Lane Centerville	Parrish Lane (Centerville) to Glovers Lane (Farmington)	X			X	X
Nielson Storage 400 West 250 South Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X
John Stathis 650 West State Street Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X
Oakridge Storage 530 West 100 North Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X
Daniels Design 530 West 100 North Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X

Identity and Address	Road Segment Triggering Acquisition	Build Alternatives Requiring Acquisition of Property[2]				
		Alt A	Alt B	Alt C	Alt D	Alt E
Peterson Storage 562 West 100 North Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X
Beck Paving 136 North 600 West Farmington	Glovers Lane (Farmington) to US-89 interchange (Farmington)	X	X	X	X	X

Notes:

[1] Information representative of property acquired as of September 2003.

[2] An "X" in a column indicates that the acquisition of this property is necessary for construction of that alternative.

4.4.3.3 Farmsteads and Horse Paddocks

As described in the Final EIS, several farmsteads and horse paddocks would be affected by the build alternatives. As indicated in the Final EIS, acquisition of farmland for highway construction is not considered a farm displacement unless the amount of farmland acquired is large enough to render the remainder of the farm nonviable. In most cases, UDOT would acquire land but leave the farmstead (farm structures and improvements) intact. Other farmland impacts, such as land acquisitions, lost crop production, and split parcels, are discussed in Section 4.2, *Farmlands*, of this document. The number and location of farmsteads and horse paddocks that would be displaced as a result of the build alternatives has not changed since publication of the Final EIS.

The following provides a summary of the impacts on farmsteads and horse paddocks that would result from the No-Build Alternative and the build alternatives.

No-Build Alternative

Existing Conditions (2004)

No farmsteads or horse paddocks would be displaced under the existing conditions No-Build Alternative.

Future Conditions (2020)

Farmland in the study area is rapidly being sold for commercial and residential development (see Section 4.2, *Farmland*, of this document). Existing farmsteads and horse paddocks may be displaced over time if future projects are undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. The location and timing of these displacements are not known at this time.

Build Alternatives

Table 4.4-5 provides a summary of the number of farmsteads and horse paddocks that would be displaced by each build alternative. (The location of these resources is provided in Section 4.4.3 of the Final EIS.) The proposed narrower typical cross section would not affect the number of horse paddocks or farmsteads that would need to be acquired for construction of any proposed build alternative (West pers. comm. b]).

Table 4.4-5 Number of Farmstead and Horse Paddock Displacements[1]

Alternative	Type of Property[2]	Number of Displacements
No-Build	NA	0
Alternative A	F	0
	H	15
Alternative B	F	2
	H	16
Alternative C	F	0
	H	8
Alternative D	F	0
	H	10
Alternative E	F	0
	H	10

Notes:

[1] Represents number of farmsteads and horse paddocks that would be displaced within the proposed 95-m (312-ft) right-of-way. See Section 4.4.3 of the Final EIS for location information.

[2] F = farmstead; H = horse paddock and/or corral

Ten horse paddock facilities have been acquired since publication of the Final EIS (Table 4.4-6) (West pers. comm. a]). These properties were originally acquired to facilitate construction of Alternative D (Final EIS Preferred Alternative), but several of the properties would also be required for construction of the other build alternatives, as indicated in Table 4.4-6.

Table 4.4-6 Horse Paddocks Acquired by Location since Publication of Final EIS[1]

Location	Number of Horse Paddocks Acquired at Location	Build Alternatives Requiring Acquisition of Property [2]				
		Alt A	Alt B	Alt C	Alt D	Alt E
Between 1200 North and Pages Lane (West Bountiful), near 1400 North	2	X	X	X	X	X
East of Bountiful Sanitary Landfill along 1100 West (West Bountiful)	2	X	X	X	X	X
At intersection of 1100 West and Porter Lane, on the north side of Porter Lane	1		X	X	X	X
On Sheep Road (1500 West, Centerville) between Commercial Coatings and Utah Power substation	1	X			X	X
On west side 1250 West (Centerville), south of Parrish Lane, between Phil's Automotive and Aspen Springs Storage	1	X			X	X
On east side of 1250 West (Centerville), north of Parrish Lane	1	X			X	X
On relocated portion of Burke (Park) Lane (Farmington)	2	X	X	X	X	X

Notes:

[1] Information representative of property acquired as of September 2003.

[2] An "X" in a column indicates that the acquisition of this property is necessary for construction of that alternative.

4.4.3.4 Summary of Displacements

Table 4.4-7 summarizes the displacement information presented above for residences, businesses, and farmsteads and horse paddocks, and updates the information presented in Table 4-8e in the Final EIS. Table 4.4-7 also provides information on the number of parcels that have been acquired to date and how those acquisitions would support construction of each of the proposed build alternatives.

Table 4.4-7 Summary of Displacements*

Type of Displacement	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Residential	7 (2)	14 (2)	5 (2)	4 (2)	4 (2)
Business	16 (8)	10 (7)	9 (7)	14 (9)	14 (9)
Farmstead	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)
Horse Paddock	15 (9)	16 (7)	8 (7)	10 (10)	10 (10)

Note:

* The number of properties acquired that would facilitate construction of the indicated build alternative is represented in parenthesis next to the number of displacements. Information representative of property acquired by UDOT as of September 2003.

4.4.3.5 Mitigation Measures

As stated in the Final EIS, assistance and re-establishment expenses would be provided to displaced property owners and lessees pursuant to eligibility and other requirements of the URAA.

Section 4.5
Economics

This section discusses economics in the study area, which is defined below. The current economic climate and temporary and permanent economic impacts that could occur in the study area as a result of implementation of any proposed build alternative are discussed herein. Four regional economic variables—employment, motorists' time savings, resource-based industries (the brine shrimp industry and federal mineral reservation income), and recreation—were assessed in the Final EIS. To update the impacts on employment that were presented in the Final EIS, revised employment estimates for Davis and Salt Lake Counties are presented below. The methodology used to estimate the value of motorists' time has been updated and applied to reassess the value of time savings under the build alternatives.

4.5.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with economics in the study area, Sections 3.5 and 4.5 of the Final EIS were reviewed to determine the changes that had taken place since publication of the Final EIS. The study area for assessing regional economic impacts in this section is the Wasatch Front, which includes all of Salt Lake, Davis, Weber, and Tooele Counties, and a portion of Morgan County. However, for the individual economic topics discussed in this section (i.e., employment, commerce, and tax base), zones of interest, referred to herein as "topical zones," were identified as appropriate in the study area. These zones are described below.

City finance directors from West Bountiful (Hall pers. comm.), Centerville (Lutz pers. comm.), Woods Cross (Uresk pers. comm. a), and Farmington (Johnson pers. comm.) were contacted to obtain current (fiscal year 2002, except fiscal year 1999 for Centerville) city operating budgets. The current operating budget for the City of North Salt Lake was obtained from the city's web site (City of North Salt Lake 2002). A copy of the *Utah Property Tax 2002 Annual Statistical Report* was obtained from the Utah State Tax Commission to determine whether the tax base had changed since publication of the Final EIS (Utah State Tax Commission 2003). Updated employment projections for census tracts in the Wasatch Front region (e.g., Davis, Morgan, Salt Lake, Tooele, and Weber Counties) were obtained from a technical report prepared by the WFRC (Wasatch Front Regional Council 2003b), and updated information on economic growth in the study area was obtained from Utah's Office of Planning and Budget (Utah Governor's Office of Planning and Budget 2002).

Information collected from these sources was used to update the impact conclusions presented in the Final EIS specific to regional and local economics, including how the proposed build alternatives would affect employment in the study area, resource-based industries in the study area, revenue generated from recreation opportunities in the study area, and time savings realized by motorists using the proposed build alternatives (e.g., the value of motorists time savings).

4.5.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to economics and individual economic topics, such as employment, commerce, and tax base. These topics are discussed to provide a foundation for assessing the economic impacts that Legacy Parkway could have in the study area, in particular the value of the travel time savings that could be realized by individuals using the proposed build alternatives.

4.5.2.1 Employment

The topical zone for analyzing local employment is based on county boundaries and the census tracts that overlay the right-of-way of the proposed build alternatives. Tables 4.5-1 and 4.5-2 update Tables 3-10a and 3-10b in the Final EIS and provide updated employment estimates for Davis and Salt Lake Counties, respectively. Table 4.5-3 updates Table 3-11 in the Final EIS and provides updated employment projections according to the census tracts that cover the rights-of-way of the proposed build alternative alignments. These estimates are based on 2002 baseline projections generated by the Utah Department of Work Force (Utah Governor's Office of Planning and Budget 2002) and the *Wasatch Front Region Small Area Socioeconomic Projections: 2002–2030*, which was prepared by WFRC in 2003 (Wasatch Front Regional Council 2003b).

Compared to the employment statistics presented in the Final EIS (Tables 3-10a and 3-10b), the updated 2020 projections for employment in Davis County show increases in the services, government, and non-farm proprietor economic sectors, and decreases in the construction, manufacturing, and trade economic sectors (Table 4.5-1). Similarly, when compared to the statistics presented in the Final EIS, the updated 2020 projections for employment in Salt Lake County show increases in the construction and services sectors, and decreases in the manufacturing, TCPU (i.e., transportation, communications, and public utilities), and trade economic sectors (Table 4.5-2). Overall, estimates of the rate of job growth for the various employment sectors have been slightly reduced since the Final EIS was published.

Notably, employment in Weber County is projected to increase at a rate of 2.4 percent per year between the years 2002 and 2020 (Wasatch Front Regional Council 2003). This is an increase over the 2 percent annual increase projected by the WFRC for Weber County in 1997 (Wasatch Front Regional Council 1997).

Table 4.5-1 Employment in Davis County (1980–2020)[1]

	Year				
Economic Sector	1980	1990	2000	2010	2020
Agriculture	2%	1%	1%	1%	1%
Mining	<1%	<1%	<1%	<1%	<1%
Construction	4%	3%	6%	4%	4%
Manufacturing	10%	10%	9%	8%	8%
TCPU[2]	3%	3%	3%	3%	3%
Trade	17%	18%	20%	19%	19%
FIRE[3]	2%	2%	3%	3%	3%
Services[4]	10%	14%	17%	20%	21%
Government	37%	28%	20%	19%	18%

	Year				
Economic Sector	1980	1990	2000	2010	2020
Non-farm Proprietors	15%	21%	22%	22%	22%

Notes:

1 Percentages shown for each sector represent percentage of total employment in the county. For each year identified in the table, employment percentages for most economic sectors vary from the percentages presented in Table 3-10a of the Final EIS.

2 TCPU = Transportation, communications, and public utilities.

3 FIRE = Finance, insurance, and real estate.

4 Includes private households and agricultural services employment.

Source: Utah Department of Work Force, Utah Governor's Office of Planning and Budget 2002.

Table 4.5-2 Employment in Salt Lake County (1980–2020)[1]

	Year				
Economic Sector	1980	1990	2000	2010	2020
Agriculture	<1%	<1%	<1%	<1%	<1%
Mining	2%	1%	<1%	<1%	<1%
Construction	5%	3%	5%	5%	5%
Manufacturing	14%	11%	9%	8%	7%
TCPU[2]	7%	6%	7%	6%	6%
Trade	22%	21%	20%	18%	18%
FIRE[3]	5%	6%	6%	6%	6%
Services[4]	17%	22%	25%	30%	31%
Government	15%	13%	12%	12%	12%
Nonfarm Proprietors	13%	16%	15%	14%	14%

Notes:

1 Percentages shown for each sector represent percentage of total employment in the county. For each year identified in the table, employment percentages for most economic sectors vary from the percentages presented in Table 3-10b of the Final EIS.

2 TCPU = Transportation, communications, and public utilities.

3 FIRE = Finance, insurance, and real estate.

4 Includes private households and agricultural services employment.

Source: Utah Department of Work Force, Utah Governor's Office of Planning and Budget 2002.

Table 4.5-3 Employment Projections (2002–2020) by Census Tracts

	Number of Jobs								Annual Growth 2002–2020			
	2002				2020							
Census Tracts*	Government	Industrial	Retail	Service & Wholesale	Government	Industrial	Retail	Service & Wholesale	Government	Industrial	Retail	Service & Wholesale
1003.03	3,820	15,228	168	7,820	4,718	18,414	255	8,908	1.18%	1.06%	2.35%	0.73%
1262.02	3,318	3	25	62	4,156	51	117	240	1.26%	17.05%	8.95%	3.59%
1262.03	13	1	19	1,181	20	2	45	1,906	2.42%	3.93%	4.91%	2.69%
1263.04	641	373	706	1,470	916	574	1,095	2,365	2.00%	2.42%	2.47%	2.68%
1270.02	1	4,134	430	1,413	51	8,076	672	2,870	24.41%	3.79%	2.51%	4.02%
1270.03	98	382	912	1,015	301	1,601	1,262	1,868	6.43%	8.29%	1.82%	3.45%
Totals	7,891	20,121	2,260	12,961	10,162	28,718	3,446	18,157	1.42%	2.00%	2.37%	1.89%

Notes:

* These census tracts encompass an area greater than the topical zone for employment. The 2000 census tract employment projections are reflected as 2002 employment projections taken from the WRFC technical report *Wasatch Front Region Small Area Socioeconomics: 2002–2030*, and present more information regarding employment in these areas than the 2000 census.

Source: Wasatch Front Regional Council 2003b.

4.5.2.2 Commerce

The topical zone for analyzing commerce comprises Salt Lake and Davis Counties. State of Utah gross annual retail sales have grown from $25.8 billion in 1996 (see Section 3.5.2 of the Final EIS) to $30 billion in 2000, which represents an approximate annual growth rate of 3.8 percent (Utah Governor's Office of Planning and Budget 2002). Salt Lake County accounted for 50 percent of the $30 billion dollar retail sales figure for 2000, which is a decrease from the county's 57.8 percent share in 1996 (Utah Governor's Office of Planning and Budget 2002). Davis County accounted for approximately 8.3 percent of the growth in the state in 2000, a slight increase from the 8.1 percent growth in 1996 that was disclosed in the Final EIS.

As stated in the Final EIS, the topical zone for commerce contributes approximately $3.2 billion to the state economy. The economic contribution of the commerce topical zone has not substantially increased since publication of the Final EIS (Utah Governor's Office of Planning and Budget 2002). In addition, although UDOT has acquired some of the businesses in the footprint of Alternative D (Final EIS Preferred Alternative), residential and commercial development has continued in areas near the proposed build alternatives, as described in Section 4.1, *Land Use*.

As described in the Final EIS, two resource-based industries (i.e., the brine shrimp industry and the mining industry associated with federal mineral reservation lands) that contribute to the regional and local economy in the commerce topical zone could be affected by implementation of the proposed build alternatives. In addition, the recreation industry, which supports recreation resources could be affected by implementation of the proposed build alternatives. The contributions of these industries to the economy in the commerce topical zone have not changed since publication of the Final EIS.

4.5.2.3 Tax Base

Property Tax Revenues

The topical zone for estimating the tax base includes all parcels located within the right-of-way of the proposed build alternatives. Table 4.5-4 updates Table 3-16a in the Final EIS and presents updated information on property taxes collected in the tax base topical zone, as well as Davis County, Salt Lake County, and the state.

Table 4.5-4 Revenues—Property Taxes (2002)

Area	Property Tax Revenues (approximate)	Proportion of State's Property Taxes
Study Area*	$2.75 million	0.3%
Davis County	$101.3 million	10.6%
Salt Lake County	$577.1 million	51%
State of Utah	$1.178 billion	–

Note:

* 2000 property tax data for parcels within the right-of-way of the proposed action build alternatives; excludes area north of Shepard Lane.

Source: Federal Highway Administration et. al. 2000, Utah Property Tax Annual Statistical Report (Utah State Tax Commission 2003).

Approximately 51 percent of the state's total assessed property value is in Salt Lake County, while less than 11 percent is in Davis County. Both of these figures represent 3 percent increases from what was disclosed in the Final EIS. This 3 percent increase is attributable to both an increase in development in the tax base topical zone (i.e., new types of property being valued and taxed) and an increase in assessed property values (i.e., attributable to market forces).

The tax base topical zone produces less than 1 percent of Utah's property tax revenues, which is comparable to what was disclosed in the Final EIS (Utah State Tax Commission 2003).

City Tax Revenues

Table 4.5-5 updates Table 3-16b in the Final EIS and presents updated information on the amount and source of general fund monies in the Cities of North Salt Lake, Woods Cross, West Bountiful, Centerville, and Farmington. These estimates are based on the current and most recent operating budgets for each of the listed jurisdictions, which are fiscal year 2002 except for Centerville, which is fiscal year 1999.[1] As described in the Final EIS, property tax revenue is the second largest single source of revenue, behind sales tax, for most of these cities. Overall, municipal tax revenues have substantially increased since publication of the Final EIS.

Table 4.5-5 City Revenue Projections[1]

Source	North Salt Lake	Woods Cross	West Bountiful	Centerville	Farmington
Total Sales Tax	$1,655,600	$1,772,765	$735,300	$2,054,207	$1,179,770
Total Property Tax	$1,061,230	$328,961	$309,262	$844,479	$912,067
Other Major Sources[2]	$2,156,100	$840,644	$677,271	$1,568,850	$2,050,733
All Other Sources	$454,355	$165,829	$318,197	$551,634	$267,453
Total Revenue (2002)	$5,327,285	$3,108,199	$2,040,035	NA	$4,410,023
Total Revenue (1999) (Final EIS)	$3,861,375	$2,195,960	$1,598,000	$5,019,170	$3,311,705
Change, 1999–2002	36%	40%	25%	NA	33%

Notes:

1 Reported revenues are for fiscal years ending June 30, 2002. City of Centerville reported revenues are for fiscal year ending June 30, 1999.

2 Revenue from other major sources includes such items as fines, forfeitures, building permits, sale of fixed assets, franchise taxes, licenses and permits.

Sources: Operating budgets for fiscal year 2002 for North Salt Lake, Woods Cross, West Bountiful, and Farmington; operating budget for fiscal year 1999 for Centerville.

4.5.3 Environmental Consequences and Mitigation Measures

This section describes regional and local economic impacts that could occur from implementation of Legacy Parkway. In addition, this section describes how induced growth north of the study area could

[1] An operating budget later than fiscal year 1999 could not be obtained from the City of Centerville.

affect regional economics.[2] A summary of local community concerns and preferences relative to economics and the No-Build (existing and future conditions) and build alternatives is presented in this section, although the general substance of input received from local communities in the study area regarding economics has not changed since publication of the Final EIS.

4.5.3.1 Regional Economic Impacts

As stated above, the study area for the regional economic impact analysis is the Wasatch Front, which includes all of Salt Lake, Davis, Weber, and Tooele Counties, and a portion of Morgan County. Both temporary and permanent regional economic impacts were considered. Temporary (short-term) impacts are those associated with construction expenditures, including increases in travel time associated with construction, and the indirect economic impacts (i.e., impacts on resource-based industries) they generate. Permanent regional impacts are long-term and are associated with continued operation and maintenance activities and shortened travel times.

Temporary and permanent impacts were evaluated in the Final EIS according to four regional economic variables: construction employment, value of motorists' time savings, impacts on resource-based industries (e.g., the brine shrimp and mining industries), and impacts on the recreation industry. As summarized in Table 4-9 in the Final EIS, which is not reproduced herein because there has been no change in the data, impacts on construction employment would be the same as those described in the Final EIS because underlying construction technologies have not changed since publication of the Final EIS. Similarly, as disclosed in the Final EIS, there would be no impacts on either the brine shrimp industry or the recreation resource industry under any proposed build alternative. Impacts on federal mineral reservations would also be the same as those listed in Table 4-9 in the Final EIS, except that Alternative E would preclude royalties on about 32 ha (80 ac) of federal mineral reservation lands, which is 1 ha (3 ac) less than the impact associated with Alternative D.

As a result, the regional economic impact discussion presented in this section focuses on updated information relative to the value of motorists' time.

Value of Motorists' Time Savings

No-Build Alternative

Existing Conditions (2004)

As described in the Final EIS, motorists would continue to experience increased levels of congestion and time delays on existing roadways in the study area under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. These future projects could result in regional economic impacts similar to those described for the build alternatives.

[2] Growth impacts south of the study area (e.g., in Davis County) were not evaluated in this section because much of the land use south of the study area is currently developed or planned for development. As a result, it was assumed that areas south of the study area would experience full build-out, with or without construction of the proposed action. See Section 4.1, *Land Use*, for a complete discussion of impacts within and beyond the North Corridor.

Build Alternatives

All the proposed build alternatives would result in a net decrease in traffic congestion in the study area. The value of this benefit was estimated in the Final EIS to be $28.7 million, based on post-construction traffic conditions and an average value of motorists' time estimated to be $9.50 per hour. (See Section 4.5.1 and Table 4-9 in the Final EIS.) Since publication of the Final EIS, there have been considerable advances in the theory and practice of estimating the value of motorists' travel time. As a result, a revised estimate of the average value of motorists' time was developed for the Supplemental EIS analysis, as described in Appendix A of the *Economic Technical Report* (HDR Engineering, Inc. 2004d). The revised estimate used in this document accounts for the different values associated with personal, business and truck travel. The revised estimate is $18.65 per hour, a $9.15 increase over the value presented in the Final EIS.

Based on this revision, the annual value of time savings associated with the proposed build alternatives would range from $56.4 million to $60.4 million, an increase of between $27.7 million and $31.7 million over the savings figures presented in the Final EIS (i.e., $28.7 million). The $56.4 million estimate only accounts for the increased dollar per hour estimate described above, while the $60.4 million estimate also takes into account recent traffic modeling estimates using the revised WFRC travel demand model (version 3.2).

In response to the appellate court remand, the federal lead agencies evaluated four different sequencing scenarios that incorporated the three major components of the Shared Solution: mass transit, I-15 improvements, and Legacy Parkway. This analysis is documented in the *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution* (HDR Engineering, Inc. 2004c) and is summarized in Section 2.4, *Sequencing*, of this document. The analysis assesses these sequencing scenarios according to a number of variables, one of which is cost to the traveling public. A complete discussion of the value of motorists' time savings with respect to the different sequencing scenarios can be found in either the technical memorandum or Section 2.4 of this document.

4.5.3.2 Local Economic and Community Impacts

As described in the Final EIS, construction of any proposed build alternative could affect the economic base of communities in the study area. Such impacts would be associated with displacement of homes, farms, and businesses; changes in vehicular access; severance of land parcels; and division of communities, which the communities view as a permanent impact. Because all these factors contribute to the social make up of the communities in the study area, they are collectively discussed in Section 4.3.3.1, *Community Cohesion*, of this document.

Section 4.6

Joint Development

This section discusses proposed recreation and public works projects that may be developed jointly with the proposed action but by other project proponents. *Joint development* is a term used by FHWA. In this context, the term encompasses opportunities and potential impacts that are also addressed elsewhere in this Supplemental EIS (i.e., pedestrian and bicycle opportunities). The following joint development opportunities are considered in the Final EIS and in this section.

- Joint use of the right-of-way for the proposed action, including future pipelines or other public works infrastructure.
- Public and private education centers and rest areas in the study area.
- Trail systems.

This section provides an update on land associated with joint development opportunities that has been acquired to date; an update on the status of the wetlands ecosystem education plan published by the UDNR Division of Wildlife Resources and the Utah Reclamation Mitigation Conservation Commission (URMCC); and a summary of UDOT's *Statewide Pedestrian and Bicycle Plan*, which was released in 2001 (Utah Department of Transportation 2001b). Various local jurisdictions have provided input since publication of the Final EIS on how a regional recreation and transportation corridor could or should be developed in conjunction with the proposed Legacy Parkway project. That input is summarized below in Section 4.6.3, *Environmental Consequences and Mitigation Measures*.

4.6.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with joint development opportunities in the study area, Sections 3.6 and 4.6 of the Final EIS were reviewed to determine whether any changes had taken place since publication of the Final EIS. The study area for joint development opportunities is described in Section 4.0.1, *Study Area*, of this document.

Documents reviewed for this analysis included the *Kaysville City General Plan, as Amended* (City of Kaysville 2002), the *Woods Cross City General Plan* (City of Woods Cross 2003), the *Davis County Shorelands Comprehensive Land Use Master Plan* (Davis County Council of Governments, no date), and the *Envision Utah Quality Growth Strategy and Technical Review* (Envision Utah 2000).

A series of meetings was held with representatives from each of the jurisdictions in the study area—North Salt Lake City, Woods Cross, West Bountiful, Centerville, Farmington, and Davis County—to discuss topics pertaining to the Supplemental EIS, including joint development opportunities, and to review trail

master plans that have been updated or revised since the Final EIS was published. These meetings were held in July and September 2003. Table 4.1-1 in Section 4.1, *Land Use*, provides information on the dates and attendees of these meetings. Minutes from these meetings were reviewed for this analysis (HDR Engineering, Inc. 2003a–k).

4.6.2 Affected Environment

The following provides a summary of information on the affected environment that has been updated since publication of the Final EIS.

4.6.2.1 Jordan Valley County Water Conservancy District

As indicated in the Final EIS, the Jordan Valley Water Conservancy District (JVWCD) and the Weber Basin Water Conservancy District (WBWCD) are pursuing the development of a water treatment plant in Weber County, Utah. The proposed water treatment plant would include a 64-km (40-mi) treated-water pipeline that would extend parallel to and west of I-15 from the plant in West Haven through Clinton, Layton, Centerville, and Woods Cross, to about 3800 West 2100 South in Salt Lake City, where it would connect to the Jordan Aqueduct Reach. The water treatment plant and treated-water pipeline are sometimes called the "Bear River Pipeline" because of their association with the Bear River. Since publication of the Final EIS, property has been purchased for a water tank in West Haven, and approximately half of the property needed for the pipeline right-of-way in Salt Lake, Davis, and Weber Counties has been acquired (Hess pers. comm.).

The Bear River Pipeline project traverses the study area. Both water conservancy districts have expressed interest in possibly using the same right-of-way as Legacy Parkway, but no formal application has been submitted to UDOT to date (Hogg pers. comm.). The project is scheduled to be completed in 15 to 20 years.

Both the proposed water treatment plant and treated-water pipeline were included in the Bear River Development Act, which was passed in 1991 to direct the development of the Bear River and its tributaries. The scope of the act also covers proposals for building dams and expanding reservoirs in and along the Bear River and its tributaries. Any proposals under the Bear River Development Act, including construction and operation of the water treatment plant and/or treated-water pipeline, would be subject to appropriate environmental review. Because there has been no application or request made to UDOT on behalf of the water conservancy districts to use any part of the proposed Legacy Parkway right-of-way for this project, the project is not included in this Supplemental EIS.

4.6.2.2 Trail System Development

As in the Final EIS, joint development opportunities relating to pedestrian/bicycle trail systems in the study area are covered in Section 4.7, *Pedestrian and Bicyclist Considerations.*

4.6.2.3 Environmental Interpretation

The wetland ecosystem education plan developed by the Utah State University Wetlands Education Team, *Beyond Kids and Signs: A Comprehensive Wetlands Education Master Plan for the Greater Great Salt Lake Ecosystem*, was published by the UDNR Division of Wildlife Resources and URMCC in April 2000 (UDNR Division of Wildlife Resources and Utah Reclamation Mitigation Conservation

Commission 2000). This plan was in development when the Final EIS was being written and was described as a draft document therein. The plan could provide opportunities for incorporating wetland ecosystem interpretation facilities, such as information and educational signs, along the proposed Legacy Parkway Trail under all the proposed build alternatives. The proposed Legacy Parkway Trail neither passes through not abuts the Legacy Nature Preserve. No environmental interpretation facilities that encourage extended human use would be constructed in the Legacy Nature Preserve within 1.6 km (1 mi) of bald eagle nest and roost sites in the study area (see Section 4.15, *Threatened and Endangered Species*), in accordance with the CWA Section 404 permit and the biological opinion issued for Alternative D (Final EIS Preferred Alternative).

4.6.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, the construction of public works infrastructure in the project right-of-way, the development of trail systems in conjunction with the proposed Legacy Parkway Trail, and the construction of various education and recreation centers along the trail alignment are the only joint development opportunities available in the study area at this time. The environmental consequences and mitigation measures associated with these joint development opportunities are the same as those presented in the Final EIS. However, supplemental information was received from several local communities in June 2003 on how trail, education, and/or recreation facilities could be incorporated into the proposed trail alignment in their communities. The following provides a summary of the input received from each local jurisdiction since publication of the Final EIS relative to the No-Build Alternative and the build alternatives.

4.6.3.1 No-Build Alternative

Existing Conditions (2004)

As stated in the Final EIS, there would be no opportunity for joint development opportunities under the existing conditions (2004) No-Build Alternative because there would not be a project in place to facilitate the organized development of facilities such as pedestrian, equestrian, and/or bicycle trails.

Future Conditions (2020)

Similarly, under the future conditions (2020) No-Build Alternative, none of the build alternatives would be implemented, so there would be no joint development opportunities available to pursue.

4.6.3.2 Build Alternatives

As described in the Final EIS, the multi-use Legacy Parkway Trail is proposed in conjunction with all the proposed build alternatives. The trail, as shown in Figure 4.6-1, connects to the Jordan River Parkway Trail in the south and consists of a 2.4-m (8-ft) paved portion for pedestrians and bicycles and a 1.8-m (6-ft) unpaved portion for equestrians. The Legacy Parkway Trail would connect with the Farmington Creek Trail, and would allow connection with other pedestrian and bicycle facilities that may be developed in the future.[1] Construction of the trail would be consistent with UDOT's *Long Range Transportation Plan*

[1] The locations of the trails in Figure 4.6-1 are based on input received from community planners and derived from local land use plans. Many of these plans were completed prior to the purchase of lands associated with the proposed

(Utah Department of Transportation 2003b), as well as UDOT's *Statewide Pedestrian and Bicycle Plan* (Utah Department of Transportation 2001b).

West Bountiful

The Final EIS described potential trail access to the Farmington Bay Waterfowl Management Area via a nonmotorized overpass at Pages Lane in West Bountiful. This nonmotorized access has since been reviewed by the city and was removed from the design plans because of feasibility and cost concerns (HDR Engineering, Inc. 2003b). In addition, the City of West Bountiful has included in their general plan a "rails-to-trails" plan for potential trail development within the D&RG right-of-way (HDR Engineering, Inc. 2003b).

Farmington

As mentioned above, the proposed Legacy Parkway Trail would tie into the Farmington trail system through the Farmington Creek Trail. Representatives from the City of Farmington have stated that the location of the Legacy Parkway Trail under any proposed build alternative would serve the following areas and facilities (HDR Engineering, Inc. 2003c).

- A new high school that will be located just north of Glovers Lane and directly west of the Legacy Parkway Alternative E alignment and I-15.
- Developing residential areas north of Glovers Lane between 650 West and the Legacy Parkway Alternative E alignment.
- The Davis County Fairgrounds.
- A new park located east of the fairgrounds and south of State Street.

In addition, the Legacy Parkway Trail would provide Farmington maintenance crews access to sewer manholes that parallel the trail, and could provide access to portions of the D&RG railroad tracks in Farmington that are informally used for recreation (see Section 4.7, *Pedestrian & Bicyclist Considerations*).

Centerville

The City of Centerville's master plan has been updated since publication of the Final EIS but has not yet been released to the public. The master plan now includes the Legacy Parkway Trail as a recreational resource, along with several planned trail access points and parking areas, including portions of the D&RG currently used informally used for recreation (HDR Engineering, Inc. 2003d).

North Salt Lake

The Foxboro development is currently being constructed in North Salt Lake west of Redwood Road between Center Street and 900 North. The development was platted in 2003. It will be a mixed-use development with homes, parks, a planned elementary school, a church, and commercial zoning along Redwood Road. About 240 low- to moderate-income housing units are planned, including 12 Housing

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Legacy Nature Preserve. If constructed, trails within the Legacy Nature Preserve would likely have to be relocated to meet the conditions of the Clean Water Act Section 404 permit.

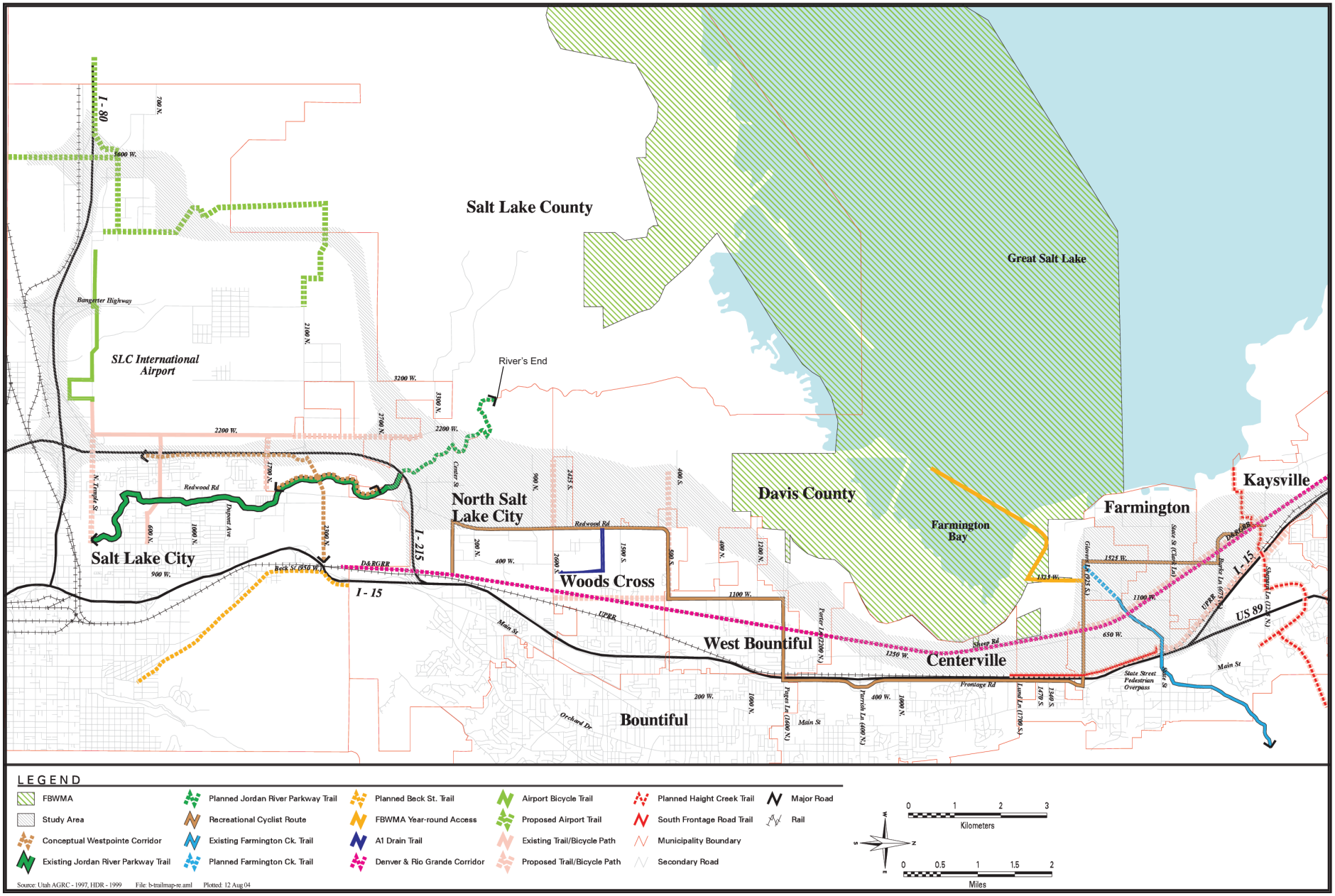

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Figure 4.6-1
Joint Development Opportunities
with Proposed Legacy Parkway Trails and Other Trails

and Urban Development- (HUD-) supported transitional housing units. The development also includes trails that would tie into the proposed Legacy Parkway Trail (HDR Engineering, Inc. 2003e).

Davis County

UTA has submitted a proposal for construction of a recreational trail along the D&RG rail line in Davis County. The trail would be a joint development project with UTA, UDOT, and local jurisdictions and would connect with the proposed Legacy Parkway Trail under all build alternatives.

Section 4.7

Pedestrian and Bicyclist Considerations

This section presents an update on the existing and proposed pedestrian and bicyclist facilities in the study area and the use and accessibility of several trail systems and bicycle paths in the study area. The section also presents an update on the impacts the alternatives would have on pedestrian and bicyclist facilities.

4.7.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with pedestrian and bicyclist considerations in the study area, Sections 3.7 and 4.7 of the Final EIS were reviewed to determine the changes that had taken place since publication of the Final EIS. The study area for pedestrian and bicyclist considerations is described in Section 4.0.1, *Study Area*, of this document.

A series of meetings was held with representatives from each of the jurisdictions in the study area—North Salt Lake City, Woods Cross, West Bountiful, Centerville, Farmington, and Davis County—to discuss topics pertaining to the Supplemental EIS, including pedestrian and bicyclist considerations, and to review trail master plans that have been updated or revised since the Final EIS was published. These meeting were held in July and September 2003. Table 4.1-1 in Section 4.1, *Land Use*, provides information on the dates and attendees of these meetings. Minutes from these meetings were reviewed to identify potential impacts on pedestrian and bicyclist resources for this Supplemental EIS (HDR Engineering, Inc. 2003a–k).

4.7.2 Affected Environment

Below is a summary of information on the affected environment related to pedestrian and bicyclist considerations that has been updated since publication of the Final EIS.

4.7.2.1 Existing Facilities

As disclosed in the Final EIS, several pedestrian and bicycle trails are currently located in or pass through the study area. Others were being constructed in or through the study area at the time of publication of the Final EIS. Since publication of the Final EIS, one of these trails has been closed because of security issues, and several others are still under construction. The following subsections summarize the current status of these facilities in the study area. Figure 4.6-1 in Section 4.6, *Joint Development*, of this document illustrates the current trail locations.

Airport Bicycle Path

As described in the Final EIS, the Airport Bicycle Path begins west of I-215 and continues west for 5.1 km (3.2 mi) to the International Center west of the airport. During summer 2001, the Salt Lake City Airport Authority closed to public access portions of 4000 West and 4200 West within the boundaries of Salt Lake City International Airport because of security concerns. This closure eliminated a large portion of this popular path, leaving only the portion west of I-215 open to the public (Boes pers. comm.).

Jordan River Parkway

As described in the Final EIS, the Jordan River Parkway Trail is a paved, multi-use pathway intended for walkers, joggers, bicyclists, and inline skaters. It is currently developed through Salt Lake City and County to just south of the Davis County line. When completed, the trail will extend northwest along the Jordan River to a location called "Rivers End" (Figure 4.6-1), which is located at the confluence of the Jordan River a drainage canal, along the western boundary of North Salt Lake (Burton pers. comm.).

Portions of the trail have already been built (i.e., paved), and Salt Lake City has been active in planning the design and construction phases for the unfinished sections. As identified in the 2002 Salt Lake City *Bicycle and Pedestrian Master Plan* (Salt Lake City Corporation 2002), the following sections of the trail have yet to be completed.

- 2100 South to 1700 South.
- California to Modesto.
- Brooklyn to 900 South.
- I-80 to North Temple.
- Northern segment (1000 North to north city limit).

The trail will ultimately end at the Farmington Bay Waterfowl Management Area (FBWMA) (see Figure 4.6-1).

South Frontage Road Trail

The South Frontage Road Trail is a popular jogging and walking path along the frontage road east of I-15 between Glovers Lane to the south and Clark Lane to the north. The lagoon portion of the Farmington Creek Trail is accessible from the northern terminus of this 3.7-km (2.3-mi) trail via a sidewalk that runs on the east side of the frontage road to Clark Lane (Main Street).

Bicycle Touring

As described in the Final EIS, many rural roads in western Davis County are used by bicyclists, including cyclists participating in the weekly recreational rides hosted by the Bonneville Bike Touring Club. The American Investment Bank Century Ride still uses several sections of Davis County Roads in Farmington.

Davis County Trails

As described in the Final EIS, the major current pedestrian and bicycle facility in the study area is the Farmington Creek Trail. The trail runs from the eastern bench of the Wasatch Front through Farmington to the intersection of 1525 West and Glovers Lane (Farmington). The southern extension of the Farmington Creek Trail provides direct access to the FBWMA near 1325 West in Farmington, which in turn provides a network of dirt roads and dikes that serves as trails for birders, pedestrians, and bicyclists.

The Farmington Creek Trail is the major east-west trail in the area, providing pedestrian and bicyclist access over I-15 and the UPRR via the State Street Pedestrian Bridge. The developed portion of the trail currently ends at 1100 West. The Final EIS stated that the trail was expected to be completed by 2001; however, according to a City of Farmington master trails map dated November 2003, the portions of the trail in the Farmington Canyon area and in the southwest section of the City of Farmington near Glovers Lane are not yet complete. There is no estimated date for completion.

Woods Cross Trails

Since publication of the Final EIS, the City of Woods Cross has completed the A-1 Drain Trail, which was described in Section 4.7.2 of the Final EIS. The A-1 Drain Trail provides pedestrian and bicycle access from neighboring subdivisions in Woods Cross to Woods Cross Community Park (Uresk pers. comm.).

4.7.2.2 Proposed Facilities

Several pedestrian and bicycle trails are also proposed to be located in part or in full in the study area. The following subsections provide an update on the status of proposed facilities discussed in the Final EIS, as well as a description of new facilities that have been proposed since publication of the Final EIS. Figure 4.6-1 in Section 4.6, *Joint Development*, illustrates the proposed trail locations.

Airport Trail

The Salt Lake City Airport Authority, with support from the Salt Lake Planning Commission and City Council, has agreed to allow the city to construct a shared-use trail around the west side of the airport to mitigate the loss of the bicycle path within the airport boundaries (see *Airport Bicycle Path* above). The new route would be a 3-m (10-ft) wide shared-use path that would connect 2200 North with the existing shared-use bicycle path on the south end of the airport. It is expected that this new route will be popular with bicyclists and hikers because it will pass through large wetlands near or in proximity to the shores of Great Salt Lake (Boes pers. comm.). The estimated date of completion of the airport trail has not been determined.

Salt Lake City Open Space Plan

As described in the Final EIS, Salt Lake City has developed an open space plan with a policy to “connect the neighborhoods…by developing a pedestrian/bicycle urban trail system which transcends these barriers.” Two trail systems, one in Westpointe and another along Beck Street, are proposed in the open space plan. The description of these proposed trail systems has not changed since publication of the Final EIS (Wheelwright pers. comm.).

D&RG Recreational Trail

In early 2003, UTA applied to WFRC for $500,000.00 in Congestion Mitigation/Air Quality (CMAQ) funds to assist in converting the D&RG railroad corridor into a pedestrian/bicycle corridor from West Bountiful to the Roy area, Davis to Weber Counties. The trail would be a joint development project with UTA, UDOT, interest groups, and the communities, and would be constructed to tie into the proposed Legacy Parkway Trail under all the build alternatives. As of late 2004, WFRC has not received any CMAQ funds, so this UTA proposal has not yet been funded through CMAQ.

North Salt Lake

The Foxboro residential development located west of Redwood Road between Center and 900 North in North Salt Lake would include a trail system that would tie into the proposed Legacy Parkway Trail (HDR Engineering, Inc. 2003e, Wood pers. comm.).

Woods Cross

The *Woods Cross City General Plan* discusses the proposed Legacy Parkway Trail and provides access to it at approximately 2425 South (HDR Engineering, Inc. 2003a, City of Woods Cross 2003). The general plan also calls for a proposed residential development along the western edge of the city, with the Alternative E alignment acting as the western boundary. This development would include trails and open space connected to the proposed action trail system. The city also plans to connect the A-1 Drain Trail with the Legacy Parkway Trail (Uresk pers. comm. b).

West Bountiful

West Bountiful is proposing to construct six access trails to integrate the city's existing trail system with the proposed Legacy Parkway Trail (HDR Engineering, Inc. 2003b). The Legacy Parkway Trail would be the backbone of these access trails and would represent approximately 30 percent of the trail system's surface area (Flanders pers. comm.).

Centerville

The proposed Legacy Parkway Trail is part of Centerville's trail master plan, which is part of the city's general plan (City of Centerville 1996). Centerville is currently developing plans for several trail access paths and parking facilities based on the proposed location of the trail alignment (HDR Engineering, Inc. 2003d).

Farmington

The City of Farmington's *Farmington Master Trail Map* (City of Farmington 2003) reflects the proposed Legacy Parkway Trail (HDR Engineering, Inc. 2003c). Within the Farmington City limits, this trail alignment would run alongside the UPRR to the Shepard Lane overpass, where it would connect to the Haight Creek Trail, another proposed trail. The proposed Legacy Parkway Trail would also give students at a proposed high school at 925 S. Glovers Lane access to other trails in Farmington (Toronto pers. comm.).

4.7.3 Environmental Consequences and Mitigation Measures

Both the No-Build Alternative, under existing (2004) and future (2020) conditions, and the build alternatives could affect existing and proposed pedestrian and bicyclist facilities in the study area. The environmental consequences and mitigation measures associated with these alternatives are described below and summarized in Table 4.7-1.

4.7.3.1 Existing Facilities

No-Build Alternative

Existing (2004)

As described in the Final EIS, under the No-Build Alternative, all the existing pedestrian and bicycle facilities in the study area would receive increased use as the population grows. Currently, pedestrians and bicyclists regularly use two arterial streets in the study area, 1100 West and 800 West in the communities of West Bountiful and Woods Cross, despite heavy car and truck traffic during rush hour. An increase in pedestrian and bicycle use under the No-Build Alternative, combined with a likely increase in car and truck traffic in these areas under the No-Build Alternative, would make these routes less desirable for walking and bicycling.

In addition, connectivity benefits between existing pedestrian and bicycle facilities in the study area that would be offered by the proposed Legacy Parkway Trail would not be realized under the No-Build Alternative because the trail would not be constructed.

Future (2020) Conditions

If none of the build alternatives is implemented, future projects may be undertaken to improve access to lands in the study area, although the nature and timing of such projects are not known at this time. These projects could result in impacts on existing pedestrian and bicycle facilities.

Build Alternatives

All the proposed build alternatives would affect both the State Street pedestrian overpass and the Farmington Creek Trail. The State Street pedestrian overpass would be demolished and replaced with a single, combined vehicle/pedestrian overpass designed to be long enough to span the I-15, UPRR, commuter rail, and proposed action alignments.

The Final EIS stated that, under all the build alternatives, an overpass would be constructed at Pages Lane to provide pedestrian, equestrian, and bicycle access to the FBWMA. Since publication of the Final EIS, the City of West Bountiful has decided not to construct this access because of feasibility and cost concerns (HDR Engineering, Inc. 2003j). This eliminates a direct access point to both the FBWMA and Bountiful City Pond. Motorized vehicles would access the FBWMA by taking the 500 South exit off Legacy Parkway and the corresponding frontage road. Similarly, motorized vehicles would access Bountiful City Pond by taking the 500 South exit and the frontage road along the west side of the proposed Legacy Parkway. Non-motorized access would be provided to both FBWMA and Bountiful City Pond by the frontage roads that run along the west side of the proposed alignments. Access to the frontage roads would be provided at 500 South. The proposed build alternatives would have no impact on

the Airport Bicycle Path, the Airport Trail, the Jordan River Parkway Trail, or any other trails in Davis County.

Table 4.7-1 Impacts on Existing Pedestrian and Bicyclist Facilities

Affected Facility	No-Build Alternative (Existing Conditions 2004)	Alternative A	Alternative B	Alternative C	Alternative D (Final EIS Preferred Alternative)	Alternative E
1100 West and 800 West Streets	Traffic conflicts with pedestrians and bicycles would increase.	Traffic conflicts with pedestrians and bicycles would decrease	Traffic conflicts with pedestrians and bicycles would decrease	Traffic conflicts with pedestrians and bicycles would decrease	Traffic conflicts with pedestrians and bicycles would decrease	Traffic conflicts with pedestrians and bicycles would decrease
State Street Pedestrian Bridge	No impact	New vehicle/ pedestrian overpass would be constructed	New vehicle/ pedestrian overpass would be constructed	New vehicle/ pedestrian overpass would be constructed	New vehicle/ pedestrian overpass would be constructed	New vehicle/ pedestrian overpass would be constructed
Farmington Creek Trail	No impact	No impact	No impact	No impact	No impact	No impact
Pages Lane	No impact	No impact; access would be provided to FBWMA & Bountiful City Pond via 500 South and frontage road	No impact; access would be provided to FBWMA & Bountiful City Pond via 500 South and frontage road	No impact; access would be provided to FBWMA & Bountiful City Pond via 500 South and frontage road	No impact; access would be provided to FBWMA & Bountiful City Pond via 500 South and frontage road	No impact; access would be provided to FBWMA & Bountiful City Pond via 500 South and frontage road
Proposed trail system in Foxboro development	Would not be constructed	No impact	No impact	No impact	No impact	No impact
Proposed residential trail system in Woods Cross	Would not be constructed	No impact	No impact	No impact	No impact	No impact
Proposed trail system in West Bountiful	30% of planned trail system would be eliminated	No impact	No impact	No impact	No impact	No impact
Proposed trail systems in Farmington	Connectivity would be reduced	No impact	No impact	No impact	No impact	No impact

4.7.3.2 Proposed Facilities

No-Build Alternative

Existing Conditions (2004)

As described in the Final EIS, many future land use plans for local jurisdictions in the study area were formulated based on the assumption that the proposed Legacy Parkway Trail would be implemented. Under the existing conditions (2004) No-Build Alternative, the following pedestrian/bicycle facilities would not be completed as planned.

- The Foxboro trail system in North Salt Lake would not be built (Wood pers. comm. c).
- Trail access and general accessibility for the proposed residential development along the western edge of the City of Woods Cross would be eliminated.
- Approximately 30 percent of the planned trail system in the City of West Bountiful would not be constructed (i.e., 30 percent of the trail system in the city is associated with the proposed trail alignment of the build alternatives) (Flanders pers. comm.), including the six access trails designed to intersect with the proposed Legacy Parkway Trail system.
- The connectivity of trails in the City of Farmington would be reduced because the Legacy Parkway Trail would not connect to the Shepard Lane overpass and the proposed Haight Creek Trail. In addition, the existing South Frontage Road Trail, rather than the proposed Legacy Parkway Trail, would provide trail access to students at the proposed high school on Glovers Lane (Toronto pers. comm.).

In general, the No-Build Alternative would be inconsistent with existing land use and circulation plans and would require revision of general and comprehensive land use and circulation plans for many of the local jurisdictions in the study area. As discussed in Section 4.1.3.3, *Impacts on Growth within and Beyond the North Corridor*, approximately 324 ha (800 ac) of developable land in the Legacy Parkway right-of-way and proposed Legacy Nature Preserve would become available for development under the No-Build Alternative. Local jurisdictions would need to update their official planning policies and plans for the area, including master plans for vehicular circulation, pedestrians, and bicycles.

Future Conditions (2020)

If none of the build alternatives is implemented, future projects could be undertaken to improve access to lands in the study area. New traffic circulation projects could result in impacts on proposed pedestrian and bicycle facilities, if the planned trails are implemented, although the nature and timing of such projects are not known at this time.

Build Alternatives

Given the information in the current land use plans, all the proposed facilities described in Section 4.7.1.1 of this document would be constructed if any proposed build alternative is implemented. However, the specific location of these facilities would likely have to be adjusted to accommodate the different trail configurations of the build alternatives. In addition, under all the proposed build alternatives, the proposed Legacy Parkway Trail would be developed jointly to tie into the proposed D&RG Recreational Trail.

Section 4.8
Air Quality

This section discusses air quality in the study area. Specifically, it includes the following updated and supplemental air quality data and information and analyses.

- Updated information on pollutants of concern specific to transportation-related projects.
- Supplemental information on urban air toxics, which were not discussed in the Final EIS.
- Supplemental information on particulate matter with a diameter of 2.5 microns or less (PM2.5), which was not discussed in the Final EIS.
- Updated mesoscale air quality modeling and analyses, based on an updated conformity analysis completed by the WFRC.
- Microscale analyses of the proposed Legacy Parkway/500 South interchange, including measurements of carbon monoxide concentrations at sensitive receptors on Legacy Parkway mainline,[1] and adjacent Legacy Parkway Trail, for carbon monoxide and particulate matter, which were not discussed in the Final EIS.

4.8.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with air quality in the study area, Sections 3.8 and 4.8 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. Because of the regional nature of air quality, the study area for this section includes all of Salt Lake and Davis Counties and relevant portions of Weber County.

The FHWA publication *Guidance for Preparing and Processing Environmental and 4(f) Documents* (Federal Highway Administration 1987a) identifies the requirements for evaluating potential air quality impacts associated with transportation projects and provides guidance on completing mesoscale and microscale air quality evaluations. As described in the Final EIS, mesoscale evaluations are related to regional air quality impacts and are typically conducted by the local metropolitan planning organization (MPO). For the proposed Legacy Parkway, the MPO responsible for completing the mesoscale evaluation is WFRC. WFRC recently completed a mesoscale evaluation and addressed regional air quality issues in the *Conformity Analysis for the Updated 2030 Long-Range Plan for the Wasatch Front Region* (Wasatch Front Regional Council 2003c). The proposed Legacy Parkway is included in this most recent mesoscale

[1] The Legacy Parkway *mainline* refers to the four travel lanes associated with the proposed highway, excluding the on- and off-ramps.

evaluation. The 2003 conformity analysis was therefore reviewed to update the mesoscale evaluation presented in the Final EIS.

Microscale evaluations are related to localized air quality impacts, primarily at the roadway or intersection level. Although not completed for the Final EIS, a microscale "hot-spot" analysis was conducted for the Supplemental EIS at the proposed Legacy Parkway/500 South interchange. The CAL3QHC line source dispersion model (version 2.0), which is the air quality dispersion model recommended by EPA, UDOT, and WFRC for roadway projects, was used to complete the microscale analysis. This model was used to calculate peak 1-hour carbon monoxide (CO) concentrations near the proposed Legacy Parkway/500 South interchange, the Legacy Parkway mainline, and the adjacent trail. A more detailed description of the methods and assumptions employed to complete the microscale analysis is provided in the following subsections.

Both the mesoscale and microscale air quality evaluations were used to determine whether Legacy Parkway would conform to the appropriate mobile-source pollutant budgets in approved state implementation plans, as described below in Section 4.8.3.

4.8.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to air quality. The section includes discussions of pollutants of concern for transportation-related projects, the National Ambient Air Quality Standards (NAAQS), and the air quality attainment status of the study area.

4.8.2.1 Pollutants of Concern

The Final EIS described five major air pollutants of concern that have the potential to cause health problems and that are typically associated with transportation-related projects: carbon monoxide (CO), particulate matter (PM), ozone (O_3), nitrogen oxides (NO_x), and volatile organic compounds (VOC). The Supplemental EIS also considers lead (Pb) as a potential air pollutant of concern because of its potential to be released from the soil during construction activities. The specific concerns associated with these pollutants and their typical sources of emission are described below. The only change in this information since publication of the Final EIS is that lead has been included in the evaluation.

- CO is emitted by combustion processes such as vehicle engines. In high concentrations, CO can reduce the amount of oxygen in the bloodstream.
- PM is regulated under one of two categories: PM with a diameter of 10 microns or less (PM10) and PM with a diameter of 2.5 microns or less (PM2.5). There are two categories of particulate emissions from mobile sources: primary and secondary.
  - Primary particulate emissions are those emitted from vehicle tailpipes, brake wear, decomposition of rubber tires, and road dust stirred up by moving vehicles.
  - Secondary particulate emissions result from chemical reactions in the atmosphere and include oxides of sulfur (SO_x) and NO_x that are emitted from vehicle tailpipes as gaseous pollutants.
  - PM has been linked to a number of health problems, including aggravated asthma, chronic bronchitis, and decreased lung function.

- O_3 is a secondary pollutant formed when precursor emissions of NO_x and VOCs react in the presence of sunlight. O_3 is a major component of photochemical smog. O_3 pollution is a regional problem during warm, sunny summer months. The photochemical reactions take several hours to complete, so that the highest O_3 concentrations typically occur far downwind of the original emission sources.

- NO_x is composed mainly of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is formed in high-temperature combustion processes such as internal combustion engines. When NO reaches the atmosphere, most of it oxidizes and produces NO_2, the brownish component of photochemical smog.

- VOCs, the reactive component of hydrocarbon emissions, are compounds of carbon and hydrogen that react chemically in the atmosphere to produce NO_2 and O_3. Principal sources of VOCs are vehicle exhaust emissions and the evaporation of gasoline from fuel tanks and carburetors.

- Pb-containing dust can be released during construction from soils that contain exceptionally high concentrations of historic lead deposits (i.e., from before lead was phased out of gasoline). Pb can cause a range of health effects, including behavioral problems and/or learning disabilities. Children 6 years old and under are at particular risk from lead exposure because their bodies are growing quickly (U.S. Environmental Protection Agency 2003a).

4.8.2.2 Climate

The climatic conditions of the study area have not changed since publication of the Final EIS.

4.8.2.3 National Ambient Air Quality Standards

As described in the Final EIS, NAAQS are set by the U.S. Environmental Protection Agency (EPA) and are the standards that have been established as the official ambient air quality standards for Utah. They include both primary standards to protect public health and secondary standards to protect public welfare (such as protecting property and vegetation from the effects of air pollution). Table 4.8-1, which updates Table 3-18 in the Final EIS, shows the NAAQS for the pollutants of primary concern in the study area (see Section 4.8.2.1). For these pollutants, the primary and secondary standards set by EPA are the same, with the exception of CO for which no secondary standard has been identified.

Table 4.8-1 National Ambient Air Quality Standards

	National (EPA) Standard	
Pollutant	Primary	Secondary
Lead (Pb)		
Quarterly average	1.5 μg/m^3	1.5 μg/m^3
Particulate Matter (PM10)		
Annual arithmetic mean	50 μg/m^3	50 μg/m^3
24-hour average	150 μg/m^3	150 μg/m^3
Particulate Matter (PM2.5)		
Annual arithmetic mean	15 μg/m^3	15 μg/m^3
24-hour average	65 μg/m^3	65 μg/m^3

Pollutant	National (EPA) Standard	
	Primary	Secondary
Carbon Monoxide (CO)		
8-hour average	9 ppm	No standard
1-hour average	35 ppm	No standard
Ozone (O_3)		
8-hour average	0.08 ppm	0.08 ppm
1-hour average	0.12 ppm	0.12 ppm
Nitrogen Dioxide (NO_2)		
Annual average	0.05 ppm	0.05 ppm

Notes:

Primary standards are set to protect public health; secondary standards are based on other factors (e.g., protecting crops and materials, avoiding nuisance conditions).

Annual standards are never to be exceeded; short-term standards are not to be exceed more than one calendar day per year.

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

Source: U.S. Environmental Protection Agency 2003b.

Several recent epidemiological studies have suggested that there may be health effects associated with air pollutants at concentrations lower than the current NAAQS (e.g., Samet et al. 2000, Green et al. 2002, Schwartz 1999). However, the NAAQS have not been revised to reflect this research and remain, as promulgated, the controlling standards against which transportation-related air quality impacts are assessed.

4.8.2.4 Air Quality Attainment Status in the Study Area

As described in the Final EIS, the Clean Air Act requires that all areas with recorded violations of the NAAQS be designated nonattainment areas (i.e., out of compliance with established air quality standards). In nonattainment areas, a state implementation plan must be developed and approved by EPA that identifies control strategies for bringing the region back into compliance with the NAAQS for that pollutant.

Nonattainment areas are further categorized as marginal, moderate, serious, severe, or extreme, depending on the severity of the recorded violations. According to the Clean Air Act, an area classified as marginal will be permitted less time to reach attainment than an area classified as extreme. Maintenance areas are areas that have been in violation of the NAAQS but have not had a recorded violation in several years and are in the process of being redesignated as attainment areas.

Table 4.8-2 shows the air quality attainment status for Salt Lake City, Ogden, and Salt Lake and Davis Counties. These designations have not changed since publication of the Final EIS.

Table 4.8-2 Nonattainment Designations for Jurisdictions in or adjacent to Study Area

Areas	Status	Pollutants
Salt Lake City	Maintenance area	Carbon Monoxide (CO)
Ogden	Maintenance area	Carbon Monoxide (CO)
	Moderate nonattainment area	Particulate Matter (PM10)
Salt Lake County	Moderate nonattainment area	Particulate Matter (PM10)
	Maintenance area	Ozone (O_3) – 1-hour average
Davis County	Maintenance area	Ozone (O_3) – 1-hour average

Source: Wasatch Front Regional Council 2003c.

As shown above in Table 4.8-2, Salt Lake City and Ogden are maintenance areas for CO, and Ogden is a nonattainment area for PM10. Salt Lake and Davis Counties are maintenance areas for O_3 (1-hour average), and Salt Lake County is a nonattainment area for PM10.[2]

4.8.2.5 Air Toxics

In addition to the NAAQS, EPA has also established a list of 33 urban air toxics (64 FR 38706). Urban air toxics are pollutants that may cause cancer or other serious health effects or adverse environmental effects. Most air toxics originate from human-made sources, including road mobile sources, non-road mobile sources (e.g., airplanes), and stationary sources (e.g., factories or refineries).

The primary sources of air toxics are industrial activities and motor vehicle emissions. Scientific research has shown that the health risks to people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk of contracting cancer, damage to the immune system, and neurological, reproductive, and/or developmental problems (Environmental Protection Agency 2000).

To better understand the effects that urban air toxics have on human health, EPA developed a list of 21 mobile-source air toxics (MSAT), including six priority MSATs: acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1, 3 butadiene (66 FR 17230). EPA is in the process of assessing the risks of various kinds of exposures to these pollutants.

In July 1999, EPA published a strategy to reduce urban air toxics; in March 2001, EPA issued regulations for automobile and truck manufacturers to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under the March 2001 regulation, between 1990 and 2020, highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67 percent to 76 percent, and on-highway diesel particulate matter emissions will be reduced by 90 percent. These reductions will be realized through implementation of mobile-source control programs, including the reformulated gasoline program, a new cap on toxics content of gasoline, the national low-emission vehicle standards, the Tier 2 motor vehicle emission standards and gasoline sulfur control requirements, and the heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements (U.S. Environmental Protection Agency 2000).

[2] Recent ambient PM10 data suggests that Salt Lake County is meeting NAAQS. PM10 monitoring data indicate that the PM10 standard has not been exceeded since 1994 (Bird pers. comm.).

The reductions described above are net emission reductions; that is, the reductions will occur even after growth in vehicle-miles traveled is taken into account.

4.8.2.6 Other Pollutants

Historically, climate change has occurred naturally. However, human activities, including industrialization, population growth, fossil fuel burning, and deforestation, are changing the atmospheric concentrations and distributions of gases in the atmosphere, including greenhouse gases and aerosols. Motor vehicles are a large producer of greenhouse gases because the burning of petroleum fuels is a primary producer of carbon dioxide (CO_2), a greenhouse gas. Changes in the concentrations of the greenhouse gases affect how the Earth absorbs and radiates heat, thus affecting climate change (U.S. Environmental Protection Agency 2002).

Naturally occurring greenhouse gases include water vapor, CO_2, methane (CH_4), nitrous oxide (N_2O), and O_3. Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but for the most part, they are solely products of industrial activity (U.S. Environmental Protection Agency 2002). Carbon dioxide is the primary transportation-related greenhouse gas.

4.8.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, the impacts of highway operation on air quality would be long term and directly related to traffic volumes and average speeds. This section presents an updated mesoscale analysis of air quality impacts based on the 2003 WFRC conformity analysis for the region. In addition, this section presents CO and PM microscale analyses for the proposed Legacy Parkway/500 South interchange and an assessment of air quality impacts on the Legacy Parkway mainline and the adjacent Legacy Parkway Trail.

4.8.3.1 Conformity Requirements

The Transportation Equity Act (TEA-21) and the Clean Air Act Amendments require that all regionally significant highway and transit projects in air quality nonattainment areas come from a “conforming” transportation plan and transportation improvement program. A *conforming plan* is one that has been analyzed regionally for emissions of controlled air pollutants and is found to be within emission limits established in the State Implementation Plan. Transportation projects are said to “conform” if, both alone and in combination with other planned projects included in that transportation improvement program , the project would not result in any of the following.

- New violations of the NAAQS.
- Increases in the frequency or severity of existing violations of the NAAQS.
- Delays in attainment of the NAAQS.

For the study area, WFRC, the MPO for the region, conducts the regional conformity analyses and submits them to FHWA for a conformity determination. Both the mesoscale evaluation completed by

WFRC and the microscale evaluations completed for the Supplemental EIS were used to help determine whether Legacy Parkway would be in conformance with the appropriate mobile-source pollutant budgets in approved state implementation plans.

4.8.3.2 Mesoscale Evaluation

As described above in Section 4.8.1, WFRC completed the most recent regional conformity analysis in December 2003 (Wasatch Front Regional Council 2003a). Based on the mesoscale analysis presented in that plan, WFRC concluded that the updated 2030 transportation plan, which includes Legacy Parkway, conformed to the state implementation plan for all air pollutants. A summary of the air quality conformity conclusions derived from this analysis are presented below for the primary pollutants of concern described in Section 4.8.2.1, as well as for sulfur dioxide, MSATs, and greenhouse gases.

Although the regional conformity analysis demonstrated that future transportation emissions, including those from the Legacy Parkway project, will not cause ambient concentrations to exceed NAAQS limits, a revised mesoscale analysis was prepared for this Supplemental EIS to identify potential changes in regional emissions between the future conditions (2020) No-Build Alternative (assuming full build-out of the WFRC long range plan) and the proposed build alternatives (Wasatch Front Regional Council 2004). The analysis was completed using the most recent version of EPA's MOBILE emission factor model, MOBILE6, and regional traffic data derived from WFRC's 2004 travel demand model (version 3.2). The following section presents the results of this analysis, including emission calculations for region-wide ozone precursors (NO_x and VOCs) and CO, for the No-Build Alternative (both existing and future conditions) and the build alternatives.

No-Build Alternative

Existing Conditions

Table 4.8-3, which updates in part Table 4-12 in the Final EIS, illustrates existing CO, NO_x, and VOC emissions within Weber, Davis, and Salt Lake Counties. As described above in Section 4.8.2.4, measured air pollutants throughout the region (including the pollutants for which the region is classified as "non-attainment" or "maintenance") are currently lower than the allowable NAAQS limits. Under existing conditions, regional air quality would remain unchanged. There would be no project-related air quality impacts.

Future Conditions (2020)

As shown in Table 4.8-3, regional vehicle miles traveled would increase under both the 2020 No-Build Alternative and the build alternatives in 2020 compared to existing conditions because of projected regional growth. However, regional emissions for all transportation-related air pollutants are predicted to decline between 2001 and 2020 under both the No-Build Alternative and the build alternatives because of the increasing efficiency of the vehicle fleet.

Table 4.8-3 Existing (2001) and Future (2020) Regional Mesoscale Air Quality for Weber, Davis, and Salt Lake Counties

	No-Build Alternative			Percentage Change between Future No-Build Alternative (2020) and Build Alternatives
	Existing Conditions	Future Conditions (2020)	Build Alternatives (2020)	
VMT (million miles/day)	31.32	48.15	48.08	0%
VHT (hours/day)	850,763	1,391,028	1,356,434	- 2%
Average Speed (mph/kph)	36.8/59.2	34.6/55.7	35.4/57.0	2%
Summer Day Emissions (tons/day)				
CO	667.84	280.77	281.62	0%
VOC	58.97	20.40	20.27	- 1%
NOx	91.45	20.70	20.83	1 %
Winter Day Emissions (tons/day)				
CO	994.16	587.49	588.41	0%
VOC	52.19	17.39	17.30	- 1%
NOx	98.74	22.55	22.63	0%

Source: Wasatch Front Regional Council 2004.

Build Alternatives

As shown in Table 4.8-3, implementation of the build alternatives would have a minor impact on overall regional emissions relative to the future conditions (2020) No-Build Alternative.

The following also provides a qualitative discussion of the primary pollutants of concern based primarily on the regional conformity analysis completed for the WFRC long range plan, which includes the proposed Legacy Parkway. As described in Section 4.3.3.4, *Traffic Patterns and Accessibility*, the level of service (LOS) on the major interstates, arterials, and local roadways in the study area in 2020 will either stay the same or improve under the build alternatives. Improvements to the level of service on through streets would equate to reductions in congestion and increases in traffic flow, which could translate to improvements in air quality. Taking into consideration expected increases in vehicle miles traveled and resulting energy consumption (see Section 4.19.3, *Energy*), at a minimum, air quality conditions in 2020 in the study area would likely be comparable to existing conditions if the build alternatives were constructed. This assumption is supported by the build alternatives' conformance with the WFRC regional conformity analysis.

Carbon Monoxide (CO)

The proposed action is located in an attainment area for CO (outside of Salt Lake City and the City of Ogden). While the majority of regional CO emissions can be attributed to motor vehicles, industrial and natural processes such as metals processing, wood stoves, and forest fires are additional sources of CO emissions. Substantial changes in other emission sources combined with changes in travel patterns and transportation networks might affect CO emissions at a regional level, but the effects of any individual project are likely to be small (Utah Department of Transportation 2003c).

Particulate Matter (PM10 and PM2.5)

The southern portion of the study area is located in Salt Lake County, which is a nonattainment area for particulate matter, as shown above in Table 4.8-2. However, since the state implementation plan for PM10 was approved by EPA in December 2002 (Utah Department of Environmental Quality, Division of Air Quality 2002), and WFRC has determined that the 2030 long range plan and transportation improvement program conforms to the state implementation plan (Wasatch Regional Council 2003c), it is unlikely that Legacy Parkway would increase the frequency or severity of the existing exceedance of the NAAQS PM10 standard.

In Utah, PM10 has a strong regional component to it. Utah's climate and geography contribute to PM10 regional impacts when temperature inversions cause particles to become trapped in the valleys. Meteorological conditions combined with changes in the regional land use and transportation patterns might affect PM10 at a regional level, but the effects of any individual project are likely to be small and uncertain (Utah Department of Transportation 2003c).

The new PM2.5 air quality standard is in place as of July 18, 1997 (62 FR 138), and data are being collected to determine the attainment status of the study area (Bird pers. comm.). As a result, there are no mesoscale conclusions that can be made for PM2.5 in the study are at this time. EPA has indicated, however, that the Wasatch Front region will be in attainment for PM2.5 (Houk 2004).

Ozone (O_3)

Legacy Parkway would be located in a maintenance area for O_3 because it is in Salt Lake and Davis Counties, both of which are maintenance areas for O_3. Since the ozone state implementation plan was approved by EPA on August 18, 1997 (Utah Department of Environmental Quality, Division of Air Quality 1997), and WFRC has determined that both the region's 2030 long range transportation plan and transportation improvement program conform to the ozone state implementation plan, it is unlikely that Legacy Parkway would cause new exceedances of the NAAQS.

Nitrogen Dioxide, Sulfur Dioxide, and Lead

There are currently no nonattainment or maintenance areas for nitrogen dioxide, sulfur dioxide, or lead in the study area. Because of their regional nature and the minimal contribution of motor vehicles as a source of these pollutants, it is unlikely that Legacy Parkway would substantially affect concentrations of these pollutants in the study area.

Section 4.17, *Hazardous Waste*, of this document provides additional information on the potential impacts associated with aerially deposited lead in the proposed right-of-way of the build alternatives.

Air Toxics

As described above in Section 4.8.2.5, EPA has developed a list of 21 mobile-source air toxics (MSAT) and is assessing the health and environmental effects of these air toxics. This analysis is ongoing, and EPA has not yet issued guidance or regulations establishing unsafe levels of all the MSATs. In particular, EPA has not established risk factors or standards for diesel particulate matter, although this pollutant is widely believed to account for the majority of MSAT health risk. The analysis of air toxics is an emerging field, and the U.S. Department of Transportation (DOT) and EPA are currently working to develop and evaluate the technical tools necessary to perform air toxics analysis, including improvements to emissions models and air quality dispersion models. Limitations with the existing modeling tools preclude performing the same level of analysis that is typically performed for other pollutants, such as carbon monoxide. FHWA's ongoing work in air toxics includes a research program to determine and quantify the

contribution of mobile sources to air toxic emissions, the establishment of policies for addressing air toxics in environmental reports, and the assessment of scientific literature on health impacts associated with motor vehicle toxic emissions.

As noted above in Section 4.8.2.5, several national regulatory programs are in place that will provide significant reductions in MSATs, including the Tier II light-duty vehicle emissions regulations, the 2007 heavy-duty diesel regulations, and the EPA non-road engine control regulations. In addition, the nature of the Legacy Parkway corridor limits any potential air toxics impacts. The proposed highway would be constructed through a largely undeveloped area and would include a large right-of-way buffer. As a result, human population exposure to mobile source emissions would be lower than for a comparable roadway constructed in a more densely developed area. Air quality impacts on wildlife resources are addressed in Subsection 4.13.3.4 of Section 4.13, *Wildlife*, of this Supplemental EIS.

Other Pollutants

There are currently no federal laws or regulations, or EPA-established criteria or thresholds, for greenhouse gas emissions. Because the sources and effects of greenhouse gases are global in nature, attempting project-level analysis of increases or decreases of greenhouse gases, including carbon dioxide, is technically infeasible. In addition, given the high level of uncertainty inherent in such an analysis, it is likely that the results would not be informative for making project-level decisions.

4.8.3.3 Microscale "Hot Spot" Impact Analysis

A microscale impact analysis was completed for the Supplemental EIS at the Legacy Parkway/500 South interchange. This interchange was selected for detailed modeling because it would have the highest traffic volumes of the proposed action components (compared to the Legacy Parkway mainline and the proposed interchange at Parrish Lane/Legacy Parkway) and therefore represents the worst-case scenario for evaluating potential air quality impacts. The microscale analysis for the Legacy Parkway/500 South interchange included mainline Legacy Parkway traffic volumes in the vicinity of the interchange.

Project-level microscale analyses were performed for CO and PM10. As described below, the CAL3QHC line source dispersion model (version 2.0) was used to calculate CO concentrations in the vicinity of the Legacy Parkway/500 South interchange. Because EPA has not issued modeling guidance for PM10 microscale analyses, a qualitative assessment of the local conditions for PM10 was conducted, which is the standard procedure for completing such analyses.

Carbon Monoxide – Microscale Analysis Methodology

As described above in Section 4.8.1, the CAL3QHC line source dispersion model (version 2.0) is the current air quality dispersion model recommended by EPA, UDOT, and WFRC for calculating pollutant concentrations caused by transportation sources. The model considers free-flow and idling emissions in conjunction with intersection geometry, wind direction, and other meteorological factors. This model was used to calculate peak 1-hour CO concentrations near the proposed Legacy Parkway/500 South interchange, and at sensitive receptors along the Legacy Parkway mainline and the proposed trail in the vicinity of the interchange. Eight-hour CO concentrations were estimated by applying a persistence factor of 0.7 to the 1-hour concentration, as recommended by EPA.

Consistent with recommendations provided in the UDOT *Air Quality "Hot Spot" Manual* (Utah Department of Transportation 2003c), critical assumptions and configuration parameters used in the CAL3QHC modeling included a 1,000-m (3,280-ft) mixing height, low wind speed (i.e., 1 m/sec

[3.2 ft/sec]), a 1-hour background CO concentration of 8.0 ppm, an 8-hour background CO concentration of 5.0 ppm, and a 2020 horizon year. In addition, the modeling assumed a very stable (Class E) atmosphere to simulate adverse wintertime air quality conditions when CO violations are more likely to occur. The modeling evaluated 36 wind directions (in 10-degree increments) to ensure that the worst-case condition was considered for each receptor location.[3] Vehicle emission rates for 2020 were also obtained from the *Air Quality "Hot Spot" Manual.*

Sensitive Receptors

CO concentrations were estimated at locations referred to as sensitive receptors. Sensitive receptors are locations where the maximum total CO concentration is likely to occur and where the general public is likely to have continuous access and exposure to vehicle emissions. The proposed Legacy Parkway/500 South interchange would be located in a relatively undeveloped area. Most individual exposure to CO emissions would be at locations adjacent to the roadway, including the mainline and ramp intersections where people would be likely to spend more time, and along the proposed trail that would run adjacent to Legacy Parkway.

Sixty receptors were modeled around the Legacy Parkway/500 South interchange, including immediately adjacent to the on- and off-ramps; along 500 South (eastbound and westbound); and along the proposed trail adjacent to the alignment, approximately 20 to 30 m (66 to 98 ft) from the northbound on- and off-ramps. For the Legacy Parkway mainline, 30 receptors were modeled adjacent to the roadway in the vicinity of the interchange.

Carbon Monoxide – Microscale Analysis Air Quality Impact Criteria

Section 4.8.3.1 describes the conformity requirements for determining whether a project would violate the NAAQS. The microscale analysis was used to determine whether any proposed build alternatives would exceed either the 1-hour or 8-hour standards for CO. Potential impacts described in this section are associated with operating Legacy Parkway; construction related air-quality impacts are summarized in Section 4.20 of the Final EIS. Mitigation measures associated with these construction-related air quality impacts have been included in Section 4.20, *Construction Impacts*, of this document.

An air quality impact would occur if the microscale analysis results indicated any of the following results.

- An exceedance of the 1-hour CO standard (35 ppm) at a receptor location.
- An exceedance of the 8-hour CO standard (9 ppm) at the highest modeled receptor. Under this criterion, the 8-hour CO concentration could increase under the build alternatives, provided the 8-hour standard of 9 ppm was not exceeded.
- For those locations where there is an existing violation of the 8-hour standard (i.e., under the Future No-Build Alternative), an increase in the severity or frequency of the modeled impact.

Meeting any of these criteria would indicate that the proposed Legacy Parkway/500 South interchange would not be in conformance with air quality regulations. Therefore, to support a conclusion of no adverse impacts, modeled CO emission must be less than the applicable 1-hour and 8-hour CO NAAQS.

[3] CO concentrations at receptor locations under worst-case meteorological conditions represent the most serious CO levels that could be caused by vehicle emissions. This approach is consistent with the objective of the ambient air quality standards to prevent human exposure to unsafe levels of air pollution.

Microscale Air Quality Impact Results

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions (2004), there would be no project-related air quality impacts under the No-Build Alternative. Air quality trends would continue, as described above in Section 4.8.2 of this document.

Table 4.8-4 presents existing 1-hour and 8-hour CO concentrations for the proposed Legacy Parkway/500 South interchange, Legacy Parkway mainline, and the Legacy Parkway Trail. These concentrations are based on mandated assumed background conditions for purposes of the air quality model and represent, likely worst-case scenario conditions. These concentrations were not measured in the field.

Future Conditions (2020)

Concentrations of CO and PM would be greater under the future conditions (2020) No-Build Alternative than under the build alternatives because congested flow conditions would increase vehicle travel times, adversely affecting air quality.

These increased concentrations, however, are not represented in Table 4.8-4 because concentrations in the table for future no-build conditions are based on assumed background concentrations, as provided in UDOT air quality guidance (Utah Department of Transportation 2003c). Although the actual concentrations are not known, it is likely that they would be higher than the current background conditions at the modeled locations.

Build Alternatives

Carbon Monoxide

As illustrated in Table 4.8-4 and the subsequent text, detailed CO modeling for the proposed Legacy Parkway/500 South interchange, including sensitive receptors along the Legacy Parkway mainline and the Legacy Parkway Trail in the area of the interchange, indicate that CO concentrations would be below the NAAQS for both the 1-hour and 8-hour standards. Historical data also indicate that CO emissions are decreasing, despite a substantial increase in population and vehicle-miles traveled in the county, as older vehicles are replaced and the vehicle fleet becomes more efficient.

Table 4.8-4 Carbon Monoxide Concentrations at Proposed Legacy Parkway/500 South Interchange, Legacy Parkway Mainline, and Legacy Parkway Trail

	1-Hour Concentration (ppm)				8-Hour Concentration (ppm)			
Location	Existing Conditions (2004)[1]	Future Conditions (2020)[1]	Build Alternatives (2020)[2]	NAAQS	Existing Conditions (2004)[1]	Future Conditions (2020)[1]	Build Alternatives (2020)[3]	NAAQS
Legacy Parkway/500 South Interchange	8.0 ppm	8.0 ppm	11.7 [4]	35	5.0 ppm	5.0 ppm	7.6 [4]	9
Legacy Parkway Mainline	8.0 ppm	8.0 ppm	12.6 [4]	35	NA	NA	8.2 [4]	9
Legacy Parkway Trail	8.0 ppm	8.0 ppm	9.9	35	NA	NA	6.3	9

Notes:

[1] Under existing (2004) and future (2020) conditions, Legacy Parkway has not been built. Although there would be no emission associated with the parkway at these locations (e.g., because it would not exist), the 1-hour and 8-hour concentrations listed in the table are based on assumed background concentrations as provided in UDOT air quality guidance (Utah Department of Transportation 2003c).

[2] Includes 1-hour background concentration of 8.0 ppm.

[3] Includes 8-hour background concentration of 5.0 ppm.

[4] Highest modeled CO concentration for all model configurations.

NA = Not applicable.

Source: CAL3QHC line source dispersion model (version 2.0).

Legacy Parkway/500 South Interchange

Under all proposed build alternatives, the highest modeled 1-hour CO concentration at the Legacy Parkway/500 South interchange was 11.7 ppm, which is below the 35 ppm 1-hour NAAQS (Table 4.8-4). The highest modeled 8-hour CO concentration was 7.6 ppm, which is below the 9 ppm 8-hour NAAQS. Both of these modeled concentrations were located near the southbound off-ramp, adjacent to both the off-ramp and the Legacy Parkway mainline.

Legacy Parkway Mainline

Under all proposed build alternatives, the highest modeled 1-hour CO concentration on the Legacy mainline was 12.6 ppm, which is below the 35 ppm 1-hour NAAQS. The highest modeled 8-hour CO concentration on the mainline was 8.2 ppm, which was below the 9 ppm 8-hour NAAQS. The highest modeled CO concentration on the Legacy Parkway mainline occurred near the southbound off-ramp of the Legacy Parkway/500 South interchange.

Legacy Parkway Trail

At receptor locations along the proposed pedestrian/equestrian trail, 1-hour modeled CO concentrations ranged from 9.0 to 9.9 ppm, which is below the 35 ppm 1-hour NAAQS. The 8-hour concentrations at these locations along the trail ranged from 5.7 to 6.33 ppm, which is below the 9 ppm 8-hour NAAQS.

Particulate Matter (PM10)

A qualitative analysis of local conditions within the study area was completed for the PM10 microscale analysis. As shown above in Table 4.8-2, both the City of Ogden and Salt Lake County are nonattainment areas for PM10. A large proportion of the through-corridor traffic that would use Legacy Parkway would originate in north Davis County or Weber County and would travel to Salt Lake County or Utah County. Microscale traffic patterns in Ogden are not expected to change as a result of the Proposed Action; therefore, no impacts are expected on the PM10 nonattainment area in Ogden (Rifkin pers. comm. a.). As a result, the only PM10 nonattainment area that would require a qualitative assessment of PM10 impacts is the portion of the study area located in Salt Lake County.

All proposed build alternatives would support vehicle traffic and would, therefore, result in PM10 emissions. Emissions associated with operation of vehicle traffic on a roadway include both tailpipe and non-tailpipe emissions. Tailpipe emissions are regulated on a national basis by EPA, which requires vehicle manufacturers to meet specific emission limitations. Tailpipe particulate emission limits for light-duty trucks and automobiles have decreased from 0.6 grams/mile for model years 1982 to 1986 to 0.08 grams/mile for model years 1994 to 2000, a reduction of 87 percent (Environmental Protection Agency 2000). PM10 emissions per vehicle are expected to decrease in the future as emission limitations become more stringent.

Non-tailpipe emissions include emissions from tire and brake wear and resuspended dust. Depending on the condition of the roadway, resuspended dust emissions are usually a greater source of particulates than tire and brake wear emissions. Resuspended dust emissions can be minimized through street sweeping and other mitigation measures; natural precipitation events and dust displaced by high-speed traffic also minimize these emissions.

There are no PM10 monitoring stations near the proposed Legacy Parkway. PM10 monitors are generally located in or near areas with known PM10 problems. The nearest PM10 monitors to the parkway corridor are in North Salt Lake and Ogden. Table 4.8-5 shows the annual average and the highest and second highest 24-hour measurements at these monitoring locations.

Table 4.8-4 Air Quality Monitoring Data – PM10 (ug/m^3)

	North Salt Lake				Ogden			
Year	Annual Average[1]	24-Hour High[2]	24-Hour Second High	Exceedances	Annual Average[1]	24-Hour High[2]	24-Hour Second High	Exceedances
2003	38	111	107	0	28	78	78	0
2002	41	121	120	0	35	163	134	1 [3]
2001	44	153	141	0	32	87	85	0
2000	46	118	117	0	28	82	55	0
1999	45	136	113	0	28	72	70	0

Notes:

[1] Annual average standard = 50 ug/m^3.

[2] 24-hour standard = 150 ug/m^3.

[3] 24-hour standard exceeded one day in the year.

ug/m^3 = microgram per cubic meter

Source: Utah Department of Environmental Quality 2004.

Ambient PM10 monitoring data for Salt Lake County indicate that the ambient air quality is below the NAAQS for PM10 (State of Utah 2002). Historical data indicate that PM10 concentrations are decreasing, despite a substantial increase in population and vehicle miles traveled in the county. This trend is expected to continue as emission limits on vehicles and other sources of PM10 become more stringent. Based on the historical trend in PM10 concentrations in the vicinity of Legacy Parkway, exceedances of the PM10 NAAQS are not expected as a result of the proposed action.

Mitigation Measures

Non-tailpipe PM10 emissions would be minimized through street sweeping, minimal use of sand for snow and ice control (see 4.10, *Water Quality*), and other general maintenance measures performed by UDOT.

Section 4.9
Noise

This section provides an update on existing noise conditions in the study area. It has been updated to reflect new noise monitoring completed in October 2003, and new noise impact information and abatement analyses based on application of the revised FHWA traffic noise model (TNM), version 2.1 (Federal Highway Administration 2003).

4.9.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with noise in the study area, Sections 3.9 and 4.9 of the Final EIS were reviewed to determine what changes had occurred since publication of the Final EIS. The study area for the noise section encompassed a corridor spanning approximately 457 m (1,500 ft) on each side of the proposed build alternative alignments; the northern and southern boundaries of the study area are defined in Section 4.0.1, *Study Area*. The 457-m (1,500-ft) study area width is consistent with the validation limits of the TNM, which are described in more detail in the following text.

The following section summarizes the approach and methodology used to incorporate information generated from the updated TNM and to reevaluate proposed noise abatement measures. This section also provides supplemental information on how noise is generated and measured, as well as the federal and state regulatory requirements that govern noise abatement criteria. It should be noted that noise impacts on 4(f)/6(f) resources, including the Farmington Bay Waterfowl Management Area (FBWMA) and the Bountiful City Pond, are discussed in Chapter 5 of this document. A brief discussion of noise abatement measures for these resources is included in 4.9.3.3, *Noise Abatement Measures*, below. Noise impacts on wildlife are discussed in Section 4.13 of this document.

4.9.1.1 Background Information on Noise

As described in the Final EIS, sound travels through the air as waves of minute air pressure fluctuations caused by vibration. Sound level meters are used to measure the actual pressure fluctuation caused by sound waves, taking into consideration different sound frequency ranges. The decibel scale used to describe sound is a logarithmic scale that accounts for the large range of sound pressure levels. The A-weighted decibel scale (dB[A]) is the composite decibel scale most widely used to approximate the way the human ear responds to noise levels. Table 3-20 in the Final EIS lists typical A-weighted noise levels for various types of sound sources.

Varying noise levels are often described in terms of the equivalent sound level (Leq). Equivalent sound levels are used to develop single-value descriptions of average noise exposure over stated periods of time.

The Leq data used for these average noise exposure descriptors are generally based on A-weighted sound-level measurements. Most often, units of hourly Leq values are used to describe traffic noise.

The nature of decibel (dB) scales is such that individual dB ratings for different noise sources cannot be added directly to give the sound level for the combined noise source. Examples of this are given below.

- Two noise sources producing equal dB ratings at a given location produce a combined noise level 3 dB greater than either sound alone.
- When two noise sources differ by 10 dB, the combined noise level is 0.4 dB greater than the louder source alone.
- People generally perceive a 10-dB increase in a noise source as a doubling of loudness. For example, a 70-dB sound level is perceived by an average person as twice as loud as a 60-dB sound.
- People generally cannot detect differences of 1 to 2 dB between noise sources. Under ideal listening conditions, differences of 2 or 3 dB can be detected by some people. A 5-dB change would probably be perceived by most people under normal listening conditions.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dB for every doubling of distance from the noise source. When the noise source is a continuous line (for example, vehicle traffic on a highway), sound levels decrease by about 3 dB for every doubling of distance away from the roadway. In traffic studies, an attenuation rate of 4.5 dB per doubling of distance is often used when the roadway is at ground level and the intervening ground is effective in absorbing sound (for example, ground vegetation, scattered trees, clumps of bushes). When the roadway is elevated, 3-dB noise attenuation per doubling of distance is used because the sound-absorbing effects of the intervening ground are limited.

Noise levels at different distances can also be affected by factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can increase or decrease noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Reflections off topographical features or buildings can sometimes result in higher sound levels (lower sound attenuation rates) than would be normally expected. Temperature inversions and altitudinal changes in wind conditions can also diffract and focus a sound wave to a location at considerable distance from the noise source. Focusing effects are usually noticeable only for very intense noise sources, such as blasting operations. As a result, the existing noise environment can be highly variable depending on local conditions.

4.9.1.2 Methods Used to Update Noise Analysis

The following methods were used to update the noise analysis presented in the Final EIS. Supplemental information regarding noise monitoring and application of the TNM is described in more detail below.

- Existing activities, developed land, and undeveloped land for which development is planned, designed, or programmed and that could be affected by noise from the proposed build alternatives were identified from field surveys and aerial photographs of the alignment corridor.

- Short-term (15-minute) sound level measurements typical of existing conditions were collected at selected representative locations throughout the study area to characterize the existing noise environment adjacent to the proposed alignments.

- Potential noise impacts associated with construction and operation of the proposed build alternatives were predicted using the updated TNM, version 2.1, which was approved by FHWA and UDOT in February 2003 (Federal Highway Administration 2003).[1]

- Project related noise impacts were identified at residential and recreational locations within about 457 m (1,500 ft) of each build alternative alignment. These impacts were identified using the relative and absolute criteria specified in Title 23, Part 772 of the Code of Federal Regulations (23CFR 772), "Procedures for Abatement of Highway Traffic Noise," and UDOT's Noise Abatement Policy (UDOT 08A2-1) (see Section 4.9.1.3 below).

- Where appropriate, noise abatement measures for reducing or eliminating noise impacts were identified and evaluated using UDOT guidelines and the Noise Abatement Policy for determining feasibility, reasonableness, and cost-effectiveness.

Noise Monitoring

As stated above, short-term (15-minute) noise monitoring was conducted at 17 locations throughout the study area. Noise monitoring was conducted between 11:00 a.m. and 4:00 p.m. on October 2, 3, and 7, 2003. During the monitoring period, the skies were clear and the wind was minimal. Sound level monitoring locations are shown in Figures 4.9-1 through 4.9-6, and the results of the monitoring effort are presented in Section 4.9.2.2 of this document.

Monitored sound levels were also used to calibrate the revised TNM prior to modeling with project-related traffic volumes. Because the proposed action would be a new alignment constructed primarily through undeveloped terrain, noise monitoring locations were selected that represent areas adjacent to the proposed alignments without being unduly influenced by traffic from major nearby sources of noise, such as I-15. Ambient noise monitoring was conducted using a Larson-Davis model 712 sound-level meter. Instrument calibration was verified with a Larson-Davis acoustic calibrator before each measurement session. At each monitoring position, the meter was held by a tripod approximately 1.5 m (5 ft) above the ground.

Traffic Noise Model

As stated above, project-related traffic noise levels were modeled using version 2.1 of the TNM. The TNM estimates acoustic intensity at receiver locations based on the level of sound energy generated from a series of straight-line roadway segments. Where appropriate, the effects of local shielding from existing structures, vegetation, terrain, and other adjustment factors were included in the model to provide a higher level of detail and accuracy.

Because the proposed action would extend over a relatively large area, much of which is undeveloped, the focus of the analysis was on those areas with a substantial number of residential dwellings. For each alternative alignment, the center of the travel lanes was delineated in the model. Noise levels were

[1] It should be noted that the location of the proposed berm was not incorporated into the TNM because it was located in an area that has no current residential receptors. Any noise attenuation benefits associated with the berm are only applicable to proposed future development within the study area. (See Section 4.1, *Land Use*, for a discussion of current and planned land uses in the study area.)

modeled to reflect traffic conditions expected in 2020 after the project is completed. Vehicle volumes and speeds modeled for the alternative alignments were based on level of service (LOS) C operations (1,680 vehicles per hour per lane), which represent the typical worst-case noise conditions where per-lane vehicle volumes are maximized under free-flow travel speeds (105 kilometers per hour (kph) (65 miles per hour [mph]) for this analysis). This modeling methodology results in worst-case noise impacts and may overstate noise impacts if traffic operations are worse than LOS C (i.e., LOS D, E, or F) where speeds are slower, or if traffic operations are LOS A and B where there is less traffic operating at higher speeds.

The noise model also requires assumptions about the percentage of automobiles (two-axle, four-tire vehicles), medium trucks (two-axle, six-tire vehicles), and heavy trucks (three or more axles) using each individual roadway. Vehicle mixes vary depending on the roadway segment, time of day, and proximity to commercial or light-industrial land uses. Since there is no existing roadway, a vehicle mix of 90 percent automobiles, 5 percent medium trucks, and 5 percent heavy trucks was assumed on the mainline for each alternative alignment.[2] This vehicle mix is similar to what has been observed on I-15 for other projects.

Limitations of the Traffic Noise Model

Validation studies have been conducted for the TNM out to distances of about 396 m (1,300 ft) from a given roadway. However, it is acknowledged that TNM predication accuracy decreases with increasing distances due largely to the effects of wind and temperature gradients and approximations in the ground propagation algorithms. Most highway traffic noise analyses consider receptor locations within 30 to 91 m (100 to 300 ft) of the highway right-of-way. Project noise analyses are normally limited to distances of less than 305 m (1,000 ft) from the roadway. Some state Departments of Transportation (DOTs) will not model any distance greater than 152 m (500 ft) from a roadway, and FHWA is not aware of any noise model that will be accurate for distances of 610 to 914 m (2,000 to 3,000 ft) from a roadway.

As described above, the study area for the noise analysis encompasses a corridor 457 m (1,500 ft) wide on either side of the centerline of the proposed build alternatives. This study area boundary is consistent with the validation limits of the TNM and provides a conservative and accurate estimate of potential noise impacts on receptors within that area.

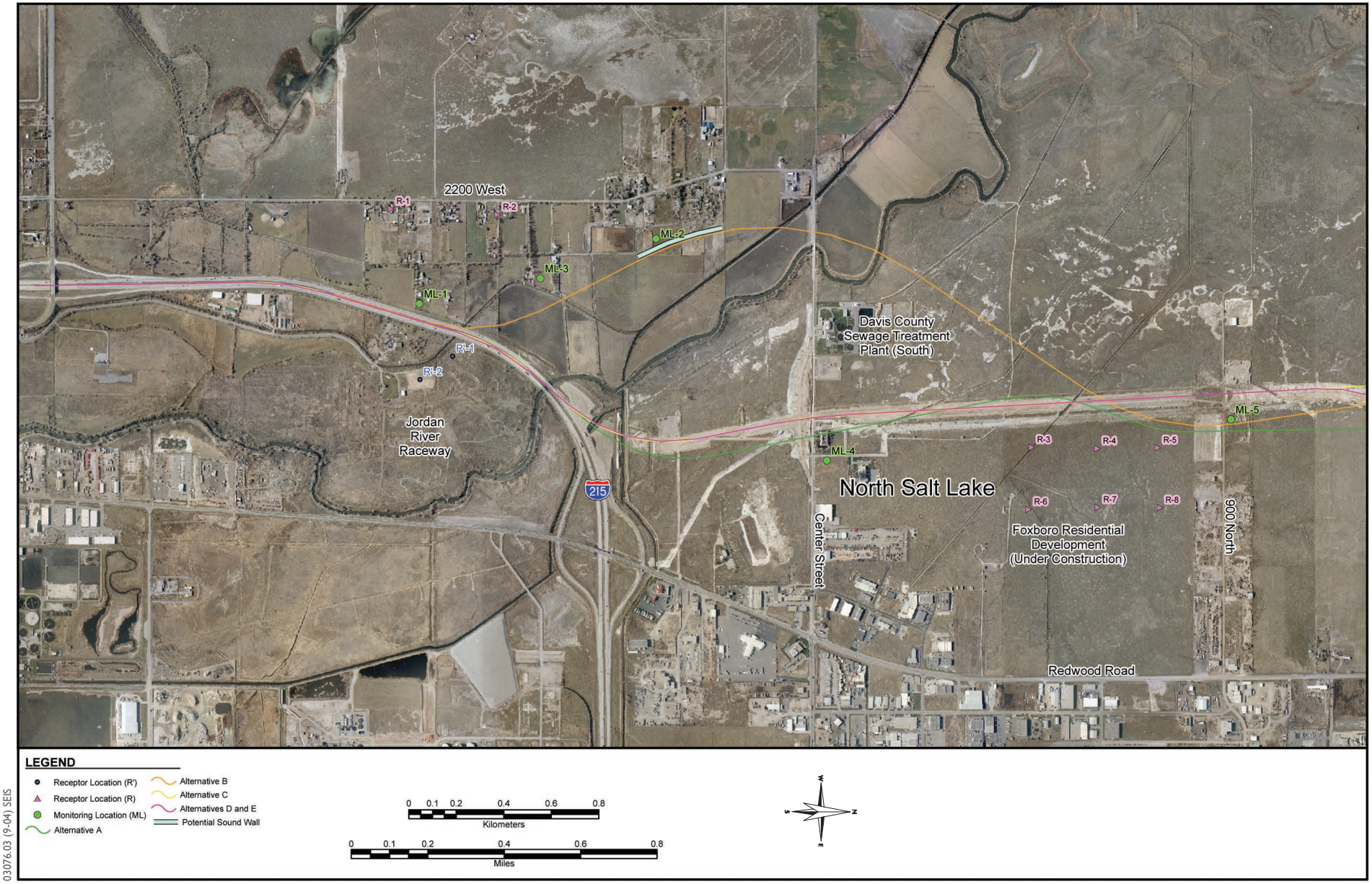
4.9.1.3 Regulatory Requirements

Federal Highway Administration Noise Standards

As described in the Final EIS, the Federal Noise Control Act of 1972 (Public Law 92-574) requires that all federal agencies administer their programs in a manner that promotes an environment free from noises that could jeopardize public health or welfare. 23 CFR 772 implements this requirement and specifies procedures and criteria for evaluating noise impacts associated with federally funded highway projects, and for determining whether such impacts are sufficient to justify funding noise abatement measures. FHWA noise abatement criteria (NAC) specified in 23 CFR 772 are summarized in Table 3-21 in the Final EIS.

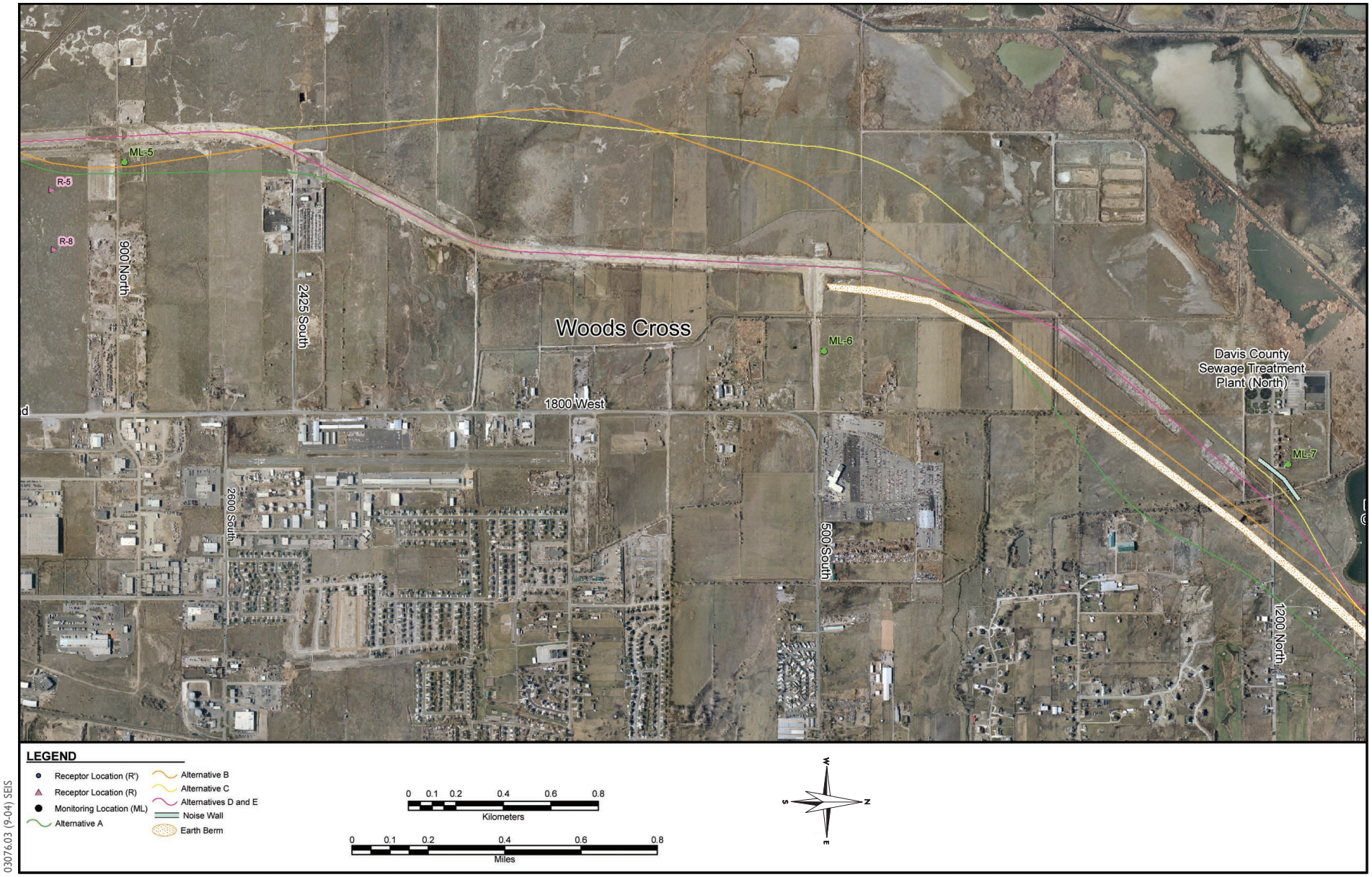
Under 23 CFR 772, a traffic noise is considered an impact when a predicted traffic noise level approaches or exceeds the NAC (see Table 3-21 in the Final EIS) or when the predicted traffic noise level substantially exceeds the existing noise levels. 23 CFR 772 does not specifically define what constitutes a

[2] Vehicle mix used for the noise analysis was based on videotaped traffic volumes for I-15 during representative traffic periods.



03076.03 (9-04) SEIS

Figure 4.9-1
Legacy Parkway Noise Impact Assessment,
Segment 1: I-215 to 900 North



03076.03 (9-04) SEIS

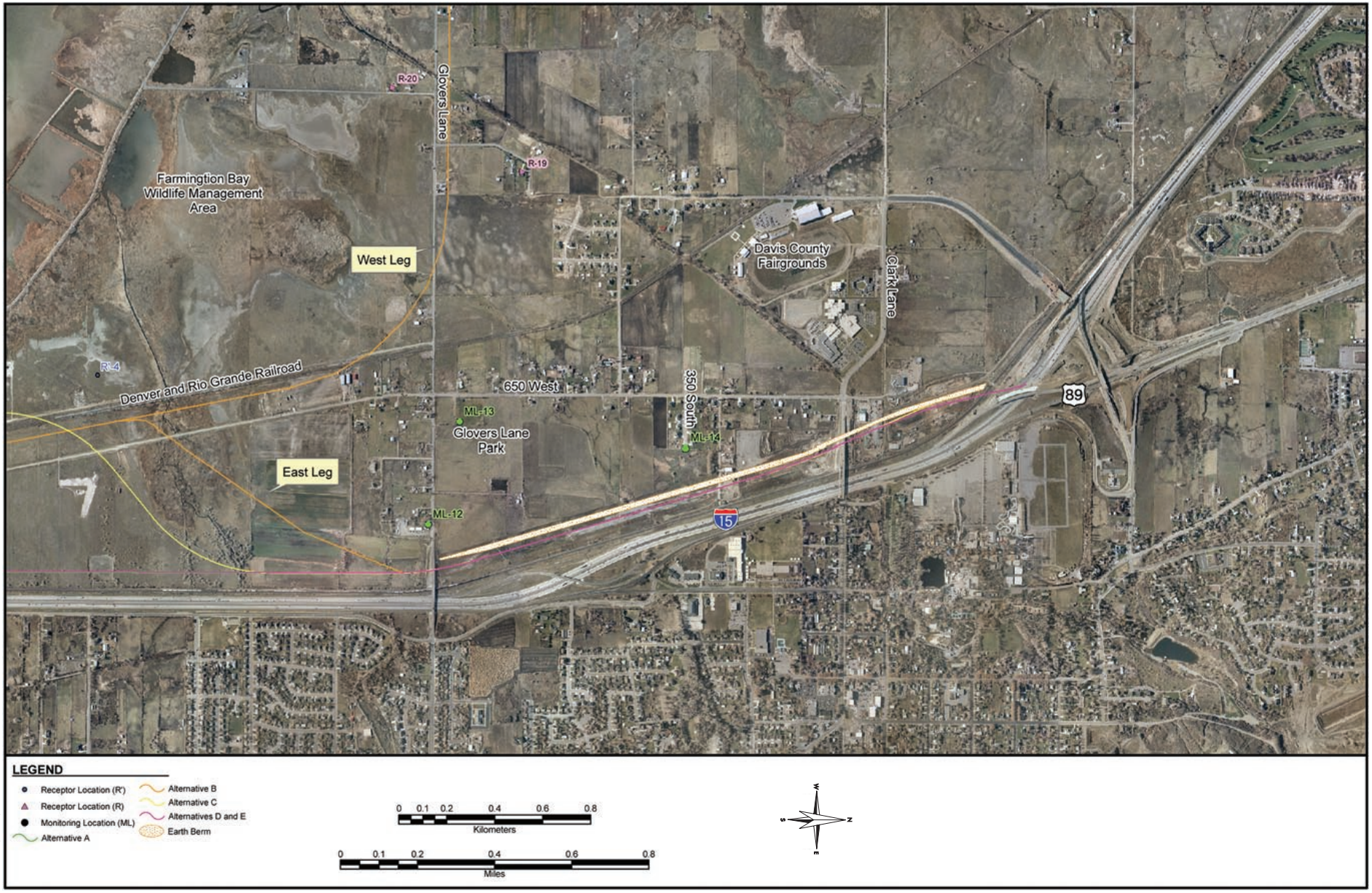
Figure 4.9-2
Legacy Parkway Noise Impact Assessment,
Segment 2: 900 North to 1200 North

03076.03 (11-04) SEIS

Figure 4.9-3
Legacy Parkway Noise Impact Assessment,
Segment 3: 1200 North to Parrish Lane

03076.03 (9-04) SEIS

Figure 4.9-4
Legacy Parkway Noise Impact Assessment,
Segment 4: Parrish Lane to Glovers Lane



03076.03 (10-04) SEIS

Figure 4.9-5
Legacy Parkway Noise Impact Assessment,
Segment 5: Glovers Lane to US-89/I-15 Interchange

03076.03 (10-04) SEIS

Figure 4.9-6
Legacy Parkway Noise Impact Assessment,
Segment 5: Glovers Lane to Northern Terminus (Alternative B Only)

substantial increase or the term "approach"; instead, it leaves interpretation of these terms to the states (see *Utah State Noise Guidelines*). Finally, FHWA NEPA guidance (Federal Highway Administration 1995) states that the significance of noise impacts identified under 23 CFR 772 must be identified based on the context and intensity of the noise impacts, where *context* refers to the extent of the noise impact (i.e., number of affected residences) and the existing noise environment, and *intensity* refers to the noise levels associated with the impact (i.e., predicted absolute noise level and predicted increase over existing noise level). Noise abatement measures that are reasonable and feasible and likely to be incorporated into the project, as well as noise impacts for which no apparent solution is available, must be identified before adoption of the final environmental document for a project.

This information has not changed since publication of the Final EIS.

Utah State Noise Guidelines

UDOT has established a Noise Abatement Policy (UDOT 08A2-1) that details highway traffic noise prediction requirements, noise analysis procedures, and noise abatement criteria consistent with the requirements of 23 CFR 772. According to this policy, a design year noise level within 2 dB(A) of the NAC is considered to approach the NAC, a design year noise level greater than or equal to the NAC is considered to exceed the NAC, and a 10-dB(A) increase over existing noise levels is considered to substantially exceed the NAC. This information has not changed since publication of the Final EIS. It should be noted that in 2004, UDOT published an updated Noise Abatement Policy. However, since the noise analysis conducted for this Supplemental EIS was initiated prior to the date of publication of the revised policy, the policy that was in effect in April 2000 was used to analyze abatement for traffic-related noise impacts.

4.9.2 Affected Environment

This section provides updated noise monitoring data that was collected along the proposed action corridor in October 2003.

4.9.2.1 Existing Noise Levels

Land uses adjacent to and within the study area encompass a mix of residential, commercial, agricultural, public recreational, and light-industrial activities (see Section 4.1, *Land Use.*) Although many of these land uses exhibit low background noise levels (e.g., open space agricultural land, pastureland, wetlands), there are several specific land uses in the area that have the potential to contribute more to ambient noise levels. Examples of such land uses are listed below.

- The Davis County sewage treatment plant, located at the west end of 1200 North in Woods Cross.
- The Bountiful Sanitary Landfill, located at the western edge of Pages Lane near West Bountiful.
- The Davis County Fairgrounds, located southeast of the 100 North and 1100 West intersection.
- The Salt Lake City International Airport.
- Light industrial businesses in the study area, including the South Bountiful Auto Salvage Yard and Quality Plating Facility, located at the west end of 2425 South in Woods Cross, and a small industrial area located south of State Street, adjacent to I-15, in Farmington.

As described above in Section 4.9.1.2, short-term noise monitoring was conducted at 17 locations in the study area (Figures 4.9-1 through 4.9-6). These locations were selected to represent residential and recreational locations in the study area where people could spend a substantial amount of time and where the impacts of the proposed action would be experienced. These areas do not necessarily represent atypically quiet or loud locations.

Table 4.9-1 shows the results of the noise monitoring at each location. Because large portions of each build alternative would be constructed in relatively undeveloped terrain in an area of few background noise sources, background noise levels are generally low throughout the corridor. Noise sources in the undeveloped portion of the alignment include farming operations, vehicle pass-by trips on minor arterials, and occasional aircraft overflights.

As illustrated in Table 4.9-1, existing noise levels met or exceeded the UDOT noise abatement criteria of 65 dB(A) at one location (ML-1 in Figure 4.9-1) due to the proximity of the monitoring site to I-215. Monitored noise levels at all other locations were below the residential NAC and ranged from 39 to 62 dB(A).

Table 4.9-1 Existing Noise Levels October 2003

Monitoring Location	Site Description	Date	L_{eq}	Approaches or Exceeds Residential NAC, 67 dB(A) or above
ML-1	Farmstead near I-215	10/07/2003	67	Yes
ML-2	Residences east of 2200 West	10/07/2003	52	No
ML-3	Residences on Century Farm Road east of 2200 West	10/07/2003	55	No
ML-4	Commercial/industrial site at 1100 West Center Street	10/02/2003	58	No
ML-5	West end of 900 North	10/02/2003	48	No
ML-6	500 South	10/03/2003	51	No
ML-7	1200 North; residences east of sewage treatment plant	10/02/2003	43	No
ML-8	Picnic area at Bountiful City Pond	10/02/2003	46	No
ML-9	Residences north of Porter Lane	10/02/2003	39	No
ML-10	Residences on Porter Lane	10/02/2003	48	No
ML-11	Undeveloped area at south end of 650 West	10/03/2003	45	No
ML-12	Residences on Glovers Lane	10/03/2003	59	No
ML-13	Glovers Lane Park	10/03/2003	56	No
ML-14	Residences east end of 350 South cul-de-sac	10/03/2003	62	No
ML-15	Residences, Farmington Ranch 100 South 1800 West	10/03/2003	45	No
ML-16	Burke (Park) Lane, north of residences	10/03/2003	57	No
ML-17	LDS Church, Farmington	10/03/2003	50	No

4.9.3 Environmental Consequences and Mitigation Measures

This section discusses updated operational noise impacts associated with the proposed build alternatives based on new noise monitoring, noise modeling, and abatement analyses completed since publication of the Final EIS. As described in Section 4.9.1.3, 23 CFR 772 specifies procedures and criteria for evaluating noise impacts associated with federally funded highway projects, and for determining whether such impacts are sufficient to justify funding noise abatement measures. In addition, UDOT has established a Noise Abatement Policy (UDOT 08A2-1) that is consistent with the 23 CFR 772 federal mandate that details highway traffic noise prediction requirements, noise analysis procedures, and noise abatement criteria. Both the federal regulations and the state guidance were used to assess whether operational noise impacts on residential and recreational receptors would require noise abatement to mitigate potential impacts.

For a more detailed discussion of the assessment of operational noise impacts, refer to the *Legacy Parkway Environmental Reevaluation, Noise Final Technical Report* (HDR Engineering, Inc. 2004e). See Section 4.20, *Construction Impacts*, for a discussion of construction-related noise impacts.

4.9.3.1 Operational Noise Impacts

Both modeled noise levels ("model receptors" designated R in Figures 4.9-1 through 4.9-6) and monitored noise levels from field measurements ("monitored levels" designated ML in Figures 4.9-1 through 4.9-6) were used in the noise model to characterize project-related noise impacts in the study area (i.e., both model locations and field locations were coded as receptor locations in the model). Data collected from the model was then used to determine whether predicted noise levels associated with the proposed action would approach or exceed the applicable residential NAC (65 dB[A]) or result in a 10-dB(A) increase over existing noise levels (a substantial increase according to UDOT criteria).

To ensure model accuracy, monitored noise levels were calibrated to within 2 dB(A) of the field measurements in those locations where existing traffic noise from I-15 and I-215 were predominant noise sources. In those locations where there were no existing sources of noise, the monitored noise levels were used as the background noise level.

Operational noise impacts associated with the No-Build Alternative and build alternatives are described below and summarized in Table 4.9-2. These impacts are described based on representative receiver locations that would potentially be affected by traffic volumes associated with the build alternatives, and have been categorized into five segments to facilitate their identification. These five segments, and some of the typical land uses associated with them, are summarized below.

- **Segment 1: I-215 to 900 North**. As illustrated in Figure 4.9-1, the southern portion of this segment is characterized primarily by undeveloped terrain, with scattered residences located in the general vicinity of I-215 (ML-1, ML-2, ML-3, R-1, and R-2). Just north of Center Street, a new residential development, the Foxboro residential development (R-3 through R-8), is under construction. Between the northern limit of the Foxboro development and 900 North, land use is either undeveloped or industrial in nature. The Davis County sewage treatment plant (south) and the Jordan River Raceway are also located in Segment 1.

- **Segment 2: 900 North to 1200 North**. This segment is characterized primarily by undeveloped terrain, as illustrated in Figure 4.9-2. There are scattered residences west of 1800 West just south of

500 South (ML-6), as well as five residences on 1200 North (ML-7), east of the Davis County sewage treatment plant (north).

- **Segment 3: 1200 North to Parrish Lane**. Segment 3 includes Bountiful City Pond (ML-8) and a residential neighborhood south of 1100 West (R-9 through R-18) (Figure 4.9-3). Residences are also located north of Porter Lane (ML-9) and South of Parish Lane (ML-10). As with Segments 1 and 2, the remaining land in Segment 3 is primarily undeveloped.

- **Segment 4: Parrish Lane to Glovers Lane**. North of Parrish Lane, Segment 4 is characterized by relatively undeveloped areas (ML-11) with scattered commercial and industrial facilities interspersed (Figure 4.9-4). There are no residences between Parrish Lane and Glovers Lane to the north; however several scattered residences (ML-12) and Glovers Lane Park (ML-13) are located in the vicinity of Glovers Lane and 650 West. The Farmington Bay Wildlife Management Area (FBWMA) is also located in Segment 4.

- **Segment 5: Glovers Lane to US-89/I-15 Interchange (Glovers Lane to Northern Terminus Alternative B only)**. As depicted in Figure 4.9-5, for Alternatives A, C, D, and E, Segment 5 extends between Glovers Lane and the US-89/I-15 interchange. In this segment, there is a residential development south of Clark Lane just east of 650 West (ML-14). The remaining land is primarily undeveloped.

  Since the Alternative B alignment extends north and west of the other build alternatives, the receptors potentially affected by the alternative are slightly different. A new residential development, Farmington Ranches, is located in this expanded area at the west end of Clark Lane (ML-15) (Figure 4.9-6). Scattered residences are also located along Glovers Lane (R-19 and R-20) and north of Farmington Ranches (ML-16). The remaining land is primarily undeveloped, including the northern terminus (ML-17).

No-Build Alternative

Existing Conditions (2004)

No project-related noise impacts would occur under the No-Build Alternative. Noise levels illustrated in Table 4.9-2 under existing conditions would continue as described.

Future Conditions (2020)

If none of the build alternatives is implemented, future projects will likely be undertaken to improve access to land in the project area, although the nature and timing of these projects are not known at this time. It is likely that these future projects would result in increased noise from traffic and human use in the study area.

Table 4.9-2 Modeled Noise Levels at Sensitive Receptors

					Alternative A			Alternative B			Alternative C			Alternatives D and E		
Receptor	Number of Dwelling Units	Other Land Use Descriptor	Modeled Existing Sound Level (L_{eq})	Existing SL or SE	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (Approach SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)
Segment 1: I-215 to 900 North																
ML-1	6		67	SL	67	0	SL	68	1	SL	67	0	SL	69	2	SL
ML-2	7		53	No	56	3	No	72	19	Both	56	3	No	55	2	No
ML-3	2		56	No	59	3	No	65	9	SL	59	3	No	58	2	No
ML-4	—	Industrial	57	No	76	19	Both	63	6	No	73	16	Both	73	16	Both
ML-5	—	Undeveloped	50	No	80	30	Both	—	—	—	76	26	Both	76	26	Both
R-1	7		54	No	57	3	No	58	4	No	57	3	No	58	4	No
R-2	3		54	No	57	3	No	59	5	No	58	4	No	58	4	No
R-3	3	Foxboro Development	47	No	72	25	Both	69	22	Both	73	26	Both	73	26	Both
R-4	3	Foxboro Development	48	No	73	25	Both	72	24	Both	72	24	Both	73	25	Both
R-5	3	Foxboro Development	52	No	77	25	Both	75	23	Both	71	19	Both	72	20	Both
R-6	3	Foxboro Development	43	No	67	24	Both	66	23	Both	67	24	Both	68	25	Both
R-7	3	Foxboro Development	43	No	68	25	Both	67	24	Both	67	24	Both	68	25	Both
R-8	3	Foxboro Development	44	No	69	25	Both	68	24	Both	67	23	Both	67	23	Both
Segment 2: 900 North to 1200 North																
ML-6	1		50	No	69	19	Both	66	16	Both	64	14	SE	69	19	Both
ML-7	5		44	No	68	24	Both	73	29	Both	78	34	Both	78	34	Both
Segment 3: 1200 North to Parrish Lane																
ML-8	—	Bountiful City Pond	46	No	70	24	Both	78	32	Both	78	32	Both	78	32	Both
ML-9	6		41	No	73	32	Both	66	25	Both	68	27	Both	74	33	Both
ML-10	3		48	No	74	26	Both	71	23	Both	74	26	Both	75	27	Both
R-9	2		40	No	67	27	Both	66	26	Both	68	28	Both	67	27	Both
R-10	3		40	No	65	25	Both	65	25	Both	67	27	Both	66	26	Both
R-11	2		40	No	64	24	SE	64	24	SE	66	26	Both	65	25	Both
R-12	2		39	No	63	24	SE	64	25	SE	65	26	Both	64	25	SE

					Alternative A			Alternative B			Alternative C			Alternatives D and E		
Receptor	Number of Dwelling Units	Other Land Use Descriptor	Modeled Existing Sound Level (L_{eq})	Existing SL or SE	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (Approach SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)	Modeled Sound Level (2020 L_{eq})	Change From Existing	Noise Impact (SL or SE)
R-13	3		40	No	64	24	SE	65	25	Both	66	26	Both	65	25	Both
R-14	2		40	No	65	25	Both	65	25	Both	67	27	Both	66	26	Both
R-15	3		38	No	62	24	SE	63	25	SE	64	26	SE	63	25	SE
R-16	2		39	No	63	24	SE	64	25	SE	65	26	Both	64	25	SE
R-17	2		41	No	65	24	Both	66	25	Both	67	26	Both	66	25	Both
R-18	2		41	No	67	26	Both	66	25	Both	68	27	Both	67	26	Both
Segment 4: Parrish Lane to Glovers Lane																
ML-11	—	Undeveloped	48	No	70	22	Both	74	26	Both	70	22	Both	69	21	Both
ML-12	3		60	No	73	13	Both	62	2	No	73	13	Both	72	12	Both
ML-13	—	Glovers Park	56	No	66	10	Both	66	10	Both	66	10	Both	65	9	SL
ML-14	6		62	No	72	10	Both	—	—	—	72	10	Both	71	9	SL
Segment 5: Glovers Lane to US-89/I-15 Interchange (Glovers Lane to Northern Terminus, Alternative B Only)																
ML-15	12		44	No	—	—	—	75	31	Both	—	—	—	—	—	—
ML-16	6		58	No	—	—	—	72	14	Both	—	—	—	—	—	—
ML-17	8		49	No	—	—	—	76	27	Both	—	—	—	—	—	—
R-19	1		48	No	—	—	—	69	21	Both	—	—	—	—	—	—
R-20	1		44	No	—	—	—	71	27	Both	—	—	—	—	—	—

Notes:

SL = sound level impact (approaches or exceeds 65 dB[A])

SE = substantial exceedance (greater than 10 dB[A] increase over existing conditions)

ML = monitoring location

R = noise model receptor location

— = receptor not applicable to the alternative

Build Alternatives

Alternative A

Modeled sound levels and project-related impacts under Alternative A are shown in Table 4.9-2. Depending on receptor location relative to the proposed alignment, modeled sound levels would increase by 0 to 32 dB(A) as a result of Alternative A. About 176 residences in the study area would be affected. Noise levels in the vicinity of these residences would increase between 10 and 32 dB(A), and this outcome would represent a substantial exceedance of the NAC (see Section 4.9.1.3).

Alternative B

Modeled sound levels and project-related impacts under Alternative B are shown in Table 4.9-2. As with Alternative A, modeled sound levels would increase between 1 and 32 dB(A) as a result of Alternative B, depending on receptor location relative to the proposed alignment. About 237 residences in the study area would be affected. Noise levels in the vicinity of these residences would increase between 10 and 32 dB(A); such levels would represent a substantial exceedance of the NAC.

Alternative C

Modeled noise levels and project-related impacts under Alternative C are shown in Table 4.9-2. Under Alternative C, modeled sound levels would increase between 0 and 34 dB(A), depending on receptor location relative to the proposed alignment. About 89 residences in the study area would be affected. Noise levels in the vicinity of these residences would increase between 10 and 34 dB(A) over existing noise levels, and this result would represent a substantial exceedance of the NAC.

Alternatives D and E

Modeled sound levels and project-related impacts under Alternatives D (Final EIS Preferred Alternative) and E are shown above in Table 4.9-2. Under Alternatives D and E, modeled sound levels would increase between 2 and 34 dB(A), depending on receptor location relative to the proposed alignment. About 131 residences in the study area would be affected. Noise levels in the vicinity of these residences would increase between 10 and 34 dB(A); such levels would represent a substantial exceedance of the NAC.

Summary of Receptors Affected by Noise

Table 4.9-3 summarizes by alternative the number of receptors that would exceed the NAC standard (67 dB[A]) or result in a substantial exceedance of the NAC standard (e.g., an increase of greater than 10 dB[A] over existing conditions) in the modeled year 2020.

Table 4.9-3 Total Number of Modeled Receptors Affected by Proposed Build Alternatives

Alternative	Total Number of Modeled Receptors	Number of Receptors with SL Impact[1]	Number of Receptors with SEs[2]	Total Number of Receptors Affected [3]
No-Build Alternative	37	1	NA	1
Alternative A	32	23	27	28
Alternative B	35	27	29	31
Alternative C	32	26	27	28
Alternatives D and E	32	25	25	28

Notes:

SL = sound level impact

SE = substantial exceedance

[1] An SL impact occurs anytime noise levels at a receptor approach or exceed 65 dB(A). For all build alternatives, this impact would occur at modeled year 2020.

[2] An SE occurs anytime the noise level increases more than 10 dB(A) over existing conditions.

[3] Represents total number of modeled receptors with either an SL impact or an SE.

4.9.3.3 Noise Abatement Measures

Noise Abatement Criteria

This section discusses methods for abating the operational traffic noise impacts identified in the previous section. Noise abatement for construction-related noise impacts is discussed in Section 4.20.3.3 of this document. According to the UDOT noise abatement policy in effect at the time this analysis was completed (UDOT 08A2-1, April 2000), noise abatement will be considered for Type I projects (i.e., new highway construction) where traffic noise impacts are identified. To be eligible for consideration of noise abatement measures, a new or proposed subdivision or other development must have a recorded plat prior to the earliest of the following occurrences.

- The earliest environmental approval date of the highway improvement as per completion of Activity 79d (Record of Decision [ROD] for an EIS) or Activity 67d (prepare final environmental document) of the UDOT *Design Process Manual*.

- The date that the local municipality's general plan or master plan has designated the highway for major improvements.

The following noise abatement measures can be included to reduce impacts from traffic noise.

- Traffic management measures (such as restricting vehicle speeds and prohibiting compression braking).

- Altering horizontal and vertical alignments (for example, depressing roadway alignments to create shielding effects).

- Constructing noise barriers when reasonable and feasible.
- Installing noise insulation in public-use or nonprofit institutional buildings.

Because the proposed roadway would act as a primary north-south connector between I-215 in Salt Lake City and the northern terminus at I-15 in Farmington, substantial speed restrictions would not meet the overall objectives of the project. Altering horizontal and vertical alignments would not be feasible because of the costs associated with excavations, other geotechnical considerations, and the potential for additional impacts on wetland areas. As a result, this section focuses on considering noise barriers as a primary means of abating project-related noise impacts.

According to the UDOT noise abatement policy (08A2-1, April 2000), several factors go into the determination of whether noise abatement measures, and specifically, noise barriers, are reasonable and feasible for abating noise impacts. These factors include the following.

- **Effectiveness of noise barrier**. The noise barrier has to achieve at least 5 dB(A) of exterior noise reduction at typical affected residences nearest the roadway.
- **Cost to install noise barrier**. The cost per residence to install a noise barrier (based on the severity of the noise impact, i.e., the increase in project-related noise levels over existing noise levels), not including other direct costs (e.g., acquiring new right-of-way, landscaping), must not exceed the abatement limit established for the project. At the time of this analysis, the noise abatement limit was based on a standard noise barrier 3 m high by 70 m long (10 ft high by 230 ft long) at an installed cost of $107.64 per square meter, or $10.00 per square foot (Adams pers. comm..). The noise abatement limit of $22,604 for this analysis was calculated based on the number of residences that would benefit (i.e., receive an improvement of at least 5 dB[A]) from construction of a noise barrier. This figure represents an increase from the abatement limit of $20,000 disclosed in the Final EIS.
- **Views and opinions of affected residents**.
- **Engineering considerations**. Engineering considerations such as abatement design, performance, and roadway safety must be taken into account.

The effectiveness of noise barriers is generally limited to areas within about 152 m (500 ft) of the proposed right-of-way. Beyond this distance, barriers do not effectively reduce noise levels at individual residences. Therefore, the noise abatement analysis was limited to those areas adjacent to each alignment where clustered residences would potentially benefit from the barrier (i.e., achieve at least a 5-dB[A] reduction in project-related noise levels) and would meet the UDOT cost-effectiveness criteria. The selection of feasible noise barrier locations is described in the following section.

Selection of Feasible Noise Barrier Locations

Based on aerial photographs of land uses in the study area, seven locations were evaluated to determine whether noise barriers would be feasible and effective, given noise levels associated with specific build alternatives (indicated in parenthesis). As described below, noise barriers were considered potentially feasible at three of these locations (R-3 through R-8, ML-7, and ML-2).

The potential locations for noise barriers evaluated in this document are different than those evaluated in the Final EIS. The differences are attributable to updated noise monitoring data; application of the revised FHWA TNM (versus the STAMINA model used for the Final EIS), which takes into consideration terrain

features, the height of the highway embankment, and the shielding effects of intervening rows of residences; and application of UDOT's revised Noise Abatement Policy.

- **Residences near ML-3: (Alternative B)**. The Alternative B alignment passes residences near ML-3 (Figure 4.9-1). Although the alignment does not lie within 152 m (500 ft) of these residences (i.e., the limit to which barriers are typically considered effective), a noise barrier was modeled near ML-3 to determine its noise abatement potential. It was determined that a barrier at this location would not provide the 5 dB(A) of noise reduction required by UDOT's Noise Abatement Policy. As a result, a barrier at this location was eliminated from consideration.

- **Residences near ML-9 (Alternatives A, D, and E)**. The Alternatives A, D, and E alignments pass residences near ML-9 (Figure 4.9-3). Although these alignments do not lie within 152 m (500 ft) of these residences, a noise barrier was modeled near ML-9 to determine its noise abatement potential. It was determined that a barrier at this location would not provide the 5 dB(A) of noise reduction required by UDOT's Noise Abatement Policy. As a result, a barrier at this location was eliminated from consideration.

- **Residences near ML-15 and ML- 17 (Alternative B)**. As described in Section 4.9.3.1, Alternative B passes through a relatively new residential development (Farmington Ranches) that was platted after the original ROD for Legacy Parkway was completed (October 1, 2000). The local jurisdiction made land use planning decisions following selection of Alternative D (Final EIS Preferred Alternative), and did not take into consideration that a supplemental environmental process could result in selection of an alignment at a different location, including that associated with Alternative B. Construction of noise barriers in the vicinity of ML-15 and ML-17 (Figure 4.9-6) would require the removal of more than 20 residences, as well as a middle school and possibly a church. As a result, noise barriers were not modeled and are not considered feasible at this location.

- **Residences near R-9 through R-18 (Alternative A)**. The Alternative A alignment passes within 244 m (800 ft) of the residential neighborhood south of 1100 West (R-9 through R-18). A noise barrier was modeled near these receptors to determine its potential effectiveness. It was determined that a barrier at this location would not provide the 5 dB(A) of noise reduction required by UDOT's Noise Abatement Policy. As a result, a barrier at this location was eliminated from consideration.

- **Residences near R-3 to R-8 (All Alternatives)**. All the proposed build alternatives pass residences near R-3 through R-8 (Figure 4.9-1) (the Foxboro development). The noise model demonstrated that a noise barrier at this location could be feasible. The following section describes how a noise barrier at this location would function under each of the build alternatives.

- **Residences near ML-7 (Alternative B, C, D, and E)**. Alternatives B, C, D, and E pass residences near ML-7, which is located on 1200 North, near the Davis County sewage plant (Figure 4.9-2). The noise model demonstrated that a noise barrier at this location could be feasible under some of the alternative alignments. The following section describes how a noise barrier at this location would function under those build alternatives.

- **Residences near ML-2 (Alternative B)**. The Alternative B alignment passes residences near ML-2, which is located south of center Street and east of 2200 West (Figure 4.9-1). The noise model demonstrated that a noise barrier at this location could be feasible. The following section describes how a noise barrier at this location would function under Alternative B.

- **Recreational Locations (All Alternatives)**. There are several recreational resources located throughout the project corridor including the Bountiful City Pond, the FBWMA, and Glovers Lane

Park. Noise abatement measures for recreational resources are considered for those areas where "frequent human use occurs and a lower noise level would be of benefit" (23 CFR 772.11). The recreational facilities located near the proposed build alternatives are active facilities and are generally associated with higher noise levels. Relatively noisy activities are associated with both the Bountiful City Pond and the FBWMA (e.g., boating, hunting). In addition, the Bountiful City Pond is located next to an active landfill (i.e., an industrial noise source), which also contributes to the noise environment at the pond. Glovers Lane Park includes a baseball field and is located adjacent to an arterial with pass-by traffic. Finally, all the recreational resources are affected to some extent by aircraft overflights from the Salt Lake City International Airport. For all these reasons, a pristine noise environment is not a significant attribute of the recreational resources in the study area. It is unlikely that there would be any benefit from implementation of noise abatement measures in these locations. Chapter 5, *Draft Section 4(f) and 6(f) Evaluation*, provides an additional discussion of noise impacts on recreational resources in the study area that qualify for protection under Section 4(f) of the Department of Transportation Act of 1966.

Noise Barrier Analysis by Alternative Alignment

This section evaluates the effectiveness and feasibility of noise barriers in the three residential locations that, according to the model, would likely benefit from the implementation of noise abatement measures (e.g., residences near R-3 through R-8, ML-7, and ML-2). This discussion is presented by build alternative. Potential noise abatement for construction activities is also described.

Alternative A

Residences near R-3 through R-8 (Foxboro Residential Development)

The Foxboro development was platted in 2003 after the original ROD for Legacy Parkway was completed (October 1, 2000). According to UDOT's Noise Abatement Policy, because the development was platted after the ROD was issued, the development is not eligible for noise barriers.

Residences near ML-7

Under Alternative A, the proposed alignment would be more than 152 m (500 ft) from these residences; therefore, a noise barrier was not modeled at this location for this alternative.

Residences near ML-2

Under Alternative A, the proposed alignment would be more than 152 m (500 ft) from these residences; therefore, a noise barrier was not modeled at this location for this alternative.

Alternative B

Residences near R-3 through R-8 (Foxboro Residential Development)

As described for Alternative A, the Foxboro development was platted after the ROD for Legacy Parkway was signed; therefore, the development is not eligible for consideration of noise barriers.

Residences near ML-7

The Alternative B alignment would be located approximately (656 ft) closer to residences near ML-7 than under Alternative A. However, a noise barrier at this location, modeled at a height of 10 m (32.8 ft),

would not provide an acoustic benefit of 5 dB(A) or more, and would, therefore, not meet UDOT's feasibility criteria.

Residences near ML-2

The Alternative B alignment would pass within 152 m (500 ft) of a group of residences near the southern terminus of the project, east of 2200 West (near ML-2). A noise barrier was modeled in the vicinity of these residences (Figure 4.9-1), and noise barrier heights were evaluated to determine what height would provide the most cost-effective abatement for affected receptors (i.e., the point at which increasing the height further would not provide more acoustic benefit).

At this location and under this alternative, a noise barrier 377 m (1,237 ft) long and 5 m (16.4 ft) high would provide an acoustic benefit to five residences at a cost of $202,900. The cost per dwelling of $13,527 would be less than the abatement limit ($22,600 per affected residence). Therefore, a noise barrier at this location would be reasonable and feasible according to UDOT's Noise Abatement Policy. Table 4.9-4 summarizes the proposed use of a barrier at this location if Alternative B is implemented.

Table 4.9-4 Noise Abatement for Legacy Parkway

Location	Noise Levels (No Barrier)	Noise Levels (With Barrier)	Change in Noise Levels	Wall Height (m)	Wall Length (m)	Cost of Barrier	Cost per Residence	Meets UDOT Noise Abatement Criteria
Alternative B								
Residences Near ML-2 (2200 West)	73 to 75	67 to 69	4 to 7	5	377	$202,900	$13,527	Yes
Alternative C								
Residences near ML-7 (1200 North)	69 to 71	63 to 66	5 to 6	5	225	$121,095	$10,031	Yes

Alternative C

Residences near R-3 through R-8 (Foxboro Residential Development)

As described for Alternative A, the Foxboro development was platted after the ROD for Legacy Parkway was signed; therefore, the development is not eligible for consideration of sound walls.

Residences near ML-7

The Alternative C alignment would pass within 152 m (500 ft) of the residences near ML-7 at 1200 North. At this location and under this alternative, a noise barrier 225 m (738 ft) long and 5 m (16.4 ft) high would provide an acoustic benefit to four residences at a cost of $121,095. The cost per dwelling of $10,091 (based on the severity of the noise impact) would be less than the abatement limit ($22,600 per affected residence). Therefore, a noise barrier at this location, as illustrated in Figure 4.9-2, would be reasonable and feasible according to UDOT's Noise Abatement Policy. Table 4.9-4 summarizes the proposed use of a barrier at this location if Alternative C is implemented.

Residences near ML-2

Under Alternative C, the proposed alignment would be more than 152 m (500 ft) from these residences, so a noise barrier was not modeled at this location.

Alternatives D and E

Residences near R-3 through R-8 (Foxboro Residential Development)

As described for Alternative A, the Foxboro development was platted after the ROD for Legacy Parkway was signed; therefore, the development is not eligible for consideration of sound walls.

Residences near ML-7

The alignments of Alternatives D and E would pass within 152 m (500 ft) of one residence on 1200 North, in the vicinity of ML-7. At this location and under this alternative, a noise barrier 1 to 10 m (3.3 to 33 ft) high and about 350 m (1,148 ft) long would provide acoustic benefit to only that one residence, at a cost of between $37,674 and $376,740. Such cost exceeds the UDOT cost abatement limit of $22,600 per affected residence, making a noise barrier at this location infeasible according to UDOT's Noise Abatement Policy.

Residences near ML-2

Under Alternatives D and E, the proposed alignment would be more than 152 m (500 ft) from these residences, so a noise barrier was not modeled at this location.

Section 4.10
Water Quality

This section discusses the quality of surface water and groundwater in the study area. It includes information on UDOT deicing practices and how these practices could affect water quality, as well as information on other contaminants of concern evaluated that were in the Final EIS. This section also presents new information on groundwater rights in the study area and a discussion of the newly designated drinking water source protection (DWSP) zones.

4.10.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with water quality in the study area, Sections 3.10 and 4.10 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for water quality is described in Section 4.0.1, *Study Area*, of this document.

Recent research on how the operation of roadways affects water quality was reviewed to determine whether new information was available that would update or change any of the conclusions or methodology presented in the Final EIS.[1] Research on deicing methods was included in this literature review, and UDOT was contacted to determine what deicing practices are typically implemented in the State of Utah (Berhard pers. comm.). The most recent water quality regulations and Clean Water Act Section 303(d) list of impaired waters was obtained from the UDEQ (Utah Department of Environmental Quality 2004), and updated information on groundwater right locations in the study area was obtained from the UDNR Division of Water Rights (UDNR Division of Water Rights 2003). UDEQ, Division of Water Quality, and UDEQ, Division of Drinking Water were also consulted regarding updated drinking water protection zones and potential changes to the Clean Water Act Section 401 Water Quality Certification for the proposed action (see Section 4.11, *Permits and Clearances*). The U.S. Environmental Protection Agency (EPA) STORET database, EPA's largest computerized environmental data system, was also reviewed for new water quality information on modeled waterways.

In addition, both the affected environment and environmental consequences sections of the Final EIS were reviewed to determine whether the decision to narrow the proposed right-of-way from 100 m (328 ft) to 95m (312 ft) would change information disclosed in the Final EIS specific to water quality (see Chapter 3, *Alternatives*).

[1] This research included review of 31 papers and reports in various scientific journals and records. See Chapter 8, *References*, of this document for specific references for this literature.

4.10.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to the quality of surface water and groundwater in the study area. Topics discussed include water quality regulations applicable in the study area, the quality of water in Great Salt Lake, the quality of surface water conveyances and groundwater, and groundwater rights and wellhead protection zones. This section also provides information on typical deicing methods used by government agencies, and those specifically used by UDOT in the Salt Lake Valley. Updated information on the use of gray water and the biogeochemical function of wetlands is also provided in this section.

4.10.2.1 Water Quality Regulations

As stated in the Final EIS, water quality in the study area is regulated by the EPA, the Corps, and UDEQ under Sections 303, 401, 402, and 404 of the CWA. (See Section 4.11, *Permits and Clearances*, of this document for a more complete discussion of these regulations.) To meet CWA goals, the State of Utah has implemented the Utah Water Quality Act and classified surface waters in Utah into Beneficial Use Classifications (see Table 3-25 in the Final EIS). Each classification has an associated numerical or narrative standard, both of which are explained in detail in Section 3.10.1 and Table 3-26 in the Final EIS. One of UDEQ's goals is to ensure that projects like the Legacy Parkway project do not cause the quality of the receiving waters to degrade such that the numerical standards are exceeded.

None of the applicable water quality regulations mentioned above has changed since publication of the Final EIS.

4.10.2.2 Great Salt Lake Water Quality

As stated in the Final EIS, relative to water quality, Great Salt Lake is best known for its high salinity, which ranges from 9 to 28 percent, depending on location. Other water quality constituents in the lake include magnesium, potassium, calcium, chloride, and sulfate. Under the Utah Water Quality Act, UDEQ classifies Great Salt Lake as a Class 5 water, which means it is protected for primary and secondary contact recreation, aquatic wildlife, and mineral extraction.

4.10.2.3 Water Quality of Surface Conveyances

As stated in the Final EIS, each of the proposed build alternatives would cross several rivers and creeks in the study area (see Figure 3-18 and Table 3-27 in the Final EIS). These rivers and creeks currently receive runoff from I-15, and were receiving runoff from I-15 at the time the Final EIS was published.

In April 2004, UDEQ updated its CWA Section 303(d) List of Impaired Waters to include portions of the Jordan River that are in the study area (Utah Department of Environmental Quality 2004). Specifically, the Jordan River from Farmington Bay upstream 9.8 km (6.1 mi) is now listed for low dissolved oxygen concentrations and high total dissolved solids (TDS). Figure 4.10-1, which updates Figure 3-18 in the Final EIS, shows the segment of the Jordan River that is impaired. This update to the impaired list means that the standards for beneficial use Classification 3C, nongame fish and other aquatic wildlife, and Classification 4, agricultural uses, in this portion of the Jordan River are not being met and that UDEQ may limit discharges by Utah Pollutant Discharge Elimination System (UPDES) permit holders that lower levels of dissolved oxygen (i.e., nutrients) into this segment of the Jordan River. This TDS limitation

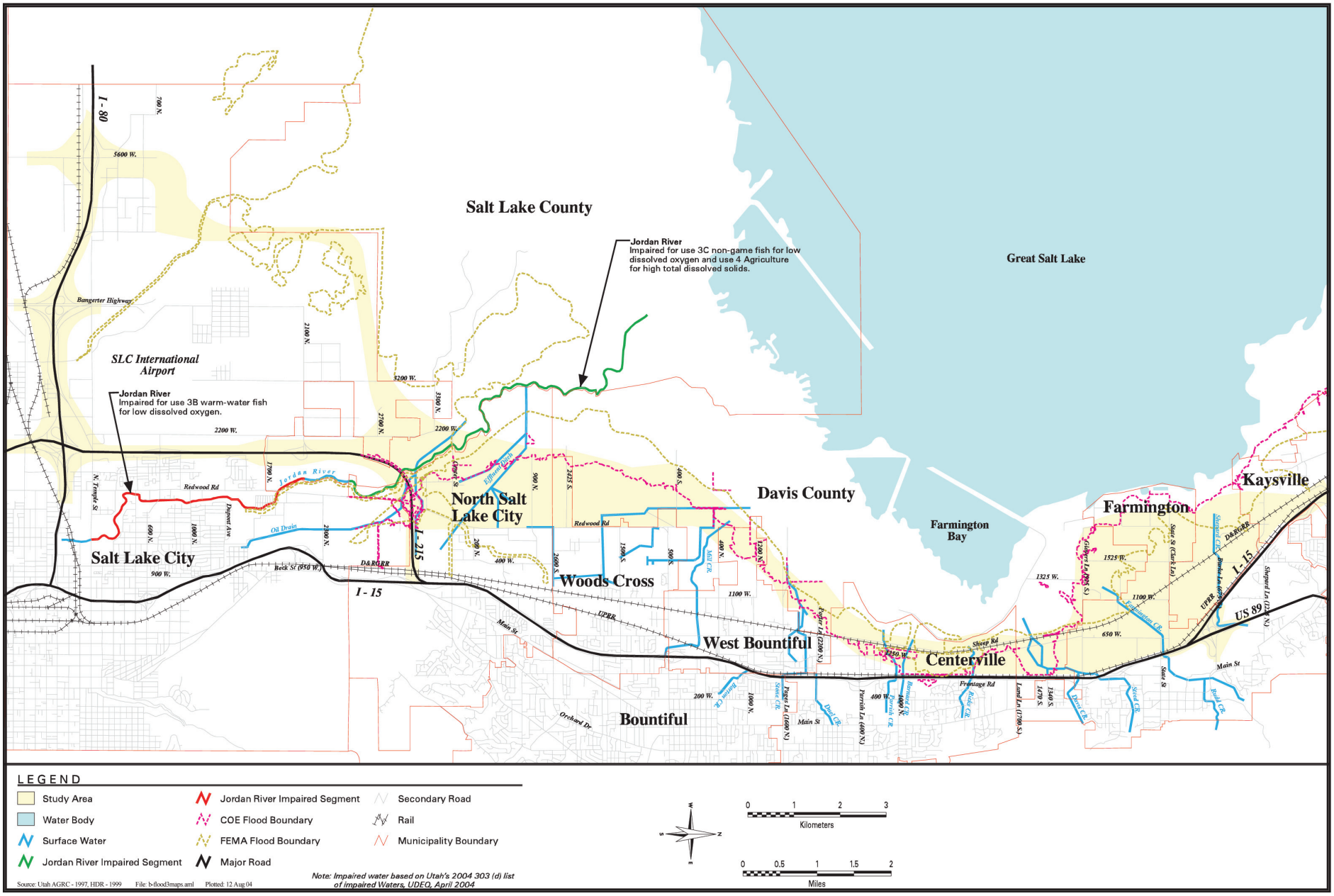


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Figure 4.10-1
Impaired Segment of the Jordan River within the Study Area

could apply to UPDES construction permits associated with construction projects, such as Legacy Parkway. The UDEQ report also lists the Jordan River as low priority for further analysis.

No other changes to the surface water quality have occurred since publication of the Final EIS.

4.10.2.4 Groundwater Quality

As described in the Final EIS, a multilayered groundwater flow system underlies the study area. A shallow, unconfined (i.e., not under pressure) aquifer lies under the ground surface up to a depth of 3 m (10 ft). This shallow aquifer is recharged by precipitation, upward leakage from the principal aquifer, and river infiltration. It exhibits higher concentrations of dissolved solids, sodium, and chloride than does the principal aquifer.

The principal aquifer, which is typically located over 60 m (200 ft) below the ground surface, is separated from the shallow aquifer by a layer of fine-grained soil. It is a confined aquifer (i.e., under pressure) that is recharged through precipitation from the base of the Wasatch Mountains. As stated in the Final EIS, it is currently used for public supply and irrigation. The water quality of the principal aquifer varies with depth and location, but it is generally characterized by lower concentrations of dissolved solids than the shallow aquifer (i.e., generally less than 500 milligrams per liter) (Baskin et al. 2002).

No supplemental information or research has been collected to indicate that the groundwater quality in the study area has substantively changed since publication of the Final EIS.

4.10.2.5 Groundwater Rights

As described in the Final EIS, a number of private and municipal wells are located in the study area. The UDNR Division of Water Rights tracks groundwater rights according to an inventoried water right number. Each water right number represents one or more actual groundwater wells. Figure 4.10-2 illustrates the current location of existing private wells in the study area, both domestic and non-domestic (i.e., irrigation, stock watering, municipal, or recreational) (UDNR Division of Water Rights 2004). Several of the wells in the study area are no longer in the footprint of the proposed build alternative alignments because of the narrowed right-of-way. Figure 4.10-2 updates Figure 3-20 in the Final EIS to reflect changes in well status since publication of the Final EIS.

At the time the Final EIS was published, UDEQ was responsible for establishing wellhead protection areas around municipal wells to protect public water supplies. UDEQ now refers to wellhead protection areas as drinking water source protection (DWSP) zones. UDEQ requires that owners of wells that are used to supply public drinking water (i.e., serve more than 25 people) prepare a DWSP plan (UAC R309-600). The plan must identify four distinct protection zones, each of which has different management requirements, as described below.

- Zone 1 is the area within a 30-m (100-ft) radius of the wellhead.
- Zone 2 is the area within a 250-day groundwater time of travel to the wellhead.
- Zone 3 is the area within a 3-year groundwater time of travel to the wellhead.
- Zone 4 is the area within a 15-year groundwater time of travel to the wellhead.

In general, development is not allowed within a designated DWSP zone unless the development is consistent with the DWSP plan. Figure 4.10-3 updates Figure 3-21 in the Final EIS to reflect designation of the new DWSP zones (UDNR Division of Water Rights 2004). One DWSP zone (a Zone 4) illustrated on Figure 4.10-3 encroaches into the study area; this DWSP zone is associated with a well owned by the City of Woods Cross. DWSP zones associated with inactive wells were not analyzed in this document.

4.10.2.6 Deicing Operations

The following provides a brief discussion of typical deicing methods employed by UDOT in the Salt Lake Valley, which includes Salt Lake and Davis Counties and encompasses the study area. Although deicing operations were not described in detail in the Final EIS, this section is presented to provide additional information on what constituents could be introduced into surface and shallow groundwater systems in the study area if any of the proposed build alternatives were constructed. UDOT uses all the methods described below throughout the state to prevent ice from building up on roads.

Salt

The application of granular salt (NaCL) to a roadway is the most widely used deicing method. UDOT uses two main types of salt on roads: solar salt and Redmond Mineral salt. Solar salt is derived from evaporation beds, such as Great Salt Lake, and typically consists of over 99 percent sodium chloride. Redmond Mineral salt comes from an underground salt deposit near Redmond, Utah, and consists of approximately 93 to 98 percent sodium chloride, with the remainder attributed to trace minerals (Anderson and Basion pers. comm.). Both products contain anti-caking compounds according to UDOT specifications, which include small amounts of ferryl cyanide (50 parts per million) (Berhard pers. comm.).

With the exception of applying abrasives alone, all deicing methods employ some form of salt. UDOT minimizes the use of salt to the extent possible for economic and environmental reasons (Berhard pers. comm.).

Abrasives (Sand)

Abrasives can also be applied to a roadway as a deicing method, although they have not been proven effective unless combined with salt. Studies suggest that at highway speeds, abrasives can be swept off the road after eight to 12 vehicle passes and that friction benefits are minimal (Nixon 2002). The use of abrasives can also degrade local air quality and can result in an accumulation of sand in gutters (Nixon 2002; Schlup and Ruess 2002).

UDOT avoids using abrasives in the Salt Lake Valley because, when airborne, they can contribute to particulate matter 10 microns in diameter or less (PM10) in the air and degrade local air quality (Berhard pers. comm.).

Abrasives and Salt

Salt typically will not melt ice at cooler temperatures (e.g., below –9 degrees Celsius [15 degrees Fahrenheit]). Abrasives are therefore sometimes added to salt when temperatures are anticipated to be very low. As stated above, UDOT avoids the use of abrasives in the Salt Lake Valley because of air quality concerns.

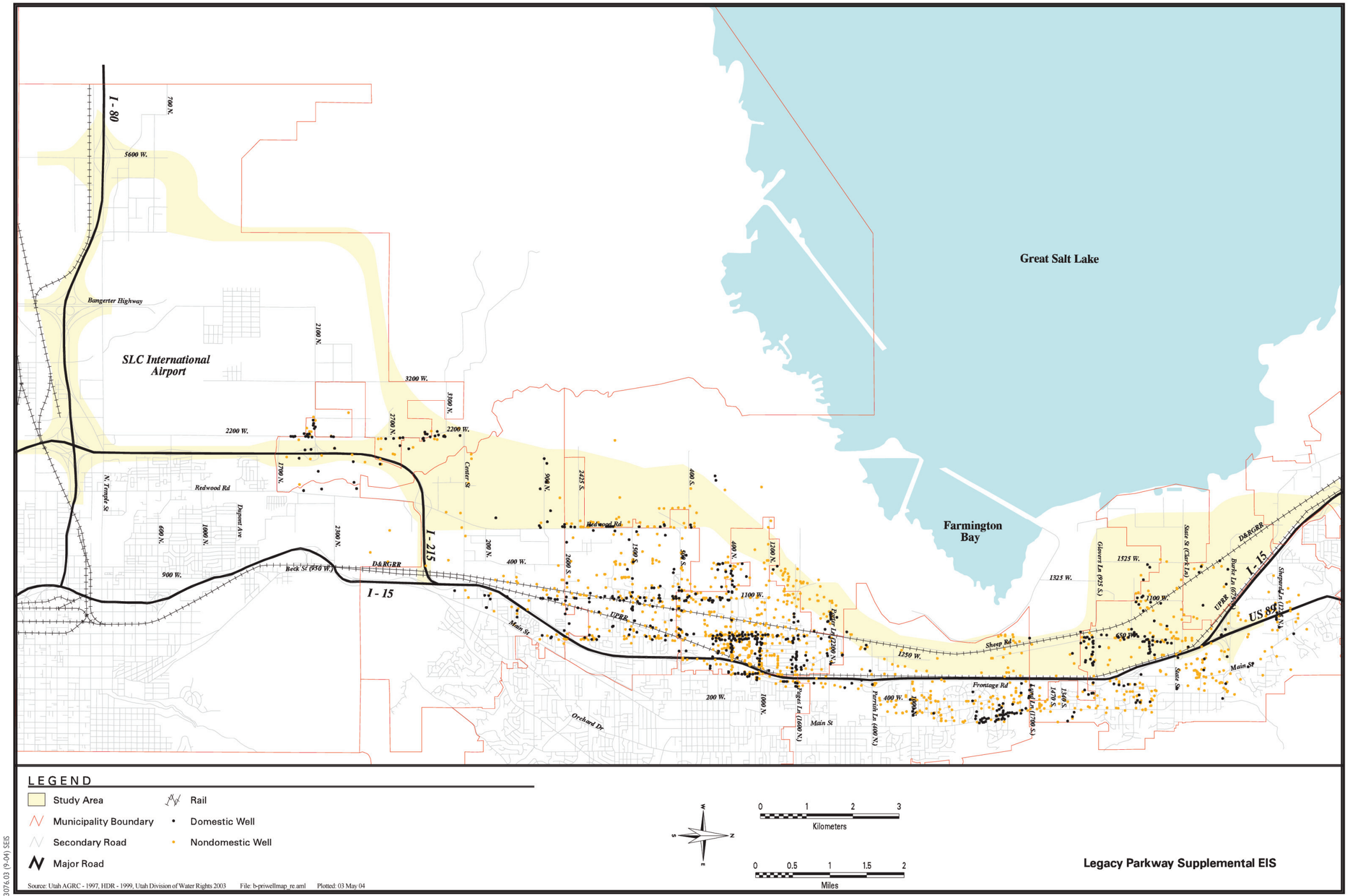

Figure 4.10-2
Existing and Private Wells

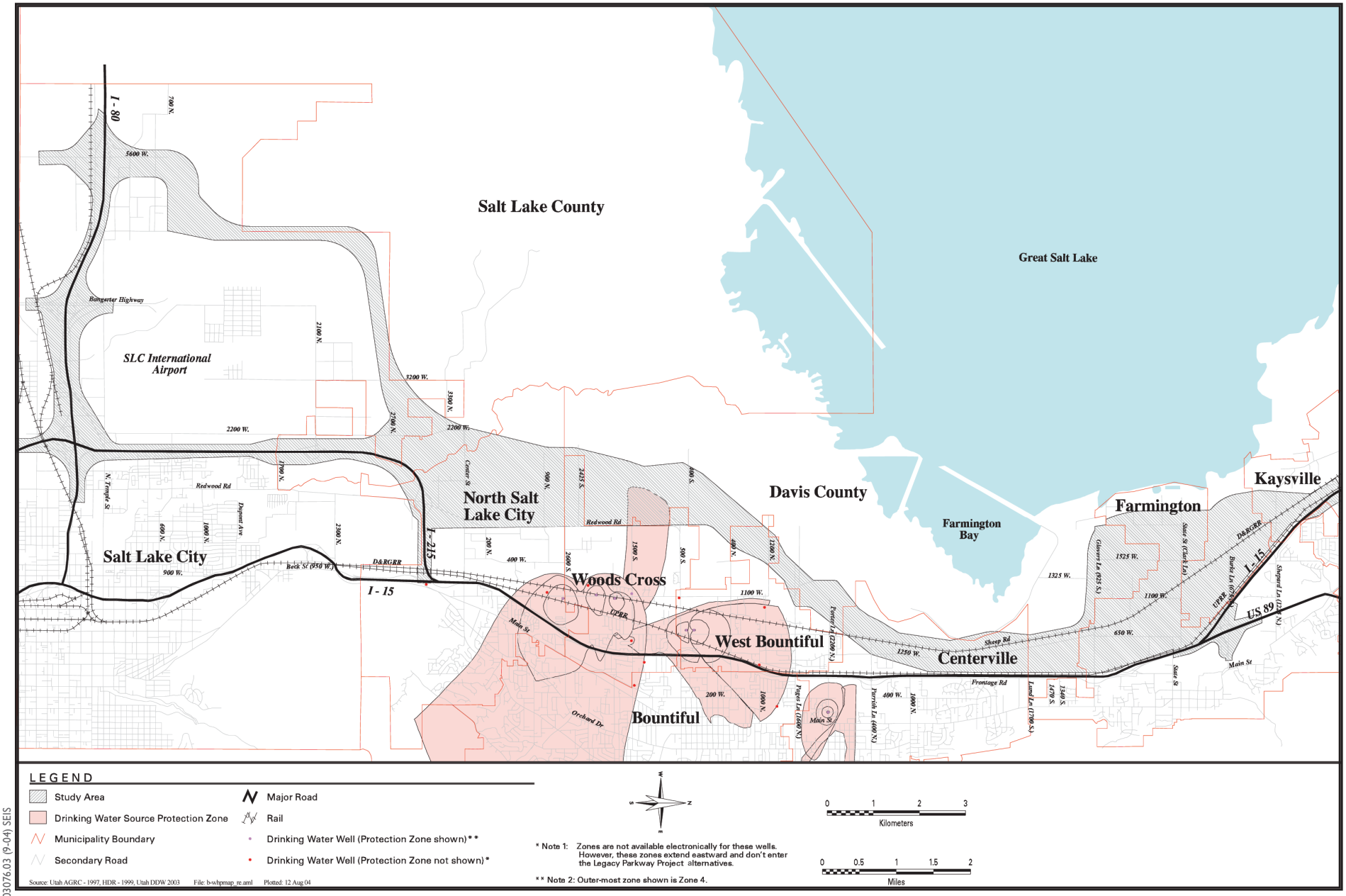

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Figure 4.10-3
Drinking Water Source Protection Zones Relative to the Study Area

Pre-wetting

Pre-wetting refers to mixing liquid brine (e.g., salt water, typically magnesium chloride) at the spreading disk just before the salt is spread on the road. When the salt is wet, it binds more effectively to the roadway and is less likely to be blown off the road by passing vehicles. Pre-wetting increases the effectiveness of using salt as a deicing method and reduces the overall quantity of salt required.

UDOT uses pre-wetting, as appropriate, throughout the state to prevent build up of ice on roads.

Anti-icing

Anti-icing refers to spreading liquid brine before the snow and/or ice accumulate on the road. This method requires anticipating weather cycles, precipitation, and temperatures. If liquid brine is applied to a road and it doesn't snow or freeze, or if it only rains, the liquid brine can actually make the road more slippery.

UDOT uses anti-icing, as appropriate, throughout the state to prevent ice build up on roads.

Temperature Monitoring

All the methods described above have temperature ranges within which they are more effective. For this reason, it is important to know the temperature of the road surface before selecting a particular deicing method. Monitoring road surface temperatures and weather forecasting and then selecting the proper deicing method based on those conditions increases the effectiveness of the deicing method and reduces the quantity of salt introduced into the environment.

UDOT uses state-of-the-art methods to monitor road temperatures, including snow removal trucks outfitted with built-in infrared temperature sensors to monitor road temperatures. In recent years, UDOT has reduced the annual salt usage in Salt Lake County from 100,000 tons per year to 80,000 tons per year by using these technologies (Berhard pers. comm.).

4.10.2.7 Use of Gray Water for Landscaping

During the design-build phase for the proposed action, UDOT disclosed that it was considering using treated wastewater (gray water) to maintain landscaping along the proposed build alternative alignments. Although gray water is treated adequately to be released into a receiving stream, it is not treated to drinking water standards. UDOT has not decided whether to use gray water to maintain landscaping in the project area, but the potential impacts associated with its use are described in Section 4.10.3.2 below.

4.10.2.8 Biogeochemistry of Wetlands

As described in the Final EIS, the biogeochemistry function of a wetland is related to water quality. Section 3.10.6 and Table 3-28 in the Final EIS describe how well wetlands in the study area are performing this function. The ability of wetlands in the study area to perform this function has not changed since publication of the Final EIS. See Section 4.12, *Wetlands*, of this document for additional information regarding wetlands in the study area.

4.10.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, implementation of any proposed build alternative could affect the quality of both surface water and groundwater. This section provides supplemental information documenting why certain contaminants were evaluated as contaminants of primary concern in both the Final EIS and this document. In addition, this section presents updated information on potential impacts on the quality of surface water and groundwater, as well as impacts on groundwater rights, including how the proposed action would affect DWSP zones in the study area.

4.10.3.1 Contaminants Evaluated

Section 4.10.1 in the Final EIS describes the typical contaminants found in highway runoff and the source of the contaminants. The source of the data in the table is FHWA Report FHWA/RD-84/057-060, *Sources and Migration of Highway Runoff Pollutants* (Federal Highway Administration 1987b). Since publication of the Final EIS, the U.S. Geological Survey (USGS) published a report titled *The National Highway Data and Methodology Synthesis* that reviews the data and methodology of FHWA's highway runoff research (U.S. Geologic Survey 2003). The USGS report indicates that organic compounds, including semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs), such as petroleum hydrocarbons, oil, and grease, can also be present in highway runoff. The source of the organic compounds is generally crankcase oil and vehicle emissions.

Table 4.10-1 provides an update of Table 4-15 in the Final EIS to reflect these organic compounds and their sources.

Table 4.10-1 Typical Highway Runoff Contaminants

Contaminant	Source
Total dissolved solids (TDS)	Deicing salts, vehicle deposits, pavement wear
Heavy metals (copper, lead, zinc)	Vehicle deposits
Chlorides, sodium, calcium	Deicing salts
Cyanide	Anti-cake compound used to keep deicing salts granular
Petroleum	Vehicle spills and leaks from lubricants, antifreeze, hydraulic fluids
Pathogenic bacteria	Soil, litter, trucks hauling livestock
Rubber	Tire wear
Total suspended solids (TSS)	Construction activities, vehicle deposits, pavement wear
Organic compounds	Crankcase oil and vehicle emission (U.S. Geologic Survey 2003)

Source: Federal Highway Administration 1987b, except as noted in table.

The Final EIS states that the primary contaminants of concern in the study area are TDS, metals, chlorides, and total suspended solids (TSS). Although these contaminants are not the only contaminants present in highway runoff, they were determined to be the primary contaminants of concern based on the existing water quality of the streams that would receive runoff from the proposed highway, the potential

of these contaminants to affect aquatic wildlife, and the fact that they are the most common contaminants found in highway runoff in Utah (Federal Highway Administration 1987b). As stated in the Final EIS, identification of the contaminants of concern was completed through consultations with the Corps, UDEQ, and UDOT.

Bill Moellmer, a water quality management scientist with UDEQ, Division of Water Quality, was contacted in November 2003 to verify that the primary contaminants of concern identified in the Final EIS were appropriate for evaluation in the Supplemental EIS. Mr. Moellmer reviewed the relevant section of the Final EIS and stated that the list of primary contaminants of concern and the analysis of the water quality impacts in the Final EIS were valid for evaluating the proposed action in the Supplemental EIS (Moellmer pers. comm.).

4.10.3.2 Surface Water Quality

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on surface water quality would occur under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. In addition, residential, commercial, and industrial development will continue in the study area regardless of whether Legacy Parkway is constructed. Although the nature and timing of such future projects are not known at this time, these projects will increase the amount of impervious area, change runoff characteristics, and potentially degrade surface water quality.

Build Alternatives

Each of the proposed build alternatives would cross surface water bodies in the study area, as described in Section 4.10.2 in the Final EIS. The analysis of impacts in the Final EIS was based on information contained in two FHWA documents: *Effects of Highway Runoff on Receiving Waters* (U.S. Department of Transportation 1985), and *Sources and Migration of Highway Runoff Pollutants* (Federal Highway Administration 1987b). A wide range of more recent literature was reviewed to supplement and clarify water quality information for the Supplemental EIS, as described in the following sections on primary contaminants of concern. However, none of the more recent literature cited resulted in a change to the original impact conclusions for surface water quality in the Final EIS.

Impacts associated with hazardous material spills and the use of gray water for landscaping are also discussed below.

Total Suspended Solids

As stated in the Final EIS, all proposed build alternatives would increase the amount of impervious surface in the study area and, therefore, the amount of stormwater runoff during rainstorms. This would result in an increase in sediment loads in surface waters. Construction activities could also erode soil and temporarily increase sediments in receiving waters. These conclusions have not changed since publication of the Final EIS.

Chlorides and Total Dissolved Solids

The Final EIS states that deicing salts could increase chlorides and TDS loading in downstream environments. Although UDOT has updated and expanded its snow removal policy to minimize the introduction of deicing salt to the environment (see Section 4.10.2.5. above), deicing salt would still be used on the proposed Legacy Parkway. The snow removal specifications described in the Final EIS are still current (i.e., salt would be applied at a lane rate of 57 kg per km [200 lb per mile], which would equate to 227 kg per km [800 lb per mile] for the proposed four-lane highway).

As described in the Final EIS, salt left on the road after the snow and ice have melted and evaporated would either be blown off the roadway onto the shoulder or dissolved into roadway runoff, which would be subject to stormwater treatment prior to entering adjacent streams and creeks. None of the literature reviewed quantified how much of this salt would remain on the shoulder and how much would pass into the surrounding surface waters; however, several studies provide measurements of the concentrations of chlorides and TDS found in roadside streams. Table 4.10-2 provides a representative sample of recent data on chloride and TDS concentrations in roadside streams.

The data in Table 4.10-2 indicate that the chloride and TDS concentrations in direct runoff from roadways that have been deiced can vary widely in winter months, and that chloride concentrations can be very high. However, the amount of runoff from a roadway is generally small compared to the runoff from the entire watershed of the stream. In addition, the Final EIS states that the background concentration of TDS in the streams that would receive runoff from the proposed action already exceeds TDS standards during the high-flow periods that coincide with possible release of deicing chemicals in winter and early spring months. Since these exceedances are limited in duration, UDEQ has determined that the streams are not impaired and that they can still meet the standards for their beneficial use classifications. Although implementation of the proposed action would further increase TDS and chloride concentrations in the affected surface water systems, the CWA Section 401 water quality certification issued to UDOT in December 2000 for Alternative D (Final EIS Preferred Alternative) states that these increases could be mitigated through specified best management practices (BMPs) (Federal Highway Administration et al. 2000).

It should be noted that, although the increase in chlorides would not affect the beneficial uses of surface waters in the study area, the increase could affect the vegetative and aquatic ecosystem. Chlorides accumulating on the roadway shoulder could kill vegetation, as disclosed in the Final EIS. Increased chloride concentrations could indirectly affect the aquatic ecosystem by causing shifts in algal communities, loss of food plants, or changes in protozoa invertebrate communities (Sorenson et al. 1996). Aquatic birds are anticipated to have a similar tolerance to salinity as domestic livestock and poultry (e.g., about 1,200 mg/L according to UDEQ standards) (Sorenson et al. 1996).

Table 4.10-2 Recent Data on Chloride and TDS Concentrations in Highway Runoff and Roadside Streams Compared to UDEQ Water Quality Standards

Source of Data	Chloride Concentration	TDS Concentration
UDEQ Surface Water Standard (Utah Administrative Code R317-2 as in effect March 1, 2004)		
Class 1 – Drinking Water	No standard	No standard
Utah's Secondary Drinking Water Standards (aesthetic standard)	250 mg/L	500 mg/L
Class 2 – Recreation	No standard	No standard
Class 3 – Aquatic Wildlife	No standard	No standard
Class 4 – Agriculture	No standard	1,200 mg/L
Runoff directly from Roadways (Federal Highway Administration 1996)		Average: 356 mg/L
St. Johnsbury, Vermont		
Stream adjacent to three-lane highway (Sorenson et al. 1995)	Maximum: 100 mg/L Mean: 22 mg/L	
California		
Streams downstream of I-180 (Sorenson et al. 1995)	Average: 270 mg/L	
Jamesville, New York		
Rural streams downstream of U.S. Hwy 20 (Sorenson et al. 1995)	Range: 10 to 235 mg/L	
Runoff directly from Hwy 20 (Sorenson et al. 1995)	Range: 20 to 5,500 mg/L	
Cincinnati, Ohio		
Runoff from roadway (Sansalone et al. 1998)		Range: 21.8 to 333.2 mg/L Number of events: 13 Mean: 158.4 mg/L Standard deviation: 110.8
Snow from roadside (Sansalone and Buchberger 1999)		Range: 50 to 200 mg/L
Residential Road I-75		Range: 0 to 2,200 mg/L

Metals

As described in the Final EIS, FHWA's numerical water quality model was used to quantify the impacts on surface waters from metals in the runoff associated with the proposed build alternatives. Copper, lead, and zinc were selected as the specific metal contaminants of concern for analysis based on the availability of the required data. Table 4.16 in the Final EIS lists the EPA acute criterion that was used at the time the Final EIS was published. The current UDEQ numeric water quality criteria is 13 micrograms per liter for copper and 65 micrograms per liter for lead. There has been no change to the zinc standard (Utah Administrative Code, R317-2-14). The data collected from the model show that the one-time-every-3-year concentration of these metals would not exceed the updated acute criteria. No new methodologies for quantitatively modeling impacts on surface water from roadways have been developed since publication

of the Final EIS. Further, EPA's STORET database did not have any new water quality data that could be used to update the modeling results (U.S. Environmental Protection Agency 2003c).

Hazardous Material Spills

As described in the Final EIS, a hazardous material spill could affect surface water quality under the No-Build Alternative or any proposed build alternative. An estimated five incidents involving hazardous materials could occur on the proposed highway or roads accessing the highway per year, based on existing I-15 data.[2] Impacts associated with hazardous material spills are difficult to quantify because their location, severity, and conditions are not known in advance; however, immediate action by the party responsible and spill response teams would minimize adverse impacts.

Use of Gray Water for Landscaping

The use of gray water to maintain landscaping in the proposed build alignments would minimize the use of treated tap water. If the gray water were not treated sufficiently, however, it could contribute contaminants to soil and water. Although UDOT has not decided whether to use gray water in the project area, any gray water would be used only with UDEQ's approval and in accordance with wastewater treatment and water quality regulations.

Mitigation Measures

As stated in the Final EIS, mitigation measures for minimizing impacts on the quality of surface water resulting from implementation of the build alternatives were developed in coordination with the Corps, UDEQ, and UDOT. Information relative to the mitigation measures identified in the Final EIS has been updated and is summarized below.

The Final EIS states that stormwater would be concentrated (i.e., routed to a ditch or a pipe) only where necessary (e.g., drainage from the overpasses). This concentrated stormwater would not be discharged directly into surface water bodies but would be routed over the vegetated filter strips (see below), or dissipated back to sheetflow. The vegetated filter strips would reduce flow, capture contaminants, and minimize discharges by allowing some volume of water to percolate into the ground as it traverses the vegetated strips. Water that does not percolate into the soil would either sheetflow off the right-of-way or drain into a culvert that carriers surface water under the roadway. No additional stormwater pipes are proposed other than those associated with surface water conveyance and/or floodplain equalization. The individual components of this mitigation are described in the following subsections.

Minimization of Concentrated Discharges

As described in the Final EIS, all the proposed build alternatives would be constructed without curbs to allow stormwater runoff to sheetflow off the highway. This mitigation measure has not changed since publication of the Final EIS.

Vegetated Filter Strips

As described in the Final EIS, road design would include vegetated filter strips to improve the quality of runoff from the highway, as recommended by the Corps and UDEQ. In response to the remand of the

[2] This estimate was disclosed in Section 4.3.4 of the Final EIS and was projected by analyzing 8 years of data between 1991 and 1998 on incidents occurring on I-15 that were reported to the UDEQ Division of Environmental Response and Remediation.

U.S. Court of Appeals for the Tenth Circuit since publication of the Final EIS, supporting documentation has been developed on the effectiveness of the vegetated filter strips in removing TSS and other contaminants from highway runoff. This information is presented in the *Legacy Parkway Technical Memorandum: Right-of-Way Issues* (HDR Engineering, Inc. 2004a), and in Section 2.1 of this document. The technical memorandum states, in summary, that vegetated filter strips would be more effective and would mimic existing hydrologic patterns more closely than other means of water treatment (e.g., detention basins). The location of the proposed vegetated filter strips are illustrated in the typical cross section figures presented in Chapter 3, *Alternatives*, of this document. It should be noted that the narrower right-of-way would not affect the ability of the vegetated filter strips to treat water quality to the standards required in the CWA Section 401 water quality certification (see *Technical Memorandum: Right-of-Way Issues* [HDR Engineering, Inc. 2004a]).

Floodplain Equalization Culverts, Surface Water Conveyances, and Groundwater Conveyances

The Final EIS states that equalization culverts would be installed to maintain sheetflow conditions across the study area to the extent practical. This mitigation measure was proposed to limit concentrated discharges and reduce erosion and impacts on water quality. Equalization culverts would be designed to limit culvert discharges to less than 0.14 cubic meters (5 cubic feet) per second. In addition, for costing purposes, the Final EIS stated that equalization culverts would be positioned every 150 m (492 ft) to maintain sheetflow conditions in the study area.

The Final EIS also states that equalization culverts would be used to mitigate impacts on wetland hydrology (e.g., to allow free movement of water in either direction and to minimize concentrated discharges) and floodplains (e.g., to allow floodwater to pass back and forth beneath the roadway to preserve the natural and beneficial floodplain.).

The conveyance structures that would be used to minimize impacts on water quality in the study area are described further in the following subsections. The equalization culverts described in the Final EIS and above are identified in the Supplemental EIS as surface water conveyances (designed to allow the free movement of water, maintain sheetflow conditions outside the Corps floodplain boundary, and minimize concentrated discharges to wetlands) and floodplain equalization culverts (designed to maintain flows within the Corps floodplain boundary). Groundwater conveyance structures are also described below to indicate how potential impacts on groundwater flows and therefore groundwater slope and depressional wetlands would be mitigated.

Figure 4.10-4 graphically depicts how surface water and groundwater would be conveyed in and around the roadway, as described below. The floodplain equalization culverts are depicted in Figure 4.14-2 of this document.

Surface Water Conveyances

Surface water conveyance structures would be used to allow free movement of water in either direction, maintain sheetflow conditions to the extent practical, and minimize concentrated discharges to waterways and wetlands in the study area. Although the Final EIS may have implied that surface water conveyances would be installed at regular intervals along the project alignment, surface water conveyances would actually be installed in areas where an existing hydrologic connection would be cut off by the proposed highway. The surface water conveyances would be designed to pass surface water through the road in the direction or directions of its existing flow. The conveyances could be manifest as many types of drainage structures, including culverts, series of small culverts, French drains, corrugated strip drains, synthetic drainage nets, and gravel layers.

The mechanism used for surface water conveyance is shown in Figure 4.10-4.

Floodplain Equalization Culverts

Based on more specific hydraulic design information obtained during the design-build process, UDOT and the Corps have determined that equalization culverts for the purpose of equalizing floodwaters across the road would be needed only within the Corps floodplain boundary rather than along the entire length of the proposed roadway as is described in the Final EIS (Parker pers. comm. a). These floodplain equalization culverts depicted and discussed in Section 4.14, *Floodplains*, of this document.

Groundwater Conveyances

Groundwater conveyance structures would be installed to mitigate the potential impact of the road embankment consolidating underlying soils and impeding groundwater flows. Groundwater conveyances would be installed in areas where fill heights exceed approximately 3 m (10 ft), and would extend from the eastern fill limit to the western fill limit.

Scour and Erosion Protection

As described in the Final EIS, scour protection to mitigate downstream erosion will be provided at all culvert outlets and stream crossings, if warranted. This mitigation measure has not changed since publication of the Final EIS.

4.10.3.3 Groundwater Quality

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on ground water quality would occur under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

In none of the build alternatives is implemented, recent conditions and trends in the quality of groundwater will likely continue. In the shallow aquifer, the chemistry of the groundwater will continue to vary considerably, based on location and future adjacent land use. In the deeper principal aquifer, sodium and chloride levels will likely continue to increase, particularly given that historical increases have been attributed in part to increased urban development and population growth in the Salt lake Valley. The extent and nature of these changes are not known at this time.

Build Alternatives

As described in the Final EIS, certain pollutants (i.e., chlorides, TDS) could be generated during construction or operation of any proposed build alternative, which could affect the water quality of the shallow aquifer in the study area. The Final EIS stated that chloride concentrations in the shallow aquifer are already high but did not specifically state that TDS concentrations were also high (i.e., as much as 20,300 mg/L in the northwestern part of the Salt Lake Valley near the study area [see Section 3.10.4 in the Final EIS]). As illustrated in Table 4.10-2 above, TDS in highway runoff does not typically exceed 2,200 mg/L, and is usually much less. Given the existing high concentrations of TDS and chlorides in the shallow aquifer, the representative TDS and chloride concentration information presented in Table 4.10-2,

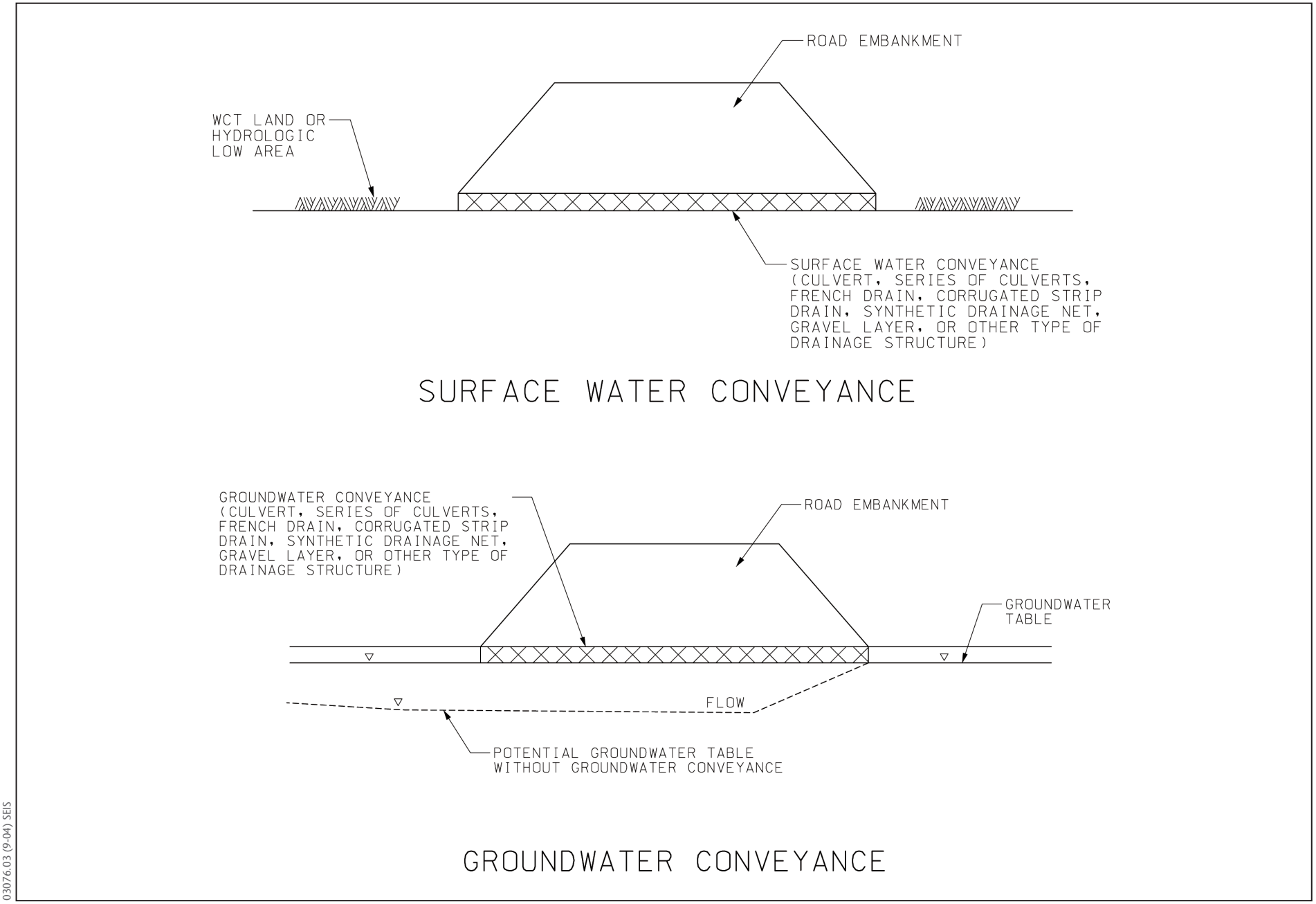

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Figure 4.10-4
Surface Water and Groundwater Conveyance Structures

and the relatively small surface area affected by the road compared to the overall extent of the aquifer, it is unlikely that the proposed build alternatives would adversely affect the water quality of the shallow aquifer in the study area.

Similarly, as stated in the Final EIS, the deeper principal aquifer is separated from the shallow upper aquifer by a layer of fine-grained soil. This barrier, and the fact that the deeper aquifer has an upward gradient, makes it unlikely that surface runoff could infiltrate the principal aquifer and affect the water quality.

Hazardous Waste Spills

As described in the Final EIS, an accidental spill of a large quantity of hazardous material could affect groundwater quality in the study area if it not immediately contained and cleaned up. Containment and cleanup would be facilitated by the flat terrain and vegetation on the right-of-way.

4.10.3.4 Groundwater Rights and Wells

No-Build Alternative

Existing Conditions (2004)

No project-related impacts on groundwater rights and wells would occur under the existing conditions (2004) No-Build Alternative.

Future Conditions (2020)

In none of the build alternatives is implemented, ground water rights and wells in the study area may be affected by future development, although the nature and timing of any such impacts are not known at this time.

Build Alternatives

Wells

As described in Section 4.10.2.5 above, UDNR's Water Rights Division tracks groundwater rights by inventoried water right numbers, each of which can include one or more groundwater wells. All water rights and their associated wells that fall within the rights-of-way of the proposed build alternatives are shown in Figure 4.10-5, which updates Figure 4-13 in the Final EIS. Wells located in the right-of-way of a build alternative would be affected by implementation of that build alternative because the owner of the well would not be able to maintain ownership.

The number of wells that would be located in the right-of-way of each build alternative is indicated in Table 4.10-3, which updates Table 4-17 in the Final EIS. These numbers are smaller than those presented in the Final EIS because the right-of-way associated with each build alternative has been narrowed from 100 m (328 ft) to 95 m (312 ft) (see Chapter 3, *Alternatives*).

As stated in the Final EIS, runoff from Legacy parkway could not affect wells located upgradient (east) of the highway and outside of the proposed rights-of-way. In addition, it is unlikely that highway runoff would have any impact on wells located outside the proposed rights-of-way on the downgradient (west) side of the highway.

Table 4.10-3 Affected Groundwater Right[1]

Water Right Classification	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Groundwater Rights within Proposed Rights-of-Way					
Domestic	12	10	8	8	8
Irrigation	30	34	35	50	34
Stock Watering	45	36	34	47	32
Municipal	0	0	0	2	0
Other[2]	3	3	4	3	3
Total[3]	73	58	63	108	55

Notes:

1 *Affected groundwater rights* represents groundwater rights located within a build alternative right-of-way.

2 Other constitutes a range of uses not classified above, such as cooling, recreational, or industrial.

3 The totals shown in the table are higher than the actual number of water rights in the study area because some water rights have more than one classification. Additional groundwater and surface water rights may be acquired to provide water to the proposed Legacy nature Preserve. As of June 2004, UDOT has acquired surface water rights from North Canyon Creek and the Jordan River.

Source: UDNR Division of Water Rights 2003.

Drinking Water Protection Zones

As described in Section 4.10.2.5 above, UDEQ now refers to wellhead protection areas as DWSP zones. Since publication of the Final EIS, owners of public drinking water sources have delineated DWSP zones and submitted DWSP plans to UDEQ, Division of Drinking Water. Development is not allowed within DWSP zones unless the development is consistent with the DWSP plan. Alternatives A, D, and E are located within a DWSP zone (Zone 4) for a public well owned by the City of Woods Cross. The City of Woods Cross has stated, however, that the proposed action would be consistent with its DWSP plan for this well (St. Jeor pers. comm.). Weber Basin Conservancy District also owns a DWSP zone located in the study area near Farmington. This well is not in use, however, and would not be affected by any proposed build alternative.

Mitigation Measures

As stated in the Final EIS, for wells located in the right-of-way of a build alternative, UDOT would either purchase the groundwater right from the owner or pay for a transfer of the right.

4.10.3.5 Biogeochemical Functions of Wetlands

As stated in the Final EIS, potential impacts on wetland biogeochemical functions were assessed using the Legacy Parkway wetland functional assessment model and quantified in functional capacity units (FCUs). See Section 4.12 of the Final EIS and Section 4.12, *Wetlands*, of this document for a detailed discussion of the results.

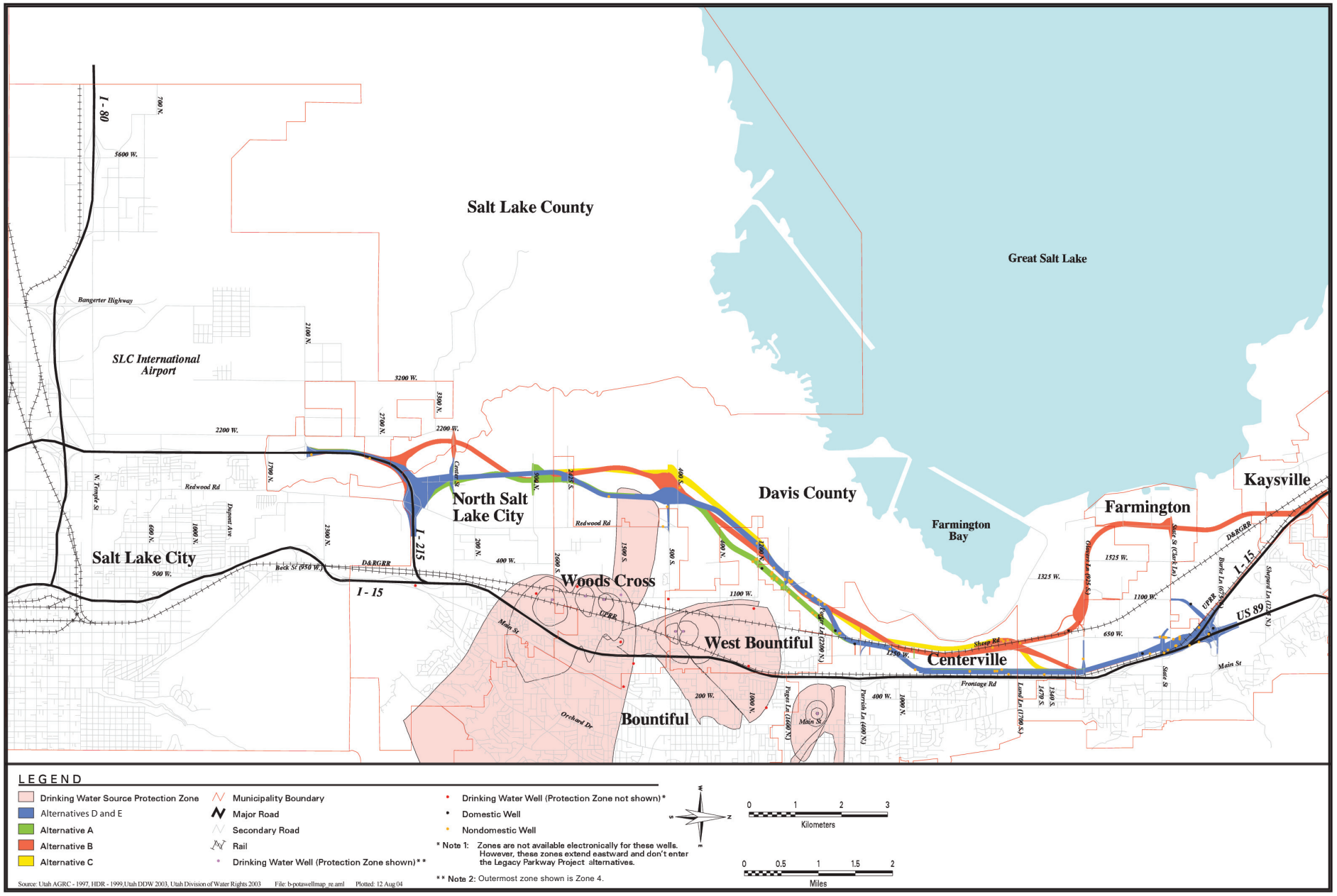

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Figure 4.10-5
Potentially Affected Wells

Section 4.11

Permits and Clearances

This section discusses the permits and clearances that would be required to construct any proposed build alternative. The information presented in this section represents an update of the information presented in Section 4.11 of the Final EIS. Updated information on the federal, state, and local permits and clearances that have been obtained to date for Alternative D (Final EIS Preferred Alternative) is also presented herein and summarized in Table 4.11-1 at the end of this section. The terms and conditions for the permits and clearances obtained for Alternative D will be reassessed by the responsible agencies after the federal lead agencies have determined which, if any, of the build alternatives presented in the Supplemental EIS will be implemented.

4.11.1 Approach and Methodology

Federal, state, and local regulatory requirements specific to resource areas that would be affected by proposed build alternatives were reviewed to determine whether they had been updated or changed since publication of the Final EIS. In addition, permits and clearances obtained to date for Alternative D were reviewed to determine their current status.

4.11.2 Affected Environment

Table 4.11-1 at the end of this section provides updated information on the status of permits and clearances obtained to date for Alternative D (Final EIS Preferred Alternative). As stated above, the types of permits and clearances listed in Table 4.11-1 and in the following text would apply to all build alternatives; however, the terms and conditions of these permits could change based on which, if any, of the alternatives presented in the Supplemental EIS is selected by the federal lead agencies for implementation. There have been no regulatory changes since 2000 that change the type of permits and clearances addressed in the Final EIS.

4.11.2.1 Federal Permits and Clearances

Section 404, Clean Water Act, Individual Permit (Corps)

As stated in the Final EIS, the Corps requires project applicants to obtain a Clean Water Act (CWA) Section 404 permit if a proposed action would result in the discharge of dredged or fill material into waters of the United States, including wetlands. All the build alternatives presented in the Final EIS and the Supplemental EIS would require placement of fill material in waters of the United States (see Section 4.12, *Wetlands*, and Section 4.13, *Wildlife*). As a result, authorization would have to be obtained from the Corps prior to implementation of any build alternative.

On January 9, 2001, the Corps issued a CWA Section 404 permit for Alternative D. Based on the narrower right-of-way associated with Alternative E, UDOT will submit a request for a permit modification to the Corps prior to publication of the Record of Decision. The Corps will reevaluate the decision to modify the CWA Section 404 permit based on the information presented in the Supplemental EIS, after the Supplemental EIS process has been completed.

Section 401, Clean Water Act, Water Quality Certification (UDEQ)

Section 401 of the CWA requires federal agencies to ensure that their proposed actions (e.g., issuance of a permit) do not violate state water quality standards. The Section 404 permit is an action that requires evaluation by Utah Department of Environmental Quality (UDEQ), Division of Water Quality, for water quality certification.

All the build alternatives presented in the Final EIS and the Supplemental EIS would require placement of fill material in waters of the United States, as described above. As a result, water quality certification pursuant to Section 401 of the CWA would have to be obtained from UDEQ.

A CWA Section 401 permit was issued by UDEQ for Alternative D on December 5, 2000. The permit does not have an expiration date, but UDEQ will reevaluate it after the Supplemental EIS process has been completed.

Section 402, Clean Water Act, Utah Pollution Discharge Elimination System Permit (UDEQ)

Section 402 of the CWA regulates discharges of pollutants to surface waters. Construction projects that disturb 0.4 or more ha (1 or more ac) of land must be covered under the statewide Utah Pollution Discharge Elimination System (UPDES) stormwater permit. All the build alternatives presented in the Final EIS and the Supplemental EIS would disturb more than 0.4 ha (1 ac) of land and would require coverage under the UPDES stormwater permit.

UPDES permits are also required for industrial discharges associated with the operation of a facility. However, because highways are not considered industrial discharges, a UPDES permit would not be required for operation of Legacy Parkway.

The UPDES stormwater permit for Legacy Parkway has two main sections: the UPDES general construction stormwater permit and the UPDES general permit for construction dewatering or hydrostatic testing. The UPDES general construction stormwater permit, which covers actual construction activities, was granted on July 1, 2001, and expires December 31, 2004. The UPDES general permit for construction dewatering or hydrostatic testing, which covers construction dewatering or hydrostatic testing, was granted on June 29, 2003, and expired December 31, 2003. UDOT received a 5-year extension with UDEQ for the construction dewatering and hydrostatic testing permit that expires December 31, 2009. Alternative D is covered under these extended permits.

Approval of Addition or Modification of Access Points (FHWA)

As described in the Final EIS, changing access points to the interstate highway system requires approval from FHWA. All the build alternatives presented in both the Final EIS and the Supplemental EIS would require access to I-215 in North Salt Lake and to I-15 and US-89 in either Kaysville or Farmington.

The interchange design/justification report (IJR) for Alternative D was approved by FHWA in August 1999 (Utah Department of Transportation 1999). UDOT is updating the IJR for FHWA review in conjunction with preparation of this Supplemental EIS. FHWA will reevaluate the decision to allow these access points, as described in the revised IJR, after the Supplemental EIS process has been completed.

Endangered Species Act (USFWS) Authorization

Section 7 of the federal Endangered Species Act (ESA) requires that federal agencies ensure that their actions neither jeopardize the continued existence of species listed as endangered or threatened nor result in destruction or adverse modification of the critical habitat of these species. Federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) if an action would result in "take" of a listed species, where *take* is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect…[an individual of a species]" (16 USC 1531 et seq.). The consultation can result in an incidental take statement establishing conditions under which a project that results in take may go forward.

All the build alternatives in the Final EIS and the Supplemental EIS could affect bald eagles, a species listed under the ESA as threatened (see Section 4.15, *Threatened and Endangered Species*). During the Final EIS process, the federal lead agencies initiated formal consultation with USFWS to assess the potential for take of bald eagles resulting from implementation of Alternative D. This consultation resulted in a biological opinion and incidental take statement issued by USFWS in February 1999 (U.S. Fish and Wildlife Service 1999), which allowed the project to proceed under certain terms and conditions. The incidental take statement and biological opinion also cover the regulatory requirements of the Migratory Bird Treaty Act and the Bald Eagle Protection Act, as required under each of those federal statutes.

FHWA received a letter from USFWS on December 3, 2003, stating that the terms and conditions of the biological opinion are still in effect. The biological opinion may be reevaluated during or after the Supplemental EIS process.

Section 106, National Historic Preservation Act Consultation (Utah SHPO & ACHP)

As stated in the Final EIS, Section 106 of the National Historic Preservation Act (NHPA) requires that historical and archeological resources be evaluated for eligibility for listing on the National Register of Historic Places (NRHP), and that eligible resources that would be affected by an action be preserved or otherwise documented. The Section 106 process requires that the federal lead agencies consult with the Utah State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), and the Utah Division of Indian Affairs to develop a Memorandum of Agreement (MOA) for evaluating historic and archeological resources affected by the proposed action and for implementing required mitigation (Federal Highway Administration et al. 2000).

All the build alternatives presented in the Final EIS and the Supplemental EIS would require consultation with the Utah SHPO prior to implementation (see Section 4.16, *Historic and Archaeological Resources*). Consultation with the Utah SHPO on Alternative D was completed prior to publication of the Final EIS. The MOA was signed on August 1, 2000. A revised draft MOA has been updated and is being circulated to signatories and consulting parties for comment (see Appendix A). The MOA will be executed before the Record of Decision is published.

Blanket Certificate (FERC)

As stated in the Final EIS, changes in the connections of major natural gas lines require notification of and approval by the Federal Energy Regulatory Commission (FERC). All the build alternatives in the Final EIS and the Supplemental EIS could affect one natural gas pipeline company under the jurisdiction of FERC: the Kern River Gas Transmission Company. If a blanket certification is required, it will be requested prior to starting construction activities.

Material Site Right-of-Way Permit (BLM)

As stated in the Final EIS, use of Bureau of Land Management (BLM) mineral reservations (e.g., gravel for fill material) requires a material site right-of-way permit from BLM. The project applicant has not determined whether mineral reservations would be used to construct any build alternative presented in the Final EIS or the Supplemental EIS. The necessity for this permit will be determined after the Supplemental EIS process has been completed. None of the construction work completed in 2001 required use of BLM mineral reservations.

4.11.2.2 State Permits and Clearances

Utah State Stream Alteration Permit (UDNR)

The Utah Department of Natural Resource (UDNR), Division of Water Rights, requires project applicants to obtain a stream alteration permit if a stream crossing would result in a major stream alteration or modification. As described in the Final EIS, stream alteration permit applications are typically combined with the Corps Section 404 permit application to facilitate a streamlined permitting process.

All the build alternatives in the Final EIS and the Supplemental EIS would require one or more stream crossings, which would trigger the need for the project applicant to obtain a stream alteration permit from UDNR. For Alternative D (Final EIS Preferred Alternative), stream alteration permits were granted as follows: Salt Lake Canal, November 15, 2001; Farmington Creek, November 30, 2001; Steed Creek, December 13, 2001; Davis Creek, December 13, 2001; and Shepherd Creek, December 31, 2001 (HDR Engineering, Inc. 2004f). A 3-year extension has been granted for each of these permits. However, UDNR may have to reevaluate all these permits after the Supplemental EIS process has been completed.

Air Quality Approval Order (UDEQ)

An air quality approval order is required to build, own, or operate a facility that pollutes the air. To obtain an air quality approval order, a notice of intent (NOI) must be submitted to UDEQ, Division of Air Quality, describing construction activities and emissions that would be associated with operating equipment. As stated in the Final EIS, the permit application must include provisions for controlling dust and emission sources.

All the build alternatives in the Final EIS and the Supplemental EIS would generate fugitive dust and emissions and would require an air quality approval order from UDEQ. The air quality approval order for Alternative D was granted on January 25, 2001. UDEQ may have to reevaluate this permit after the Supplemental EIS process has been completed.

Water Rights (UDNR)

As stated in the Final EIS, an application must be made to UDNR, Division of Water Rights, if an existing groundwater well (i.e., point of diversion) within the right-of-way of a build alternative needed to be relocated. In addition, if the rights to a well were purchased by UDOT, the deed record at UDNR would have to be updated.

All the build alternatives in the Final EIS and the Supplemental EIS, as well construction of the Legacy Nature Preserve, could require relocation of points of diversion, based on the right-of-way that is purchased to support construction of the proposed highway and preserve. UDOT would have to apply to UDNR to change the location of any points of diversion and to change the deed record for purchased groundwater wells.

UDOT has purchased the majority of the right-of-way, including the associated water rights, necessary for construction of Alternative D (Final EIS Preferred Alternative) and the Legacy Nature Preserve (West pers. comm. d [c]). To date, no changes in the location of points of diversion have been proposed. Applications to change the location of points of diversion will be made to UDNR, as appropriate, after the Supplemental EIS process has been completed. Some additional groundwater and surface water rights may be acquired to provide water to the Legacy Nature Preserve.

Certificate of Registration (UDNR)

As stated in the Final EIS, a certificate of registration is required by UDNR, Division of Wildlife Resources, if a proposed action could affect raptor nests. All the build alternatives evaluated in the Final EIS and the Supplemental EIS could affect raptor nests (see Section 4.13, *Wildlife*). Therefore, UDOT would have to obtain a certificate of registration from UDNR prior to implementing any proposed build alternatives.

The certificate of registration for Alternative D was renewed on January 1, 2004. This permit is updated on an annual basis and will be reevaluated by UDNR after the Supplemental EIS process has been completed.

Approval of Remediation Work Plan (UDEQ & EPA)

As stated in the Final EIS, a remediation work plan must be submitted and approved by UDEQ or the U.S. Environmental Protection Agency (EPA) if construction activities would occur on existing hazardous waste sites. All the build alternatives in the Final EIS and the Supplemental EIS would require construction of components on existing hazardous waste sites (see Section 4.17, *Hazardous Waste Sites*). Therefore, a remediation work plan specifying clean-up levels and protective measures for construction personnel would have to be submitted to UDEQ and/or EPA for approval.

An MOA between UDEQ and UDOT was signed in 2000 (Appendix A). The applicability of the remediation plan and required approvals will be determined after the Supplemental EIS process has been completed.

4.11.2.3 Local Permits & Clearances

Floodplain Development Permit (Local Jurisdiction)

As described in the Final EIS, all the proposed build alternatives in the Final EIS and the Supplemental EIS would require construction of components within the Federal Emergency Management Agency (FEMA) 100-year floodplain boundary, including placement of highway fill and drainage structures at stream crossings (see Section 4.14, *Floodplains*). As a result, floodplain development permits would have to be obtained from local jurisdictions in the area for work within the 100-year floodplain.

No floodplain development permits have been obtained for Alternative D (Final EIS Preferred Alternative) (Adams pers. comm.). The necessity for these permits will be determined after the Supplemental EIS process has been completed.

Development Permit for Critical Flood Areas (Davis County)

As stated in the Final EIS, Davis County requires permits for development in "critical flood areas," where *critical flood areas* are defined as areas within 30 m (100 ft) of certain creeks and channels. All the build alternatives in the Final EIS and the Supplemental EIS would cross one or more of these designated critical flood areas, which would require a development permit from Davis County.

No development permits for critical flood areas have been obtained for Alternative D. The necessity for these permits will be determined after the Supplemental EIS process has been completed.

Construction-Related Permits and Clearances (Various Agencies)

All the build alternatives identified in the Final EIS and the Supplemental EIS could require construction-related permits and clearances for activities occurring outside the right-of-way, such as staging of construction areas, borrow areas, or concrete batch plant sites.

Permits for a crusher and for a concrete batch plant associated with implementation of Alternative D were granted on September 20, 2001 by UDEQ, Division of Air Quality. The necessity for reevaluating these permits or obtaining additional construction-related permits will be determined after the Supplemental EIS process has been completed.

Table 4.11-1 Required Permits and Clearances

Permit	Granting Agency(ies)	Applicant	When Application Must Be Filed	When Application Is Granted	Applicable Portion of Project	Updated Status (January 2004)
Federal						
Section 404 Individual Permit (Clean Water Act) (Joint application with Stream Alteration Permit)	Corps	UDOT	Concurrent with Final EIS	Concurrent with ROD	Portions of roadway in waters of the U.S.	Granted 1/9/01. UDOT has submitted a request for permit modification to the Corps to reflect narrower right-of-way associated with Alternative E. The Corps will reevaluate the decision to issue and/or modify the Section 404 permit.
Section 401 Water Quality Certification (Clean Water Act)	UDEQ, Division of Water Quality	UDOT	Concurrent with Final EIS	Concurrent with ROD	Required for issuing Section 404 permit to ensure proposed action will comply with state water quality standards	Granted 12/5/2000. No expiration date.
Section 402 (UPDES) Permit (Clean Water Act)	UDEQ, Division of Water Quality	Contractor	Design-build phase	Prior to construction	Stormwater quality during construction phrase	UPDES Stormwater General Permit for Construction Activities was granted 7/1/01. The Final EIS Preferred Alternative is covered under this statewide permit until 12/31/04. UPDES Dewatering/Hydrostatic Testing Permit was granted 6/29/03. UDOT received a 5-year extension that expires 12/31/09.

Permit	Granting Agency(ies)	Applicant	When Application Must Be Filed	When Application Is Granted	Applicable Portion of Project	Updated Status (January 2004)
Approval of Addition or Modification of Access Points	FHWA	UDOT	EIS phase	Concurrent with ROD	Interstate access changes	Interchange design/justification report (IJR) approved 8/99. UDOT is updating the IJR for FHWA review in conjunction with preparation of this Supplemental EIS. FHWA will reevaluate the decision to allow these access points, as described in the revised IJR.
Incidental Take Statement (Section 7, Endangered Species Act)	USFWS	FHWA and the Corps	EIS phase	Final EIS	Project affects on migratory birds, eagles, and threatened and endangered species	An incidental take statement was included in the biological opinion for Alternative D, which was issued on 2/11/99. On 12/3/03, USFWS verified that the terms and conditions of the biological opinion were still in effect.
Section 106 Permit (National Historic Preservation Act)	SHPO and ACHP	UDOT	Concurrent with Final EIS	Final EIS	Impacts on historic and archaeological resources	A memorandum of agreement (MOA) between the federal lead agencies, SHPO, and ACHP was signed on 8/1/00. A revised draft MOA has been updated and is being circulated to signatories and consulting parties for comment (see Appendix A). The MOA will be executed before the Record of Decision is published. The Section 106 permit was issued prior to the release of the Final EIS.
Blanket Certificate (prior notice)	FERC	Gas company	Design-build phase	Prior to construction	Major gas line relocations	Will be obtained as needed.
Material Site Right-of-Way Permit	BLM	UDOT (prepared by contractor)	Prior to use	Prior to use	Required if fill is to be taken from areas with BLM mineral reservations	Will be obtained as needed.

Permit	Granting Agency(ies)	Applicant	When Application Must Be Filed	When Application Is Granted	Applicable Portion of Project	Updated Status (January 2004)
State						
Stream Alteration Permit (Joint application with Section 404 Permit)	UDNR, Division of Water Rights	UDOT	Concurrent with Final EIS	Concurrent with ROD	Structures at stream crossings	Stream alteration permits were granted as follows: Salt Lake Canal 11/15/01, Farmington Creek 11/30/01, Steed Creek 12/13/01, Davis Creek 12/13/01, and Shepherd Creek 12/31/01. The contractor has received a 3-year extension for these permits.
Air Quality Approval Order	UDEQ Division of Air Quality	Contractor	Design-build phase	Prior to construction	Air quality during construction phase (emissions from equipment)	Granted 1/25/01. No expiration date. An Emissions Control Plan (EMC) was prepared for this permit.
Water Rights (change deed record or apply for change in point of diversion)	UDNR, Division of Water Rights	UDOT	Right-of-way acquisition phase	Right-of-way acquisition phase	Changes in point of diversion or in use associated with wells in the right-of-way or water required for wetland mitigation	UDOT has purchased water rights along with property for right-of-way. Changes in points of diversion will be coordinated with UDNR as necessary.
Certificate of Registration	UDNR, Division of Wildlife Resources	Contractor	Design-build phase	Prior to construction	Impacts on raptor nests	This permit is renewed annually and was last renewed on 1/04/2004. It expires 12/31/2004.
Approval of Remediation Work Plan	UDEQ or EPA	UDOT	EIS and design-build phases	Prior to construction	Hazardous waste, CERCLA, and NPL sites	An MOA was signed between UDEQ and UDOT in 2000. Specific permits will be submitted on a case-by-case basis.

Permit	Granting Agency(ies)	Applicant	When Application Must Be Filed	When Application Is Granted	Applicable Portion of Project	Updated Status (January 2004)
Local						
Floodplain Development Permit (local floodplain coordinator)	Davis County, North Salt Lake, Woods Cross, West Bountiful, Centerville, Farmington	UDOT (prepared by contractor)	Design-build phase	Design-build phase	Portions of roadway or structures in FEMA floodplain for creeks or Great Salt Lake	Will be obtained on a case-by-case basis prior to construction.
Development Permit for Critical Flood Areas	Davis County	UDOT (prepared by contractor)	Design-build phase	Design-build phase	Portions of roadway or structures within 30 m (100 ft) of certain channels	Will be obtained on a case-by-case basis prior to construction.
Off-site Construction-related permits	Various	Contractor	Contractor	Prior to construction	Impacts associated with offsite activities such as construction staging, borrow areas, batch plant sites, etc.	Permits for a crusher and a concrete batch plant were both granted on 9/20/01 by UDEQ, Division of Air Quality. Other permits will be obtained as needed.

Notes:

All the listed permits would be required for construction of Legacy Parkway under all proposed build alternatives and options.

ACHP = Advisory Council on Historic Preservation

BLM = Bureau of Land Management

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Corps = U.S. Army Corps of Engineers

Draft EIS = Draft Environmental Impact Statement

EIS = Environmental Impact Statement

EPA = U.S. Environmental Protection Agency

FEMA = Federal Emergency Management Agency

FERC = Federal Energy Regulatory Commission

FHWA = Federal Highway Administration

Final EIS = Final Environmental Impact Statement

NPL = National Priorities List

NRHP = National Register of Historic Places

ROD = Record of Decision

SHPO = State Historic Preservation Office

Supplemental EIS = Supplemental Environmental Impact Statement

UDEQ = Utah Department of Environmental Quality

UDNR = Utah Department of Natural Resources

UDOT = Utah Department of Transportation

UDWR = Utah Department of Wildlife Resources

UPDES = Utah Pollution Discharge Elimination System

USFWS = U.S. Fish and Wildlife Service

Section 4.12
Wetlands

This section describes the wetlands and other aquatic resources in the study area. It presents information regarding changes in wetland type and function that have occurred since publication of the Final EIS and provides supplemental information to define and describe more clearly the vegetation types present in the wetland areas in the study area. Specifically, this section

- describes wetland impacts that have occurred to date as a result of initial project construction;
- identifies all direct and indirect impacts of the No-Build and build alternatives on wetlands in the study area;
- describes wetland succession, both in general and specifically related to Great Salt Lake flooding;
- discusses the role of flooding on the temporal variation in wetland functions;
- quantifies direct and indirect impacts in acres affected;
- characterizes direct and indirect impacts in terms of wetland functions;
- discloses cumulative effects on wetland resources; and
- updates the status of proposed wetland mitigation and the Legacy Nature Preserve.

Appendix D, *Wetlands Functional Assessment Technical Appendix*, provides detailed technical data to supplement the information presented in this section.

4.12.1 Approach and Methodology

This section presents updated and supplemental information on wetland resources in the study area. The study area for the wetlands analysis has not changed since publication of the Final EIS with respect to the build alternatives. For the Supplemental EIS, the study area also includes the area associated with the Legacy Nature Preserve.

4.12.1.1 Wetland Delineation and Reverification

As described in the Final EIS, wetlands in the study area were originally characterized and mapped between April and July of 1997, as documented in the *Legacy-West Davis Wetlands Delineation*

Technical Report (Baseline Data Inc. 1998). Delineated wetlands were then classified and subjected to a wetlands functional assessment, which was described in the *Legacy Parkway Wetland Final HGM Technical Report* (Baseline Data Inc. 2000). Both technical reports were summarized in Appendix B of the Final EIS. In August 1998, the Corps approved the delineation and the proposed wetland functional assessment concept. Additional wetland mapping was done following publication of the Draft EIS for the Legacy Parkway project (September 1998), primarily to identify wetlands present in the Legacy Nature Preserve. The additional wetlands were delineated by identifying and mapping areas vegetated by wetland cover types.

To verify the accuracy of the wetland delineation and to provide updated information for the Supplemental EIS analysis, wetlands within and bordering the proposed right-of-way for the Alternative D (Final EIS Preferred Alternative) alignment were visually inspected between October 28 and November 7, 2003. Changes noted during these field surveys were documented in a wetlands reverification letter report and submitted to the Corps on March 16, 2004 (Preston pers. comm.). This report determined that about half the wetlands within or intersected by the right-of-way of Alternative D (Final EIS Preferred Alternative) had been entirely or partially filled during clearing and grading of the 100-m (328-ft) right-of-way, prior to the court-ordered suspension of construction activities associated with the Legacy Parkway project. The remaining 70 wetlands intersected by the right-of-way have not been altered since the previous wetland delineation. The wetland delineation reverification also identified wetlands adjacent to the right-of-way that had been filled or potentially filled by projects not related to the Legacy Parkway project. This updated information was verified by the Corps in 2004.

4.12.1.2 Wetlands Functional Assessment

As presented in the Final EIS, the wetlands functional assessment for wetlands in the study area was developed from the hydrogeomorphic (HGM) method for evaluating wetland functions initially developed by the Corps (Brinson 1993). The HGM method categorizes wetlands by their water sources, hydrodynamics, and geomorphic setting, and then evaluates wetland functions based on physical and biological attributes. The wetlands functional assessment was used to quantitatively measure how well wetlands in the study area function. This measurement was used, in part, to determine how much mitigation would be needed, rather than basing that determination on wetland acreage alone. At the time this Supplemental EIS was prepared, an updated regional HGM model was in progress but not complete enough to offer the accuracy or precision needed to update the wetlands functional assessment information presented in the Final EIS. As a result, the information on wetland functions presented in this document continues to be based on the wetlands functional assessment conducted for the Final EIS.

Additional information about wetland types in the study area and further clarification about how the wetlands functional assessment was performed, including the type of data used, the rationale for the approach to assessing indirect impacts on wetland functions, and the method for scaling the variables used in the assessment models, are included in Appendix D.

4.12.2.3 Regulatory Update

Since publication of the Final EIS, a recent supreme court ruling (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, No. 99-1178 [January 9, 2001]) (SWANCC) addressed the issue of whether certain wetlands are subject to federal jurisdiction under Section 404 of the federal Clean Water Act (CWA). In the SWANCC decision, the Supreme Court ruled that, for nonnavigable, isolated, intrastate wetlands, providing habitat for migratory birds was insufficient as the sole basis for assertion of federal jurisdiction under the CWA. This ruling removed a part of the definition of “waters of the United

States" under which many small isolated wetlands have been afforded CWA protection. Other criteria for establishing jurisdiction under the CWA remain unaffected by the SWANCC case, including having a connection with interstate commerce or being adjacent or tributary to other waters of the United States (33 CFR Section 328.3[a]).

The Corps has decided that Great Salt Lake and the wetlands adjacent to it are jurisdictional waters of the United States. Specifically, the Corps has determined that Great Salt Lake is a water of the United States because it is navigable-in-fact and has been found to have substantial connections with interstate commerce, as noted in the 2001 memorandum concerning isolated waters from the General Counsel of the Environmental Protection Agency and the Corps Chief Counsel (U.S. Environmental Protection and Agency and U.S. Army Corps of Engineers January 2001). Great Salt Lake is fed by the Bear River, which is an interstate water originating in Idaho. Wetlands in the primary study area are adjacent to Great Salt Lake. Although most of the wetlands in the study area have been designated as groundwater slope or depressional wetlands, many of them form extensive wetland complexes and lie within Great Salt Lake's historic high-water elevation (1,283 m [4,212 ft]), and most are within the area of influence of maximal lake flooding (1,286 m [4,220 ft]). Many of the groundwater slope wetlands are interconnected by surface water flow and are connected to Great Salt Lake by direct flow or by streams and drainage channels. In addition, the wetlands in the Legacy Parkway project study area help sustain the water quality, habitat support, and other functions of the Great Salt Lake Ecosystem (GSLE). As a result, the Corps has determined that all the delineated wetlands in the study area remain jurisdictional and subject to regulation under Section 404 of the CWA; the SWANCC ruling did not affect this protection.

4.12.2 Affected Environment

The study area, which is described above in Section 4.12.1, encompasses 987 ha (2,439 ac) of wetlands in three HGM wetland classes (depressional, groundwater slope, lacustrine fringe) and seven wetland cover types (forested wetland, shrub-scrub, marsh, wet meadow, playa, unconsolidated shore, and open water) (Figure 4.12-1). Table 4.12-1 provides information on the acreage of each wetland class, according to cover type. The baseline information on wetlands and land use in the study area used in this analysis was collected between 1997 and 1999. Therefore, "existing conditions," as used in this section, refers to the extent, character, and functions of wetlands in the study area as they existed in 1997–1999.

The Final EIS based all quantitative discussion of wetland functions, impacts, and mitigation on the three wetland classes mentioned above—depressional, groundwater slope, lacustrine fringe (Figure 3-22 in the Final EIS). However, this document separates wetland functions, impacts, and mitigation according to wetland cover types to provide additional ecological context by which to interpret the analysis. Table 4.12-1, which updates and supplements Table 3-30 in the Final EIS, summarizes the quantities and functional ratings that make up these wetland classes and cover types. Functional ratings given to the wetlands were based on the average functional value for all wetland functions. These functional ratings can range from low to high, based on average functional values represented in Table 4.12-2.

Section 4.12.2.4 of this document provides a discussion of how wetlands are affected by Great Salt Lake flooding.

Table 4.12-1 Wetland Cover Types, Quantities, and Functional Ratings for the Study Area

HGM Class	Wetland Cover Type	Quantity in Hectares (Acres)											
		Total		High		High-to-Medium		Medium		Medium-to-Low		Low	
Depressional	Forested Wetland	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.2	(0.4)	0.0	(0.0)	0.0	(0.0)	0.2	(0.4)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Depressional	Shrub-Scrub	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		1.4	(3.6)	0.0	(0.0)	1.4	(3.6)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Depressional	Marsh	14.5	(35.8)	0.7	(1.7)	5.5	(13.6)	8.0	(19.7)	0.3	(0.8)	0.0	(0.0)
Groundwater Slope		42.3	(104.5)	6.4	(15.8)	2.1	(5.3)	26.3	(64.9)	7.5	(18.5)	0.0	(0.0)
Lacustrine Fringe		233.2	(576.1)	0.0	(0.0)	206.3	(509.7)	26.9	(66.4)	0.0	(0.0)	0.0	(0.0)
Depressional	Wet Meadow	115.3	(284.9)	2.6	(6.5)	84.0	(207.6)	26.7	(66.0)	1.9	(4.8)	0.0	(0.0)
Groundwater Slope		152.4	(376.6)	80.8	(199.6)	18.2	(45.1)	48.9	(120.9)	4.5	(11.1)	0.0	(0.0)
Lacustrine Fringe		148.1	366.0	0.0	(0.0)	98.9	(244.5)	49.2	(121.5)	0.0	(0.0)	0.0	(0.0)
Depressional	Playa	46.4	(114.6)	3.5	(8.6)	31.3	(77.3)	10.5	(26.0)	0.0	(0.0)	1.1	(2.6)
Groundwater Slope		18.1	(44.7)	15.2	(37.6)	0.0	(0.0)	2.7	(6.6)	0.2	(0.4)	0.0	(0.0)
Lacustrine Fringe		124.5	(307.6)	0.0	(0.0)	99.7	(246.3)	24.8	(61.3)	0.0	(0.0)	0.0	(0.0)

HGM Class	Wetland Cover Type	Quantity in Hectares (Acres)											
		Total		High		High-to-Medium		Medium		Medium-to-Low		Low	
Depressional	Unconsolidated Shore	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		38.9	(96.2)	0.0	(0.0)	36.5	(90.1)	2.5	(6.1)	0.0	(0.0)	0.0	(0.0)
Depressional	Open Water	2.5	(6.2)	0.0	(0.0)	1.4	(3.5)	1.1	(2.7)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.1	(0.2)	0.0	(0.0)	0.0	(0.0)	0.1	(0.2)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		49.4	(122.1)	0.0	(0.0)	25.1	(62.0)	24.3	(60.1)	0.0	(0.0)	0.0	(0.0)
Total		987.2	(2439.3)	109.2	(269.8)	610.5	(1508.5)	252.1	(622.9)	14.4	(35.5)	1.1	(2.6)

Table 4.12-2 Average Functional Values for Functional Rating

Functional Rating	Average Functional Value
High	0.88 to 1.0
High-to-Medium	0.63 to 0.87
Medium	0.38 to 0.62
Medium-to-Low	0.18 to 0.37
Low	0.00 to 0.17

4.12.2.1 Hydrogeomorphic Wetland Classes

As described in the Final EIS, wetlands in the study area can be categorized by geomorphic setting, water source, and hydrodynamics. As mentioned above, three wetland classes are present in the study area: depressional, groundwater slope, and lacustrine fringe. Each wetland class consists of one or more vegetation types. Lacustrine fringe wetlands have perhaps the widest diversity of vegetation communities associated with them, because of the cycle of succession that is associated with the ebb and flow of Great Salt Lake.

Depressional Wetlands

As described in the Final EIS, depressional wetlands are characterized by topographic depressions or basins where surface waters collect. The primary hydrology source is precipitation, both direct and from surface runoff, although the deeper basins may also intersect the groundwater table. The hydrodynamics are primarily vertical, although horizontal flow may occur when basins fill to capacity and overflow via one or more outlets. Depressional wetlands vary in depth, and because the lower elevations remain wet for longer periods of time, the deeper parts of the wetlands support vegetation types that require more water than the margins or the shallower wetlands.

The areas west of Redwood Road have many depressional wetlands where precipitation is the major hydrological source. Wetland hydrology of these depressional wetlands usually peaks in March and April, when snowmelt and precipitation events are most frequent. The rest of the depressional wetlands derive their hydrology from a combination of precipitation, groundwater, and surface flows.

There are approximately 178 ha (441 ac) of depressional wetlands in the study area, comprising 18 percent of all wetlands in the study area. They mostly have a high-to-medium functional rating score.

Groundwater Slope Wetland

As described in the Final EIS, groundwater slope wetlands are found in areas where the subsurface groundwater intersects the soil surface. The hydrodynamics are primarily horizontal and unidirectional, with flow moving from the groundwater table through the wetlands to an outlet. Most groundwater slope wetlands in the study area are associated with small surface streams or creeks that have their origins in small seeps and springs near the foot of the Wasatch Mountains. Most groundwater slope wetlands are found west of Farmington and to a lesser extent west of Redwood Road

There are approximately 213 ha (526 ac) of groundwater slope wetlands in the study area, comprising 21 percent of all wetlands in the study area. Most groundwater slope wetlands have a high functional rating score.

Lacustrine Fringe Wetlands

As described in the Final EIS, lacustrine fringe wetlands are found at the edge or fringe of Great Salt Lake. The hydrodynamics are bidirectional, with wetland hydrology derived directly from the lake or impoundment. The lake (impoundment) level fluctuates, depending on the time of year. During the spring, water is at the highest level and may slowly draw down through the summer and fall. Water depths are usually 2 m (6.5 ft) or less. There are approximately 596 ha (1,472 ac) of lacustrine fringe wetlands in the study area. Lacustrine fringe wetlands comprise 60 percent of all wetlands in the study area. They mostly have a high-to-medium functional rating score.

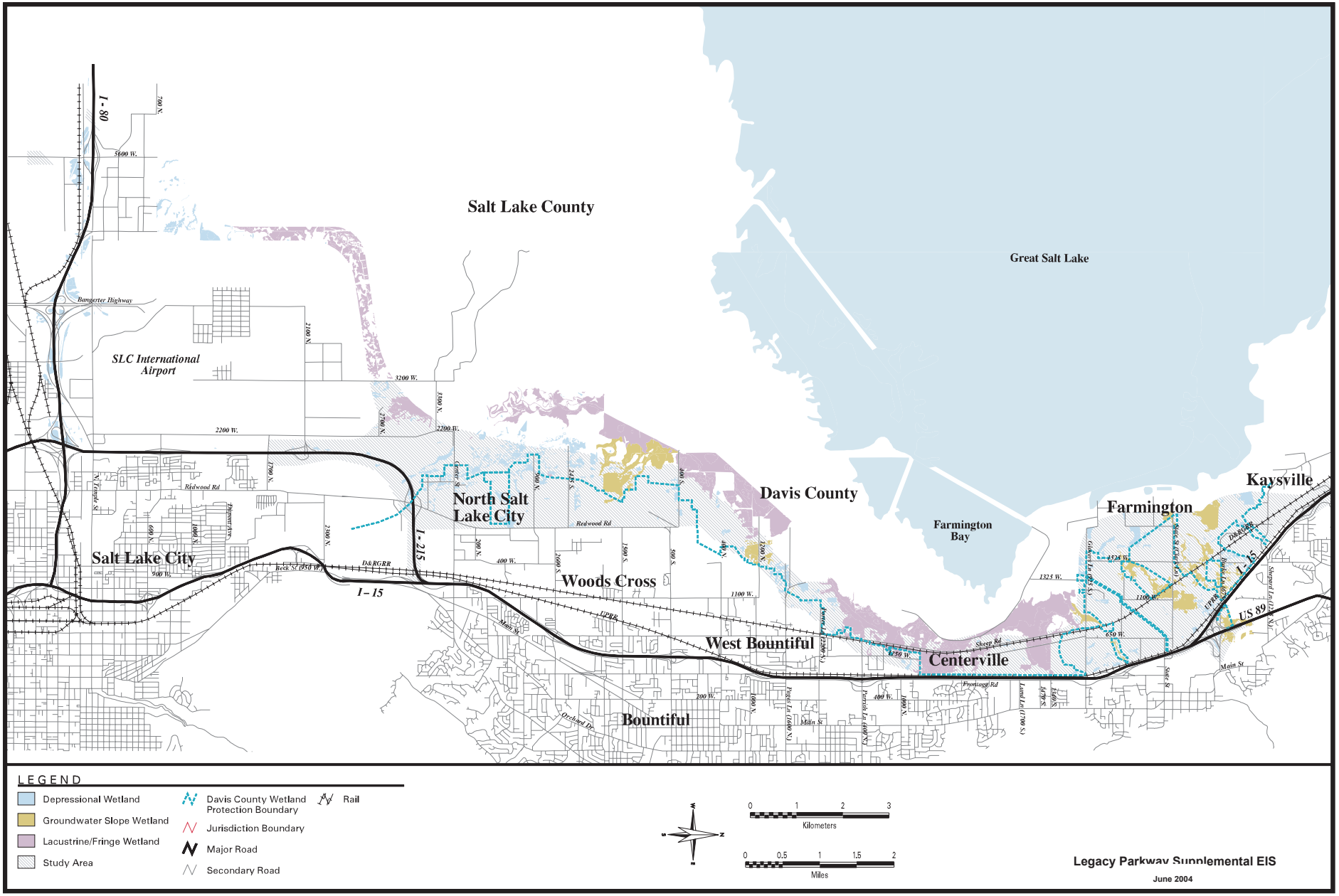

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Figure 4.12-1
Jurisdictional Wetlands

The wetlands that surround the Farmington Bay Waterfowl Management Area (FBWMA) are lacustrine fringe wetlands of Great Salt Lake. These lacustrine fringe wetlands are important because the area is used heavily by waterfowl and shorebirds and functions as flood storage for Great Salt Lake during high-water years.

4.12.2.2 Wetland Cover Types

Within each of the HGM wetland categories described above, there can be several different wetland vegetation cover types. As mentioned above, there are seven cover types present in the study area; these cover types are listed in Table 4.12-3 and described in detail in Appendix D. Section 4.13, *Wildlife*, also presents information on the wildlife use of these wetland cover types. Because the wetlands analysis focused more on the vegetation and physical properties of the wetlands and the wildlife analysis focused primarily on wildlife use of the wetlands, the approach, methodology, and habitat types for the wildlife analysis differed from those used for the wetlands analysis. Table 4.12-3 presents a comparison of wetland cover types analyzed in this section and corresponding wildlife habitat types analyzed in Section 4.13 of this document. Although only wetland cover types are discussed in this section, surrounding uplands also affect the ability of wetlands to perform their functions. Section 4.13, *Wildlife*, of this document discusses uplands more specifically.

Table 4.12-3 Comparison of Wetland Cover Types and Corresponding Wildlife Habitat Types

Wetland Cover Type	Wildlife Habitat Type
Forested wetland	Riparian*
Scrub-shrub	Riparian*
Marsh	Emergent marsh
Wet meadow	Wet meadow
Playa	Mudflat/pickleweed
Unconsolidated shore	Mudflat/pickleweed
Open water	Open water

Note:
*Riparian wildlife habitat contains uplands as well as wetlands.

4.12.2.3 Wetland Functions

For this Supplemental EIS, the lead agencies reviewed the wetlands functional assessment conducted for the Final EIS and all available information pertinent to the nature and function of the wetlands in the study area. Appendix D, *Wetlands Functional Assessment Technical Appendix*, provides a detailed description of wetland functions and functional capacity units. In summary, as described in the Final EIS, wetlands in the study area perform functions in three basic categories: hydrology, biogeochemistry, and flora and fauna habitat support. For this evaluation, these three function categories were measured according to five specific functions.

- Function 1: Wetland hydrology maintenance.

- Function 2: Dissolved elements and compounds removal.
- Function 3: Particulate retention.
- Function 4: Habitat structure.
- Function 5: Habitat connectivity, fragmentation, and patchiness.

A discussion of wetland functions in the study area is provided in Appendix D.

4.12.2.3 Wetlands and Great Salt Lake Flooding

Lacustrine fringe wetlands adjacent to Great Salt Lake are subject to Great Salt Lake's natural long-term cycles of rising and falling. As a consequence, wetland functions in the lacustrine fringe wetlands change naturally in accord with the varying hydrologic regime and are not constant. The effects of changing lake levels are analyzed in detail in the *Wildlife Impacts Analysis Technical Memorandum* (Jones & Stokes 2004). This section summarizes this natural effect on wetlands.

The natural flood-drought cycle alters the composition and structure of the vegetation in the wetlands adjacent to Great Salt Lake, with subsequent changes in wetland functions that are vegetation-dependent. In the initial stages, abundant runoff into the wetlands adjacent to the lake promotes the development of marsh vegetation. Salts are leached from the soil, and the plant community becomes less halophytic. As Great Salt Lake rises, however, vegetation on the lake margins is affected by increased salinity and prolonged submersion. As floodwaters expand the lake margin eastward, the vegetation east of the lake becomes more hydrophytic. Areas dominated by upland vegetation are converted to wetlands under the new hydrologic regime. Wave action breaks up the dead vegetation and scours the now-denuded lake margins, converting vegetated wetlands to open water. At the highest lake levels, more than 85 percent of the wetlands in the study area would be converted to open water (Jones & Stokes 2004).

As the lake waters recede, bare ground and mud flats are left. At first, halophytic vegetation is established. The influx of salts during flood events is important for maintaining the playas. In depressional areas, salts accumulate as the surface water evaporates, maintaining playas and wet meadows dominated by halophytes. Freshwater marsh and wet meadow develop where groundwater discharge supports wetland vegetation and where salt-laden runoff is exported by surface drainage. As salts are flushed from the soil by surface runoff or by groundwater discharge, the plant communities change over time to become less halophytic. Areas no longer subject to wetland hydrology are colonized by upland species.

Changing lake levels also affect other wetland functions. Lacustrine fringe wetlands are supported by lake water. During extended drought periods, when lake levels fall, wetlands immediately adjacent to the lake may still receive some hydrologic input from the lake water. However, lacustrine fringe wetlands further from the lake may be supported only by precipitation or by groundwater when the lake level is low.

The ability of wetlands to remove dissolved substances and retain particulates is directly related to the cover and biomass of the wetland vegetation. At the highest lake levels, much of the area once covered by wetlands has been converted to open water habitat. Consequently, the ability of wetlands along the east shore of the lake to filter dissolved substances and retain particulates is greatly reduced during flood events, and their function as a buffer between development and the lake is also greatly reduced.

Wetlands east of Great Salt Lake are important for providing a diversity of habitats. This habitat diversity is maintained to a large degree by variation in the lake level. When the lake floods, the wildlife habitat function of the wetlands changes greatly. As the lake levels drop, these changes begin to reverse. Playas and other saline wetlands become reestablished, together with the wildlife dependent on them. At other locations, large unvegetated areas are exposed, and there is a lag period before the wetland and upland habitat becomes reestablished. This natural cycle of disturbance also makes the wetlands more vulnerable to invasion by exotic species, which displace native plant species and do not provide the same habitat value as native species.

The wetlands functional assessment was conducted for current conditions, i.e., low lake levels. Under a different hydrologic regime, i.e., high or intermediate lake levels, there would be differences in the quantity and relative abundance of each wetland type in every wetland category and differences in wetland functions.

4.12.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, all the build alternatives would affect wetland resources in the study area. Two categories of wetland impacts would occur, direct and indirect, both of which are characterized in this discussion according to which wetland functions are being affected. The Final EIS based the quantitative discussion of wetland impacts on the three HGM wetland classes described in Section 4.12.2.1. This section separates wetland impacts according to wetland cover types to provide additional ecological context by which to interpret the analysis. This section also provides updated information on the following topics.

- The acreage of wetlands filled due to construction of the Legacy Parkway project since publication of the Final EIS (i.e., Alternative D [Final EIS Preferred Alternative]).
- Additional acres of wetlands located on parcels added to the proposed Legacy Nature Preserve after publication of the Final EIS.
- Updated information relative to direct wetland impacts based on the narrowed right-of-way width proposed for the build alternatives (95 m [312 ft] vs. 100 m [328 ft]).

Wetlands directly affected (i.e., filled) by projects not related to the Legacy Parkway project were included in the cumulative effects analysis and are discussed in Section 4.21, *Cumulative Effects*.

The following sections describe wetland impacts for all the proposed build alternatives. However, because the HGM model was not re-run to account for the proposed narrower right-of-way (i.e., 95 m [312 ft]), the discussion of indirect impacts and impacts on wetland functions presented below is based on the 100-m (328-ft) right-of-way analyzed in the Final EIS. As a result, for those impact categories, a discussion of impacts associated with Alternative E is not specifically presented. Given the narrower right-of-way of Alternative E, it can be assumed that indirect impacts and impacts on wetland functions are somewhat less than those presented for Alternative D. The acreage of direct impacts on wetlands associated with Alternatives D and E has been differentiated and is represented in Table 4.12-5.

4.12.3.1 Direct Impacts

Direct impacts are impacts that would occur as a result of ground disturbance, including earthwork (clearing, grading, excavation and fill) to create the road bed, the landscaped berm, and the trail; construction of bridges and other structures; utility relocations; construction vehicle traffic; and staging and storage areas.

For the initial impact analysis calculations made for the Final EIS, it was assumed that direct impacts associated with the build alternatives would be limited to the area within the proposed action right-of-way, and that all the area within the project right-of-way would be directly affected. The impact analysis was carried out by assuming that all wetlands within the project right-of-way would be filled. However, site-specific conditions at some locations within the right-of-way could allow the final design to incorporate a narrower footprint; consequently, some wetland areas within the right-of-way may not actually be filled. As a result, estimated impacts on wetlands are considered a worst-case analysis. A separate analysis was carried out for each proposed build alternative.

Fifty-eight wetlands were entirely or partially filled by the initial clearing and grading for Legacy Parkway or by Legacy-related construction activities associated with the I-15/US-89 interchange in Farmington; the total extent of project-related fill was 19.4 ha (47.9 ac). Five other wetlands were partially filled by construction of temporary access roads in the Legacy Nature Preserve; the total extent of project-related fill in the Legacy Nature Preserve was 0.1 ha (0.3 ac). Because these wetlands were filled in conjunction with the Legacy Parkway project, their condition prior to the construction activities was used for assessing baseline conditions.

Table 4.12-4, which updates Table 4-20 in the Final EIS, summarizes the potential direct impacts in terms of the total area affected by each proposed build alternative. Figures 4-14a through 4-14d in the Final EIS show the wetland polygons that would be directly affected by the right-of-way of each build alternative, assuming a 100-m (328-ft) right-of-way.

Table 4.12-4 Direct Impacts on Wetlands by Wetland Class and Wetland Cover Type (for 100-m [328-ft] Right-of-Way

		Area in Hectares (Acres)							
Wetland Class	Wetland Cover Type	Alternative A		Alternative B		Alternative C		Alternative D	
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Forested Wetland	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	0	(0)	0	(0)	0	(0)
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Shrub-Scrub	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	1	(3)	0	(0)	0	(0)
Depressional	Marsh	1	(2)	2	(4)	1	(2)	1	(3)
Groundwater Slope		1	(2)	4	(10)	1	(4)	1	(3)

Wetland Class	Wetland Cover Type	Area in Hectares (Acres)							
		Alternative A		Alternative B		Alternative C		Alternative D	
Lacustrine Fringe		8	(19)	16	(38)	7	(17)	7	(18)
Depressional		17	(43)	15	(38)	17	(42)	17	(42)
Groundwater Slope	Wet Meadow	8	(19)	11	(26)	7	(16)	6	(14)
Lacustrine Fringe		4	(9)	7	(16)	9	(23)	4	(9)
Depressional		2	(5)	4	(10)	6	(14)	5	(12)
Groundwater Slope	Playa	0	(0)	2	(5)	1	(4)	1	(2)
Lacustrine Fringe		1	(2)	2	(5)	6	(14)	2	(4)
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Unconsolidated Shore	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	6	(15)	5	(13)	0	(0)
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Open Water	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		3	(7)	7	(16)	0	(0)	3	(7)
Totals*		44	(108)	76	(187)	60	(148)	46	(114)

Note:
* Includes acreage of wetlands already filled during previous construction activities.

Reduction of the right-of-way width from 100 m (328 ft) to 95 m (312 ft) would reduce impacts on wetlands under all proposed build alternatives, as illustrated in Table 4.12-5.

4.12-5 Direct Impacts on Wetlands under 328-ft Right-of-Way and 312-ft Right-of-Way

	Build Alternatives in hectares (acres)			
	Alternative A	Alternative B	Alternative C	Alternative D/E*
Acreage of Wetlands Impact – 100-m (328-ft) Right-of-Way	44 (108)	76 (187)	60 (147]	46 (114]
Reduction in Wetlands Impact Associated with Narrower 95-m (312-ft) Right-of-Way	2 (4)	2 (5)	1 (2)	1 (1)
Acreage of Wetland Impact – 95-m (312-ft) Right-of-Way	42 (104)	74 (182)	59 (145)	45 (113)

Notes:

All conversions have been rounded.

* Alternative D represents the 100-m (328-ft) right-of-way alignment from the Final EIS; Alternative E represents the 95-m (312-ft) right-of-way alignment evaluated in the Supplemental EIS.

Design flexibility, or the ability for the designer to modify facility components (consistent with design standards) to avoid sensitive resources, would be used during construction of the proposed highway to reduce the project footprint and subsequent impact on wetland resources. Specifically, it is anticipated that design flexibility would result in an additional savings of approximately 1 ha (2 ac) of wetlands during construction of the build alternatives. In addition, during initial construction of the Final EIS Preferred Alternative (Alternative D), the design-builder identified 6 ha (14 ac) of wetlands in the right-of-way (primarily in the north and south interchanges) that would not be affected during construction. Although this 6-ha (14-ac) savings is specifically associated with the final design of Alternative E, it is likely that a similar amount of wetland area would be avoided during construction of Alternatives A, B, and C as well.

No-Build Alternative

Existing Conditions

Under the No-Build Alternative, there would be no project-related direct impacts on wetlands resources. If none of the build alternatives is chosen, wetlands affected by project-related impacts to date (2004) would either be restored to preconstruction conditions or mitigated, at the instruction of the Corps. However, areas currently designated for incorporation into the Legacy Nature Preserve that are not used to mitigate project-related impacts on wetlands would be, under current law, beyond UDOT's authority to retain.

Future Conditions (2020)

At the current rate of development, the areas between the existing developed areas east of Legacy Parkway and Great Salt Lake will likely be developed by 2020. Wetland resources will likely be affected, although the nature, timing, and location of any impacts were not known at the time the wetlands functional assessment was done or at the time of this Supplemental EIS. Projects that have occurred since the Final EIS was published and the location of planned development are discussed in Section 4.1, *Land Use*, of this document. Future build-out conditions not associated with any build alternative indicate a loss or degradation of 15.1 ha (37.4 ac) of marsh, 4.7 ha (11.6 ac) of playa, and 27.8 ha (68.7 ac) of wet meadow habitats in the project study area from development not related to Legacy Parkway (see Section 4.13, *Wildlife*). Any proposed fill on wetland resources would have to be authorized under Section 404 of the CWA before impacts could occur.

Build Alternatives

Alternative A

Alternative A would have the lowest amount of direct impacts on wetlands of the build alternatives. In the Final EIS, it was calculated that a total of 44 ha (108 ac) of wetlands in the study area would be filled under this alternative. As a result of the reevaluation and project changes, the total acres of direct wetlands impact for this alternative have been reduced to 42 ha (104 ac) (Table 4.12-5). Affected wetlands would be at the higher elevations along the east side of the study area, with direct impacts

primarily on wet meadow in depressional and groundwater slope wetlands and on marsh in the lacustrine fringe wetlands adjacent to Great Salt Lake.

Alternative B

Alternative B would have the highest amount of direct impacts on wetlands of the build alternatives. In the Final EIS, it was calculated that a total of 76 ha (187 ac) of wetlands in the study area would be filled under this alternative. As a result of the reevaluation and project changes, the total acreage of wetlands subject to direct impacts by this alternative has been reduced to 74 ha (182 ac) (Table 4.12-5). The primary impacts would be on lacustrine fringe wetlands and wet meadow cover type. Marsh, wet meadow, unconsolidated shore, and open water habitats would be filled in the lacustrine fringe wetlands at the lower elevations along the west side of the study area. Wet meadow would also be filled in depressional and groundwater slope wetlands.

Alternative C

Alternative C would have more direct impacts on wetlands than Alternative A or Alternative D, but less than Alternative B. In the Final EIS, it was calculated that a total of 60 ha (147 ac) of wetlands in the study area would be affected under this alternative. As a result of the reevaluation and project changes, the total acreage of wetlands subject to direct impacts by this alternative has been reduced to 59 ha (145 ac) (Table 4.12-5). The primary impacts would be on lacustrine fringe wetlands and wet meadow cover type. Marsh, wet meadow, unconsolidated shore, and open water habitats would be filled in the lacustrine fringe wetlands at the lower elevations along the west side of the study area. Wet meadow would be filled in depressional and groundwater slope wetlands, and playa would be filled in depressional wetlands.

Alternative E

It was disclosed in the Finale EIS that Alternative D would have more direct impacts on wetlands than Alternative A but less than Alternatives B and C. A total of 46 ha (114 ac) of the wetlands in the study area would be filled under this alternative. As a result of modifying Alternative D to create Alternative E with a reduced right-of-way width, the total acres of direct wetlands impact for Alternative E would be 45 ha (113 ac) (Table 4.12-5). Affected wetlands would be at the higher elevations along the east side of the study area, with direct impacts primarily on wet meadow and playa in depressional wetlands, on wet meadow in groundwater slope wetlands, and on marsh in the lacustrine fringe wetlands adjacent to Great Salt Lake.

4.12.3.2 Indirect Impacts

Indirect impacts are impacts that occur later in time and impacts that could affect the function of wetlands located outside the project footprint. The following effects are examples of indirect impacts that the Legacy Parkway project could have on wetlands.

- During construction, ground disturbance would create wind-blown dust and potential for erosion of sediments into study area wetlands, which could adversely affect wetland hydrology and vegetation.
- Soil disturbance and removal of existing vegetation would increase the potential for the spread of invasive exotic plant species into the study area and potentially into wetlands.
- Construction materials, such as fuel, oil, lubricants, and concrete that may be spilled into study area wetlands could have adverse affects on vegetation and aquatic invertebrates.

- Construction of a new roadbed would create a barrier to surface water flows, altering the size or character of wetlands. The roadbed may compact underlying soils, altering the subsurface water flows in groundwater seep wetlands. The impervious road surface would also alter the local runoff pattern, affecting the hydrology of depressional wetlands.

- Deicing substances (salt, sand, and other substances) could be conveyed into the wetlands, with subsequent adverse effects on the vegetation and supported fauna. Traffic on the new road would generate particulates and contaminants, which could also have adverse effects on wetland habitat.

- Spills of hazardous materials transported via the parkway could have adverse affects on vegetation and aquatic invertebrates if the materials enter wetlands.

- The roadbed could create a barrier for movement of wildlife between wetlands, especially for reptiles and amphibians.

Many of these indirect effects are discussed in more detail in this document in Section 4.10, *Water Quality*, and Section 4.13, *Wildlife*.

The effects of specific impact mechanisms were not addressed by the wetland functional assessment conducted for the Final EIS. Instead, an estimate of the general level of wetland function indirectly lost because of project construction was calculated for wetlands within 305 m (1,000 ft) of the project footprint. A separate analysis of indirect impacts was carried out for each alternative, as summarized below. Table D-5 in Appendix D summarizes quantitatively the potential indirect impacts in relation to the total area affected under each proposed alternative. These indirect impacts are in addition to the direct impacts shown in Table 4.12-5. Figures 4-14a through 4-14c in the Final EIS show the wetlands that would be indirectly affected by each alternative. Indirect impacts on wetland functions are discussed in more detail in Section 4.12.3.3 below.

No-Build Alternative

Existing Conditions

Under the No-Build Alternative, there would be no project-related indirect impacts on wetlands resources. If none of the build alternatives is selected, wetlands affected by project-related impacts to date (2004) would either be restored to preconstruction conditions or mitigated at the instruction of the Corps. However, areas currently designated for incorporation into the Legacy Nature Preserve that are not used to mitigate for project-related impacts on wetlands would be, under current law, beyond UDOT's authority to retain.

Future Conditions (2020)

Currently, open space in Davis County is being developed at a rate of approximately 280 ha (700 ac) per year (Davis County 2003f). If growth continues at this rate, which it is projected to do (see Section 4.1, *Land Use*), all the developable land within the study area will be developed by 2020. Even assuming that no wetlands in the study area are filled and therefore directly affected, it is likely that many wetlands in the area will be indirectly affected by this other predicted development. Based on the wetlands functional assessment, about 74 percent of the wetlands in the study area would be indirectly affected by 2020 by future development not related to Legacy Parkway.

Build Alternatives

Alternative A

Of the build alternatives, Alternative A would have the lowest amount of indirect impacts on wetlands. About 218 ha (539 ac) of wetlands in the study area would be indirectly affected under this alternative. In depressional wetlands, the indirect impacts primarily would be on wet meadow and playa. In groundwater slope wetlands, the indirect impacts primarily would be on wet meadow and marsh. In lacustrine fringe wetlands, the indirect impacts would be on marsh, wet meadow, unconsolidated shore, and open water.

Alternative B

Of the build alternatives, Alternative B would have the greatest amount of indirect impacts on wetlands. About 40 ha (1,011 ac) of wetlands in the study area would be indirectly affected under this alternative. This alternative would have substantial indirect effects on all three wetland classes. Much of the indirect effect on wetlands would be on wet meadow, but there would also be substantial indirect effects on marsh, playa, unconsolidated shore, and open water habitats.

Alternative C

Alternative C would have more indirect impacts on wetlands than Alternative A or Alternative D but less than Alternative B. About 367 ha (907 ac) of wetlands in the study area would be indirectly affected under this alternative. Wetlands affected would be similar to those affected under Alternative B.

Alternative D

Alternative D would have more indirect impacts on wetlands than Alternative A but less than Alternatives B and C. About 233 ha (575 ac) of wetlands in the study area would be indirectly affected under this alternative. Wetlands affected would be similar to those affected under Alternative A.

4.12.3.3 Impacts on Wetland Functions

Impacts on wetland functions were quantified using the wetlands functional assessment models developed for the Final EIS (discussed in Section 4.12.1.2). These impacts were calculated as the change in wetland function multiplied by the area of affected wetlands. All wetland functions would be reduced to zero for wetlands or portions of wetlands that would be directly affected within the right-of-way.

Impacts on wetland functions were prepared for each wetland category and each wetland cover type and are summarized below by alternative. Tables E-6 to E-10 in Appendix D, which update and supplement Tables 4-20 and 4-22 in the Final EIS, present these impacts quantitatively by wetland function.

No-Build Alternative

Existing Conditions

Under the No-Build Alternative, there would be no project-related direct or indirect impacts on wetlands functions. If none of the build alternatives is selected, wetlands affected by project-related impacts to date (2004) would either be restored to preconstruction conditions or mitigated at the instruction of the Corps. Howver, areas currently designated for incorporation into the Legacy Nature Preserve that are not used to mitigate project-related impacts on wetlands would be, under current law, beyond UDOT’s authority to retain. Future Conditions (2020)

As described above, it is likely that, by 2020, all the wetland resources in the study area will be either directly or indirectly affected by planned development. Although the nature and timing of this development is not definitive, such development would affect wetland functions in the study area.

Build Alternatives

The following describes how each of the different wetland functions would be affected by the proposed build alternatives.

Hydrology

Function 1: Maintain Wetland Hydrology

The ability of wetlands in the study area to maintain wetland hydrology would be altered by construction of Legacy Parkway. Wetlands that would be filled would lose the ability to perform this function. The new roadbed would create a barrier to surface water flows, altering the size and/or character of wetlands. Ponding on the upslope side of the roadbed would cause wetlands to pond more deeply and for longer periods, potentially shifting the habitat character towards a more aquatic type, whereas wetlands downslope of the roadbed would become drier, shifting the habitat character to a more upland type. A similar effect would be expected if the roadbed compacted underlying soils, altering the subsurface water flows in groundwater seep wetlands. Although the effects of soil compaction might only result in a few inches change in the groundwater levels, these changes would be sufficient to substantially alter the hydrology of wetlands that are only inundated a few inches deep for short, intermittent periods, such as the wet meadows and playas. The impervious road surface would increase the amount of surface runoff in the vicinity of the roadbed, potentially changing the habitat to a more hydric type. Table D-6 in Appendix D summarizes quantitatively the potential impacts of Legacy Parkway in the FCUs lost under each build alternative.

Alternative A

Alternative A would have the least effect on wetland hydrology. Most direct effects on wetland hydrology would be in depressional wetlands, and most of the indirect effects would be in groundwater slope and lacustrine fringe wetlands. Most wetland habitat affected would be wet meadow, although a large proportion of the indirect effects would be on marsh.

Alternative B

Alternative B would have the largest effect on wetland hydrology. Most direct effects on wetland hydrology would be on wet meadow and marsh habitats in all three wetland classes. Indirect effects would be on wet meadow and marsh habitats, primarily in lacustrine fringe wetlands, but also in groundwater slope wetlands.

Alternative C

Alternative C would have less effect on wetland hydrology than Alternative B but more than Alternative A and Alternative D. Most direct effects on wetland hydrology would be in lacustrine fringe and depressional wetlands, and most of the indirect effects would be on lacustrine fringe wetlands. Most wetland habitat affected would be wet meadow, but much marsh and playa habitat would also be affected.

Alternative D

Alternative D would have less effect on wetland hydrology than Alternatives B and C but more than Alternative A. Most direct effects on wetland hydrology would be in wet meadow in depressional wetlands. Most indirect effects would be on wet meadow in all three wetland classes, although a large proportion of the indirect effects would be on marsh and unconsolidated shore in lacustrine fringe wetlands.

Biogeochemistry

Function 2: Removal of Dissolved Elements and Compounds

The ability of wetlands in the study area to remove dissolved elements and compounds would be altered by construction of Legacy Parkway. Wetlands that would be filled would lose the ability to perform this function. This function would also be impaired in wetlands adjacent to the build alternatives, where the character of the vegetation would shift to a more upland type or where vegetation cover would decrease. This function would be enhanced where the character of the vegetation would shift to a more wetland type or where vegetation cover would increase. In addition, an increase in the level of dissolved elements and compounds is expected in wetlands adjacent to the road, which may exceed the ability of the wetland to perform this function. Table D-7 in Appendix D summarizes quantitatively the potential impacts of Legacy Parkway in the total FCUs lost under each build alternative.

Alternative A

Alternative A would have the least effect on the ability to remove dissolved elements and compounds. Most direct effects on this function would be in wet meadows, primarily in depressional wetlands. Most indirect effects on this function also would be in wet meadows but primarily in groundwater slope wetlands.

Alternative B

Alternative B would have the largest effect on the ability to remove dissolved elements and compounds. Most direct effects on this function would be on wet meadow habitat and on marsh in lacustrine fringe wetlands. Indirect effects would be on wet meadow, primarily in groundwater slope and lacustrine fringe wetlands, and on marsh habitats in lacustrine fringe wetlands.

Alternative C

Alternative C would have less effect on the ability to remove dissolved elements and compounds than Alternative B but more than Alternative A and Alternative D. Most direct effects on this function would be in wet meadow habitat. Most indirect effects on this function would be on wet meadow habitat and on marsh in lacustrine fringe wetlands.

Alternative D

Alternative D would have less effect on the ability to remove dissolved elements and compounds than Alternatives B and C but more than Alternative A. Most direct effects on wetland hydrology would be in wet meadow, primarily in depressional wetlands. Most indirect effects would be on wet meadow in depressional and groundwater slope wetlands.

Function 3: Particulate Retention

The ability of wetlands in the study area to retain particulates would be altered by construction of Legacy Parkway. Wetlands that would be filled would lose the ability to perform this function. This function

would also be impaired in wetlands adjacent to the Parkway where the character of the vegetation would be shifted to a more upland type or where vegetation cover would decrease. This function would be enhanced where the character of the vegetation would shift to a more wetland type or where vegetation cover would increase. In addition, an increase in the input of particulates is expected in wetlands adjacent to the road, which could cause the wetlands to silt in.

Although not addressed by the wetland functional assessment models, depressional wetlands would respond differently than non-depressional wetlands to an increased influx of particulates. Depressional wetlands would initially have a high capacity to retain particulates, but because water flow is primarily into the wetlands, over time they would silt in and lose this function and other functions. In contrast, non-depressional wetlands have a limited capacity to retain particulates and could be overwhelmed by particulate-laden water, so that particulates would pass through them unrestrained. However, because water flows through non-depressional wetlands, particulate-free water would remove particulates from the wetlands, and over time the ability to retain particulates would be restored.

Table D-8 in Appendix D summarizes quantitatively the potential impacts of Legacy Parkway in the total FCUs lost under each build alternative.

Alternative A

Alternative A would have less effect on the ability to retain particulates than Alternatives B and C but more than Alternative D. Most direct effects on this function would be in wet meadows, primarily in depressional wetlands. Most indirect effects on this function would be in wet meadows, marsh, and unconsolidated shore.

Alternative B

Alternative B would have the largest effect on the ability to retain particulates. Most direct effects on this function would be on wet meadow habitat and on marsh in lacustrine fringe wetlands. Indirect effects would be on wet meadow, primarily in groundwater slope and lacustrine fringe wetlands, and on marsh habitats in lacustrine fringe wetlands.

Alternative C

Alternative C would have less effect on the ability to retain particulates than Alternative B but more than Alternatives A and D. Most direct effects on this function would be in wet meadow habitat. Most indirect effects on this function would be on wet meadow habitat and on marsh in lacustrine fringe wetlands.

Alternative D

Alternative D would have the least effect on the ability to retain particulates. Most direct effects on wetland hydrology would be in wet meadow, primarily in depressional wetlands. Most indirect effects would be on wet meadow in depressional and groundwater slope wetlands.

Flora and Fauna Habitat Support

Function 4: Habitat Structure

The Legacy Parkway project would result in changes in the cover, composition, and hydrophytic character of the wetland vegetation in the study area, which would alter the ability of the wetlands to provide habitat to wildlife. Altering wetland hydrology would change the vegetation type or convert the wetland to upland. Soil disturbance and removal of existing vegetation would increase the potential for spread of invasive exotic plant species into study area wetlands, which would displace the native wetlands

plants. Spills of construction materials or hazardous materials into study area wetlands would adversely affect both vegetation and aquatic invertebrates. De-icing substances (salt, sand, and other substances) could be conveyed into the wetlands, with subsequent adverse effects on the vegetation and supported fauna. Although soils in the project area naturally have high salinity, salts from the roadway would be expected to accumulate in the wetlands.

Contaminants entering the wetland ecosystem at low levels, although not exceeding water quality standards for acute toxicity, would nevertheless be expected to accumulate in the wetland ecosystem. Depressional wetlands, especially those which lack outlets, would be particularly subject to buildup of these substances. The effects of these impacts on wildlife are discussed in more detail in Section 4.13, *Wildlife*, of this document. Table D-9 in Appendix D quantitatively summarizes the potential impacts of Legacy Parkway in the total FCUs lost under each build alternative.

Alternative A

Alternative A would have the least effect on habitat structure. Most direct and indirect effects on this function would be in wet meadow, primarily in depressional and groundwater slope wetlands.

Alternative B

Alternative B would have the largest effect on habitat structure. Most direct and indirect effects on this function would be on wet meadow habitat in all wetland classes. There would also be substantial direct and indirect effects on marsh in lacustrine fringe wetlands.

Alternative C

Alternative C would have less effect on habitat structure than Alternative B but more than Alternatives A and D. Most direct effects on this function would be in wet meadow habitat. Most indirect effects on this function would be on marsh in lacustrine fringe wetlands.

Alternative D

Alternative D would have less effect on habitat structure than Alternatives B and C but more than Alternative A. Most direct and indirect effects on habitat structure would be in wet meadow in all three wetland classes.

Function 5: Habitat Connectivity, Fragmentation, and Patchiness

The Legacy Parkway project would have adverse impacts on wetland habitat by fragmenting existing wetlands and creating a barrier between the resulting habitat fragments and other adjacent wetlands. In addition to creating a physical barrier, the road would alter the wetland hydrology of wetland complexes, causing some to become drier and others wetter, creating barriers that would prevent some species from moving between the wetlands. Loss of wetland character would also result in the loss of permanent habitat and foraging area. The effects of these impacts on wildlife are discussed in more detail in Section 4.13, *Wildlife*.

Table D-10 in Appendix D summarizes quantitatively the potential impacts of Legacy Parkway in the total FCUs lost under each build alternative.

Alternative A

Alternative A would have the least effect on habitat connectivity, fragmentation, and patchiness. Most direct and indirect effects on this function would be in wet meadow, primarily in depressional and groundwater slope wetlands.

Alternative B

Alternative B would have the largest effect on habitat connectivity, fragmentation, and patchiness. Most direct and indirect effects on this function would be on wet meadow habitat in all wetland classes. There would also be substantial direct and indirect effects on marsh in lacustrine fringe wetlands.

Alternative C

Alternative C would have less effect on habitat connectivity, fragmentation, and patchiness than Alternative B but more than Alternatives A and D. Most direct and indirect effects on this function would be on wet meadow habitat in all wetland classes. There would also be substantial direct and indirect effects on marsh in lacustrine fringe wetlands.

Alternative D

Alternative D would have less effect on habitat connectivity, fragmentation, and patchiness than Alternatives B and C but more than Alternative A. Most direct and indirect effects would be in wet meadow in all three wetland classes.

4.12.3.4 Mitigation Measures

The following sections describe the measures proposed to mitigate impacts on wetland resources associated with implementation of the build alternatives. The mitigation measures are described in terms of the three-step sequencing analysis used by the Corps to prioritize what measures are adopted to mitigate wetland impacts: avoidance, minimization, and compensation (e.g., restoration, enhancement, creation).

The mitigation packages proposed in this section are based on the assumption that all the wetlands within the right-of-way of the build alternatives would be affected. UDOT has indicated that it will apply for a modification to the Section 404 permit requesting 99 acres of fill (see Section 1.1.2, *Project Applicants Proposal*). In addition, as described in Section 4.12.2.1, *Direct Impacts*, a small number of the wetlands within the proposed right-of-way would be avoided through design flexibility. As such, these mitigation packages are based on acreages of wetland impacts that may, in fact, be greater than what would actually occur during project construction.

Avoidance and Minimization

As described in Chapter 3, *Alternatives*, five regional alignments were considered in the Final EIS, three of which eliminated from additional analysis partly because of their impacts on wetlands. Within the Great Salt Lake Corridor (i.e., the regional corridor containing the build alternatives evaluated in this Supplemental EIS), avoidance and minimization measures were used as much as possible in designing the alignment for each alternative. As described in the Final EIS, it would not be possible to build Legacy Parkway and avoid all impacts on wetlands. The build alternatives analyzed in this section and the Final EIS were evaluated in part because they represented alignments designed specifically to avoid wetland resources. In most cases, these alternatives represented the alternatives with the least impacts of the other

alternatives evaluated and eliminated in previous studies, although some alternatives with lower wetlands impacts were eliminated because of cost or relocation impacts or because the alternative failed to meet the project purpose and need.

Under all proposed build alternatives, measures to minimize wetland impacts would also be implemented during project construction and would be incorporated into the final project design. Floodplain equalization culverts would be placed under the road within the Corps floodplain boundary to maintain hydrologic connections between the east and west sides of the parkway during high lake levels. Surface- and groundwater conveyance structures would be installed wherever existing hydrologic connections or wetlands are present. The roadway design has also been modified to lower the embankment height in non-floodplain areas, which further minimizes the minor effect of soil compaction on the sub-surface water table. Best management practices (BMPs) would be used to limit the amount of eroded sediment and other materials that leave the right-of-way. Other mitigation measures for minimizing water quality impacts, such as vegetated filter strips, are discussed in Section 4.10, *Water Quality*.

Preservation

A major element of the mitigation for wetland impacts would be protection and maintenance in perpetuity of wetlands in the study area as part of the Legacy Nature Preserve. Preservation would result in a net loss wetland acres, but it is useful to remove threats to prevent loss or decline of wetland functions. The Corps may authorize wetland preservation as the basis of mitigation under exceptional circumstances, when the protection and maintenance of wetland functions is important to the region where those wetlands occur and where the wetlands are subject to demonstrable threat of loss or substantial degradation (Regulatory Guidance Letter No. 02-2, December 24, 2002).

The wetland complexes along the eastern shore of Great Salt Lake perform important physical, chemical, and biological functions. They are a buffer between the lake and developed lands in the I-15 corridor, provide flood storage during high-water years, and serve as a filter for surface waters flowing into the lake from the east. They provide nesting and foraging habitat for waterfowl and shorebirds and upland refuge habitat during flood events. Proposed mitigation lands would protect and maintain this buffer between the lake and developed lands in perpetuity.

Wetlands in the study area are under demonstrable threat of loss or substantial degradation from human activities not associated with the Legacy Parkway project. Most of these wetlands already have been degraded by agricultural conversion, development, and other land use changes. They face continued threats from projected growth and development in and to the west of the study area. The wetlands are interspersed with substantial areas of uplands that can be developed without obtaining wetland permits. The threats, therefore, are not only from direct changes to the wetlands but from the indirect effects that may result if available upland is, as projected, fully developed. As described in Section 4.1, *Land Use*, open space in Davis County is being developed at the rate of approximately 280 ha (700 ac) per year (Davis County 2003f). If this rate of development continues, which it is projected to do, most of the study area will be developed by 2020. As explained in the Final EIS, this development is projected to occur on uplands and does not account for possible authorized direct wetland filling for future development.

The Final EIS proposed establishing the Preserve to protect and maintain a buffer between Great Salt Lake and future development. A conceptual preserve was originally designed for each alternative that would preserve wetlands at a mitigation ratio of approximately 3:1 (three times as much area of wetlands preserved as wetlands lost) as well as providing wetland enhancement and restoration in addition to preservation. Four different conceptual preserves were developed, each configured according to the

location of the alternative alignment and the amount of affected wetlands (see Figures 4-14a through Figure 4-14d in the Final EIS).

Legacy Nature Preserve

As described in the Final EIS, the Legacy Nature Preserve was proposed to protect the large tracts of wetlands complexes adjacent to Great Salt Lake that are at risk of being lost of impaired by future development.

Section 4.12.4 of the Final EIS described the areal extent of the Legacy Nature Preserve associated with each build alternative. Based on the wetlands functional assessment in combination with an established ratio of area preserved wetlands to wetlands lost, the Legacy Nature Preserve was proposed to encompass approximately 440 ha (1,088 ac) for Alternative A; approximately 856 ha (2,116 ac) for Alternative B; approximately 621 ha (1,535 ac) for Alternative C; and approximately 506 ha (1,251 ac) for Alternative D (Final EIS Preferred Alternative). Properties associated with the Legacy Nature Preserve would be acquired by the state in fee simple title and managed in perpetuity according to a management plan coordinated with the resource agencies and other interests.

As described in the Final EIS, an additional 126 ha (317 ac) of mitigation lands proximate to the FBWMA were added to the Legacy Nature Preserve associated with Alternative D (Final EIS Preferred Alternative) at the request of the USFWS (Figure 4.12-2). This area is considered valuable wildlife habitat and was added to mitigate impacts on wildlife that USFWS believes were not captured by the wetlands functional assessment. In addition, after publication of the Final EIS and during preparation of the respective Records of Decision (RODs) by the Corps and FHWA, four additional parcels totaling 217 ha (530 ac) were added to the Legacy Nature Preserve to address EPA's concerns regarding the adequacy of the mitigation package proposed for Alternative D.

The incorporation of these additional parcels directly into the mitigation packages for the all the other proposed build alternatives would result in preservation of the following additional acreage of wetlands.

- Under Alternative E, 180 ha (446 ac) of wetlands (315 ha (778 ac) of wetlands in total).
- Under Alternative A, 193 ha (478 ac) of wetlands (337 ha [834 ac] of wetlands in total).
- Under Alternative B, 115 ha (285 ac) of wetlands (348 ha [861 ac] of wetlands in total).
- Under Alternative C, 106 ha (261 ac) of wetlands (323 ha [796 ac] of wetlands in total).

Inclusion of these additional mitigation lands equally under all the build alternatives would be discussed with the regulatory agencies upon selection of a preferred alternative to determine the adequacy of the mitigation package, and if the additional lands should be incorporated in full or in part. In either case, a mitigation package—proportionate to the amount of impacts and based on a similar analysis and the same principles as those used for the Legacy Nature Preserve identified for Alternative D in the Final EIS and for Alternative E in this document—would be proposed for all the build alternatives, with input for the Corps and other regulatory agencies.

Restoration and Enhancement

Wetland restoration and enhancement was proposed in the Final EIS as a viable mitigation method that could be used to offset impacts on wetland resources due to the historical alteration and degradation of wetlands in the study area. Since publication of the Final EIS, a number of restoration and enhancement

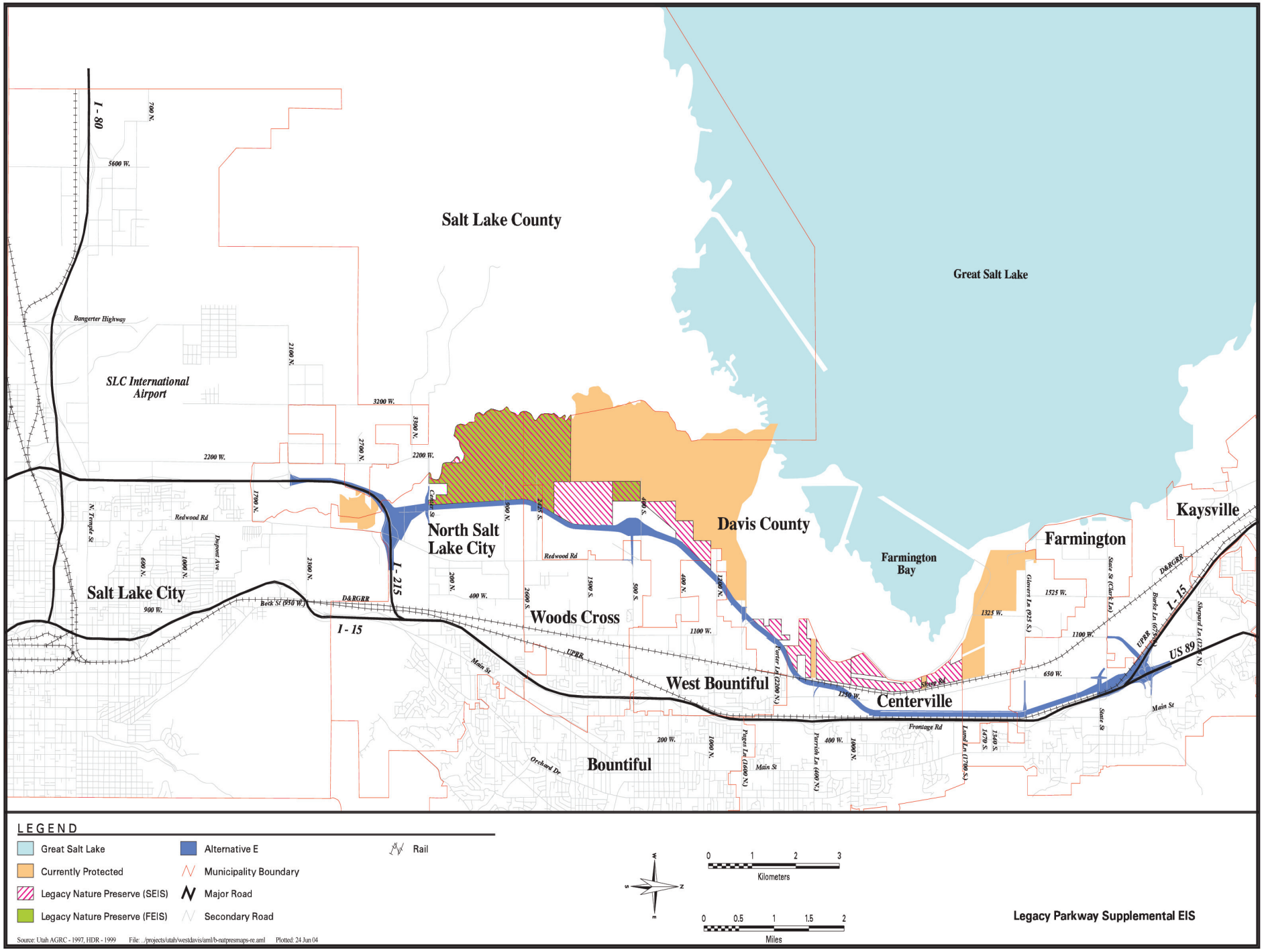

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Figure 4.12-2
Parcels Associated with Legacy Nature Preserve

activities have occurred in the Legacy Nature Preserve associated with Alternative D (Final EIS Preferred Alternative). Specific actions taken in the Legacy Nature Preserve to date are presented in the following text to represent how such activities would mitigate wetland impacts under any of the proposed mitigation packages, regardless of which build alternative is implemented. In other words, although the location and extent of these restoration and enhancement actions would be slightly different under each proposed build alternative, the types of mitigation employed would be similar regardless of where the mitigation actions occur.

Hydrology Measures, including Wetlands Creation

In many of the proposed mitigation areas, wetland hydrology has been altered by farming, draining, and water development practices. The Final EIS proposed to restore hydrology in certain wetland areas as part of the mitigation proposal.

Within the Legacy Nature Preserve associated with Alternative D (Final EIS Preferred Alternative), several measures to mitigate impacts on wetlands have already been implemented. Implementing mitigation in the Legacy Nature Preserve has been subject to the terms of the Section 404 Permit and the Mitigation Plan approved by the Corps pursuant to that permit. These instruments provide additional information about the preservation, restoration, and enhancement activities conducted and to be conducted in the Legacy Nature Preserve.

Several measures have been implemented to restore wetland hydrology in the Preserve. Roads not required for maintenance have been removed and contoured to match the adjacent land. Most removed roads in the mitigation area are minor roads, and removing them has restored local hydrology by removing a barrier to overland water flow. Ditches, which were functioning as storm drainage conduits and effectively lowering the adjacent water table, have been filled and contoured to match the adjacent land. This action will stop draining of adjacent lands and raise the water table in the area. In addition, drain tiles within the southern portion of the Legacy Nature Preserve have been identified and will be plugged in order to raise the water table.

Additional mitigation measures to restore habitat structure include restricting grazing, removing trash, debris, illegal fill and structures, and relocating utilities. In one area where trash and debris were removed within the Legacy Nature Preserve, wetland hydrology reestablished, resulting in the physical restoration of 3.41 ha (8.43 ac) of wetlands. The wetland functional capacity has not been determined for these wetlands.

An active water management plan is being developed for the 121 ha (300 ac) Jordan River Floodplain in the southern portion of the Legacy Nature Preserve. Old channels and sloughs of the Jordan River historically were cut off from the main stem by levees that have prevented the Jordan River from flowing into its floodplain. Portions of the old channels had been filled. The net affect during the last 100 years was a gradual drying of the floodplain, less inundation of wetland areas, and species shifts in vegetative communities due to disturbance by livestock and farming activities.

The floodplain hydrology within the Legacy Nature Preserve is also being restored by reconstructing historic channels to a near natural state, returning water flows into the sloughs, providing a water delivery system into the floodplain, and controlling where the water pools and flows to restore and maintain fresh, brackish and saline wetlands habitats. Wetland vegetation is dependant on a complex interaction between timing, duration, depth, and salinity of water in the wetland. Maximizing the floodplain wetlands for wildlife productivity includes the ability to provide optimum timing, depths, and duration of delivery to the wetlands. A water delivery system has been developed that consists of inlet diversion, overflow weirs,

and water control structures. It will be used to provide periods of flooding, timely draw-downs and drying.

Water rights secured for the floodplain include the purchase of 1,400 acre feet of water from the South Davis detention basin fed by water from North Canyon Creek and South Davis storm drainage. This provides up to 6 cfs from April through October. UDOT has filed on an additional 20 cfs for all 12 months. In addition, 12 shares (about 48 acre feet) of North Point Consolidated Company water have been purchased.

Although the Final EIS did not recommend wetland creation to mitigate for wetland loss, wetland creation was discussed in concept in the mitigation plan for the ROD. These wetlands were to be created by using artesian wells to develop additional wetland hydrology within the mitigation preserve. These wells have been established, and approximately 4.9 ha (12 ac) of groundwater slope wetlands have been created.

Removal of Noxious Weeds

Large stands of noxious species of weeds have invaded the Great Salt Lake region and their current rapid spread continues to degrade the habitat support functions of the wetlands and uplands surrounding Great Salt Lake. They are usually introduced species not historically part of the landscape and are capable of spreading and taking over areas in relatively short periods of time, pushing out other more desirable, native species. Southern Davis County has large areas of largely uncontrolled and spreading noxious weeds including much of the proposed mitigation area. Noxious species invasive in the wetlands include poison hemlock *(Conium maculatum)* and perennial pepperweed *(Lepidium latifolium)*. Others species that are not as widespread but are increasingly invading the area along the Jordan River and drainage ditches include purple loosestrife (*Lythrum salicaria)*. Other species more typical of uplands may also form dense stands along wetland margins, including Scotch thistle *(Onopordum acanthium)*, musk thistle *(Carduus nutans)*, Canada thistle (*Cirsium arvense)*, white top *(Caradaria draba)*, and field bindweed *(Convolvulus arvensis)*. The Section 404 permit for Alternative D (Final EIS Preferred Alternative) requires as part of the mitigation the development and implementation of a noxious and/or invasive plant control plan. The noxious and/or invasive plant control plan includes inventorying, initial eradication, and on-going control.

Monitoring

The Section 404 permit for Alternative D (Final EIS Preferred Alternative) states that existing playa, wet meadow, and marsh be quantified within the Jordan River floodplain, with the goal of retaining the relative percentages of these diverse habitats to within 25 percent of the baseline percentages. Five years of baseline vegetation and wildlife monitoring have been completed and monitoring will continue to verify these goals are being met and to determine vegetation and wildlife responses to management. An adaptive approach will be incorporated to increase productivity of wildlife.

Chapter 4.13
Wildlife

This section discusses wildlife and wildlife habitats in the project study area, the regional study area, and the Great Salt Lake Ecosystem (GSLE), as defined below. It updates the affected environment, potential environmental consequences on wildlife, and proposed mitigation measures presented in the Final EIS. The discussion of environmental consequences considers development since publication of the Final EIS, including construction activities associated with Alternative D (Final EIS Preferred Alternative; see Section 4.20) and unrelated development in the study area, and the revised right-of-way width and typical cross section associated with all the proposed build alternatives (see Chapter 3, *Alternatives*).

4.13.1 Approach and Methodology

As described in Section 2.5, *Wildlife Impacts Analysis*, in response to the tenth circuit court remand of the Final EIS for the Legacy Parkway project and comments received during public scoping, the federal lead agencies have expanded the scope of the wildlife analysis presented in the Final EIS. The wildlife analysis presented herein considers direct, indirect, and cumulative impacts on wildlife, particularly migratory bird species, within 305 m (1,000 ft) of the project right-of-way and beyond. To help develop the approach and methodology for addressing the wildlife issues raised by the court and other wildlife issues raised during scoping, the lead agencies and UDOT formed a science technical team consisting of resource agency scientists. The *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum* (wildlife technical memorandum) (Jones & Stokes 2004) was prepared to document the process, methodology, and analysis for addressing wildlife impacts. This section of the Supplemental EIS is based on the results of that wildlife technical memorandum, as well as on review of the Final EIS and the administrative record.

Potential impacts of the proposed Legacy Parkway on wildlife were analyzed at two geographic levels within the GSLE: the project level (project study area) and the regional level (regional study area). These areas are described below and shown in Figures 4.13-1, 4.13-2 and 4.13-3.

4.13.1.1 Project Study Area

The study area for the project-level analysis encompassed the Final EIS wildlife study area, the proposed Legacy Nature Preserve mitigation area, and additional lands included in the wetland delineation study (Baseline Data, Inc. et al. 1998) (Figures 4.13-1 and 4.13-2). The project study area encompasses 4,186 ha (1,0344 ac), the total area for which high-resolution geographic information system (GIS) data was available for mapping wildlife habitats. The project-level analysis was conducted using this high-resolution dataset. The footprints of all the proposed build alternatives are entirely within the project study area.

4.13.1.2 Regional Study Area

The study area for the regional-level wildlife analysis was defined by three parameters: (1) a subset of U.S. Geological Survey (USGS) hydrologic units in the eastern portion of the GSLE, (2) the extent of these units for which comprehensive regional GIS land-use data were available, and (3) the portion of these areas below 1,433 m (4,700 ft) in elevation (Figures 4.13-1 and 4.13-3).

The 1,433-m (4,700-ft) elevational boundary was selected to include wetland habitats associated with Utah Lake that could potentially be used by migrating birds that also use the project study area. A variety of migrating bird species are likely to use both areas despite the differences in ecology (Utah Lake is a freshwater lake, whereas the project study area is associated with Great Salt Lake's saltwater ecosystem). The regional study area was used to evaluate all project-related effects on wildlife beyond the project study area.

4.13.1.3 Great Salt Lake Ecosystem

The proposed Legacy Parkway project is located on the southeast shore of Great Salt Lake. In this report, the GSLE refers to Great Salt Lake, its floodplains, and all adjacent wildlife habitats that are used by migratory bird species (Figure 4.13-4), as mapped in Aldrich and Paul (2002).

4.13.1.4 Methods Used to Acquire Information

The analysis and methodology presented in the wildlife technical memorandum was used to update the affected environment and environmental consequences information presented in Sections 3.13 and 4.13 of the Final EIS. The wildlife technical memorandum and supplemental wildlife analysis presented in this document were prepared with input from the science technical team, which comprised ecologists and biologists from FHWA, the Corps, UDOT, and their representative technical consultants, as well as wildlife biologists and technical experts from the U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), and Utah Department of Natural Resources (UDNR). This inclusive approach was intended to ensure that the best available scientific information was acquired and appropriately analyzed in the Supplemental EIS. The following methods were used to acquire information on migratory birds, upland and wetland habitats, and special-status species in the GSLE.

- **Habitat Delineation**. Wildlife habitats within the project study area, including open water, riparian, emergent marsh, wet meadow, mudflat/pickleweed, pasture, cropland, salt desert scrub, and developed (urban landscaping), were delineated and mapped.

- **GIS Mapping**. Wildlife habitats around Great Salt Lake for which GIS data were available were mapped.

- **Species Identification**. Wildlife species that use or could potentially use the delineated habitats were identified, and their ecological status (seasonal occurrence, breeding and migratory status, habitat requirements, etc.) within the project study area and around Great Salt Lake was documented using available data.

- **Habitat Evaluation**. The ecological importance of the different habitats to migratory wildlife within the project study area and around Great Salt Lake was evaluated.

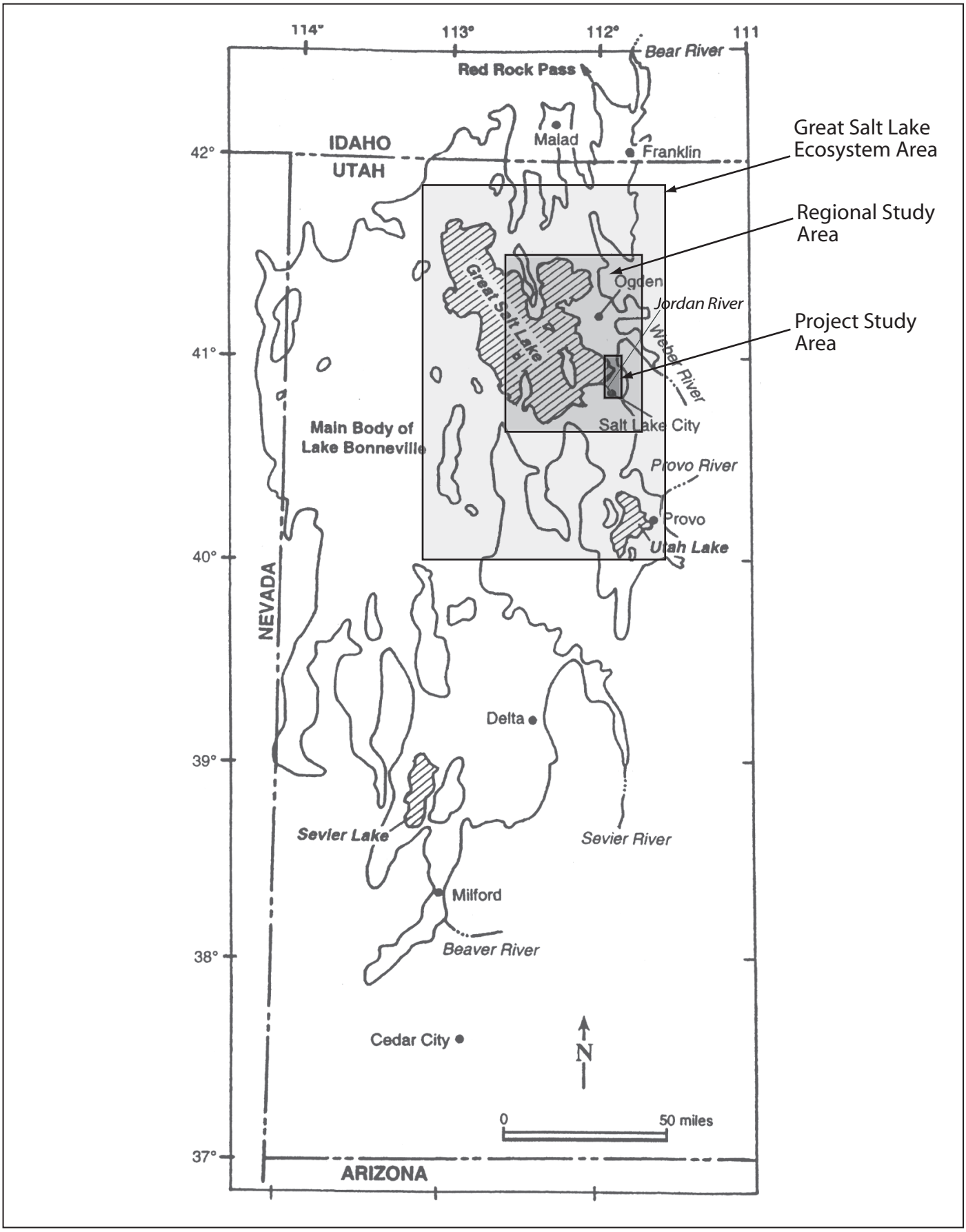

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Figure 4.13-1
Location of Great Salt Lake in Lake Bonneville Basin

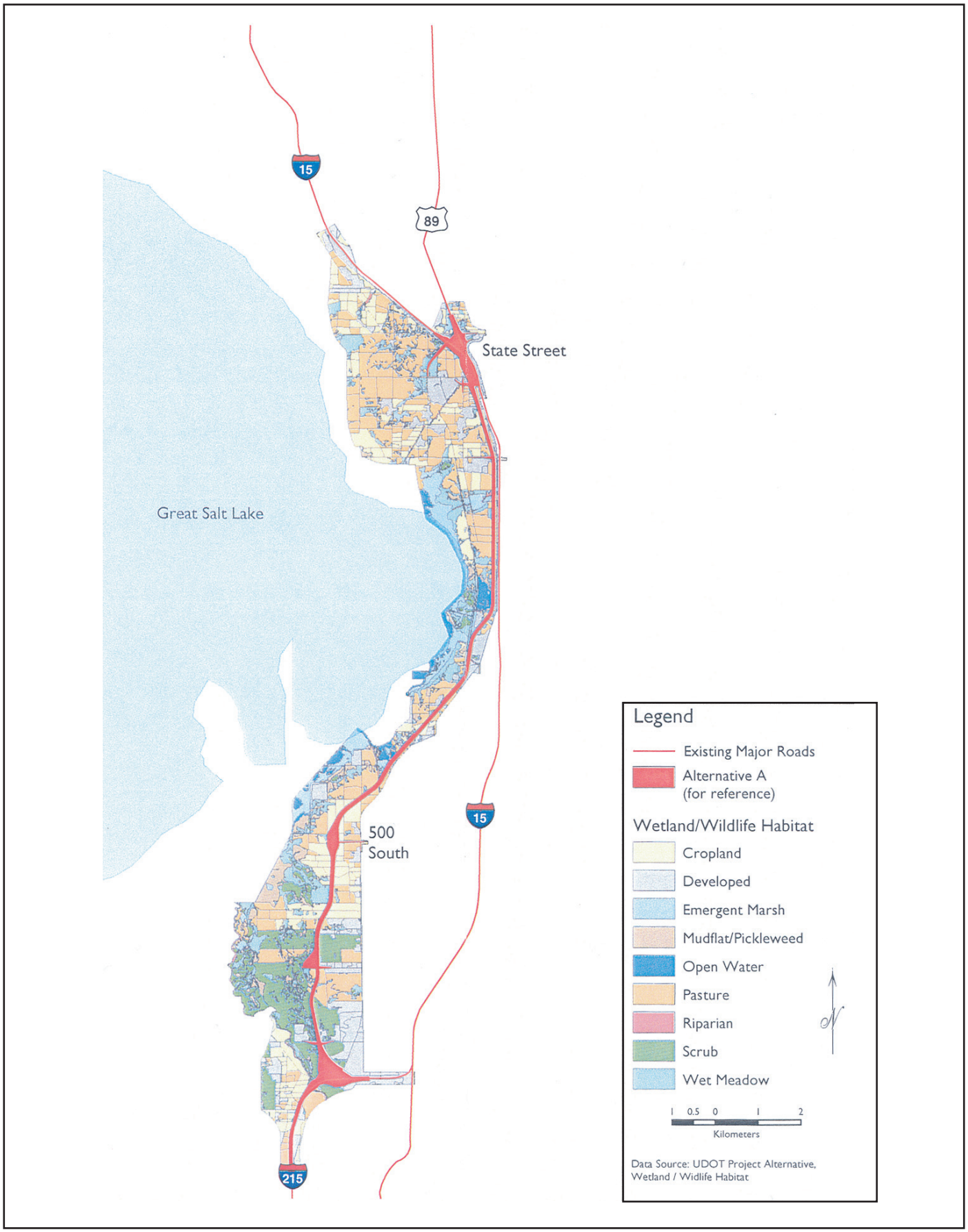

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Figure 4.13-2
Project Study Area

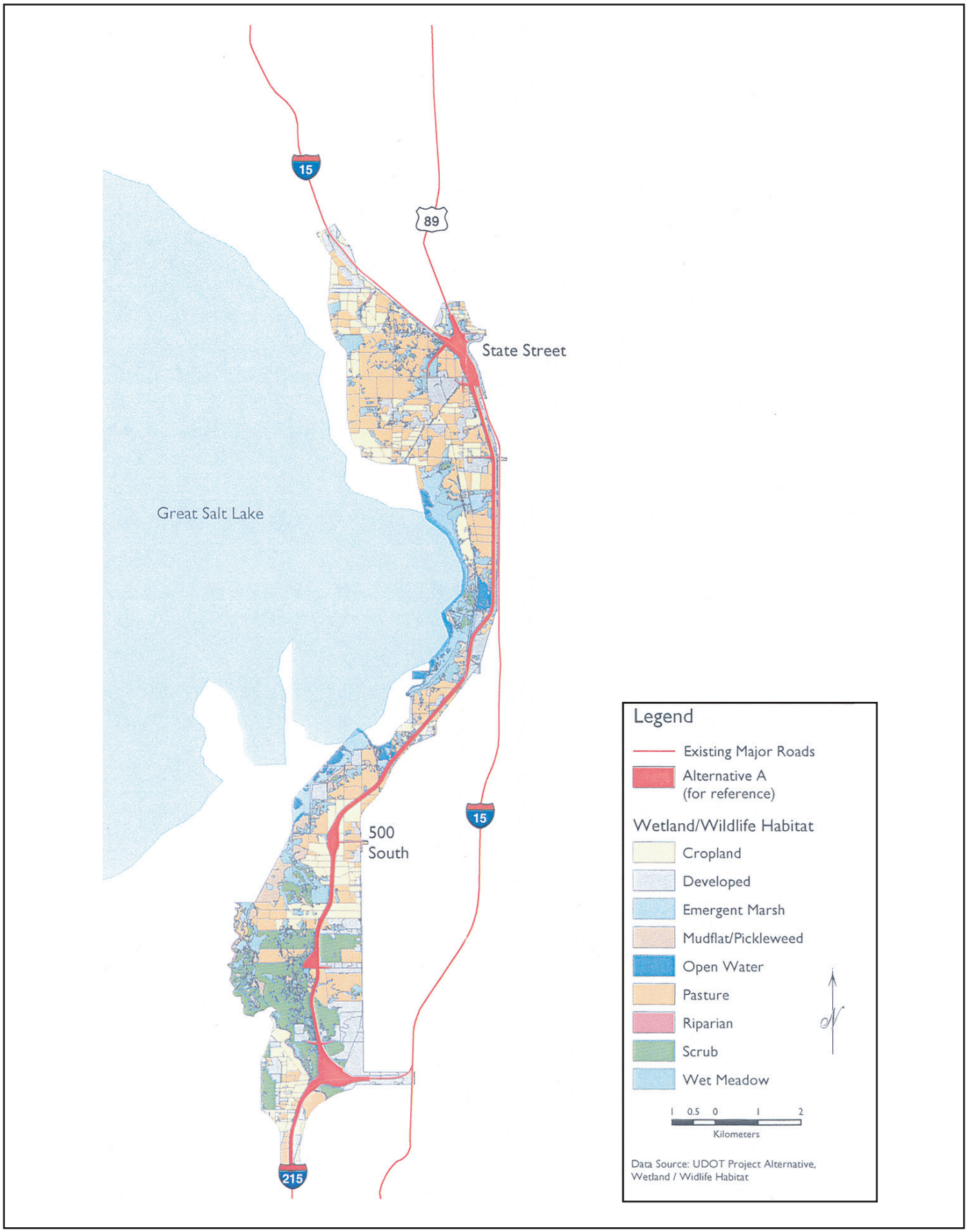

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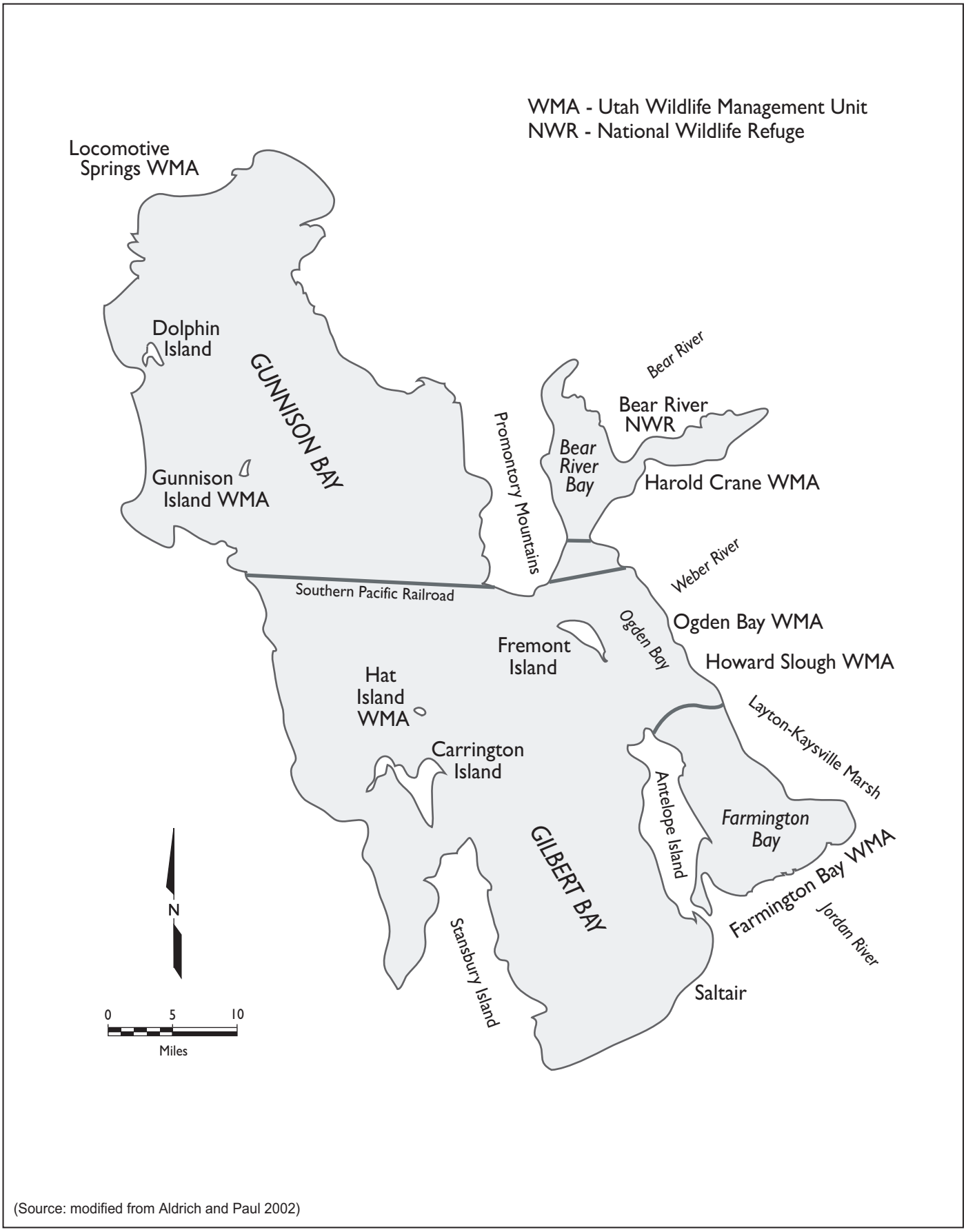
Figure 4.13-2
Project Study Area



(Source: modified from Aldrich and Paul 2002)

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Figure 4.13-4
Great Salt Lake Ecosystem (GSLE) Area

- **Literature Review**. Scientific literature on the potential impacts of highway noise, artificial light, highway mortality, habitat modification, and human disturbance on wildlife was reviewed.

4.13.1.5 Methods Used in the Analysis

Information collected from the above data sources and data-collecting methods was used to evaluate the potential impacts of the proposed action on wildlife resources within the project study area, regional study area, and GSLE. On the basis of this information, a list of species that occur or that could potentially occur in the project study area was prepared. Because of the importance of the project and regional study areas and the GSLE to migratory birds, these taxa were the focus of the evaluation of impacts on wildlife. The wildlife impact analysis emphasized habitat types; most wildlife species utilize multiple habitat types, and such habitat-based analysis is a widely accepted basis for assessing potential impacts.

Several analyses were conducted to complete this evaluation; these analyses are briefly summarized below to provide context for the impact assessment presented in Section 4.13.3. A complete discussion of the methods used to complete these analyses is presented in the wildlife technical memorandum.

GIS Analysis of Habitat Change

A GIS analysis was conducted to determine how wildlife habitat would change within the project study area with implementation of the Legacy Parkway project, and how these changes could potentially affect species that use the habitats locally and regionally around Great Salt Lake. Measures of habitat change included habitat loss, habitat fragmentation (see Section 4.13.2.3 for a definition of this term), and habitat degradation. The following text describes the methods used to assess these parameters.

Habitat Loss

Direct habitat loss that would occur as a result of highway construction was determined by overlaying the footprint boundary for each build alternative onto the wildlife habitat map and using GIS software to measure the total area of each habitat within those boundaries.

Habitat Fragmentation

Several different habitat fragmentation metrics, including mean patch size, mean perimeter-to-area ratio, and mean nearest neighbor distance, were used to evaluate the fragmentation effects of changes in size and distribution of suitable habitats resulting from the build alternatives. FRAGSTATS, a fragmentation analysis software, and Patch Analyst, an ArcView3.2 extension, in combination with GIS analysis, were used to determine the existing number of habitat patches in the project study area, the number of habitat patches (by patch size) that would be fragmented by a build alternative, and the number of habitat patches (by patch size) that would result after fragmentation associated with a build alternative. The habitat fragmentation analysis also considered trends in fragmentation (i.e., trends in the number of patches in each size group and of the total extent of each habitat type by patch size) and mean and median patch size.

Habitat Degradation

A qualitative assessment of potential changes in air quality and water quality resulting from construction and operation of the proposed build alternatives was completed to determine potential habitat degradation effects on wildlife species in the project study area. This assessment included a qualitative evaluation of potential wildlife mortality resulting from exposure to a new roadway system, as well as how changes to

the wetland hydrology and addition of artificial lighting and landscaping could further affect existing wildlife habitat. These assessments were supported through review of recent and relevant literature and imput from the wildlife technical team, as described in the wildlife technical memorandum.

GIS Analysis of Changes in Lake Level and Dynamics of Habitat Availability and Distribution

A GIS analysis was conducted to evaluate the interaction of changes in the level of Great Salt Lake with the direct habitat availability and losses that would result from each build alternative. The wildlife habitat maps were combined with an inundation zone dataset for Great Salt Lake (U.S. Geologic Survey 2003) to illustrate the combined habitat loss from natural lake level fluctuation and the proposed alternatives. Details of these calculations are provided in Appendix B of the wildlife technical memorandum.

Highway Noise Disturbance

To assess the potential impacts of highway noise on wildlife in the project vicinity, two approaches were used. First, to estimate the distance at which project highway noise could potentially affect wildlife communication, an analysis was conducted of the bioacoustics requirements of representative birds and the masking potential of highway noise on those species' communications. Species analyzed were selected to represent the range of sound frequencies present in the bird songs and calls.

Second, to assess the area of each habitat type within and adjacent to the project study area that could potentially be affected by highway noise, noise contours were modeled for each project alternative and delineated on a map of the habitats in the project study area. From this map, the approximate area of effect for each build alternative could be calculated.

A detailed description of the methods used to complete the bioacoustics analysis and the highway noise model analysis are presented in Appendix F of the wildlife technical memorandum.

4.13.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to wildlife and the occurrence of special-status species in the GSLE and in the project study area. The description of existing conditions accounts for recent land development since publication of the Final EIS, including initial construction activities associated with Alternative D (Final EIS Preferred Alternative; see Section 4.20, *Construction Impacts*) and unrelated development in the study area, and the revision in the width of the right-of-way and typical cross section associated with all the proposed build alternatives (see Chapter 3, *Alternatives*). A description of historic conditions is included to provide context for the discussion of cumulative impacts in the environmental consequences section.

4.13.2.1 Changes in Habitat since Final EIS

Project activities that have resulted in changes in habitat in the project study area since the Final EIS was published are described in detail in Section 4.20, *Construction Impacts*. In summary, UDOT began construction on Legacy Parkway in summer 2001. The project under construction was Alternative D (Final EIS Preferred Alternative). UDOT implemented a design-build delivery system to construct the project until construction was halted in November 2001 because of an injunction from the U.S. Court of Appeals for the Tenth Circuit.

The following habitat modifications have occurred to date.

- Approximately 4.9 ha (12 ac) of vegetation (wet meadow, emergent marsh, and mudflat/pickleweed habitat patches scattered in upland pasture) at the I-215 interchange location at the southern terminus of the proposed action were cleared and grubbed (all vegetation removed). Fill of varying heights (up to 6 m [20 ft]) was also placed in this area. These areas now have essentially no wildlife habitat value.

- Vegetation (largely cropland and pasture with intermittent patches of wet meadow, emergent marsh, and mudflat/pickleweed) was cleared from a segment about 6 km (3.7 mi) long by 98 m (320 ft) wide at the southern terminus of the project near I-215. This area was graded and fill (about 0.6 m to 0.9 m [2 ft to 3 ft] in height) was added. A segment about 1 km (0.7 mi) long by 98 m (320 ft) wide just north of 500 South was also cleared of pasture/cropland vegetation. At present, these areas have essentially no wildlife habitat value.

- The entire interchange at I-15 at the northern terminus of the project has been cleared of all vegetation (wet meadow and pasture habitat with a mixture of emergent marsh, open water, and cropland habitat patches). These areas now have essentially no wildlife habitat value. Construction activities, with associated habitat disturbance and modification, continue on the extension of Park Lane (formerly Burke Lane) and all ramps from Park Lane to I-15 and US-89 and the Shepard Lane project. Construction of drainage facilities also continues in this area. The Park (formerly Burke) Lane and drainage facility construction is planned for completion in spring 2005. Some bridge construction (piers and abutments) was initiated for the Legacy Parkway mainline over I-15, but it was not completed before the court injunction halted construction.

4.13.2.2 Historic Habitat Conditions

There has been a 58 percent reduction in wetland/wildlife habitats[1] from estimated historic conditions (pre-settlement; before 1847) to current conditions in the regional study area. The amount of loss varies by hydrologic unit. The Ogden hydrologic unit, which has the second highest historic wetland/wildlife extent in the regional study area and where the majority of the proposed action would be located, has already lost nearly 70 percent of its estimated historic wetland/wildlife habitats. The comparison of estimated historic conditions to current conditions illustrates the downward trend in the extent of wetland/wildlife habitats in the regional study area. The extent of remaining estimated historic wetland/wildlife habitats is provided below and detailed in the wildlife technical memorandum.

- **Regional study area**. Forty-two percent of the estimated historic wetland/wildlife habitats is still available in the regional study area.

- **Hydrologic unit**. The extent of remaining habitat varies by hydrologic unit. Some examples are listed below.

  - Tooele Valley hydrologic unit: 80 percent (22,652.7 ha [56,370 ac]) of historic habitat remains.

[1] The term *wetland/wildlife habitat* refers to a mapping category comprising polygons that include soils suitable for wetland vegetation, as well as associated upland areas, as defined by the Natural Resource Conservation Service Soil Survey Geographic (SSURGO) database and the USFWS National Wetlands Inventory (NWI) dataset. These datasets were used to establish a baseline of historic wetland and associated upland habitat distribution for use in evaluating temporal changes in habitat distribution and availability. Accordingly, this term pertains only to quantitative analysis involving historic conditions. These datasets are explained in greater detail in Section 3.11.1 of the wildlife technical memorandum.

- Utah Lake hydrologic unit: 17 percent (3,870 ha [11,018 ac]) of historic habitat remains.
- Ogden hydrologic unit: 30 percent (14,898 ha [35,043 ac]) of historic habitat remains.
- Jordan River hydrologic unit: 38 percent (12,477 ha [37,333 ac]) of historic habitat remains.

4.13.2.3 Existing Wildlife in Project Study Area

Great Salt Lake and the wetlands surrounding its shoreline provide important habitat for a great variety of amphibians, reptiles, birds, and mammals, some of which are rare and have small geographical distributions. In total, 12 fish species, 8 amphibians, 10 reptiles, 219 birds, and 50 mammals have been documented as occurring within the project study area or are believed to have the potential to occur there based on the presence of suitable habitat and the general abundance of the species in the GSLE. Of these species, 223 (215 birds, 8 bats) are migratory. A total of 136 species are known to occur in the project right-of-way areas, and an additional 139 species could potentially occur there. Up to 120 of these species could potentially breed within the project study area. Table 4.13-1 describes the abundance of these species in the GSLE and the project study area, as well as the migratory, breeding, and habitat use patterns of these species in these areas.

Twenty-eight species, including 24 migratory birds, two bats, one shrew, and one fox are classified as special-status species, or species that are protected by one or more state or federal environmental laws (Table 4.13-2). For the purposes of this section, *special-status species* include species identified on the following lists and/or covered by the following regulations.[2]

- Federal.
  - Federally listed endangered and threatened species.
  - Federal candidate species.
  - Migratory Bird Treaty Act species (16 USC 703–711).
  - Fish and Wildlife Conservation Act species (16 USC 2901–2911).
- State of Utah.
  - Utah State Species of Concern (Utah Administration Rule R657-48).
  - State of Utah Conservation Agreement Species.

Table 4.13-2 summarizes the legal and protected status, habitat use, and seasonal occurrence of each special-status species. The table also describes the abundance of each species within the GSLE and the project study area, as well as their migratory, breeding, and habitat use patterns in these areas.

As discussed in the Final EIS, the predominance of migratory birds that use the project study area highlights the ecological importance of this area to these species (Jones & Stokes 2004). Great Salt Lake,

[2] Of note, Section 4.15, *Threatened and Endangered Species*, provides a specific discussion of impacts on species protected under the federal Endangered Species Act and as species of special concern by the Utah Division of Wildlife Resources that could occur in the study area, defined in Section 4.0.1, *Study Area*.

Table 4.13-1a Legacy Parkway/GSLE Bird Species Habitat Matrix

	Migratory Species	GSL Ecosystem					Legacy Parkway Project Study Area							Farmington Bay WMA					Bear River NWR					Habitat Use								
		Seasonal Abundance				Breeds in GSLE	Seasonal Abundance				Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Seasonal Abundance				Breeds in FBWMA	Seasonal Abundance				Breeds in BRNWR	Open Water	Riparian	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
		P	S	W	T		P	S	W	T				P	S	W	T		P	S	W	T										
Loons																																
Pacific Loon	X				RT								X									RT		F								
Common Loon	X				RT								X									UT		F								
Grebes																																
Pied-billed Grebe	X		CS	UW		X		US	RW		X	X			CS	UW		X		CS	UW		X	F		FB	F					
Horned Grebe	X			RW	RT								X			RW	RT				RW	RT		F		F						
Eared Grebe	X		CS	RW		X		RS		CT		X			CS	RW		X		US		CT	X	FB		B						
Western Grebe	X		CS	RW		X				RT		X			CS			X		CS	RW		X	FB		B						
Clark's Grebe	X		CS			X							X		CS			X		CS	RW		X	FB		B						
Pelicans and Cormorants																																
American White Pelican (WSC)	X		CS			X		RS				X			CS					CS				F		F						
Double-crested Cormorant	X		CS			X		RS			X	X			CS			X		CS				F	B	F						
Wading Birds																																
American Bittern	X		RS			X							X		RS			X		RS						FB						
Great Blue Heron	X	CP				X	CP				X	X		CP				X	CP					F	FB	FB	F					
Great Egret	X		RS		RT								X				RT			RS				F		F						
Snowy Egret	X		CS			X		US				X			CS			X		CS			X	F	B	FB	F	F	F			
Cattle Egret	X		CS			X				RT		X			US					CS						B	F		F	F		
Black-crowned Night-heron	X		CS	RW		X		CS			X	X			CS	UW		X		CS			X	F	B	FB	F	F	F			
White-faced Ibis	X		CS			X		CS				X			CS			X		CS			X	F		FB	F	F	F	F		
Swans, Geese, Ducks																																
Tundra Swan	X			RW	CT`								X			RW	CT				RW	CT		F								
Trumpeter Swan	X			RW									X				O				RW			F								
Greater White-fronted Goose	X				RT								X				RT					A		F						F		
Snow Goose	X				UT								X				UT					UT				F				F		
Ross' Goose	X				RT								X				RT					RT				F				F		
Canada Goose	X	CP				X	CP				X	X		CP				X	CP				X	F		F	F	F	FB	F	F	F
Wood Duck	X	RP											X	RP							RW			F								F
Green-winged Teal	X		US	CW	CT	X				UT		X			US	CW	CT			US	CW	CT	X	F		FB	FB	F	F	F		
Mallard	X	CP				X	UP				X	X		CP				X	CP				X	F	F	FB	FB	F	FB	FB		F
Northern Pintail	X		RS	RW	CT	X				UT		X			RS	UW	CT	X		RS	UW	CT	X	F		FB	FB	F	F	F	B	
Blue-winged Teal	X		US			X		RS				X			US		UT	X		US			X	F		FB	FB	F	F			
Cinnamon Teal	X		CS	RW		X		RS				X			CS	RW		X		CS	RW		X	F		FB	FB	F	F	F		
Northern Shoveler	X		RS	UW	CT	X				UT		X			RS	UW	CT	X		RS	UW	CT	X	F		FB	FB	F	F		B	
Gadwall	X		CS	UW		X		US	UT		X	X			CS	UW		X		CS	UW		X	F		FB	FB	FB	FB	FB	B	
Eurasian Wigeon	X				RT					RT		X										RT		F		F	F	F	F	F		
American Wigeon	X			UW	CT					RT		X				UW	CT				UW	CT		F		F	F	F	F	F		
Canvasback	X		RS	RW	CT	X							X		RS	RW	CT	X		RS	RW	UT	X	F		FB						
Redhead	X		CS	RW		X							X		CS	UW		X		CS	RW		X	F		FB						
Ring-necked Duck	X			RW	RT								X			RW					RW	RT		F								
Greater Scaup	X				UT								X				RT					RT		F								
Lesser Scaup	X			CW									X			UW	CT				UW	CT		F								
Long-tailed Duck	X			RW									X				O				RW			F								
White-winged Scoter	X			RW									X				O				RW			F								
Surf Scoter	X			RW									X				O				RW			F								
Common Goldeneye	X			CW					RW			X				UW	CT				UW	CT		F								
Barrow's Goldeneye	X			RW									X			RW					RW			F								
Bufflehead	X			CW									X			UW	CT				UW	CT		F								
Hooded Merganser	X			RW	RT								X			RW	RT				RW	RT		F								
Common Merganser	X			UW	CT								X			UW	CT				RW	CT		F								
Red-breasted Merganser	X			UW	CT								X			RW	CT				RW	CT		F								
Ruddy Duck	X		CS	UW		X				RT		X			CS	UW		X		CS	UW		X	F		FB						
Diurnal Raptors																																
Turkey Vulture	X		CS					US				X			US					CS								F	F	F	F	F
Osprey	X				RT					RT		X					RT					RT		F								
Bald Eagle (FT)	X		RS	CW		X		RS	CW		X	X				CW					CW				FB	F	F	F	F		F	
Northern Harrier	X	CP				X	CP				X	X		CP				X	CP				X		F	FB	F	F	FB	F	FB	F
Sharp-shinned Hawk	X			UW	UT					RT		X					RT				UW	UT			F			F	F	F	F	F
Cooper's Hawk	X			UW	UT					RT		X					RT				UW	UT			F			F	F	F	F	F
Northern Goshawk (CAS)	X				RT							(X)									RW	RT			F						F	
Swainson's Hawk (BCC)	X		RS		UT	X		RS			X	X					UT			CS					B		F	F	F	F	F	
Red-tailed Hawk	X	CP				X	UP				X	X		CP				X	CP				X		B		F	F	F	F	F	F
Ferruginous Hawk (BCC; WSC)	X		RS										X				RT			US							F	F	F	F	F	
Rough-legged Hawk	X			CW					CW			X				CW					CW						F	F	F	F	F	F
Golden Eagle (BCC)	X	RP								RT		X		RP					UP								F	F	F	F	F	

		GSL Ecosystem					Legacy Parkway Project Study Area							Farmington Bay WMA					Bear River NWR					Habitat Use								
	Migratory Species	Seasonal Abundance				Breeds in GSLE	Seasonal Abundance				Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Seasonal Abundance				Breeds in FBWMA	Seasonal Abundance				Breeds in BRNWR	Open Water	Riparian	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
		P	S	W	T		P	S	W	T				P	S	W	T		P	S	W	T										
American Kestrel	X	CP				X	CP				X	X		CP				X	CP						B		F	F	F	F	F	F
Merlin	X			RW					RW			X				RW					UW							F	F	F	F	F
Peregrine Falcon (BCC)	X	RP				X	RP				X	X		UP				X	UP					F		F	F	F	F	F	F	F
Prairie Falcon (BCC)	X	RP				X	RP					X		UP					UP								F	F	F	F	F	
Pheasant and Quail																																
Ring-necked Pheasant		UP				X	RP				X	X		CP				X	UP						F		F	F	FB	FB	FB	FB
California Quail		RP											X	UP											FB					F		FB
Gruiformes																																
Virginia Rail	X		CS	RW		X		RS			X	X			CS	UW		X		CS			X			FB	F	F	F			
Sora	X		CS			X		RS			X	X			CS			X		CS			X			FB	F	F	F			
Common Moorhen	X	RP				X							X		RS			X	RP				X	F		FB						
American Coot	X	CP				X	UP				X	X		CP				X	CP				X	F		FB	FB	F	F	F		
Sandhill Crane	X		RS		UT	X				RT		X			RS			X		US		CT		F		FB	F	F	F	F		
Shorebirds																																
Black-bellied Plover	X				CT					RT		X					UT					UT					F	F	F			
American Golden-plover (BCC)	X				RT								X				RT					RT					F	F	F			
Snowy Plover (BCC)	X		CS			X							X		US			X		CS			X					FB				
Semipalmated Plover	X				UT								X				UT					RT						F				
Killdeer	X	CP				X	CP				X	X		CP				X		CS	RW		X				FB	FB	FB	FB	FB	FB
Black-necked Stilt	X		CS			X		CS			X	X			CS			X		CS			X	F		FB	FB	FB	FB			
American Avocet (BCC)	X		CS			X		CS			X	X			CS			X		CS			X	F		FB	FB	FB	FB			
Greater Yellowlegs	X				CT					UT		X					CT					CT		F			F	F	F			
Lesser Yellowlegs	X				CT					UT		X					CT					CT		F			F	F	F			
Solitary Sandpiper (BCC)	X				RT					RT		X					RT					UT			F		F	F	F			
Willet	X		CS			X		RS			X	X			CS			X		CS			X				FB	FB	FB	FB	FB	
Spotted Sandpiper	X		US			X				RT		X			CS			X				UT			FB			F				
Whimbrel (BCC)	X				RT								X				RT					RT						F	F			
Long-billed Curlew (BCC)	X		US		CT	X				RT		X			US			X		CS			X				F	FB			FB	
Marbled Godwit (BCC)	X				CT					RT		X					CT					CT		F			F	F	F			
Ruddy Turnstone	X				RT								X				RT					RT						F				
Red Knot	X				UT								X				RT					RT						F	F			
Sanderling (BCC)	X			RW	UT								X				UT				UW	RT						F				
Semipalmated Sandpiper	X				RT								X				UT					RT						F				
Western Sandpiper	X				CT					RT		X					CT					CT						F				
Least Sandpiper	X			RW	CT					RT		X				RW	CT				RW	CT						F				
Baird's Sandpiper	X				CT					RT		X					UT					UT						F				
Pectoral Sandpiper	X				UT					RT		X					UT					RT					F	F	F			
Dunlin	X				RT								X				RT					RT						F				
Stilt Sandpiper	X				RT								X				RT					RT						F				
Short-billed Dowitcher	X				RT								X				RT					RT		F		F	F	F				
Long-billed Dowitcher	X				CT					RT		X					CT					CT		F		F	F	F				
Wilson's Snipe	X	CP				X	CP				X	X			CS	UW		X		CS	UW		X			F	FB	F	FB			
Wilson's Phalarope (BCC)	X		US		CT	X		RS		UT	X	X			CS			X		US		CT		F		F	FB	F	F			
Red-necked Phalarope	X				CT					RT		X					CT					CT		F								
Gulls and Terns																																
Franklin's Gull	X		CS			X				CT		X			CS			X		CS				F		FB	F	F	F	F		
Bonaparte's Gull	X				UT					RT		X					UT					UT		F		F						
Ring-billed Gull	X		RS	CW		X			UW			X				CW				US	CW		X	F		F	F	F	F	F		F
California Gull	X	CP				X	UP					X		CP				X	CP				X	F		F	F	F	F	F	F	F
Herring Gull	X			UW									X			UW					UW			F								F
Thayer's Gull	X			RW									X			RW					RW			F								F
Glaucous Gull	X			RW									X			RW					RW			F								F
Caspian Tern	X		US			X		RS					X		US									F								
Common Tern	X				RT								X				RT					RT		F								
Forster's Tern	X		CS			X		CS			X	X			CS			X		CS			X	F		FB						
Black Tern	X		US			X		RS				X			US					US		CT		F								
Pigeons and Doves																																
Rock Pigeon	X	CP				X	UP				X	X							CP				X									FB
Mourning Dove	X		US	RW		X		US	RW		X	X			CS			X		CS			X		FB			F	F	F	F	FB
Cuckoos																																
Yellow-billed Cuckoo (FC)	X				RT								X												FB							FB
Owls																																
Barn Owl	X	UP				X	RP				X	X		RP					UP								F	F	F	F	F	FB
Great Horned Owl	X	UP				X	UP				X	X		CP					UP						FB	F	F	F	F	F	F	FB
Burrowing Owl (BCC; WSC)	X		RS			X		RS			X	X								US			X					F	F		FB	
Long-eared Owl	X				RW								X												F		F	F	F		F	
Short-eared Owl (WSC)	X	CP				X	UP				X	X		UP				X	UP				X			F	F	F	F	F	FB	

	Migratory Species	GSL Ecosystem					Legacy Parkway Project Study Area							Farmington Bay WMA					Bear River NWR					Habitat Use								
		Seasonal Abundance				Breeds in GSLE	Seasonal Abundance				Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Seasonal Abundance				Breeds in FBWMA	Seasonal Abundance				Breeds in BRNWR	Open Water	Riparian	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
		P	S	W	T		P	S	W	T				P	S	W	T		P	S	W	T										
Goatsuckers and Swifts																																
Common Nighthawk	X				UT					UT		X					CT			CS				F	F	F	F	F	F	F	F	F
Common Poorwill	X			US						RT			X							US				F	F	F	F		F	F	F	F
White-throated Swift	X			US						RT			X				RT			US					F	F	F		F	F	F	F
Hummingbirds																																
Black-chinned Hummingbird	X		RS		RT					RT		X					UT			US					F		F	F	F	F	F	F
Calliope Hummingbird	X				RT								X				RT								F		F	F	F	F	F	F
Broad-tailed Hummingbird	X		RS		RT					RT		X					RT			US					F		F	F	F	F	F	F
Rufous Hummingbird	X				RT					RT		X					RT					UT			F		F	F	F	F	F	F
Kingfishers																																
Belted Kingfisher	X	UP				X	UP				X	X		UP					UP					F	FB							
Woodpeckers																																
Red-naped Sapsucker	X				RT								X				RT								F							F
Downy Woodpecker	X	RP				X							X	RP					UP						F							F
Northern Flicker	X	RP				X				RT		X		UP				X	UP						FB						F	FB
Flycatchers																																
Olive-sided Flycatcher	X				RT					RT		X													F						F	F
Western Wood-peewee	X				RT					RT		X										RT			F						F	F
Cordilleran Flycatcher	X				RT					RT		(X)										RT			F						F	F
Willow Flycatcher	X				RT					RT		(X)										RT			F						F	F
Hammond's Flycatcher	X				RT					RT		(X)										RT			F						F	F
Dusky Flycatcher	X				RT					RT		(X)										RT			F						F	F
Gray Flycatcher	X				RT					RT		(X)										RT			F						F	F
Say's Phoebe	X	RP				X							X				O		UP												FB	
Ash-throated Flycatcher	X				RT					RT		(X)										RT			F						F	F
Western Kingbird	X		CS			X		US			X	X			RS			X		US			X		FB		F	F	F	F	F	FB
Eastern Kingbird	X				RT								X				O								F							F
Shrikes																																
Northern Shrike	X			UW					UW			X				RW					UW				F	F	F	F	F	F	F	F
Loggerhead Shrike (BCC)	X	UP				X	UP					X		RP					RP						F	F	F	F	F	F	FB	F
Vireos																																
Plumbeous Vireo	X				RT								X				RT					RT			F							F
Warbling Vireo	X				RT					RT		X					RT					RT			F						F	F
Jays, Crows, and Allies																																
Black-billed Magpie	X	UP				X	UP				X	X		UP				X	CP				X		FB		F	F	F	F	F	FB
American Crow	X			RW									X								RW						F		F	F	F	F
Common Raven	X	CP				X	CP				X	X		CP				X	CP				X		B	F	F	F	F	F	F	FB
Larks																																
Horned Lark	X	CP				X	CP				X	X		CP				X	CP				X				F	FB	F		FB	
Swallows																																
Purple Martin	X				RT								X				O							F	F	F	F	F	F	F	F	F
Tree Swallow	X				CT					CT		X					CT			US		CT		F	F	F	F	F	F	F	F	F
Violet-green Swallow	X				UT					UT		X					CT			US		CT		F	F	F	F	F	F	F	F	F
Northern Rough-winged Swallow	X				UT					UT		X					CT			US		CT		F	F	F	F	F	F	F	F	F
Bank Swallow	X				CT					CT		X					CT			US		CT		F	F	F	F	F	F	F	F	F
Cliff Swallow	X		CS			X		CS			X	X					CT	X		CS			X	F	F	F	F	F	F	F	F	B
Barn Swallow	X		CS			X		CS			X	X					CT	X		CS			X	F	F	F	F	F	F	F	F	B
Chickadees																																
Black-capped Chickadee	X			RW	UT				RW	RT		X				RW						UT			F						F	F
Mountain Chickadee	X			RW									X			RW						RT			F							F
Wrens																																
Rock Wren	X				RT								X									UT									F	
House Wren	X				UT								X				UT					UT			F						F	F
Marsh Wren	X		CS	RW		X		US			X	X			CS			X		CS	UW		X			FB						
Kinglets and Thrushes																																
Ruby-crowned Kinglet	X			UW						RT		X				RW						UT			F						F	F
Blue-gray Gnatcatcher	X				RT								X									RT			F						F	F
Mountain Bluebird	X				RT					RT		X					UT					UT					F	F	F	F	F	
Townsend's Solitaire	X				RT					RT			X									RT					F		F	F	F	
Hermit Thrush	X				RT								X				RT					UT			F							F
Swainson's Thrush	X				RT								X				RT								F							F
American Robin	X	UP				X	UP				X	X		UP				X	UP						FB		F	F	F	F		FB
Mimids																																
Gray Catbird	X		RS			X							X												FB							
Northern Mockingbird	X				RT								X							US		RT			F						F	F
Sage Thrasher	X		US			X		RS				X					RT			US		CT	X								FB	

	Migratory Species	GSL Ecosystem					Legacy Parkway Project Study Area							Farmington Bay WMA					Bear River NWR					Habitat Use								
		Seasonal Abundance				Breeds in GSLE	Seasonal Abundance				Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Seasonal Abundance				Breeds in FBWMA	Seasonal Abundance				Breeds in BRNWR	Open Water	Riparian	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
		P	S	W	T		P	S	W	T				P	S	W	T		P	S	W	T										
Starlings																																
European Starling		CP				X		US	CW		X	X		CP				X	CP				X		FB		F	F	F	F	F	FB
Pipits																																
American Pipit	X			UW	CT					CT		X				UW	CT				UW	CT			F		F	F	F	F		
Waxwings																																
Bohemian Waxwing	X			UW					RW			X				RW					RW				F							F
Cedar Waxwing	X			UW					RW			X				RW					RW				F							F
Wood-Warblers																																
Orange-crowned Warbler	X				RT					RT		X					RT					UT			F						F	F
Nashville Warbler	X				RT					RT		X					RT					RT			F							F
Virginia's Warbler (BCC)	X				RT								X				RT					RT			F						F	F
Yellow Warbler	X				UT					UT		X					UT					UT			F	F					F	F
Yellow-rumped Warbler	X				CT					CT		X					CT					UT			F	F					F	F
Townsend's Warbler	X				RT					RT		X					RT								F							F
American Redstart	X												X												F							F
Northern Waterthrush	X				RT								X				RT								F							
MacGillvray's Warbler	X				UT					RT		X										RT			F	F					F	F
Common Yellowthroat	X		CS		CT	X		US			X	X			CS			X		CS		CT	X		F	FB						
Wilson's Warbler	X				UT					RT		X					RT					UT			F	F					F	F
Tanagers, Grosbeaks and Cardinaline, Buntings																																
Western Tanager	X				RT								X				UT					UT			F							F
Black-headed Grosbeak	X				RT								X				RT					UT			F							F
Lazuli Bunting	X				UT					UT		X					RT					UT			F						F	F
Emberizine Sparrows and Allies																																
Green-tailed Towhee	X				RT								X				RT					UT			F							F
Spotted Towhee	X				UT					RT		X					RT					UT			F						F	F
American Tree Sparrow	X			UW					UW			X				UW					UW				F	F	F	F	F	F	F	F
Chipping Sparrow	X				CT					CT		X					RT					UT			F		F	F	F	F	F	F
Brewer's Sparrow (BCC)	X		CS		CT	X		RS				X					RT			CS		CT	X		F		F	F	F	F	FB	F
Vesper Sparrow	X		US		UT	X				RT		X					RT			CS		CT	X		F		F	F	F	F	F	F
Lark Sparrow	X		US		UT	X				RT		X					RT			US		UT			F		F	F	F	F	F	F
Lark Bunting	X				RT								X									RT									F	
Savannah Sparrow	X		CS		CT	X		US			X	X			CS			X		CS		CT	X				FB		F			
Song Sparrow	X	CP				X	UP				X	X		CP				X	CP				X		FB	F	F		F			F
Lincoln's Sparrow	X				RT					RT		X					RT					UT			F		F		F	F	F	F
Harris' Sparrow	X			RW									X				O				RW				F		F	F	F	F	F	F
White-throated Sparrow	X			RW									X								RW				F		F	F	F	F	F	F
White-crowned Sparrow	X			CW	CT				CW			X				UW					CW	CT			F	F	F	F	F	F	F	F
Dark-eyed Junco	X			CW	CT				CW			X				UW					CW	CT			F	F	F	F	F	F	F	F
Lapland Longspur	X			RW									X								UW						F	F			F	
Snow Bunting	X			RW									X								UW						F	F			F	
Icterids																																
Red-winged Blackbird	X	CP				X	CP				X	X		CP				X	CP				X		F	FB	F	F	F	F		F
Western Meadowlark	X	CP				X	CP				X	X		CP				X	CP				X				F	F	FB	F	FB	F
Bobolink (WSC)	X		RS			X							X									RT					FB		F	F	F	
Yellow-headed Blackbird	X		CS			X		CS			X	X			CS			X		CS			X		F	FB	F	F	F	F	F	F
Brewer's Blackbird	X	UP				X	UP				X	X		CP				X	CP				X		F	F	F	F	FB	FB	F	F
Brown-headed Cowbird	X	CP				X	UP				X	X			RS					CS			X		FB	FB	FB	FB	FB	FB	FB	FB
Northern Oriole	X		US			X		US			X	X			RS							UT			FB							FB
Finches and Old World Sparrows																																
Cassin's Finch	X			RW									X				O								F							F
House Finch	X	CP				X	CP				X	X		CP					CP				X		FB	F	F	F	F	F	FB	FB
Pine Siskin	X			CW					CW			X				UW						UT			F					F	F	F
American Goldfinch	X		RS	CW					UW			X				UW			CP						F	F	F			F	F	F
Evening Grosbeak	X			RW					RW				X				O					RT			F							F
House Sparrow		UP				X			UP		X	X							CP				X		F				F	F		FB
Summary																																
Total number of cells with values	215	38	60	62	108	88	29	34	20	67	51	140	79	32	44	44	96	61	34	62	54	105	59	78	107	79	100	109	103	85	99	107

Table 4.13-1b Non-Bird Species Habitat Matrix

	Species Status						Habitat Use									
	GSLE		LP Project Study Area													
	Occurrence Status	Potential Occurrence	Project Study Area	Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Open Water	Riparian	Stream/River	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
Fish																
Brown trout	A			P		X			X							
Rainbow trout	A			P		X			X							
Carp	C		C	X	X		X		X	X						
Speckled dace	D			P		X			X							
Long-nose dace	D			P		X			X							
Utah sucker	D			P		X	X		X	X						
Channel catfish	D			P		X	X		X	X						
Bullhead	D			P		X	X		X	X						
White bass	D		C	P		X			X							
Green sunfish	D		C	X		X	X		X	X						
Bluegill	D		C	P		X			X							
Walleye	D		C	P		X			X							
Amphibians																
Tiger salamander	R			P		X				X	X					
Great Basin spadefoot	U			P		X				X	X	X			X	
Woodhouse's toad	R			P		X		X		X	X		X			
Western chorus frog	C		C	P	X					X	X					
Northern leopard frog	U			P		X			X	X	X					
American bullfrog	U		R	P		X				X	X					
Reptiles																
Common sagebrush lizard	D			P		X									X	
Side-blotched lizard	D			P		X									X	
Desert horned lizard	D		P	P	X										X	
Tiger whiptail	D		P	P	X										X	
Eastern racer	C		C	P	X						X		X		X	
Gopher snake	C		C	P	X			X					X	X	X	
Common garter snake	C		C	P	X			X		X	X		X			
Terrestrial garter snake	D			P	X			X		X	X		X			
Night snake	D		P	P		X									X	
Western rattlesnake	D		P	P		X									X	
Mammals																
Vagrant shrew	D		P	P		X				X						
Masked shrew	D		P	P		X				X						
Preble's shrew (WSC)	D		P	P		X				X						
Western small-footed myotis		X				X		X		X	X		X		X	
Little brown bat		X				X		X		X	X		X		X	
Long-legged myotis	C					X		X		X	X		X		X	
Western pipistrelle	C					X		X		X	X		X		X	
Big brown bat	C					X		X		X	X		X		X	
Hoary bat		X		P		X		X								
Spotted bat (WSC)	R					X							X		X	
Townsend's big-eared bat (WSC)	C					X		X		X	X		X		X	
Brazilian free-tailed bat	C			P		X		X		X	X		X		X	
Nuttall's cottontail		X		P		X							X	X	X	
White-tailed jackrabbit		X		P	X								X			
Black-tailed jackrabbit	C		C	X	X								X	X	X	
Least chipmunk	D		P	P		X		X							X	
Piute ground squirrel	D		P	P		X							X	X	X	
Rock squirrel	C		C	X	X								X	X	X	
Northern pocket gopher		X		P		X		X					X	X		
Botta's pocket gopher		X		P		X		X					X	X	X	
Great Basin pocket mouse	D		P	P		X									X	
Ord's kangaroo rat		X		P		X									X	
Beaver	R		R	P		X		X	X							
Western harvest mouse		X		X		X		X					X		X	
Deer mouse	C		C	X	X			X					X	X	X	X
Northern grasshopper mouse	U			P		X									X	
Desert woodrat		X	D	P		X							X		X	
Bushy-tailed woodrat		X	D	P		X							X		X	
Meadow vole	C		C	X	X			X			X		X		X	
Montane vole	D		P	P		X				X	X			X		
Long-tailed vole	D			P		X		X					X			

	Species Status						Habitat Use									
	GSLE		LP Project Study Area													
	Occurrence Status	Potential Occurrence	Project Study Area	Breeds in Project Study Area	Documented Occurrence within Project Study Area	Could Potentially Occur within Project Study Area	Open Water	Riparian	Stream/River	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
Sagebrush vole	R		P	P		X									X	
Muskrat	C		C	X	X		X	X	X	X	X					X
House mouse	C		C	X	X			X					X	X	X	X
Black rat	U			X		X		X								X
Norway rat		X		P	X			X		X	X		X	X		X
Porcupine	R			P		X		X								
Coyote	C		R	X	X							X	X	X	X	X
Red fox	C		C	X	X			X				X	X	X	X	X
Kit fox (WSC)	A					X									X	
Raccoon	C		C	X	X			X		X	X	X	X	X	X	X
Long-tailed weasel	C		R	X	X			X					X		X	X
Mink	U			P		X		X	X	X	X					
Badger	U		D	P		X							X		X	
Spotted skunk	R		R	P	X			X					X			
Striped skunk	C		C	X	X			X				X	X	X	X	X
Mountain lion	R					X										
Bobcat	U			P		X									X	X
Mule deer	C		C	X	X			X		X			X	X	X	
Pronghorn	R			P		X							X		X	
Summary																
Fish (12 species)	12	0	5	12	1	11	5	0	12	5	0	0	0	0	0	0
Amphibians (6 species)	6	0	2	6	1	5	0	1	1	6	6	1	1	0	1	0
Reptiles (10 species)	10	0	7	10	4	6	0	3	0	2	3	0	4	1	8	0
Mammals (50 species)	38	12	25	41	15	35	1	28	3	16	13	4	32	15	34	11

Special-Status Species

FT	Federally Listed as Threatened
FC	Federal Candidate Species
BCC	Birds of Conservation Concern
CAS	Conservation Agreement Species
WSC	Wildlife Species of Concern
X	Breeds in Project Study Area

Abundance Status

C = Common: Found consistently in fair numbers in appropriate habitat and season
U = Uncommon: Found consistently in small numbers in appropriate habitat and season
R = Rare: Found infrequently bur regularly in very small numbers in appropriate habitat and season
D = Within species range but insufficient data to determine abundance
A = Accidental
X = Column heading status applies

Residence Status

P = Permanent Resident: Found year-round
S = Summer visitant: Present during the nesting season
W = Winter visitant: Present during January and February
T = Transient: Migrates through the area in the spring and/or fall
X = Column heading status applies
(X) = Very few GSLE records; low probability of occurrence at LP Site

Examples of Combined Codes

CP = Common Permanent Resident
RW = Rare Winter Visitant
UT = Uncommon Transient

Habitat Use Codes

F = Foraging Habitat
B = Breeding Habitat
FB = Foraging and Breeding Habitat

Table 4.13-2. Special-Status Wildlife Species of the Legacy Parkway Project Study Area/Great Salt Lake Ecosystem

Species	Migratory Species[1]	GSL Ecosystem: Seasonal Abundance				Breeds in GSLE	Legacy Parkway Project Study Area: Seasonal Abundance				Breeds in Project Study Area	Documented on Proposed Build Alternative ROWs	Could Potentially Occur on Proposed Build Alternatives ROWs	Habitat Use: Open Water	Riparian	Emergent Marsh	Wet Meadow	Mudflat/Pickleweed	Pasture	Cropland	Salt Desert Scrub	Developed
Federally Listed Species[2]		P	S	W	T		P	S	W	T												
Bald Eagle (Threatened)	X		RS	CW		X		RS	CW		X	X			FB	F	F	F	F		F	
Federal Candidate Species[2]		P	S	W	T		P	S	W	T												
Yellow-billed Cuckoo	X				RT								(X)		F							F
Conservation Agreement Species[3]		P	S	W	T		P	S	W	T												
Northern Goshawk	X				RT							(x)			F						F	
USFWS Birds of Conservation Concern[4]		P	S	W	T		P	S	W	T												
Swainson's Hawk	X		RS		UT	X		RS			X	X			B		F	F	F	F	F	
Ferruginous Hawk (also WSC species)	X		US		RT								X				F	F	F	F	F	
Golden Eagle	X	RP								RT		X					F	F	F	F	F	
Peregrine Falcon	X	RP				X	RP				X	X				F	F	F	F	F	F	F
Prairie Falcon	X	RP				X	RP					X					F	F	F	F	F	
American Golden-Plover	X				RT								X				F	F	F			
Snowy Plover	X		CS			X							X					FB				
American Avocet	X		CS			X		CS			X	X		F		FB	FB	FB	FB			
Solitary Sandpiper	X				RT					RT		X			F		F	F	F			
Whimbrel	X				RT								X					F	F			
Long-billed Curlew	X		US		CT	X				RT		X					F	FB			FB	
Marbled Godwit	X				CT					RT		X		F			F	F	F			
Sanderling	X			RW	UT								X					F				
Wilson's Phalarope	X		US		CT	X		RS		UT	X	X		F		F	FB	F	F			
Burrowing Owl (also WSC species)	X		RS			X		RS			X		X					F	F		FB	
Loggerhead Shrike	X	UP				X	UP					X			F						FB	F
Virginia's Warbler	X				RT								X		F						F	F
Brewer's Sparrow	X		CS		CT	X		RS				X			F		F	F	F	F	FB	F
Utah DWR Wildlife Species of Concern[3]																						
American White Pelican	X		CS			X		RS					X	F		F						
Short-eared Owl	X	CP				X	UP				X	X				F	F	F	F	F	FB	
Bobolink	X				RT								X				F		F	F	F	
Preble's shrew		D											(x)				X					
Spotted bat		R											X		X		X	X		X		X
Townsend's big-eared bat		C											X		X		X	X		X		X
Kit fox		A											X								X	
Summary: Total number of cells with values	24	9	10	2	14	13	4	7	1	5	7	14	14	4	10	6	18	20	16	10	14	7

[1] Species identified in the Migratory Bird Treaty Act
[2] Species listed under the Endangered Species Act
[3] UDWR (2003)
[4] USFWS (2002)

Bird Codes

Abundance Status

C = Common: Found consistently in fair numbers in appropriate habit and season
U = Uncommon: Found consistently in small numbers in appropriate habitat and season
R = Rare: Found infrequently but regularly in very small numbers in appropriate habitat and season

Residence Status

P = Permanent Resident: Found year-round
S = Summer visitant: Present during the nesting season
W = Winter visitant: Present during January and February
T = Transient: Migrates through the area in the spring and/or fall
X = Column heading status applies
(X) = Very few GSLE records; low probability of occurrence at Legacy Parkway project study area

Habitat Use Codes

F = Foraging Habitat
B = Breeding Habitat
FB = Foraging and Breeding Habitat

Codes for Amphibians, Reptiles, and Mammals

C = Common
R = Rare
D = Within species range but insufficient data to determine abundance
A = Accidental
X = Column heading status applies

with its unique mosaic of wetland, upland, mudflat, river delta, brackish and freshwater marsh, and ephemeral pond habitats, has long been recognized for its importance to migratory birds (Behle 1958; Knopf 1975; Jehl 1988; Paton 1994; Shuford et al. 1995; Paul and Manning 2002; Ivey et al. 2000). These habitats, and the ecological features of this large inland oasis, provide important refuge and resources for up to approximately 5 million birds a year. The wetlands of Great Salt Lake that these birds use account for 75 percent of all wetlands in Utah (Jensen 1974). The GSLE is internationally important because it is an integral part of the Pacific and Central Flyways for migratory waterfowl and is a key link of the Western Hemisphere Shorebird Reserve Network. Brine shrimp (*Artemesia fransiscana*) and brine flies (*Ephydra cinerea*) produced in Great Salt Lake provide a vital food source for these birds.

4.13.2.4 Existing Wildlife Habitats in Project Study Area

The proposed Legacy Parkway project alignments cross a complex of wetlands and uplands that includes the following habitat types.

- Wetland/riparian wildlife habitat categories.[3]
  - Open water.
  - Riparian.
  - Emergent marsh.
  - Wet meadow.
  - Mudflat/pickleweed.
- Upland wildlife habitat categories.
  - Pasture.
  - Cropland.
  - Salt desert scrub.
  - Developed (including urban landscaping).

[3] Some discrepancies are evident between direct habitat loss of wildlife habitat quantified in this Supplemental EIS and the extent of delineated wetlands described in Section 4.12 and in the Final EIS. These discrepancies are primarily the result of differences between the habitat classification system developed by the wildlife technical team for the wildlife technical memorandum and the classification system used to identify jurisdictional waters (including wetlands). Specifically, the wildlife technical memorandum examined wildlife habitats, whereas the wetland delineation follows Corps delineation standards. Accordingly, open water and riparian habitats have been mapped differently for purposes of this wildlife habitat analysis; consequently, the habitats mapped for this analysis include areas excluded from the Final EIS analysis because they did not qualify as jurisdictional waters. Moreover, the mapping undertaken in the preparation of the technical memorandum encompassed all habitats in the project study area, resulting in a dataset markedly different from that produced by the wetland delineation effort. The mapping methodologies are discussed in detail in Appendix B of the wildlife technical memorandum.

Figure 4.13-5 shows the distribution of these habitats in the project study area. Figure 4.13-6 shows the total acreage of each habitat. Detailed descriptions of each habitat and their associated wildlife are presented in Section 2.4.1 of the wildlife technical memorandum.

The wetland/riparian habitats around the lake are formed and maintained by a complex interplay of surface and subsurface fresh water and the fluctuating dynamics of Great Salt Lake's surface elevation. Many of the habitats directly associated with the shoreline, such as mudflats, nearshore playas, and emergent marshes, develop and subside with the rise and fall of the lake. Other more interior habitats, including wet meadows, permanent and ephemeral ponds, and riparian corridors, are more responsive to seasonal precipitation patterns and fluctuations in the water table. The upland habitats are more stable, providing important refuge, resting, and foraging habitat for many species, particularly when the lake level is high and the lower elevation habitats are flooded.

4.13.2.5 Existing Conditions Related to Wildlife Habitats in Project Study Area

This section describes the following existing conditions in relation to wildlife habitat in the project study area.

- Habitat fragmentation.
- Habitat quality (water and air).
- Wetland hydrology.
- Artificial landscaping.
- Wildlife mortality.
- Noise.
- Artificial light.
- Human disturbance.

Existing Habitat Fragmentation

By definition, habitat fragmentation results in the formation of smaller patches of habitat where larger, more contiguous patches once existed (Meffe et al. 1997). As a result of fragmentation, a larger population of a species that inhabited the original patch may become divided into several smaller subpopulations that are connected only by movement of individuals migrating between disjunct patches rather than along contiguous habitat (Primack 2000). Habitat fragmentation results in direct habitat loss and in changes in the geometry and biological connectivity between patches (Meffe et al. 1997). These changes can result in modifications of the availability and suitability of habitat to extant wildlife in an affected area. Over time, extinction rates in smaller, more isolated populations are generally higher than those in larger populations because of loss of genetic variation, inbreeding, genetic drift, and greater susceptibility to random population fluctuations and environmental changes, all of which ultimately affect the long-term viability of wildlife populations (Soulé 1987; Forman 1995; Primack 2000). However, such

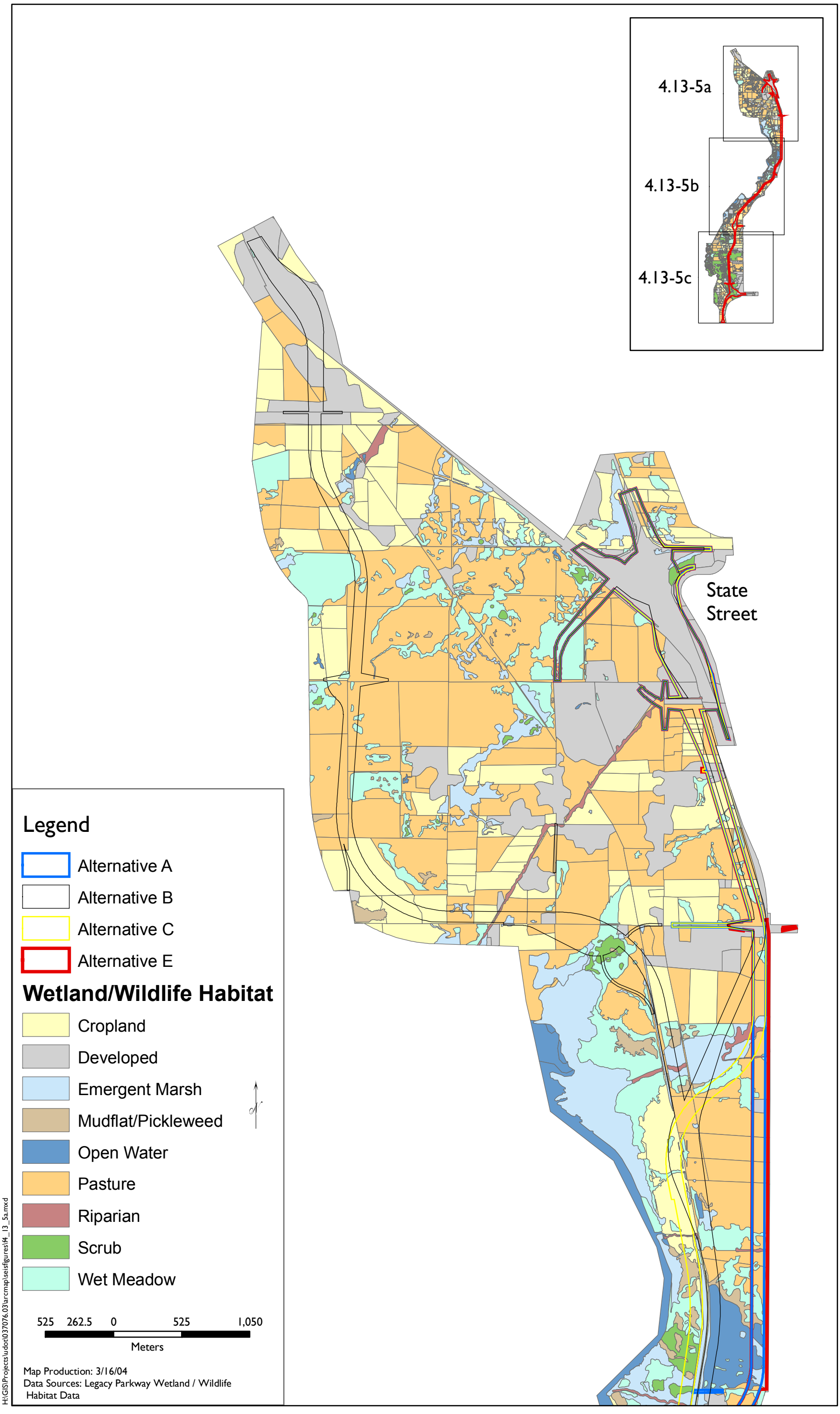


Figure 4.13-5a
Wildlife Habitats and Build Alternatives in the Legacy Parkway Project Study Area

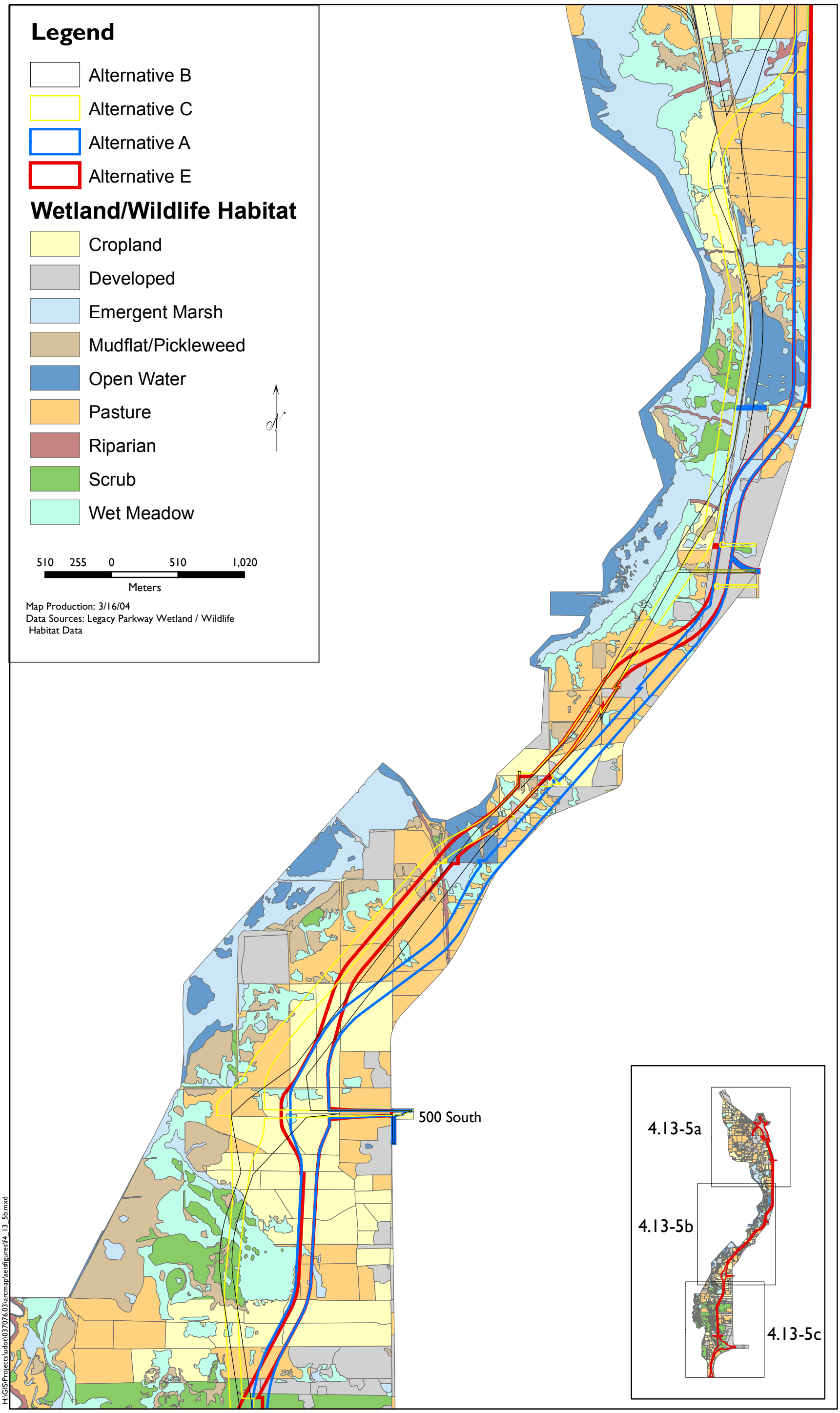


Figure 4.13-5b
Wildlife Habitats and Build Alternatives in the Legacy Parkway Project Study Area

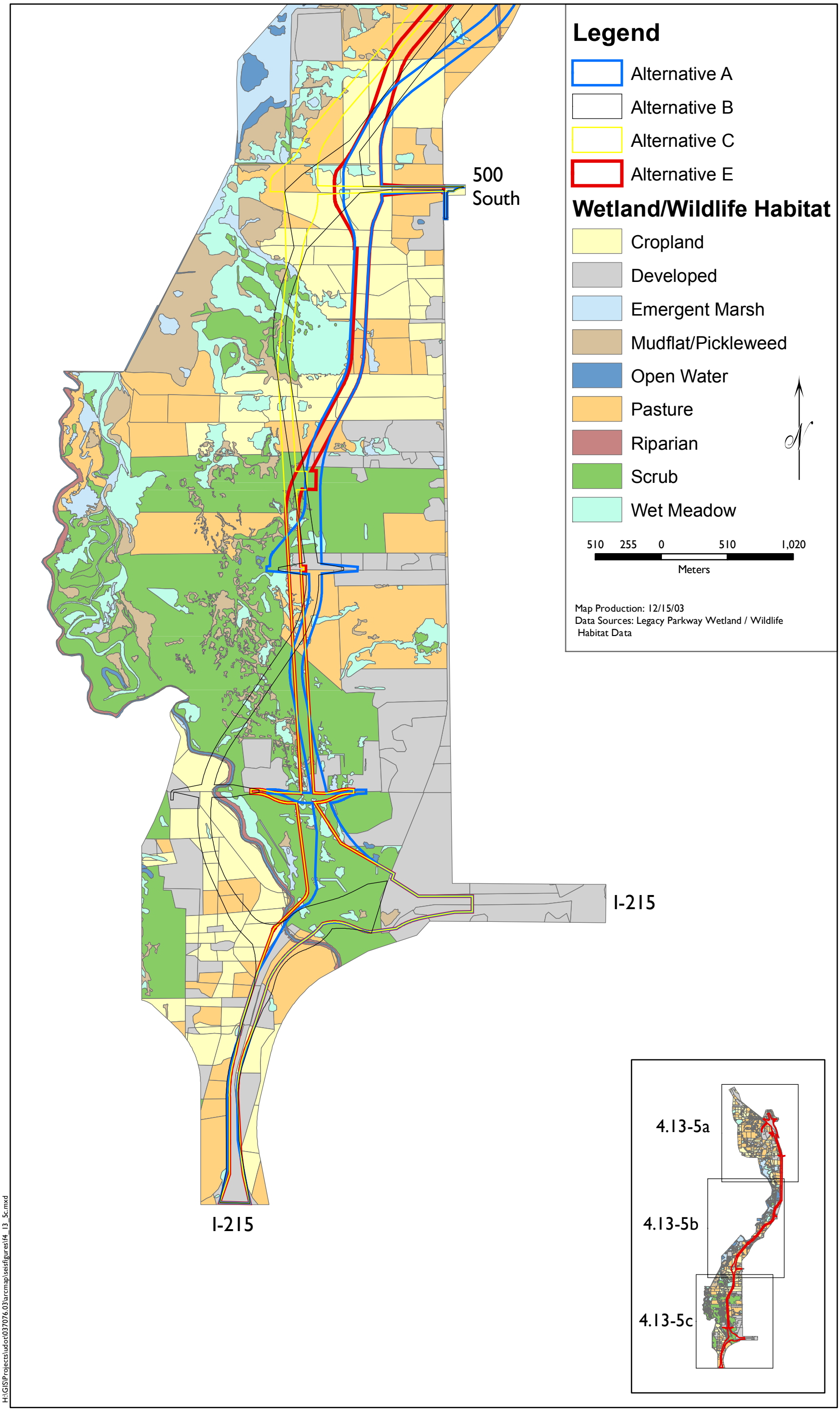
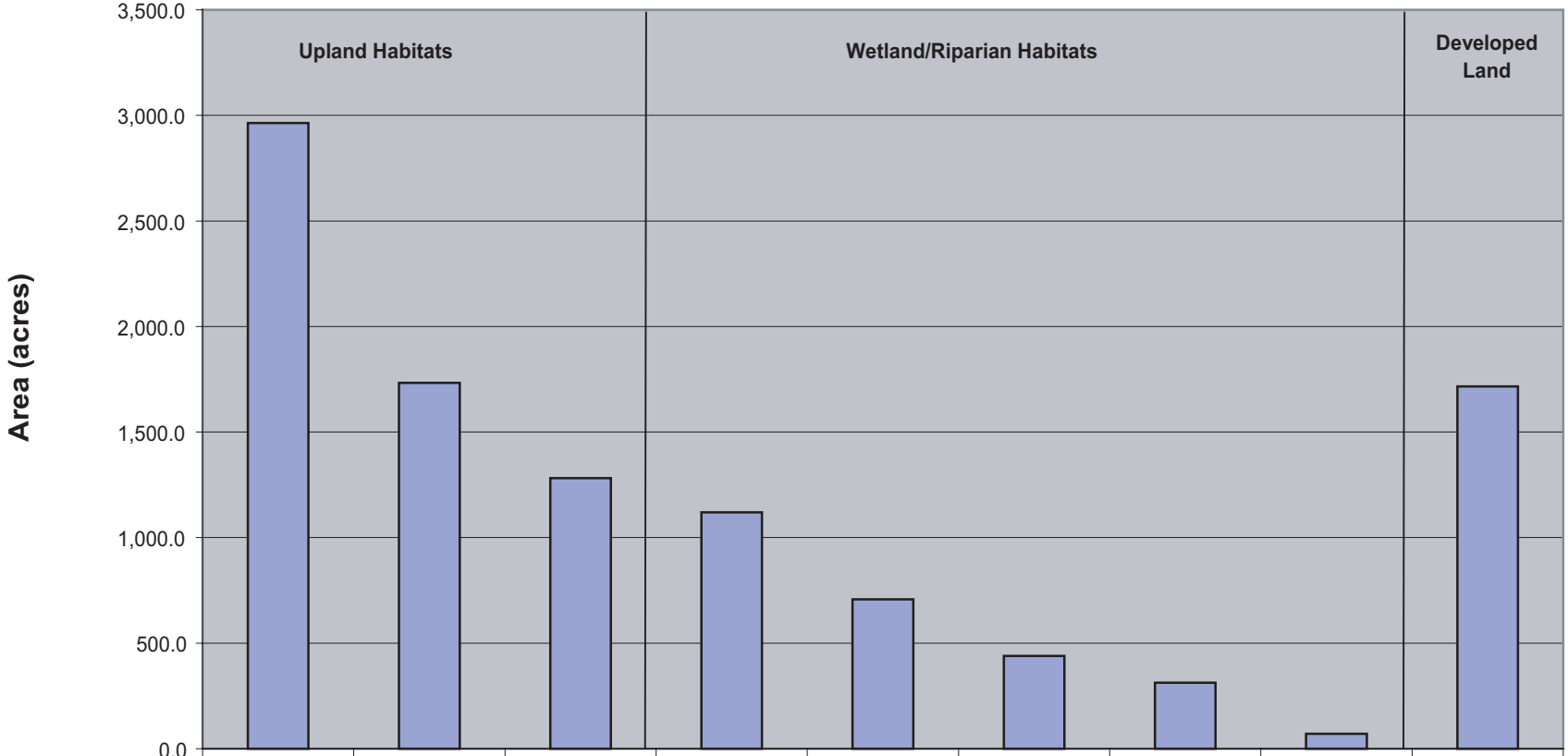


Figure 4.13-5c
Wildlife Habitats and Build Alternatives in the Legacy Parkway Project Study Area



	Pasture	Cropland	Desert Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Open Water	Riparian	Developed
Habitat Area (acres)	2,963.3	1,733.1	1,282.2	1,118.9	707.2	439.8	312.8	70.9	1,715.9

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Figure 4.13-6
Total Existing Wildlife Habitat in Project Study Area

effects are most likely to impact relatively sedentary species with low dispersal capabilities such as amphibians, reptiles, small mammals, and many invertebrates.

The existing habitats within the project study area exhibit extensive fragmentation today due to previous construction of railroad corridors (UPRR and D&RG), I-15, and many smaller roads, as well as other previous development and disturbance (e.g., farming, grazing, dikes, and fences) in many areas in the project vicinity. These and other land use changes in the project study area and the GSLE have resulted in marked fragmentation of wildlife habitats along the Wasatch Front. In particular, these changes have resulted in movement barriers to wildlife between the Wasatch Mountains and Great Salt Lake. Rural and urban road networks in the intervening uplands, agriculture, and development have also significantly fragmented historic wildlife habitats in the GSLE. The wildlife populations now present in these areas are likely to have already experienced many of the population changes typically associated with habitat fragmentation (e.g., reduced carrying capacity, lower reproductive success, higher susceptibility to predation). However, aside from GIS information documenting habitat changes, no data are available to substantiate or detail these changes. Existing conditions represent highly modified populations from historic times. Based on observed changes in other fragmented wildlife populations described in the literature (e.g., Soulé 1987; Forman 1995; Primack 2000), it is presumed that wildlife in the project study area has experienced reduced species diversity, population densities, and distributions in response to cumulative long-term effects of these land use changes.

Existing Habitat Quality

Section 4.10, *Water Quality*, provides an updated description of water quality in the study area, as described in Section 4.0.1, *Study Area*. Relative to existing wildlife habitat quality, since publication of the Final EIS, the Jordan River has been listed as an impaired water that does not meet Class 3B (warm-water species of game fish) or Class 3C (non-game fish) standards under the Clean Water Act because of low dissolved oxygen.

As described in Section 4.8, *Air Quality*, air quality in the project and regional study areas is generally considered good. The air quality monitoring site nearest the project study area is in Bountiful (65 West 300 South). Levels of ozone, sulfur dioxide, carbon monoxide, and particulate matter (PM10 and PM2.5) are monitored at the site. Salt Lake and Davis Counties are nonattainment areas for ozone (1 hour-average) and PM10. Since 1997, there have been two exceedances of the 1-hour standard for ozone (0.125 ppm) and two for the new PM2.5 standard (65 $\mu g/m^3$).

Existing Wetland Hydrology

The hydrology of the project study area is a function of both seasonal and spatial patterns of water flow, both on the surface and underground. The surface water bodies within the project study area include the Jordan River, nine creeks, wetlands associated with Great Salt Lake, and several ditches and canals.

Many of the wetlands respond to a shallow water table associated with groundwater discharge and periodic precipitation. As described in Section 4.10, *Water Quality*, the project study area is located over a multilayered groundwater flow system consisting of a shallow unconfined aquifer and a deeper principal aquifer that is part of a larger aquifer system on the eastern shore. The depth of the shallow groundwater varies between 0 and 3 m (9 ft). The principal aquifer lies at a depth of approximately 60 m (200 ft) and is separated from the shallow groundwater by a layer of fine-grained soil of varying thickness. It is recharged primarily by precipitation at the base of the Wasatch Mountains outside the project study area. Subsurface groundwater flow generally moves from this recharge area westward toward Great Salt Lake, but there is also an equal or greater component of vertical flow from deeper confined zones of the principal aquifer (Forster and Neff 2002).

Substantial modification of the natural surface hydrology of the wetlands associated with the Jordan River Delta has occurred with the creation and management of numerous duck clubs and the Farmington Bay Waterfowl Management Area (FBWMA). These changes have benefited many migrating waterfowl and shorebird species through enhancement of wetlands formerly affected by historic water diversion and management projects.

Existing Artificial Landscaping in Project Vicinity

Portions of the project study area have been artificially landscaped in residential, commercial, and industrial areas. Some of this landscaping also exists in rural residential areas, including around ranch houses and other ranch buildings. Artificial landscaping incorporates many nonnative and native trees, shrubs, and other vegetation. The urban landscaping in the project study area provides useable habitat for a variety of native and introduced migratory species.

Existing Sources of Direct Wildlife Mortality in Project Vicinity

There is little information on existing sources of wildlife mortality within the project study area. Aside from natural causes of death, such as predation, disease, and limited longevity, there is undoubtedly some roadkill associated with existing roads in the area, particularly for amphibians, reptiles, and small mammals found in adjacent habitats, as well as predatory birds and mammals that may be attracted to the carcasses.

Existing Sources and Levels of Noise in Project Vicinity

The noise levels within the project study area were sampled July 1 to 2, 2003, to estimate existing conditions. This analysis included both short-term (1-hour) and long-term (3-day) measurements at various locations within the project study area (Figure 4.13-7) and up to approximately 6 km (3.7 mi) beyond the project study area. Existing noise levels in the project study area are elevated by traffic noise from I-15 and aircraft overflights from Salt Lake City International Airport. Tables 4.13-3 and 4.13-4 present the results of this sampling. A complete discussion of the noise impacts analysis is provided in Section 4.9, *Noise*.

Existing Sources of Artificial Light in Project Vicinity

Increased lighting can affect wildlife in a variety of ways, both positive and negative. Some species such as bats may benefit from artificial light because it attracts aerial insects, their primary prey. Artificial light may also benefit various predators such as foxes by making prey species such as mice more visible at night. Other species, including some fish, amphibians, birds, mammals, and invertebrates, may have their diurnal or reproductive cycles interrupted or may experience direct mortality and increased predation rates because of artificial light.

The project study area is affected by artificial lighting from residential and commercial developments in the greater Salt Lake City region. Some of the major industrial sources of artificial light in the project vicinity are listed below.

- Chevron USA, Inc. petroleum refinery in Salt Lake City.
- Amoco Oil Company petroleum refinery in Salt Lake City.
- Tesoro petroleum refinery in Salt Lake City.

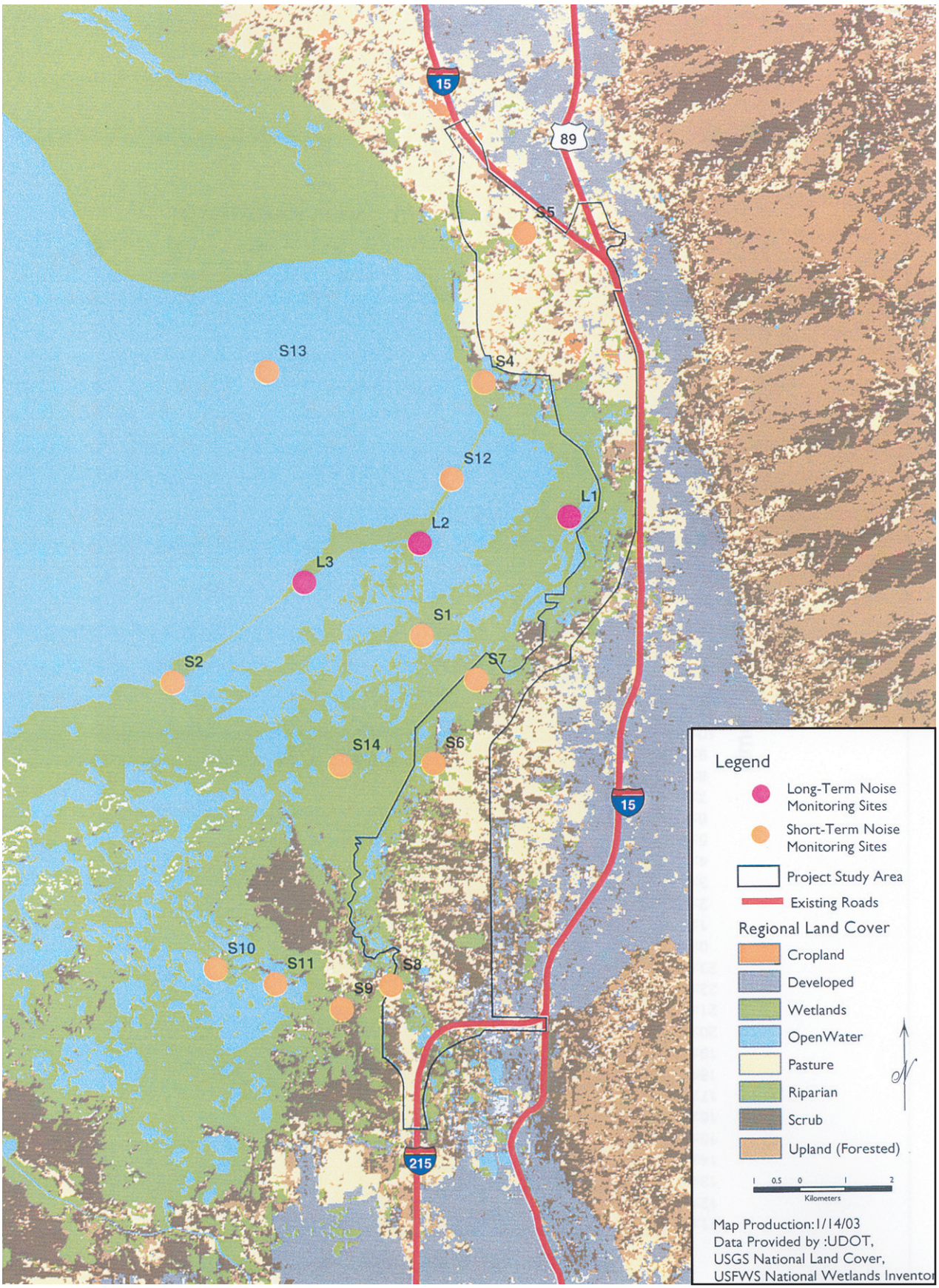

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Figure 4.13-7
Noise Monitoring Locations in the Legacy Parkway Project Study Area

Table 4.13-3 Short-Term Sound Level Measurements

Recording Location	Date	Start Time	Duration (min)	Average Wind Speed (mph)	Leq[1]	Lmin[2]	L90[3]	L50[3]	L10[3]	Lmax[4]	Distinct Noise Sources
5	1 Jul	12:43	16:00	8.4	52.2	41.8	43.9	47.1	53.5	67.3	Vehicle passages, crickets, wind in vegetation
6	1 Jul	13:50	16:00	11.6	52.3	40.2	44.8	49.3	56.3	62.6	Aircraft, wind in vegetation
7	1 Jul	14:48	10:00	14.8	52.3	45	47.1	51.3	55.1	66.6	Wind in vegetation, no audible human sound
8	1 Jul	15:36	15:00	8.6	59.5	39.2	42.3	48	60.5	79.1	Vehicle passages, distant traffic, aircraft, wind in vegetation
9	1 Jul	18:40	18:00	11.1	48.3	32.2	39.7	44.7	52.4	60.9	Wind in vegetation, aircraft
10	1 Jul	19:20	15:00	2.7	59.9	33.2	36.2	45	62	76.5	Aircraft, birds
11	1 Jul	19:59	15:00	4.4	51.9	33.1	40.2	45.4	51.5	71.4	Aircraft, birds
12	2 Jul	7:02	19:00	2.2	43.9	32	33.7	36.1	44	61.6	Aircraft, birds
13	2 Jul	7:57	14:00	2.8	46.8	39.8	41.8	43.4	46.6	61	Aircraft, distant birds
1	2 Jul	9:36	17:00	1.2	42.6	33.4	36.5	40.6	45.8	52.6	Aircraft, birds
2	2 Jul	10:33	18:00	2.9	45.1	31.2	33.8	40.8	49.2	57.1	Aircraft, crickets
6	2 Jul	12:33	15:00	4.1	40.8	31.7	33.8	36.7	42.1	57.6	Wind in vegetation, birds, aircraft
14	2 Jul	13:29	16:00	4.5	47.2	31.8	33.7	36.6	52.3	61.2	Wind in vegetation, birds, aircraft
4	2 Jul	14:53	15:00	4.8	37.1	30.8	31.6	33.6	38.4	53.1	Distant construction activity, aircraft
				Mean	48.6	35.4	38.5	42.8	50.7	64.3	
				STDEV	6.6	4.7	5.0	5.5	6.8	7.6	
				Min	37.1	30.8	31.6	33.6	38.4	53.1	
				Max	59.9	45	47.1	51.3	62	79.1	
				Range	22.8	14.2	15.5	17.7	23.6	26.0	

[1] **Leq.** Equivalent Sound Level. The equivalent steady-state sound level that, in a stated period of time, would contain the same acoustical energy.
[2] **Lmin.** Minimum Sound Level. The minimum sound level measured during the measurement period.
[3] **Lxx.** Percentile-Exceeded Sound Level. The sound level exceeded "x" percent of a specific time period. L10 is the sound level exceeded 10 percent of the time.
[4] **Lmax.** Maximum Sound Level. The maximum sound level measured during the measurement period.

Table 4.13-4 Mean, Standard Deviation, Minimum, and Maximum Noise Levels

SPL[1] (dBA)[2]	Leq[3]				L10[4]				L50[4]				L90[4]			
	L1	L2	L3	L1–L3	L1	L2	L3	L1–L3	L1	L2	L3	L1–L3	L1	L2	L3	L1–L3
Mean	53	45	52	50	55	48	54	51	47	41	46	45	43	36	41	40
SDEV	11	8	8	10	11	8	9	11	8	7	8	8	7	5	6	7
Minimum	41	36	40	36	42	37	41	35	37	34	36	34	36	32	35	32
Maximum	78	69	71	78	81	73	75	81	71	67	69	71	65	58	64	65

[1] **SPL.** Sound Pressure Level.
[2] **dBA.** A-Weighted Decibel. An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
[3] **Leq.** Equivalent Sound Level. The equivalent steady-state sound level that, in a stated period of time, would contain the same acoustical energy.
[4] **Lxx.** Percentile-Exceeded Sound Level. The sound level exceeded "x" percent of a specific time period. L10 is the sound level exceeded 10 percent of the time.

- Flying J petroleum refinery in North Salt Lake.
- Portland Cement plant in North Salt Lake.
- Phillips 66 petroleum refinery in Woods Cross.
- Crysen Refining petroleum refinery in Woods Cross.
- Golden Eagle Refinery, Inc. petroleum refinery in Woods Cross.
- Utah Power and Light substation in Centerville.
- Salt Lake City International Airport, located just west of the project's southern terminus (runway, building, and control tower lights, as well as aircraft lights).

Existing Sources of Human Disturbance in Project Vicinity

Human disturbance can have adverse effects on wildlife, and many bird species are sensitive to some level of direct disturbance of their nest sites or intrusions into their nesting territories. Portions of the project study area have already been converted to residential, commercial, and industrial uses; wildlife using these areas often experiences frequent disturbance from human activities and domestic pets. Human and domestic pet access to the wildlife habitat within the project study area would likely result in some level of habitat degradation and wildlife mortality; domestic and feral cats pose a particular threat to wildlife (especially avian) mortality.

Other portions of the project study area are currently low-density, rural residential areas or ranches. In those areas, potential human sources of wildlife disturbance include vehicle traffic on the unsurfaced roads and off-highway vehicle use in unroaded areas. The grazing, trampling, etc. of cattle and horses also are likely to remove cover and alter species habitat. In addition, unauthorized hunting and shooting may occur in some areas and can result in direct wildlife mortality.

4.13.3 Environmental Consequences and Mitigation Measures

This section discloses potential direct, indirect, and cumulative effects of each project alternative on wildlife, including species of concern to federal agencies and the State of Utah. As described in Section 4.0.3, *Alternatives Evaluated*, the alternatives analyzed in this document represent modifications, based on a reduced right-of-way width of 95-m (312-ft), of the alternatives analyzed in the Final EIS.

As described in the Final EIS, all the proposed build alternatives could have impacts on wildlife and their upland and wetland habitats in the project study area. In addition, since publication of the Final EIS, construction activities associated with Alternative D (Final EIS Preferred Alternative) and new development unrelated to the proposed action have affected wildlife in the project study area. This section provides an updated discussion of the following wildlife impacts for each proposed build alternative; these impacts are examined in more detail in the wildlife technical memorandum.

- Direct habitat loss.
- Changes in lake level and habitat availability.
- Habitat fragmentation.
- Changes in habitat quality, including
  - air quality and
  - water quality.
- Habitat modification, including
  - wetland hydrology and
  - artificial landscaping.
- Wildlife mortality.
- Artificial light disturbance.
- Highway noise disturbance.
- Human disturbance.
- Effects on wildlife species of concern.
- Cumulative effects.

4.13.3.1 Direct Habitat Loss

Construction of any build alternative would result in direct loss of wildlife habitat in the project right-of-way. Habitat losses would be caused by such activities as excavation, grading, highway construction, and

development and use of staging and access areas. The extent and character of these losses would be a function of the location of the alignment within the matrix of habitats in the project study area.

Total Available Habitat

The total amount of each habitat that occurs in the project area is shown above in Figure 4.13-6. Upland habitats (pasture, cropland, and salt desert scrub) comprise much larger areas than do wetland/riparian habitats (wet meadow, emergent marsh, mudflat/pickleweed, open water, and riparian). Pasture is the most extensive upland habitat; wet meadow is the most extensive wetland/riparian habitat. Developed lands are excluded from this discussion because construction of any build alternative would cause a net increase of this habitat category.

As explained in Footnote 3 above, the mapping methodology for the wildlife analysis resulted in discrepancies between the apparent extent of habitats described in Section 4.12, *Wetlands*, and this section. Wetland/riparian habitats used for the wildlife analysis include delineated wetlands and non-delineated riparian areas. Including these habitats in the wetland/riparian category enabled the wildlife analysis to focus on land areas actually used by wildlife, rather than areas defined strictly by the technical wetland delineation boundaries.

No-Build Alternative

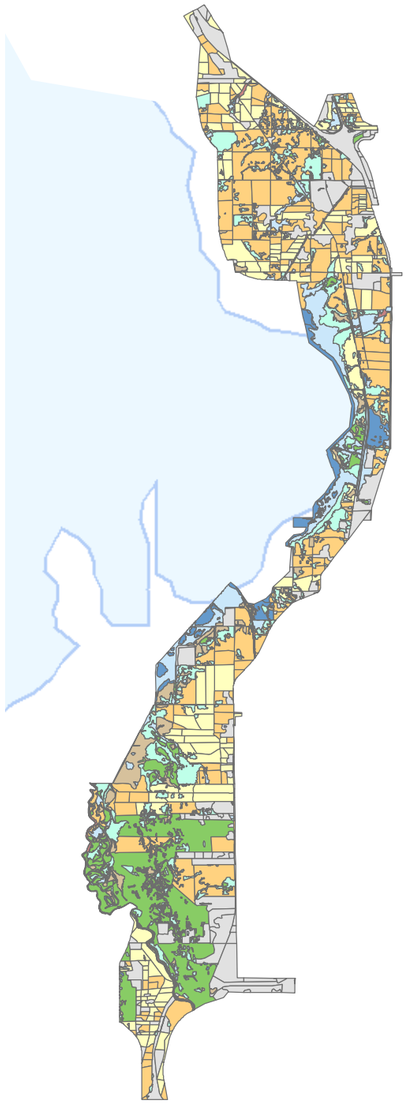
Existing Conditions (2004)

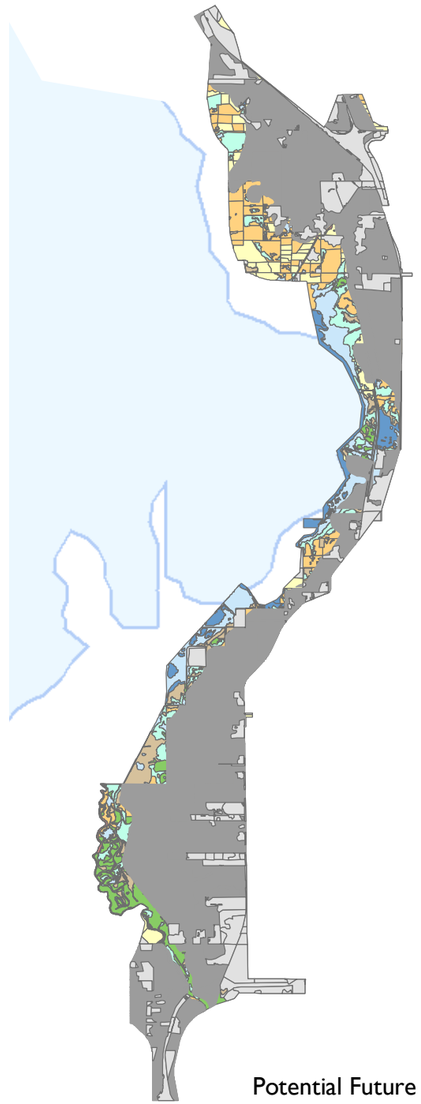
Under the existing conditions No-Build Alternative, there would be no project-related loss of wildlife habitat in the project study area. There also would be no mitigation in the form of the proposed Legacy Nature Preserve, which is described below in Section 4.13.3.14.

Future Conditions (2020)

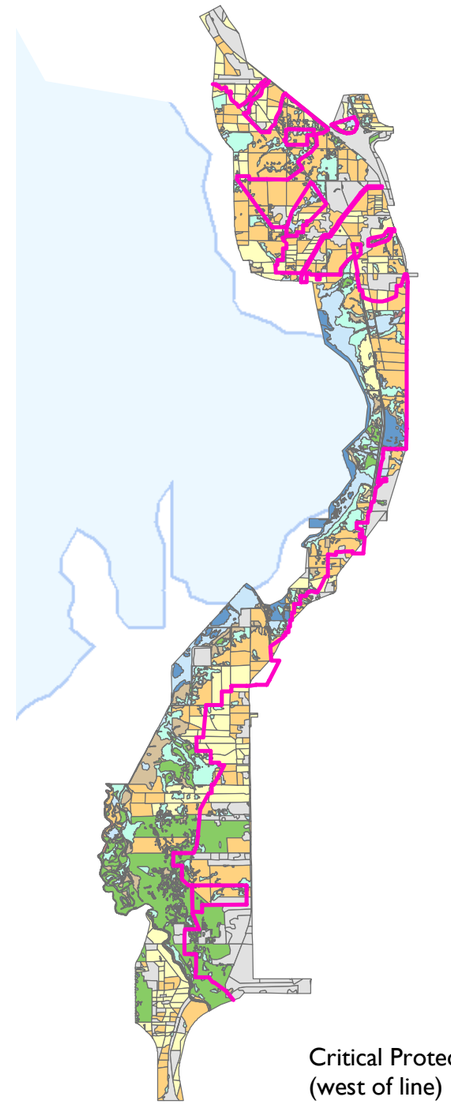
Even without construction of Legacy Parkway, under the future conditions No-Build Alternative, reasonably foreseeable future land use changes would add to the historic loss and fragmentation of wildlife habitat (see Section 4.13.2.2, *Historic Habitat Conditions*). Approximately 47 percent of the wetland/wildlife habitat remaining in the regional study area (55,002 ha [135,915 ac] of 117,027 ha [288,181 ac] is on private land, which is subject to reasonably foreseeable future land use changes. The percentage of historical wetland/wildlife habitat remaining in the region varies locally by hydrologic unit, as described above in Section 4.13.2.2.

Table 4.13-5 illustrates the potential impact of future development on wetland/wildlife habitat in the study area, both with and without the proposed build alternatives. Two categories of development were identified to illustrate potential impacts of future development in the project study area: areas developed subsequent to 1997 (developed), and areas potentially developable in the future (developable). As indicated in Table 4.13-5, the Legacy Parkway project is not the only potential source of loss of wetland and upland habitats in the future. For example, future build-out conditions not associated with any proposed build alternative (*Build-Out Developed* in Table 4.13-5) indicate a loss or degradation of 15.1 ha (37.4 ac) of emergent marsh, 4.7 ha (11.6 ac) of mudflat/pickleweed, and 27.8 ha (68.7 ac) of the wet meadow habitats in the project study area from development not related to Legacy Parkway (Figure 4.13-8).





Potential Future Development



3

Critical Protection Areas*
(west of line)

Legend

Critical Protection Areas (west of line)*

Potential Future Developement

- Developed
- Developable

Wetland / Wildlife Habitat

- Cropland
- Developed
- Emergent Marsh
- Mudflat/Pickleweed
- Open Water
- Pasture
- Riparian
- Scrub
- Wet Meadow

N

1 0.5 0 1 2
Kilometers

Map Production: 12/15/03
Data Sources: UDOT Project Alternatives and Wetland / Wildlife Habitat Data, Potential Future Development modified from the Final EIS
*Davis County Critical Protection Area from the Wetlands Conservation Plan -- A Plan for Protection of the Great Salt Lake Wetlands Ecosystem in Davis County (December 1996).

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Figure 4.13-8
Legacy Parkway Study Area Potential Future Development

Table 4.13-5 Potential Impact (acres) of Future Development and Build Alternatives in Project Study Area

Habitat	Total Project Study Area	Build Out		Alternative A and Build Out		Alternative B and Build Out		Alternative C and Build Out		Alternative E and Build Out	
		Developed	Developable	Developed	Developable	Developed	Developable	Developed	Developable	Developed	Developable
Cropland	1733.1	264.3	1103.2	379.9	988.2	482.9	938.6	279.4	1011.6	374.3	994.4
Emergent Marsh	707.2	37.4	161.1	52.0	155.6	74.3	139.1	54.5	151.5	55.0	152.6
Mudflat/Pickleweed	439.8	11.6	168.9	17.3	167.4	26.3	156.5	42.9	152.1	26.4	159.7
Open Water	312.8	8.1	27.1	16.6	24.7	30.5	20.4	16.7	21.3	21.9	19.3
Pasture	2963.3	588.5	1706.5	754.2	1545.3	849.3	1544.0	764.5	1547.5	787.8	1522.9
Riparian	70.9	12.2	21.8	14.2	19.7	15.2	19.6	16.4	18.6	14.9	19.0
Scrub	1282.2	167.4	799.9	283.7	688.1	232.7	748.7	306.2	673.8	282.6	690.2
Wet Meadow	1118.9	68.7	566.8	130.2	511.6	147.0	506.3	149.9	499.6	127.7	515.8
Wetland	2649.7	138.1	945.6	230.4	878.9	293.5	841.8	278.9	843.1	246.0	866.4
Upland	5978.6	1020.2	3609.6	1417.8	3221.7	1564.9	3231.2	1440.0	3233.0	1444.8	3207.4

Build Alternatives

The total area of upland, wetland/riparian, and combined habitats that would be directly lost as a result of each build alternative is described below and summarized in Figure 4.13-9.

Alternative A

Alternative A would result in the following direct habitat loss within the right-of-way.

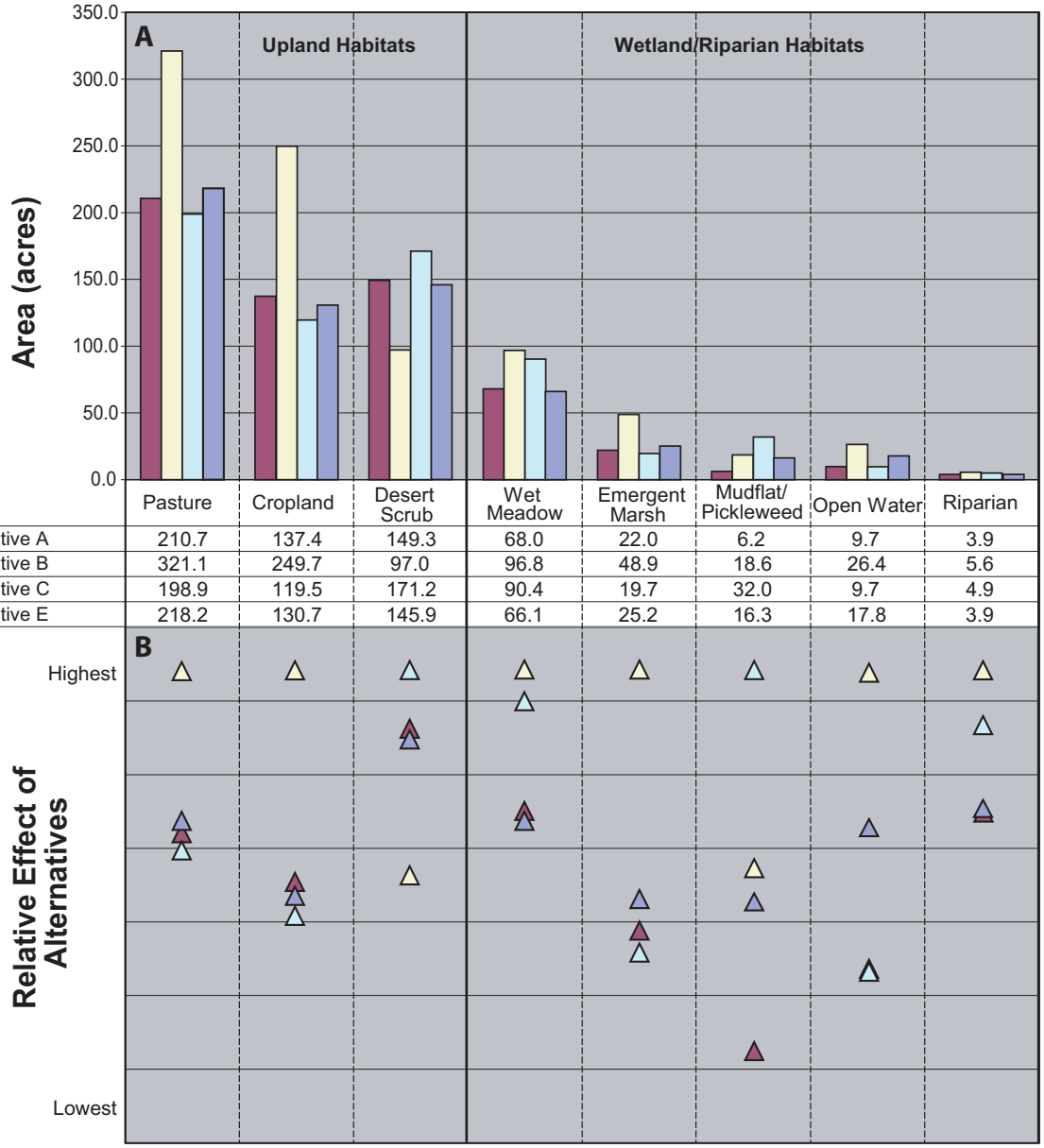
- Loss of 44.4 ha (109.8 ac) of wetland/riparian habitat, comprising
  - 27.5 ha (68.0 ac) of wet meadow,
  - 8.9 ha (22.0 ac) of emergent marsh,
  - 2.5 ha (6.2 ac) of mudflat/pickleweed,
  - 3.9 ha (9.7 ac) of open water, and
  - 1.6 ha (3.9 ac) of riparian habitat.
- Loss of 201.3 ha (497.4 ac) of upland wildlife habitat, comprising
  - 85.3 ha (210.7 ac) of pasture,
  - 55.6 ha (137.4 ac) of cropland, and
  - 60.4 ha (149.3 ac) of salt desert scrub habitat.

The total amount of land in the developed habitat category in the Alternative A right-of-way would be 109.9 ha (271.5 ac).

Alternative B

Alternative B would result in the following direct habitat loss within the right-of-way.

- Loss of 79.5 ha (196.3 ac) of wetland/riparian, comprising
  - 39.2 ha (96.8 ac) of wet meadow,
  - 19.8 ha (48.9 ac) of emergent marsh,
  - 7.5 ha (18.6 ac) of mudflat/pickleweed,
  - 10.7 ha (26.4 ac) of open water, and
  - 2.3 ha (5.6 ac) of riparian habitat.
- Loss of 270.2 ha (667.8 ac) of upland wildlife habitat, comprising



	Pasture	Cropland	Desert Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Open Water	Riparian
Alternative A	210.7	137.4	149.3	68.0	22.0	6.2	9.7	3.9
Alternative B	321.1	249.7	97.0	96.8	48.9	18.6	26.4	5.6
Alternative C	198.9	119.5	171.2	90.4	19.7	32.0	9.7	4.9
Alternative E	218.2	130.7	145.9	66.1	25.2	16.3	17.8	3.9

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Figure 4.13-9
Direct Habitat Loss in Project Study Area by Habitat Type

- 129.9 ha (321.1 ac) of pasture,
- 101.1 ha (249.7 ac) of cropland, and
- 39.3 ha (97.0 ac) of salt desert scrub habitat.

The total amount of land in the developed habitat category in the Alternative B right-of-way would be 100.0 ha (247.1 ac).

Alternative C

Alternative C would result in the following direct habitat loss within the right-of-way.

- Loss of 63.2 ha (156.7 ac) of wetland/riparian habitat, comprising
  - 36.6 ha (90.4 ac) of wet meadow,
  - 7.8 ha (19.7 ac) of emergent marsh,
  - 12.9 ha (32.0 ac) of mudflat/pickleweed,
  - 3.9 ha (9.7 ac) of open water, and
  - 2.0 ha (4.9 ac) of riparian habitat.
- Loss of 198.2 ha (489.6 ac) of upland wildlife habitat, comprising
  - 80.5 ha (198.9 ac) of pasture,
  - 48.4 ha (119.5 ac) of cropland, and
  - 69.3 ha (171.2 ac) of salt desert scrub habitat.

The total amount of land in the developed habitat category in the Alternative C right-of-way would be 91.3 ha (225.5 ac).

Alternative E

Alternative E would result in the following direct habitat loss within the right-of-way.

- Loss of 52.3 ha (129.3 ac) of wetland/riparian wildlife habitat, comprising
  - 26.7 ha (66.1 ac) of wet meadow,
  - 10.2 ha (25.2 ac) of emergent marsh,
  - 7.2 ha (17.8 ac) of open water,
  - 6.6 ha (16.3 ac) of mudflat/pickleweed, and
  - 1.6 ha (3.9 ac) of riparian habitat.

- Loss of 200.2 ha (494.8 ac) of upland wildlife habitat, comprising
  - 88.3 ha (218.2 ac) of pasture,
  - 52.9 (130.7 ac) of cropland, and
  - 59.0 ha (145.9 ac) of salt desert scrub.

The total amount of land in the developed habitat category in the Alternative E right-of-way would be 103.8 ha (256.6 ac).

Regional Context: Proportion of Available Habitat Loss under Build Alternatives

As described in Section 4.13.2, although all the wildlife habitats found in the project study area are also found in other areas of the GSLE, the project study area is located within a system of extensive wetlands that includes the Jordan River Delta and the FBWMA, which is used by many thousands of migratory birds each year. In total, the project study area represents 0.88 percent of the regional study area, and 0.8 percent of the wildlife habitat in the region is located in the project study area. Table 4.13-6 presents a summary of the acreage of each habitat type in the project and regional study areas for each project alternative.

Table 4.13-6 Areal Comparison of Build Alternatives with Regional Study Area*

	Regional Land Cover	Project Study Area		Alternative A		Alternative B		Alternative C		Alternative E	
Habitat	acres	acres	%	acres	%	acres	%	acres	%	acres	%
Cropland	113,742	83	0.07	1	0.001	3	0.003	1	0.001	0	0.000
Developed	159,416	467	0.29	108	0.068	111	0.069	105	0.066	111	0.069
Emergent Marsh	42,817	1,212	2.83	24	0.056	110	0.257	86	0.201	44	0.103
Mudflat/Pickleweed	184,915	341	0.18	2	0.001	12	0.006	17	0.009	3	0.001
Pasture	285,165	3,372	1.18	315	0.110	351	0.123	213	0.075	274	0.096
Riparian	3,728	8	0.20	0	0.000	1	0.024	0	0.006	0	0.000
Scrub	206,017	2,469	1.20	267	0.130	283	0.137	293	0.142	286	0.139
Unclassified	11,283	67	0.60	23	0.205	24	0.217	26	0.227	22	0.195
Upland	22,084	707	3.20	79	0.356	101	0.458	64	0.290	79	0.357
Wet Meadow	99,139	1,203	1.21	52	0.052	87	0.088	71	0.071	67	0.067
Total Wetland[1]	326,871	2,756	0.84	79	0.024	209	0.064	174	0.053	114	0.035
Total Upland[2]	604,923	5,924	0.98	582	0.096	637	0.105	506	0.084	561	0.093
Total[3]	1,128,305	9,929	0.88	870	0.077	1,083	0.096	874	0.077	886	0.079

* Areal calculations are based on regional-scale data. Please refer to the cumulative impacts analysis and Appendix B for a discussion of data limitations.
[1] Total Wetland comprises emergent marsh, wet meadow, and mudflat/pickleweed.
[2] Total Upland comprises desert salt scrub, cropland, and pasture.
[3] Total is the sum of all habitat types

The wildlife technical memorandum provides a detailed discussion of the contribution of the Legacy Parkway project to habitat loss in the region. Less than 0.1 percent of regionally available wildlife habitat around Great Salt Lake that is used by migratory species would be directly lost under any build alternative. The percentage lost per alternative is summarized in Table 4.13-7 to provide the regional context for this habitat loss.

Table 4.13-7 Percentage of Regionally Available Wildlife Habitat Loss by Alternative

Alternative	Wetland/Riparian Habitats	Upland Habitats
No-Build (Existing Conditions)	0.0%	0.0%
Alternative A	0.024%	0.096%
Alternative B	0.064%	0.105%
Alternative C	0.053%	0.084%
Alternative E	0.035%	0.093%

4.13.3.2 Changes in Lake Level and Habitat Availability

No-Build Alternative

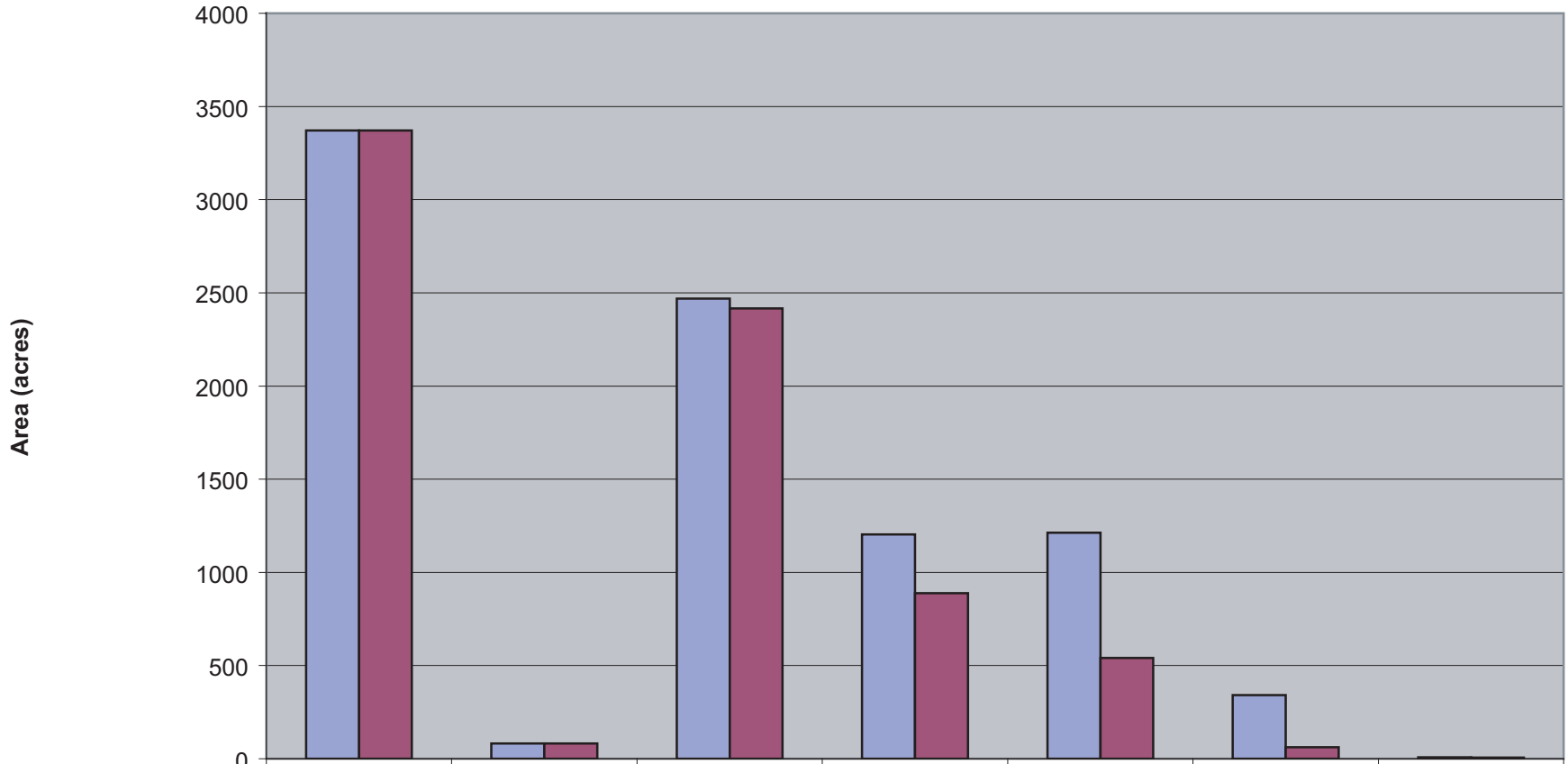
Existing Conditions and Future Conditions

As the level of Great Salt Lake rises through natural processes, existing terrestrial habitats are inundated and converted to saline, open water habitat. The lake reached a historic high of approximately 1,283.7 m (4,211.5 ft) on April 15, 1987, and a low of 1277.4 m (4,191 ft) on October 15, 1963. As the lake level rises, the total amount of available terrestrial habitat within the project study area decreases. As the lake level naturally recedes, the former ecological communities regenerate slowly. These conditions would continue to exist under the No-Build Alternative.

The level of Great Salt Lake is expected to rise and fall in the future, and effects of this natural phenomenon are expected to be similar to those described above under existing conditions.

Build Alternatives

To account for the dynamics of the level of Great Salt Lake, the combined effects of natural inundation from changes in lake level and implementation of each build alternative were examined to determine how these factors act in concert to affect the temporal pattern of overall availability of wildlife habitats within the project and regional study areas. Figures 4.13-10 and 4.13-11 show the areal extent of available habitats in the project and regional study areas at low and high lake levels. These data show relatively little change in upland habitats (pasture, cropland, scrub) with lake level change, but the availability of wetland habitats (wet meadow, emergent marsh, and mudflat/pickleweed) is markedly reduced at high lake levels. Regionally, at high water there is a 64 percent reduction in both mudflat/pickleweed habitat and emergent marsh habitat, a 30 percent change in wet meadow, and a 15 percent reduction in available riparian habitat.



	Pasture	Cropland	Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Riparian
Total Habitat at Low Water (acres)	3,372	83	2,469	1,203	1,212	341	8
Total Habitat at High Water (acres)	3,371	81	2,416	888	541	62	6

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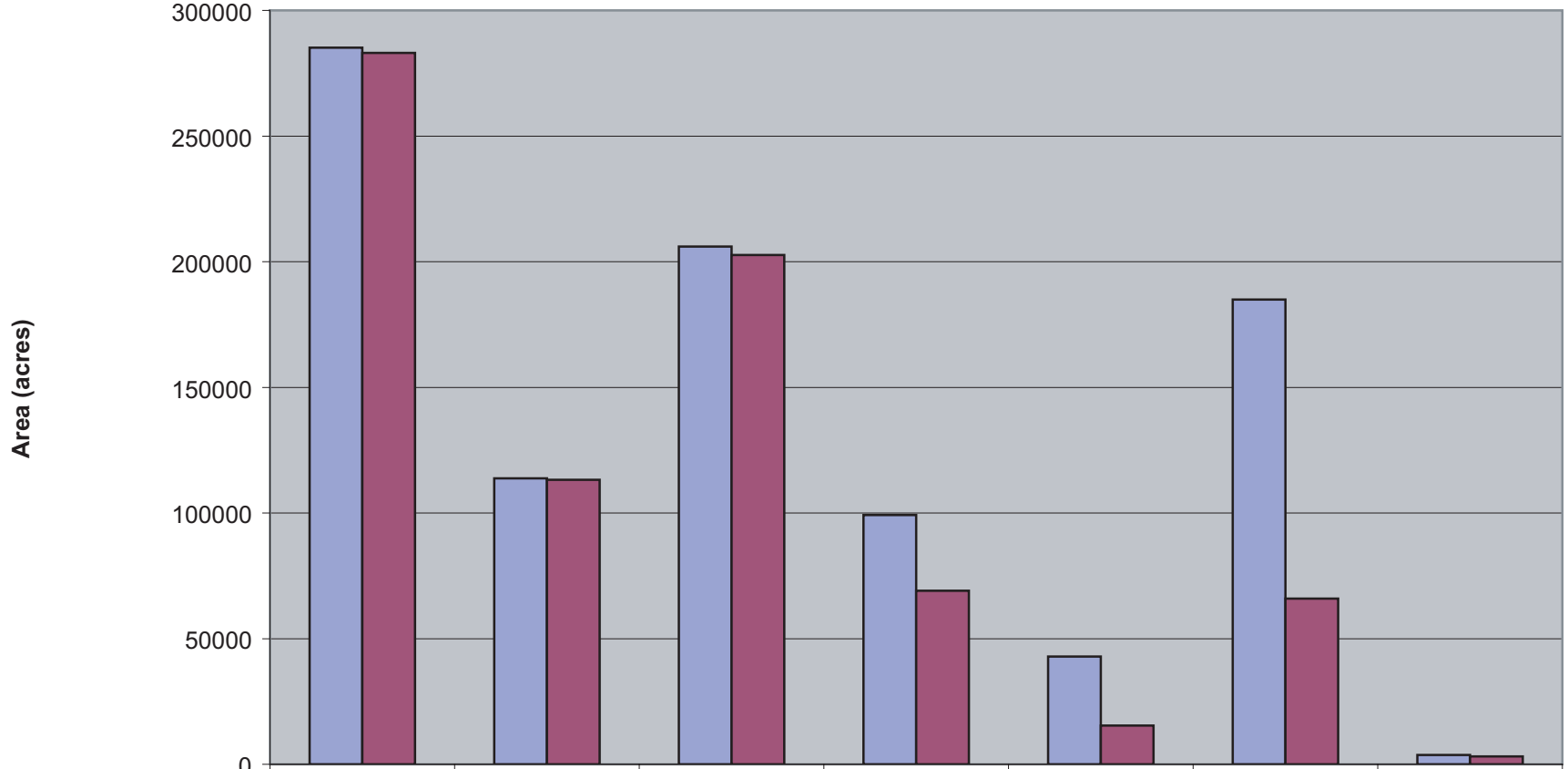
Figure 4.13-10
Wildlife Habitat Availability in Project Study Area at Low and High Lake Levels



	Pasture	Cropland	Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Riparian
Total Habitat at Low Water (acres)	285,165	113,742	206,017	99,139	42,817	184,915	3,728
Total Habitat at High Water (acres)	283,104	113,195	202,614	69,005	15,431	65,938	3,139

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Figure 4.13-11
Wildlife Habitat Availability in Regional Study Area at Low and High Lake Levels

Table 4.13-8 shows the acreage of each habitat that would be lost under each alternative and the percentage of regionally available habitat the lost area represents at low and high lake levels. Proportionally, the amount of any habitat that would be lost under any proposed alternatives is very small at both low lake level (<0.4 percent) and high lake level (<0.5 percent). Because of the very large area of habitat available regionally and the comparatively small area of the proposed action, the change in lake level does not measurably affect the proportion of habitat lost under each alternative, even though the level of the lake can cause up to a 64 percent change in the regional availability of habitat. The largest proportional change in any habitat between low and high lake level is only 0.3 percent (emergent marsh, Alternative B). This level of change, while calculable, is insignificant with regard to the inherent error of the GIS polygon measurement methodology.

At the project study area level, the change in the areas of habitats that would be lost to the proposed action (Figure 4.13-10, Table 4.13-9) is proportionally greater at both low and high lake levels than that described above for the regional level (Table 4.13-8). For example, mudflat/pickleweed habitat lost under Alternative C changes from 5 percent of the available habitat in the project study area at low lake level to 27 percent of the habitat in the project study area at high lake level—a change of 22 percent. Under Alternative B, emergent marsh habitat changes 11 percent from 9 percent at low lake level to 20 percent at high lake level. Changes in other habitats are all smaller. These project study area changes represent the local effects of lake level change on habitat availability. As with the regional analysis, the greatest changes in wetland habitats are at the lower elevations.

The biological affects of lake level change are summarized below and detailed in the wildlife technical memorandum.

- The rate of change of each existing habitat type associated with inundation varies depending largely on the habitat's distribution within each inundation zone. For example, the extent of available mudflat/pickleweed changes rapidly between 1,281.4 m (4,204 ft) and 1,283.8 m (4,212 ft), the inundation zone in which most of that habitat occurs; this rate surpasses the rates of change of other low-elevation wetland/riparian habitats (emergent marsh, wet meadow, and riparian). Overall, the lower-elevation wetland/riparian habitats become inundated at higher rates than do upland habitats within the same inundation zones.

- The higher-elevation portions of the project study area provide important local refugia for many wetland species when lake levels are high. With increasing lake level and diminishing availability of habitat, the relative impacts of the build alternatives on these refuge areas would increase. However, large areas of the wildlife habitat that characterize the project study area are found throughout the GSLE. The wider availability of habitats makes the study area less important on a regional scale.

- In the project study area, a rise in lake level reduces the availability of wetland habitats and progressively forces birds to move inland, closer to the proposed highway alignment or elsewhere in the GSLE where suitable habitat is available. This process could potentially increase the risk of project-related impacts on birds (e.g., collisions with vehicles, noise, human disturbance). Such consequences would pertain especially to wetland species that typically use upland areas for refuge during inclement weather and for roosting. All the build alternatives would potentially compound the effects of habitat inundation by reducing the availability of associated upland habitat used by these species. However, these effects would be temporally scaled to the frequency, height, and duration of inundation in the project study area. Based on historic lake level change patterns, inundation at the higher elevations has a much lower probability of occurrence, but would have an increasingly pronounced effect as habitat availability diminishes. With recession of lake levels, these effects decrease as former habitat regenerates.

Table 4.13-8. Regional Wildlife Habitat Availability at Low and High GSL Lake Levels

	Alternative A				Alternative B			
Habitat	Area* (acres)	% of Regional Habitat at Low Lake Level	% of Regional Habitat at High Lake Level	Change in % Between High and Low Lake Level	Area* (acres)	% of Regional Habitat at Low Lake Level	% of Regional Habitat at High Lake Level	Change in % Between High and Low Lake Level
Pasture	315	0.11	0.11	0.00	351	0.12	0.12	0.00
Cropland	1	0.00	0.00	0.00	3	0.00	0.00	0.00
Scrub	267	0.13	0.13	0.00	283	0.14	0.14	0.00
Wet Meadow	52	0.05	0.08	0.02	87	0.09	0.09	0.00
Emergent Marsh	24	0.06	0.16	0.10	110	0.26	0.56	0.31
Mudflat/Pickleweed	2	0.00	0.00	0.00	12	0.01	0.00	0.00
Riparian	0	0.00	0.00	0.00	1	0.02	0.03	0.00

	Alternative C				Alternative E			
Habitat	Area* (acres)	% of Regional Habitat at Low Lake Level	% of Regional Habitat at High Lake Level	Change in % Between High and Low Lake Level	Area* (acres)	% of Regional Habitat at Low Lake Level	% of Regional Habitat at High Lake Level	Change in % Between High and Low Lake Level
Pasture	213	0.07	0.08	0.00	274	0.10	0.10	0.00
Cropland	1	0.00	0.00	0.00	0	0.00	0.00	0.00
Scrub	293	0.14	0.14	0.00	286	0.14	0.14	0.00
Wet Meadow	71	0.07	0.08	0.01	67	0.07	0.09	0.03
Emergent Marsh	86	0.20	0.39	0.19	44	0.10	0.29	0.18
Mudflat/Pickleweed	17	0.01	0.01	0.00	3	0.00	0.00	0.00
Riparian	0	0.01	0.00	-0.01	0	0.00	0.00	0.00

*Area represents acreage of each habitat that lies within the build alternative right-of-way. These acreages are based upon the regional dataset to facilitate regional-scale analysis.

Table 4.13-9 Wildlife Habitat Availability within the Project Study Area at Low and High GSL Lake Levels

	Project Study Area			Alternative A				Alternative B			
Habitat	At Low Lake Level (acres)*	At High Lake Level (acres)	Change in Available Habitat (acres) Between Low and High Lake Level	Area (acres)	% of Project Study Area Habitat at Low Lake Level	% of Project Study Area Habitat at High Lake Level	Change in % Between High and Low Lake Level	Area (acres)	% of Project Study Area Habitat at Low Lake Level	% of Project Study Area Habitat at High Lake Level	Change in % Between High and Low Lake Level
Pasture	3,372	3,371	1	315	9.333	9.336	0.004	351	10.401	10.405	0.004
Cropland	83	81	1	1	0.809	0.820	0.011	3	3.774	3.825	0.052
Scrub	2,469	2,416	53	267	10.808	11.045	0.237	283	11.465	11.717	0.251
Wet Meadow	1,203	888	315	52	4.326	5.860	1.534	87	7.266	9.842	2.577
Emergent Marsh	1,212	541	671	24	1.982	4.443	2.461	110	9.064	20.321	11.257
Mudflat/Pickleweed	341	62	279	2	0.717	3.915	3.198	12	3.453	18.861	15.408
Riparian	8	6	2	0	0.000	0.000	0.000	1	11.765	15.385	3.620

	Alternative C				Alternative E			
	Area (acres)	% of Project Study Area Habitat at Low Lake Level	% of Project Study Area Habitat at High Lake Level	Change in % Between High and Low Lake Level	Area (acres)	% of Project Study Area Habitat at Low Lake Level	% of Project Study Area Habitat at High Lake Level	Change in % Between High and Low Lake Level
Pasture	213	6.305	6.308	0.002	274	8.126	8.129	0.003
Cropland	1	0.809	0.820	0.011	0	0.539	0.546	0.007
Scrub	293	11.862	12.121	0.260	286	11.591	11.845	0.254
Wet Meadow	71	5.879	7.964	2.085	67	5.546	7.513	1.967
Emergent Marsh	86	7.101	15.919	8.818	44	3.651	8.186	4.535
Mudflat/Pickleweed	17	4.951	27.046	22.095	3	0.782	4.270	3.489
Riparian	0	2.941	3.846	0.905	0	0.000	0.000	0.000

* Acreages in this table are derived from the regional GIS dataset, which is a low-resolution dataset. Consequently, the acreages differ from those presented in project-level analyses.

- With increasing lake level, some less mobile wildlife (e.g., mice, snakes, frogs, nonflying insects) will perish if the rise is rapid unless they can move to suitable habitat above the waterline. If the rise is gradual (e.g., over several seasons), local populations will change in size in proportion to the reduced carrying capacity of the remaining habitat.

- As the lake level recedes, the effects of inundation decrease as former habitat regenerates.

4.13.3.3 Habitat Fragmentation

No-Build Alternative

Existing Conditions (2004)

The historic wildlife habitats of the GSLE along the Wasatch Front have been highly fragmented by urban, industrial, and agricultural development and numerous highways and roads. These land use changes have created a major barrier to movement by many species of wildlife from the Wasatch foothills to Great Salt Lake. However, under the existing conditions No-Build Alternative, there would be no project-related fragmentation of wildlife habitat in the project study area.

Future Conditions (2020)

As described in Section 4.13.3.1, regardless of whether the proposed action is implemented, future planned development is anticipated to occur throughout the project study area and vicinity, and this future development will be a source of future wildlife habitat fragmentation. This build-out of developable lands within the study area would result in additional loss and fragmentation of existing wildlife habitats from urban/industrial development and construction of associated roads. Under this scenario, most of the habitat changes would result from direct habitat loss as large blocks of existing habitat are converted to developed land. The roads associated with these developments would mostly be contained within these converted blocks, although some peripheral and connector roads would also likely be built. Many of the existing large habitat patches, as well as medium and small patches, would be lost, but it is not known to what extent these existing habitat patches would be fragmented into smaller patches.

Build Alternatives

All the build alternatives would dissect the matrix of wildlife habitats in the project study area into east and west areas. The area east of the proposed rights-of-way is largely modified by development and is experiencing continued rapid urban growth. Projected future growth in this area is likely to result in complete build-out. This area, however, does not appear to support any ecologically unique habitats that are not still represented west of the proposed alignments. The area west of the project rights-of-way retains a greater proportion of wetlands and wildlife habitats. This primary fragmentation effect of the project is not expected to reduce the diversity of habitat types within the project study area.

In addition to this primary fragmentation effect, all the build alternatives would result in the finer scale fragmentation of many existing wildlife habitat patches within the project study area. Each build alternative would result in a general decrease in the size of habitat patches available to wildlife in the area and a decrease in the number of larger patches, particularly in upland habitats. There would be a declining trend in the total amount of habitat in most size classes in most habitat types, with the exception of wetland habitats in the <0.4-ha (<1-ac) size class.

These changes would likely result in a number of effects on wildlife habitat, including reduction in habitat patch size, increase in the perimeter-to-area ratio of patches and associated edge effects, reduced connectivity between habitat patches, and introduction of barriers to dispersal for some species. Reduced habitat patch size can decrease the resources available to wildlife species, in turn reducing the local carrying capacity for those species. Moreover, smaller habitat patches are typically characterized by an increase in the length of the patch edge relative to the patch area, as well as a reduction in the distance from the edge to the center of the patch. These changes can favor a reduction in the ecological buffering capacity of the patch for species sensitive to detrimental factors outside the patch (e.g., microclimate, competition from other species, predation, noise and human disturbance, pollution, and highway mortality). Construction of any build alternative could also introduce a physical barrier to movement and dispersal of some species, especially those with low dispersal capabilities including small mammals, reptiles, and amphibians.

A quantitative assessment of the habitat fragmentation impacts for each alternative is provided in Table 4.13-10.

The overall effects of construction of the Legacy Parkway project on habitat fragmentation are summarized below.

- Alternatives A and E would have the least impact on fragmentation across the habitat types. Alternative A is located more to the east and would reduce the amount of habitat isolated between the right-of-way and existing development east of the alignment.

- The number of upland patches would increase under all build alternatives. Alternatives A and E would cause the least increase in the number of upland patches. Alternative B would cause the largest increase in the number of upland patches, predominantly in the smaller patch sizes. The changes in mean patch size reflect the same pattern.

- The number of wetland patches would increase/riparian under all build alternatives. Alternative E would cause the least increase in the number of wetland/riparian patches. Alternative A would cause the highest increase, but would result in very little change in mean patch size.

- In the area east of the proposed alignments, there are no unique or unusually valuable habitat types, either terrestrial or wetland/riparian, that would not still be represented in the remaining area west of the alignments. This primary fragmentation effect of the project would not therefore reduce the diversity of habitat types in the project study area or in the GSLE in general.

- The fragmentation effects of the build alternatives on local wildlife populations would be additive to existing levels of fragmentation and all reasonably foreseeable future fragmentation that is likely to occur in the area (see Section 4.13.3.3, *Cumulative Effects*). Physical segregation of upland habitats from wetlands in the project study area could potentially have an adverse regional effect on migratory shorebirds and waterfowl that traditionally use both habitats in the area.

Because the existing habitat in the project study area is already highly fragmented by a diversity of human activities (e.g., agriculture, fences, roads, urban development), the additional fragmentation effects that the build alternatives would have on wildlife would likely be less than but additive to the effects of direct habitat loss. The fragmentation analysis of the build alternatives shows detectable variation among alternatives, but the differences are small and biologically indistinguishable at the scale of this analysis. The results of the assessment of the effects of direct habitat loss on species of concern indicate that while local populations of some species would be affected by loss of individuals and/or habitat, these losses

Table 4.13-10 Summary of Habitat Fragmentation by Habitat Category Resulting from Build Alternatives

Habitat Category	Alternative		Number of Patches in Each Size Class					**Total Number of Patches**	Summary Statistics (acres)	
			<1	1–10	10–50	50–100	>100		Mean Patch Size	Median Patch Size
Upland	No Action		147	70	40	13	12	**282**	21.20	0.79
	Alternative A	Patches Fragmented	10	9	15	7	10			
		Total Patches	175	97	46	13	13	**344**	15.93	0.90
	Alternative B	Patches Fragmented	6	16	22	10	11			
		Total Patches	196	97	59	14	12	**378**	14.05	0.84
	Alternative C	Patches Fragmented	9	14	17	8	10			
		Total Patches	181	100	50	11	13	**355**	15.46	0.94
	Alternative E	Patches Fragmented	7	8	12	7	10			
		Total Patches	182	91	47	17	11	**348**	15.76	0.79
Wetlands	No Action		464	227	39	5	2	**737**	3.17	0.60
	Alternative A	Patches Fragmented	38	57	9	1	1			
		Total Patches	494	218	36	5	2	**755**	2.96	0.48
	Alternative B	Patches Fragmented	78	78	15	3	2			
		Total Patches	500	206	39	6	1	**752**	2.88	0.48
	Alternative C	Patches Fragmented	70	74	13	2	1			
		Total Patches	498	206	36	7	1	**748**	2.93	0.45
	Alternative E	Patches Fragmented	55	65	7	1	1			
		Total Patches	486	208	39	5	2	**740**	3.01	0.45

Habitat Category	Alternative		Number of Patches in Each Size Class					**Total Number of Patches**	Summary Statistics (acres)	
			<1	1–10	10–50	50–100	>100		Mean Patch Size	Median Patch Size
Open Water	No Action		25	12	4	1	1	**43**	7.27	0.69
	Alternative A	Patches Fragmented	2		2	1	0			
		Total Patches	28	15	3	1	1	**48**	6.31	0.61
	Alternative B	Patches Fragmented	1	1	2	1	0			
		Total Patches	28	14	4	0	1	**47**	6.09	0.74
	Alternative C	Patches Fragmented	2	0	2	0	0			
		Total Patches	28	14	4	1	1	**48**	6.31	0.64
	Alternative E	Patches Fragmented	2	0	2	1	0			
		Total Patches	26	14	4	1	1	**46**	6.41	0.69

alone would not result in a notable change in the long-term viability of these species in the GSLE. Similarly, the contributory effects of habitat fragmentation by the build alternatives would not likely result in any detectable change in long-term population viability of any species of concern in the area.

4.13.3.4 Air Quality

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related air quality impacts that would affect wildlife habitat in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could affect air quality in the project and regional study areas, although the nature and timing of these projects and their relative effect on air quality are not known at this time.

Build Alternatives

Section 4.8, *Air Quality*, describes the existing and projected air quality conditions in the project study area. Any effect on wildlife habitat quality resulting from changes in air quality would be similar for all alternatives. Virtually nothing is known about how changes in air quality affect wildlife. Existing air quality standards established for human health provide a baseline standard for potential effects on wildlife. Temperature inversions and local concentrations of air pollutants would likely effect humans and wildlife comparably, although differences in physiology (e.g., higher metabolism and proportionally larger alveolar lung/air sac surface area in birds) may exacerbate some effects in some species. Animals are exposed to air pollutants through the inhalation of gases or small particles and the absorption of gases through the skin. Amphibians and soft-bodied invertebrates (e.g., earthworms) are most susceptible to be affected by the absorption of air pollutants. An individual's response to a pollutant varies greatly and depends on the pollutant involved, the duration and time of exposure, and the amount taken up by the animal. Pollutant fallout onto vegetation and existing water bodies in the project study area could have local effects on plant productivity, ecotoxicity of plants used for food by wildlife, and water quality (see below). The overall potential effects of critiria air pollutants on resident humans and presumably wildlife populations would likely include the following, as described by pollutant.

- **Nitrogen dioxide.** Lung damage, illnesses of breathing passages and lungs. Nitrogen dioxide is an ingredient of acid rain, which can damage vegetation and water quality for amphibians, fish, and other aquatic organisms.

- **Volatile organic compounds (VOCs).** VOCs include chemicals such as benzene, toluene, methylene chloride, and methyl chloroform. They react with nitrous oxides (NO_x) to form ozone, which can cause breathing problems, reduce lung function, irritate eyes and respiratory passages, reduce resistance to infections, and possibly speed up aging of lung tissue. VOCs can also cause cancer, and ozone can damage vegetation.

- **Carbon monoxide.** Reduces the ability of blood to bring oxygen to body cells and tissues; it is particularly hazardous to individuals that have damaged lungs or breathing passages. Can exacerbate problems created by VOCs, NO_xs, and ozone.

- **Lead.** Can cause brain and other nervous system damage. Small and young individuals are at special risk. Some lead-containing chemicals cause cancer in animals. Lead also causes digestive problems.
- **Particulate matter (PM).** Can cause respiratory passage irritation, lung damage, and bronchitis.

Analysis of future (2020) air quality conditions indicates that CO and PM will likely be higher in the study area under the no build conditions. Ozone is not expected to cause new exceedances of the National Ambient Air Quality Standards (Utah Department of Environmental Quality, Division of Air Quality 1997), but the potential effects of ozone on wildlife in the study area are unknown. Similarly, future concentrations of nitrogen dioxide, sulfur dioxide, and lead are not expected to change from existing conditions in the project study area, but their effects on wildlife are unknown. Any effects on wildlife and the quality of wildlife habitat resulting from changes in air quality would be similar under all build alternatives.

4.13.3.5 Water Quality

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related impacts on water quality that would affect wildlife habitat in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could effect water quality in the project study area, although the nature and timing of these projects and their relative effect on water quality are not known at this time.

Build Alternatives

All the build alternatives would result in similar increases in highway runoff contaminants. Section 4.10, *Water Quality*, and the wildlife technical memorandum provide a list of the primary contaminants in the project study area and their sources. The primary contaminants are not the only contaminants present in highway runoff, but they are the contaminants of primary concern regarding effects on water quality (Moellmer 2003). The primary contaminants reduce water quality and potentially affect wildlife in a variety of ways (Forman et al. 2003). Because of the increased transportability of many of these contaminants in aquatic systems, wetlands adjacent to the highway would most likely be the areas most affected. However, the design of the Legacy Parkway project includes vegetated filter strips in the highway meridian and floodplain equalization culverts, surface water conveyances, and groundwater conveyances at strategic points of runoff concentration; these features would minimize exposure to the primary contaminants in wildlife habitats adjacent to the highway. Any adverse effects of these contaminants would be restricted to local concentration areas where these features are present.

Hazardous waste or other chemical spills in wetland habitats could potentially have catastrophic effects on wildlife, especially when lake levels are high. Existing UDOT and FHWA/EPA requirements for safe transport of these materials and emergency spill containment programs minimize these effects under most conditions, but unavoidable accidents do occur. In the State of Utah during the 10-year period from 1994 to 2003, an average of 215 highway incidents involving hazardous materials occurred per year, but only

6.7 of these incidents on average were considered serious each year.[4] Most effects of these incidents are generally localized and would consequently vary under different build alternatives, although they would likely be the worst in aquatic habitats. The Alternative B alignment, which crosses the most wetland habitat, would be most susceptible to adverse effects on wildlife resulting from an accidental hazardous materials spill. Because the Alternative A and Alternative E alignments are located in more upland areas, they would be somewhat less susceptible than the other alternatives.

4.13.3.6 Wetland Hydrology

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related impacts on wetland hydrology that would affect wildlife habitat in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could affect wetland hydrology in the project study areas, although the nature and timing of these projects and their relative effect on wetland hydrology are not known at this time.

Build Alternatives

In 2001, 1.5 to 1.8 m (5 to 6 ft) of fill was placed along the Alternative E alignment between I-215 and 1500 South, and up to 6 m (20 ft) was placed in the I-215 interchange area. To determine empirically how these activities would affect local wetland hydrology, a network of piezometers (soil water-pressure gauges) were installed parallel to the fill areas in 2001 (Forster and Neff 2002). This study revealed that the groundwater level in the area is very shallow; the groundwater supporting the wetlands is derived largely from vertical flow of water from deeper aquifers rather than from precipitation. The study concluded that the water supply to wetlands in the project study area was not likely to be seriously affected by highway construction, with the exception of areas immediately adjacent to the right-of-way. New drainage features proposed for Legacy Parkway, including groundwater conveyance structures (see Section 4.10, *Water Quality*), would equalize groundwater when the groundwater elevation reaches a given level, effectively mimicking the westward flow of shallow water beneath the right-of-way. Consequently, no adverse impacts on local wetland hydrology are anticipated from implementation of the Legacy Parkway project under any build alternative.

[4] A serious incident is defined as a fatality or major injury caused by the release of a hazardous material, the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire, a release or exposure to fire which results in the closure of a major transportation artery, the alteration of an aircraft flight plan or operation, the release of radioactive materials from Type B packaging, the release of more than 11.9 gallons or 88.2 pounds of a severe marine pollutant, or the release of a bulk quantity (more than 119 gallons or 882 pounds) of a hazardous material (http://hazmat.dot.gov/files/hazmat/hmisframe.htm).

4.13.3.7 Wildlife Mortality

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related wildlife mortality.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could occur such that wildlife mortality in the project study area could increase. However, the nature, timing, and extent of these impacts are not quantifiable at this time.

Build Alternatives

UDOT records of documented roadkill are nonspecific and generally represent only large mammals (e.g., deer), not smaller species. This information is of limited value in evaluating the full spectrum of species affected by road-related mortality.

With increased vehicular traffic in the project study area under all the build alternatives, road mortality of individuals of some species—particularly birds flying between habitat patches on different sides of the highway and dispersing amphibians, reptiles, and small mammals—is likely to increase. This would be particularly evident during periods of high lake level when waterfowl and shorebirds would be more likely to use upland habitats adjacent to the highway. The three fences proposed to border the highway right-of-way would help minimize these impacts by forcing birds to take higher flight paths and deterring cross-highway movement of most species. Numerous drainage culverts proposed to be installed under the highway would also facilitate wildlife movement without road mortality. The effects of highway-related road mortality of wildlife would likely be similar under all the build alternatives

4.13.3.8 Artificial Landscaping

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be change in the extent of artificial landscaping in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could increase the amount of artificial landscaping in the project study area, although the nature and extent of such changes are not known at this time.

Build Alternatives

Artificial landscaping often attracts a diversity of species, particularly birds and small mammals (Forman et al. 2003). Migrating passerine birds frequently rest and forage on insects and fruit in landscaped areas. Fruit- and seed-producing trees and shrubs are especially attractive to these species. Planted trees also attract a variety of raptors, particularly hawks, falcons, and owls, which use them for night/day roosting

and nesting sites. Raptors perch in these trees to hunt for rodents, rabbits, and other prey in adjacent fields. Some small mammals may also find suitable food and shelter in landscaped areas associated with highways (Forman et al. 2002).

According to the Landscape Baseline Plan in the Final EIS, the type and design of plantings in the artificial landscaping would be similar under all build alternatives. The new landscaping would potentially have both beneficial and adverse effects on wildlife species that currently inhabit the project study area. These effects would be similar under all build alternatives. Beneficial effects would include the introduction of new trees, shrubs, and herbaceous vegetation that would provide foraging, roosting, and nesting habitats for birds and other wildlife. Adverse effects could potentially occur from the proximity of the vegetation to the highway (Forman et al. 2002). Wildlife mortality due to collisions with vehicles could potentially increase because a variety of species would be attracted to this roadside vegetation for cover and food (see Section 4.13.3.7, *Wildlife Mortality*, above). Resident owls, migrating raptors, passerine birds, and some mammals could find landscaped areas especially attractive. The artificial landscaping would also contribute to both the local and regional cumulative effects on wildlife from all new urban landscaping.

4.13.3.9 Artificial Light Disturbance

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related change in the amount of artificial lighting in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could increase the amount of artificial lighting, which could affect wildlife habitat in the project study area. However, the nature and extent of such changes are not known at this time.

Build Alternatives

All build alternatives would contribute minimally to the cumulative effects on wildlife from increased artificial lighting within the project and regional study areas. New artificial lighting associated with the proposed action would be associated with localized street lamps at on-ramps and off-ramps, luminaries (lighting of highway signs), and headlights. When the lake level is high, many migratory birds are likely to use the wetlands and uplands close to the highway. During periods of low visibility, the lights at intersections could attract migratory birds that become disoriented. Under such conditions, birds could collide with moving vehicles or light poles. While such bird mortality events have been documented in the Great Salt Lake Basin and elsewhere (Jones & Stokes 2004), adverse low-visibility weather is infrequent in the project study area.

Overall, the proposed action would add a minimal amount of light to existing conditions. Potential effects of light on birds, amphibians, mammals, fish, aquatic invertebrates, and terrestrial invertebrates also are likely to be minimal (Jones & Stokes 2004). Such effects would be the same under all build alternatives.

4.13.3.10 Highway Noise Disturbance

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related change in the level of noise disturbance in the project study area.

Future Conditions (2020)

If none of the build alternatives is constructed, future planned build-out of the project study area will still occur and will likely cause noise to rise above existing levels. Potential future growth scenarios that exclude the proposed action and related sources of noise disturbance are described in detail in the wildlife technical memorandum. Typical noise levels for progressive phases of development are summarized below (Cowan 1994).

- Rural 40–48 decibels (dB)
- Small town and quiet suburban 45–55 dB
- Suburban and low-density urban 52–60 dB
- Urban area 58–67 dB
- Dense urban area with heavy traffic 65–74 dB
- Downtown in large city 72–80 dB

It is anticipated that under the future conditions No-Build Alternative, noise in the project study area will increase from that typical of the lower noise levels (rural) to those of some of the higher noise levels, such as urban and dense urban with heavy traffic. Noise sources would contribute to the future noise environment of the project study area in proportion to the temporal phasing and geographic extent of each type of development.

Build Alternatives

The modeled areal extent of potential highway noise effects on wildlife habitat shows differences among alternatives in each noise level contour interval relative to the position of the alignment and the spatial distribution of wildlife habitat patches. The total area of wildlife habitat exposed to the different noise levels within the area analyzed is summarized in Table 4.13-11. These estimates, however, are for reference comparison of alternatives only. The noise level contours generated by the FHWA TNM have not been tested for accuracy beyond 396 m (1,300 ft). The locations of contours beyond this distance are projected estimates only and could vary significantly depending on existing background noise, atmospheric conditions, and substrate type. The noise levels shown within each contour interval, particularly those farthest from the proposed highway alignments, are likely to have only minimal, if any, effect on birds if background wind noise is prevalent (Jones & Stokes 2004).

Analysis of the total area of wildlife habitat that would be affected by highway noise in each noise contour interval showed an increase of between 42 percent and 61 percent in the 60+ dB impact area,

depending on the alternative; an increase of between 19 percent and 58 percent in the 55 to 60 dB area; and an increase of between 27 percent and 47 percent in the 50 to 55 dB area. The noise level interval of 45 to 50 dB shows slight decreases in the area affected within the analysis area (Jones & Stokes 2004).

Table 4.13-11 Acres of Wildlife Habitat Exposed to Noise under Build Alternatives

	Noise Level Interval (acres exposed to noise level)			
Alternative	>/= 60 dB	>/= 55 < 60 dB	>/= 50 < 55 dB	>/= 45 < 50 dB
No-Build (Existing Conditions)	6,908	5,632	8,438	26,551
Alternative A	10,501	7,848	10,726	25,333
Alternative B	11,124	8,884	12,462	25,582
Alternative C	9,814	8,041	11,669	25,298
Alternative E	10,670	6,686	11,985	25,057

Birds use vocal signals to communicate information on many aspects of their status and behavior that are important for survival, social cohesion, and reproductive success. Songs and calls function to identify the caller's species, sex, age (experienced adult vs. juvenile), territorial status, and motivational state (e.g., aggressive, submissive); to attract mates and repel rivals; to stimulate egg laying and synchronize hatching; to strengthen pair bonds; to signal change in domestic duties; to entice young to eat; and to warn of predators, maintain flock cohesion, and incite group mobbing action against intruders. Many species have complex vocal repertoires of songs and calls that can vary subtly in many ways, including frequency and timing of use, intensity (amplitude variation), and syntax (order of signal presentation). Clear transmission and reception of these signals and the subtleties of their variation are critical for maintaining the normal biological and ecological function of each species.

Highway noise typically is neither loud nor startling enough to cause marked stress effects on wildlife (Saigul-Klin et al. 1977). However, highway noise can mask important vocal communication and natural sounds important for mate attraction, social cohesion, predator avoidance, prey detection, navigation, and other basic behaviors. Masking of vocal communication occurs when highway noise interferes with signal transmission by swamping out the signal or parts of the signal (e.g., low-amplitude elements of a song) or degrading the signal to a point at which it is no longer recognizable to other members of a species. When such masking or degradation occurs, the normal communication and associated biological functions of the species can be impaired. Depending on the degree of masking and the particular species' capacity to adapt (e.g., to sing louder), masking can potentially result in abandonment of an area or reduced productivity and survival. Signal masking may result in the inability of males to effectively attract mates and/or repel territorial rivals. Excess energy may be required to physically maintain a territory and to sing louder. Predator warning and parent-offspring signals can be impaired. All these factors could potentially result in reduced survival and reproductive success of affected populations adjacent to the highway.

Traffic noise associated with all the build alternatives could potentially mask vocal communication among some birds. These masking effects are highly species-specific and depend largely on the unique bioacoustics characteristics of each species' vocal signals. The potential impact on American bitterns (*Botaurus lentiginosus*) represents the greatest distance for possible masking effects (4.8 km [3 mi]; see Appendix E of the wildlife technical memorandum), but this species is only a rare summer visitant to the GSLE that has not been observed in the project study area. Other species such as black-necked stilts (*Himantopus mexicanus*), which are common breeders within the project study area, would only be minimally affected by traffic noise close to the highway (76 m [250 ft]; see Appendix E of the wildlife

technical memorandum). For territorial songbirds such as Brewer's sparrows (*Spizella breweri*), noise would have a potential masking effect at intermediate distances. A detailed analysis of noise impacts on individual species is presented in the wildlife technical memorandum.

Potential Effects of Highway Noise on Species of Concern

Nine bird species of concern (bald eagle [*Haliaeetus leucocephalus*], Swainson's hawk [*Buteo swainsoni*], peregrine falcon [*Falco peregrinus*], prairie falcon [*Falco mexicanus*], burrowing owl [*Athene cunicularia*], short-eared owl [*Asio flammeus*], Wilson's phalarope [*Phalaropus tricolor*], bobolink [*Dolichonyx oryzivorus*], and American avocet [*Recurvirostra americana*]) are known to breed in or near the project study area.[5] The potential effects on these species of highway noise that would result from the build alternatives are described in detail in the wildlife technical memorandum. Based on a minimal vocal signal amplitude analysis, the potential effects distance of highway noise for bird species of concern could extend from less than 38 m (125 ft) to much greater than 915 m (3,000 ft) from the highway. For example, for male bobolinks to transmit their complete territorial song they would have to be farther than 900 m (2,953 ft) from the highway to enable un-masked transmission of minimal signals in those songs. Similarly, Wilson's phalaropes would need to be more than 600 m (1,968 ft) from the highway to ensure their low amplitude vocal signals could be transmitted to neighboring nesting phalaropes. Burrowing owls would need to be 305 m (1000 ft) or more from the highway to avoid noise masking of inter-territorial communication.

It is not known exactly how highway noise would affect the local density and reproductive capacity of individual species of concern currently using habitats in the project study area. Highly noise-sensitive species may leave the affected areas; others may experience reduced reproductive success due to poor communication or reduced ability to detect predators and potential prey. Published research on highway noise impacts on grassland bird species in acoustic habitat (Reijnen et al. 1995) similar to that found in the project study area shows reduced bird densities in response to traffic noise levels higher than 45 dB(A). Using 45-dB(A) as an outward-limit benchmark of effects, the area potentially affected by noise from the proposed action could extend on average 4 km (2.5 mi) from the highway (Jones & Stokes 2004).

4.13.3.11 Human Disturbance

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, there would be no project-related change in the level of human disturbance in the project study area.

Future Conditions (2020)

If none of the build alternatives is implemented, proposed future development could increase the level of human disturbance in the project study area, although the nature and extent of such effects are not known at this time.

[5] Table 4.13-1 above lists the special-status species known to occur or potentially occurring in the project study area. Section 4.15, *Threatened and Endangered Species*, further discusses impacts on species listed, proposed for listing, or candidates for listing, under the federal Endangered Species Act, and species listed on the Utah Sensitive Species List as wildlife species of concern.

Build Alternatives

Access of humans and domestic pets (especially cats) to wildlife habitats adjacent to the highway could result in some level of habitat degradation and wildlife mortality. The existing design for the Legacy Parkway project includes three fences that would restrict access to sensitive wildlife areas and should minimize these effects. Localized disturbance from human use of the proposed trail corridor is also possible, but such adverse effects would likely be secondary to traffic noise effects. Alternative B, which crosses the largest extent of wetland habitats (Figure 4.13-4), would probably cause the greatest wildlife disturbance, particularly when the lake level is high. Because Alternatives A and E are located in more upland alignments than Alternatives B and C, they would probably disturb wildlife to a lesser extent. However, many wildlife species, particularly shorebirds, use these upland areas. Fencing of the highway right-of-way and protection of the Legacy Nature Preserve would reduce human impacts under all build alternatives.

4.13.3.12 Potential Effects on Species of Concern

As described in Section 4.13.2.3, *Existing Wildlife in Project Study Area*, several species analyzed in this section are protected under one or more federal or state wildlife protection law (e.g, the federal Endangered Species Act, the Migratory Bird Treaty Act, the Fish and Wildlife Conservation Act, Utah Administrative Rule R657-48). Table 4.13-2 summarizes the seasonal occurrence and abundance, migratory and breeding status, and habitat use patterns of these species within the GSLE and the project study area. This information is also described in more detail in the wildlife technical memorandum.

No-Build Alternative

Existing Conditions

Under the existing conditions No-Build Alternative, there would be no project-related impacts on special-status species. Habitat use and seasonal occurrence of special-status species in the study area would remain similar to that represented in Table 4.13-2.

Future Conditions (2020)

As described in Section 4.13.3.1, even without construction of Legacy Parkway, reasonably foreseeable future land use changes would add to the historic loss of wildlife habitat. Table 4.13-6 illustrates the potential impact of future development on wetland/wildlife habitat, both with and without the proposed build alternatives. Future losses of wildlife habitat would likely adversely affect special-status species in the study area, although the relative extent is not known.

Build Alternatives

The principal potential effects on wildlife species of concern would be similar under all the build alternatives (Jones & Stokes 2004). These effects could include direct loss of foraging habitat, disturbance of nesting sites, and masking of vocal communication near the highway. The magnitude of these effects would be proportional to the level that individual species use each habitat. The effects of the build alternatives on these species are directly related to the amount of direct habitat loss. The project could result in a reduction in population of some species of concern within the project study area, but the overall impact of these losses alone would not affect the long-term viability of any of these species in the GSLE.

The following discussion provides information on how the proposed action could affect habitats for species of concern, based on input received from USFWS, EPA, and Utah Department of Natural Resources (UDNR), Division of Wildlife Resources (UDWR). The information presented below and correspondence from USFWS (letter dated December 3, 2003) reaffirms the terms and conditions in the original biological opinion (BO), formal Section 7 consultation under the federal Endangered Species Act (ESA) for the Legacy Parkway project (U.S. Fish and Wildlife Service 2003b). Projected losses of individual habitats under each build alternative are presented in Table 4.13-6. These effects are summarized below; more detailed analyses are presented in the wildlife technical memorandum. Effects on species listed, proposed for listing, or candidates for listing under the federal ESA and wildlife species of special concern on the Utah Sensitive Species List are further discussed in Section 4.15, *Threatened and Endangered Species*.

Federally Listed Species

Bald Eagle (Status: Threatened)

Breeding. One active nest exists in an artificial nesting structure on state-owned land within about 1.6 km (1 mi) of the project study area. This is the only known nesting location in northern Utah, and one of only four known in the state (Utah Division of Wildlife Resources 2002). This nest is within about 1 km (0.6 mi) of a regularly traveled country road, and the nesting pair is accustomed to some degree of human noise and disturbance (U.S. Fish and Wildlife Service 1999a). If this nest is active in the future, the pair could experience some noise disturbance from construction and operation of the Legacy Parkway project. Such disturbance could result in temporary or permanent abandonment of the site by the nesting eagles, resulting in a loss of productivity of up to two eggs or young per year during the construction period, and possibly during operation (if the nest site is abandoned permanently) (U.S. Fish and Wildlife Service 1999a). However, many raptor species nest in close proximity to highways, and they appear to habituate to highway noise. The actual effects of highway noise on this nesting pair cannot be determined without onsite analysis, but the effects are expected to be similar under all build alternatives.

Raptors are often killed as a result of collisions with moving vehicles. Bald eagles often forage on carrion, and they may be attracted to highway corridors to forage on carcasses of mule deer and other large mammals and birds. The Legacy Parkway project could provide an additional source of carrion and could increase the potential for bald eagle collisions with vehicles, especially for inexperienced juvenile birds. Raptor mortality along roadways in Utah is not well documented, but 15 eagles were reported killed in Carbon and Emery Counties in 1996 and 1997, probably due to collisions with coal trucks (U.S. Fish and Wildlife Service 1999a). Direct mortality effects on bald eagles would likely be the same under all build alternatives.

Wintering. Bald eagles are common winter visitors to the project study area. Four active roost sites exist near the project study area at distances of 2.3 km (1.4 mi), 2.1 km (1.3 mi), 1.6 km (1.0 mi), and 0.2 km (0.1 mi). Some of these roost sites could be disturbed or abandoned during construction of any build alternative. The roost site within 1 km (0.6 mi) of the project study area would be the most likely to be adversely affected (U.S. Fish and Wildlife Service 1999a).

In the project study area, bald eagles primarily forage in the following habitats: emergent marsh, wet meadow, mudflat/pickleweed, pasture, and salt desert scrub. All the build alternatives would result in direct loss and fragmentation of suitable bald eagle foraging habitat. Alternative A would result in 184.6 ha (456.2 ac) of habitat loss; Alternative B in 235.7 ha (582.4 ac); Alternative C in 207.1 ha (511.8 ac); and Alternative E in 190.8 ha (471.5 ac). These direct habitat losses would contribute to the marked cumulative reduction of foraging habitat for this species in the project study area. However, according to the regional land use dataset analysis (Table 4.13-6), these losses would affect less than 0.11 percent of

the overall extent of these habitats in the regional study area. As described above, wintering bald eagles scavaging road-kill along the highway would also be subject to increased potential road mortality from collisions with vehicles.

Federally Delisted Species

Peregrine Falcon

Breeding. Two nesting eyries exist in the project study area in abandoned Common Raven nests on 340 kV electric power transmission support towers; the same nesting pair uses both nests (U.S. Fish and Wildlife Service 1999a). This nesting pair is accustomed to some disturbance because their eyries are within 1.6 km (1 mi) of I-15 and within 0.2 km (0.1 mi) of a dike that supports a well-traveled, unsurfaced road in the FBWMA (U.S. Fish and Wildlife Service 1999a).

Raptors may be killed by collisions with moving vehicles. Peregrine falcons may forage for bird prey along highway corridors. The overall proximity of the Legacy Parkway project to the existing eyries increases the potential for peregrine falcon collisions with vehicles, especially for inexperienced juvenile birds (U.S. Fish and Wildlife Service 1999a). Direct mortality effects on peregrine falcons would probably be the same under all build alternatives.

Wintering. In winter, peregrine falcons from northern breeding populations are rare transients in the GSLE (U.S. Fish and Wildlife Service 1999a). They primarily forage in the following habitats in the project study area: emergent marsh, wet meadow, mudflat/pickleweed, pasture, salt desert scrub, and developed areas. All build alternatives would result in direct loss and fragmentation of suitable wetland and upland peregrine falcon foraging habitat at the same levels as those described above for bald eagle.

Wintering peregrine falcons forage over large areas and are not dependent on individual habitat patches that may be lost during highway construction. Regional growth projected to occur could lead to further loss and fragmentation of existing peregrine falcon foraging areas. Direct impacts of the Legacy Parkway project would affect less than 0.11 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). These losses would contribute to the overall cumulative reduction of suitable foraging habitat for this species in this area.

Federal Candidate Species

Yellow-Billed Cuckoo

Yellow-billed cuckoos (*Coccyzus americanus*) are rare migrants in the GSLE; they have low potential to occur in the project study area because of limited suitable riparian breeding habitat (Table 4.13-2). Recent surveys of riparian habitats in the project region recorded only three yellow-billed cuckoos during 7,000 survey hours (E. Owens, cited in U.S. Fish and Wildlife Service 2002). Recent documentation of a yellow-billed cuckoo in a peregrine falcon nest in Salt Lake City, however, suggests that this species still migrates through the GSLE and all remnant riparian habitats, including those available in the project study area, could potentially provide suitable roosting and foraging habitat for yellow-billed cuckoos. All build alternatives would result in direct loss of less than 2.3 ha (5.6 ac) of riparian habitat (Figure 4.13-6). Howe (1986 in Hughes 1999) reported densities of yellow-billed cuckoo in appropriate habitat in New Mexico ranging from 1 to 15 pairs per ha (0.4 to 6.1 pairs per acre). In suitable habitat, the area lost to construction of the proposed action could potentially support one to several pairs of yellow-billed cuckoos. However, the riparian habitats in the project study area, which include areas of sparsely distributed Russian olive trees (*Elaeagnus angustifolius*), is generally degraded and of low suitability for this species. As indicated by the low number of birds detected in regional surveys mentioned above, the

affected area is not likely to provide good habitat for this species. The habitat losses caused by the proposed action are unlikely to have any adverse effects on this rare transient species.

Conservation Agreement Species

Northern Goshawk

Northern goshawks (*Accipiter gentiles)* have not been observed in the project study area. However, some studies on the seasonal movement and habitat use patterns suggest that goshawks could potentially use this area during the winter. Moreover, the project study area supports prey species that could sustain wintering individuals that move through the GSLE. The few wintering individuals that may occur in this region probably range over a large area with a variety of grassland and shrubland habitats. Direct habitat loss under any build alternative would not likely affect this species.

U.S. Fish and Wildlife Service Birds of Conservation Concern

Swainson's Hawk

Swainson's hawks are considered rare summer breeders in the project study area, where they have been known to nest in riparian habitat. They have been observed in the areas delineated by the proposed Legacy Parkway rights-of-way. Favorable foraging conditions are common in the agricultural areas (primarily alfalfa) in and adjacent to the project study area; other crops, such as sod, corn, and wheat, also provide foraging habitat. Alternatives A and E would result in direct loss of 1.6 ha (3.9 ac) of riparian habitat, Alternative B in the loss of 2.3 ha (5.6 ac), and Alternative C in the loss of 2.0 ha (4.9 ac) (Figure 4.13-6).

Reported nesting densities for Swainson's hawks in areas with either a mixture of native habitat and agriculture or a high diversity of irrigated crops include 30.23 pairs/100 km^2 (0.001 pair/ac) in central California (England et al. 1995 in England et al. 1997); 23.1 pairs/100 km^2 (0.0009 pairs/ac) in Hanna, Alberta (Schmutz 1987); 18.0 pairs/100 km^2 (0.0007 pairs/ac) in Kindersley, Saskatchewan (Houston in England et al. 1997); and 9.5 pairs/100 km^2 (0.0003 pairs/ac) in Los Medanos, New Mexico (Bednarz et al. 1990). In northeastern California, the overall density of Swainson's hawk territories was 20 pairs/100 km^2 (0.0008 pairs/acre), but varied from 5.7 pairs/100 km^2 (0.0002 pairs/ac) in irrigated pasture to 36.8 pairs/100 km^2 (0.0014 pairs/ac) in areas dominated by alfalfa (Woodbridge et al. 1995a in England et al. 1997). These data indicate that the riparian area that would be lost under any build alternative would support at most only one pair of Swainson's hawk. Site-specific surveys would be necessary prior to construction to determine if any active Swainson's hawk nest is present within the project study area and whether any build alternative would disturb that nest.

All the build alternatives would also result in a direct loss of foraging habitat for this species. Alternative A would result in 55.6 ha (137.4 ac) of cropland habitat loss; Alternative B in 101.1 ha (249.8 ac]); Alternative C in 48.4 ha (119.6 ac); and Alternative E in 52.9 ha (130.7 ac). Based on radiotelemetry survey data in central California, Swainson's hawks forage over areas ranging between 325 ha (800 ac) and 8,500 ha (21,000 ac) (approx. average 2,750 ha [6,800 ac]; Estep pers. comm. 2004). The foraging area that would be lost under each build alternative would comprise approximately 0.6 to 31 percent of the foraging range of a single pair, depending on the available habitat in the project study area. Loss of this habitat would result in that pair shifting to new foraging areas in the GSLE. The Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6).

Ferruginous Hawk

Ferruginous hawks (*Buteo regalis)* have not been observed in the project study area but could potentially occur there while moving in or through the GSLE. Suitable habitats in the project study area include wet meadow, mudflat/pickleweed, pasture cropland, and salt desert scrub. Ferruginous hawks could possibly occur in the same habitats as Swainson's hawks and would experience similar loss of foraging habitat under all the build alternatives. Although the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6), they would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Golden Eagle

Golden eagles (*Aquila chrysaetos*) are rare permanent residents of the GSLE and rare transients in the project study area. Their preferred foraging habitats in the GSLE could include wet meadow, pasture, cropland, and salt desert scrub habitats. All the build alternatives would result in the direct loss of foraging habitat. Alternative A would result in 228.8 ha (565.4 ac) of habitat loss; Alternative B in 309.5 ha (764.8 ac); Alternative C in 234.8 ha (580.2 ac); and Alternative (E) in 226.9 ha (560.7 ac). In the western United States, golden eagles forage over home ranges that average 20 to 33 km^2 (2,000 to 3,300 ha [4,942 to 8,154 ac]) (Kochert et al. 2002). Resident pairs tend to maintain home ranges year-round, with shifts in intensity of use from breeding season to winter (Dunstan et al. 1978 in Kochert et al. 2002; Marzluff et al. 1997 in Kochert et al. 2002). Individuals do not use all areas within their home range equally, but concentrate activity within core areas (Platt 1984 in Kochert et al. 2002; Marzluff et al. 1997 in Kochert et al. 2002). In southwestern Idaho, core area contained 95 percent of locations of radio-tagged eagles, but only 14.4 percent of the breeding-season range and 25.3 percent of the non-breeding range (Marzluff et al. 1997 in Kochert et al. 2002). The low frequency of golden eagle occurrences in the project study area suggests that the birds that use this area are either residents with core territory areas elsewhere in the GSLE or are migrants moving through the area. The direct impacts of the Legacy Parkway project could affect 6.8 to 15.4 percent of one golden eagle home range, depending on its actual size, or small portions of several territories if they overlap. These impacts would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). The proposed action would not affect the long-term viability of this species within the GSLE but would contribute to the ongoing local and regional cumulative reduction of suitable foraging habitat for this species.

Prairie Falcon

Prairie falcons are rare permanent residents and breeders in the GSLE. They are occasionally seen foraging in the project study area, but they do not breed there (Table 4.13-1). Habitats most likely to be used by this species in the project study area are emergent marsh, wet meadow, mudflat/pickleweed, pasture, cropland, and salt desert scrub. All the build alternatives would result in the direct loss of foraging habitat for this species. Alternative A would result in 240.2 ha (593.5 ac) of habitat loss; Alternative B in 336.6 ha (831.8 ac); Alternative C in 255.5 ha (631.4 ac); and Alternative E in 243.7 ha (602.2 ac). The estimated home range of this species in southwestern Idaho is 108 to 315 km^2 (10,800 to 31,500 ha [26,690 to 77,840 ac]) (Dunstan et al. 1978 in Kochert et al. 2002; Marzluff et al. 1997 in Kochert et al. 2002). The direct impacts of the Legacy Parkway project could affect 0.7 to 3.1 percent of one prairie falcon home range, depending on its actual size and overlap with the project study area. For any alternative, this area would comprise less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). The proposed action would not affect the long-term viability of this species within the GSLE, but would contribute to the ongoing local and regional cumulative reduction of suitable foraging habitat for this species.

American Golden-Plover

American golden-plovers (*Pluvialis dominica*) are rare migrants through the GSLE and have not been observed in the project study area (Table 4.13-1). However, they could occur in the project study area during migration, where they may occasionally forage in pasture, cropland, mudflat/pickleweed, and wet meadow habitats. All the build alternatives would result in direct loss of foraging habitats for this species. Alternative A would result in 170.9 ha (422.3 ac) of habitat loss; Alternative B in 277.7 ha (686.2 ac); Alternative C in 178.4 ha (440.8ac); and Alternative E in 150.5 ha (371.9 ac). The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6), but they would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Snowy Plover

Snowy plovers (*Charadrius alexandrinus*) are common breeders in the GSLE, but they have not been observed in the project study area (Table 4.13-1). Their preferred breeding and foraging habitats (salt flats and mudflat/pickleweed habitats) are minor components of the project study area. Because salt flats are relatively abundant in the GSLE, the local snowy plover population is unlikely to be adversely affected by the loss of 2.5 to 12.9 ha (6.4 to 31.9 ac) of mudflat/pickleweed habitat. The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6), but they would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

American Avocet

American avocets occur regularly in the project study area (Table 4.13-1). In the project study area avocets nest in emergent marsh, wet meadow, mudflat/pickleweed, and pasture habitats. Foraging habitat is a minor component of the project study area. All the build alternatives would result in the direct loss of foraging habitats for this species. Alternative A would result in 6.4 ha (15.8 ac) of habitat loss; Alternative B in 18.2 ha (45.0 ac); Alternative C in 16.8 ha (41.5 ac); and Alternative E in 13.8 ha (34.1 ac). The breeding density of American avocets in northern Utah has been estimated to be 16 to 28 pairs/ha (6 to 11 pairs/ac). If all the habitat area lost from construction of the proposed action were suitable for nesting, Alternative A would result in the direct loss of nesting habitat for 102 to 179 pairs; Alternative B in the loss of habitat for 291 to 510 pairs, Alternative C in the loss of habitat for 269 to 470 pairs, and Alternative E in the loss of habitat for 221 to 386 pairs. However, because of the extensive distribution of suitable breeding habitat throughout the GSLE, the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats (Table 4.13-6). Accordingly, the maximum loss of breeding habitat from any alternative (i.e., 510 pairs under Alternative B) would affect only approximately 1.9 percent of the estimated 53,000 breeding American avocets in the regional study area (Paul et al. 1998b in Robinson et al. 1997). The loss of habitat resulting from any build alternative would reduce the local density of breeding birds within the project study area but would not notably affect the long-term viability of American avocets in the GSLE. The project would, however, contribute to the ongoing marked cumulative loss of breeding habitat for this species throughout the region.

Solitary Sandpiper

Solitary sandpipers (*Tringa solitaria*) have not been observed in the project study area (Table 4.13-1). Patton et al. (1992 in Moskoff 1995) reported only 19 records of this species visiting Great Salt Lake; Point Reyes Bird Observatory (1995 in Moskoff 1995) recorded only three occurrences during fall migration in 1994 and 1995. Although they are unlikely to occur in the project study area in any given year, individuals may occasionally forage in emergent wetlands, shallow streams, and pools within riparian corridors, mudflat/pickleweed, and wet meadow habitats. All the build alternatives would result

in the direct loss of foraging habitats for this species. Alternative A would result in 40.5 ha (100.1 ac) of habitat loss; Alternative B in 68.8 ha (170.0 ac); Alternative C in 59.3 ha (146.5 ac); and Alternative (E) in 45.1 ha (111.4 ac). The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). Because of the low frequency of use of the project study area by solitary sandpipers, it is unlikely that loss of foraging habitat resulting from any build alternative would affect the long-term viability of this species in the GSLE, but such loss would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Whimbrel

Whimbrels (*Numenius phaeopus*) are rare transients in the GSLE and have not been observed in the project study area (Table 4.13-1). Although they are unlikely to occur in the project study area in any given year, individuals may occasionally forage in pasture, cropland, mudflat/pickleweed, and wet meadow habitats. All the build alternatives would result in the direct loss of foraging habitats for this species. Alternative A would result in 175.5 ha (434.2 ac) of habitat loss; Alternative B in 277.7 ha (686.2 ac); Alternative C in 178.4 ha (440.8 ac); and Alternative E in 174.5 ha (431.2 ac). The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). Because of the low frequency of use of the project study area by whimbrels, it is unlikely that loss of foraging habitat resulting from any build alternative would affect the long-term viability of this species in the GSLE, but such loss would contribute to the ongoing local and regional cumulative reduction of foraging habitat for this species.

Long-Billed Curlew

Although breeding long-billed curlews (*Numenius americanus*) have not been observed in the project study area, occurrences of migrants have been documented (Table 4.13-1). They may forage in wet meadows, mudflat/pickleweed, and areas within salt desert scrub habitat. All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in 60.4 ha (149.3 ac) of habitat loss; Alternative B in 86.0 ha (212.5 ac); and Alternative C in 118.8 ha (293.6 ac); and Alternative E in 92.3 ha (228.1 ac). The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). As with other transient shorebirds that use the project study area, it is unlikely that loss of foraging habitat resulting from any build alternative would affect the long-term viability of long-billed curlews in the GSLE, but such loss would contribute to the ongoing local and regional cumulative reduction of foraging habitat for this species.

Marbled Godwit

Marbled godwits (*Limosa fedoa*) are rare migrants in the project study area (Table 4.13-1). They forage in mudflat/pickleweed, shallow open water, cropland, pasture, and wet meadow habitats. All the build alternatives would result in the direct loss of foraging habitats for this species. Alternative A would result in 174.8 ha (431.9 ac) of habitat loss; Alternative B in 288.4 ha (712.7 ac); Alternative C in 182.3 ha (450.5 ac); and Alternative E in 181.7 ha (563.7 ac). The habitat losses associated with all alternatives, however, would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). This change would result in local loss of foraging habitat for this species in the project study area; it would not affect the long-term viability of this species in the GSLE, but it would contribute to the ongoing regional cumulative reduction of suitable foraging habitat for this species.

Sanderling

Sanderlings (*Calidris alba*) have not been observed in the project study area (Table 4.13-1), but could occasionally use the area. Because their foraging habitat (mudflat/pickleweed) is a minor component of the project study area and this habitat is relatively abundant in the regional study area, sanderlings are unlikely to be adversely affected by the loss of 2.5 to 12.9 ha (6.4 to 31.9 ac) of habitat. The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6), but they would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Wilson's Phalarope

Wilson's phalaropes are rare breeders and uncommon migrants in the project study area (Table 4.13-1). They nest in wet meadow habitat and forage there and in open water, emergent marsh, and mudflat/pickleweed habitats. All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in loss of 27.5 ha (68 ac) of breeding habitat loss; Alternative B in 39.1 ha (96.8 ac); Alternative C in 35.6 ha (90.4 ac); and Alternative E in 26.7 ha (66.1 ac). Very little information is available on nesting densities of this species. Estimated nest densities in an ephemeral wetland in Saskatchewan varied between 0 and 1.1 breeding pairs/ha (0.445 pairs/ac) and between 0.55 and 1.1 pairs/ha (0.22 and 0.44 pairs/ac) in a permanent wetland (Colwell and Jehl 1994). Assuming that wet meadow habitat in the project study area is wet during the breeding season, Alternative A would result in potential loss of habitat for 15.1 to 30.2 pairs; Alternative B in the loss of habitat for 53.2 to 106.5 pairs; Alternative C in the loss of habitat for 49.7 to 99.4 pairs; and Alternative E in the loss of habitat for 14.6 to 29.4 pairs. The impact of the proposed action on the regional population of Wilson's Phalaropes within the GSLE, however, would be small. In July, the Wilson's phalarope staging population at Great Salt Lake frequently represents more than a third of the world's population, varying between 54,000 (1984) and 603,333 (1991) individuals (Aldrich and Paul 2002). A large portion of these birds breed in the regional study area. On a regional scale, the wet meadow habitat in the project study area comprises only 0.052 to 0.88 percent of the potential breeding habitat available to Wilson's phalaropes within the regional study area (Table 4.13-6).

Alternative A would result in 42.8 ha (105.8 ac) of foraging habitat loss; Alternative B in 77.2 ha (190.8 ac); Alternative C in 61.2 ha (151.2 ac); and Alternative E in 50.7 ha (125.3 ac). Because Wilson's phalaropes are highly gregarious and social throughout the year, they often concentrate in large numbers while foraging. These foraging habitat losses would likely result in notable shifts of foraging areas for local populations of birds using the project study area. However, on a regional level, the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of Wilson phalarope foraging habitats in the regional study area (Table 4.13-6). However, these losses would contribute to the marked cumulative reduction of suitable foraging habitat.

Burrowing Owl

Burrowing owls have been observed in the project study area (Table 4.13-1), where suitable habitats include dry mudflat/pickleweed, pasture, cropland, salt desert scrub, urban fields, and freeway right-of-way. They nest in crevices and burrows, especially those excavated by red fox and badgers. They breed and forage primarily in pasture, salt desert scrub, and cropland (along edges) habitats as well as on dikes and islands in water impoundments. All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in 203.8 ha (503.6 ac) of habitat loss; Alternative B in 277.8 ha (686.5 ac); Alternative C in 211.1 ha (521.6 ac); and Alternative E in 206.8 ha (511.0 ac). Radiotelemetry studies of burrowing owl movement patterns in central Saskatchewan showed that home range size varied from 0.14 to 4.81 km^2 (14 to 48.1 ha [34.6 to 118.9 ac]). Assuming similar spatial requirements for burrowing owls in the regional study area, Alternative A would remove habitat

sufficient to support 10.5 to 36 pairs, Alternative B would remove habitat for 14.3 to 49 pairs, Alternative C would remove habitat for 4.4 to 15 pairs, and Alternative E would remove habitat for 4.3–14 pairs. The population size of burrowing owls in the regional study area is unknown, but the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of suitable habitats in the regional study area (Table 4.13-6). Such losses would contribute to a marked cumulative reduction of suitable foraging habitat for this species in the area.

This species is generally declining in many areas throughout the western U.S. (Haug et al. 1993). Vehicle collision is a major source of mortality. If the proposed action were to traverse existing burrowing owl habitat, road mortality would likely increase. Moreover, highway alignments can provide travel corridors for a variety of native and nonnative predators, including introduced foxes, which can have severe local effects on burrowing owl populations.

Loggerhead Shrike

Loggerhead shrikes (*Lanius ludovicianus*) are uncommon year-round residents in the GSLE and have not been observed in the project study area (Table 4.13-1). Suitable habitats in the project study area include riparian corridors, pasture, salt desert scrub, and developed areas (urban landscaping). All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in 147.6 ha (364.7 ac) of habitat loss; Alternative B in 171.5 ha (423.8 ac); Alternative C in 151.8 ha (375.1 ac); and Alternative E in 148.9 ha (367.9 ac). Reported territory sizes of loggerhead shrikes vary from 4.6 to 25 ha (10.4 to 62 ac) (Yosef 1996). Assuming comparable territory sizes in the regional study area, Alternative A would remove habitat sufficient to support 6 to 32 territories; Alternative B would remove habitat for 6.9-37.3 territories, Alternative C would remove habitat for 6-33 territories, and Alternative E would remove habitat for 6-32 territories. The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6) and would not affect the long-term viability of this species in the GSLE. However, such impacts would contribute to the marked ongoing cumulative reduction of suitable foraging habitat for this species.

Virginia's Warbler

Virginia's warblers (*Vermivora virginiae*) have not been observed in the project study area (Table 4.13 1). They are found during migration in riparian and some scrub (with large, tall shrubs) habitats that have high densities of insects. Potential habitat in the project study area includes riparian corridors, salt desert scrub, and urban shrub (developed). Virginia's warblers have low potential to occur in the project study area because of the limited extent of riparian habitat and the low stature of the shrubs in the salt desert scrub habitat (Table 4.13-1). All the build alternatives would result in direct losses of less than 2.3 ha (5.6 ac) of suitable habitat; these losses are unlikely to have any adverse effects on this species.

Brewer's Sparrow

Brewer's sparrows are rare summer visitants in the project study area (Table 4.13-1). They breed in shrub steppe habitats and are found during migration in riparian and scrub habitats. Suitable habitats within the project study area include riparian, wet meadow, mudflat/pickleweed, pasture, cropland, salt desert scrub, and urban shrub (developed). All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in 232.9 ha (575.5 ac) of habitat loss; Alternative B in 319.3 ha (789.0 ac); Alternative C in 249.7 ha (617.0 ac); and Alternative E in 235.1 ha (580.9 ac). Breeding season densities of Brewer's Sparrows can be highly variable between years, ranging from 50 to 350 individuals/km^2 (0.5 to 3.5 individuals/ha [0.2 to 1.4 individuals/ac]) (Weins and Rottenberry 1985 in Rottenberry et al. 1999) in southeast Oregon. In southeast Idaho, densities ranged from 116 to 192 individuals/km^2 (1.16 to 1.92/ha [0.47 to 0.78/ac]) (Oetersin and Best 1897 in

Rottenberry et al. 1999); and in central Oregon, densities ranged from 111 to 277 individuals/km^2 (1.11 to 2.77/ha [0.45 to 1.12/ac]) (Rottenberry et al. 1999). Assuming an approximate density of 2.47 individuals/ha [1 individual/ac] for populations in the project study area, the habitat losses listed above could theoretically result in loss of habitat sufficient to support 580 to 789 brewer's sparrows. However, the existing habitat in the project study area is not sufficient to support such a density of birds. Moreover, because this species has been documented only as a rare summer visitant, these estimates are clearly extreme. Accordingly, the proposed action would likely have only a small effect on this species.

Additionally, the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-7). The proposed action would therefore not affect the long-term viability of this species in the GSLE. It would, however, contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

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American White Pelican

American white pelicans (*Pelecanus erythrorhynchus*) are rare summer visitants to the project study area (Table 4.13-1). All the build alternatives would result in the direct loss of small areas of potential foraging habitat (i.e., open water) for this species. Alternative A would result in 3.9 ha (9.6 ac) of habitat loss; Alternative B in 10.7 ha (26.4 ac); Alternative C in 3.9 ha (9.6 ac); and Alternative E in 7.2 ha (17.8 ac). The direct impacts of the Legacy Parkway project would be minimal on this species, affecting less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). However, these changes would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Short-Eared Owl

Short-eared owls are uncommon breeders in the project study area (Table 4.13-1). In the project study area, they are likely to be found in emergent marsh, wet meadow, mudflat/pickleweed, pasture, cropland, and salt desert scrub habitats. All the build alternatives would result in the direct loss of breeding and foraging habitats for this species. Alternative A would result in 240.2 ha (593.5 ac) of habitat loss; Alternative B in 336.8 ha (832.2 ac); Alternative C in 255.5 ha (631.4 ac), and Alternative E in 243.7 ha (602.2 ac). This species exhibits considerable variation in the size of breeding territories (Holt and Leasure 1993); territories range from 20 to 121 ha/pair (49 to 299 ac/pair) in North American populations (Holt and Leasure 1993). If short-eared owls in the GSLE exhibit the same range, the proposed action would potentially result in loss of habitat sufficient to support 2 to 16 breeding pairs of short-eared owls. Sighting records in the project area suggest that the number of owls that would be affected by the proposed action would fall near the lower end of this range. The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6). The proposed action is not likely to affect the long-term viability of this species within the GSLE, but it would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

Bobolink

Bobolinks have occasionally been observed in agricultural fields at the northern end of the project study area near the FBWMA (Table 4.13-1). All the build alternatives could result in the direct loss of some breeding and foraging habitats for this species, but the amount of habitat is unknown. Site-specific preconstruction surveys would be necessary to determine whether any build alternative could disturb active bobolink nests (Federal Highway Administration et al. 2000).

Grasshopper Sparrow

Grasshopper sparrows (*Ammodramus savannarum*) have not been documented in the project study area, but could potentially occur there. Because of this status, the potential impact of the proposed action on this species would be small or nonexistent. Site-specific preconstruction surveys would be necessary to determine whether any build alternative could disturb active grasshopper sparrow nests (Federal Highway Administration et al. 2000).

Preble's Shrew

Because habitats similar to those supporting Preble's shrews (*Sorex preblei*) are present, the species may occur in wet meadow habitat in the project study area. All the build alternatives would affect such habitat. Alternative A would result in 27.5 ha (68.0 ac) of habitat loss; Alternative B in 39.2 ha (96.9 ac); Alternative C in 36.6 ha (90.4 ac); and Alternative (E) in 26.7 ha (66.0 ac). Because no information is currently available on the density of this species in different habitats, it was impossible to estimate the number of shrews that could potentially be affected by the proposed action. However, the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of habitats potentially suitable for Preble's shrew in the regional study area (Table 4.13-6).

Spotted Bat

Like many species of arid-land bats, spotted bats (*Euderma maculatum*) take their insect prey on the wing. For this reason, these aerial foragers are not tied to any specific habitats in the project study area, and direct habitat losses probably would not have any adverse effects on this species. Spotted bats could benefit from the artificial lighting that is proposed under all the build alternatives because the lighting would attract and concentrate aerial insects, potentially reducing the energetic costs of foraging for some individuals.

Townsend's Big-Eared Bat

While no studies have been conducted, it is likely that Townsend's big-eared bats (*Plecotus townsendii*) frequents suitable foraging habitat around the lake, including the project study area. Like many species of arid-land bats, Townsend's big-eared bats take their insect prey on the wing. For this reason, these aerial foragers are not tied to any specific habitats in the project study area, and direct habitat losses would probably not have any adverse effects on this species. Townsend's big-eared bats could benefit from the artificial lighting that is proposed under all the build alternatives because the lighting would attract and concentrate aerial insects, potentially reducing the energetic costs of foraging for some individuals.

Kit Fox

Great Salt Lake is located on the northeastern edge of the known distribution of kit fox (*Vulpes macrotis*) (Zevellof and Collett 1988). Kit foxes are found throughout Utah in desert and semiarid regions with flat shrub or shrub-grass communities with little ground cover. Where these foxes occur in the Great Basin, shadscale, greasewood, and sagebrush communities are common. Major prey items include desert rodents, jackrabbits, cottontail rabbits, groundnesting birds, reptiles, and insects.

Due to limited suitable habitat along the Wasatch Mountains in the vicinity of the project study area, kit foxes are considered extremely rare and have a low probability of occurring there. If they do occur in the project study area, they are most likely to frequent salt desert scrub habitats. All the build alternatives could result in the direct loss of suitable habitat for this species. Alternative A would result in 60.4 ha (149.3 ac) of habitat loss; Alternative B in 39.3 ha (97.1 ac); Alternative C in 69.3 ha (171.2 ac); and Alternative E in 59.0 ha (145.8 ac). The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area (Table 4.13-6), but the

Legacy Parkway project would contribute to the local and regional cumulative reduction of suitable foraging habitat for this species.

4.13.3.13 Cumulative Impacts

Historic land use changes within the GSLE have significantly reduced available wildlife habitat for migratory birds and other species, both around Great Salt Lake and within the project study area, as described in the bullet items below.

- An estimated 58 percent of historic wetland/wildlife habitat in the GSLE (159,439ha [393,980 ac] of 274,633 ha [678,630 ac]) has been lost to past activities, primarily due to agriculture and urban development.

- In the Ogden and Jordan River hydrologic units combined, where the proposed action is located, approximately 66 percent of historic wetland/wildlife habitat (57,374.13 ha [141,774 ac] of 86,664 ha [214,150 ac]) has been lost.

Reasonably foreseeable future habitat loss, including that attributable to the proposed build alternatives, is summarized in Section 4.13.3.1, and explained in detail in the wildlife technical memorandum. All the proposed build alternatives would have adverse direct and indirect effects and contribute to cumulative effects on local wildlife populations, including migratory birds. These adverse effects could potentially contribute to declines in the local numbers of affected species. In addition, traffic noise could potentially affect the behavior and reproductive capacity of various migratory bird species within the project study area and vicinity.

Although any proposed build alternative would contribute to cumulative effects on wildlife habitat loss, the area of wildlife habitat affected by direct habitat loss is small—approximately 0.1 percent of the total amount of wildlife habitat available throughout the regional study area. Highway noise effects would affect a larger area, approximately 1.3 percent of existing wildlife habitat in the regional study area. Loss or degradation of these areas and biological functions (reproductive capacity of birds affected by noise) would add to the cumulative historic and foreseeable future habitat loss and associated impacts on wildlife in the GSLE. These impacts alone, however, would not likely affect the long-term viability of any wildlife species in the GSLE.

4.13.3.14 Mitigation Measures

This section provides a description of mitigation measures to compensate for wildlife impacts that would result from implementation of the proposed action. The Final EIS proposed 632 ha (1,568 ac) of compensatory mitigation for these impacts in the form of a Legacy Nature Preserve (Preserve). This Preserve would offset historic and future cumulative impacts through restoration and preservation of wildlife habitat within the project study area. The total mitigation area of the Preserve currently proposed by UDOT and approved by the Corps and FHWA is 849 ha (2,098 ac). This includes 315 ha (778 ac) of wetland/riparian habitat (i.e., emergent marsh, mudflat/pickleweed, open water, riparian, and wet meadow habitats), 532 ha (1,315 ac) of upland habitat (i.e., croplands, pasture, and scrub habitats), and 2 ha (5 ac) of developed land.

The total amount of land designated for the Preserve mitigation (see Section 4.12, *Wetlands*) was determined in three stages. In the first stage, 506 ha (1,251 ac) were identified as suitable mitigation during the preparation of the Draft EIS. It was based on the amount of land needed to mitigate the loss of

wetland function and wildlife habitat based on the analysis using the wetland functional assessment models, as well as on an evaluation of wildlife habitat needs. During the preparation of the Final EIS an additional 126 ha (317 ac) were added to mitigate impacts on wildlife that were not captured by the wetland functional assessment models. In the final stage, during the preparation of the Record of Decision (ROD) by the Corps, another 217 ha (530 ac) were added to the mitigation package to address concerns expressed by EPA regarding a potential for unquantified indirect impacts on wetlands and wildlife resulting from the selected build alternative.

Wildlife Benefits of Legacy Nature Preserve

Habitat Preservation

The primary mitigation for impacts on wildlife would be to protect and maintain in perpetuity 849 ha (2,098 ac) of wildlife habitats in the project study area. These lands are an integral part of the wetland and associated upland habitat complexes along the eastern shore of Great Salt Lake that provide foraging and staging habitat for millions of migratory waterfowl and shorebirds each year. These lands also provide nesting habitat for many species. These habitats have been affected by past development and are at risk from future development. Most of the land within the project study area has been degraded ecologically by agricultural, urban and industrial development, and other land use changes. These areas face continued threats from future urban growth and development in and to the west of the study area. The Final EIS estimated that open space in Davis County was being developed at the rate of approximately 280 ha (700 ac) per year, and at that rate, most of the study area, including land now within the Legacy Nature Preserve, would be developed by 2020. This estimated rate of development has not changed since the Final EIS (Davis County 2004). Preservation of these lands would offset the historic and projected future cumulative loss of wetlands in the GSLE.

Habitat Restoration and Enhancement

In addition to preservation, the mitigation plan, as approved in the ROD, states that the Preserve would be managed to enhance its wildlife values. Restoration and enhancement measures would restore some of the wetland and wildlife habitat functions lost due to past land use changes. Incompatible land uses that have degraded the wildlife habitats include extensive use of all-terrain vehicles (ATVs), especially in the northern properties; over grazing; cultivated cropping; uncontrolled access by domestic pets, including feral cats and dogs; dumping of trash; and filling of wetlands. Also, in many areas the natural hydrology had been altered by farming and water development practices. Old channels and sloughs of the Jordan River were cut off from the main stem when levees prevented the river from overflowing into its historic floodplain.

Habitat restoration and enhancement measures proposed in the mitigation plan include removing roads, reseeding upland areas, leaving berms in certain areas in the southern portion of the Preserve, plugging tile drains, removing interior fences, removing utilities, and restoring hydrology to previously destroyed wetlands. Other activities to be implemented that would enhance habitat quality in the Preserve include controlling human disturbance, such as removing grazing; developing and implementing a noxious and/or invasive plant control plan; and managing water flows. A complete discussion of wetland restoration and enhancement appears in Section 4.12, *Wetlands*.

UDOT is committed to restoring and enhancing wetland and upland habitats in the mitigation area to ensure that they provide high wildlife value. Management for wildlife that use the Preserve would focus on enhancing and maintaining the mitigation property wetlands and uplands to maximize their use by the diverse array of migratory species currently inhabiting the regional and project study areas.

Mitigation for Habitat Loss

As described in Section 4.13.3, *Environmental Consequences*, construction of any proposed build alternative would result in direct loss of wildlife habitat in the project right-of-way. The extent and character of these losses would be a function of the location of the alignment within the matrix of habitats in the project study area. The Legacy Nature Preserve would compensate for direct impacts of the project by preserving and restoring more than four times as much wetland habitat and more than twice as much upland habitat than would be affected by constructing any build alternative (Table 4.13-12).

Table 4.13-12 Legacy Nature Preserve Mitigation Lands Compared to Direct Wildlife Habitat Losses under Build Alternatives

Alternative	Wetland/Riparian Wildlife Habitats in hectares (acres)*	Upland Wildlife Habitats in hectares (acres)
Legacy Nature Preserve	315 (778)	532 (1,315)
Alternative A	44 (110)	214 (531)
Alternative B	79 (196)	270 (668)
Alternative C	63 (157)	198 (490)
Alternative E	52 (129)	200 (495)

* Note that wetland/riparian wildlife habitat is not exactly the same as *jurisdictional wetlands* as defined in Section 4.12, *Wetlands*. Specifically, open water and riparian habitats have been mapped differently for purposes of the wildlife habitat analysis; this is discussed in greater detail in Appendix B of the wildlife technical memorandum. Please refer to Footnote 1 earlier in this section.

As described above, in the absence of these mitigation lands, most of this area could be developed in the future and would result in a regional loss of potential high-quality wildlife habitat. Therefore, placing these lands in a preserve also prevents other foreseeable future cumulative impacts from occurring and preserves a large portion of the wildlife habitats identified as critical protection areas in the Davis County Wetlands Conservation Plan (Figure 4.13-12).

Effects of Lake Level Change on Availability of Wildlife Habitats in Legacy Nature Preserve

Figure 4.13-13 shows that the Preserve mitigation area is also subject to natural cyclic inundation from changes in lake level. The types and quantity of wildlife habitat available in the Preserve is therefore conditional on the prevailing level of the lake. As the lake level rises, terrestrial habitat converted to open saline water is no longer available to wildlife that formerly used it. Species using the mitigation area would be forced to use more limited habitats closer to the highway and would potentially be increasingly subject to highway mortality and reduced habitat quality. At higher lake levels when the lake inundates most or all of the Preserve, those species would be displaced to other areas outside the Preserve, either within the GSLE basin or elsewhere. Inundation of the Preserve would also periodically negate restoration and enhancement efforts in low elevation terrestrial habitats.

The dynamic inundation-regrowth nature of the wildlife habitats in the proposed Preserve does not match that of the more constant upland habitats that would be lost under the build alternatives. However, the Preserve would provide large areas of quality habitat for long periods between inundation events that would be used by many species of wildlife. During high lake level periods, regional precipitation conditions that contributed to the rise in lake level are also likely to result in the “greening” of formerly

dry areas around the GSLE basin and other areas along traditional wildlife migratory corridors. These areas would provide alternate refuge and stopover areas for many migrating species that would potentially use the Preserve.

It is not known how the regional dynamics of habitat availability would affect species displaced from the Preserve by high water. However, the mitigation area has significant value in preserving key habitats for these species during low lake level periods and in preserving an important part of the natural GSLE cycle.

Mitigation for Habitat Fragmentation

As described in Section 4.13.3, *Environmental Consequences*, construction of any build alternative of the Legacy Parkway project would transect the matrix of wildlife habitats in the project study area. This would result in fragmentation of existing wetland and upland habitats into smaller patches that could reduce the local carrying capacity for some species. Other possible effects of habitat fragmentation include reduced connectivity between habitat patches; increased “edge” effects; and possible dispersal barriers for some species.

The Preserve would compensate for many of these fragmentation effects by restoring and enhancing much of the existing degraded and fragmented habitat within the proposed Preserve area. The Legacy Nature Preserve would be managed to maintain large and contiguous wildlife habitat areas with low levels of human disturbance. Most wildlife species currently found there should benefit from an increased carrying capacity resulting from habitat enhancement and reversed fragmentation restoration efforts that would create a more contiguous habitat area

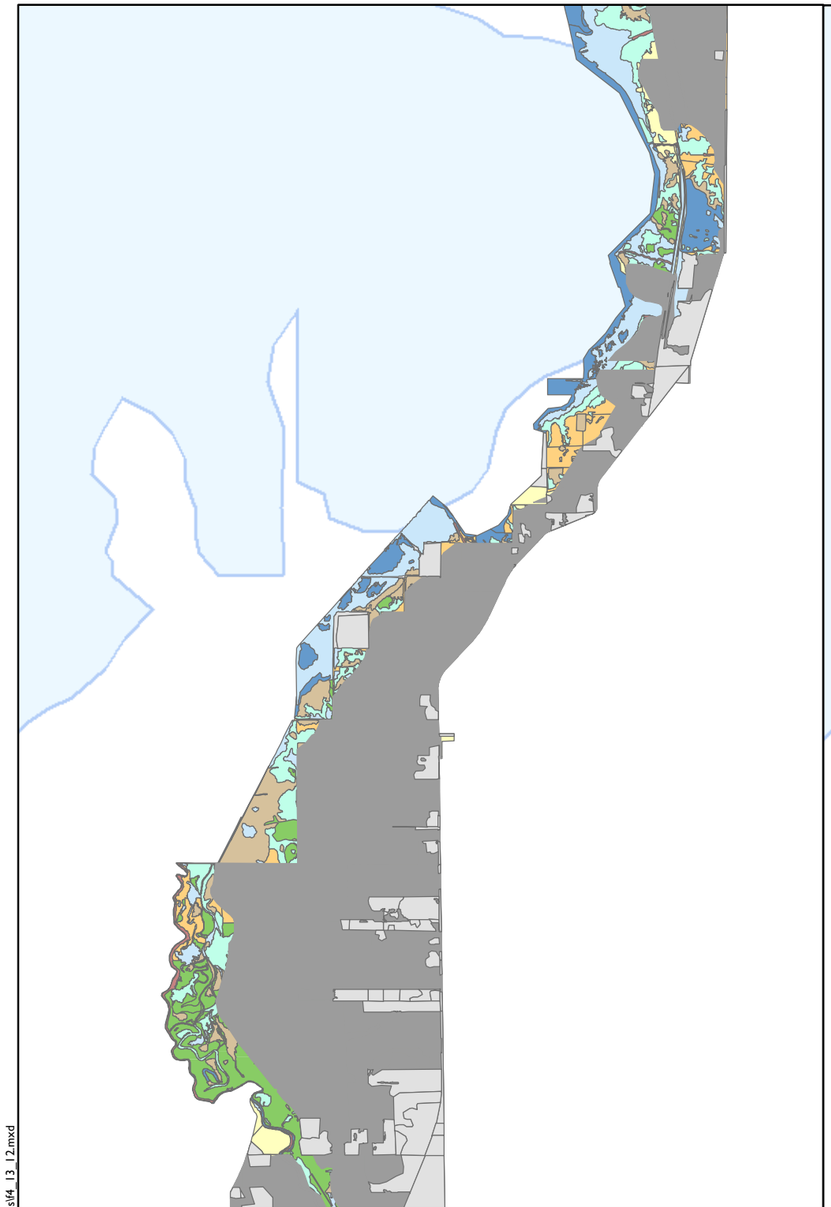
Mitigation for Noise Impacts on Wildlife

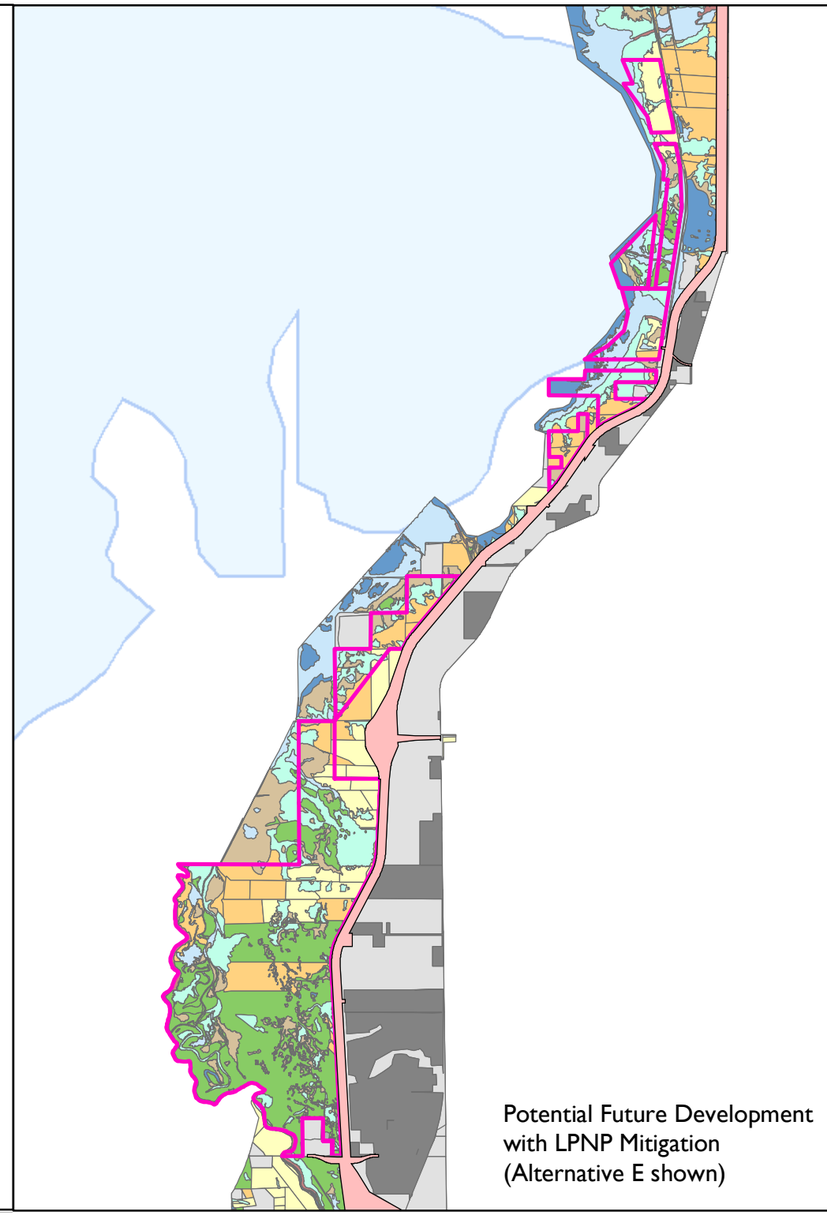
Based on best available information on biological impacts of highway noise on wildlife, it is likely that noise-sensitive species adjacent to the proposed build rights-of-way would either move away from the disturbance area or remain and adapt to the extent they are able, with some reductions in local population densities and species diversity. More noise-tolerant species could replace noise-sensitive species in some areas. However, the overall impact of noise on wildlife resulting from the proposed action is not expected to jeopardize the long-term viability of any species that currently use the project study area. The Preserve would mitigate adverse biological effects of highway noise through habitat enhancement that would increase the productivity of wildlife species affected by the proposed action. By improving habitat conditions (food availability, shelter from disturbance and predation), the carrying capacity of many of these species would likely increase, thereby offsetting in part the predicted population declines of these species adjacent to the proposed highway. UDOT will monitor noise and survey for representative breeding migratory bird species in the Legacy Nature Preserve during spring 2005 and after completion of the proposed action to determine the impacts of noise. An adaptive management program, including additional noise abatement practices and restoration/enhancement of the Preserve habitats, will be implemented as appropriate to mitigate the noise impacts determined by the initial monitoring studies.

The mitigation Preserve would also create a distance and noise buffer of undeveloped habitat for some habitat areas west of the proposed highway alignment, including sensitive wildlife areas such as parts of the FBWMA and wetlands west of the project that are managed by local duck clubs.

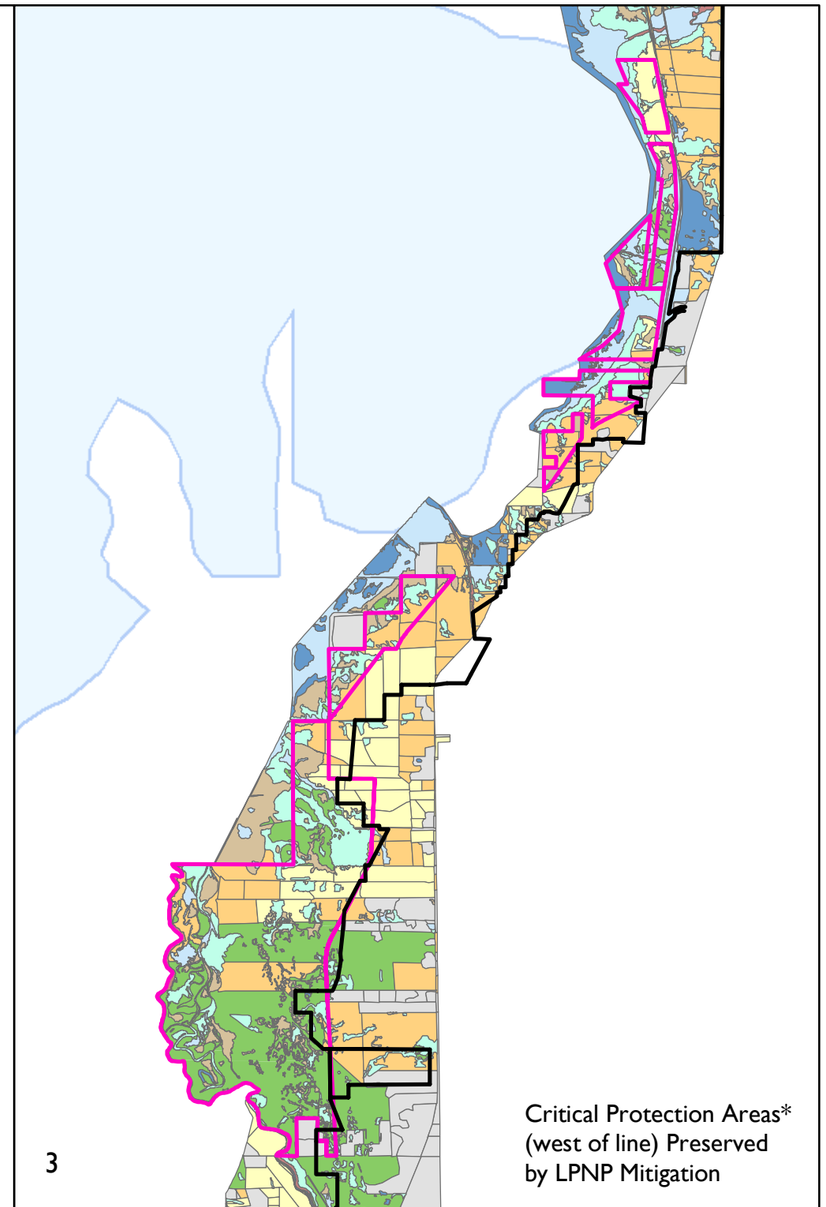
Effects of Highway Noise on Quality of Habitat in the Legacy Nature Preserve

Because the Preserve is in close proximity to the proposed action, highway noise would affect wildlife within the Preserve. Under existing conditions (Figure 4.13-14), the Preserve area is subject to noise





Potential Future Development with LPNP Mitigation (Alternative E shown)



3

Critical Protection Areas* (west of line) Preserved by LPNP Mitigation

Legend

- LPNP Mitigation Boundary
- Critical Protection Areas (west of line)*

Potential Future Developement

- Developed
- Developable
- Alternative E*

Wetland / Wildlife Habitat

- Cropland
- Developed
- Emergent Marsh
- Mudflat/Pickleweed
- Open Water
- Pasture
- Riparian
- Scrub
- Wet Meadow

N

0.8 0.4 0 0.8 1.6

Kilometers

Map Production: 12/15/03

Data Sources: UDOT Project Alternatives and Wetland / Wildlife Habitat Data, Potential Future Development modified from the Final EIS

*Davis County Critical Protection Area from the Wetlands Conservation Plan -- A Plan for Protection of the Great Salt Lake Wetlands Ecosystem in Davis County (December 1996).

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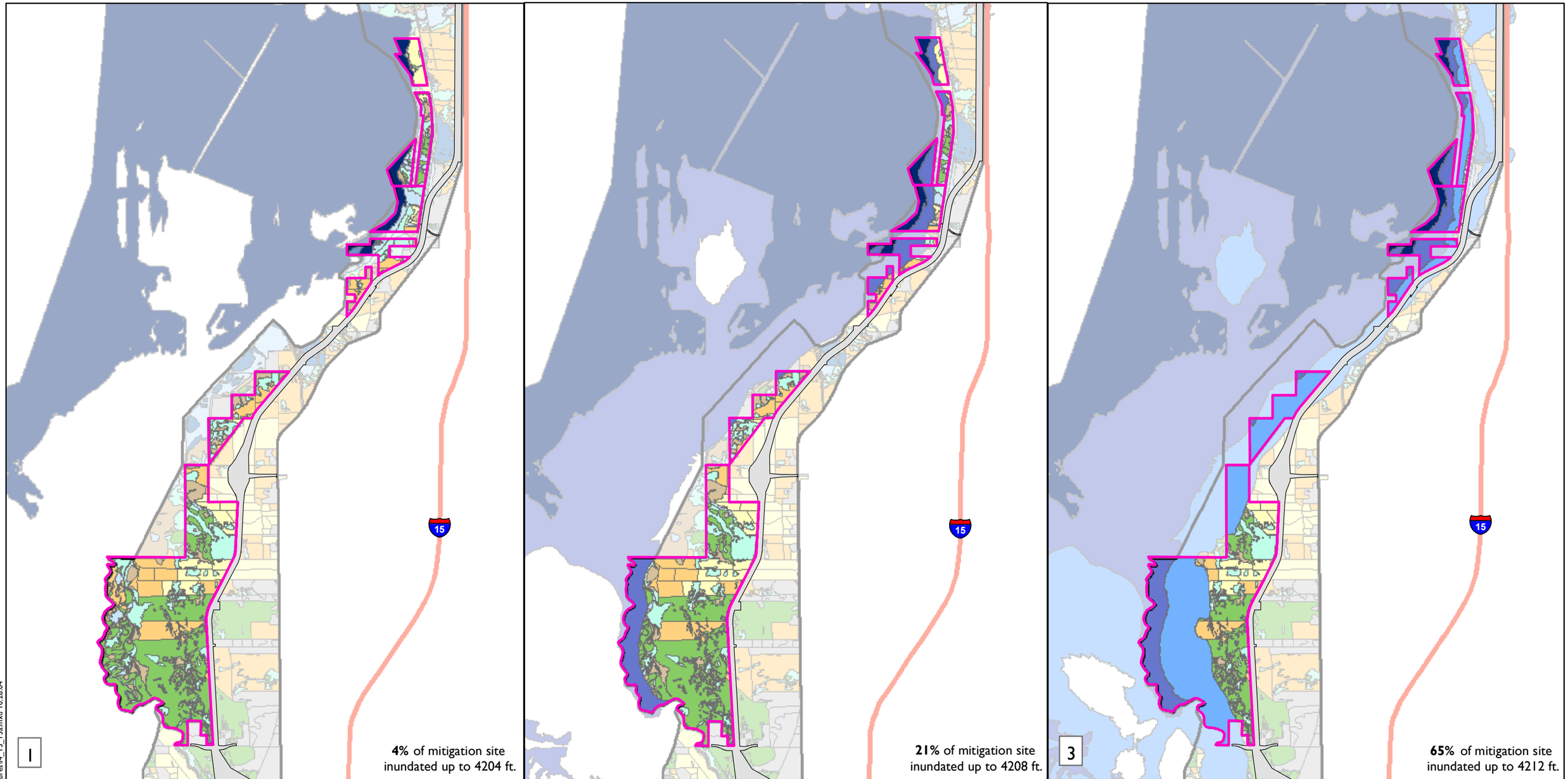
Figure 4.13-12

Legacy Parkway Study Area Potential Future Development and Legacy Parkway Nature Preserve



Legend

- Major Existing Roads
- Project Study Area Boundary
- LPNP Mitigation Boundary
- Alternative E

Areas outside the LPNP mitigation boundary have been muted for display.

Inundation Zones (elevation in feet)

1 (4200 - 4204)
2 (4204-4208)
3 (4208-4212)
4 (4212-4216)
5 (4216-4220)
6 (>4220)

Wetland / Wildlife Habitats

- Cropland
- Developed
- Emergent Marsh
- Mudflat/Pickleweed
- Open Water
- Pasture
- Riparian
- Scrub
- Wet Meadow

1 0.5 0 1 2
Kilometers

Map Production: 12/15/03
Data Sources: UDOT Project Study Area Boundary, Exsiting Roads. Contours Generated USGS 10 Meter Digital Elevation Model (DEM)

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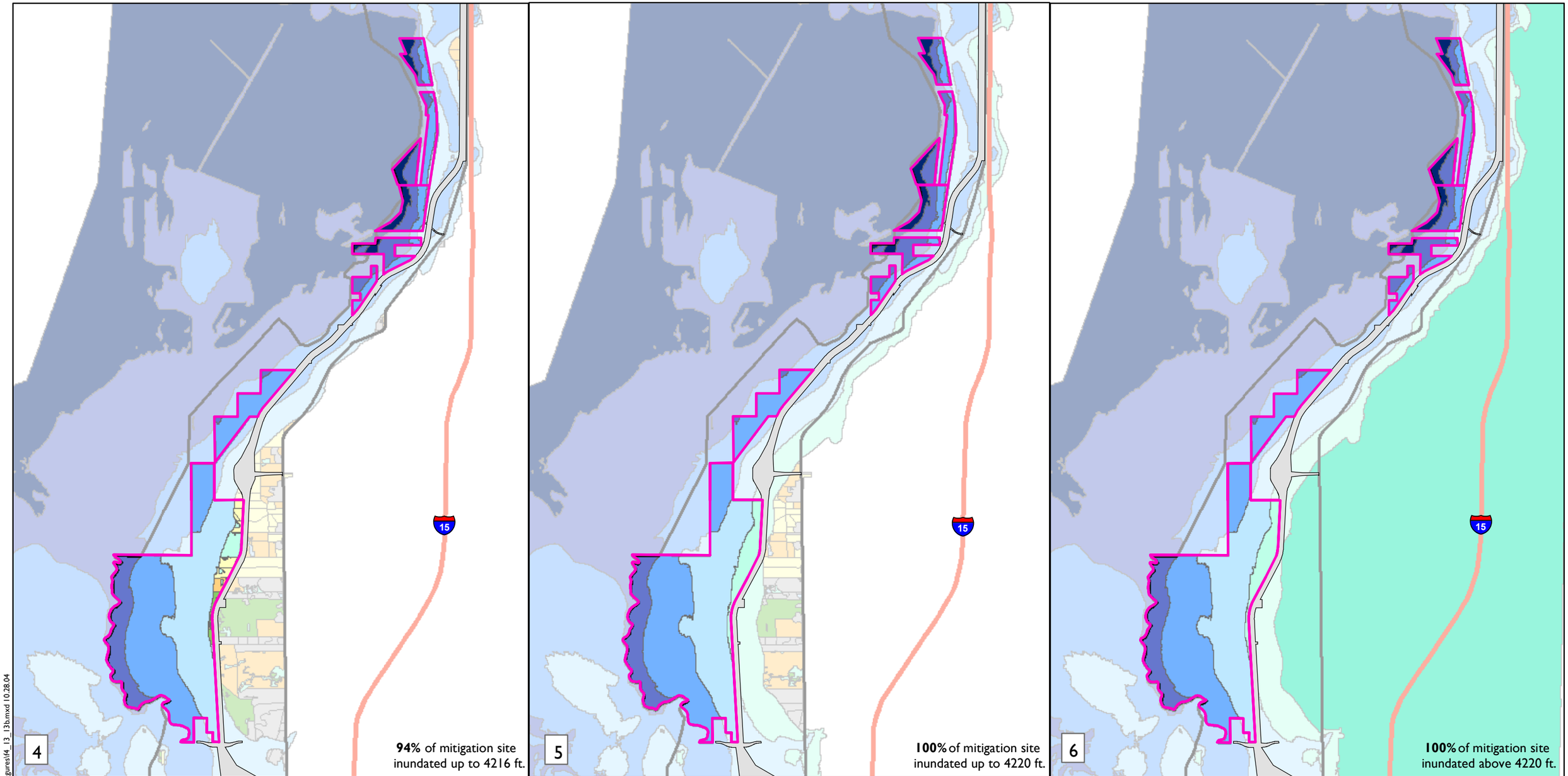
Figure 4.13-13a
Great Salt Lake Inundation Zones



Legend

- Major Existing Roads
- Project Study Area Boundary
- LPNP Mitigation Boundary
- Alternative E

Areas outside the LPNP mitigation boundary have been muted for display.

Inundation Zones (elevation in feet)

1 (4200 - 4204)
2 (4204-4208)
3 (4208-4212)
4 (4212-4216)
5 (4216-4220)
6 (>4220)

Wetland / Wildlife Habitats

- Cropland
- Developed
- Emergent Marsh
- Mudflat/Pickleweed
- Open Water
- Pasture
- Riparian
- Scrub
- Wet Meadow

1 0.5 0 1 2
Kilometers

Map Production: 12/15/03
Data Sources: UDOT Project Study Area Boundary, Exsiting Roads. Contours Generated USGS 10 Meter Digital Elevation Model (DEM)

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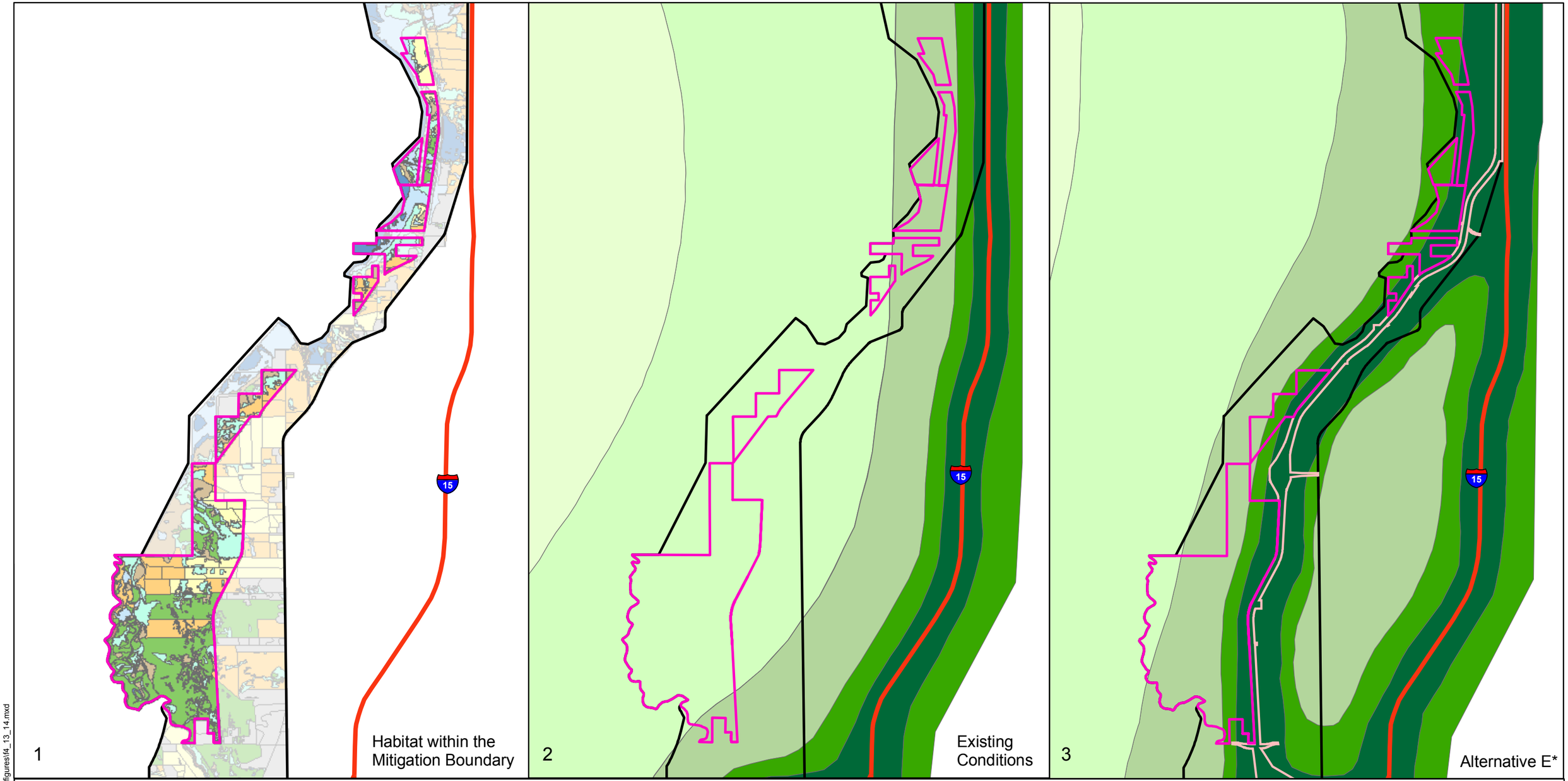
Figure 4.13-13b
Great Salt Lake Inundation Zones

levels mostly below 50 dB, with smaller areas closest to I-15 experiencing noise in the 50–55 dB range (Figures 4.13-14 and 4.13-15). With implementation of the Legacy Parkway project, large areas of the Preserve would be subject to higher noise levels (up to >60 dB) (Figures 4.13-14 and 4.13-16). Figure 4.13-17 shows the net area (i.e., change) of each habitat that would be affected by highway noise compared to existing conditions. This figure shows increases of areas in higher noise level contours (50–>60 dB), as well as a decrease in the extent of areas currently within the 45–50 dB contour.

This noise disturbance would affect wildlife species in the same manner as described in Section 4.13.3.10. Noise-sensitive species would either move away from the disturbance or stay and adapt to the extent they are able, with potential reductions in survival rates and/or reproductive success. These impacts could affect the proposed habitat enhancement benefits for parts of the Preserve, as described above, particularly parts of the Preserve adjacent to the highway. The proposed monitoring program would provide quantitative information on the nature of these noise impacts in the Preserve. Implementation of specific adaptive management actions identified by the initial monitoring program described above can be equally applied to mitigate the compounding effects of noise impacts within the Preserve. The wildlife technical memorandum describes these effects in greater detail.

Other Mitigation Measures to Protect Wildlife Habitat

Under all build alternatives, measures to minimize wetland and wildlife habitat impacts would be implemented during project construction and would be incorporated into the final project design. Culverts would be placed under the highway within the Corps floodplain boundary to maintain hydrologic connections between the east and west sides of the parkway during high lake levels. Surface water conveyance and groundwater conveyance structures would be installed wherever existing hydrologic connections or wetlands are present. The roadway design has been modified to lower the embankment height in non-floodplain areas to further minimize the minor effect of soil compaction on the subsurface water table. Best management practices (BMPs) would be employed to limit the amount of eroded sediment and other materials that leave the right-of-way. Another mitigation measure for preventing habitat degradation, such as water quality impacts, is the use of vegetated filter strips designed to remove pollutants from highway runoff.



Legend

- LPNP Mitigation Boundary
- Project Study Area Boundary
- Alternative E*
- Major Existing Roads

TNM Modelled Noise Levels (Decibels)[1]

- <45
- > = 45 < 50
- > = 50 < 55
- > = 55 < 60
- > = 60

Wetland / Wildlife Habitats

- Cropland
- Developed
- Emergent Marsh
- Mudflat/Pickleweed
- Open Water
- Pasture
- Riparian
- Scrub
- Wet Meadow

Areas outside the LPNP mitigation boundary have been muted for display.

1 0.5 0 1 2
Kilometers

Map Production: 12/15/03

Data Sources: UDOT Project Study Area Boundary, Project Alternatives and Exsiting Roads. Contours generated from field data.

*Supplemental EIS 312-foot ROW

[1] The noise level contours generated by the traffic noise model have not yet been verified beyond 305m (1000ft). The locations of contours beyond this distance are projected estimates only and could vary significantly depending on existing background noise, atmospheric conditions, and substrate type.

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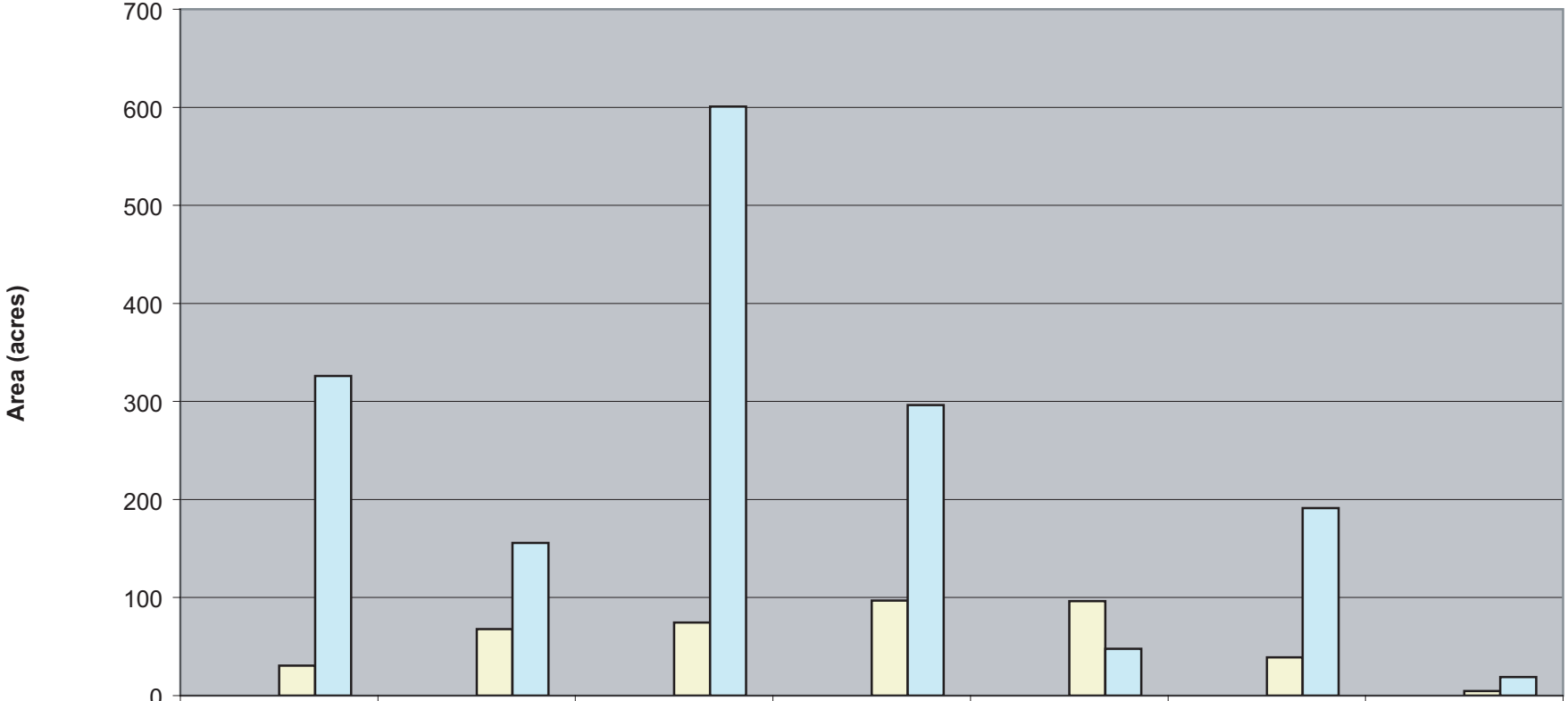
Figure 4.13-14

Highway Noise Level for the Proposed Legacy Parkway Nature Preserve



	Pasture	Cropland	Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Riparian
>=60	0	0	0	0	0	0	0
>=55 < 60	0	0	0	0	0	0	0
>=50 < 55	30.7	67.7	74.5	96.9	96.3	39.1	4.7
>=45 < 50	326.1	155.8	600.8	296.4	47.8	191.4	19.0

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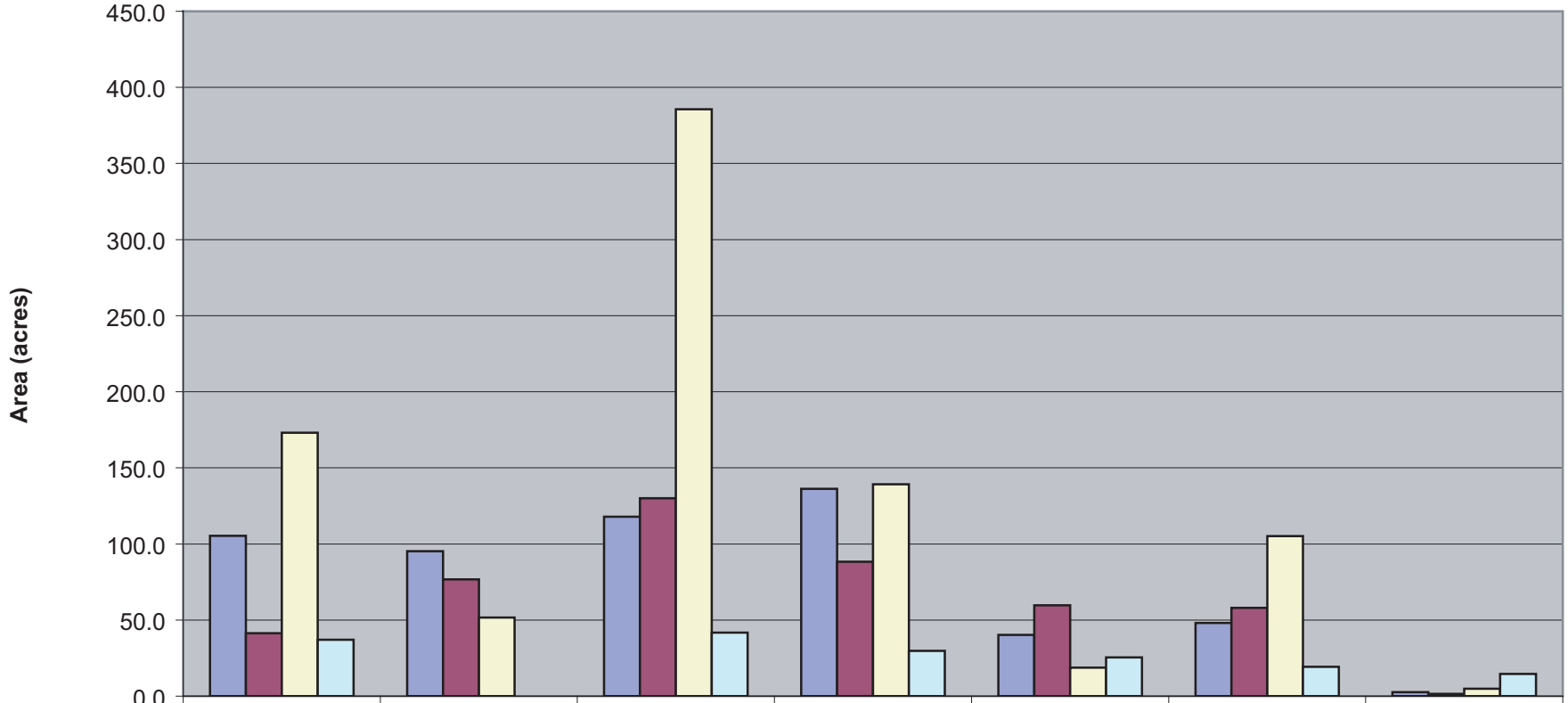
Figure 4.13-15
Areal Extent of Proposed Legacy Parkway Nature Preserve Affected by Noise (Existing Conditions)



	Pasture	Cropland	Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Riparian
>=60	105.3	95.2	117.8	136.1	40.2	48.1	2.7
>=55<60	41.3	76.8	130.1	88.3	59.7	57.9	1.5
>=50 < 55	173.1	51.6	385.6	139.2	18.8	105.2	4.9
>=45 < 50	37.0		41.7	29.7	25.4	19.2	14.5

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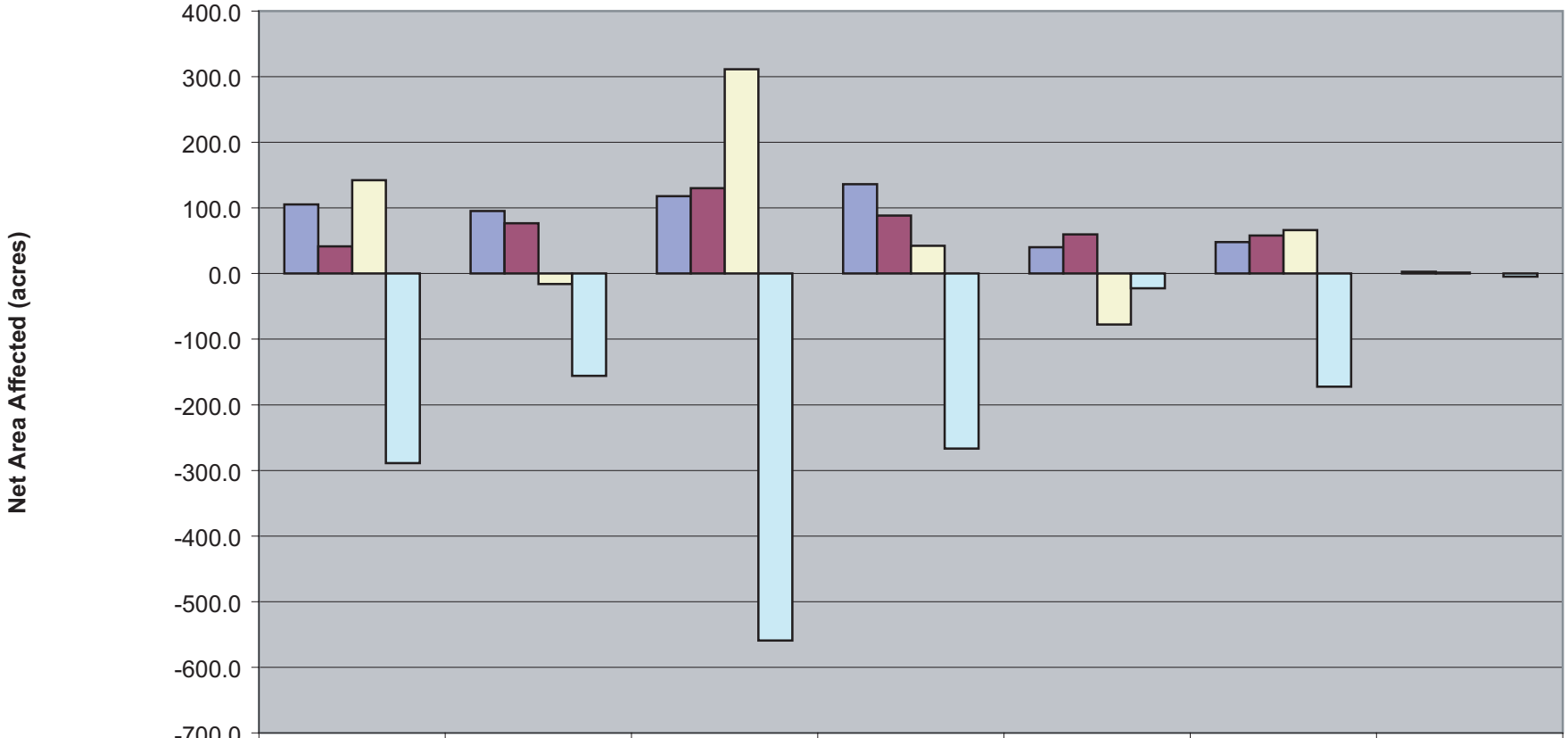
Figure 4.13-16
Area of Proposed Legacy Parkway Nature Preserve That Would Be Affected by Noise (Alternative E)



	Pasture	Cropland	Scrub	Wet Meadow	Emergent Marsh	Mudflat/ Pickleweed	Riparian
>=60 w/road	105.3	95.2	117.8	136.1	40.2	48.1	2.7
>=55<60 w/road	41.3	76.8	130.1	88.3	59.7	57.9	1.5
>=50 < 55 w/road	142.4	-16.1	311.1	42.3	-77.5	66.1	0.3
>=45 < 50 w/road	-289.0	-155.8	-559.0	-266.7	-22.4	-172.2	-4.5

03076.03 (11/04)

Figure 4.13-17
Net Area Affected by Noise Compared to No Road Condition

Section 4.14
Floodplains

This section discusses floodplains in the study area. In addition, the section provides information about the Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM) for Davis and Salt Lake Counties that have been updated since the publication of the Final EIS.

4.14.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with floodplains in the study area, Sections 3.14 and 4.14 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for floodplains is described in Section 4.0.1, *Study Area*, of this document.

Utah State Floodplain Manager, Judy Watanabe, was consulted on September 18, 2003, to determine whether Davis County floodplain maps had been changed or revised since publication of the Final EIS (Watanabe pers. comm.). Nancy Barr of the State Floodplain Office was consulted on November 5, 2003, to determine whether Salt Lake County floodplain maps had been changed or revised since publication of the Final EIS (Barr pers. comm.). Scott Stoddard of the Corps was also contacted to determine whether the Corps floodplain study had been changed or revised since publication of the Final EIS (Stoddard pers. comm.).

4.14.2 Affected Environment

This affected environment section presents a summary of updated information on the affected environment relative to floodplains. As indicated in the Final EIS, 15 communities in Davis County and 13 communities in Salt Lake County participate in the National Flood Insurance Program (NFIP), which is administered by FEMA. As stated in the Final EIS, the communities that participate in the NFIP are required to administer a permit review program that minimizes flood damages based in part on FEMA-generated FIRM maps. The updated regulatory setting and updated status of the FIRM maps that pertain to the study area are presented below.

4.14.2.1 Regulatory Setting

Executive Order 11988, Floodplain Management, and Title 23 CFR Section 650, Subpart A, “Location and Hydraulic Design of Encroachments on Floodplains”, provide guidance to federal agencies on constructing projects within the boundaries of designated floodplains.

Executive Order 11988, Floodplain Management

Executive Order 11988 requires that all federal agencies take action to reduce the risk of flood loss, restore and preserve the natural and beneficial values served by floodplains, and minimize the impact of floods on human safety, health, and welfare. Federal agencies' actions must reflect consideration of alternatives to avoid adverse impacts in floodplains, and must modify the proposed action to minimize such impacts where such impacts are unavoidable.

Title 23 Code of Federal Regulations Section 650, Subpart A, "Location and Hydraulic Design of Encroachments on Floodplains"

Title 23 CFR 650, Subpart A, prescribes FHWA's policies and procedures for locating and designing highway encroachments in floodplains. Specifically, FHWA must avoid longitudinal and/or significant encroachments into floodplains, where practicable, and must minimize adverse affects on floodplains resulting from its actions. 23 CFR 650.105(q) defines a "significant encroachment" as a highway encroachment and any direct support of floodplain development that would involve one or more of the following construction- or flood-related impacts.

- A significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route.
- A significant risk.
- A significant adverse impact on natural and beneficial floodplain values.

A proposed action that includes a significant encroachment cannot be approved unless FHWA finds that the proposed significant encroachment is the only practicable alternative.

4.14.2.2 FEMA Studies and Maps

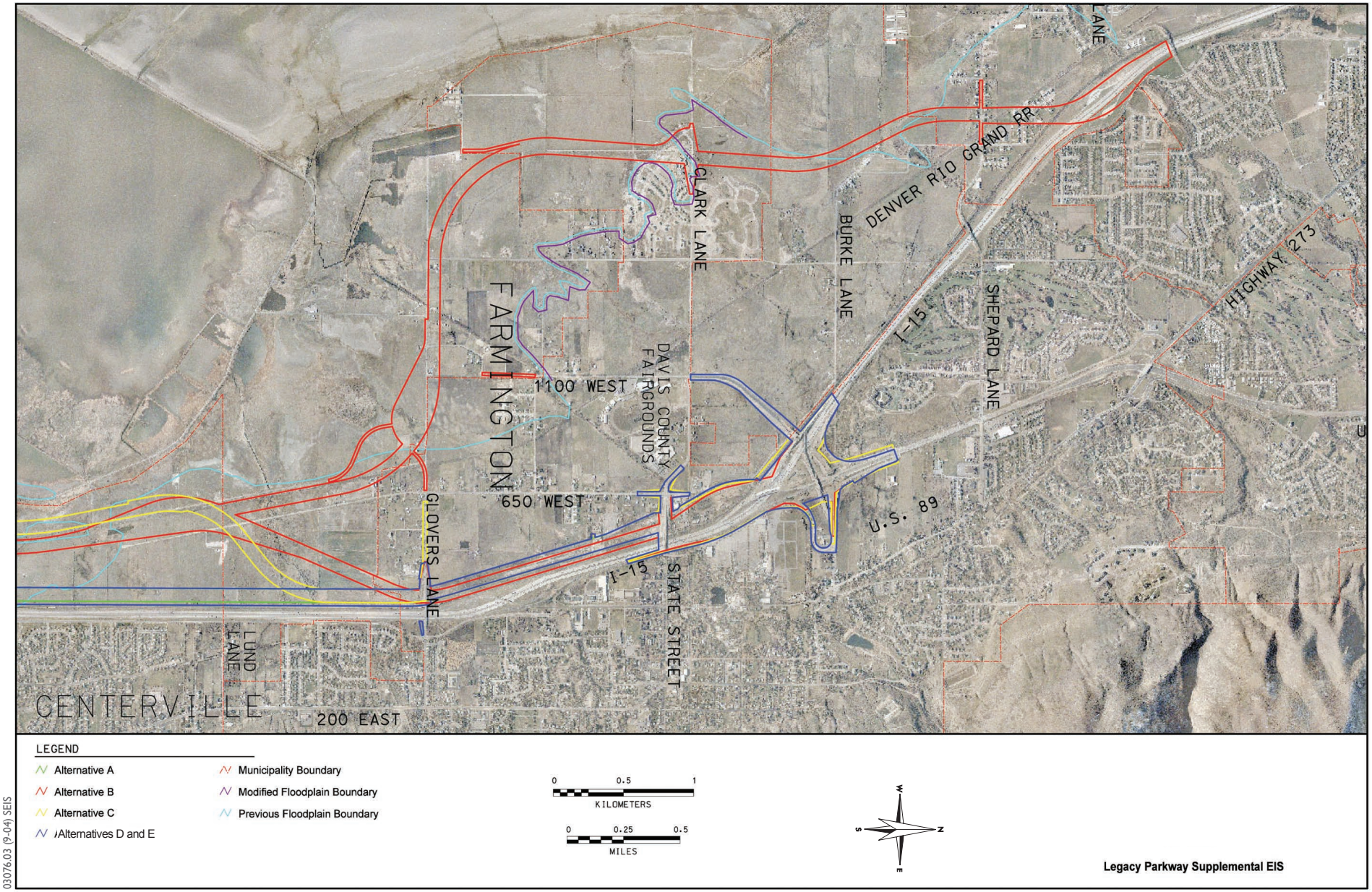
The floodplain map for Farmington Creek and Great Salt Lake was revised in 2001 to reflect updated hydrologic and topographical information (Federal Emergency Management Agency 2001). This revision resulted in an eastward expansion of the Great Salt Lake FEMA floodplain boundary of 152 m to 305 m (500 ft to 1,000 ft) between approximately 1500 West and 100 North in the City of Farmington (Figure 4.14-1). This is the only change to the FIRM maps that was reported for floodplains in the study area.

4.14.2.3 Vertical Datum Differential

There has been no change to the vertical datum differential since publication of the Final EIS.

4.14.2.4 Corps Floodplain Study

The Corps floodplain study has not been revised since 1998, and the Corps floodplain boundary has not changed since publication of the Final EIS (Stoddard pers. comm.). Therefore, there is no additional discussion of the Corps floodplain study in this document. However, since the FEMA floodplain boundary has been updated since publication of the Final EIS (see Section 4.14.2.2), the relationship between the Corps Great Salt Lake floodplain boundary (defined in the Corps floodplain study) and the updated FEMA floodplain boundary has changed.



03076.03 (9-04) SEIS

Figure 4.14-1
Revised Floodplain Area

4.14.2.4 Wetland Hydrology

As stated in the Final EIS, the wetlands found in the study area are not extremely important for flood control and/or water storage functions around river and stream systems. Their elevations are not high enough to perform those functions, and they are not geomorphically positioned in the watershed to capture and retain peak floodwaters of rivers and stream. Wetlands adjacent to Great Salt Lake provide more of a flood control function by capturing and storing a small portion of the lake's floodwater, helping prevent it from intruding into adjacent cities and towns. The wetlands in the Jordan River floodplain and areas surrounding Farmington Bay near Centerville also provide flood control functions (Federal Highway Administration et al. 2000). This information has not changed since publication of the Final EIS. For more information on wetlands see Section 4.12.

4.14.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, portions of all the proposed build alternatives would encroach into the FEMA 100-year floodplain of Great Salt Lake and several streams in the study area. The environmental consequences and mitigation measures associated with encroachment into these floodplains are similar to those described in the Final EIS. Since publication of the Final EIS, however, UDOT has reduced the proposed right-of-way of the proposed build alternatives from 100 m to 95 m (328 ft to 312 ft) (see Chapter 3, *Alternatives*, of this Supplemental EIS). This reduction in right-of-way width would reduce the area that would be within the 100-year floodplain for each proposed build alternative (Table 4.14-1). The environmental consequences associated with encroachment of the proposed action into the 100-year floodplain and the proposed mitigation measures are summarized below.

4.14.3.1 Floodplain Management

Section 4.14.1 of the Final EIS states that all the proposed build alternatives would run alongside or near both the FEMA and Corps 100-year floodplain boundaries throughout the study area, except that the Alternative B alignment would fall approximately 1 km (0.6 mi) inside the FEMA floodplain boundary in the Farmington area, and alongside the Great Salt Lake floodplain boundary in the southern portion of the study area. The expansion of the FEMA floodplain boundary in the Farmington Area, discussed above in Section 4.14.2.2, would increase the length of Alternative B that lies within the floodplain of Great Salt Lake by approximately 152 m to 305 m (500 ft to 1000 ft). Figure 4.14-1 shows the location of the revised FEMA floodplain boundaries relative to the proposed Alternative B alignment.

All the proposed build alternatives would still be designed to allow passage of 100-year flood flows at stream crossings and a 100-year floodwater elevation in Great Salt Lake, as described in the Final EIS. Floodplain equalization culverts would be installed to allow water from high lake levels to pass through the parkway to areas east of the proposed highway (Figure 4.14-2). Pumping water from Great Salt Lake to maintain flood levels and to protect the proposed highway alignment would not be required and is not included as a component of the proposed action.

4.14.3.2 Floodplain Impacts

The revision to the FEMA floodplain boundary does not change any of the overall impact conclusions presented in Section 4.14.2 of the Final EIS. The acreage of affected floodplain (both FEMA and Corps

floodplains) associated with the proposed build alternatives is listed in Table 4.14-1. The table accounts for the reduced right-of-way.

Table 4.14-1 Impacts on Great Salt Lake Floodplain North of Center Street

Floodplain Area Associated with Build Alternatives	Area Affected by Alternative, Hectares (Acres)				
	Alternative A[1]	Alternative B[1]	Alternative C[1]	Alternative D[2]	Alternative E[1]
FEMA Floodplain Filled	11 (27)	82 (202)	15 (38)	17 (43)	17 (42)
Corps Floodplain Filled	52 (128)	150 (371)	131 (323)	86 (213)	85 (211)
FEMA Floodplain East of the Proposed Alignment	25 (62)	81 (201)	92 (227)	22 (56)	24 (59)
Corps Floodplain East of the Proposed Alignment	24 (60)	228 (562)	246 (607)	72 (179)	73 (181)

Notes:

[1] Area represents acreage of floodplain filled based on a 95-m (312-ft) right-of-way width. For Alternatives A, B, and C, this represents a reduction in the right-of-way presented in the Final EIS.

[2] Area represents acreage of floodplain filled based on a 100-m (328-ft) right-of-way. This right-of-way is consistent with that presented in the Final EIS.

No-Build Alternative

Existing Conditions (2004)

As stated in the Final EIS, no project-related impacts on floodplains would occur under the existing conditions No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. It is possible that these future projects would encroach into the FEMA and Corps floodplains, although the nature and timing of these projects are not known at this time. Floodplain development permits, which would be issued by the governing local jurisdiction, would have to be obtained before construction within a floodplain could occur.

Build Alternatives

As described in Section 4.14.2 of the Final EIS, each build alternative would result in some longitudinal encroachment into the Corps and FEMA 100-year floodplain of Great Salt Lake, as well as transverse encroachments of the floodplains of several streams in the study area. These encroachments would be associated with construction of the proposed interchange with I-215 in the southern portion of the study area and construction of the proposed action alignments north of Center Street. Impacts on the Great Salt Lake floodplain that would occur as a result of the encroachment into the floodplain north of Center

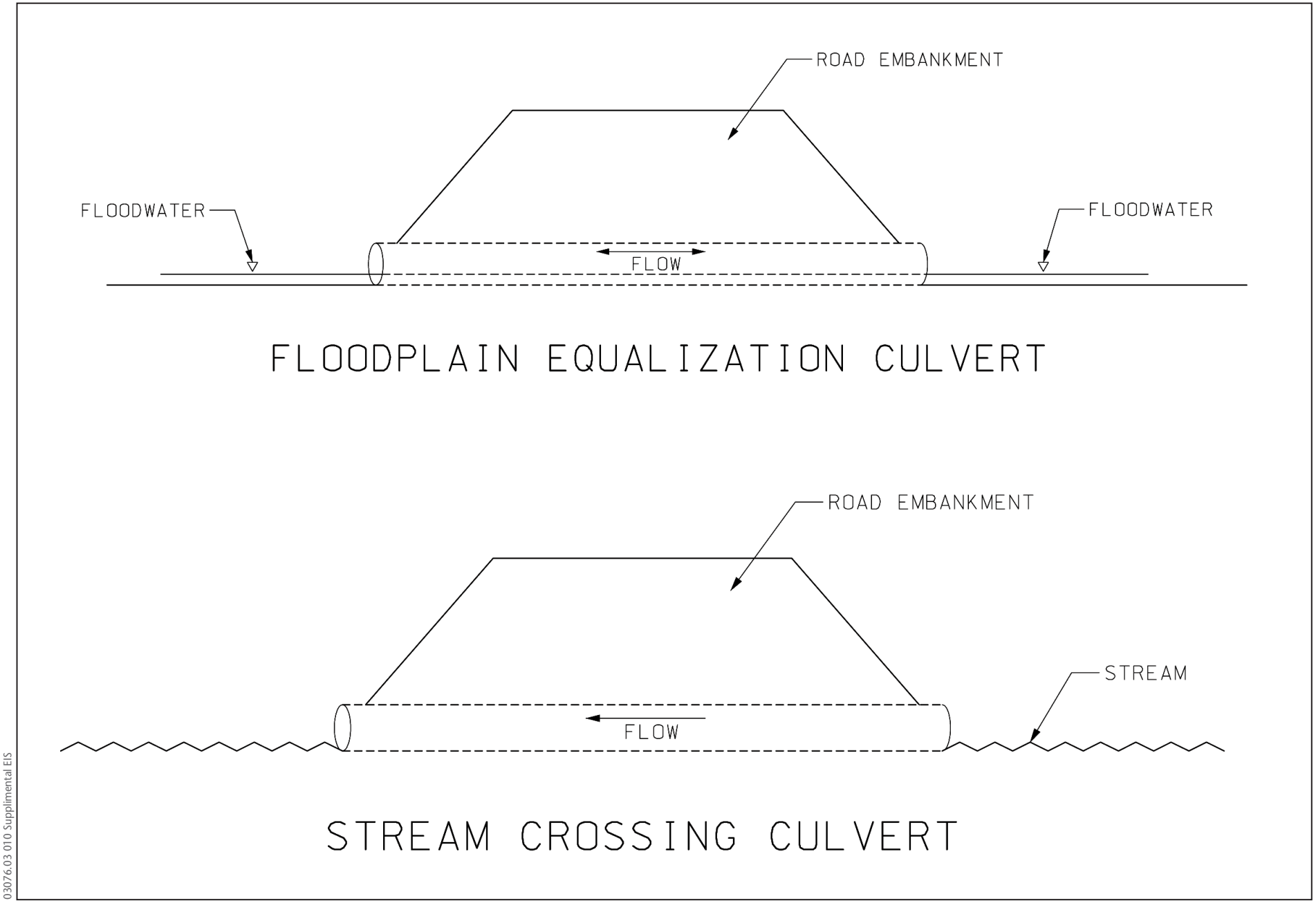


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Figure 4.14-2
Floodplain Equalization and Stream Crossing Culverts

Street are quantified in Table 4.14-1. Impacts associated with construction of the interchange with I-215 are not represented in Table 4.14-1 because they would be the same under all build alternatives.

The acreages presented in Table 4.14-1 are based on a 95-m (312-ft) right-of-way width, except for the acreage presented for Alternative D, which is based on a 100-m (328-ft) right-of-way. Expansion of the floodplain boundary did not substantively change the acreage calculations presented in the Final EIS.

The location and design of all the proposed build alternatives avoids and minimizes, to the extent practicable, longitudinal encroachments into floodplains in the study area. None of the build alternatives would result in a significant encroachment into floodplains in the study area. Floodplain equalization culverts and stream crossing culverts would be included in the design to ensure that, during a flood period, evacuation and emergency vehicle routes would be maintained and that the natural floodplain values of the study area would not be lost. As a result, implementation of any proposed build alternative would meet the requirements of both Executive Order 11998 and 23 CFR 650, Subpart A.

4.14.3.3 Hydrologic Function of Wetlands

The hydrologic function of wetlands in the study area, or their ability to provide surface water storage, was evaluated in the Final EIS and reassessed in this Supplemental EIS using a hydrogeomorphic (HGM) model. All the build alternatives would directly and indirectly affect the hydrologic function of wetlands, as described in Section 4.12, *Wetlands*, of this document. The expansion of the floodplain boundary would not change this impact conclusion for any build alternative.

4.14.3.4 Mitigation Measures

As indicated in the Final EIS, to mitigate impacts on floodplains in the study area resulting from construction of any build alternative, floodplain equalization culverts would be installed to allow floodwaters to flow freely between the eastern and western sides of the proposed highway within the Corps floodplain boundary (Parker pers. comma.). Stream-crossing culverts would be designed to allow passage of floodwaters from the FEMA 100-year flood, and riprap would be provided at the ends of such culverts to minimize erosion. Both the floodplain equalization and stream crossing culverts are depicted in Figure 4.14-2.

Section 4.15

Threatened and Endangered Species

This section discusses threatened and endangered wildlife species in the study area, including those that are listed or proposed for listing under the federal Endangered Species Act (ESA), and those that are listed on the Utah Sensitive Species List. This section has been updated to reflect changes that have occurred in the listing status of species since publication of the Final EIS, including the listing of five additional species that could occur in the study area as state species of special concern: grasshopper sparrow, Preble's shrew, bobolink, kit fox, and Northern goshawk.

4.15.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with special-status wildlife species in the study area, Sections 3.15 and 4.15 of the Final EIS were reviewed to determine what changes that had taken place since publication of the Final EIS. The study area for threatened and endangered species is described in Section 4.0.1, *Study Area*, of this document.

Coordination letters were sent to the U.S. Fish and Wildlife Service (USFWS) and the Utah Department of Natural Resources (UDNR) Division of Wildlife Resources requesting updated information on special-status species that could occur in the study area (Perkins pers. comm.). A letter was received from USFWS in December 2003 that provided an updated list of federally listed species that could occur in Davis and Salt Lake Counties (Maddox pers. comm.) (Appendix A). A copy of the revised Utah Sensitive Species List, which was updated in December 2003, was obtained from UDNR Division of Wildlife Resources (UDNR, Division of Wildlife Resources 2003 a), as was a copy of the Salt Lake and Davis Counties species lists, which were updated in February 2004 (UDNR, Division of Wildlife Resources 2004a). These updated federal and state species lists were compared to the information presented in the Final EIS and used, in conjunction with an evaluation of species habitat requirements, to update the list of species that could potentially occur in the study area and the effects the proposed action could have on those species.

The information presented in this section is also consistent with the analysis conducted for the *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum* (wildlife technical memorandum) (Jones & Stokes 2004) and Section 4.13, *Wildlife*, of this document.

4.15.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to special-status wildlife species. Since publication of the Final EIS, one species proposed for listing on the federal endangered species list has been removed and one has been added (U.S. Fish and Wildlife Service 2003).

In addition, since publication of the Final EIS, six species listed on the Utah Sensitive Species List for Salt Lake and Davis Counties have been removed (UDNR, Division of Wildlife Resources 2003a) and 14 have been added (UDNR, Division of Wildlife Resources 2004a).

Table 4.15-1, which updates Table 3-33 in the Final EIS, lists the special-status species that occur or could potentially occur in the study area that have been added to or removed from either the federal endangered species list or the state sensitive species list since publication of the Final EIS. As described in Section 4.15.2.1, Utah no longer designates state threatened or endangered species.

Table 4.15-1 Special-Status Species That Occur or Could Occur in Study Area

Species		Status*	
Common Name	Scientific Name	Federal	State
Plants			
Ute ladies' tresses	*Spiranthes diluvialis*	T	–
Mammals			
Spotted bat	*Euderma maculatum*	–	SPC
Pale Townsend's big-eared bat	*Plecotus townsendi pallescens*	–	SPC
Kit fox	*Vulpes macrotis*	–	SPC
Preble's shrew	*Sorex preblei*	–	SPC
Birds			
Bald eagle	*Haliaeetus leucocephalus*	T	–
Bobolink	*Dolichonyx oryzivorus*	–	SPC
Yellow-billed cuckoo	*Coccyzus americanus*	P	SPC
Ferruginous hawk	*Buteo regalis*	–	SPC
Grasshopper sparrow	*Ammodrammus savannarum*	–	SPC
Short-eared owl	*Asio flammeus*	–	SPC
Burrowing owl	*Athene cunicularia*	–	SPC
American white pelican	*Pelicanus erthrothynchos*	–	SPC
Long-billed curlew	*Numenius americanus*	–	SPC
Northern goshawk	*Accipiter gentilis*	–	CAS
Amphibians and Fish			
Boreal toad	*Bufo boreas*	–	SPC
Spotted frog	*Rana pretiosa*	–	SPC
Least chub	*Lotichthys phlegethontis*	–	SPC

Notes:

* T = Threatened under the ESA; E = Endangered under the ESA; P = Proposed for listing under the ESA; SPC = Utah State Species of Special Concern; CAS = Utah State Conservation Agreement Species.

Shaded cells indicate special-status species whose status has changed since publication of the Final EIS. Species removed from the Utah Sensitive Species List since publication of the Final EIS are not noted in this table.

Source: U.S. Fish and Wildlife Service 2003; UDNR, Division of Wildlife Resources 2003a; UDNR, Division of Wildlife Resources 2004a.

4.15.2.1 Definitions

As described in the Final EIS, the threatened and endangered species addressed in this section include all plant and animal species that are proposed for listing (P) and species currently listed as threatened (T), endangered (E), or candidate (C) by USFWS. Also discussed are State of Utah species of special concern (SPC) and Conservation Agreement Species (CAS), which are listed on the Utah State Sensitive Species List. The definitions described in the Final EIS have not changed, except that the state no longer designates species as threatened or endangered. As a result, all state special-status species are only assigned the SPC designation, as appropriate. There have been no other changes to this section since publication of the Final EIS.

4.15.2.2 Federally Listed Species

Two species listed as threatened under the ESA were described in the Final EIS: bald eagle (*Haliaeetus leucocephalus*) and Ute ladies' tresses (*Spiranthes diluvialis*). There have been no changes to the status of either species or its potential to occur in the study area since publication of the Final EIS. As noted in the Final EIS, peregrine falcon (*Falco peregrinus*), which was included in the list of federally endangered species in the biological opinion for the proposed action (U.S. Fish and Wildlife Service 1999a) (Appendix A), was delisted in August 1999 and is no longer considered in this section because it is no longer considered a special-status species (U.S. Fish and Wildlife Service 1999b).

Since publication of the Final EIS, the yellow-billed cuckoo was added to the federal list of species proposed for listing as threatened under the ESA. This species is still included on the Utah State Sensitive Species List for Salt Lake and Davis Counties (UDNR, Division of Wildlife Resources 2004a), as described in the Final EIS. It should be noted that no cuckoos were detected during bird surveys conducted between 1999 and 2003 within the area of the proposed Legacy Nature Preserve (UDNR, Division of Wildlife Resources 2004b). Recent documentation of a yellow-billed cuckoo in a peregrine falcon nest in Salt Lake City, however, suggests that this species still migrates through the study area.

Mountain plover (*Charadrius montanus*), which was also described as a species proposed for listing as threatened under the ESA in the Final EIS, is no longer proposed for listing. Table 4.15-1 above provides an updated list of all federally listed species that occur or could potentially occur in the study area.

4.15.2.3 State-Listed Species

Ferruginous hawk (*Buteo regalis*) and yellow-billed cuckoo (*Coccyzus americanus*) were included in the Final EIS as state threatened species. The State of Utah no longer designates state threatened and endangered species, but both species remain on the Utah State Sensitive Species List as species of special concern (UDNR, Division of Wildlife Resources 2003a).

4.15.2.4 State Species of Special Concern

Six species included in the Final EIS as state species of special concern are no longer listed on the Utah State Sensitive Species List. The six species are black tern (*Chlidonias niger*), Caspian tern (*Stema caspia*), common yellowthroat (*Geothlypis trichas*), osprey (*Pandion haliaetus*), Swainson's hawk (*Buteo swainsoni*), and Brazilian free-tailed bat (*Tadarida brasiliensis*) (UDNR, Division of Wildlife Resources 2003a).

However, 14 state species of special concern not described in the Final EIS are now listed on the state list for Salt Lake and Davis Counties (UDNR, Division of Wildlife Resources 2004a). Five of these species—grasshopper sparrow (*Ammodrammus savannarum*), Preble's shrew (*Sorex preble*), bobolink (*Dolichonyx oryzivorus*), kit fox (*Vulpes macrotis*), and Northern goshawk (*Accipiter gentilis*)—could occur in the study area, as described below. These species are also listed in Table 4.15-1.

The distribution mapping and habitat requirements of the other nine state species of special concern suggest that they do not occur in the study area. In addition, none of the four bird species were identified during bird surveys conducted for the Final EIS in 1997 (Federal Highway Administration et al. 2000), or during baseline bird surveys conducted between 1999 and 2003 for the proposed Legacy Nature Preserve (UDNR, Division of Wildlife Resources 2004b). Table 4.15-2 lists these nine species, their habitat requirements, and the reasons the proposed action would not impact them.

Table 4.15-2 State Species of Special Concern Excluded from Further Analysis

Species		
Common Name	Scientific Name	Distribution and Habitat Requirements
Birds		
Black swift	*Cypseloides niger*	Known distribution outside study area. Occurs in mountainous regions. Nesting elevations are from 1,829 m (6,000 ft) to 3,505 m (11,500 ft).
Greater sage grouse	*Centrocercus urophasianus*	Known distribution outside study area
Lewis's woodpecker	*Malanerpes lewis*	Occurs over a wide range of forested habitats. Rare and unpredictable occurrence in study area.
Three-toed woodpecker	*Picoides tridactylus*	Occurs in coniferous forests, generally above 2,438 m (8,000 ft). Known distribution outside study area.
Amphibians and Fish		
Bluehead sucker	*Catastomus discobalus*	Known distribution outside study area.
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	Known distribution outside study area.
Smooth greensnake	*Opheodrys vernalis*	Known distribution outside study area.
Mollusks		
Lyrate mountainsnail	*Oreohelix haydeni*	Favors habitats with limestone talus. Known distribution outside study area.
Western pearlshell	*Margaritifera falcate*	Not likely to occur in the study area because of habitat requirements. Known distribution outside study area.

Source: Utah Conservation Data Center [no date].

Grasshopper Sparrow

Grasshopper sparrows occur in the Great Basin region of Utah (McIvor 1998). They breed in shrub steppe habitats in Utah and may nest and/or forage in wet meadow, cropland, and pasture habitats as well. Their preferred habitats in the western United States comprise lush portions of open grasslands that also include a sparse shrub component. Grasshopper sparrows consume mostly large insects, such as grasshoppers, in

the summer. They capture insects exclusively on the ground; exposed, bare areas are required for successful foraging (Vickery 1996).

Preble's Shrew

Very little is known about the distribution of Preble's shrew in Utah. Its range, as it is currently understood, includes much of Montana, central Idaho, eastern Oregon, and surrounding areas in semiarid to arid habitats. Records of its occurrence in Timpie Springs along the southern shore of Great Salt Lake indicate its presence in this region. The known habitat of this species includes marshy areas such as creeks and bogs bordered by willows and other brushy plants. Preble's shrews have been recently found in a montane sagebrush community in northern California, suggesting that the species may also use drier habitats (Zeveloff and Collett 1988). Because similar habitats are found in the project study area, the species may occur there; however, its status in the study area is unknown.

Bobolink

Isolated breeding populations of bobolinks occur in northern Utah near Centerville, Logan, Brigham City, Kamas, Heber, Morgan, Mountain Green, West Layton, and Provo. Bobolinks nest and forage in wet meadows, wet grasslands, and irrigated areas (primarily pasture and hay fields) (Martin and Gavin 1995). Although historically common in northern Utah, bobolinks are now rare in the area, and they often exhibit unpredictable fluctuations in population numbers. During the breeding season, their diet includes weed and grain seeds, a variety of larval and adult insects, spiders, and harvestmen. The young are exclusively fed invertebrates. During migration and winter periods, grain seeds are the staple diet, supplemented occasionally with insects.

Kit Fox

Great Salt Lake is located on the northeastern edge of the known distribution of kit fox (Zevellof and Collett 1988). Kit foxes are found throughout Utah in desert and semiarid regions with flat shrub or shrub-grass communities with little groundcover. Where these foxes occur in the Great Basin, shadscale, greasewood, and sagebrush communities are common. Major prey items include desert rodents, jackrabbits, cottontail rabbits, ground-nesting birds, reptiles, and insects.

Northern Goshawk

Northern goshawks are rare migrants in the Great Salt Lake ecosystem; they are more abundant in the higher forested reaches of the watersheds of Great Salt Lake and elsewhere in Utah (Ryser 1985). Ryser noted that in the Great Basin during winter, there is some altitudinal migration of goshawks from mountain forests down into the foothills and valleys, as well as immigration of individuals into the Great Basin from the north. Goshawks have been observed foraging in open sagebrush areas in Nevada where they prey on ground squirrels (Younk and Bechard 1992). Also, wintering goshawks use cottonwood riparian areas in the Rocky Mountains and Intermountain Region (Squires and Ruggiero 1995), as well as adjacent open areas (Hughes 1999).

4.15.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, the proposed action could affect both federally listed species and state species of special concern. Since publication of the Final EIS, five additional species that could occur in the study area have been added to the state list for Davis and Salt Lake Counties, and six species of special concern were removed from the state list. The following section provides an update of the environmental consequences and mitigation measures specific to the special-status species in the study area.

The estimates of potential direct impacts on the special-status species described below are drawn from the wildlife technical memorandum (Jones & Stokes 2004), which quantifies by habitat type the potential direct impacts of each build alternative. For each species of concern, the text below describes the range of the amount of suitable habitat (from most lost to least lost) that could be directly affected by the build alternatives. The wildlife technical memorandum and Section 4.13, *Wildlife*, of this document describe more fully the relationship between habitat lost to a build alternative and remaining similar habitat available for wildlife.

4.15.3.1 Threatened and Endangered Vegetation

As described in the Final EIS, although Ute ladies' tresses was originally documented as occurring in the region, it was not found in the study area and would therefore not be affected by the proposed action. There has been no change to this section since publication of the Final EIS.

4.15.3.2 Threatened and Endangered Wildlife

The Final EIS presented impacts on threatened and endangered wildlife species in two categories: avian (bird) and non-avian. Environmental consequences and mitigation measures for avian and non-avian species that occur or could potentially occur in the study area are updated below.

Non-avian Species—Federally Listed

As described in the Final EIS, no federally listed non-avian species occur or could occur in the study area.

Non-avian Species—State Species of Special Concern

Since publication of the Final EIS, the Brazilian free-tailed bat was removed from the state list. In addition, two additional non-avian species that could occur in the study area—kit fox and Preble's shrew—have been listed as state species of special concern. Potential impacts on those species are described below.

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions (2004) No-Build Alternative, there would be no project-related impacts on any non-avian species listed as state species of special concern.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. In addition, residential, commercial, and industrial development will continue in the study area. These future projects could affect non-avian species in the study area listed as state species of special concern. See the wildlife technical memorandum for a detailed discussion of foreseeable future conditions in the study area.

Build Alternatives

Preble's Shrew

Because wet meadow habitats similar to those that support Preble's shrews are present, the species may occur in the study area. All the proposed build alternatives would result in some loss of such habitat. As described in the wildlife technical memorandum (Jones & Stokes 2004), this loss could range from 26.7 ha (66.0 ac) under Alternative E to 39.2 ha (96.9 ac) under Alternative B. Because no information is currently available on the density of this species in different habitats, it is not possible to estimate the number of shrews that could potentially be affected by the proposed action. However, the direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of habitats potentially suitable for Preble's shrew in the regional study area.[1]

Kit Fox

Because there is limited suitable habitat along the Wasatch Mountains in the vicinity of the study area, kit foxes are considered extremely rare and have a low probability of occurring there. If they do occur in the study area, they are most likely to frequent salt desert scrub habitats. All the proposed build alternatives could result in the direct loss of suitable habitat for this species. As described in the wildlife technical memorandum, this loss could range from 39.3 ha (97.1 ac) under Alternative B to 69.3 ha (171.2 ac) under Alternative C. The direct impacts of the Legacy Parkway project would affect less than 0.1 percent of the overall extent of these habitats in the regional study area.

Bird Species—Federally Listed

As described in Section 4.15.2.1 above, the yellow-billed cuckoo was proposed for listing as threatened under the federal ESA after the Final EIS was published. However, because the cuckoo was considered a state species of species concern in the Final EIS, impacts on the species were disclosed in that document, and those impacts have not changed.

Similarly, impacts on bald eagle have not changed since publication of the Final EIS.

Bird Species—State Species of Special Concern

Six state bird species of special concern have been removed from the Utah State Sensitive Species List since publication of the Final EIS and are therefore no longer addressed in this document. Three additional avian species that could occur in the study area—grasshopper sparrow, bobolink, and Northern goshawk—have been listed as state species of special concern. Potential impacts on these species are described below.

[1] See Section 4.13, *Wildlife*, for a definition of the geographic extent of the regional study area.

There have been no other changes to the impacts or mitigation measures described for threatened and endangered species since publication of the Final EIS.

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions (2004) No-Build Alternative, there would be no project-related impacts on grasshopper sparrow, bobolink, or Northern goshawk.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. In addition, residential, commercial, and industrial development will continue in the study area. These future projects could impact grasshopper sparrow, bobolink, and Northern Goshawk in the study area.

Build Alternatives

Grasshopper Sparrow

Grasshopper sparrows have not been documented in the study area but could potentially occur there. Because of this status, the potential impact of the proposed build alternatives on this species would be small or nonexistent.

Bobolink

Bobolinks have occasionally been observed in agricultural fields at the northern end of the study area near the FBWMA. However, no one has ever documented the area of use beyond its general location or how many individuals use the area. All the proposed build alternatives could result in the direct loss of some suitable breeding and foraging habitats for this species, but the amount of habitat loss is unknown because the number of birds and the area of use have not been determined.

Northern Goshawk

Northern goshawks have not been observed in the study area. However, some studies on the seasonal movement and habitat use patterns suggest that goshawks could potentially use the study area during the winter. Moreover, the study area supports prey species that could sustain wintering individuals that move through the Great Salt Lake Ecosystem. The few wintering individuals that may occur in this region probably range over a large area that supports a variety of grassland and shrubland habitats. Direct habitat loss under any proposed build alternative would not be likely to affect this species.

Mitigation Measures

As described in the Final EIS, the reasonable and prudent mitigation measures outlined in the biological opinion for the proposed action would be implemented to minimize take of bald eagles. Table 4.15-3 lists theses measures and their terms and conditions. Terms and conditions of the biological opinion are no longer considered nondiscretionary under authority of the ESA with respect to the peregrine falcons; however, USFWS still recommends their implementation (U.S. Fish and Wildlife Service 1999b). The Legacy Nature Preserve would also mitigate the loss of habitat for wildlife species that use the study area. In addition, site-specific preconstruction surveys would be completed for Preble’s shrew, grasshopper

sparrow, and bobolink to determine whether any proposed build alternative could disturb local populations or active nests of the species.

See Section 4.13, *Wildlife*, for a more complete description of the mitigation proposed for impacts on wildlife species.

Table 4.15-3 Reasonable and Prudent Mitigation Measures and Terms and Conditions of Biological Opinion

Mitigation Measure Number	Description of Measure	Terms and Conditions
RPM 1	Measures shall be implemented to prevent construction activities from impacting nesting or wintering bald eagles.	No construction activity will occur from the courtship through incubation/brood rearing periods (approximately January 1 through May 21) within one mile of the bald eagle nest. During the nestling through post fledging dependency period (approximately May 21 through August 31), the one-mile buffer may be relaxed to one-half mile for some activities. Coordination with and concurrence from USFWS must occur prior to any activities occurring under this term/condition. FHWA shall require continuous monitoring of the bald eagle nest by a qualified wildlife biologist for activities occurring within one mile of the bald eagle nest. If, during monitoring, the bald eagles appear disturbed in any manner, construction activities shall immediately cease, and FHWA shall immediately follow the reporting requirement issued in the biological opinion. No construction activities will occur from November 1 through March 31 within one-half mile of the bald eagle winter roosting sites.
RPM 2	Measures shall be implemented to prevent construction activities from impacting nesting peregrine falcons.	No construction activities will occur from the courtship through incubation/brooding periods (approximately February 1 through June 21) within one mile of the peregrine falcon aerie. During the nestling through post-fledging dependency period (June 21 through August 31), the one-mile buffer may be relaxed to one-half mile for some activities. Coordination with and concurrence from the USFWS must occur prior to any activities occurring under this term/condition. FHWA shall require continuous monitoring of the peregrine falcon aerie by a qualified wildlife biologist for any activities occurring within one mile of the peregrine falcon aerie. If, during monitoring, the peregrine falcons appear disturbed in any manner, construction activities shall immediately cease, and FHWA shall immediately follow the reporting requirements issues in this biological opinion.

Mitigation Measure Number	Description of Measure	Terms and Conditions
RPM 3	Measures shall be implemented to control human use of the area so as to prevent take, particularly harm and harassment, to nesting bald eagles and peregrine falcons and/or their young as well as to wintering bald eagles.	Project employees will be informed of the presence of the bald eagle and peregrine falcon and the need to minimize disturbance during nesting and wintering periods.
		No recreational trail facilities which encourage extended human use of the area will be constructed within one mile of the nest and roost sites.
		Right-of-way fence will be constructed and maintained along the length of the highway to deter human use of the proposed Legacy Nature Preserve.
RPM 4	Measures shall be implemented to prevent highway maintenance activities from impacting nesting bald eagles and peregrine falcons over the life of the project.	No maintenance activities that result in noise or activity levels above that of normal highway operation conditions shall be conducted within one mile of the peregrine falcon aeries and one mile of the bald eagle nest site during the breeding season.
		No maintenance activities that result in noise or activity levels above that of normal highway operation conditions shall be conducted from November 1 through March 31 within one-half mile of the bald eagle winter roost sites.

Source: Final Formal Biological Opinion for Project Number SP-0067, Legacy Parkway, Salt Lake and Davis Counties, Utah (U.S. Fish and Wildlife Service 1999a).

Section 4.16

Historic and Archaeological Resources

This section provides an update on cultural and paleontological resources located in the area of potential effect (APE), an analysis of potential impacts on newly identified historic properties, and a discussion of how the revised draft Memorandum of Agreement (MOA) (see Appendix A) will address these potential impacts.

4.16.1 Approach and Methodology

4.16.1.1 Supplemental EIS

To update the affected environment and environmental consequences information associated with historic structures and archaeological sites in the study area, Sections 3.16 and 4.16 of the Final EIS were reviewed to determine the changes that had taken place since publication of the Final EIS. The study area for cultural and paleontological resources is represented by the APE, which, in general, encompasses the Legacy Nature Preserve and a 1,000-m (3,280-ft) area on either side of the proposed build alternative alignments. The APE for the Supplemental EIS is similar to the survey area described in the Final EIS, and is smaller than the study are defined in Section 4.0.1, *Study Area*. Slight modifications to this general definition of the APE are represented in the following documents.

- Class III Cultural Resource Inventory of 255 acres for the Legacy Nature Preserve (Wright et. al. 2001).
- Legacy Parkway Pipeline Relocation Project Final Class III Cultural Resources Inventory Letter Report (SWCA Environmental Consultants 2002).
- Site 42Dv94: A Human Remains Discovery in the Jordan River Wetlands, Davis County, Utah (SWCA Environmental Consultants 2003a).
- Site 42Dv98: IMACS Site Form (SWCA Environmental Consultants 2003b).
- Draft: Industrial Debris and Bottle Louse: Data Recovery at the Lagoon Drive Discovery Site (42Dv93) on the Legacy Parkway project, Farmington, Davis County, Utah (SWCA Environmental Consultants 2004a).
- Final Documentation of the Woodman Townsite, the Antelope Island Improvement Company Boat Landing, the Lake Shore Bathing Resort, and Associated Features for the Legacy Parkway Pipeline Project in Davis County, Utah (SWCA Environmental Consultants 2004b).

The following supplemental investigations and activities were completed to update information relative to historic structures and prehistoric and historic archaeological sites in the APE.

- During the Section 404 process after publication of the Final EIS, additional literature reviews and field investigations were conducted for the parcels associated with the proposed Legacy Nature Preserve. These additional archaeological sites were identified, evaluated, and otherwise documented in the six reports listed above.

- Data recovery excavations were conducted in 2000 at one of the prehistoric sites in the APE (42Dv2). Documentation of the field investigation and the results are pending. Additional field investigations were conducted at 42Dv2 during construction monitoring to determine whether site boundaries extended beyond previously known areas.

- The historic structure inventory in the Final EIS was updated to account for structures in the APE whose eligibility for listing on the National Register of Historic Places (NRHP) had changed since publication of the Final EIS (Overstreet et al. 2004).

- Structures in the Clark Lane Historic District (CLHD) were evaluated as components of that district, as listed on the NRHP, rather than as an assemblage of individually eligible (or not eligible) structures, which was how they were evaluated in the Final EIS.

- In consultation with the Utah State Historic Preservation Office (SHPO), it was determined that the UPRR and D&RG corridors are eligible for listing on the NRHP.

- The Utah Geological Survey was contacted to confirm the presence of previously documented paleontological resources and to determine whether new paleontological resources had been discovered since publication of the Final EIS (Wright et al. 2001).

National Register of Historic Places – Criteria for Eligibility for Listing

Criteria for evaluating the significance of resources for listing on the NRHP are outlined in 36 CFR 800.10, “National Register Criteria,” and in handbooks that describe the NRHP evaluation process. Four criteria are used to evaluate the significance of properties—Criterion A through Criterion D. Under all the criteria, the quality of significance is considered present in sites that possess integrity of location, design, setting, materials, workmanship, feeling, and association. However, quality of significance also serves to differentiate the criteria, as shown below.

- **Criterion A**: The quality of significance is present in sites that are associated with events that have made a significant contribution to the broad patterns of our history.

- **Criterion B**: The quality of significance is present in sites that are associated with the lives of persons significant in our past.

- **Criterion C**: The quality of significance is present in sites that embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

- **Criterion D**: The quality of significance is present in sites that have yielded, or may be likely to yield, information important in prehistory or history.

All historic and archaeological resources identified in this document were evaluated using these criteria for eligibility for listing on the NRHP.

4.16.1.2 Memorandum of Agreement

On June 21, 2000, as part of the Final EIS process, an MOA was signed by the Advisory Council on Historic Preservation (ACHP), SHPO, FHWA, UDOT, and the Utah Division of Indian Affairs, with tribal concurrence from the Northwest Band of Shoshone of the Shoshone Nation, Idaho and Utah. Other tribes were invited to concur but declined to sign as concurring parties. These tribes included the Shoshone Bannock Tribes of Idaho, the Ute Indian Tribe of the Uintah-Ouray, Utah, the Confederated Tribes of the Goshute (Ibapah), and the Skull Valley Band of Gosiute, Utah. The MOA governs the treatment and disposition of resources in the APE that are under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA).

A revised draft MOA was drafted in November 2004 to address comments received from the public regarding potential construction-related vibration impacts on structures within the CLHD; to address discovery, data recovery, minimization of impacts, and preservation of historic and archaeological resources eligible for listing on the NRHP that were discovered after publication of the Final EIS; and to provide additional requirements for coordinating with interested tribes. Although still under review by the SHPO, a copy of the revised draft MOA, as well as a copy of the June 2000 MOA, are included in Appendix A.

4.16.2 Affected Environment

The following subsections provide a summary of updated information on the affected environment, relative to prehistoric and historic archaeological sites, historic structures, historic railroad corridors, and paleontological resources.

4.16.2.1 Prehistoric and Historic Archaeological Sites

The Final EIS identified the then-known prehistoric and historic sites, including 27 sites that were recorded for the first time during field surveys conducted for the Final EIS in 1998 (Baseline Data Inc. 1998). The following sites were discovered or their status changed as a result of the additional investigations and activities described above in 4.16.1.1. Table 4.16-1 below, which updates Table 3-34b in the Final EIS, lists the prehistoric and historic and archaeological sites identified in the APE during field visits.

Site 42Dv2 (Prehistoric Camp)

42Dv2 is a large, prehistoric site that was identified in the Final EIS. In 2000, in accordance with the stipulations of the June 2000 MOA (see Section 4.16.1.2, *Memorandum of Agreement*), data recovery excavations were conducted at 42Dv2, during which both cultural materials and human remains were recovered. Excavations at 42Dv2 were halted when it was determined that construction of the proposed action (i.e., groundbreaking activities associated with construction of Alternative D [Final EIS Preferred Alternative]) would not affect the site. The documentation of the investigation is pending.

Supplemental field investigations at 42Dv2 were conducted during initial construction and monitoring activities associated with construction of Alternative D (Final EIS Preferred Alternative), in accordance

with the June 2000 MOA, to determine whether the previously determined boundaries of the site extended west into the right-of-way of Alternative D. Cultural materials and features were identified west of the previously determined boundaries of the site, indicating that the boundaries of 42Dv2 extend into the right-of-way of Alternative D. The site boundaries were expanded to the west to include those elements identified during construction monitoring before construction activities were halted (See Revised Draft MOA, Appendix A).

Site 42Dv3 (Prehistoric Site)

The expansion of the proposed Legacy Nature Preserve since publication of the Final EIS prompted a new literature search and field investigation (Wright et al. 2001). One additional prehistoric site was identified in the APE as a result of the literature search, 42Dv3. This site had been previously recorded, but locating it again in the field was not possible because of insufficient location data in the original site form (Wright et al. 2001). As a result, 42Dv3 is not further considered in this supplemental evaluation.

Sites 42Dv68 and 42Dv69 (Historic Storage Facilities)

These historic archaeological sites, located at 350 North Redwood Road, were removed for construction of the Foxboro development, a residential construction project unrelated to the Legacy Parkway project. As a result, they are no longer considered in this supplemental evaluation.

Site 42Dv88 (Prehistoric Lithic and Ceramic Scatter)

This prehistoric lithic and ceramic scatter was identified in the proposed Legacy Nature Preserve during supplemental studies (Wright et al. 2001).

Site 42Dv89 (Historic Berms)

This archaeological site comprising two historic earthen and rock slag berms was first investigated in 2001 (Wright et al. 2001). The site was recorded again with expanded boundaries in 2004 (SWCA Inc., Environmental Consultants 2004b).

Site 42Dv90 (Historic Archaeological Debris)

This archaeological site comprising a subsurface deposit of historic debris and surface architectural debris was identified in the Legacy Nature Preserve during investigations completed in that area in 2002 for pipeline relocations associated with construction of Alternative D (Final EIS Preferred Alternative) (SWCA Inc., Environmental Consultants 2002).

Site 42Dv91 and 42Dv92 (Historic Ditches)

Archaeological sites 42Dv91 and 42Dv92, two earthen water diversion ditches, were identified in the Legacy Nature Preserve during investigations completed in that area in 2002 for pipeline relocations associated with construction of Alternative D (SWCA Inc., Environmental Consultants 2002).

Site 42Dv93 (Historic Trash Scatter)

This site comprising historic trash scatter was discovered during construction monitoring activities associated with the proposed action. The site, consisting of a historic trash debris deposit containing glass,

ceramics, and metal, is the probable remains of an early twentieth-century dairy operation. Because it was discovered during construction, data recovery and excavation data recovery mitigation was conducted in 2002 (SWCA Inc., Environmental Consultants 2004a).

Site 42Dv94 (Prehistoric Site)

This site was discovered in 2002 during monitoring activities associated with the proposed action. The site contained human remains, which were discovered eroding from the margins of the City Drain Canal in North Salt Lake City, Utah. The human remains have been fully excavated; however, additional remains may be present in the area (SWCA Inc., Environmental Consultants 2003a).

Site 42Dv97 (Historic Privy)

A historic privy (42Dv97) was identified after publication of the Final EIS, subsequent to the acquisition of a residential property at 1395 W. Parrish Lane in Centerville. In consultation with SHPO, FHWA and UDOT determined that it would be necessary to evaluate site eligibility if construction activities resumed at the site.

Site 42Dv98 (Prehistoric/Historic Lithic and Ceramic Scatter)

This is a multi-component site consisting of a prehistoric lithic and ceramic scatter and a historic trash scatter. The site was identified after publication of the Final EIS during investigations of the proposed Legacy Nature Preserve (SWCA Inc., Environmental Consultants 2003b).

Site 42Dv102 (Historic Surface Scatter and Historic Artifacts)

Historic archaeological site 42Dv102 was identified after publication of the Final EIS during field investigations in the Legacy Nature Preserve associated with proposed installation of a water pipeline associated with construction of Alternative D (SWCA Inc., Environmental Consultants 2002). The site consists of a historic artifact scatter, containing primarily glass and ceramics.

Site 42Dv103 (Historic Surface Scatter and Historic Artifacts)

Site 42Dv103 was identified after publication of the Final EIS during field investigations in the Legacy Nature Preserve associated with proposed installation of a water pipeline associated with construction of Alternative D (SWCA Inc., Environmental Consultants 2002). It consists of a surface scatter of historic artifacts.

Site 42Dv112 (Historic Townsite)

42Dv112, referred to as the Woodman Townsite, was identified during additional archaeological investigation in the Legacy Nature Preserve after a visual review of large-scale aerial photographs indicated a street-grid pattern associated with the nineteenth-century townsite (SWCA Inc., Environmental Consultants 2004b).

Site 42Dv113 (Historic Berm)

This site is a historic boat landing consisting of an earthen and slag berm. It was identified after publication of the Final EIS during an archaeological investigation in the Legacy Nature Preserve, which also resulted in the discovery of 42Dv112 (SWCA Inc., Environmental Consultants 2004b).

Table 4.16-1 Update of Historic and Prehistoric Archaeological Sites Identified in the APE during Field Surveys*

Site Number	Site Type	Description	NRHP Eligible	Criterion
Davis County				
42Dv2	Prehistoric	Camp—Human remains	Yes	D
42Dv22	Prehistoric	Burial	No	NA
42Dv67	Historic	Homestead	Yes	C, D
42Dv68	Historic	Storage facility	No	NA
42Dv69	Historic	Storage facility	No	NA
42Dv70	Prehistoric	Lithic and ceramic scatter	Yes	D
42Dv71	Historic	Well	No	NA
42Dv72	Prehistoric	Lithic and ceramic scatter	Yes	D
42Dv73	Historic	Trash scatter	No	NA
42Dv74	Prehistoric/historic	Artifact scatter/foundation	Yes	
42Dv75	Historic	Water conveyance	No	NA
42Dv76	Prehistoric	Lithic and ceramic scatter	Yes	D
42Dv77	Prehistoric	Lithic scatter	Yes	D
42Dv80	Prehistoric	Artifact scatter	Yes	D
42Dv88	Prehistoric	Lithic and ceramic scatter	Yes	D
42Dv89	Historic	Railroad berms, wooden posts	No	NA
42Dv90	Historic	Archaeological deposit and architectural debris	Yes	D
42Dv91	Historic	Canal remnant	No	NA
42Dv92	Historic	Canal remnant	No	NA
42Dv93	Historic	Debris from light-industrial dairy	No	D
42Dv94	Prehistoric	Human remains	Yes	D
42Dv97	Historic	Privy	Undetermined	Likely D
42Dv98	Prehistoric/historic	Lithic and ceramic scatter	Yes	D
42Dv102	Historic	Surface scatter of historic artifacts	No	NA
42Dv103	Historic	Surface scatter of historic artifacts	No	NA
42Dv112	Historic	Townsite	No	NA
42DV113	Historic	Earthen/slag berm, railroad spur	No	NA
Salt Lake County				
42Sl 154/182	Prehistoric/Historic	Lithic scatter/glass scatter	Yes	D
42Sl155	Prehistoric	Lithic scatter	No	NA

Site Number	Site Type	Description	NRHP Eligible	Criterion
42Sl197	Prehistoric	Artifact scatter	No	NA
42SL 241	Historic	Trash scatter	No	NA
42SL 242	Prehistoric/historic	Artifact/trash scatter	Yes	D
42SL 243	Historic	Trash scatter	No	NA
42SL 244	Prehistoric	Lithic scatter	No	NA
42SL 245	Prehistoric/historic	Artifact/trash scatter	No	NA
42SL 246	Prehistoric	Artifact scatter	Yes	D
42SL 247	Historic	Trash scatter	No	NA
42SL 248	Prehistoric	Lithic scatter	Yes	D
42SL 249	Prehistoric	Lithic/groundstone scatter	No	NA
42SL 250	Historic	Trash scatter	No	NA
42SL 251	Historic	Concrete foundation	No	NA
42SL 252	Prehistoric	Artifact scatter	No	NA
42SL 253	Historic	Trash scatter	No	NA
42SL 254	Historic	Trash scatter	No	NA
42SL 255	Historic	Trash, depressions	Yes	D

Note:
* Shaded cells indicate sites found or updated during additional surveys since 1998.
Source: Wright et al. 2001; Christensen 2004

4.16.2.2 Historic Structures

The historic structure inventory completed in 1998 for the Final EIS identified 26 in-period structures (i.e., at least 45 years old) within the APE (Federal Highway Administration et al. 2000). Of the 26 structures, 18 were considered eligible for listing on the NRHP. A new historic structure inventory of the APE was conducted in 2003–2004 to update the previous inventory (Overstreet et al. 2004). This inventory identified 36 in-period structures, not all of which are eligible for listing on the NRHP, and one NRHP historic district, the CLHD. (The historic district is discussed Section 4.16.2.3.) Table 4.16-2 provides an updated list of these structures and consolidates information from the Final EIS and the field surveys completed by Wright et al. (2001) and Overstreet et al. (2004).

During the 2003–2004 field surveys, 23 structures were identified as individually eligible for listing on the NRHP. Their location is illustrated on Figures 4.16-1a and 4.16-1b. Potential impacts on these 23 structures and on the CLHD are discussed below in Section 4.16.3. For clarification, it should be noted that the in-period historic structures that were listed individually in the Final EIS but are now considered part of the CLHD are listed separately in Table 4.16-3. Tables 4.16-2 and 4.16-3 together represent an update of Table 3-35 in the Final EIS.

Table 4.16-2 In-Period Historic Structures in the APE, outside the Clark Lane Historic District[1]

Property Address	NRHP Eligibility		Building Type	Date Constructed	Date(s) Recorded	Comments[2]
	1998	2004				
White House, 10 North 650 West, Farmington	Eligible	NA	Temple Form	1910	1998	Structure documented according to June 2000 MOA and then demolished.
641 W. Glover Lane, Farmington	Eligible	NA	Bungalow	1940	1998	Final EIS noted structure was eligible for listing on the NRHP, but Colman and Colman (1998) noted not eligible. Overstreet et al. (2004) could not locate.
326 Burke Lane, Farmington	NA	Not Eligible	Hall Parlor House	1920	2004	
About 1300 W. Glover Lane, Farmington	NA	Eligible	Animal Facility	1950	2004	
453 W. Glover Lane, Farmington	NA	Not Eligible	WWII-era Cottage	1955	2004	
About 415 South 650 West, Farmington	NA	Eligible	Animal Facility	1950	2004	
About 637 South 650 West, Farmington	Eligible	Eligible	Cross Wing	1910	1998, 2004	Overstreet et al. (2004) recorded again as an animal facility.
788 South 650 West, Farmington	Eligible	NA	Bungalow	1945	1998	Overstreet et al. (2004) could not locate.
About 2120 South 650 West, Farmington	NA	Eligible	Animal Facility	1930	2004	
1515 North 1100 West, West Bountiful	NA	Eligible	Foursquare House	1920	2004	
About 2125 North 1100 West, West Bountiful	NA	Eligible	Animal Facility	1940	2004	

Property Address	NRHP Eligibility		Building Type	Date Constructed	Date(s) Recorded	Comments[2]
	1998	2004				
662 W. Clark Lane, Farmington	NA	Eligible	Animal Facility	1950	1998, 2004	
541 West 250 South, Farmington	Not Eligible	NA	Residential	1945	1998	Overstreet et al. (2004) could not locate.
1020 North 2000 West, Kaysville	Eligible	NA	Residential	1910	1998	Final EIS noted structure was eligible for listing on the NRHP, but Colman and Colman (1998) noted not eligible.
1395 W. Parrish Lane, Centerville	Not Eligible	NA	Bungalow	1930	1998	Overstreet et al. (2004) could not locate.
680 S. Redwood Rd., Woods Cross	Eligible	NA	Bungalow	1930	1998	Final EIS noted structure was eligible for listing on the NRHP, but Colman and Colman (1998) noted not eligible. Overstreet et al. (2004) could not locate.
772 S. Redwood Rd., Woods Cross	NA	Not Eligible	Bungalow	1930	2004	
808 S. Redwood Rd., Woods Cross	NA	Not Eligible	Bungalow	1930	2004	
About 836 S. Redwood Rd., Woods Cross	NA	Eligible	WWII-era Cottage	1950	2004	
864 South 1800 West, Woods Cross	Eligible	Not Eligible	Bungalow	1930	1998, 2004	Overstreet et al. (2004) recorded again as 864 S. Redwood Rd. and as not eligible for listing on the NRHP.
918 S. Redwood Rd., Woods Cross	NA	Eligible	Cross Wing	1920	2004	

Property Address	NRHP Eligibility		Building Type	Date Constructed	Date(s) Recorded	Comments[2]
	1998	2004				
900 South 1800 West, Woods Cross	Not Eligible	Eligible	Cross Wing	1910	1998, 2004	Overstreet et al. (2004) recorded as about 946 S. Redwood Rd., a WWII-era cottage, date 1950.
946 South 1800 West, Woods Cross	Eligible	Eligible	Residential	1920	1998, 2004	Overstreet et al. (2004) recorded again as about 974 S. Redwood Rd
1430 South 1800 West, Woods Cross	Not Eligible	Not Eligible	Cross Wing	1915	1998, 2004	Overstreet et al. (2004) recorded again as 1430 S. Redwood Rd.
About 1452 S. Redwood Rd., Woods Cross	NA	Eligible	WWII-era Cottage	1950	2004	
1650 South 1800 West, Woods Cross	Eligible	Eligible	Cross Wing	1915	1998, 2004	Overstreet et al. (2004) recorded again as 1650 S. Redwood Rd.
1890 S. Redwood Rd., Woods Cross	Not Eligible	NA	Residential	1950	1998	Overstreet et al. (2004) could not locate.
2016 South 1800 West, Woods Cross	Not Eligible	Eligible	Cross Wing	1920	1998, 2004	Overstreet et al. (2004) recorded again as 2018/2020 S. Redwood Rd.
About 2408 S. Redwood Rd., Woods Cross	Eligible	Eligible	WWII-era Cottage	1950	2004	
1095 N. Redwood Rd., North Salt Lake	Eligible	Eligible	WWII-era Cottage	1950	2004	
About 900 N. Redwood Rd., North Salt Lake	Not Eligible	Eligible	Foursquare House	1905	2004	
350 (1) N. Redwood Rd., North Salt Lake	NA	Eligible	Military Storage	1940	2004	Structure part of complex recorded as archaeological site 42Dv68 in 1997; recently subject of mitigation; removed for housing development.

Property Address	NRHP Eligibility		Building Type	Date Constructed	Date(s) Recorded	Comments[2]
	1998	2004				
350 (2) N. Redwood Rd., North Salt Lake	NA	Eligible	Military Storage	1940	2004	Structure part of complex recorded as archaeological site 42Dv68 in 1997; recently subject of mitigation; removed for housing development.
350 (3) N. Redwood Rd., North Salt Lake	NA	Eligible	Military Storage	1940	2004	Structure part of complex recorded as archaeological site 42Dv68 in 1997; recently subject of mitigation; removed for housing development.
2770 North 2200 West, North Salt Lake	NA	Eligible	Foursquare House	1920	2004	
2704 North 2200 West, North Salt Lake	NA	Not Eligible	WWII-era Cottage	1950	2004	
2662 North 2200 West, North Salt Lake	NA	Eligible	Bungalow	1930	2004	
2650 North 2200 West, North Salt Lake	NA	Eligible	WWII-era Cottage	1950	2004	
2664 North Rose Park Lane, North Salt Lake	NA	Eligible	Foursquare House	1910	2004	
2790 North 2200 West, Salt Lake City	Eligible	Not Eligible	Temple Form	1935	1998, 2004	Overstreet et al. (2004) recorded as a WWII-era cottage, date 1950.
3067 North 2200 West, Salt Lake City	Eligible	NA	Residential	1930	1998	Overstreet et al. (2004) could not locate.
3071 North 2200 West, Salt Lake City	Eligible	NA	Residential	1930	1998	Overstreet et al. (2004) could not locate.
3200 North 2200 West, North Salt Lake	NA	Eligible	Ranch House	1955	2004	

Property Address	NRHP Eligibility		Building Type	Date Constructed	Date(s) Recorded	Comments[2]
	1998	2004				
About 3290 North 2200 West, North Salt Lake	NA	Eligible	Ranch House	1950	2004	
Structure in Section 36, west of Farmington	NA	Not Eligible (2001 survey)	Hall Parlor house	Early 20th Century	2001	Wright et al. (2001) identified structure as a hall parlor house converted to agricultural use as a barn. Noted as not eligible for listing on the NRHP in 2001.
Clark Lane Historic District	NA	Listed on NRHP	Historic District	1856–1940	2004	See Section 4.16.2.3, *Clark Lane Historic District*, and Table 4.16-3.

Note:

[1] Shaded cells represent in-period structures individually eligible for listing on the NRHP based on the 2003–2004 survey.

[2] Overstreet et. al (2004) could not locate several of the structures identified during the 2004 survey. This disparity could be attributable to demolition of these structures since publication of the Final EIS and/or a change in the house number identifying the structure. The current inventory (Overstreet et al. 2004) is the most accurate representation of standing structures in the APE.

1800 W. in Woods Cross = Redwood Road in Woods Cross

Source: Overstreet et al. 2004 and Wright et al. 2001.

4.16.2.3 Clark Lane Historic District

Historical Significance of District and Structures

The CLHD was nominated for listing on the NRHP as a district in 1994. The district encompasses both sides of State Street in the City of Farmington and extends from the State Street overpass over I-15 (400 West) east to 200 West. The northern and southern boundaries of the CLHD are defined by the lot margins of the structures on the northern and southern sides of State Street, in accordance with National Park Service guidelines (National Park Service 1997).

When the CLHD was nominated, it consisted of 26 structures, 13 of which contributed to its historical significance (Balle 1994). The CLHD was associated with agriculture throughout the early part of its period of significance (1856–1940), but most of its agricultural outbuildings have been removed. The existing homes represent a wide variety of architectural styles from the period of significance. Particularly important to the integrity of the CLHD is the row of trees along each side of State Street (Balle 1994).

The Final EIS evaluated individual structures within the boundaries of the CLHD but did not evaluate the district as a single entity. Some of the individual structures evaluated in the Final EIS contribute to the integrity of the CLHD, others do not. Table 4.16-3 lists the structures in the CLHD that were discussed in the Final EIS. Their 2003 status as contributing or non-contributing members to the historical significance

of the CLHD is also provided in the table. Two of the structures within the CLHD—399 W. State Street and 393 W. State Street, Farmington—are within the APE for the proposed action, as indicated in the table. Table 4.16-3 does not represent a complete list of structures within the CLHD; rather, the table lists only those that were originally evaluated in the Final EIS.

Table 4.16-3 Clark Lane Historic District In-Period Historic Structures Identified in Final EIS*

Property Address	Section 106 Status (NRHP)		Building Type	Date Constructed	Date(s) Recorded	Comments
	1998	2003				
340 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Victorian Gothic	1890	1998	
368 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Bungalow	1910	1998	
382 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Bungalow	1920	1998	
393 W. State St., Farmington	Not Eligible	Does not contribute to CLHD	Cross-Wing House	1910	2003	
399 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Period Cottage	1920	1998, 2003	Contributes to CLHD, but also individually eligible for listing on NRHP
367 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Bungalow	1920	1998	
361 W. State St., Farmington	Not Eligible	Does not contribute to CLHD	Bungalow	1940	1998	
335 W. State St., Farmington	Individually Eligible	Contributes to CLHD	Cross Wing	1905	1998	
307 W. State St., Farmington	Not Eligible	Contributes to CLHD	Cross Wing	1900	1998	Shown as 301 W. State St. in Baseline Data Inc. (1998) but corrected for Final EIS to 307 W. State St.

Note:

* Shaded cells represent structures in the CLHD that are within the APE of the proposed action.

Source: Overstreet et al. 2004.

Clark Lane Historic District and Vibration

In 2001, the public was notified that State Street was being considered as a haul route for construction traffic associated with the proposed action. Following this notification, several members of the public expressed concern that historic structures in the CLHD could be damaged by earthborne vibration caused by construction activities. Potential vibration impacts on structures are discussed below in Section 4.16.3.3 and addressed in detail in Section 4.20, *Construction Impacts*.

4.16.2.4 Historic Railroad Corridors

Two historic railroad corridors, the D&RG and UPRR corridors, were not included in the Final EIS. Although SHPO concurred with the inventory at the time the Final EIS was published, because these corridors are within the APE, they are considered potential historical resources in this document. SHPO, FHWA, and other consulting parties determined that the D&RG and the UPRR are eligible for listing in the NRHP under Criterion A

4.16.2.5 Paleontological Resources

As described in the Final EIS, paleontological resources found in the APE consist of invertebrate fossils of low significance. No additional paleontological or prehistoric resources have been found in the APE since publication of the Final EIS.

4.16.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, implementation of any build alternative could affect historic and archaeological resources in the APE. The nature and extent of these impacts, however, have changed since publication of the Final EIS because of the updated historic structure inventory, updated evaluation of the CLHD, and additional field investigations conducted in the APE, including in the proposed Legacy Nature Preserve. Updated impact information relative to historic and archaeological resources in the APE is provided below.

4.16.3.1 Prehistoric and Historic Archaeological Sites

No-Build Alternative

Existing Conditions

There would be no project-related impacts on historic or prehistoric sites under the No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would affect prehistoric and historic archaeological sites in the APE, although the nature and timing of these projects are not known at this time.

Build Alternatives

As described in the Final EIS, eight historic and prehistoric sites eligible for listing on the NRHP were identified in the APE. Since publication of the Final EIS, four additional sites eligible for listing on the NRHP have been identified in the APE, within one additional site still undetermined. Of the total 12 sites located in the APE that are eligible for listing on the NRHP, five could be adversely affected by one or

more proposed build alternative. One additional site, if determined to be eligible for listing on the NRHP, would be adversely affected by one or more proposed build alternative. Adverse impacts associated with ground disturbance and construction activities, such as cutting, grading, and filling, would affect the physical integrity of these six sites, which are described below. Updated and supplemental information on the nature of the impacts on all 13 sites is summarized in Table 4.16-4 below. Table 4.16-4 updates Table 4-35 in the Final EIS.

Site 42Dv2 (Prehistoric Camp)

The Final EIS stated that construction of any proposed build alternative would adversely affect 42Dv2. In accordance with the measures prescribed to mitigate this impact in the Final EIS and in the June 2000 MOA, portions of 42Dv2 were excavated. Excavation at the site was halted in 2002 after it was determined that construction of Alternative D (Final EIS Preferred Alternative) would not affect the site (i.e., the site was not located within the physical footprint of the proposed build alternative). The site boundaries were expanded during construction monitoring efforts, per discovery monitoring stipulations in the MOA, before construction was halted.

As indicated in Table 4.16-4, implementation of Alternatives A, C, D/E would result in an adverse impact on 42Dv2 because, under those alternatives, the site would be incorporated into the proposed right-of-way. Mitigation measures to minimize impacts on 42Dv2 are described below.

Site 42Dv70 (Prehistoric Lithic Scatter)

Although the Final EIS disclosed that 42Dv70 would be adversely affected by all the proposed build alternatives, it was determined during the design-build process that construction of Alternative D would not affect the site (Lizotte pers. comm. 2001a). Similarly, as indicated in Table 4.16-4, of all the build alternatives proposed in the Supplemental EIS, only construction of Alternative B would adversely affect 42Dv70. Mitigation measures to minimize impacts on 42Dv70 are described below.

Site 42Dv77 (Prehistoric Lithic Scatter)

The Final EIS disclosed that construction of Alternative B would result in an adverse impact on 42Dv77. Those impacts would still occur as stated in the Final EIS if Alternative B were selected.

Site 42Dv90 (Historic Archaeological Deposit and Debris)

As described in 4.16.2.1, 42Dv90 was identified in 2002 during pipeline relocation associated with construction of Alternative D (Final EIS Preferred Alternative). As indicated in Table 4.16-4, construction of Alternative B only would result in an adverse impact on this site.

Site 42Dv94 (Prehistoric Site – Human Remains)

As described in 4.16.2.1, 42Dv94 contained human remains, which were discovered eroding from the margins of the City Drain Canal in North Salt Lake City. Although the identified human remains were completely excavated, there is potential for additional remains to be present in the area.

As indicated in Table 4.16-4, implementation of Alternatives A, C, and D/E would result in an adverse impact on 42Dv94 because, under those alternatives, the site would be incorporated into the proposed right-of-way. Mitigation measures to minimize impacts on 42Dv94 are described below.

Site 42Dv97 (Historic Privy)

As described in 4.16.2.1, 42Dv97 consists of a historic privy located in Centerville that was discovered during property acquisition associated with construction of Alternative D. The eligibility of this site for listing on the NRHP has not been determined, but if the site exhibits integrity and sufficient archaeological data potential, it would likely be eligible under Criterion D. If it is determined that 42Dv97 is eligible for listing on the NRHP, Alternatives A and D/E would adversely affect the site. This impact is listed as "unknown" in Table 4.16-4.

Table 4.16-4 Impacts on NRHP-Eligible Historic and Prehistoric Archaeological Sites[1]

Site Number	Site Type	Impact (by Alternative)					
		No-Build	A	B	C	D	E
42Dv2	*Prehistoric camp*	*None*	*Adverse*	*None*	*Adverse*	*Adverse*	*Adverse*
42Dv67	Historic homestead	None	None	None	None	None	None
42Dv70	*Prehistoric lithic scatter*	*None*	*None*	*Adverse*	*None*	*None*	*None*
42Dv72[2]	Prehistoric camp	None	None	None	None	None	None
42Dv74	Prehistoric camp/ historic foundation	None	None	None	None	None	None
42Dv76	Prehistoric lithic scatter	None	None	None	None	None	None
42Dv77	Prehistoric lithic scatter	None	None	Adverse	None	None	None
42Dv80[2]	Prehistoric artifact scatter	None	None	None	None	None	None
42Dv88[2]	Prehistoric lithic and ceramic scatter	None	None	None	None	None	None
42Dv90	Historic	None	None	Adverse	None	None	None
42Dv94	Prehistoric	None	Adverse	None	Adverse	Adverse	Adverse
42Dv97[3]	Historic	None	Unknown	None	None	Unknown	Unknown
42Dv98[2]	Prehistoric/historic	None	None	None	None	None	None

Note:

1 Shaded cells indicate historic and prehistoric sites identified since publication of the Final EIS. Italicized cells indicate historic and prehistoric sites whose impact conclusion has changed since publication of the Final EIS.

2 These sites are located in the area of the proposed Legacy Nature Preserve.

3 Eligibility status of 42Dv97 is currently unknown. If this site is eligible for listing on the NRHP, it would be adversely affected by construction of Alternatives A and D/E.

Source: Federal Highway Administration et al. 2000, HDR Engineering, Inc. 2004g.

In summary, Alternatives A and D/E would adversely affect two NRHP-eligible sites, and one potentially eligible archaeological site. Alternative B would adversely affect three NRHP-eligible sites, and Alternative C would adversely affect two NRHP-eligible sites.

Mitigation Measures

Mitigation would be required for any NRHP-eligible archaeological site physically affected by construction of a proposed build alternative. Typical mitigation measures for NRHP-eligible archaeological sites include archival investigations, development of a data recovery plan, and consultation between FHWA, UDOT, SHPO, the tribes, and other consulting parties.

To date, consultation with SHPO has resulted in the following specific mitigation measures.

- As described above, implementation of Alternatives A, C, D, or E would result in an adverse impact on 42Dv2 and 42Dv94. If any of those build alternatives are selected for implementation, in accordance with the revised draft MOA, the site limits will be delineated and protected from construction activities through the use of construction fencing.

- To minimize impacts to 42Dv70, a professional archaeologist will monitor excavation and earthmoving activities associated with highway construction in the vicinity of the site. Although 42Dv70 would only be adversely affected under Alternative B, this mitigation measure will be implemented regardless of which build alternative is chosen, in accordance with the June 2000 MOA and supplemental consultations with SHPO (Lizotte pers. comm. 2001a).

The existing Legacy Nature Preserve management plan, as described in the Final EIS, provides for short-term protection of historic and archaeological resources within the proposed preserve. No impacts on historic and archaeological resources within the preserve are anticipated from implementation of the proposed build alternatives. The Legacy Nature Preserve mitigation plan will include a management plan to ensure the future health of these resources. In addition, should any build alternative be implemented, a long-term management plan for archaeological sites within the proposed preserve would be developed by FHWA, UDOT, and SHPO in conjunction with the organization that would manage the preserve. Mitigation of adverse effects on archaeological resources would be conducted according to the revised draft MOA (see Appendix A).

4.16.3.2 Historic Structures

As described above in Section 4.16.2.2, 23 in-period structures individually eligible for listing on the NRHP (excluding structures located in the CLHD) are located within the APE. The following provides an update of impacts on those historic structures. Figures 4.16-1a and 4.16-1b illustrate the location of these structures.

No-Build Alternative

Existing Conditions

There would be no project-related impacts on historic structures under the No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would affect historic structures in the APE, although the nature and timing of these projects are not known at this time.

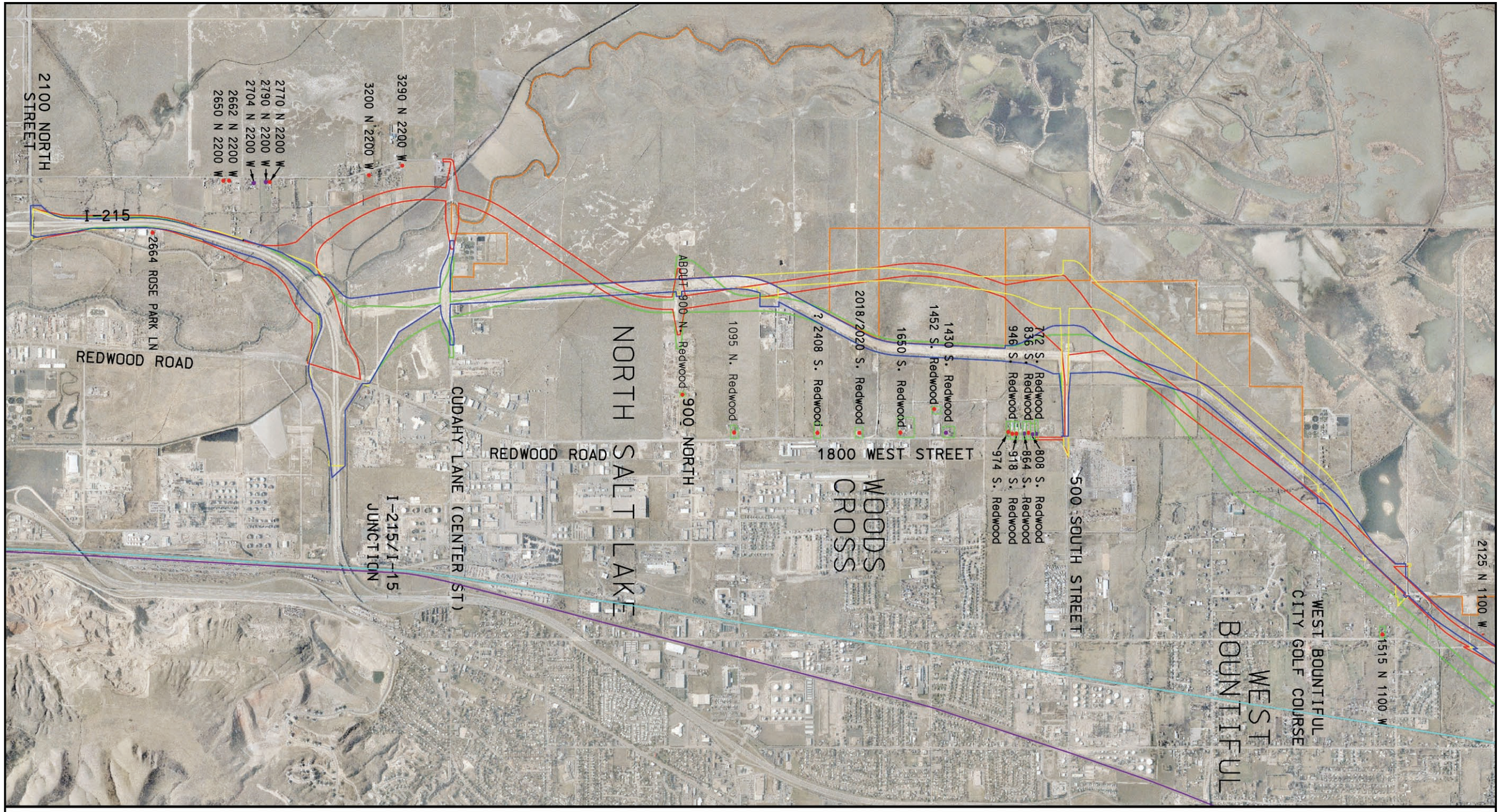
Build Alternatives

The Final EIS stated that one NRHP-eligible historic structure—the White House at 10 North 650 West in Farmington—could be affected by the build alternatives. Since publication of the Final EIS and in accordance with the June 2000 MOA, that building was documented to Utah State intensive-level survey (ILS) standards and removed (i.e., demolished).

Two additional historic structures, 1300 W. Glover Lane and 662 W. Clark Lane, located in the APE and eligible for listing on the NRHP, would be adversely affected by implementation of one or more of the proposed build alternatives. As a result, three NRHP-eligible structures would be affected by one or more proposed build alternative. Table 4.16-5 summarizes impact information by alternative for each historic structure in the APE.

Table 4.16-5 Impacts on NRHP-Eligible Historic Structures

	Impact (by Alternative)					
Property Address	No-Build	A	B	C	D	E
10 North 650 West, Farmington[1]	None	Adverse	Adverse	Adverse	Adverse	Adverse
About 1300 W. Glover Lane, Farmington	None	None	Adverse	None	None	None
About 415 South 650 West, Farmington	None	None	None	None	None	None
About 637 South 650 West, Farmington	None	None	None	None	None	None
About 2120 South 650 West, Farmington[2]	None	None	None	None	None	None
1515 North 1100 West, West Bountiful	None	None	None	None	None	None
About 2125 North 1100 West, West Bountiful[2]	None	None	None	None	None	None
662 W. Clark Lane, Farmington	None	Adverse	None	Adverse	Adverse	Adverse
About 836 S. Redwood Rd., Woods Cross	None	None	None	None	None	None
918 S. Redwood Road, Woods Cross	None	None	None	None	None	None
946 South 1800 West, Woods Cross	None	None	None	None	None	None
974 S. Redwood Road, Woods Cross	None	None	None	None	None	None
About 1452 S. Redwood Rd., Woods Cross	None	None	None	None	None	None
1650 South 1800 West, Woods Cross	None	None	None	None	None	None
2018/2020 S. Redwood Road, Woods Cross	None	None	None	None	None	None
About 2408 S. Redwood Rd., Woods Cross	None	None	None	None	None	None
1095 N. Redwood Rd., North Salt Lake	None	None	None	None	None	None
About 900 N. Redwood Road, North Salt Lake	None	None	None	None	None	None



LEGEND

- Alternative A
- Alternative B
- Alternative C
- Alternative D and E
- Denver & Rio Grande Railroad
- Union Pacific Railroad
- Legacy Nature Preserve
- Clark Lane Historic District
- Eligible Historic Structure
- Non Eligible Historic Structure
- Parcel Boundaries

0 1 2 KILOMETERS

0 0.5 1 MILES

W S N E

Legacy Parkway Supplemental EIS

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Figure 4.16-1a
Historic Structures in the APE

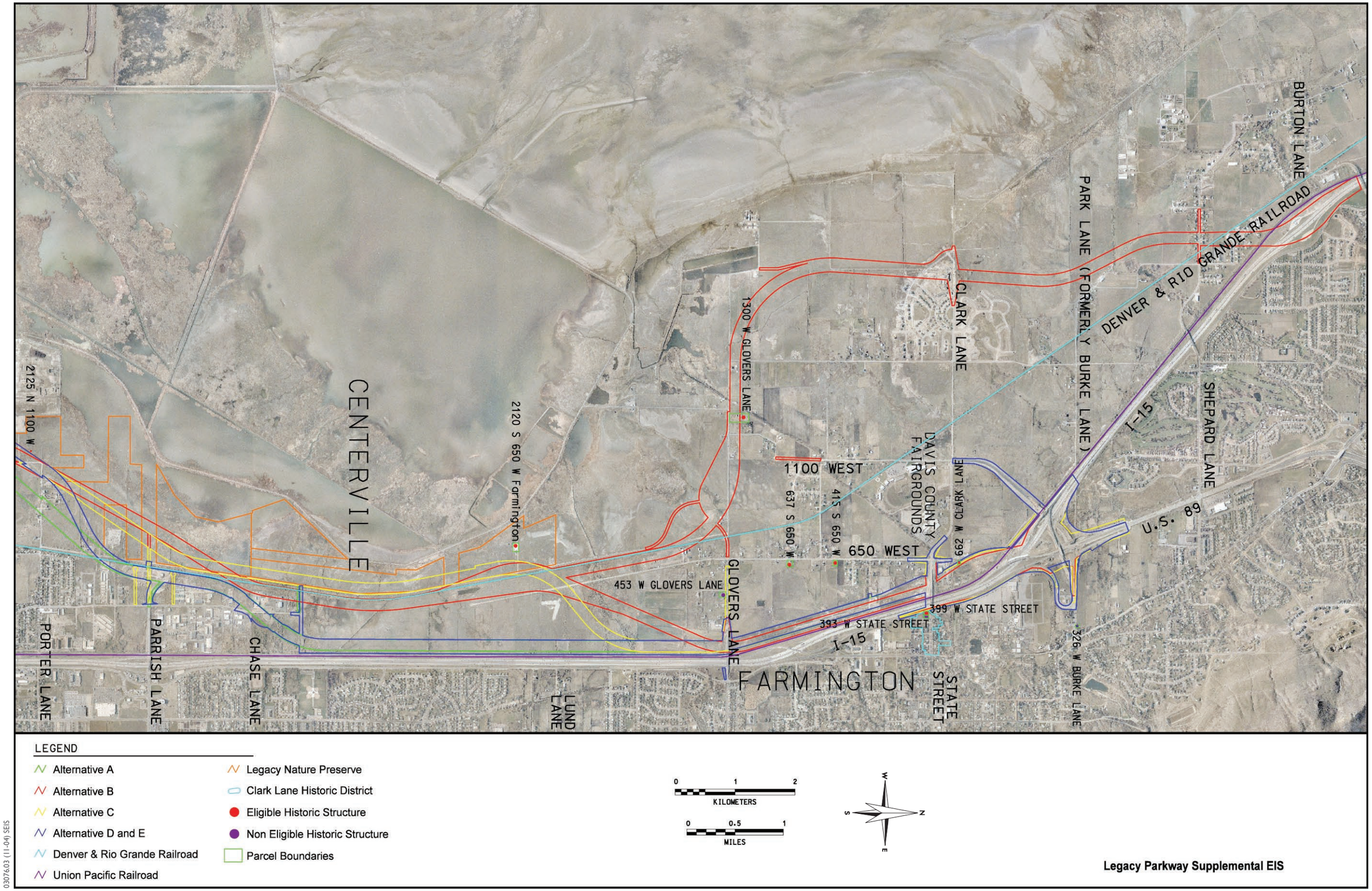

Figure 4.16-1b
Historic Structures in the APE

	Impact (by Alternative)					
Property Address	No-Build	A	B	C	D	E
2770 North 2200 West, North Salt Lake	None	None	None	None	None	None
2662 North 2200 West, North Salt Lake	None	None	None	None	None	None
2650 North 2200 West, North Salt Lake	None	None	None	None	None	None
2664 N. Rose Park Lane, North Salt Lake	None	None	None	None	None	None
3200 N 2200 W, North Salt Lake	None	None	None	None	None	None
About 3290 North 2200 West, North Salt Lake	None	None	None	None	None	None
Clark Lane Historic District	None	None	None	None	None	None

Note:

[1] Property at 10 North 650 West, Farmington (White House), is no longer extant; however, since this property was affected in conjunction with construction of Alternative D (Final EIS Preferred Alternative), it is disclosed as an adverse impact in the Supplemental EIS. This property would also have been affected with implementation of any other proposed build alternative.

[2] These structures are located in the proposed Legacy Nature Preserve. There would be no impacts on these sites.

Source: Federal Highway Administration et al. 2000, HDR Engineering, Inc. 2004g.

In summary, all the proposed build alternatives would adversely affect two of the three NRHP-eligible historic structures located in the APE.

Mitigation Measures

The White House at 10 North 650 West in Farmington, which the Final EIS identified as subject to adverse impacts associated with construction of Alternative D, has been demolished since publication of the Final EIS. Mitigation for this adverse impact was completed as described in the Final EIS (i.e., the building was documented to Utah State ILS standards before it was removed). Mitigation for adverse affects on the historic structures at 1300 W. Glover Lane and 662 W. Clark Lane, both in Farmington, would be conducted according to the revised draft MOA (Appendix A). These measures would include preparation of an ILS form, photographic documentation of the structures, preparation of illustrated floor plans, archival research, and a submittal to the Utah Division of History, Preservation Section.

4.16.3.3 Clark Lane Historic District

As described above in Section 4.16.2.3, part of the CLHD is in the APE; three individual structures that contribute to the CLHD—393 W. State Street, 398 W. State Street, and 399 W. State Street—are located in the APE. Of these structures, only 399 W. State Street is eligible for individual listing on the NRHP. Potential impacts on these structures are presented in context of the CLHD as a whole, because any impact on a contributing element of the CLHD could affect the CLHD as a whole.

No-Build Alternative

Existing Conditions

There would be no project-related impacts on the CLHD under the No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives are implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would impact the CLHD, although the nature and timing of these projects are not known at this time.

Build Alternatives

Construction of any proposed build alternative could affect the CLHD. Although none of the structures in the CLHD would be removed under any proposed build alternative, construction of any proposed build alternative would slightly alter the footprint of the parcels at 393 W. State Street, 398 W. State Street, and 399 W. State Street. Vibration from construction activities could also affect the structures (see Section 4.20, *Construction Impacts*).

Specifically, a total of 121 square meters (sq m) (1,302 square feet [sq ft]) of the existing parcels at 399 W. State Street and 398 W. State Street would be modified through re-grading and fill placement to provide new, permanent driveway access to both parcels. The footprints of the parcels at 399 W. State Street and 393 W. State Street would be increased by a total of 99 sq m (1,066 sq ft) due to realignment of the existing curbs and gutters, as well as a tapering of the road cross section from east to west. These modifications are shown in Figure 5-10, and described in more detail in Chapter 5 of this document.

The modifications described above are addressed in the revised draft MOA (Appendix A). The revised draft MOA includes mitigation measures to ensure that project-related impacts are minimized and that the CLHD and its contributory elements are returned to their original pre-construction condition. The revised draft MOA also includes measures to minimize potential harm from construction-related vibration, as described in Section 4.20, *Construction Impacts*. With implementation of the mitigation measures in the MOA, none of the proposed build alternatives would adversely affect the three parcels within the APE or the CLHD as a whole.

Mitigation Measures

As stated above, the revised draft MOA includes mitigation measures to ensure that project-related impacts are minimized and that the CLHD and its contributory elements are returned to their original pre-construction condition. The revised draft MOA also includes measures to minimize potential harm from construction-related vibration.

4.16.3.4 Historic Railroad Corridors

No Build Alternative

Existing Conditions

There would be no project-related impacts on historic railroad corridors under the No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would impact the historic railroad corridors in the APE, although the nature and timing of these projects are not known at this time.

Build Alternatives

The historic D&RG Railroad corridor, which is eligible for listing on the NRHP under Criterion A, would be affected by implementation of all the proposed build alternatives. Alternative B would cross the D&RG (at grade) three times near Parrish Lane, Shepard Lane, and Glovers Lane. Alternatives A and D/E would cross the D&RG (at-grade) twice, once just south of Parrish Lane in Centerville and once just north of Chase Lane in Centerville. Alternative C would cross the D&RG (at-grade) twice, at approximately Parrish Lane and Lund Lane. These crossings are illustrated in Figures 5-10 and 5-11. FHWA and UDOT have determined, in consultation with SHPO, that these impacts do not represent an adverse effect on the D&RG railroad corridor.

The UPRR railroad corridor, which is also eligible for listing on the NRHP, would not be affected by any proposed build alternative. The build alternatives would bridge the UPRR right-of-way at all intersections within the corridor.

Mitigation Measures

None of the proposed build alternatives adversely affects the NRHP-eligible railroad corridors identified in the APE. No mitigation measures are proposed.

4.16.3.5 Paleontological Resources

No-Build Alternative

Existing Conditions

There would be no project-related impacts on paleontological resources under the No-Build Alternative.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would affect paleontological resources in the APE, although the nature and timing of these projects are not known at this time.

Build Alternatives

As described in Section 4.16.2.5, paleontological resources found in the APE consist of invertebrate fossils of low significance. The proposed build alternatives would not result in an impact on any of these resources.

Mitigation Measures

None of the proposed build alternatives adversely affects paleontological resources identified in the APE. No mitigation measures are proposed.

Section 4.17

Hazardous Waste Sites

This section discusses potential hazardous waste sites within the study area and the potential for the sites to be affected by the proposed build alternatives. It provides updated information on potential hazardous waste sites disclosed in the Final EIS, as well as information on hazardous waste sites identified since publication of the Final EIS. In addition, this section presents information on impacts associated with aerially deposited lead.

4.17.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with potential hazardous waste sites in the study area, Sections 3.17 and 4.17 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for potential hazardous waste sites is described in Section 4.0.1, *Study Area*, of this document.

Environmental databases were searched for properties or sites within the study area that have known contamination and sites that are regulated according to the requirements of state or federal laws (Environmental Data Resources 2003). The following is a list of environmental databases that were searched, many of which were also consulted during preparation of the Final EIS.

- Superfund Sites, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).
- National Priorities List (NPL), priority CERCLIS sites.
- Emergency Response Notification System (ERNS).
- Facility Index System (FINDS), a comprehensive database containing a description of other databases with more information.
- FIFRA/TSCA Tracking System (FTTS), a database created to register companies that handle toxic chemicals under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and Toxic Substance Control Act (TSCA).
- Solid Waste Landfills database (SWLF).
- Resource Conservation and Recovery Information System (RCRIS), Large-Quantity Generators (RCRIS-LQG), Small-Quantity Generators (RCRIS-SQG), and Treatment, Storage, or Disposal Facilities (RCRIS-TSDF).

- Open or closed mines (MINES).
- Aboveground storage tanks (AST).
- Underground storage tanks (UST).
- Leaking underground storage tanks (LUST), both open (under investigation) and closed (no additional actions are required or ever took place).
- Toxic Chemicals Release Inventory System (TCRIS or more commonly TRI).

To obtain additional information on sites identified through these database searches, the ArcIMS 3.0 interactive map viewer (UDEQ Division of Environmental Response and Remediation 2003) was reviewed. ArcIMS 3.0 is a web-based tool, maintained by the UDEQ Division of Environmental Response and Remediation (DERR), which provides consolidated location and status information on many of the sites listed in the databases above.

In addition, since publication of the Final EIS, soil samples were taken at two properties identified as sites of concern in the Final EIS: refinery effluent ditch from fuel tank farm (unique identification [ID] AP-3) and construction contractor yard (Hogan and Associates) (unique ID AP-10). These limited field investigations were conducted to further evaluate the potential to encounter soil or groundwater contamination at these sites (HDR Engineering, Inc. 2000). Additional soil samples were also collected from undisturbed areas within existing UDOT right-of-way at the proposed northern and southern interchange locations. These samples were collected to assess the risk associated with encountering high concentrations of aerially deposited lead at proposed Legacy tie in locations. These areas were chosen because they were located adjacent to existing highway systems where tire wear and the past use of leaded gasoline made the possibility of encountering aerially deposited lead more likely.

Furthermore, David West, Right-of-Way Manager for UDOT, was contacted to determine whether any potential hazardous waste sites within the proposed Alternative D right-of-way had been acquired since publication of the Final EIS.

Impacts on potential hazardous waste sites were also reassessed to determine whether the narrower typical cross section proposed in the Supplemental EIS for each of the build alternatives (i.e., 95 m [312 ft] versus 100 m [328 ft], as described in Chapter 3, *Alternatives*, of this document) would change the impacts on hazardous waste sites disclosed in the Final EIS.

4.17.2 Affected Environment

This section presents a summary of updated information on the affected environment relative to potential hazardous waste sites. Additional hazardous waste sites identified during the database searches described above are listed below. Several potential hazardous wastes sites identified in the Final EIS have been acquired since publication of the Final EIS. The location and status of these properties are also described in this section.

4.17.2.1 Potential Hazardous Waste Sites

As described in Section 3.17.1 of the Final EIS, 63 potentially hazardous waste sites are located in or near the study area. These sites are listed in Table 3-37 and shown in Figures 3-25a through 3-25f in the Final

EIS. Three additional potential hazardous waste sites were identified during the database search described above. These were the only additional sites identified for evaluation in the Draft Supplemental EIS. The additional sites are described below and shown in Figure 4.17-1.

BFI/Stericycle (S104968070)

This site was identified in the SWLF, RCRIS (RCRIS-LQG), and TRI databases. Its LQG unique ID number is S104968070. The address of this site is 90 North 1100 West, North Salt Lake, which is the same address as BFI Waste Systems, a private waste-hauling company. This site contains a medical waste incinerator and may also support a small waste storage area, although no waste storage or treatment is permitted onsite. This site may also be listed because of the waste collection vehicles that are typically stored at such facilities. No notices of violation were identified in the EPA Facility Registry System (FRS).

Quality Plating (1001225950)

This site was identified in the RCRIS database as an RCRIS-SQG, unique identification number 1001225950. It is located at 2425 South, 2087 West, North Salt Lake, east of the alternative alignments. No notices of violation were identified in the EPA FRS.

Davis County Jail (U000557897)

This site was identified in the LUST database, unique identification number U000557897. It is located south of State Street near the proposed northern terminus. Two UST's, one containing diesel fuel and the other gasoline, were removed from the site in September 1996. During removal of the tanks, diesel fuel was discovered, requiring remediation of the site and identification in the LUST database. The site was remediated and the incidents filed in the LUST database were closed (i.e., require no further action) in 1997. No other notices of violation were identified in the EPA FRS.

Table 4.17-1 lists the name, unique ID number, and site type for these three potential hazardous waste sites, as well as the environmental databases that they were identified in.

Table 4.17-1 Potential Hazardous Waste Sites Identified since Publication of the Final EIS

Site Name	Unique ID Number	Site Type	Source of Information
BFI/Stericycle	S104968070	RCRIS-LQG	SWLF, RCRIS, TRI
Quality Plating	1001225950	RCRIS-SQG	RCRIS
Davis County Jail	U000557897	LUST	State LUST/UST List

Note:
Additional potential hazardous waste sites that occur in the study area are listed in Table 3-37 in the Final EIS.

Table 4-36d in the Final EIS lists all potential hazardous waste sites within the right-of-way of Alternative D (Final EIS Preferred Alternative), as well as those that occur within 200 m (656 ft) (i.e., a reasonable distance) of the Alternative D right-of-way. The information in this table has not changed since publication of the Final EIS, except that the three new potential hazardous waste sites listed above are all located within 200 m (656 ft) of the Alternative D right-of-way. In addition, several of the sites located within the Alternative D right-of-way have been acquired since publication of the Final EIS (West pers. comm. [c]). Table 4.17-2 below lists the current status of all the sites that occur within the right-of-

way of Alternatives D and E, and states whether they have been acquired by UDOT. For comparative purposes, Table 4.17-3 lists the potential hazardous waste sites described in Table 4.17-2 and indicates whether they would occur within the right-of way of any other build alternative.

Table 4.17-2 Status of Hazardous Waste Sites in Alternatives D and E Right-of-Way

Site Name	Unique ID Number	Status
Bay Area Refuse Disposal Site (Bountiful City Landfill)	39982	Property has been acquired, but no construction activities have occurred at this location. Potential impacts associated with this site have not changed since publication of the Final EIS
UST (UST 4001371)*	2189010	No change in status since publication of the Final EIS.
Firing Range	AP-1	No change in status since publication of the Final EIS.
Effluent Ditch from Fuel Tank Farm	AP-3	Soil samples collected at site. See 4.17.2.2 for additional information.
Auto Repair Shop	AP-8	Property has been acquired. Onsite structures demolished and site cleared since publication of the Final EIS.
Construction Contractor Yard (Hogan & Associates)	AP-10	Soil samples collected at site. See 4.17.2.2 for additional information.
Paving Contractor Yard	AP-11	Property has been acquired. Site remediation completed in 1998, as described in Section 4.17.3 of the Final EIS.
North West Oil Drain	AP-12	No change in status since publication of the Final EIS.
Petroleum Pipelines (Amoco, Chevron, and Pioneer)	NA	No change in status since publication of the Final EIS.

Note:

* Unable to locate UST site using the Final EIS Unique ID number. Review of DERR interactive map showed UST 4001371 in the same location as UST 2189010 shown in Figure 4-19a in the Final EIS.

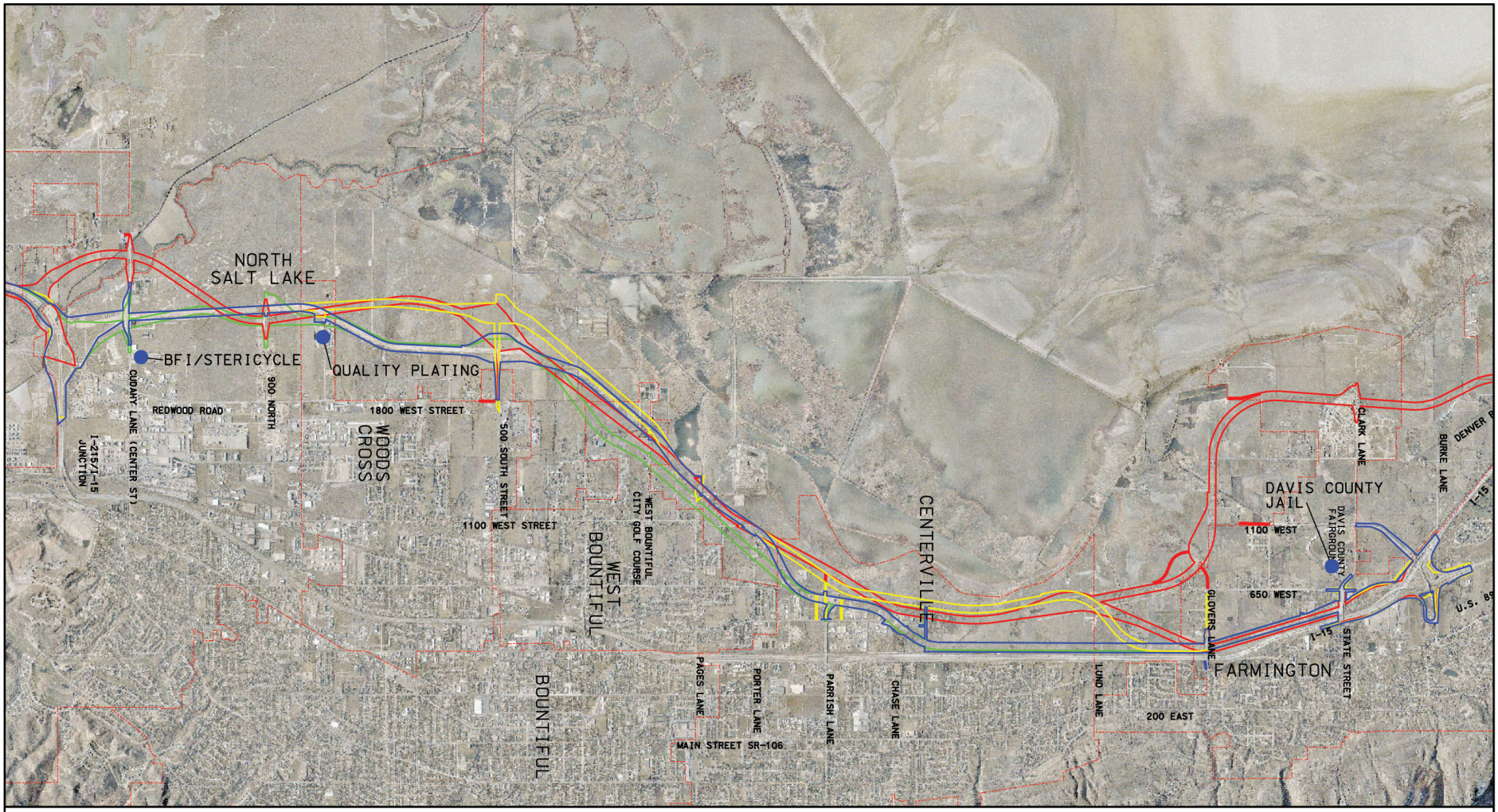

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Figure 4.17-1
Additional Hazardous Waste Sites
Evaluated Since the Publication of the Final EIS

Table 4.17-3 Hazardous Waste Sites in Alternatives D and E Right-of-Way That Would also Be Affected by Other Build Alternatives

		Build Alternatives[1]			
Site Name	Unique ID Number	A	B	C	D and E
Bay Area Refuse Disposal Site (Bountiful City Landfill)	39982		X	X	X
UST (UST 4001371)[2]	2189010	X	X	X	X
Firing Range	AP-1	X		X	X
Effluent Ditch from Fuel Tank Farm	AP-3	X	X	X	X
Auto Repair Shop	AP-8	X			X
Construction Contractor Yard (Hogan & Associates)	AP-10	X			X
Paving Contractor Yard	AP-11	X	X	X	X
North West Oil Drain	AP-12	X	X	X	X
Petroleum Pipelines (Amoco, Chevron, and Pioneer)	NA	X	X	X	X

Notes:

[1] An "X" in a column indicates that the site would be in the right-of-way of the indicated build alternative.

[2] Only hazardous waste sites that occur within the Alternatives D and E right-of-way (see Table 4.17-2) are listed in this table. This information is presented for comparative purposes to illustrate whether other build alternatives would also affect these sites. There are hazardous waste sites that are not listed in this table that would be affected by Alternatives A, B, and C. The status of such sites has not changed since publication of the Final EIS; see Section 4.17.4 of the Final EIS for a detailed discussion of those sites.

4.17.2.2 Results of Field Investigations

Since publication of the Final EIS, limited field investigations have been conducted to further evaluate the potential to encounter soil or groundwater contamination at two hazardous waste sites in the study area: effluent ditch from fuel tank farm (AP-3) and construction contractor yard (Hogan and Associates) (AP-10) (HDR Engineering, Inc. 2000). Because these two sites were located in the Alternative D right-of-way, they were targeted to assess the risk of encountering contamination. If required, clean up at these locations could cause construction delays. The results of those field investigations are summarized below.

Effluent Ditch from Fuel Tank Farm (AP-3)

Four soils samples were collected at AP-3. Diesel-range petroleum hydrocarbons were detected in all four samples, and gasoline-range petroleum hydrocarbons were detected in three of the four samples, although none of the detected contaminants was above allowable standards. Oil and grease contamination was also detected in one of the samples (HDR Engineering, Inc. 2000).

Construction Contractor Yard (Hogan and Associates) (AP-10)

Two areas with stained soil were located during field reconnaissance at AP-10. The first covered a 19-sq m (200-sq ft) area near a drum storage area on the site, and the second covered a 9-sq m (100-sq ft)

area near an AST on the site (HDR Engineering, Inc. 2000). Soil samples collected showed petroleum contamination to a depth of approximately 0.6 m (2 ft) at both locations. Contamination levels were not above allowable standards.

4.17.2.3 Aerially Deposited Lead

The historic use of leaded gasoline and tire wear can lead to a potential increase in concentrations of aerially deposited lead in unpaved areas adjacent to roads and highway. Aerially deposited lead (usually found within the top 0.6 m [2 ft] of soil) and lead in general can cause a range of health effects, including behavioral problems, learning disabilities, seizures, and even death. Children 6 years old and under are at particular risk from lead exposure because their bodies are growing quickly (Environmental Protection Agency 2003a).

There is a potential for construction workers to encounter aerially deposited lead in unpaved areas in the study area that are adjacent to existing roads, in particular in areas near proposed interchange locations. To estimate the potential impacts on construction workers from aerially deposited lead in these areas, UDOT collected and analyzed soil samples from undisturbed areas near the proposed southern and northern termini of the project (Sadik-McDonald pers. comm.). These areas were chosen because they were located adjacent to existing highway systems where tire wear and the past use of leaded gasoline made the possibility of encountering aerially deposited lead more likely. The results of analysis of these samples showed between 28 and 77 milligrams of lead per kilogram of soil (mg/kg). These levels are below both the average background lead concentrations in the Salt Lake Valley (123 mg/kg) and EPA's typical level of concern for lead (400 mg/kg). This potential impact is disclosed below in Section 4.17.3.4.

4.17.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, all the proposed build alternatives could affect potentially hazardous waste sites in the study area. The screening process used to determine which of the hazardous waste sites were of the greatest concern relative to construction of each of the build alternatives has been updated since publication of the Final EIS, as described below. The updated screening process and the potential impacts associated with the identified hazardous waste sites are described below. In addition, impacts on construction workers from aerially deposited lead in the study area are discussed below.

The reduction of the right-of-way width from 100 m (328 ft) to 95 m (312 ft) did not change the impact conclusions associated with potential hazardous waste sites.

4.17.3.1 Site Screening

As described in the Final EIS, potential hazardous waste sites were screened to identify the sites in or near the proposed alignment that were more likely to contain contaminated soil or groundwater. Specifically, the screening process entailed the following two steps.

- Identifying the type of site or event and its current status (described in Section 4.17.2 above).
- Comparing the site's location to the proposed alignments (by proximity and location, with respect to the hydraulic gradient of the water table).

The potential hazardous waste sites were divided into three categories depending on their probability of environmental degradation: high, medium, and low. Only sites that were within 1.6 km (1 mi) of a proposed alternative right-of-way, a distance used for purposes of database search and initial site screening, were considered during this initial evaluation.

The process used in the Supplemental EIS for dividing the potential hazardous waste sites into the three categories was similar to that used in the Final EIS (described in Section 3.17.3 of the Final EIS). However, several additional site types not identified in the Final EIS were added for evaluation in the Supplemental EIS. Updated information relative to these categories is provided below.

Each of the site types (described below and listed in Table 4.17-1 above and Table 3-37 in the Final EIS) was compared to these three categories to yield a preliminary indication of the probability of environmental degradation. These sites were then evaluated to determine whether they were within or adjacent to (i.e., within 200 m [656 ft] of) the right-of-way of a build alternative. Based on their proximity to a right-of-way, the inferred groundwater flow direction, and their probability of environmental degradation, the sites were categorized as sites of “greater” or “secondary” concern. A complete description of this site screening process is provided in Sections 3.17.3 and 4.17.2 of the Final EIS.

High Probability of Environmental Degradation

The Final EIS identified CERCLA and NPL sites as sites that typically have a high probability of existing soil or groundwater contamination. For purposes of this supplemental analysis, open LUST sites (i.e., those that are currently under investigation) were also considered sites with a high probability of environmental degradation. Open LUST sites are included in this category because of the unknown nature of the site.

Medium Probability of Environmental Degradation

The Final EIS identified active USTs and active or closed SWLFs as sites that typically have a medium probability of environmental degradation. For purposes of this supplemental analysis, closed LUST sites (i.e., LUST sites where a compliance matter has been closed/resolved), RCRIS-TSDF sites, and MINES sites are also considered sites that have a medium probability of environmental degradation.

Closed LUST sites are included in this category because, depending on the circumstances of the LUST closure, they can have residual contamination that could pose a threat to human health or the environment if disturbed. RCRIS-TSDF sites, which treat, store, or dispose of hazardous wastes, are sites for which no releases have been reported; therefore, they were considered medium risk. Sites with historic mining operations are considered medium risk because they have a moderate chance of contamination.

Low Probability of Environmental Degradation

The Final EIS identified RCRIS-SQG, RCRIS-LQG, ERNS and HMIRS hazardous material spill sites, removed and closed UST’s, and Clean Air Act (CAA) Title 3 sites (regulated air emissions) as sites that typically have a low probability of environmental degradation. For purposes of this supplemental analysis, registered AST and FTTS sites are also considered sites that have a low probability of environmental degradation.

Registered AST sites are considered to have a low probability of environmental degradation because visual evidence of a leak at an AST is easier to detect than a leak at an UST. As a result, contamination can be more quickly contained and managed to prevent potential migration into the groundwater table or

to an offsite location. A large quantity release at an FTTS site would result in the site showing up in either the RCRIS or CERCLIS database.

4.17.3.2 Impacts from Potential Hazardous Waste Sites

As described in the Final EIS, each build alternative could affect potential hazardous waste sites within or adjacent to the proposed build alternative rights-of-way. Contaminated soil and/or groundwater associated with potential hazardous waste sites could affect worker health and safety during construction and could result in construction delays. Work in and around contaminated areas could also result in spreading of the contamination. As described in the Final EIS, the greatest potential to encounter contaminated groundwater exists where excavations are required (i.e., bridges or culvert crossing) or where piles are needed (i.e., bridges).

As described in Section 4.17.2.1 above, three new hazardous waste sites have been identified since publication of the Final EIS. The potential for these sites to be affected by the build alternatives is discussed below. There is no change to the impact conclusions relative to potential hazardous waste sites disclosed in the Final EIS, with the exception that several hazardous waste sites identified in the Final EIS have been acquired and remediated since publication of the Final EIS (as described in Section 4.17.2.1 above).

No-Build Alternative

Existing Conditions (2004)

Under the existing conditions No-Build Alternative, neither the hazardous waste sites described in the Final EIS nor the newly identified sites described in this chapter would be affected because no construction would occur.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would impact potential hazardous waste sites in the study area, although the nature and timing of these projects are not known at this time.

Build Alternatives

Section 4.17.4 and Tables 4-36a through 4-36d of the Final EIS discuss the potential hazardous waste sites that would be affected by construction of the build alternatives. The proposed narrower right-of-way associated with the build alternatives in this Supplemental EIS would not affect any of the impact conclusions disclosed in the Final EIS. Field investigations at the effluent ditch for the fuel tank farm (AP-3) and the construction contractor Yard (Hogan & Associates) (AP-10) confirmed the presence of contaminants (see Section 4.17.2.1 above) and the Final EIS conclusion that remediation activities would likely be required at these sites prior to construction of any proposed build alternative.

Section 4.17.2 above describes three additional hazardous waste sites identified in the study area since publication of the Final EIS. If hazardous materials are present at the BFI/Stericycle (S104968070), shallow groundwater could be contaminated. Although the BFI/Stericycle (S104968070) site is located 50 m (164 ft) to 100 m (328 ft) east and north of the right-of-way for the proposed Center Street overpass (i.e., outside the proposed right-of-way of all build alternatives), the hydraulic gradient at the site could cause contamination, if present, to migrate into the right-of-way associated with Alternatives A, C, D,

and E. The mitigation measures described in the Final EIS and summarized below would minimize adverse impacts associated with potential contamination.

The Quality Plating (1001225950) and the Davis County Jail (U000557897) sites do not have the proximity or the necessary location with respect to the hydraulic gradient of the water table to pose a significant contamination threat to construction of any build alternative. Quality Plating is located approximately 200 m (656 ft) east of the rights-of-way associated with Alternatives A, D, and E, and over 200 m (656 ft) east of the rights-of-way of Alternatives B and C. In addition, this site is an RCRIS-SQG site and poses a low probability of environmental degradation (see Section 4.17.3.1 above). The Davis County Jail is located more than 200 m (656 ft) west of the rights-of-way associated with Alternatives A, C, D, and E. Because the groundwater at the jail site is assumed to move west, this site would not be affected by construction of any proposed build alternative. It is also unlikely that the Davis County Jail site would be affected by construction of Alternative B because the proposed Alternative B alignment is located approximately 2 km (1.2 mi) west of the jail site, a relatively large distance.

4.17.3.3 Mitigation Measures for Impacts from Potential Hazardous Waste Sites

The mitigation measures described in Section 4.17.5 of the Final EIS are still applicable. Sites with known chemical hazards that occur within or adjacent to the right-of-way of a proposed build alternative would be remediated by UDOT based on guidance received from EPA and/or UDEQ. Similarly, if contamination by unknown chemicals is encountered, construction work would be halted until the nature of the hazard and appropriate response measures could be determined.

4.17.3.4 Impacts from Aerially Deposited Lead

As described in Section 4.17.2.3 above, there is a potential for construction workers to encounter aerially deposited lead in unpaved areas in the study area that are adjacent to a road right-of-way, and, in particular, near the proposed interchange locations with I-15. The following provides a discussion of this construction-related impact.

No-Build Alternative

Existing Conditions (2004)

No construction would occur under the existing conditions No-Build Alternative, so there would be no potential for construction workers to be exposed to aerially deposited lead.

Future Conditions (2020)

If none of the build alternatives is implemented, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. It is possible that these future projects would impact areas with higher concentrations of aerially deposited lead, although the nature, timing, and location of these projects are not known at this time.

Build Alternatives

Each build alternative includes construction of several interchanges where the proposed action encounters existing roads and highways. As described above in Section 4.17.2.3, soil samples collected near the proposed southern and northern termini of the project showed levels of aerially deposited lead below both the average background lead concentration for the Salt Lake Valley and EPA's typical level of concern for lead. Therefore, based on the limited sample results, there is a low possibility of encountering aerially deposited lead at concentrations that would result in adverse health effects. However, construction workers will be instructed to take precautions to limit the amount of dust inhaled. In addition, dust control measures will be employed to minimize the release of lead dust into the atmosphere.

Section 4.18
Visual Resources

This section discusses visual resources within the study area. Although the visual conditions in the study area have not changed since publication of the Final EIS, planned development in the area has continued, which could affect views of the proposed highway from offsite. In addition, the proposed embankment height associated with the build alternatives has changed, which may reduce visual impacts associated with the proposed action.

4.18.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with visual resources in the study area, Sections 3.18 and 4.18 of the Final EIS were reviewed to determine whether any changes had taken place since publication of the Final EIS. The northern and southern study area limits for this section are the same as those described in Section 4.0.1, *Study Area*; however, the western and eastern study area boundaries have been extended to accommodate the larger viewshed in the proximity of the proposed action. As a result, the study area for this section is bound on the east by the Wasatch Mountains and on the west by Antelope Island and Great Salt Lake.

HDR Engineering conducted a reconnaissance-level field survey of the study area on September 26, 2003. Project orthophotographs from the Final EIS were also compared to recent orthophotographs of the study area to determine whether there had been any changes in visual conditions.

To analyze visual resources, the Final EIS relied on the Bureau of Land Management (BLM) Visual Resources Contrast Rating System. The rating system was used to inventory and evaluate the visual resources in the study area based on the following two viewer groups.

- Offsite viewers who would be looking at the proposed Legacy Parkway.
- Onsite viewers (i.e., users of the proposed Legacy Parkway) who would be looking from the parkway at the surrounding area.

The Final EIS also divided viewers within the visual study area into the following three principal subgroups.

- Travelers along existing arterial streets, highways, and freeways, such as Redwood Road and I-15, that traverse the project area.
- Residents of neighborhoods, including those in the Davis County foothills area and new Foxboro development.

- People engaging in recreation at existing sites, including the Bountiful City Pond and the FBWMA.

In addition, 14 key observation points (KOPs) were analyzed in the Final EIS to assess the visual impacts of the proposed action; 10 KOPs were views of Legacy Parkway from offsite and four KOPs were views of offsite from the proposed highway. Section 3.18.2 of the Final EIS describes these KOPs in detail; Figure 4.18-1 herein, which updates Figure 3-26 in the Final EIS, shows the location of these KOPs.

4.18.2 Affected Environment

This affected environment section presents a summary of updated information on the affected environment relative to visual resources. No new data was found to indicate that the existing visual conditions or identified viewer groups in the study area had changed since publication of the Final EIS. Continued residential, commercial, and industrial development in the study area has occurred, which could affect views of the proposed highway from offsite. However, this continued development has not substantively changed the status of the affected environment associated with visual resources.

4.18.2.1 Development in Study Area since Publication of Final EIS

Residential, industrial, and commercial development has continued since publication of the Final EIS, including partial construction of the following two new housing developments in the study area.

- Foxboro housing development in North Salt Lake.
- Farmington Ranches housing development in Farmington.

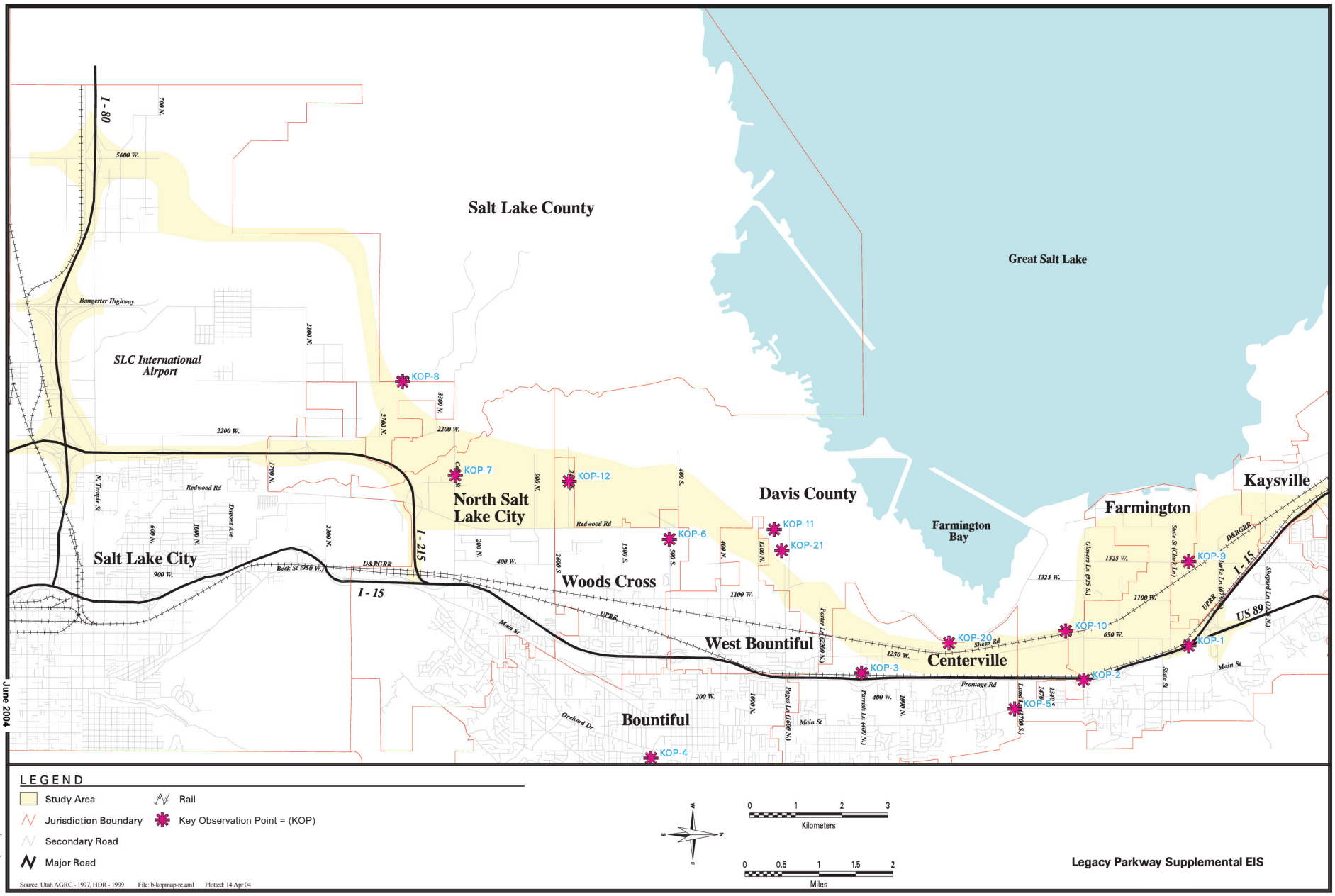
The Foxboro housing development is being constructed in North Salt Lake west of Redwood Road between Center Street and 900 North on a 110-ha (272-ac) site. The development was platted in 2003, is currently under development, and will include a mixed-use development with homes, parks, a planned elementary school, a church, and commercial zoning along Redwood Road. It will include a total of 1,250 homes, 240 of which are low- to moderate-income housing units, including 12 Housing and Urban Development (HUD)–supported transitional housing units. Multiple homes and up to five multi-family buildings of three stories in height are already built or near completion.

Farmington Ranches is a development of single-family residential housing currently under construction west of the Davis County fairgrounds at 1525 West Clark Lane. It is a 288-ha (711-ac) housing development with a total of 540 single-family lots and an elementary school. The development is scheduled to be complete by 2005.

The discussion of these two housing developments updates the information presented in the Final EIS on views of the proposed highway from the study area, as well as views of the surrounding area from the proposed highway.

14.8.2.2 Visual Resources in Study Area Viewed from Offsite

As described in the Final EIS, four main offsite locations comprising 10 KOPs were used to assess views of Legacy Parkway: the Redwood Road area (KOPs 6, 7, and 8), the Davis County foothills area (KOPs 4 and 5), the I-15 area (KOPs 1, 2, and 3), and areas near the FBWMA (KOPs 20 and 21) (Figure 4.18-1). Section 3.18.2 of the Final EIS provides a complete description of the foreground, middle ground, and



Source: Utah AGRC - 1997, HDR - 1999 File: b-kopmap-re.aml Plotted: 14 Apr 04

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Figure 4.18-1
Key Observation Point Locations

background views typical for these KOPs. Most viewer groups that would view the proposed highway would be located in the residential developments to the east of the proposed alignments.

Construction of the Foxboro housing development and the Farmington Ranches housing development would increase the potential number of offsite viewers that would have views of the proposed highway. Specifically, the residents of the Foxboro housing development would view the proposed highway from the Redwood Road area (KOP 6). The view that the residents of the Farmington Ranches housing development would have of the proposed highway would be most similar to that described for the area on and near the FBWMA (KOP 20).

Typical activities of the viewers in the Redwood Road areas when viewing the proposed highway would include driving or spending time inside their homes or outside in their yards. Typical activities of the viewers in the area near FBWMA would include bird watching, hiking, fishing, and hunting.

4.18.2.3 Offsite Visual Resources Viewed from Study Area

As described in the Final EIS, four KOPs were used to represent visual resources looking from the study area to offsite locations: West Farmington (KOP 9), Farmington Bay (KOP 10), West Bountiful (KOP 11), and Redwood Road (KOP 12). These views generally represent an urban viewshed, consisting of a highly varied mix of industrial, commercial, and residential elements, including large warehouses, older small units, and other types of buildings and complexes. Construction of the Foxboro housing development and the Farmington Ranches housing development would further emphasize the mix of urban visual elements in the study area.

4.18.3 Environmental Consequences and Mitigation Measures

The Final EIS described two types of impacts associated with visual resources in the study area: those tied to temporary construction activities and those associated with the operation of the proposed build alternatives. Since publication of the Final EIS, the nature and intensity of these impacts have not changed significantly; however, slight changes to the proposed highway design and continued development in the study area would reduce the operation-related visual impacts of the proposed highway when viewed from certain offsite locations. The environmental consequences associated with impacts on visual resources in the study area and the proposed mitigation measures to minimize these effects are summarized below.

4.18.3.1 Construction-Related Visual Impacts

Construction-related visual impacts are described in Section 4.20, *Construction Impacts*, of this document.

4.18.3.2 Operation-Related Visual Impacts

As described in the Final EIS, operation-related visual impacts were assessed from two perspectives: that of a viewer looking at the study area from an offsite location and that of a viewer looking at an offsite location from the study area (i.e., views from the proposed highway). The Visual Resources Contrast Rating System mentioned in Section 4.18.1 above was used in the Final EIS to determine the impacts a proposed build alternative would have on the existing viewshed, i.e., the extent to which a build

alternative would contrast with the existing viewshed. This system uses a numerical scale of 1 to 4, with 4 representing the greatest contrast (impact). Section 4.18 of the Final EIS provides a detailed explanation of how this rating system was applied to evaluate project-related impacts on visual resources.

The nature and intensity of the operation-related visual impacts have not changed significantly since publication of the Final EIS, except that the residents of the new housing developments (i.e., Foxboro housing development) constructed since publication of the Final EIS would now have views of the proposed highway from their communities. However, a reduction in the proposed embankment height associated with all the proposed build alternatives and the continued construction of these new housing developments would reduce the operation-related visual impacts of the proposed highway from certain offsite locations. The following describes the impacts associated with the alternatives from the two different viewer perspectives.

Visual Resources in Study Area Viewed from Offsite

No-Build Alternative

Existing Conditions (2004)

There would be no operation-related visual impacts under the existing conditions No-Build Alternative because none of the proposed build alternatives would be constructed.

Future Conditions (2020)

If none of the build alternatives is implemented, future residential, commercial, and industrial infrastructure will continue to be constructed in the study area. In addition, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met be the proposed action. These projects would affect the visual quality of the study area when viewed from an offsite location. Because the nature and timing of these projects are not known at this time, however, these impacts are difficult to assess.

Build Alternatives

Visual resource impacts from the perspective of a viewer looking at the study area from an offsite location were described in the Final EIS based on the four offsite areas (10 KOPs) described above in Section 4.18.2.2. Since publication of the Final EIS, the Foxboro housing development has been constructed; all residents of this development would have a direct view of the proposed highway, which would be considered an adverse operation-related visual impact.

In addition, since publication of the Final EIS, the embankment height associated with all the proposed build alternatives has been reduced from 2.7 m (9 ft) to 1.8 m (6 ft), except in floodplain areas, to reduce the amount of required fill material. This reduced embankment height would create a lower profile roadway that would be less visible from offsite. This reduction in the height of the embankment would reduce the visual impact of all the proposed build alternatives on the surrounding area; however, the permanent visual presence of pavement, fill slopes, grade separations, lighting, roadway hardware, and drainage structures would still result in an adverse operation-related visual impact, as described in the Final EIS.

The Foxboro and Farmington Ranches housing developments would also reduce the visual impact of the proposed highway when viewed from the Davis County foothills area (KOPs 4 and 5) (Figure 4.18-1). As described in the Final EIS, both I-15 and several large industrial areas would block views of the proposed highway from the Davis County foothills area; the construction of these new developments would further

block views of the highway for viewers in the higher elevation offsite residential areas in the foothills. Therefore, the impact conclusions disclosed in the Final EIS have not changed.

Visual Impact Ratings

Table 4-39a in the Final EIS presents the results of the contrast rating for each of the proposed build alternatives at the 10 offsite KOP locations. These visual impact ratings have not changed since publication of the Final EIS. Although reducing the embankment height generally creates a lower-profile roadway, it would not substantially alter the visual impact ratings presented in those tables because the embankments are not entirely eliminated. The continued development of land in the study area for residential, commercial, and industrial uses, along with viewer activity, was already accounted for in the visual impact ratings presented in the Final EIS.

Offsite Visual Resource Viewed from Study Area

No-Build Alternative

Existing Conditions (2004)

There would be no operation-related visual impacts under the existing conditions No-Build Alternative because none of the proposed build alternatives would be constructed.

Future Conditions (2020)

If none of the build alternatives is implemented, future residential, commercial, and industrial infrastructure will continue to be constructed in the study area. In addition, future transportation improvement projects may be undertaken by local jurisdictions in the study area to address capacity needs not being met by the proposed action. These projects would affect the views from the study area to offsite locations. Because the nature and timing of these projects are not known at this time, however, these impacts are difficult to assess.

Build Alternatives

Visual resource impacts, from the perspective of a viewer in the study area (i.e., using the proposed highway or adjacent trail) looking at an offsite location, were described in the Final EIS based on the four KOPs, as described above in Section 4.18.2.3. As stated in the Final EIS, the greatest visual impact on viewers in the study area looking offsite would be the highway itself. The permanent visual background presence of pavement, fill slopes, grade separations, lighting, roadway hardware, and drainage structures would have the greatest long-term operation-related visual impact associated with the project, particularly for the motorists driving on the proposed highway and for those in its immediate proximity. The inclusion of the proposed Legacy Nature Preserve into the build alternatives would provide improved views west of the highway due to restoration activities, including the removal of debris and revegetation of certain areas.

Visual Impact Ratings

Table 4-39b in the Final EIS presents the results of the contrast rating for each proposed build alternative at the four KOP onsite locations. These visual impact ratings have not changed since publication of the Final EIS.

4.18.3.3 Mitigation Measures

As described in the Final EIS, landscaping, a berm/buffer area, and a trail system have been integrated into the design of all the proposed build alternatives to minimize operation-related visual impacts. Section 4.18.3 of the Final EIS describes different approaches that would be applied to different areas to minimize visual impacts.

Section 4.19
Energy

This section discusses current and projected future energy consumption associated with traffic in the study area. Daily energy consumption figures (2001) have been updated based on output from the 2004 WFRC travel demand model (version 3.2). The updated travel demand model was also used to estimate daily energy consumption in 2020 in order to evaluate the potential energy-related environmental impacts of traffic associated with the proposed action.

4.19.1 Approach and Methodology

To update the affected environment and environmental consequences information associated with energy in the study area, Sections 3.19 and 4.19 of the Final EIS were reviewed to determine what changes had taken place since publication of the Final EIS. The study area for energy is the North Corridor, which includes all of Salt Lake and Davis Counties. In addition, this section presents energy information for a four-county area, which includes Weber, Davis, Salt Lake, and Utah Counties. The energy impacts were evaluated assuming that the 2020 build scenario would include Legacy Parkway, I-15 reconstruction to 10 lanes, and Maximum Future Transit; to that extent, the transportation system varies from the projected 2020 transportation system in the WFRC long range plan. These differences have been explained more fully in Chapters 1 and 2 of this SEIS

The analysis presented in the Final EIS was based on the 1997 version of the WFRC travel demand model. This model was updated in 2004, and the updated model (version 3.2) has been used to reevaluate the assessment of energy impacts presented in this document.

4.19.2 Affected Environment

As described in the Final EIS, traffic is projected to continue increasing along existing highways and roadways in the study area. Current (2001) vehicle-miles traveled (VMT) in the study area were determined using the 2004 travel demand model (version 3.2), as were VMT for the four-county area described above. The existing traffic demand information and related energy consumption are reported in Table 4.19-1, which updates Table 3-38 in the Final EIS.

Table 4.19-1 Existing (2001) and Future (2020) Daily Traffic-Related Energy Consumption

	Existing Conditions (2001)			No-Build Alternative (Future Conditions [2020])			Build Alternatives (2020)		
Area	VMT	Energy Consumption (million Btu)	Fuel Consumption (gallons)	VMT	Energy Consumption (million Btu)[1]	Fuel Consumption (gallons)	VMT	Energy Consumption (million Btu)[1]	Fuel Consumption (gallons)
North Corridor	2,550,920	15,943	127,546	3,750,708	17,692	141,536	3,761,419	17,742	141,940
Four-County[2]	39,692,416	248,078	1,984,621	62,449,902	294,575	2,356,600	62,355,035	294,127	2,353,020

Notes:

[1] The slight decrease in energy consumption between the 2020 future no-build conditions and 2020 build alternatives in the four-county area compared to the increase in energy consumption in the North Corridor between these two conditions is attributable to the increased effect robust transit (e.g., transit itself and policy/pricing changes) would have at the four-county level, versus within the North Corridor.

[2] VMT totals for the four-county area include centroid connectors. Centroid connectors represent groups of local streets. The model represents such minor facilities in an aggregate, abstract manner, and mileage accumulated on centroids is an approximation of minor street mileage. VMT totals that include centroid mileage account for all travel, not only on the major highway and arterial networks, but also on the local and collector streets. This mileage, therefore, includes travel between the arterial network and the sites at which the traffic is generated, such as groups of homes or commercial establishments. VMT totals that exclude centroid travel exclude mileage accumulated on the first and last mile, approximately, of each trip.

VMT = vehicle miles traveled; Btu = British thermal unit; 1 gallon gasoline = 125,000 Btu (Oregon State Department of Energy 2003).

Passenger vehicles are assumed to achieve gasoline fuel efficiency of 20 miles per gallon (mpg) in 2001 (U.S. Department of Transportation 2002), and 26.5 mpg in 2020 (U.S. Department of Energy 2003a).

Source: Wasatch Front Regional Council travel demand model (version 3.2), as modified by Interplan.

4.19.3 Environmental Consequences and Mitigation Measures

As described in the Final EIS, vehicles using any proposed build alternative would consume energy. If Legacy Parkway is not constructed, however, vehicles using existing facilities will also consume energy. To determine how much future energy consumption could be attributed to vehicles using Legacy Parkway, the 2004 WFRC travel demand model (version 3.2) was used to generate two sets of future (2020) daily energy consumption figures for the study area (i.e., North Corridor) and for the four-county area: one without Legacy Parkway (future no-build conditions), and one with Legacy Parkway.

Construction activities associated with Legacy Parkway would also result in energy consumption; construction impacts are discussed in Section 4.20, *Construction Impacts*. The following provides a summary of potential energy impacts.

4.19.3.1 Direct Impacts

Direct energy impacts are associated with energy that would be consumed by vehicles using the transportation facilities in the study area, including Legacy Parkway if it is constructed. As described in the Final EIS, fuel consumption varies with traffic characteristics. The primary traffic characteristics are traffic flow (average vehicle speed), driver behavior, the geometric configuration of the highway, the vehicle mix, and climate and weather. Of all the traffic-related factors, average vehicle speed accounts for most of the variability in fuel consumption and is a good predictor of fuel economy for most urban travel. Fuel efficiency under steady-flow “cruising” driving conditions peaks at 72 kilometers per hour (kph) (45 miles per hour [mph]) to 97 kph (60 mph), and then rapidly declines as speeds increase. At lower speeds, fuel efficiency is reduced by engine friction, tires, use of powered accessories (e.g., air conditioning), and repeated braking and acceleration (Davis and Diegel 2003).

The VMT in the study area and in the four-county area under the existing (2001) conditions, future no-build conditions (2020), and build alternatives in 2020 were determined using the 2004 WFRC travel demand model (version 3.2) and are presented in Table 4.19-1 above. The build alternatives were not evaluated individually because energy consumption would not vary significantly among them. The energy impacts are summarized below.

No-Build Alternative

Existing Conditions (2001)

No project-related energy impacts would occur under the existing conditions (2001) No-Build Alternative.

Future Conditions (2020)

Under the future conditions (2020) No-Build Alternative, VMT in the study area (i.e., North Corridor) in 2020 is projected to increase approximately 47 percent over 2001 levels, and related energy consumption is projected to increase by approximately 11 percent over the next 20 years (Table 4.19-1). The VMT in the four-county area in 2020 is projected to increase 57 percent over 2001 levels, and related energy consumption by about 19 percent. The fuel efficiency of vehicles is expected to improve by about 33 percent during the same period (e.g., new light-duty vehicle efficiency is projected to reach 26.5 mpg

by 2020) (U.S. Department of Energy 2003b). This projected increase in fuel efficiency is included in the energy calculations shown in Table 4.19-1.

As illustrated in Table 4.19-1 under the No-Build Alternative future conditions, vehicles traveling through the study area in 2020 would use slightly less energy and fuel than under the build alternatives. However, vehicles traveling through the four-county area would use slightly more energy and fuel under the future conditions No-Build Alternative than under the build alternatives. This is attributable, in part, to the increased role that robust transit would play in the four-county area versus in the study area.[1]

Build Alternatives

The build alternatives would result in increased energy consumption in the study area due to traffic use of the Legacy Parkway facilities. Under the build alternatives, VMT in the study area in 2020 is projected to increase approximately 47 percent over 2001 levels, and related energy consumption is projected to increase by approximately 11 percent over the next 20 years (Table 4.19-1). Under the build alternatives, the VMT in the four-county area in 2020 is projected to increase 57 percent over 2001 levels, and related energy consumption by about 19 percent.

As described above for the future conditions (2020*)* No-Build Alternative, however, the increases in VMT and energy consumption in both the study area and the four-county area are very similar to those that would be experienced in 2020 if none of the build alternatives were constructed. The difference in daily energy consumption between the proposed build alternatives and future no-build scenario is 50.5 million Btu (0.003 percent), and the difference in daily fuel consumption is 404 gallons (0.003 percent) (Table 4.19-1). This slightly higher energy usage under the build alternatives would result from the added traffic capacity provided by the build alternatives. However, the difference in energy usage is relatively small because the added traffic capacity of the build alternatives would decrease the energy consumption of individual vehicles by increasing average vehicle speeds and smoothing traffic flows. Although the future no-build scenario results in lower VMT, congestion and stop-and-go traffic would increase the energy usage per VMT in the study area.

Energy consumption in the four-county area would decrease under the build alternatives compared to the future conditions No-Build Alternative, as described above and illustrated in Table 4.19-1.

[1] See Section 2.3.2.1, *Development of Integrated Transit Enhancement Packages*, for a definition of robust transit.

Section 4.20

Construction Impacts

4.20.1 Approach and Methodology

This section supplements the construction impacts analysis presented in the Final EIS. This analysis of construction impacts was based on the following review and consultation.

- Review of Section 4.20 of the Final EIS.
- Review of the resource-specific technical analyses developed for this Supplemental EIS.
- Consultation with UDOT regarding construction activities that have taken place to date and project design changes.
- Review of actual impacts that have occurred during the initial construction activities.

UDOT began construction on Legacy Parkway in summer 2001. The project under construction was the Preferred Alternative from the Final EIS (Alternative D). UDOT implemented a design-build delivery system to construct the project until construction was halted in November 2001 because of an injunction from the U.S. Court of Appeals for the Tenth Circuit. The design-build contract has since been terminated.

Detailed analysis of highway construction impacts is sometimes difficult to provide under the design-build delivery system because the exact locations of material borrow and disposal sites, haul roads, detour routes, and other details of the construction process are often not known when the EIS is prepared. That was the case when the Final EIS was prepared. However, because construction was started on a portion of the Legacy Parkway project (before being halted by the court), the details of some of these impacts can be estimated by drawing from the actual experiences of project construction.

The existing conditions, including construction activities to date and changes that have been made to the design of the project as well as impacts of previous construction and reasonably foreseeable future construction impacts, are discussed below.

4.20.2 Affected Environment

This section presents a summary of the construction activities to date and changes made to the design of the project.

4.20.2.1 Construction Activities to Date

The following construction activities have been completed to date.

- **Southern Interchange**. The contractor cleared and grubbed (removed vegetation from) about 4.9 ha (12 ac) at the I-215 interchange location at the southern terminus of the proposed action. The contractor also placed fill at varying heights (up to 6 m [20 ft]) in this area (Campagna pers. comm.).

- **Mainline**. The contractor cleared, grubbed, and performed grading and filling (about 0.6 m to 0.9 m [2 ft to 3 ft] in height) on a segment about 6 km (3.7 mi) long at the southern terminus of the project near I-215 (Campagna pers. comm.). The contractor also cleared and grubbed a segment about 1 km (0.7 mi) long just north of 500 South.

- **Northern Interchange**. The entire interchange at I-15 at the northern terminus of the project has been cleared and grubbed. Construction continues on the extension of Park Lane (formerly Burke Lane) and all ramps from Park Lane to I-15 and US-89 as part of the *Farmington City Master Transportation Plan* (City of Farmington 1998) and the Sheppard Lane project. Construction of drainage facilities in this area also continues as part of implementing the master plan and the Sheppard Lane project. The Park Lane (formerly Burke Lane) and drainage facility construction is planned for completion in the spring of 2005. Some bridge construction (piers and abutments) was initiated for the Legacy Parkway mainline over I-15, but it was not completed.

4.20.2.2 Design Changes

The construction delivery system (design-build) and the type of construction impacts described in Section 4.20 of the Final EIS have not changed since publication of the Final EIS. However, three design changes have been made since publication of the Final EIS that would slightly reduce the magnitude of construction impacts.

- **Narrower Right-of-Way**. Since publication of the Final EIS, UDOT revised its minimum design standard for median width from 20 m (66 ft) to 15 m (50 ft). As a result, the width of the Legacy Parkway right-of-way has been reduced from 100 m (328 ft) to 95 m (312 ft). This will reduce the footprint of the construction area and the area of disturbed earth.

- **Reduced Embankment Height**. During the design-build process, UDOT and the contractor reduced the embankment height for the mainline in all areas except floodplain areas from 3 m (9 ft), as presented in the Final EIS, to 2 m (6 ft). This is a reduction in fill height of about 1 m (3 ft) over a large portion of the highway (only between 5 and 11 percent of the overall alignment lies with the Corps floodplain for any build alternative [see Section 4.14, *Floodplains*]). The reduced embankment height will reduce the amount of earthwork and fill required for construction.

- **Lengthened Bridges**. To provide support towards the goal of integration of mass transit with the design and construction of Legacy Parkway, the bridge structures were lengthened to accommodate the physical integration of the commuter rail project at Park Lane (formerly Burke Lane), State Street, Glovers Lane, I-15 southbound to Legacy Parkway southbound ramp, Legacy Parkway northbound to I-15 northbound ramp, US-89 southbound to Legacy Parkway southbound ramp, and Legacy Parkway northbound to US-89 northbound ramp.

4.20.3 Environmental Consequences and Mitigation Measures

Section 4.20.1 of the Final EIS described construction-related impacts under the No-Build and build alternatives. This section provides updated and/or new construction-related impacts relative to implementation of the build alternatives. Construction-related impacts and their associated mitigation measures that were disclosed in the Final EIS but have not changed since publication of that document are not described herein.

4.20.3.1 No-Build Alternative

Existing Conditions (2004) and Future Conditions (2020)

No changes have taken place since publication of the Final EIS that warrant updating this section. The information regarding the No-Build Alternative in the Final EIS is still accurate.

4.20.3.2 Build Alternatives

As described in Section 4.20 of the Final EIS, construction of any proposed build alternative would result in temporary construction-related impacts from ground disturbance and operation of equipment. Possible impacts would include air quality, noise, water quality, wetlands, wildlife, cultural resources, visual resources, business operations, utility service, railroad operations, and traffic flow. These impacts, as disclosed in Section 4.20 and the resource-specific sections of the Final EIS, would still occur. However, as noted above, they would be reduced because of the reduced right-of-way width, reduced embankment height, and reduced amount of earthwork needed to construct the project. The narrower right-of-way would slightly decrease predicted impacts on air quality from fugitive dust, on water quality from erosion and suspended sediments, on wetlands from construction activities, and on archaeological, paleontological, and historical resources that might be present underground. The reduced embankment height would decrease the amount of earthwork and fill required for the project, thus reducing the amount of sand and gravel that would be hauled from sand and gravel pits to the project.

Because the impacts identified in the Final EIS would still occur but to a lesser degree, they are not detailed here. However, because previous construction activities provided information on sand- and gravel-related impacts that was not available at the time the Final EIS was prepared, those impacts are disclosed below.

Impacts from Sand and Gravel Sources and Truck Hauling

Sand and gravel sources for highway construction projects can include existing commercial sand and gravel pits (also referred to as material borrow sources) or new sources developed for a specific project. It is unlikely that a new sand and gravel pit would be developed for constructing Legacy Parkway because commercial pits already exist near the project alignment. The design-builder that was under contract for the initial construction of the project in 2001 used material from two nearby pits; eight sand and gravel pits near the study area could potentially provide the fill material necessary to construct any proposed build alternative.

The Final EIS did not include a discussion of impacts related to the procurement of sand and gravel for the proposed action because UDOT does not specify materials sources for private construction contractors bidding on UDOT projects, and as a result, the location of the source(s) was not known at that time. A discussion of typical impacts to be expected from the procurement of sand and gravel and information gained from actual construction activities to date is presented below.

UDOT does not specify particular sand and gravel sources for its contractors because that would eliminate competition from non-specified sources and would be inconsistent with the State of Utah's procurement guidelines designed to control costs of publicly funded projects. Therefore, private contractors bidding on UDOT projects determine the source of the sand and gravel and how the material will be transported. Typically contractors use dump trucks to haul the material from a commercial sand and gravel pit to various staging areas along the project route.

The environmental effects produced by the sand and gravel sources are addressed during the permitting process for a particular site. Local governments regulate localized impacts from operation of a mine, such as noise, dust, congestion, traffic, zoning, and erosion runoff. The Utah Department of Environmental Quality also regulates dust and water quality impacts from mines.

Typical impacts from sand and gravel pit operations include air quality and water quality impacts caused by fugitive dust, erosion, and suspended sediments; noise; and increased truck traffic on local routes. For existing active commercial sand and gravel pits, these impacts are already present and mitigation measures are in place. Providing material for construction of the Legacy Parkway project could increase the quantity of material mined at a particular sand and gravel pit for a limited period. Increasing the quantity of material mined at a particular pit would not necessarily magnify impacts on air quality or water quality because air and water quality impacts depend on the surface area of earth that is disturbed, and mining activities would most likely extend vertically instead of laterally. Noise and truck traffic associated with the sand and gravel pit could increase temporarily.

The design-builder that was under contract for the initial construction of the project in 2001 used material from the Staker Parson pit on Beck Street in North Salt Lake and the Craythorne pit near Hill Air Force Base in Syracuse. Table 4.20-1 shows existing commercial sand and gravel pits near the project area.

Table 4.20-1 Commercial Sand and Gravel Pits near Proposed Legacy Parkway Alignments

Sand and Gravel Pit	Location
Allroc	2500 N. Beck Street, North Salt Lake
Construction Products Company	1075 N. Warm Springs Road, North Salt Lake
Craythorne	601 West 1700 South, Syracuse
Geneva Rock	5400 South 6000 West, West Valley City
Geneva Rock	2635 E. South Weber Drive, South Weber
Lakeview Rock Products	2300 N. Beck Street, North Salt Lake
Staker Parson	1810 N. Beck Street, North Salt Lake
Staker Parson	7425 South 2700 East, South Weber

Most of the earthwork required for Legacy Parkway would be for fill. Table 4.20-2 shows earthwork quantities estimated in the Final EIS and in the Supplemental EIS. The earthwork quantities in the

Supplemental EIS are lower than those in the Final EIS because the right-of-way and embankments of the modified project have been reduced. The cost estimates and earthwork quantities that were provided in Appendix N of the Final EIS have been updated.

Some fill has already been placed on the Alternative D (Final EIS Preferred Alternative) alignment, which overlaps in part with the Alternative A, B, and C alignments in the area where the fill was placed. The quantities shown in Table 4.20-2 have not been reduced to account for the fill that has already been placed.

Truck trips were calculated from the total earthwork amount (rounded to the nearest 1,000 cubic meters) including cut and fill.

The contractor hired for the design-build work conducted in 2001 estimated that about 8 million cubic meters (10.5 million cubic yards) of fill would be required for construction of Alternative D (Final EIS Preferred Alternative), which is less than the 10 million cubic meters (13 million cubic yards) estimated in the Final EIS. Because no final design has been completed for any other Supplemental EIS alternative, refined estimates for these alternatives are not available. The earthwork estimates from the Supplemental EIS and Final EIS are shown in Table 4.20-2 for comparison purposes.

4.20-2 Required Earthwork and Construction-Related Energy Consumption by Alternative

Alternative	Estimated Amount of Earthwork, cubic m (cubic yd) [1]	Approximate Number of Truck Trips [2]	Vehicles Miles Traveled	Fuel Consumption (Gallons)	Energy Consumption (million Btu)
No-Build Alternative	None	0	0.0	0.0	0.0
Alternative A	10,000,000 (13,000,000)	720,000	10,080,000	1,344,000	168,000
Alternative B	13,000,000 (17,000,000)	940,000	13,160,000	1,754,667	219,333
Alternative C	10,000,000 (13,000,000)	720,000	10,080,000	1,344,000	168,000
Alternative D (Final EIS Preferred Alternative)	8,000,000 (10,500,000)	580,000	8,120,000	1,082,667	135,333
Alternative E	8,000,000 (10,500,000)	580,000	8,120,000	1,082,667	135,333

Notes:

Btu = British thermal unit

One gallon gasoline = 125,000 Btu (Oregon State Department of Energy 2003).

[1] The estimated amount of earthwork necessary for constructing Alternatives A, B, and C was derived from Appendix N of the Final EIS. These figures are exaggerated because they do not account for a reduction in the proposed embankment height (see 4.20.2.2, *Design Changes*). The amount of earthwork necessary for constructing Alternatives D and E was derived from final design calculation and the Legacy Parkway partial termination contract.

[2] The approximate number of truck trips is based on a truck capacity of 13.7 cubic meters (18 cubic yards).

Source: U.S. Energy Information Administration 2004.

Constructing the Legacy Parkway project would temporarily increase construction truck traffic on haul routes. Trucks would travel from sand and gravel pits to the project site and from cut areas on the project site to other fill or disposal locations. To reduce the impact on local roads, after the Final EIS was published UDOT specified that the contractor only use state roads as haul routes. UDOT is still

committed to this mitigation measure. Haul routes would vary depending on where construction were taking place along the project alignment.

Energy Impacts

Constructing any build alternative would involve operating heavy machinery with a resulting impact on energy usage. To evaluate construction-related energy impacts, the approximate number of truck trips associated with each build alternative was estimated and is illustrated in Table 4.20-2. The figures associated with vehicle-miles traveled in Table 4.20-2 were based on an average truck trip length of 22.5 km (14 mi) which, in turn, was based on assumptions regarding which sand and gravel pit(s) in the study area would be used and the location along the alignment to and from which the trucks travel. The average fuel efficiency of the type of trucks typically used for earthwork was estimated at 7.5 mpg.

Impacts on Clark Lane Historic District

As described in Section 4.16, *Historic and Archaeological Resources*, the Clark Lane Historic District (CLHD) is located on State Street between 200 West and 400 West in Farmington.[1] Residents of the CLHD raised concerns about construction impacts after a public notification (July 2001) identified a construction haul route along State Street through the CLHD. Representatives from the CLHD summarized their concerns to UDOT in a letter dated April 17, 2003 (Appendix A). The letter conveyed concerns about impacts from vibrations from pile driving, impacts on the historic streetscape, and impacts from truck vibrations. Below is a discussion of how each concern was addressed.

Vibrations from Pile Driving

The letter from the CLHD residents stated that groundborne vibrations from pile driving during the reconstruction of the State Street overpass could damage historic structures. In 2001, UDOT conducted vibration monitoring and determined that vibration levels associated with reconstruction of the overpass would not be high enough to affect any structures within the CLHD (Lizotte pers. comm. 2001b). The Utah State Historic Preservation Office (SHPO) challenged that determination on the grounds that the proposed vibration limits were potentially inappropriate because of the elderly nature of the CLHD structures and the intensity of the proposed pile driving activities (Murphy pers. comm. a).

To address these concerns, UDOT reevaluated vibration levels in the CLHD in 2003. Three structures within the CLHD (i.e., 399 W. State Street, 398 W. State Street, and 393 W. State Street) are within 61 m (200 ft) of the proposed pile driving location for the State Street overpass, which, depending on the degree of force used to drive the piles (typical or high impact) and the soil conditions, could exceed the threshold and cause damage to those homes (e.g., 3.1 mm/sec [0.12 in/sec]). On April 14, 2004, FHWA and UDOT held a meeting with residents of the CLHD to discuss and take recommendations on minimizing these potential impacts on the district. Based in part on input received during that meeting, SHPO, FHWA, and UDOT revised their Memorandum of Agreement (MOA) to reflect measures to minimize vibration impacts on the CLHD resulting from pile driving activities (Appendix A).[2] These mitigation measures are summarized in Section 4.20.3.3, *Mitigation Measures*, below.

[1] Figure 5-3 illustrates the boundaries of the Clark Lane Historic District.

[2] The MOA governs the treatment and disposition of resources in the study area that are under the jurisdiction of Section 106 of the National Historic Preservation Act (NHPA).

Historic Streetscape

The letter from the CLHD residents stated that adverse effects on historic streetscape and properties, including removal of street trees and changes in grade, street width, and elevation, could occur during reconstruction of the State Street overpass. Since publication of the Final EIS, the design of the overpass has been revised to eliminate the need to acquire property from any contributing element of the CLHD (see 4.16, *Historic and Archeological Resources*, for a description of the structures that contribute to the integrity of the CLHD). However, temporary easements would be needed to realign existing curbs and gutters and taper the road cross-sections from east to west in front of the properties at 399 W. State Street, 398 W. State Street, and 393 W. State Street.

A total of 121 sq m (1307 sq ft) of land would be modified by regrading and fill activities at 399 W. State Street and 398 W. State Street to provide new, permanent driveway access to those parcels (Figure 5-10). The footprints of the parcels at 399 W. State Street and 393 W. State Street would be increased by a total of 99 sq m (1,068 sq ft) to accommodate the realignment of curbs and gutter and the proposed road tapering, and the footprint of the parcel at 398 W. State Street would be reduced by 47 sq m (508 sq ft). Mitigation measures to offset these impacts and to ensure that the CLHD and its contributory elements are returned to their original preconstruction condition are stipulated in the revised MOA (Appendix A) and summarized in Section 4.20.3.3 below.

The MOA also states that the mature trees in front of 399 W. State Street and 393 W. State Street will not be affected by the proposed build alternatives.

Vibrations from Trucks

The potential vibration effects of truck traffic on the CLHD are no longer a consideration because State Street is no longer being considered as a proposed haul route for construction traffic (Appendix A).

Construction-Related Visual Impacts

As described in the Final EIS, construction-related visual impacts would be essentially the same under all proposed build alternatives. During construction, the work zone would be cleared of vegetation and the exposed bare ground would likely contrast visually with the surrounding agricultural, recreational, and residential areas that viewers of the area are accustomed to seeing. Visual quality from sensitive viewer locations (e.g., residents of new homes in the Foxboro development that have been completed prior to construction activities) would be temporarily reduced during construction operations. Until construction is completed and the right-of-way is revegetated, the construction area would visually stand out.

The construction-related visual impacts, while likely greater in intensity than the operation-related visual impacts, would be temporary. As a result, visual impacts related to the operation of the proposed build alternatives, as described in Section 4.18.3.2, would have a greater long-term visual impact on viewers in the study area than would visual impacts related to the actual construction of those alternatives.

It should be noted that construction was initiated on the southern end of the Alternative D alignment prior to the court injunction. The construction-related visual impacts that occurred onsite were no greater than or different from those described in the Final EIS. However, because all construction-related work was stopped by the court injunction, the mitigation measures described in Section 4.18.3 of the Final EIS, which have not changed since its publication, were not carried out in those areas. In addition, in the vicinity of the northern terminus, UDOT has continued construction on projects outlined in the Farmington master plan (i.e., projects whose configuration is not dependant on the selection of any given

build alternative) (City of Farmington 1998). As stated above, the construction-related visual impacts onsite are no greater than or different from those described in the Final EIS.

Construction-Related Noise Impacts

For all the proposed build alternatives, construction operations would consist of similar activities resulting in comparable construction-related noise impacts. Table 4.20-3 illustrates the noise levels produced by various types of construction equipment. Properly maintained equipment produces noise levels near the middle of the indicated ranges. The type of construction equipment used for this project typically generates noise levels of 80 to 90 dBA at a distance of 15 m (50 ft) while the equipment is operating (U.S. Environmental Protection Agency 1971; Toth 1979; Gharabegian et al. 1985).

Table 4.20-3 Typical Construction Equipment Noise Levels

	Noise Level (dBA) at Specified Distance				
Type of Equipment	15 m (50 ft)	20 m (500 ft)	26 m (1,000 ft)	30 m (1,500 ft)	610 m (2,000 ft)
Bulldozer	80	60	54	50	48
Front loader	72–84	52–64	46–58	42 –54	40–52
Jack hammer or rock drill	81–98	61–78	55–72	51–68	49–66
Crane with headache ball	75–87	55–67	49–61	45–57	43–55
Backhoe	72–93	52–73	46–67	42–63	40–61
Scraper and grader	80–93	60–73	54–67	50–63	48–61
Electrical generator	71–82	51–62	45–56	41–52	39–50
Concrete pump	81–83	61–63	55–57	51–53	49 - 51
Concrete vibrator	76	56	50	46	44
Concrete and dump trucks	83–90	63–70	57–64	53–60	51–58
Air compressor	74–87	54–67	48–61	44–57	42–53
Pile drivers (peaks)	95–106	75–86	69–80	65–76	63–74
Pneumatic tools	81–98	61–78	55–72	51–68	49–66
Roller (compactor)	73–75	53–55	47–49	43–45	41–43
Saws	73–82	53–62	47–56	43–52	41 - 50

Source: U.S. Environmental Protection Agency 1971.

Construction equipment operations can vary from intermittent to fairly continuous with multiple pieces of equipment operating concurrently. Assuming that a bulldozer (87 dBA), backhoe (90 dBA), grader (90 dBA), and front-end loader (82 dBA) are operating concurrently in the same area, peak construction-period noise would generally be about 94 dBA at 15 m (50 ft) from the construction site.

Locations within about 580 m (1,900 ft) of a construction site would experience occasional episodes of noise levels greater than 60 dBA. Areas within about 229 m (750 ft) of a construction site would experience episodes of noise levels greater than 70 dBA. Such episodes of high noise levels would not be continuous throughout the day and would generally be restricted to daytime hours.

Most construction activities associated with the proposed action would occur during daylight hours, which would minimize noise impacts. Incidents of noise conflicts could occur when construction directly adjacent to residential, park, or recreation areas is necessary.

4.20.3.3 Mitigation Measures

Section 4.20 of the Final EIS included certain mitigation measures for construction activities, and there has been no change to these mitigation measures. Some additional construction-related mitigation measures were included in resource-specific sections of the Final EIS and of this Supplemental EIS as appropriate, and are not repeated in this section.

The following new construction-related mitigation measures have been proposed as part of this Supplemental EIS.

- **Mitigation for Noise Impacts**. Mitigation measures to minimize impacts from construction-related noise are detailed in the noise technical report (Appendix C) (HDR Engineering, Inc. 2004e). To reduce temporary noise from construction, contractors will comply with all state and local regulations relating to construction noise. In addition, the following measures will be incorporated into contract specifications to help reduce the effects of construction noise.

    - Restrict construction to daytime hours within 305 m (1,000 ft) of residences. No construction will be performed within 305 m (1,000 ft) of an occupied dwelling unit on Sundays or legal holidays or between 10:00 p.m. and 6:00 a.m. on other days. Any variance from this condition will require approval by the UDOT construction manager.

    - All equipment will have sound-control devices at least as effective as the original factory-installed devices. No equipment will have unmuffled exhaust.

    - The noise from any rock-crushing or screening operations performed within 914 m (3,000 ft) of any occupied dwelling unit will be mitigated either by placing material stockpiles between the operation and the affected dwelling or by other means approved by the UDOT construction manager.

    - As directed by the UDOT construction manager, the contractor will implement appropriate additional noise mitigation measures, possibly including changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, or installing acoustic barriers around stationary construction noise sources.

- **Mitigation for Truck Traffic on Haul Routes**. UDOT will specify that the contractor use only state roads as haul routes. Haul routes will vary depending on where construction is taking place along the roadway.

- **Mitigation for Construction-Related Air Quality Impacts**. Construction-related air quality impacts were discussed in Section 4.20 of the Final EIS, but no mitigation measures were prescribed. Fugitive dust, which is dust generated by construction equipment such as haul trucks and earth-moving vehicles, will be mitigated according to a dust control plan to be developed by the contractor according to Utah Division of Air Quality standards. This plan will include measures for minimizing fugitive dust, such as applying dust suppressants and water sprays, minimizing the extent of disturbed surface areas, and restricting activities during periods of high wind.

- **Mitigation for Potential Vibration Impacts on the Clark Lane Historic District from Pile Driving Activities**. As described in Section 4.20.2 above, mitigation measures for potential impacts on the CLHD associated with pile driving activities at the State Street overpass were incorporated into a revised draft MOA (Appendix A). In summary, the MOA stipulates maximum energy ratings for pile driving hammers, prescribes vibration monitoring requirements for the home at 399 W. State Street, provides specific guidance on measures to take if vibration levels exceed 0.12 in/sec, and includes a requirement for pre- and post-construction surveys of structures in the CLHD and notification of homeowners in the district prior to pile driving activities. The complete text of the MOA is included for reference in Appendix A.

- **Mitigation for Potential Historic Streetscape Impacts in the Clark Lane Historic District**. As described in Section 4.20.3.2, none of the build alternatives would affect mature trees in front of 393 W. State Street and 398 W. State Street in the CLHD. To ensure that the CLHD and its contributory elements are returned to their original preconstruction condition, the MOA stipulates that the design of the State Street overpass include provisions for minimizing grade changes, redesigning and incorporating sidewalks within the CLHD into the sidewalks for the new bridge structure, and maintaining existing landscape and streetscape features. The complete text of the revised MOA is included for reference in Appendix A.

Section 4.21

Cumulative Impacts

This section updates the cumulative impacts analysis presented in the Final EIS. The updated analysis is based on a revised list of past, present, and reasonably foreseeable projects that are, or would be, located in the Legacy Parkway study area, and that could impact the same resources that would be affected by the proposed action.

4.21.1 Approach and Methodology

As described in the Final EIS, the Council on Environmental Quality (CEQ) defines a cumulative effect as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

CEQ guidance recommends that a cumulative impact analysis focus on effects that can be evaluated meaningfully. This recommendation, along with guidance from the Environmental Protection Agency (EPA) in the publication *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (U.S. Environmental Protection Agency 1999), and guidance from CEQ in the publication *Considering Cumulative Effects under the National Environmental Policy Act* (Council on Environmental Quality 1997), was used to complete the cumulative impacts analysis for the Supplemental EIS, taking into consideration an updated list of past, present, and reasonably foreseeable projects.

The updated information presented in this section, including both the list of considered projects and the resource specific cumulative impact analysis, is based on the updated information presented in Chapter 4 of the Supplemental EIS. As such, the study area for each cumulative impact evaluation varies by resource area. The general study area boundary for the proposed action is defined in Section 4.0.1, *Study Area*, of this document; modifications to this boundary, if they were made, are described in the specific resource area sections in Chapter 4 and listed in Section 4.0.1.

4.21.2 Past, Present, and Reasonably Foreseeable Future Actions

This section provides an updated list of past, present, and reasonably foreseeable projects considered in the cumulative impacts analysis. The following highway projects were included in the cumulative impacts analysis.

- I-15 reconstruction from 600 South in Salt Lake City to 200 North in Kaysville (future);
- I-15 reconstruction from 31st Street to 2700 North in Ogden (future);
- The proposed Layton interchange on I-15 about 8 km (5 mi) north of Legacy Parkway (future);
- US-89 reconstruction (present);
- Mountain View Corridor on the west side of Salt Lake valley (future—EIS is currently in progress);
- Redwood Road improvements (future);
- Commuter rail (future—EIS currently in progress).

In addition, past, present, and proposed future land development throughout the study area has resulted in open land being converted to agricultural and urban uses. Past development includes conversion of open land to agricultural and urban uses in both Salt Lake and Davis Counties. Current developments include the new Foxboro residential development in North Salt Lake, and Farmington Ranches located west of the Davis County Fairgrounds. Based on the number of Davis County building permits issued since 1999, about 283 ha (700 ac) acres of land are being developed per year in Davis County (Sommerkorn pers. comm. c). A similar rate of land development is expected in the future.

4.21.3 Evaluation of Cumulative Impacts

Most of the potential cumulative impacts described in the following sections would be associated with growth that will occur in the region and the change in land use from open to developed land. This planned growth and change in land use will occur regardless of whether the proposed Legacy Parkway is implemented, although the types of land use and timing would be different, mainly around the two proposed Legacy Parkway interchanges. The growth and change in land use could cause cumulative impacts on land use, farmland, pedestrian and bicycle facilities, air quality, noise, wetlands, wildlife, habitat for threatened and endangered species, historical and archaeological resources, and visual resources as the area is developed.

Changes in the discussions provided in this section from that provided in the Final EIS are attributable either to the addition of reasonably foreseeable projects to the cumulative impacts analysis or to changes in the methodology used to determine direct and indirect impacts for specific resource topic areas, as described in the previous sections of Chapter 4. If the information presented relative to cumulative effects in the Final EIS has not changed, a statement to that effect is presented in the discussion below.

4.21.3.1 Land Use

As described in Section 4.1.2, the study area for land use extends to the north to account for potential growth inducement impacts in northern Davis and Weber Counties. Section 4.1.3 of this document concluded that the Shared Solution could contribute to the conversion of land to development uses by changing the land use around the two proposed Legacy Parkway interchanges to commercial use, but that it would not in and of itself induce growth north of the study area.

The combined projects in the Shared Solution, which include the proposed Legacy Parkway, I-15 north reconstruction (widening), and commuter rail, could induce growth and development in northern Davis County and in Weber County[1]. Section 4.1.4 of the Final EIS disclosed that, although Legacy Parkway would greatly improve north-south mobility in the North Corridor, the major portion of this improvement in mobility would be attributable to the combined expansion of I-15 and the construction of Legacy Parkway. The cumulative effect of commuter rail was not assessed in the Final EIS because commuter rail was not a reasonably foreseeable project and was not a component of the Shared Solution or the WFRC long range plan at the time of publication of the Final EIS, even though the Final EIS included a transit component. The addition of commuter rail to the long range plan reinforces the conclusion in the Final EIS that the accessibility provided to these areas by Legacy Parkway, I-15, and commuter rail could promote accelerated development of residential growth in Davis and Weber Counties, provided other key characteristics of the area are favorable for such growth (e.g., neighborhood conditions [schools, crime], price and economics, air quality, noise, etc.). Transit-oriented development (TOD) associated with the commuter rail portion of the Shared Solution may occur near the rail stations in a manner consistent with planned development near the proposed Mildale and Sandy stations in Salt Lake City. However, it should be noted that TOD would be attributable to the Shared Solution rather than Legacy Parkway in and of itself.

With the exception of the project right-of-way and Legacy Nature Preserve, local jurisdictions interviewed for both the Final EIS and the Supplemental EIS stated that the level of development in the study area is expected to be the same, regardless of the mobility improvements made and even though the improvements offered under the Shared Solution could affect the short-term location and timing of development in the study area and areas to the north.

4.21.3.2 Farmland

During the 1990s, Utah's loss of farmland was about 8,000 ha (20,000 ac) per year (Utah Department of Agriculture and Food 2000). The amount of farmland in Utah has continued to decline in the study area as agricultural areas within city boundaries have been converted to urban uses. Approximately 263 ha (700 ac) of land are being developed per year in Davis County, much of which is farmland (Sommerkorn pers. comm. b). Further, the Utah Division of Water Resources' Water-Related Land Use Data Inventory Map dated 2003 shows about 1,073 ha (2,652 ac) of farmland in the study area, while the Final EIS showed 1,582 ha (3,917 ac) in the study area in 2000.[2]

These historic cumulative impacts on farmland are attributable to development and will probably continue to occur given the current conversion rate of land to urban uses in the study area. Since Legacy Parkway would affect between 97 and 207 ha (243 and 508 ac) of farmland, depending on the build alternative, it would contribute to the cumulative loss of farmland. However, it is likely that most of this farmland loss would be due to planned and ongoing development and would occur regardless of whether Legacy Parkway is implemented.

[1] The Shared Solution concept identifies a multi-modal solution to transportation deficiencies both in and around the study area. The concept did not include commuter rail at the time the Final EIS was published. A complete description of the Shared Solution and its evolution since publication of the Final EIS is contained in Chapter 1.
[2] See Section 4.2, *Farmland*, of the Supplemental EIS. Some farmland acreage differences between the Supplemental EIS and Final EIS are attributable to changes in the way farmland was categorized in each document.

4.21.3.3 Social

As described in the Final EIS, none of the social impacts associated with the past, present, and reasonably foreseeable projects would occur in the same area or on the same groups as those affected by the proposed action, except that many groups (e.g., minority and low income populations) would more generally benefit by improvements in mobility. This discussion has not changed since publication of the Final EIS.

4.21.3.4 Relocations

Section 4.3 of this document describes the relocations that would be required if any build alternative is constructed. As stated in the Final EIS, other projects considered in this section, including the I-15 reconstruction projects, would also require some relocation of residences and businesses. Residential units affected by highway projects qualify for relocation assistance, and businesses and farms affected qualify for business or farm displacement assistance. This assistance may not be available if similar displacements occur as a result of other types of development.

This discussion has not changed since publication of the Final EIS.

4.21.3.5 Economics

As described in the Final EIS, the economic impacts associated with construction of Legacy Parkway and other projects considered in this section would be temporary and would generally occur at different times. They would represent only a small portion of the overall economics in the study area (see Section 4.5.2), and therefore would only result in a minor cumulative impact. This discussion has not changed since publication of the Final EIS.

4.21.3.6 Joint Development

As described in the Final EIS, the main joint development opportunity made possible by Legacy Parkway would be associated with the multi-use trail that would run adjacent to the proposed highway. Ongoing development in the corridor, including the Foxboro development and Farmington Ranches, could provide additional opportunities for recreational development in conjunction with the Legacy Parkway Trail. There would be no other joint development cumulative impacts.

4.21.3.7 Pedestrian and Bicycle Considerations

As described in the Final EIS, the main pedestrian and bicyclist activities made possible by the Legacy Parkway project would be those provided by the multi-use trail. This trail would benefit the pedestrian and bicycle trail systems spanning Davis and Salt Lake Counties (see Figure 4.6-1). The trail is reflected in the general plans of several cities in the study area, and it has been integrated into the proposed trail systems for several proposed and existing residential developments near the proposed highway (see Section 4.7).

Construction of commuter rail would also improve pedestrian access in the study area by generally improving the walkability of transportation options in the study area. Although improvements to I-15 would not specifically contribute to pedestrian and bicycle opportunities in the study area, the combined

effect of commuter rail and the proposed action would result in a beneficial cumulative impact on pedestrian and bicycle opportunities in the study area.

4.21.3.8 Air Quality

As described in the Final EIS, air quality would improve over future No-Build conditions with implementation of the Legacy Parkway project and other projects considered in this section because the projects are designed to reduce congestion and travel times, facilitating compliance with air quality standards. The predominant air quality factors influencing air quality in the study area have historically been and will likely continue to be the stationary and mobile source emissions associated with the continued development, all of which would occur with or without implementation of the Legacy Parkway project. It should also be noted that conformity with state air quality goals requires a regional and cumulative analysis, which is discussed in Section 4.8, *Air Quality*.

4.21.3.9 Noise

Construction of any proposed build alternative would increase noise levels in the noise study area (i.e., within 457 m (1,500 ft) of the proposed build alternatives) from noise levels typical of a rural area to those associated with the new highway (Table 4.21-1). Existing noise levels in the study area, which represent the baseline for the cumulative impact analysis, range from about 39 dBA (undeveloped areas) to 67 dBA (next to I-215). Potential cumulative impacts from noise would be associated with the travel-related noise from the highway projects described in this section, including the proposed action, as well as from ongoing and planned residential, commercial, and industrial development in and adjacent to the study area.

Table 4.21-1 Typical Noise Levels in Rural and Urban Areas in the U.S.

Area	Typical Range of dBA	Average Census Tract Population Density (people/square mile)
Wilderness and rural	16–35	Zero to little population
Quiet suburban residential	48–52	630
Normal suburban residential	53–57	2,000
Urban residential	58–62	6,300
Noisy urban residential	63–67	20,000
Very noisy urban residential/downtown city	68–75	63,000

Source: Cooper Engineering 1985; Canter 1996

It is likely that, by 2020, the study area will be developed to include more residential, commercial, and industrial land uses, with or without implementation of the Legacy Parkway project (see Section 4.1, *Land Use*, of this document). In addition, as roadways and municipal support systems are developed to support these changes in land uses, it is likely that noise levels would continue to increase, changing from those of a suburban residential area to those of an urban residential area. As stated above, these cumulative noise impacts would likely occur with or without the proposed action.

It should be noted that the northern portion of Legacy Parkway would parallel I-15 just south of the US-89/I-15 interchange. Projected traffic on Legacy Parkway in combination with traffic on US-89 and I-15, as well as operation of commuter rail, would result in a cumulative noise impact on the surrounding area. Operation of the highways alone would result in noise levels approximating an urban residential/downtown city environment. Noise levels would increase when a commuter rail train is using a track in the area but would decrease to between 68 dBA and 75 dBA after the train passes.

4.21.3.10 Water Quality

As described in the Final EIS, the primary effect on water quality from the Legacy Parkway project would be from pollutants and sediments contained in stormwater runoff from impervious surfaces and construction sites. Since development, including construction of additional impervious surfaces, would likely occur in the study area with or without the proposed action, Legacy Parkway would have a relatively minor cumulative impact on water quality, taking into consideration potential build out conditions without the project. In addition, the Legacy Parkway project, as well as the other highway projects assessed in this section, would use extensive best management practices during construction to minimize pollutant and sediment concentrations in stormwater runoff.

Deicing practices associated with Legacy Parkway, as well as other roadway improvements considered in this section, could affect the salinity of runoff in the study area. Since much of the soil and water in the study area is already highly saline because it is within the floodplain of Great Salt Lake, it is unlikely that temporary acute increases in salinity associated with deicing practices would have a long-term impact on water resources in the study area. Both the Legacy Nature Preserve and the vegetated filter strips associated with the highway would minimize the cumulative impact of this practice.

This discussion has not changed since publication of the Final EIS.

4.21.3.11 Wetlands

As described in Sections 4.12, *Wetlands*, and 4.13, *Wildlife*, of this document, the loss of wetland habitat in the study area has been an ongoing process that began with settlement and development of agriculture in the nineteenth century and continues under current conditions. For the wetlands analysis, the Supplemental EIS assumed that future development could affect all remaining uplands in the wetlands study area, resulting in adverse indirect impacts on remaining wetlands. The wildlife analysis, using a slightly different characterization of habitats (see Section 4.12.2.2, *Wetland Cover Types*), concluded that there was a historic loss of approximately 58 percent of the wetland/riparian habitat in the modified project area (Jones & Stokes 2004).

Loss of wetlands continues; wetland fill authorized in Salt Lake and Davis Counties between 1992 and 2003 averaged over 12 ha (30 ac) per year. Future loss of wetlands and wetland functions appears likely, with or without implementation of any of the proposed build alternatives, given the historic trend and future development pressure within the study area. Under the future conditions No-Build Alternative, even if no wetland fill were to occur, wetland functions in the study area would decrease over 20 percent due to planned development of adjacent upland habitat.

The Legacy Parkway project would contribute to the cumulative loss of wetlands and wetland functions in the study area. The impact is substantial both because of the timing of the impact (after many wetlands have already been filled or lost wetland functions) and the magnitude of the impact, compared with those of other current projects.

4.21.3.12 Wildlife

See Section 4.13, *Wildlife*, for a discussion of cumulative impacts on wildlife and wildlife habitat.

4.21.3.13 Floodplains

As described in Section 4.14, floodplain impacts were assessed for both the 100-year floodplain associated with Great Salt Lake and the 100-year floodplains of the streams that the proposed highway would cross within the study area. Cumulative impacts on stream floodplains from past, present, and reasonably foreseeable projects are limited because project proponents are generally required to maintain the existing flood characteristics (i.e., flood elevation and boundary) of rivers and streams affected by a project.

For the Great Salt Lake floodplain, most of the proposed build alignments would traverse the eastern edge of the floodplain, as delineated by the Corps and FEMA (see Section 4.14). Where the Great Salt Lake floodplain lies on the eastern side of Legacy Parkway, the highway design would allow flood waters to pass to the west side of the highway through equalization culverts to minimize impacts on the floodplain elevation or boundary. Similarly, the I-15 reconstruction projects would require a slight encroachment on the Great Salt Lake floodplain north of Chase Lane in Centerville, and future development could encroach on the floodplain, although the nature and location of such encroachment are not known at this time.

4.21.3.14 Threatened and Endangered Species

As described in the Final EIS, Legacy Parkway, combined with other highway projects and development in the study area, could have a cumulative effect on threatened, endangered, and state species of special concern in the study area. An updated list of federal threatened and endangered species and state species of special concern that could occur in the study area was provided by USFWS and the Utah Division of Fish and Wildlife, and is summarized in Section 4.15, *Threatened and Endangered Species*, of this document.

The bald eagle (*Haliaeetus leucocephalus*) is the only federally listed species that could be affected by the proposed action. The commuter rail draft EIS (Utah Transit Authority 2004) and the I-15 draft EIS (Federal Highway Administration and Utah Department of Transportation. 1998) both state that impacts on federally listed species, including the bald eagle, and state species of special concern are not expected. Legacy Parkway, as well as some private developments proposed in the study area, could contribute to cumulative impacts on threatened and endangered species through loss of habitat and an increase in human disturbances.

4.21.3.15 Historic and Archaeological Resources

Past regional transportation projects, future regional transportation project (including Legacy Parkway), and current and planned development, have affected and will continue to affect historic and archaeological resources in the study area that have various degrees of integrity and significance (see Section 4.16.2). The Final EIS recognized the cumulative effects on cultural resources of the reconstruction of I-15 and future development, along with the impacts of Legacy Parkway. The other reasonably foreseeable actions will have additional cumulative effects on historic and archaeological resources.

4.21.3.16 Hazardous Waste Sites

As stated in the Final EIS, there would be no cumulative effects on hazardous waste sites because any environmental effects would be mitigated. There has been no change in this discussion since publication of the Final EIS.

4.21.3.17 Visual Resources

As described in the Final EIS, the majority of the cumulative visual impacts in the study area have been caused by land development and the infrastructure associated with it, including streets, highways, railroads, and power lines. The existing visual character of the study area is already disturbed by the presence of pavement, cut-and-fill slopes, grade separations, lighting, roadway hardware, and drainages structures associated with I-15, I-215, and US-89, as well as other local roadways in the vicinity (see Section 4.18, *Visual Resources*). Several new developments in the study area, including the Foxboro development and Farmington Ranches, have been completed since publication of the Final EIS, further changing the visual environment and making it more urban.

The proposed Legacy Parkway would result in an additional amount of currently undeveloped land being converted to roadway use. This conversion and any indirect development associated with the new roadway would contribute to the historic, cumulative visual impact associated with changing the visual nature of the study area from rural to urban uses.

Section 4.22

Short-Term Uses Versus Long-Term Productivity

The short-term use of the environment versus preserving its long-term productivity relates to converting the natural productivity of the land to some developed use. The natural productivity of the land is considered a renewable use of the land; developed use generally has a relatively short economic lifespan and is regarded as a short-term use.

As described in the Final EIS, all the proposed build alternatives would have an impact on farmland, wetlands, and other wildlife habitats in the study area. No changes to the consistency of the proposed action's short-term uses of the environment with local land use and transportation plans or maintenance and enhancement of long-term productivity, as defined by local governments, have occurred since publication of the Final EIS. However, since publication of the Final EIS, construction activities associated with Alternative D (Final EIS Preferred Alternative) and development unrelated to the proposed action have affected farmland and wetland and upland habitats in the project study area. See Sections 4.2, 4.12, 4.13, and 4.20 for a complete description of farmland impacts, impacts on wetland and wildlife habitats, and construction-related impacts that have occurred since publication of the Final EIS.

Section 4.23

Irreversible and Irretrievable Commitment of Resources

Implementation of the proposed action since publication of the Final EIS (i.e., project construction prior to the court injunction) involved the commitment of a range of natural, physical, human, and fiscal resources. Land affected in the construction of Legacy Parkway was committed to use as a highway; however, it could be converted to another use should a greater need arise. As a result of the initial project construction, fossil fuels, labor, highway construction materials, and funding were irretrievably committed to the project. See Section 4.20, *Construction*, for a complete description of construction impacts that have occurred since publication of the Final EIS.

As stated in the Final EIS, the commitment of the resources is based on the premise that residents in the immediate area, the region, and the State of Utah would benefit by the improved transportation system, which would outweigh the commitment of these resources. If an alternative on another alignment is selected or if the No-Build Alternative is selected, wetland and other natural habitat resources that were removed by grading and other construction activities would be returned to a natural state. In addition, property acquired for the proposed action would be disposed of.

Table 4.24-1 Mitigation Summary

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Land Use		
Cities and Counties	(None)	No change.
Consistency with Plans and Policies	(None)	No change.
Growth within and beyond the North Corridor	(None)	No change.
Farmland		
All Farmland	*All Build Alternatives.* Owners of farmland directly within the Legacy Parkway right-of-way would be compensated according to requirements of the URAA and other state and federal guidelines. In the case of indirect impacts, the Utah Department of Transportation (UDOT) would determine whether (based on the comparative costs) access is restored or the remainder of the farmland is purchased.	No change. These mitigation measures do not replace any farmland taken by the project.
Social		
Socially Disadvantaged Groups and Environmental Justice Populations	*Alternative A and the PA.* Business displacement assistance would be provided to Commercial Coatings pursuant, to the eligibility and other requirements of the Uniform Relocation Assistance Act (URAA).	No change.
Neighborhood and Community Cohesion	(None)	No change.
Travel Patterns and Accessibility	(None)	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Public Facilities	*All Build Alternatives.* The impacts on public facilities would be mitigated by providing compensation for the real property taken or damaged or by functionally replacing the publicly owned real property with another facility that would provide an equivalent use.	No change.
Public Services and Utilities	The relocation of utilities would cause possible impacts on wetlands, farmlands, and native vegetation. Generally, these impacts would be temporary in nature. Disturbed areas from pipeline relocations would be backfilled and restored to their natural state.	Mitigation measures for impacts on wetlands are described in Section 4.12, *Wetlands*, and in Section 4.2, *Farmlands*, for farmlands.
Recreation Resources	*All Build Alternatives.* Access to the southern entrance of the Farmington Bay Waterfowl Management Area (FBWMA) and to the Bountiful City Pond would be maintained by a frontage road and a non-motorized overpass at Page's Lane. Mitigation for impacts of all build alternatives, except Alternative A on the Bountiful City Pond, would be mitigated by replacing the lands lost and by reshaping the shoreline to provide an equivalent area for users of the pond.	*All Build Alternatives.* The non-motorized vehicle overpass at Page's Lane has been eliminated. As a result, motorized vehicles would access the FBWMA by taking the 500 South exit off Legacy Parkway and the corresponding frontage road. Similarly, motorized vehicles would access Bountiful City Pond by taking the 500 South exit and the frontage road along the west side of Legacy Parkway. Non-motorized access would be provided to both the FBWMA and the Bountiful City Pond by the frontage roads that run along the west side of the proposed alignments. Access to the frontage roads would be provided at 500 South.
	Alternatives B and C. The impact on FBWMA's eastern entrance and parking lot would be mitigated by providing a frontage road along the western side of Legacy Parkway from Sheep Road to the eastern entrance. The parking lot and other land would be replaced with land of at least equal value and usefulness.	No change.
Relocations		
Residential	*All Build Alternatives.* Relocation assistance would be provided to the affected households, pursuant to the eligibility and other requirements of the URAA.	No change.
Business	*All Build Alternatives.* Business relocation and re-establishment assistance would be provided to the affected businesses, pursuant to the eligibility and other requirements of the URAA.	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Farm and Horse Paddocks	*All Build Alternatives.* Assistance would be provided to the affected farmstead and horse paddock operations, pursuant to the eligibility and other requirements of the URAA.	No change.
Economic		
Regional Economic Impacts	(None)	No change.
Local Economic and Community Impacts	(None)	No change.
Joint Development	The 100-m (328-ft) highway right-of-way proposed for this project includes room for the trail. Impacts on wetlands, farmlands, and wildlife from the trail would be included in the mitigation for the overall project.	No change other than change in right-of-way width to 95 m (312 ft).
Considerations Relating to Pedestrians and Bicyclists	(None)	No change.
Air Quality	(None)	Non-tailpipe PM10 emissions would be minimized through street sweeping, minimal use of sand for snow and ice control (see Section 4.10, *Water Quality*), and other general maintenance measures performed by UDOT. See Section 4.20, *Construction Impacts*, for a discussion of mitigation for construction-related air quality impacts.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Noise	The extent of the noise impacts would be determined during the design phase, and UDOT's current noise abatement policy would be applied. Preliminary analysis shows construction of noise barriers would be feasible in the following areas: *Noise Abatement for Alternative A* Noise barriers would be feasible west of 1100 West and 800 West in Davis County and West Bountiful City. *Noise Abatement for Alternative B* Noise barriers would be feasible in south Kaysville for 25 residences along Sheppard Lane near the northern project terminus. *Noise Abatement for Alternative C* Noise barriers would be feasible between 1200 north and 2200 north in West Bountiful. *Noise Abatement for the Preferred Alternative* Noise barriers would be feasible between 1200 north and 2350 north in West Bountiful.	It should be noted that the potential locations for noise barriers evaluated in this document are different than those evaluated in the Final EIS. The differences are attributable to updated noise monitoring data; use of a different traffic noise model (TNM instead of the STAMINA model used for the Final EIS), which takes into consideration terrain features not available with the STAMINA model; more sophisticated noise transmission algorithms; and the shielding effects of intervening rows of residences. *Noise Abatement for Alternative A* None. *Noise Abatement for Alternative B* The Alternative B alignment would pass within 152 m (500 ft) of residences near the southern terminus of the project, east of 2200 West (near ML-2). At this location and under this alternative, a noise barrier 377 m (1,237 ft) long and 5 m (16.4 ft) high would provide an acoustic benefit to five residences. The cost per dwelling of $13,527 would be less than the abatement limit ($22,600) per affected residence. Therefore, a noise barrier at this location would be reasonable and feasible according to UDOT's Noise Abatement Policy.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		Noise Abatement for Alternative C The Alternative C alignment would pass within 152 m (500 ft) of the residences near ML-7 at 1200 North. At this location and under this alternative, a noise barrier 225 m (738 ft) long and 5 m (16.4 ft) high would provide an acoustic benefit to four residences. The cost per dwelling of $10,091 would be less than the abatement limit ($22,600 per affected residence). Therefore, a noise barrier at this location would be reasonable and feasible according to UDOT's Noise Abatement Policy. *Noise Abatement for Alternative D* None. *Noise Abatement for Alternative E* None.
Water Quality		
Surface Water and Groundwater from Parkway Operations	*All Build Alternatives.* Through coordination with the U.S. Army Corps of Engineers (Corps), the Utah Department of Environmental Quality (UDEQ), and the Utah Department of Transportation (UDOT), mitigation requirements were selected that would provide acceptable water quality protection, once Legacy Parkway is operational. The following mitigation would be provided:	No change.
	Minimization of Concentrated Discharges. Legacy Parkway would be constructed without curbs so that stormwater runoff would sheetflow off the highway. Stormwater would be concentrated only where necessary (that is, to collect drainage on overpasses). This concentrated stormwater would not be discharged directly into wetlands or into streams with quantitative water quality standards. Instead, concentrated discharges would be routed over vegetated buffer strips (grassy median) or dissipated back to sheetflow.	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
	Vegetated Filter Strips. Roadway design would include vegetated filter strips (grassy median) to improve the quality of water runoff from the highway, as recommended by the Corps and UDEQ. All cleared areas within the right-of-way except the paved surface would be vegetated. The vegetation would filter suspended particles, metals, oils, and greases from the runoff.	*Vegetated Filter Strips.* The narrower right-of-way would reduce the width of the vegetated filter strips from 20 m (66 ft) to 15 m (50 ft). This reduction in the width of the vegetated filter strips would not affect the ability of the vegetated filter strips to treat water quality to the standards required in the CWA Section 401 water quality certification
	Equalization Culverts. Runoff on the upstream side of the road would gradually flow to the toe of the roadway slope and/or the berm, then cross under the road through small equalization culverts. The culverts would be positioned to maintain sheetflow conditions across the study area to the extent practical and, at a minimum, would limit culverted discharges to less than 0.14 cu m (5 cu ft) per second. For costing purposes, it is assumed that there would be a culvert every 150 m (492 ft).	*Surface Water Conveyance.* The equalization culverts referred to in the FEIS that were intended to allow free movement of water in either direction, maintain sheetflow conditions to the extent practical, and minimize concentrated discharges for water quality and wetland mitigation, are now referred to as surface water conveyances. Although the Final EIS may have implied that surface water conveyances would be installed at regular intervals along the project alignment, surface water conveyances would actually be installed in areas where an existing hydrologic connection would be cut off by the proposed highway. The surface water conveyances would be designed to pass surface water through the road in the direction or directions of its existing flow. The conveyances could be manifest as many types of drainage structures, including culverts, series of small culverts, French drains, corrugated strip drains, synthetic drainage nets, and gravel layers. *Floodplain Equalization Culverts.* Based on more specific hydraulic design information, UDOT and the Corps determined that equalization culverts for the purpose of equalizing floodwaters across the road would only be needed within the Corps floodplain boundary, rather than along entire length of the proposed roadway.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		Groundwater Conveyance. Groundwater conveyance structures would be installed to mitigate the potential impact of the road embankment consolidating underlying soils and impeding groundwater flows. Groundwater conveyances would be installed in areas where fill heights exceed approximately 3 m (10 ft), and would extend from the eastern fill limit to the western fill limit.
	Scour and Erosion Protection. If warranted, scour protection to mitigate downstream erosion would be provided at all culvert outlets and stream crossings, based on a case-by-case analysis to determine outlet velocities. Velocities would be calculated for 50-year storm flows except at stream crossings, where the 100-year storm flow would be used. The following criteria would apply: For velocities greater than 1.2 m (4 ft) per second but less than 4.6 m (15 ft) per second, loose riprap would be provided, based on UDOT design guidelines (UDOT 2004). For velocities greater than 4.6 m (15 ft) per second, an energy dissipater would be provided.	No change.
Groundwater Rights	UDOT would either purchase the groundwater right from the owner or pay for a transfer of the right. The determination would be made on a case-by-case basis.	No change.
Permits	(None)	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Wetlands		
Wetlands (Direct and Indirect)	*All Build Alternatives*. The Legacy Nature Preserve will mitigate the wetland impacts of all build alternatives. Restoration is included within the Preserve. The Legacy Nature Preserve was initially formulated for each build alternative using a mitigation ratio of 10 to 1. The Legacy Nature Preserve would be about 440 ha (1,088 ac) for Alternative A, 856 ha (2,116 ac) for Alternative B, 621 ha (1,535 ac) for Alternative C, and 506 ha (1,251 ac) for the Preferred Alternative. An additional 128 ha (317 ac) of mitigation lands proximate to the FBWMA were added to the Legacy Nature Preserve associated with Alternative D (Final EIS Preferred Alternative) at the request of USFWS. Restoration measures described in the Final EIS that have been updated are described in the Legacy Nature Preserve Addendum to the Wetland Mitigation Plan (April 2001).	The extent of the Legacy Nature Preserve has been modified since publication of the Final EIS. In addition to the 126 ha (317 ac) of mitigation lands added at the request of USFWS, four additional parcels totaling 217 ha (530 ac) were added to the Legacy Nature Preserve to address EPA's concerns regarding the adequacy of the mitigation package for Alternative D. The incorporation of these additional parcels directly into the mitigation packages for all the other proposed build alternatives would result in the preservation of the following. • An additional 193 ha (478 ac) of wetlands (315 ha [778 ac] of wetlands in total) under Alternative A. • An additional 115 ha (285 ac) of wetlands (348 ha [861] of wetlands in total) under Alternative B. • An additional 106 ha (261 ac) of wetlands (323 ha [796 ac] of wetlands in total) under Alternative C. • An additional 180 ha (446 ac) (315 ha [778 ac] of wetlands in total) under Alternative E. Inclusion of these additional mitigation lands equally under all the build alternatives would be discussed with the regulatory agencies upon selection of a preferred alternative to determine the adequacy of the mitigation package. As of June 2004, mitigation that has already been completed within the Legacy Nature Preserve includes the following. • Acquisition of 788 ha (1,948 ac) of land associated with the Legacy Nature Preserve. • Installation of 9.7 km (6 mi) of perimeter fencing and 549 m (1,800 ft) of silt fence. • Removal of 3048 m (10,000 ft) of internal fences.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		• Removal of one road, including restoration of the area to original contours and reseeding. • Filling of one abandoned and unused drainage ditch in the southern section of the Legacy Nature Preserve. • Removal of 905 tires, 3,614 dump truck loads of trash, five buildings, and five car frames. • Regarding of large areas that were disturbed by uncontrolled access and illegal dumping. • Revegetation of disturbed areas. • Relocation of a Davis County sewer line out of the Legacy Nature Preserve. • Relocation of two QUESTAR gas lines out of the Legacy Nature Preserve relocation. • Installation of a water control structure diverting water from the Jordan River into the floodplain and a water control structure regulating water returning to the Jordan River. • Development of an active water management plan for the 121 ha (300 ac) Jordan River Floodplain in the southern portion of the Legacy Nature Preserve. • Re-creation of the old Jordan River oxbow and channel, called the Mini Jordan River, totaling 2.4 km (1.5 mi). • Creation of an island called Lord Byron's Island within the Mini Jordan River. • Construction of 390 m (1,280 ft) of meander channel. • Construction of a storm drain to handle stormwater from North Salt Lake. • Establishment of artesian wells and subsequent creation of approximately 4.9 ha (12 ac) of groundwater slope wetlands.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Wildlife		
Wildlife (Direct and Indirect) Acreage	*All Build Alternatives*. The restoration measures for the Legacy Nature Preserve (see Wetland Mitigation Summary above) would also benefit wildlife. The Legacy Nature Preserve would provide wetland and upland habitat for a wide variety of species. An additional 126 ha (317 ac) of mitigation lands proximate to the FBWMA were added to the Legacy Nature Preserve associated with Alternative D (Final EIS Preferred Alternative), at the request of USFWS, to offset wildlife impacts not captured by the wetland functional assessment models.	The extent of the Legacy Nature Preserve has been modified since publication of the Final EIS. In addition to the 126 ha (317 ac) of mitigation lands added at the request of USFWS, four additional parcels totaling 217 ha (530 ac) were added to the Legacy Nature Preserve to address EPA's concerns regarding the adequacy of the wetland mitigation package for Alternative D. As a result, the total mitigation area for the Legacy Nature Preserve proposed by UDOT and approved by the Corps and FHWA is 849 ha (2,098 ac). The extent of the original Legacy Nature Preserve and additional parcels was based on implementation of Alternative D (Final EIS Preferred Alternative). Although this mitigation package would apply in full to Alternative E (despite the narrower right-of-way width), modifications to the Legacy Nature Preserve boundary would be considered in consultation with the regulatory agencies to determine the adequacy of the mitigation package, and if the additional lands added after publication of the Final EIS should be incorporated in full or in part. UDOT will monitor noise and survey for representative breeding migratory bird species in the Legacy Nature Preserve during spring 2005 and after completion of the proposed action to determine the impacts of noise. Based on the analysis presented in Section 4.13, *Wildlife*, the Legacy Nature Preserve would mitigate the direct loss of wildlife habitat, habitat fragmentation, and noise impacts.
Wildlife (Direct and Indirect) Streams	*All Build Alternatives*. The Jordan River would be bridged, and natural stream substrate culverts would be used along perennial streams (Farmington Creek) and other large drainages requiring culverts larger than 1.2 m (4 ft) in diameter to facilitate movement of fish and other aquatic wildlife. The culverts would be placed at an elevation that would retain natural stream substrates and have the greatest value in maintaining natural conditions.	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Wildlife (Direct and Indirect) Vegetation	The right-of-way would be landscaped with natural vegetation.	No change.
Wildlife (Direct and Indirect) Equalization Culverts	Culverts would be installed to allow floodwater during the Great Salt Lake's high-water years to pass beneath the roadway and supply wildlife habitat east of the alignment rights-of-way.	No change.
Wildlife – Birds Raptors	*All Build Alternatives*. Raptors. Preconstruction surveys of known raptor nests would be conducted within the Legacy Parkway corridor by a qualified wildlife biologist to determine which nests are active. If nests are determined active, coordination with the USFWS and UDWR would occur and appropriate actions under the Migratory Bird Treaty Act (MBTA) and USFWS Raptor Guidelines (Romin and Muck 1999) would be followed to ensure the least amount of impact on the species.	No change. (See threatened and endangered species)
Peregrine Falcon	Peregrine Falcon. UDOT will prevent construction activities from impacting nesting peregrine falcons by implementing the following measures:	No change. (See threatened and endangered species)
Peregrine Falcon Construction Activities	UDOT shall require a qualified wildlife biologist to monitor the nest for any activities occurring within 1.6 km (1 mi) of the nest from the courtship through post-fledgling dependency periods (about a 126-day period from February 1 through August 31).	No change. (See threatened and endangered species)
Peregrine Falcon Construction Activities	If, during monitoring, the peregrine falcons appear disturbed in any manner, construction activities shall immediately cease and UDOT shall immediately consult with USFWS before continuing construction activities.	No change. (See threatened and endangered species)
Peregrine Falcon Human Use	Human use of project lands shall be controlled to prevent any take (particularly harm and harassment) of nesting peregrine falcons and/or their young.	No change. (See threatened and endangered species)
Peregrine Falcon Human Use Project Employees	Project employees shall be informed of the presence of the peregrine falcon and the need to minimize disturbance during nesting.	No change. (See threatened and endangered species)

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Peregrine Falcon Human Use Recreation	No recreational trail facilities that encourage extended human use of the area (for example, picnic tables and rest areas) shall be constructed on project lands within 1.6 km (1 mi) of the nest and roost sites.	No change. (See threatened and endangered species) Additionally, no animals, including livestock and/or pets, will be allowed on mitigation properties.
Peregrine Falcon Human Use Right-of-Way Fences	Right-of-way fences shall be constructed and maintained along the length of the Parkway.	No change. (See threatened and endangered species)
Floodplains	*All Build Alternatives.* The road elevation would be sited above the 100-year flood elevation of the streams that the project crosses and the Great Salt Lake. Any damage sustained by the new roadway when the lake level is high would be corrected through road maintenance. Major drainage structures would be designed to pass the 100-year flood without overtopping the road or changing the regulatory floodway. Riprap and other measures would be provided at the ends of drainage structures to control erosion where appropriate.	No change.
	Equalization Culverts. Equalization culverts would allow floodwater to pass back and forth beneath the roadway to preserve the natural and beneficial floodplain.	No change. Equalization culverts for the purpose of equalizing floodwaters across the road would only be constructed within the Corps floodplain instead of throughout the entire roadway (Parker pers. comm. a). These equalization culverts are now referred to as floodplain equalization culverts.
Threatened and Endangered Species		
Wildlife – Avian	*All Build Alternatives*. The Legacy Nature Preserve would provide long-term benefits for avian species. Additional reasonable and prudent measures and their terms and conditions based on the USFWS Biological Opinion are outlined below.	No change. The reasonable and prudent mitigation measures outlined in the biological opinion to minimize take of bald eagle are listed in Table 4.15-3 of this document. Because the peregrine falcon has been delisted as an endangered species, the terms and conditions of the biological opinion, with respect to peregrine falcon, are no longer considered nondiscretionary under authority of the ESA. However, USFWS still recommends implementation of these measures.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Historic and Archaeological Resources		
Historic Structures	*All Build Alternatives.* Pursuant to 36 CFR 800.5(e), the Utah State Historic Preservation Office (SHPO) would be consulted regarding methods to minimize the effects of the project on the historic qualities of the White House. Historic Properties eligible under criterion C would be documented to Utah State Intensive Level Survey (ILS) standards prior to demolition.	The White House at 10 North 650 West in Farmington, which the Final EIS identified as subject to adverse impacts associated with construction of Alternative D, has been demolished since publication of the Final EIS. Mitigation for this adverse impact was completed as described in the Final EIS (i.e., the building was documented to Utah State ILS standards before it was removed). Mitigation of adverse affects to the historic structures as 1300 W. Glover Lane and 662 W. Clark Lane, both in Farmington, would be conducted according to the revised draft MOA. These measures would include preparation of an ILS form, photographic documentation of the structures, preparation of illustrated floor plans, archival research, and a submittal to the Utah Division of History, Preservation Section. *Clark Lane Historic District (All Build Alternatives)* The revised draft MOA includes design mitigation measures to ensure that project-related impacts are minimized and that the CLHD and its contributory elements are returned to their original pre-construction condition. The revised draft MOA also includes measures to minimize potential harm from construction-related vibration.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Prehistoric and Archaeological Sites	*All Build Alternatives.* Archeological sites would be excavated and data recovered in accordance with an approved Memorandum of Agreement (MOA). See Appendix O (Section 106 Memorandum of Agreement) for more details. All activities would be coordinated with the (Utah) State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP). The MOA was also distributed to regional Native America Tribes for their concurrence.	*All Build Alternatives.* Mitigation would be required for any NRHP-eligible archaeological site physically affected by construction of a proposed build alternative. Typical mitigation measures for NRHP-eligible archaeological sites include archival investigations, development of a data recovery plan, and consultation between FHWA, UDOT, SHPO, the tribes, and other consulting parties. To date, consultation with SHPO has resulted in the following specific mitigation measures. • Implementation of Alternatives A, C, D, or E would result in an adverse impact on 42Dv2 and 42Dv94. If any of those build alternatives are selected for implementation, in accordance with the revised draft MOA, the site limits will be delineated and protected from construction activities through the use of construction fencing. • To minimize impacts on 42Dv70, a professional archaeologist will monitor excavation and earthmoving activities associated with highway construction in the vicinity of the site. Although 42Dv70 would only be adversely affected under Alternative B, this mitigation measure will be implemented regardless of which build alternative is chosen, in accordance with the June 2000 MOA and supplemental consultations with SHPO (Lizotte pers. comm. 2001a). In addition, the Legacy Nature Preserve mitigation plan will include a management plan to ensure the future health of cultural resources within the boundaries of the Legacy Nature Preserve.
Historic Railroad Corridors	None.	None of the proposed build alternatives adversely affect NRHP-eligible railroad corridors identified in the APE. No mitigation measures are proposed.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Hazardous Waste Sites		
	All Build Alternatives. Measures would be implemented to prevent the spread of contamination and worker exposure to contaminants during construction. In the case of known chemical hazards, the site remedy may be negotiated through the U.S. Environmental Protection Agency (EPA) and/or UDEQ; remedial action would be conducted by a qualified hazardous waste contractor certified by the U.S. Occupational Safety and Health Administration (OSHA). If contamination by unknown chemical hazards is suspected, the Parkway construction contractor would stop work. The contractor would employ the services of a certified industrial hygienist and environmental scientists who can identify the nature of the hazard and appropriate response measures.	No change. Landfill mitigation would apply to Alternatives B, C, D, and E.
	All Build Alternatives. The Northwest Oil Drain site would be mitigated by avoidance through bridging.	
	Alternatives B, C, and Preferred Alternative. The impacts on the Bountiful Sanitary Landfill would be mitigated by relocating the facilities and removing landfill waste material located within the right-of-way, and disposing of it at a permitted facility.	

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Visual Resources		
	All Build Alternatives. Revegetation of the highway grade would help soften the visual impacts of the highway and blend it into the existing landscape. Native plants would be used where possible. The work would be completed as quickly as possible after construction to lessen the amount of time the highway grade would be more visible.	No change.
	Landscaping and a trail system are planned for the entire length of Legacy Parkway. Landscaping includes different approaches for different areas. Where Legacy Parkway is adjacent to I-15, grasses would be used. In areas of open farmland and light industry, there would be moderate tree and shrub planting. Windows facing east would maintain views of the mountains and windows facing west would maintain open views. In residential areas, berms and tree and shrub plantings would be used.	
Energy	(None)	No change.
Construction		
	All Build Alternatives. A public information program would be implemented to alert the community of ongoing and future construction activities. Information would include construction work hours and alternative travel routes. Signs would be used to notify motorists of work activities and changes in traffic patterns. Night and weekend work may shorten the duration of the construction impacts. Lights used during nighttime construction would be aimed directly at the work area and/or shielded from nearby residences. Construction activities would be limited during certain periods to protect threatened and endangered species.	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Construction Noise	(none)	To reduce temporary noise from construction, contractors will comply with all state and local regulations relating to construction noise. In addition, the following measures will be implemented: Restrict construction to daytime hours within 305 m (1,000 ft) of residences. No construction will be performed within 305 m (1,000 ft) of an occupied dwelling unit on Sundays or legal holidays or between 10:00 p.m. and 6:00 a.m. on other days. Any variance from this condition will require approval by the UDOT construction manager. All equipment will have sound control devices at least as effective as the original factory-installed devices. No equipment will have unmuffled exhaust. The noise from any rock-crushing or screening operations performed within 914 m (3,000 ft) of any occupied dwelling unit will be mitigated either by placing material stockpiles between the operation and the affected dwelling or by other means approved by the UDOT construction manager. As directed by the UDOT construction manager, the contractor will implement appropriate additional noise mitigation measures, possibly including changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, or installing acoustic barriers around stationary construction noise sources.
Construction Haul Routes	(none)	UDOT will specify that the contractor only use state roads as haul routes. Haul routes will vary depending on where construction is taking place along the roadway.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Construction Air Quality	(none)	Fugitive dust, which is dust generated by construction equipment such as haul trucks and earth-moving vehicles, will be mitigated according to a dust control plan, to be developed by the contractor according to Utah Division of Air Quality standards. This plan will include measures for minimizing fugitive dust, such as applying dust suppressants and water sprays, minimizing the extent of disturbed surface areas, and restricting activities during periods of high wind.
Construction Vibration on Clark Lane Historic District		Maximum energy ratings for pile driving hammers, prescribes vibration monitoring requirements for the home at 399 W. State Street, provides specific guidance on measures to take if vibration levels exceed 0.3 cm/sec (0.12 in/sec), and includes a required for pre- and post-construction surveys of structures in the CLHD and notification of homeowners in the district prior to pile driving activities.
Construction Streetscape Impacts		As described in Section 4.20.3.2, none of the build alternatives would affect mature trees in front of 393 W. State Street and 398 W. State Street in the CLHD. To ensure that the CLHD and its contributory elements area returned to their original pre-construction condition, the MOA stipulates that the design of the State Street overpass will include provisions for minimizing grade changes, redesigning and incorporating sidewalks within the CLHD into the sidewalks for the new bridge structure, and maintaining existing landscape and streetscape features. The complete text of the MOA is included for reference in Appendix A.
Short-Term Uses vs. Long-Term Productivity	(None)	No change.
Irreversible and Irretrievable Commitment of Resources	(None)	No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Section 4(f) Properties		
Farmington Bay Waterfowl Management Area (FBWMA)	*Avoidance Alternatives* The direct use of the FBWMA eastern entrance would be avoided by Alternative A and the PA. It could also be avoided by shifting Alternative B entirely to the eastern side of the D&RGRR, or by elevating Alternative B or C over the parking lot and small area north of the lot. *Minimization Measures* 128 ha (317 ac) of land would be set aside to provide a buffer to the FBWMA and would be given to the UDWR to manage as part of the FBWMA. This land would be in addition to the Legacy Nature Preserve	*Avoidance Alternatives* No change. *Minimization Measures* The amount of land required by Alternatives B and C has been reduced due to the change in the width of the right-of-way. Land required by Alternatives B and C from the eastern entrance and parking area of the FBWMA (as discussed in Section 5.5.1) would be replaced with land of equal value, location, and usefulness and the parking area relocated. If Alternative B or C were adopted, all planning to minimize further harm would be included. The 128 ha (317 ac) of land are currently managed, under the Section 404 permit, by UDOT as part of the Legacy Nature Preserve. Ultimate management authority over these 128 ha (317 ac) and the remainder of the Legacy Nature Preserve will be established through the Section 404 permit process.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Bountiful City Pond	*Avoidance Alternatives* Alternative A is the only alternative that would not require direct use of this parcel. The PA would require 2.4 ha (6 ac) of the 17-ha (43-ac) parcel (14 percent). Less than 50 m (164 ft) of the shoreline of the pond would be affected. A Bountiful City Pond Avoidance Alternate would be located between the PA and Alternative A. *Minimization Measures* Alternatives B and C and the PA. The Legacy Parkway right-of-way would be the minimum possible that meets design standards. The land used would be replaced with land of at least equal value and usefulness. The affected shoreline would be reshaped to provide the same habitat and an area for users to walk around the pond.	Direct use of this resource has been eliminated for all build alternatives due to modifications made to the final design of the build alternatives and reevaluation of specific areas of the property eligible for protection under Section 4(f). Modifications were made to the final design for Alternative D (Final EIS Preferred Alternative) that included constructing retaining walls to avoid any fill in the pond and associated wetlands. These modifications have been incorporated into the final design of all build alternatives. In addition the City of Bountiful, in coordination with the Utah Division of Wildlife Resources and Sport Fish Restoration, has developed and implemented a management plan that includes developing specific areas of the property for recreation purposes and other areas for municipal purposes. Improvements have been made to the recreation facilities near the pond, and recreation use has increased. The areas of the property used for and functioning as recreation resources are eligible for protection under Section 4(f). Those areas of the property not used for recreation have been reevaluated, and such municipal uses are not eligible for protection under Section 4(f). Specifically, areas developed and managed as public recreation areas on the property would not be incorporated into the proposed action. The City of Bountiful has agreed to accept 4 ha (10 ac) of replacement land in exchange for less than 2.4 ha (5.9 ac) of land needed for Alternatives B, C, and E.
Utah State Parks Land and Jordan River Raceway (renamed Jordan River OHV Center)	*Avoidance Alternatives* All Build Alternatives would require some of the Jordan River Raceway Land. To avoid using Raceway land, the interchange would have to be designed to stay within the current right-of-way, which could not be done without violating the desirable standards of geometric design. *Minimization Measures* All Build Alternatives would use the minimum right-of-way needed to meet roadway design standards. The land used would be replaced with land of at least equal value, location, and usefulness.	*Avoidance Alternatives* No change. *Minimization Measures* No change.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
Historic Resources	*Avoidance Alternatives* All Build Alternatives would require demolition of the white house. *Minimization Measures* Recordation on an Intensive Level Survey Form would be done in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). Mitigation would be coordinated with the SHPO and ACHP.	All build alternatives required a direct use of the White House at 10 North 650 West in Farmington, including demolition of the structure and incorporation of the property into the right-of-way. After publication of the Final EIS, the ILS form was completed in accordance with U.S. Secretary of Interior's Standards and Guidelines for documentation (48 FR 44728-37). The site documentation was submitted to SHPO on February 21, 200. SHPO approved the site documentation on March 8, 2001. The structure was subsequently demolished. None of the build alternatives would require a permanent direct use of the CLHD or structures in the CLHD because design and minimization measures have been developed and included in the revised draft MOA to avoid a permanent direct use of the CLHD and result in a temporary occupancy instead. The temporary occupancy of the CLHD would meet all the criteria outlined in 23 CFR 771.135(p)(7). *Avoidance Alternatives* Alternative B would result in a direct use of this resource. The entire property lies within the right-of-way for Alternative B. There is no prudent avoidance alternative other than Alternatives A, C and E in this area. However, selection of any of these build alternatives to avoid using the animal facility would result in a direct use of 662 West Clark Lane in Farmington. Alternative B does not require a direct use of 662 West Clark Lane in Farmington. However, selection of Alternative B would result in a direct use of the historic structure at 1300 Glovers Lane in Farmington. Alternatives A and C do require a direct use of this resources and could avoid demolishing the historic structure by constructing retaining walls, but would still require a direct use of 0.02 ha (0.06 ac) from the historic property boundary.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		All the build alternatives require a direct use of the D&RG Railroad by crossing it at grade. An avoidance alternative to the direct use of the D&RG Railroad right-of-way for Alternatives A, C, and E would be to span both crossings with a roadway bridge. The cost to implement this avoidance alternative is estimated at approximately $8,000,000. This is roughly 23 times the estimated $350,000 cost for the two at-grade crossings per alternative. SHPO has concurred there would be no adverse effect as a result of the direct use of the D&RG Railroad by crossing it at grade. An avoidance alternative for Alternative B would be to shift the alignment further west, between Parrish Lane and Glovers Lane, and span the D&RG Railroad where the proposed Legacy Parkway connects with US-89. However, shifting the Alternative B alignment further west would result in a direct use of the FBWMA near the eastern entrance on Sheep Road and the FBWMA isolated property. SHPO has concurred that crossing at grade would not have an adverse effect on the historic resource; therefore, a direct use of FBWMA to avoid a direct use of the D&RG Railroad is not prudent. *Measures to Minimize Harm* Measures to minimize harm to 1300 Glovers Lane in Farmington for Alternative B would include completion of an ILS form in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). All actions would be coordinated with SHPO and ACHP in accordance with the revised draft MOA. The right-of-way required for Alternative B in this area was reviewed for any potential to minimize the direct use of this structure, however the current design is the minimum right-of-way width feasible in this location.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		Construction of a retaining wall for Alternatives A and C would minimize the impact on 662 West Clark Lane in Farmington and would allow the structure to remain in place, but would still require a direct use of 0.02 ha (0.06 ac) from the historic property boundary. No other minimization measures are possible for Alternatives A and C. If Alternative E is selected the direct use on this resource would be minimized through the completion of an ILS form in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). All actions would be coordinated with SHPO and ACHP in accordance with the revised draft MOA. SHPO concurred there would be no adverse effect on the D&RG Railroad by crossing it at grade, all possible planning to minimize harm to the resource would be included in implementation of the adopted alternative.
Archaeological Sites	*None*	*Avoidance Alternatives* Alternatives A, C, and E require a direct use of Sites 42Dv2 and 42Dv94 by incorporation of the site into the right-of-way required for southern interchange with I-215. An avoidance alternative would be implementation of the interchange area planned for Alternative B. However, constructing the Alternative B southern interchange would affect 13 ha (33 ac) of prime farmland, require 6 ha (15 ac) of land from a century farm compared to 2 ha (5 ac) for the other build alternatives, and would affect two multigenerational farms that the other alternatives would not affect. Because of the additional impacts required by the Alternative B southern interchange on other resources in the area and the fact that these sites would remain untouched within the right-of-way, the Alternative B southern interchange is not considered prudent avoidance alternative.

Section 4.24
Mitigation Summary

4.24.1 Approach and Methodology

This section updates the summary of mitigation measures provided in Section 4.24, *Mitigation Summary*, of the Final EIS. Table 4.24-1 below provides a summary of the mitigation measures presented in Table 4-40 in the Final EIS, as well a summary of updated and supplemental mitigation measures identified since publication of the Final EIS. Mitigation measures in this document that differ from those presented in the Final EIS were modified as a result of one or more of the following items.

- Agreements made in the Final EIS Records of Decision (RODs), which were issued in October 2000.
- The Clean Water Act Section 404 permit, which was issued by the Corps in January 2001 for implementation of Alternative D (Final EIS Preferred Alternative).
- Wetland mitigation commitments outlined in *Legacy Nature Preserve Addendum to the Wetland Mitigation Plan*, prepared in April 2001.
- Narrowing of the proposed right-of-way from 100 m (328 ft) in the Final EIS to 95m (312 ft) in the Supplemental EIS for Alternatives A, B, C, and E.
- Other design modifications described in Chapter 3, *Alternatives*, and Chapter 4, *Environmental Analysis*.

Although the right-of-way and project impacts associated with the proposed build alternatives evaluated in the Supplemental EIS would be less than those associated with build alternatives evaluated in the Final EIS, proposed mitigation for project impacts, and specifically the extent of the Legacy Nature Preserve for Alternative E, has not been reduced. In light of more detailed qualitative evaluation of impacts on natural resources, particularly wildlife, done for the Supplemental EIS, UDOT has proposed to leave the size of the Legacy Nature Preserve unchanged to assure that direct and indirect impacts that may not be subject to precise quantification are mitigated. See Section 4.13, *Wildlife*, for a complete discussion of the progression of the development of the Legacy Nature Preserve.

Table 4.24-1 presents a summary of the mitigation described in this Supplemental EIS for each resource topic. Table 4.24-1 updates Table 4-40 in the Final EIS.

Impact Category	Mitigation Measures in FEIS	Current Mitigation Measures
		Minimization Measures No further use of or impacts on these sites are anticipated during this project, any possible impacts could be minimized through the completion of archaeological data recovery in that portion of the site that was directly used upon discovery, as outlined in the revised draft MOA. Additional minimization measures for this site would include delineation of the site boundaries and fencing during construction These alternatives would require construction activity adjacent to them but would not require any additional direct use.
Section 6(f) Properties	*All Build Alternatives* Replacement land of equal value, location and usefulness would be provided in accordance with Section 6(f) requirements to replace the portion of the Jordan River Raceway that would be required.	No change.

ACHP = Advisory Council on Historic Preservation

BMPs = best management practices

Corps = U.S. Army Corps of Engineers

EPA = U.S. Environmental Protection Agency

FBWMA = Farmington Bay Waterfowl Management Area

ILS = Intensive-Level Survey

MBTA = Migratory Bird Treaty Act

MOA = Memorandum of Agreement

OSHA = Occupational Safety and Health Administration

PA = Preferred Alternative

SHPO = (Utah) State Historic Preservation Office

TSS = total suspended solids

UDEQ = Utah Department of Environmental Quality

UDOT = Utah Department of Transportation

UDWR = Utah Division of Wildlife Resources

UPDES = Utah Pollutant Discharge Elimination System

URAA = Uniform Relocation Assistance Act

USFWS = U.S. Fish and Wildlife Service

Chapter 5

Draft Section 4(f) and 6(f) Evaluation

Chapter 5

Draft Section 4(f) and 6(f) Evaluation

5.1 Approach and Methodology

This chapter provides an update of Chapter 5, *Section 4(f)/6(f) Evaluation*, of the Final EIS. To update the information regarding Section 4(f) and 6(f) resources, Chapters 3, 4, and 5 of the Final EIS were reviewed to determine the changes that had taken place since publication of the Final EIS. The supplemental investigations and activities listed below were also undertaken to update the information relative to Section 4(f) and 6(f) resources.

- Status of the Section 4(f) and 6(f) properties identified in the Final EIS was reviewed to determine whether any changes have occurred to their status, use, avoidance measures, and measures to minimize harm. This review included evaluating whether the adopted design change reducing the right-of-way width of the build alternatives changed the acreage required from the Section 4(f) and 6(f) properties. The median width was reduced by 5 m (16 ft), resulting in a reduction of the right-of-way from 100 m (328 ft) in the Final EIS to 95 m (312 ft) in this Supplemental EIS.

- A new noise impact analysis was conducted using FHWA's updated traffic noise model (TNM) (Federal Highway Administration 2003).

- The historic and archaeological resources inventory in the Final EIS (Overstreet et al. 2004) was updated. The updated inventory was reviewed to identify any additional properties or sites that had become eligible for protection under Section 4(f) and 6(f) since the Final EIS.

- Use of the Section 4(f) properties was assessed by reviewing information included in the updated historic and archaeological resources inventory; alternatives to avoid use and measures to minimize harm were also reviewed.

- Additional literature was reviewed, including agency correspondence, comment letters received in response to the Final EIS, and the *Legacy Parkway Supplemental EIS Scoping Report* (Federal Highway Administration and U.S. Army Corps of Engineers 2003). Correspondence received since the scoping period was also reviewed.

- The Parkway Facility Adjacent to Redwood Road Alternative was added to the range of alternatives studied as described in Section 3.2.3 of Chapter 3, *Alternatives*, and is included in this Section 4(f) and 6(f) evaluation. However, this alternative was eliminated from further detailed evaluation based on impacts that would occur on Section 4(f) properties along this alignment.

- Additional literature and field investigations were conducted for the area associated with the proposed Legacy Nature Preserve during the Section 404 permit process. Two historic structures inside the Legacy Nature Preserve boundaries were identified as eligible for protection under Section 4(f).

The organization of this Section 4(f), 6(f) Evaluation is as presented below.

- Regulatory Setting.
  - Section 4(f).
  - Section 6(f).
- Description of Proposed Action.
  - Purpose of and Need for Action.
  - Alternatives.
- Section 4(f) and 6(f) Properties.
  - Recreation, Wildlife, and Waterfowl Refuges.
  - Historic Resources.
  - Archaeological Resources.
- Use of Section 4(f) and 6(f) Resources.
  - Recreation, Wildlife, and Waterfowl Refuges.
  - Historic Resources.
  - Archaeological Resources.
- Summary of Use of Section 4(f) and 6(f) Properties.
- Avoidance Alternatives for Section 4(f) and 6(f) Properties.
- Measures to Minimize Harm to Section 4(f) and 6(f) Properties.
- Coordination.

5.2 Regulatory Setting

The regulatory setting for this evaluation has not changed since publication of the Final EIS. The applicable regulations are discussed below.

5.2.1 Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 (as amended and codified in 49 USC 303) prohibits the Secretary of Transportation from approving any program or project that:

> …requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance as determined by federal, state, or local officials having jurisdiction thereof, or any land from an historic site of national, state, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use. (Department of Transportation Act of 1983, 49 USC 303)

Section 4(f) applies to historic properties and archaeological resources only when the property or resource is included on or eligible for listing on the National Register of Historic Places (NRHP). Section 4(f) only applies to archaeological sites that are on or eligible for inclusion on the NRHP and warrant preservation in place. Section 4(f) does not apply if it is determined that the archaeological resource is important chiefly because of what can be learned by data recovery (even if it is decided that the resource would not be recovered) and has minimal value for preservation in place. The criteria for eligibility for the NRHP are defined in Section 4.16, *Historic and Archaeological Resources*, of this Supplemental EIS and incorporated herein by reference.

The term *use* refers to either a *direct* or a *constructive* use of the property. The uses, as defined in 23 CFR 771.135 (p), are described as follows.

- (1) Direct use occurs
  - (i) When land is permanently incorporated into a transportation facility.
  - (ii) When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes as determined by the criteria in paragraph (p)(7) of this section; or
  - (iii) When there is a constructive use of land.
- (2) Constructive use occurs when the transportation project does not incorporate land from a section 4(f) resource, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under section 4(f) are substantially impaired. Substantial impairment occurs when the protected activities, features or attributes of the resource are substantially diminished.

Depending on the resource, a constructive use would involve permanent and severe noise, vibration, aesthetic, or access impacts. As outlined in 23 CFR 771.135 (p)(4), a constructive use of a protected resource occurs under any of the following situations.

- (i) The projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by section 4(f), such as hearing the performances at an outdoor amphitheater, sleeping in the sleeping area of a campground, enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance, or enjoyment of an urban park where serenity and quiet are significant attributes.

- (ii) The proximity of the proposed project substantially impairs the aesthetic features or attributes of a resource protected by section 4(f), where such features or attributes are considered important contributing elements to the value of the resource.
- (iii) The project results in a restriction on access which substantially diminishes the utility of a significant publicly owned park, recreation area, or historic site.
- (iv) The vibration impact from operation of the project substantially impairs the use of a Section 4(f) resource, such as projected vibration levels from a rail transit project that are great enough to affect the structural integrity of a historic building or substantially diminish the utility of the building.
- (v) The ecological intrusion of the project substantially diminishes the value of wildlife habitat in a wildlife or waterfowl refuge adjacent to the project or substantially interferes with the access to a wildlife or waterfowl refuge, when such access is necessary for established wildlife migration or critical life processes.

5.2.2 Section 6(f)

State and local governments often obtain grants through the Land and Water Conservation Fund Act (LWCF) to acquire or make improvements to parks and recreation areas (16 USC Sections 460-4 through 460-11, September 3, 1964, as amended). Section 6(f) of the act prohibits the conversion of property acquired or developed with these grants to a non-recreational use without the approval of the U.S. Department of the Interior's (DOI's) National Park Service. Section 6(f) directs DOI to ensure that replacement lands of equal value (monetary), location, and usefulness are provided as conditions to such conversions. Consequently, where such conversions of Section 6(f) lands are proposed for transportation projects, replacement lands must be provided.

The Jordan River Off-Highway Vehicle (OHV) Center property includes a 3.6-ha (9-ac) section of land purchased with funds under Section 6(f)(3) of the LWCF Act, classifying it as a Section 6(f) property. The Jordan River OHV Center also qualifies as a recreation resource eligible for protection under Section 4(f).

5.3 Description of Proposed Action

5.3.1 Purpose of and Need for Action

The purpose of and need for the Legacy Parkway project have not changed since the Final EIS. Chapter 1, *Purpose of and Need for Action,* of this Supplemental EIS provides a detailed discussion of the purpose of and need for action. Following is a summary.

The primary purpose of the project is to provide capacity to relieve traffic congestion through the year 2020 in the North Corridor, located in Salt Lake and Davis Counties, Utah. An additional purpose of the project is to provide an alternate north-south route through the North Corridor.

Legacy Parkway is proposed, as one part of the Shared Solution to transportation issues in the North Corridor, to provide part of the transportation facilities needed in the North Corridor to accommodate the safe and efficient movement of people and goods through 2020. The Shared Solution, of which Legacy

Parkway is one of three major components, was developed by Utah's state, local, and regional officials as the transportation infrastructure needed to meet future transportation demand in the North Corridor. The Shared Solution includes the following primary components.

- **I-15 improvements**. Reconstruction of I-15 in the North Corridor to address design deficiencies and widen the facility from eight to ten lanes.
- **Mass transit expansion**. Expansion of mass transit in the North Corridor, including expanded mass transit and new commuter rail or other transit technology.
- **Legacy Parkway**. Construction of a four-lane, divided, limited-access highway, including a trail for pedestrian, bicycle, and equestrian uses.

The need for Legacy Parkway remains as explained in the Final EIS. However, travel demand data for existing and future traffic conditions have been examined based on the 2004 WFRC travel demand model (version 3.2), and the updated analysis confirms that all three of the Shared Solution components are needed to meet projected transportation demand in the North Corridor through 2020 and beyond.

5.3.2 Alternatives

Chapter 3, *Alternatives*, of this Supplemental EIS presents a detailed description of the following discussion related to the analysis of alternatives. Because consideration of alternatives that avoid the use of Section 4(f) resources is part of the regulatory standard, the alternatives presented in this Supplemental EIS are addressed, as appropriate, in this evaluation as well. Presented below is a summary of the analysis.

The initial alignment screening process presented in the Final EIS considered five regional corridor alignments for Legacy Parkway: Antelope Island, trans-bay, Farmington Bay, railroad (Denver & Rio Grande [D&RG] and Union Pacific Railroad [UPRR]), and Great Salt Lake. Based on the analysis in the Final EIS, five alternatives within the Great Salt Lake regional alignment were carried forward for detailed study: No-Build and Alternatives A, B, and C, and D (Final EIS Preferred Alternative). All the build alternatives analyzed in the Final EIS included a trail system for pedestrian, bicyclist, and equestrian use.

Two primary modifications have been made to the alternatives since the Final EIS: (1) the right-of-way width has been reduced from 100 m (328 ft) to 95 m (312 ft), and (2) the project features have been designed and implemented to allow better integration with mass transit. Alternative D (Final EIS Preferred Alternative) has been dropped from further consideration. However, the impacts of Alternative D (Final EIS Preferred Alternative) are presented for comparison purposes to illustrate changes in impacts between the Final EIS and the Supplemental EIS.

This Supplemental EIS evaluated additional alternatives and reconsidered alternatives addressed in the Final EIS. The criteria used in the Supplemental EIS to evaluate alternatives that were considered but subsequently eliminated from detailed study included the ability of the alternatives to meet project purpose and need and the consideration of environmental factors such as impacts on wetlands; farmland; hazardous wastes sites; use of Section 4(f)/6(f) resources; and socioeconomic factors, including utility, business and residential displacements, other community impacts, and cost.

Because potential impacts on Section 4(f) and 6(f) resources was a major reason for not carrying forward the Parkway Facility Adjacent to Redwood Road Alternative (see Section 3.2.3) of Chapter 3,

Alternatives) this alternative is included in this Section 4(f), 6(f) evaluation as well. The Parkway Facility Adjacent to Redwood Road Alternative starts at the Legacy Parkway/I-215 interchange in the same location as all build alternatives, continues north to Center Street in North Salt Lake, then turns northeast and parallels Redwood Road on the west until intersecting the Alternative E alignment approximately 1.6 km (1 mi) north of 500 South in Woods Cross and following the Alternative E alignment thereafter. The Parkway Facility Adjacent to Redwood Road Alternative is shown in Figure 5-1, in relation to Alternative E. There would be developable land west of the alignment of the Parkway Facility Adjacent to Redwood Road Alternative in North Salt Lake and Woods Cross. Existing accesses would be maintained. The alignment shown in Figure 5-1 assumes a frontage road between Center Street in North Salt Lake to 500 South in Woods Cross, and from 500 South to Pages Lane at the Bountiful Landfill. The Parkway Facility Adjacent to Redwood Road Alternative alignment was evaluated using a 95-m (312-ft) right-of-way width.

5.4 Section 4(f) and 6(f) Properties

Section 4(f) and 6(f) properties are shown in Figure 5-1. The following subsections present detailed descriptions as a result of the changes, summarized above in Section 5.1, that have taken place since publication of the Final EIS.

5.4.1 Recreation, Wildlife, and Waterfowl Refuge Resources

Since publication of the Final EIS, there have been no new parks, wildlife, or waterfowl refuges identified in the study area as eligible for protection under Section 4(f) or 6(f).

Recreation Resources Identified since Publication of Final EIS

Table 5-1 shows the existing trails and future (proposed, conceptual, or planned) trails in the study area identified as eligible for protection under Section 4(f) since publication of the Final EIS.

Table 5-1 Section 4(f) Trails

Trails	Jointly Developed with Proposed Legacy Parkway Trail	Section 4(f) Use
Exiting Trails		
Airport Bicycle Path	No	No
Jordan River Parkway	No	No
Farmington Creek Trail	No	No
South Frontage Road	No	No
A-1 Drain Trail	No	No
Future Trails (Conceptual, Proposed, or Planned)		
D&RG Recreation Trail[2]	Yes	No
Airport Trail[3]	No	No
Jordan River Parkway to River's End[3]	Yes	No
North Salt Lake/Foxboro[2]	Yes	No

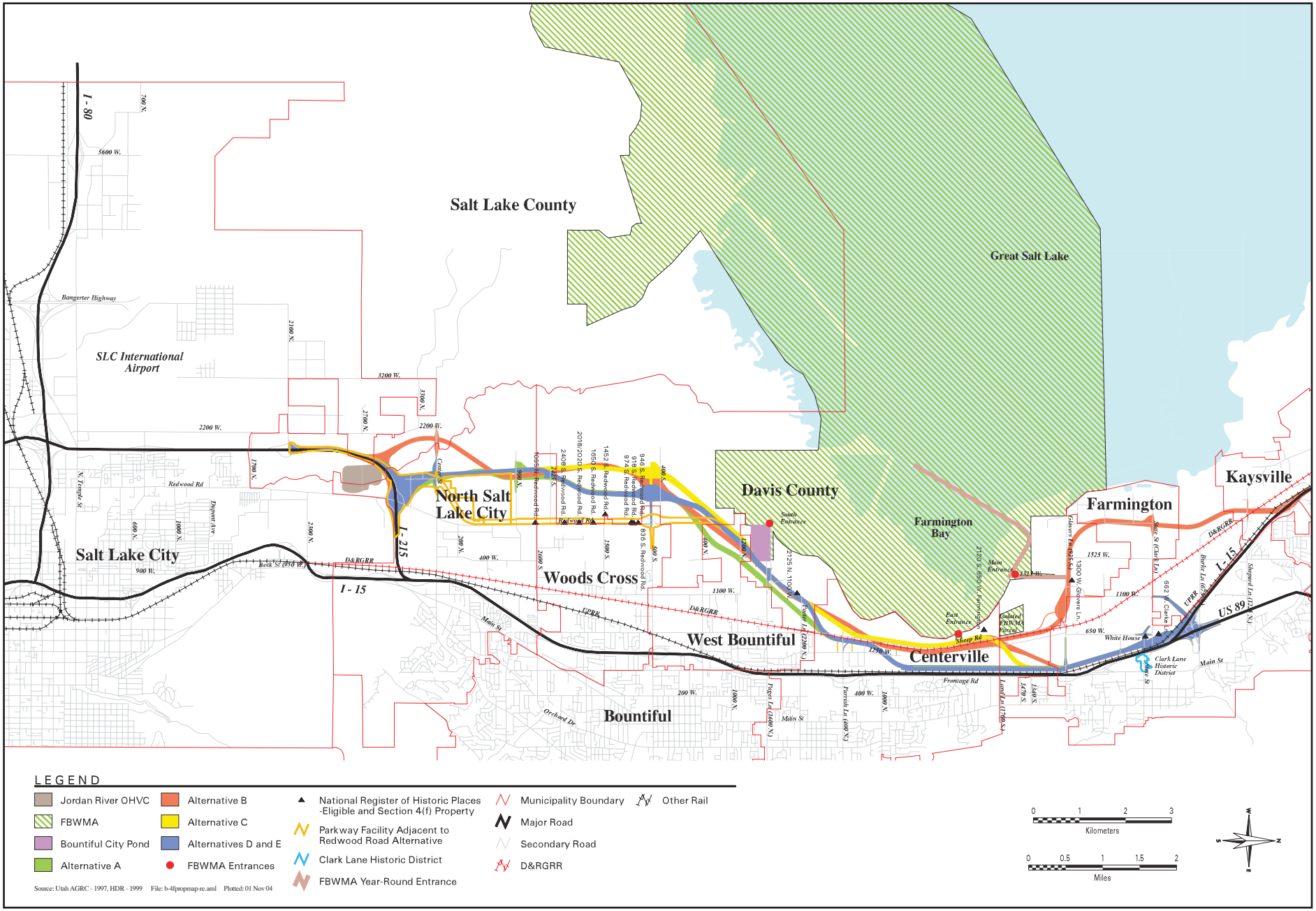

Figure 5-1
Section 4(f) and 6(f) Property Locations

Woods Cross Trails[2]	Yes	No
West Bountiful Rails to Trails[2]	Yes	No
Centerville Legacy Parkway Trail Access Point and Parking Area[2]	Yes	No
Beck Street[3]	No	No
Westpointe Corridor[1]	No	No
Farmington Creek Trail to Glovers Lane[3]	Yes	No

Notes:
[1] Conceptual; [2] Proposed; [3] Planned

Direct or constructive use of these trails would not occur as a result of any proposed build alternative. Therefore, none of the trails listed above are discussed further in this Section 4(f) evaluation. A more detailed description of these trails can be found in Section 4.7, *Pedestrian and Bicyclist Considerations*, and the trails shown on Figure 4.6-1.

Further information on joint development of the trails being developed jointly with the proposed action can be found in Section 4.6, *Joint Development.*

Farmington Bay Waterfowl Management Area (Section 4[f] Property)

As described in the Final EIS, the Farmington Bay Waterfowl Management Area (FBWMA) is a 4,865-ha (12,000-ac) wildlife and waterfowl management area in the southeastern part of Great Salt Lake, directly west of the northern half of the proposed action (Figure 5-1). A 25-ha (63-ac) property of the FBWMA is located northeast of the main portion of the FBWMA. This 25-ha (63-ac) property is also managed for wildlife and waterfowl. The entire FBWMA is an important part of the Great Salt Lake Ecosystem (GSLE) with respect to waterfowl migration. The GSLE is of international importance as part of the Western Hemisphere Shorebird Reserve Network. The FBWMA is owned by the State of Utah and managed by the Utah Department of Wildlife Resources.

Recreation activities are available to the public and include waterfowl hunting, boating, walking, bicycling, wildlife viewing, and wildlife education. Facilities to support these activities include seven parking areas and an airboat launch. Since publication of the Final EIS, the Farmington Bay Learning Center, a visitor education center, has been built near the main entrance. At the time of the Final EIS, visits were estimated to be 50,000 annually. In 2003, visits had increased to 72,000 annually.

The main entrance and access point is at 1325 West Glovers Lane in Farmington. There is also an eastern entrance on Sheep Road in Centerville and a southern entrance at Pages Lane in Bountiful.

The FBWMA is an important waterfowl management area and a significant wildlife resource. The FBWMA's primary function is waterfowl management, but it also has some of the same functions as a waterfowl refuge. Based on coordination with the officials having jurisdiction over this resource, FHWA has determined that the FBWMA is eligible for protection under Section 4(f) as a waterfowl refuge. FHWA has also determined that the FBWMA also qualifies as a recreation resource protected under Section 4(f). Public recreation activities on the property, ownership, jurisdiction, and access to the property have not changed since publication of the Final EIS.

Bountiful City Pond (Section 4[f] Property)

As described in the Final EIS, the Bountiful City Pond property is a 34-ha (83-ac) property south of the Bountiful Sanitary Landfill. On the eastern half of the property is a 17-ha (43-ac) pond. The City of Bountiful owns and has jurisdiction over the property, which is managed by the Bountiful Landfill Department. Excavation of the pond provided fill material for the adjacent landfill, and the pond serves as mitigation for the wetland impacts associated with construction of the landfill. The pond was initially created through a Section 404 Permit, and the City of Bountiful discouraged recreation use of the pond.

At the time the Final EIS was published, recreation activities available for public use on the property were considered incidental by the City of Bountiful and included fishing, boating, personal watercraft use, bird watching, and hunting. Use of the property for recreational purposes was severely restricted because of limited access and lack of facilities. Access to the property was by one unimproved road that led to the northeastern corner of the property. The only existing facility was a bank of the pond in the northeast corner that had been sloped to facilitate launching of small watercraft such as canoes and personal watercraft. Despite limited access, lack of facilities, and discouragement of recreation, the City of Bountiful stated in a letter dated December 11, 1997, "…the pond experiences significant recreational use…," and therefore the entire property was considered to have the potential to qualify for protection under Section 4(f) and was treated as such in the Final EIS.

Since publication of the Final EIS, the City of Bountiful, in coordination with the Utah Division of Wildlife Resources and Sport Fish Restoration, has developed and implemented a management plan that includes specific areas of the property to develop for recreational purposes and other areas that may be used for municipal purposes. The City of Bountiful now considers the specific areas developed for recreation with the use of the Statewide Urban Fishery Development Grant as significant recreation resources.

As outlined in the *Bountiful Pond Statewide Urban Fishery Development Report* (UDNR, Division of Wildlife Resources 2003b), the following improvements have been made to the recreational facilities on the property since publication of the Final EIS.

- A paved parking area with 30 stalls, including three handicap- and van-accessible stalls.
- A walking trail around portions of the pond, using the Division of Wildlife Resources road to avoid wetland impacts.
- Two floating fishing piers that also serve as wildlife viewing areas and are handicap accessible.
- Twelve picnic tables on concrete pads in pairs at various locations around the pond, with grills adjacent to the picnic tables.
- A total of 250 trees planted along the northern boundary and small area on the south side of the pond, including weeping willow, cottonwood, and flowering crabapple trees.
- A permanent handicap-accessible restroom facility adjacent to the new parking area.
- A concrete non-motorized boat ramp as part of the parking lot construction.
- Educational signs at various locations around the pond.
- Trout and catfish for fishing stocked in the pond by the Utah Division of Wildlife Resources.

Motorized watercraft are not allowed on the pond between April 1 and September 1.

Public recreation has increased in the specific areas of the pond developed for recreation. The areas of the property currently used for and functioning as recreation resources are eligible for protection under Section 4(f).

Section 4(f) status of the areas of the property not used for recreation have been reevaluated, in part because the City of Bountiful disagrees with the establishment of the entire property as a significant recreation resource. In a letter dated September 23, 2004, the City of Bountiful clarified plans for the property and explains plans to manage the property for multiple uses (City of Bountiful, Sept. 23, 2004, included in Appendix A). The letter states the City of Bountiful plans to maintain the developed recreation facilities and pond for at least the next 30 years but has no plans for additional recreation development of the remaining parts of the property. Specifically, there are no plans for recreation development or activities in the southeast and southwest corners of the property. The City of Bountiful plans "to use other parts of the property for other municipal purposes as needed." Potential uses include, but are not limited to, equipment and/or materials storage, staging, or as a source of fill material. Such municipal uses are not eligible for protection under Section 4(f). Such municipal uses are not eligible for protection under Section 4(f). As stated in the letter dated September 23, 2004, the recreation development completed to date was done under the full understanding by the City of Bountiful that the southeast corner of the property would be used for the proposed Legacy Parkway project and pond access.

The FHWA Section 4(f) Policy Paper provides the following guidance regarding Section 4(f) properties (Federal Highway Administration 1989).

> Section 4(f) applies to historic sites and **only those portions of lands which are designated by statute or identified in the management plans of the administering agency as being for parks recreation,** or wildlife or waterfowl refuge purposes and which are determined to be significant for such purposes. For public land holdings which do not have management plans (or where existing management plans are not current) Section 4(f) applies to those areas which function primarily for Section 4(f) purposes. **Section 4(f) does not apply to areas of multiple-use lands which function primarily for purposes not protected by Section 4(f)**. (Emphasis added.)

The property is currently managed by the City of Bountiful for multiple uses, not all of which are recreation uses or eligible for protection under Section 4(f), as described above. Based on the City of Bountiful's management plan, the area of the property currently established as recreation facilities, including the pond, is the only area of the property the City of Bountiful plans to use for recreation purposes and, therefore, is the only area considered eligible for protection under Section 4(f). Based on it's review of the information provided by the City of Bountiful, FHWA determined that the southeast corner, southwest corner, and undeveloped areas being reserved for future municipal uses are not eligible for protection under Section 4(f).

Utah State Parks Land, including Jordan River Off-Highway Vehicle Center (Section 4[f] and 6[f] Property)

As described in the Final EIS, the Utah State Parks and Recreation Division owns and manages a 51-ha (126-ac) property in the northern bend of I-215, directly south and east of the interstate. This property includes the Jordan River OHV Center.[1] The Jordan River OHV Center is an off-highway vehicle and motocross facility operated by a private concessionaire since 1997. It operates 5 days a week. At the time

[1] Since publication of the Final EIS, the name of the area has changed from the Jordan River Raceway to the Jordan River Off-Highway Vehicle (OHV) Center.

the Final EIS was published, an average of 50 paid riders visited the Jordan River OHV Center daily; since that time, there were 5,583 paid riders between July 2002 and July 2003, and 5,800 paid riders between July 2003 and December 2003.

The Jordan River OHV Center is exclusively a motorized recreation area. Trails associated with the Jordan River OHV Center are not permanent or intensively developed. There are no future development plans to change the motorized recreational use of the property. It is part of the Jordan River floodplain and serves a floodplain management function.

A 3.6-ha (9-ac) section of this property was purchased with funds under Section 6(f)(3) of the LWCF Act, classifying it as a Section 6(f) property also.

As noted above, the changes since the Final EIS include the change in the name and in the number of riders who visit the OHV Center. There have been no changes in the ownership, jurisdiction, access to the property, or status as a Section 4(f) and 6(f) property.

5.4.2 Historic and Archaeological Resources

Historic Resources

As described in the Final EIS, 18 historic structures were identified as eligible for listing on the NRHP and therefore eligible for protection under Section 4(f). The historic structures identified in the Final EIS are listed in Table 5-2. As described in the Final EIS, all the build alternatives required a direct use of one of those 18 historic structures, the White House at 10 North 650 West in Farmington.

Table 5-2 Historic Resources Identified in Final EIS as Eligible for NRHP Listing and Section 4(f) Protection[1]

Property Address	Building Type	Date Constructed	Effect[2]
10 North 650 West, Farmington White House (demolished)	Temple Form	1910	Adverse Effect
641 West Glovers Lane, Farmington	Bungalow	1940	No Effect
637 South 650 West, Farmington	Cross wing	1910	No Effect
788 South 650 West, Farmington	Bungalow	1945	No Effect
335 West State St., Farmington	Cross Wing	1905	No Effect
340 West State St., Farmington	Victorian Gothic	1890	No Effect
367 West State St., Farmington	Bungalow	1920	No Effect
368 West State St., Farmington	Bungalow	1910	No Effect
382 West State St., Farmington	Bungalow	1920	No Effect
399 West State St., Farmington	Period Cottage	1920	No Effect
1020 North 200 West, Kaysville	Residence	1910	No Effect
680 South Redwood Rd. (1800 West), Woods Cross	Bungalow	1930	No Effect

864 South Redwood Rd. (1800 West), Woods Cross	Bungalow	1930	No Effect
946 South Redwood Rd. (1800 West), Woods Cross	Residence	1920	No Effect
1650 South Redwood Rd. (1800 West), Woods Cross	Cross Wing	1915	No Effect
2790 North 2200 West, Salt Lake City	Temple Form	1935	No Effect
3067 North 2200 West, Salt Lake City	Residence	1930	No Effect
3071 North 2200 West, Salt Lake City	Residence	1930	No Effect

Notes:

[1] The shaded rows indicate the individual properties evaluated in the Final EIS within the CLHD boundaries.

[2] The terms *Adverse Effect* and *No Effect* are taken from Section 106 of the National Historic Preservation Act determinations; see Section 4.16, *Historic and Archaeological Resources*.

A historic resource inventory was conducted, as described in Section 4.16.1.1, to update the inventory presented in the Final EIS (Overstreet et al. 2004). The updated inventory identified an additional 23 structures and one historic district, eligible for listing on the NRHP and therefore protection under Section 4(f). Table 5-3 lists the historic structures identified in this updated inventory, including the Clark Lane Historic District (CLHD) and two historic railroad corridors. The CLHD is listed on the NRHP and includes 26 structures within its boundaries, 13 of which contribute to the historical significance of the CLHD. The CLHD was not evaluated as a single historic district in the Final EIS; rather, individual structures within the CLHD boundaries were evaluated. For this supplemental evaluation, the CLHD is considered a single historic district in which impacts on individual contributing structures are evaluated with regard to the CLHD as a whole.

Table 5-3 Historic Resources Identified in 2004 Inventory as Eligible for NRHP and Section 4(f) Protection

Property Address	Building Type	Date	Effect	4(f) Use (by Alternative)
1515 North 1100 West, West Bountiful	Foursquare House	1920	No Effect	No Use
2125 North 1100 West, West Bountiful[2]	Animal Facility	1940	No Effect	No Use
836 South Redwood Road (1800 W.), Woods Cross[1]	WWII-Era Cottage	1950	Adverse Effect	PFRR only
918 South Redwood Road (1800 W.), Woods Cross	Cross Wing	1920	Adverse Effect	PFRR only
946 South Redwood Road (1800 W.), Woods Cross[1]	WWII – Era Cottage	1950	Adverse Effect[3]	PFRR only
974 South Redwood Road (1800 W.), Woods Cross	Bungalow	1920	Adverse Effect	PFRR only
1452 South Redwood Road (1800 W.), Woods Cross[1]	WWII-Era Cottage	1950	No Effect	No Use
1650 South Redwood Road (1800 W.), Woods Cross	Cross Wing	1915	Adverse Effect	PFRR only

2018/2020 South Redwood Road (1800 W.), Woods Cross	Cross Wing	1920	Adverse Effect	PFRR only
2408 South Redwood Road (1800 W.), Woods Cross[1]	WWII-Era Cottage	1950	Adverse Effect	PFRR only
900 North Redwood Road (1800 W.), North Salt Lake	Foursquare House	1905	No Effect	No Use
1095 North Redwood Road (1800 W.), North Salt Lake	WWII-Era Cottage	1950	Adverse Effect	PFRR only
3290 North 2200 West, North Salt Lake	Ranch House	1950	No Effect	No Use
3200 North 2200 West, North Salt Lake	Ranch House	1955	No Effect	No Use
2770 North 2200 West, North Salt Lake	Foursquare House	1920	No Effect	No Use
2662 North 2200 West, North Salt Lake	Bungalow	1930	No Effect	No Use
2650 North 2200 West, North Salt Lake	WWII–Era Cottage	1950	No Effect	No Use
2664 North Rose Park Lane 2200 West, North Salt Lake	Foursquare House	1910	No Effect	No Use
415 South 650 West, Farmington	Animal Facility	1950	No Effect	No Use
637 South 650 West, Farmington	Cross Wing	1910	No Effect	No Use
2120 South 650 West, Farmington[2]	Animal Facility	1930	No Effect	No Use
1300 Glovers Lane, Farmington	Animal Facility	1950	Adverse Effect	B
662 West Clark Lane, Farmington	Animal Facility	1950	Adverse Effect	A, C, E, and PFRR
Clark Lane Historic District, Farmington[3]	Historic District	1856 to 1940	No Adverse Effect	Temporary Occupancy
Denver & Rio Grande Railroad[4]	Railroad Corridor	1882	No Adverse Effect	A, B, C, E, and PFRR
Union Pacific Railroad[4]	Railroad Corridor	1869	No Effect	No Use

Notes:

[1] Estimated address.

[2] Located in the Legacy Nature Preserve.

[3] Listed on the NRHP.

[4] Not included in Overstreet et al. 2004 inventory; discovered in consultation with SHPO.

PFRR = Parkway Facility Adjacent to Redwood Road Alternative.

The terms *Adverse Effect* and *No Effect* are taken from Section 106 of the National Historic Preservation Act determinations; see Section 4.16, *Historic and Archaeological Resources*.

.Source: Overstreet et al. 2004.

Historic Resources Identified since Publication of Final EIS

Since publication of the Final EIS, additional historic structures eligible for listing on the NRHP—1300 Glovers Lane in Farmington and 662 West Clark Lane in Farmington—have been identified that may be affected by the proposed action. These historic structures are eligible for listing on the NRHP and therefore eligible for protection under Section 4(f). As shown in Table 5-2 above, these resources may not be affected under all proposed build alternatives.

Historic Railroad Corridors

Two historic railroad corridors in the study area, the D&RG and the UPRR, were not included in the inventories prepared for the Final EIS. SHPO concurred with the inventory at the time of the Final EIS. Since publication of the Final EIS, portions of these historic railroad corridors have been inventoried and evaluated in adjacent counties. Because they are within the project study area, they are considered potential historic resources. SHPO, FHWA, and other consulting parties determined that the D&RG and the UPRR are eligible for listing on the NRHP under Criterion A, and therefore eligible for protection under Section 4(f). The proposed action would require a direct use of the D&RG Railroad and it is included in this evaluation. However the proposed action would not result in use of the UPRR. The Final EIS included plans to span the UPRR in areas where the proposed action intersected the UPRR right-of-way. All the build alternatives cross the UPRR right-of-way at Glovers Lane, State Street, at the proposed Legacy Parkway to I-15 connector ramps, the proposed Legacy Parkway to US-89 connector ramps, and at Burke Lane. The build alternatives in the Final EIS and in this Supplemental EIS, bridge the UPRR right-of-way at all these locations, avoiding a direct use of the UPRR. The bridges allow for the required UPRR vertical clearances. The UPRR is not discussed further in this Section 4(f) evaluation because the proposed action would not result in a direct or constructive use of the UPRR. A constructive use would not occur because the UPRR is not a noise-sensitive resource, nor is it subject to aesthetic impacts, vibration impacts, access impacts or ecological intrusion.

Legacy Nature Preserve

As part of the proposed mitigation for the Legacy Parkway project, the Legacy Nature Preserve was established. After publication of the Final EIS, additional literature and field investigations were conducted on the properties associated with the Preserve during the Section 404 permit process. Two historic structures eligible for protection under Section 4(f) are located within the footprint of the Legacy Nature Preserve—2125 North 1100 West in West Bountiful and 2120 South 650 West in Farmington. These structures are shown in Figure 5-2. These structures were evaluated for potential effects as result of the formation of the Legacy Nature Preserve. It was determined that these two historic structures would remain in place, and FHWA determined there would not be a Section 4(f) use of these historic structures because they would not be permanently incorporated into a transportation facility. The historic structures located with the boundaries of the Legacy Nature Preserve are not discussed further in this Section 4(f) evaluation for this reason.

Historic Resources on Redwood Road

The Parkway Facility Adjacent to Redwood Road Alternative, added to the range of alternatives evaluated since publication of the Final EIS, is the only build alternative that has the potential to have an effect on the following eight historic structures.

- 836 South Redwood Road, Woods Cross.
- 918 South Redwood Road, Woods Cross.

- 946 South Redwood Road, Woods Cross.
- 974 South Redwood Road, Woods Cross.
- 1650 South Redwood Road, Woods Cross.
- 2018/2020 South Redwood Road, Woods Cross.
- 2408 South Redwood Road, Woods Cross.
- 1095 North Redwood Road, North Salt Lake.

These eight structures were identified in the updated inventory and not discussed in the Final EIS. Because the Parkway Facility Adjacent to Redwood Road Alternative is the only build alternative that has the potential to affect these eight structures and the impacts are similar on each property, these properties are described under the heading of Historic Resources Affected by the Parkway Facility Adjacent to Redwood Road Alternative. Figures 5-1 and 5-3 show the location of these structures.

Description of Historic Section 4(f) Resources

The following sections provide more detail on the Section 4(f) historic resources.

White House at 10 North 650 West, Farmington (Section 4[f] Property)

As described in the Final EIS, the White House was a historic structure eligible for listing on the NRHP under Criterion C (see Section 4.16.1.1 of this document for definitions of the NRHP criteria for eligibility for listing), and therefore eligible for protection under Section 4(f). The White House was a white clapboard temple form style, built around 1910. The White House sat on 0.6 ha (1.5 ac) in the northeastern corner of the 650 West and Clark Lane (State Street)[2] intersection in Farmington, west of I-15. Only the structure was eligible for the NRHP, not the land on which it was located. At the time of the Final EIS, the property was privately owned, although not occupied, and future plans for the parcel were unknown. It was accessible by vehicles and pedestrians from Clark Lane. Because the property was privately owned, public access was not allowed. The White House was located on the west side of I-15, in an area adjacent to the State Street overpass crossing I-15. Figure 5-4, an update of Figure 5-2 in the Final EIS, shows the location of the White House.

Clark Lane Historic District, Farmington (Section 4[f] Property)

The CLHD was nominated for listing on the NRHP as a historic district in 1994. The western boundary of the CLHD is the State Street overpass of I-15 (400 West) and the eastern boundary is 200 West. The northern and southern boundaries of the CLHD are defined by the northern lot margins of the structures on the north and south sides of State Street, in accordance with National Park guidelines (National Park Service 1997). Figure 5-4 shows the boundaries of the CLHD.

At the time the CLHD was nominated to the NRHP, the district consisted of 26 structures, 13 of which were considered contributors to the historical significance of the district (Balle 1994). The CLHD was associated with agriculture throughout the early period of significance (1856–1940). Most of the agricultural outbuildings have been removed. The existing residential structures represent a wide variety

[2] West of I-15, State Street becomes Clark Lane.

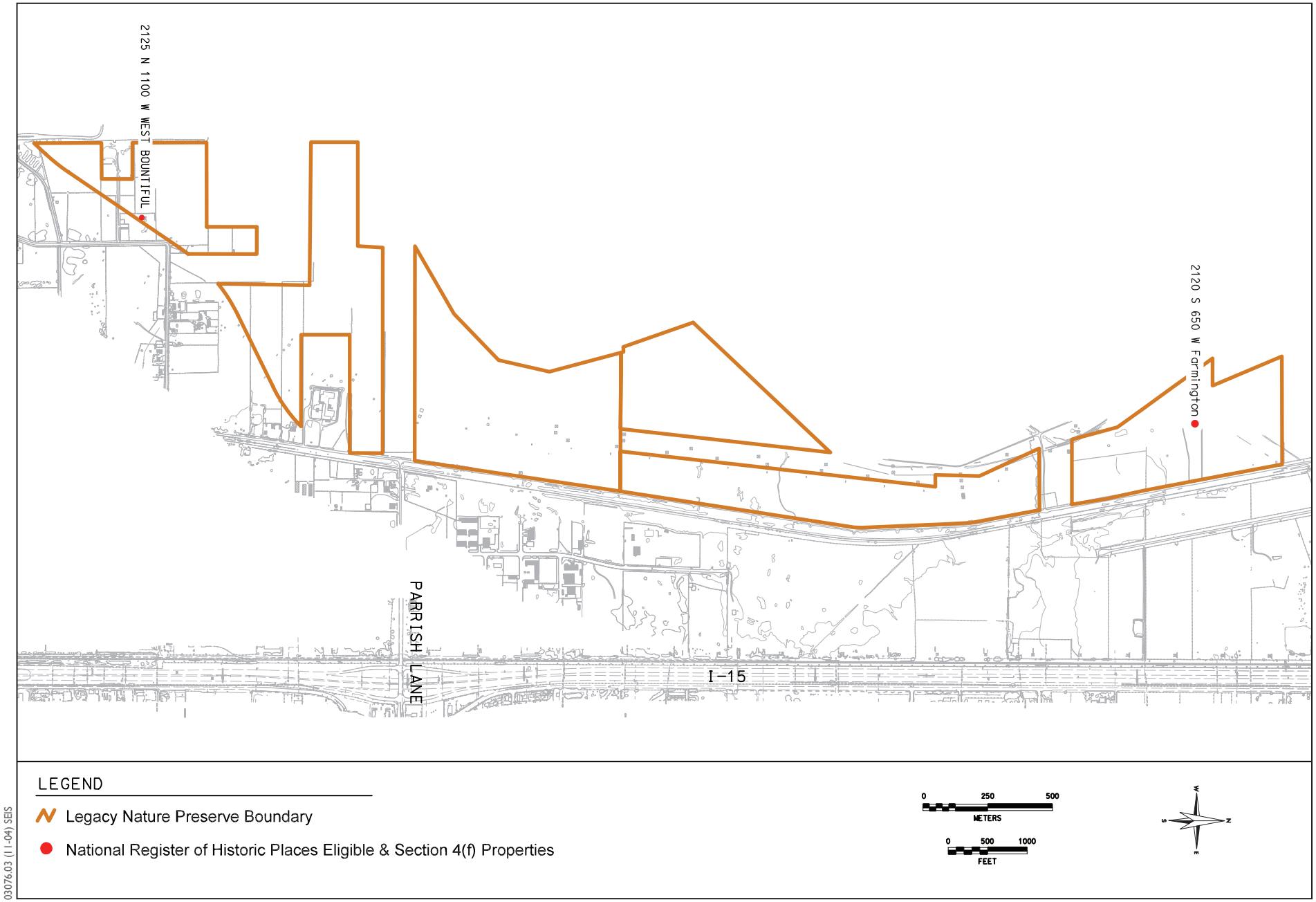

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Figure 5-2
Legacy Nature Preserve Boundary and Section 4(f) Property Locations

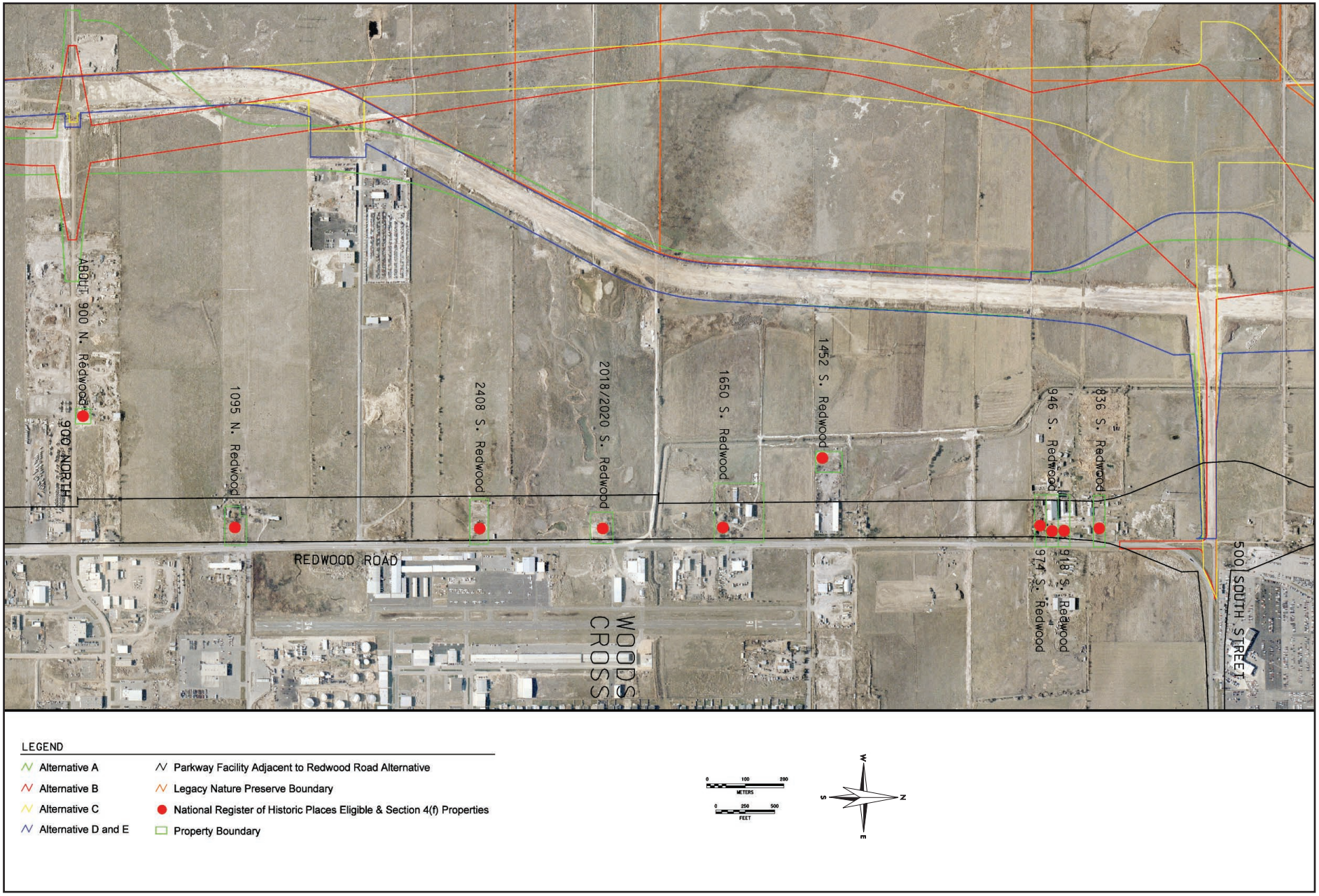

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Figure 5-3
Parkway Facility Adjacent to Redwood Road Alternative and Section 4(f) Property Locations

LEGEND

Approximate Boundary Clark Lane Historic District

Historic Property Boundary

White House

0 50 100 150 200 250 300
Meters

0 100 200 300 400 500 600 700 800
Feet

N
W E
S

Source: WFRC - 1997, HDR - 1997 File: a-4fhistmap-re.aml Plotted: 01 Nov 04

03076.03 (11-04) SEIS

Figure 5-4
White House and Clark Lane
Historic District (Farmington) Locations

of architectural styles from the period of significance. The row of trees along each side of State Street is of particular importance to the integrity of the CLHD (Balle 1994).

1300 Glovers Lane, Farmington (Section 4[f] Property)

The historic structure located at approximately 1300 Glovers Lane in Farmington, is an animal facility built in approximately 1950. The animal facility sits on 1.17 ha (2.90 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that it is eligible for the NRHP under Criterion C, and therefore eligible for protection under Section 4(f).

662 West Clark Lane, Farmington (Section 4[f] Property)

The historic structure located at approximately 662 West Clark Lane in Farmington is an animal facility built in approximately 1950. The animal facility sits on a 0.198-ha (0.49-ac) property, of which only 0.084 ha (0.207 ac) is historic and eligible for protection under Section 4(f). This property is owned by Davis County School District.

UDOT and FHWA, in coordination with SHPO, have determined that it is eligible for the NRHP under Criterion C, and therefore eligible for protection under Section 4(f).

D&RG Railroad (Section 4[f] Property)

The D&RG Railroad in Utah was a direct result of a plan to operate a railroad along a north-south line between Denver, Colorado and El Paso, Texas to serve the booming mining industry. Plans for the original destination of El Paso, Texas changed in 1880 to Salt Lake City, Utah. The D&RG Railroad reached Salt Lake City in 1882, and construction of the line north to Ogden was completed the following year. (Utah Rails.Net 2004.)

As described in the *Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation* (HDR Engineering, Inc. 2004b), the railroad grade is present throughout the length of the study area, running in a north/south alignment. Ties and tracks are still present in some areas. Sections of the D&RG Railroad are still actively being used within the study area, from the southern end of the North Corridor to 400 North in West Bountiful, providing a freight transportation link to the petroleum refineries in North Salt Lake, Woods Cross, and West Bountiful. The width of the rail right-of-way through this area averages 18.3 m to 30.5 m (60 ft to 100 ft).

As described in the *Legacy Parkway Technical Memorandum: Integration of Mass Transit with the Legacy Parkway* (Fehr & Peers 2004), in the Final EIS, the build alternatives were designed to span the D&RG Railroad tracks at Parrish Lane and 1250 West through Centerville. This was done at the request of UPRR, who owned the D&RG right-of-way at that time. UPRR intended to preserve the corridor so they could have the option of using the tracks in the future. After the Final EIS was published, the D&RG right-of-way was purchased by the Utah Transit Authority (UTA) in conjunction with the purchase of the UPRR line. UDOT contributed $10 million of Legacy Parkway funds to assist UTA in purchasing the railroad corridors in exchange for agreement by UTA to allow the proposed action to cross the D&RG Railroad at grade. This provision resulted in a reduction of expense for the project, and UDOT modified the design for crossing the D&RG Railroad right-of-way to cross at grade rather than spanning the tracks, including the crossings at Parrish Lane and 1250 West through Centerville.

FHWA, in coordination with SHPO, has determined the D&RG Railroad is eligible for the NRHP and therefore eligible for protection under Section 4(f).

In addition to being a Section 4(f) resource because of its NRHP eligibility, the D&RG Railroad is also a planned recreation trail. UTA has applied to WFRC for funds (Congestion Mitigation/Air Quality) to convert the railway grade to a pedestrian/bicycle trail from West Bountiful to the Roy area in Weber County. The D&RG Railroad corridor is therefore considered formally designated for recreation and eligible for protection under Section 4(f). However, the D&RG Railroad recreation trail is being planned jointly with the development of the Legacy Parkway Trail. FHWA's Section 4(f) policy paper (Federal Highway Administration 1998) provides the following guidance based on the joint development of the D&RG Railroad trail with the Legacy Parkway Trail: "the requirements of Section 4(f) do not apply to the subsequent highway construction on the reserved right-of-way as previously planned." For this reason, only impacts on the historic nature of the D&RG Railroad are discussed further in this Section 4(f) evaluation.

Historic Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only

Figure 5-3 shows the structures, property boundaries, and right-of-way required for the construction of the Parkway Facility Adjacent to Redwood Road Alternative. The Parkway Facility Adjacent to Redwood Road Alternative, if implemented would require a direct use of the eight historic structures described below.

836 South Redwood Road, Woods Cross (Section 4[f] Property)

The single dwelling structure located at approximately 836 South Redwood Road in Woods Cross was built in approximately 1950. It is a one-story World War II-era cottage constructed of drop/novelty siding. Two non-contributing outbuildings are also located on the property. The structure sits on 0.405 ha (1.00 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

918 South Redwood Road, Woods Cross (Section 4[f] Property)

The cross-wing house located at approximately 918 South Redwood Road in Woods Cross was built in the 1920s. The structure sits on 0.409 ha (1.01 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

946 South Redwood Road, Woods Cross (Section 4[f] Property)

The single dwelling structure located at 946 South Redwood Road in Woods Cross was built in approximately 1920. It is a one-story sided bungalow. Four non-contributing outbuildings are also located on the property. The structure sits on 0.409 ha (1.01 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

974 South Redwood Road, Woods Cross (Section 4[f] Property)

The bungalow located at 974 South Redwood Road in Woods Cross was built in approximately 1920. The structure sits on 0.405 ha (1.00 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

1650 South Redwood Road, Woods Cross (Section 4[f] Property)

The single dwelling structure located at 1650 South Redwood Road in Woods Cross was built in approximately 1890. It is a two-story brick Victorian-Elect World War II-era cross wing. Four non-contributing outbuildings and one contributing outbuilding are also located on the property. The structures sit on 1.95 ha (4.82 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

2018/2020 South Redwood Road, Woods Cross (Section 4[f] Property)

The cross-wing house located at 2018/2020 South Redwood Road in Woods Cross was built in approximately 1920. The structure sits on 0.47 ha (1.17 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

2408 South Redwood Road, Woods Cross (Section 4[f] Property)

The single dwelling structure located at 2408 South Redwood Road in Woods Cross was built in approximately 1950. It is a one-story stucco/plaster and brick World War II-era cottage. One non-contributing outbuilding and one contributing outbuilding are also located on the property. The structure sits on 0.55 ha (1.37 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

1095 North Redwood Road, North Salt Lake (Section 4[f] Property)

The single dwelling structure located at 1095 North Redwood Road in North Salt Lake was built in approximately 1950. It is a one-story sided World War II era cottage. Four non-contributing outbuildings are also located on the property. The structure sits on 0.53 ha (1.31 ac) and is privately owned.

UDOT and FHWA, in coordination with SHPO, have determined that this structure is eligible for listing on the NRHP under Criterion C and therefore eligible for protection under Section 4(f).

Archaeological Resources

New archaeological sites eligible for protection under Section 4(f) have been identified since publication of the Final EIS. Only one of these new archaeological sites—Site 42Dv94—has been identified as having the potential for a Section 4(f) use by the proposed action.

Additional data recovery and field investigations were conducted at Site 42Dv2, which had been previously identified in the Final EIS. As a result of the additional data recovery and field investigations, Site 42Dv2 was determined eligible for protection under Section 4(f).

Site 42Dv67 was identified in the Final EIS as not being adversely affected by the proposed action. The Parkway Facility Adjacent to Redwood Road Alternative, added to the range of alternatives evaluated

since publication of the Final EIS, if implemented has the potential to impact Site 42Dv67. Because there are existing outbuildings still standing on the property, it is eligible for protection under Section 4(f).

Site 42Dv97 is a historic privy located at 1395 West Parish Lane in Centerville. This site was discovered during property acquisition. In consultation with SHPO and other consulting parties, it was determined that testing would be necessary to determine the eligibility of the site for listing on the NRHP. Because the current injunction prohibits ground disturbance, the site can only be tested when and if the injunction is lifted. If testing occurs, the eligibility determination for listing on the NRHP will be made at that time. Based on information about the site obtained to date, it is likely that Site 42Dv97 is only eligible for protection under Criterion D of Section 106 of the National Historic Preservation Act, which would mean that it would not be eligible for protection under Section 4(f). For this reason, Site 42Dv97 is not analyzed for Section 4(f) uses, avoidance, or minimization at this time. However, if after testing it is determined that the site is eligible for listing on the NRHP under Criterion A, B, or C, a Section 4(f) evaluation would be completed for Site 42Dv97. This site may be potentially affected by implementation of Alternatives A and E and the Parkway Facility Adjacent to Redwood Road Alternative

These archaeological resources are discussed below. See Chapter 4, *Supplemental Environmental Analysis*, Section 4.16, *Historic and Archaeological Resources*, for a more detailed description of the archaeological sites.

Site 42Dv2 (Section 4[f] Property)

Site 42Dv2 is a large prehistoric campsite, located in an area acquired for southern interchange with I-215. This site was identified in the Final EIS as an archeological resource under Criterion D (see Section 4.16.1.1 for a definition of the criterion). At the time of the Final EIS, the site did not warrant preservation in place and was therefore not considered eligible for protection under Section 4(f). The Final EIS disclosed that the site would be adversely affected by all build alternatives. Portions of 42Dv2 were excavated in accordance with the original Memorandum of Agreement (MOA) (see Appendix A) to mitigate impacts on this site and in consultation with SHPO. During data recovery, human remains were encountered. Excavations were halted in 2002 prior to completion after it was determined that the remaining site would not be further disturbed by construction of Alternative D (Final EIS Preferred Alternative). Because of the complexity of the site investigation, documentation of the field investigation and results are pending.

FHWA has determined that, because human remains were encountered and because there is sufficient potential for additional human remains to be present on the site, Site 42Dv2 now warrants preservation in place and therefore qualifies for protection under Section 4(f). This determination was made based on the significance of the site and the sanctity of grounds containing human remains.

Site 42Dv94 (Section 4[f] Property)

Site 42Dv94 is a prehistoric site discovered in 2002 during monitoring activities associated with the proposed action. The site contained human remains discovered eroding from the margins of the City Drain Canal in North Salt Lake City, Utah. The human remains have been fully excavated per the inadvertent discovery procedures outlined in the original MOA. This site is currently located in an area acquired for the right-of-way for the southern interchange with I-215.

There is sufficient potential for additional remains to be present in the area (SWCA Inc., Environmental Consultants 2003), and therefore Site 42Dv94 warrants preservation in place and protection under Section 4(f). This determination was based on the sanctity of grounds containing human remains.

Archaeological Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only

Site 42Dv67 (Section 4[f] Property)

Site 42Dv67 is a historic homestead site west of Woods Cross, adjacent to Redwood Road. It consists of a collapsed stone, brick, and frame house. There are also remains of eight outbuildings and the presence of historic trash. The Final EIS stated that this site would not be adversely affected by the proposed action. The Parkway Facility Adjacent to Redwood Road Alternative is the only alternative that would require a direct use of Site 42Dv67.

Site 42Dv67 is eligible for listing on the NRHP under Criteria C and D because some of the outbuildings present on the property are still standing. As a result, FHWA has determined that this site is eligible for protection under Section 4(f).

5.5 Use of Section 4(f) and 6(f) Properties

This section evaluates direct and constructive use of Section 4(f) and 6(f) properties as a result of the proposed action. (Definitions of direct and constructive use are provided above in Section 5.2.1.)

5.5.1 Recreation, Wildlife, and Waterfowl Refuge Resources

Farmington Bay Waterfowl Management Area (Section 4[f] Property)

As described in the Final EIS, three areas of the FBWMA are located in the project study area and are discussed in the following sections.

- The 25-ha (63-ac) property off the northeastern edge of the FBWMA's main body, on the northern side of Lund Lane.
- The far eastern border of the FBWMA, including the parking lot and eastern entrance on Sheep Road.
- The southern entrance to the FBWMA at the western end of Pages Lane near the Bountiful Sanitary Landfill.

However, as described below, only the far eastern border of the FBWMA would be subject to a direct use by Alternatives B and C, as discussed below.

Figures 5-5 and 5-6 are updates of Figures 5-3a and 5-3b in the Final EIS, and show these areas of the FBWMA and their relationship to the build alternatives.

Direct Use

There have been changes to the discussion of direct use of the FBWMA since the Final EIS: the adopted design change to the right-of-way width of the build alternatives, and the addition of the Parkway Facility Adjacent to Redwood Road Alternative to the range of alternatives evaluated. As stated in the Final EIS, there would be no direct use of the 25-ha (63-ac) property or the southern entrance by any proposed build alternative. This has not changed since the publication of the Final EIS.

As described in the Final EIS, only Alternatives B and C would involve a direct use of the eastern entrance and parking area of the FBWMA. The Final EIS also states that replacing the property and relocating the parking lot would not diminish the use of the property for waterfowl management. Since publication of the Final EIS, it has been determined that replacing the property and relocating the parking lot would not diminish the use of the property for recreation purposes either. In addition, revisions have been made in the amount of land required because the right-of-way width has been reduced. The revised amount of land required under Alternative B is 0.02 ha (0.04 ac), a reduction of 0.18 ha (0.46 ac). The revised amount of land required under Alternative C is 1.18 ha (2.91 ac), a reduction of .02 ha (0.09 ac). Table 5-4 summarizes the acres of direct use of land required by each alternative.

Table 5-4 Acres of Direct Use of Land at FBWMA's Eastern Entrance, Updated for Reduced Right-of-Way

	Alternative				
	A	B	C	D	E*
Eastern Entrance	0.0 ha (0.0 ac)	0.02 ha (0.04 ac)	1.18 ha (2.91 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)

Note:

* Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative would have the same impact on this resource.

Figure 5-5 shows the project alternatives near the northeastern and eastern areas of the FBWMA. At the scale of this figure, the reduction in the right-of-way width is too minor to be readily apparent.

Constructive Use

As stated in the Final EIS, none of the build alternatives would result in constructive use of the FBWMA. This has not changed since publication of the Final EIS, although evaluations were updated and are described below. Alternatives B and C would result in direct use of land from the FBWMA, and as such there would be no constructive use of this resource under these alternatives. See Section 4.13.3.10, *Highway Noise Disturbance*, in Chapter 4, *Supplemental Environmental Analysis*, for further information on possible effects of the proposed action on waterfowl and wildlife.

Noise

Noise levels, as described in the Final EIS, would increase in the southeastern corner of the 25-ha (63-ac) property on the eastern edge of the FBWMA and at the southern entrance because of the proximity of one or more of the proposed alignments.

Since publication of the Final EIS, a new noise analysis was completed. It was determined that the proximity of one or more of the proposed alignments would increase noise levels in the same areas identified in the Final EIS. Table 5-5 summarizes the change in dBA from existing conditions, as identified in the updated noise analysis.

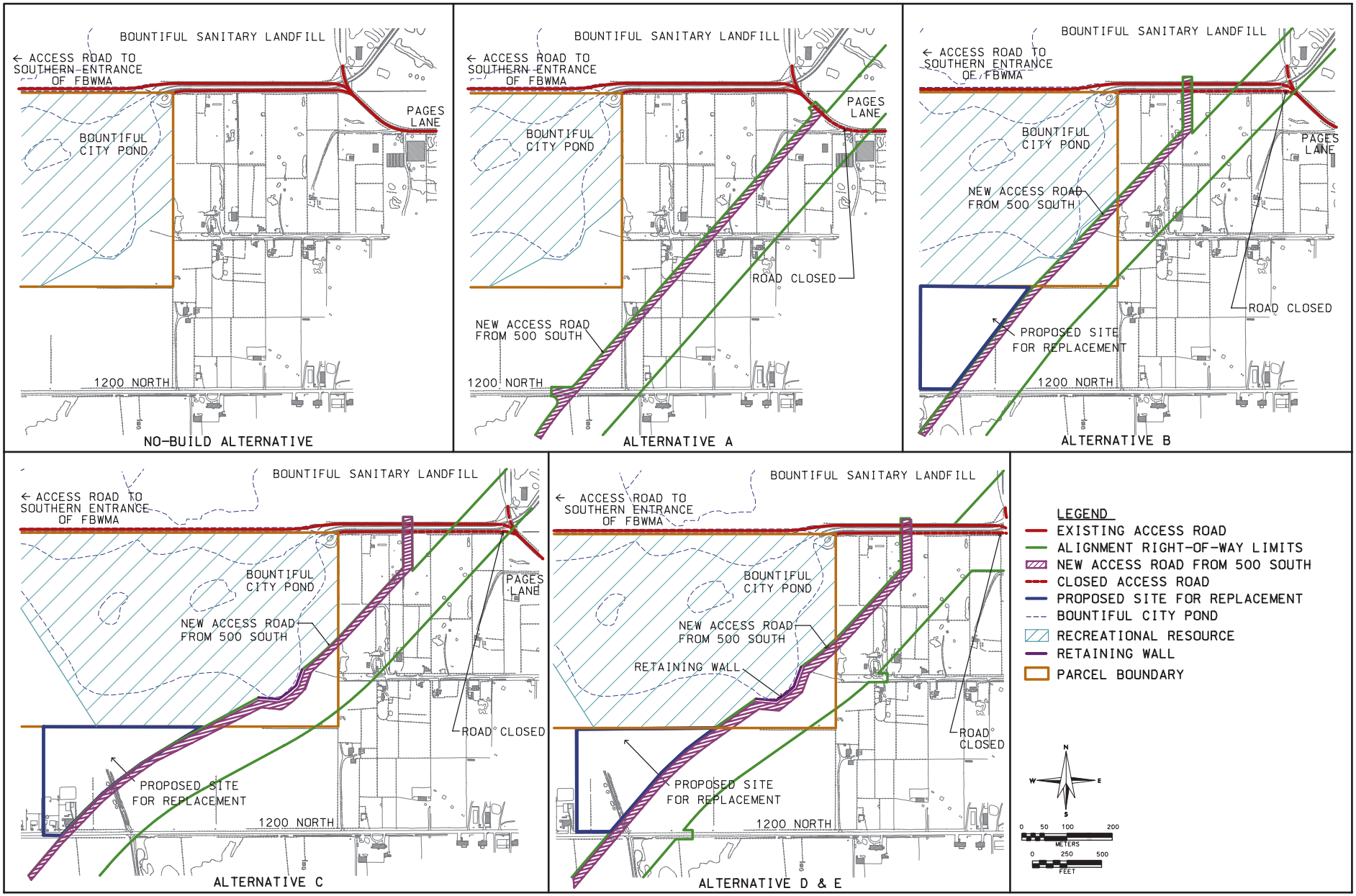

Figure 5-6
Impacts and Replacement Land
FBWMA's Southern Entrance and Bountiful City Pond

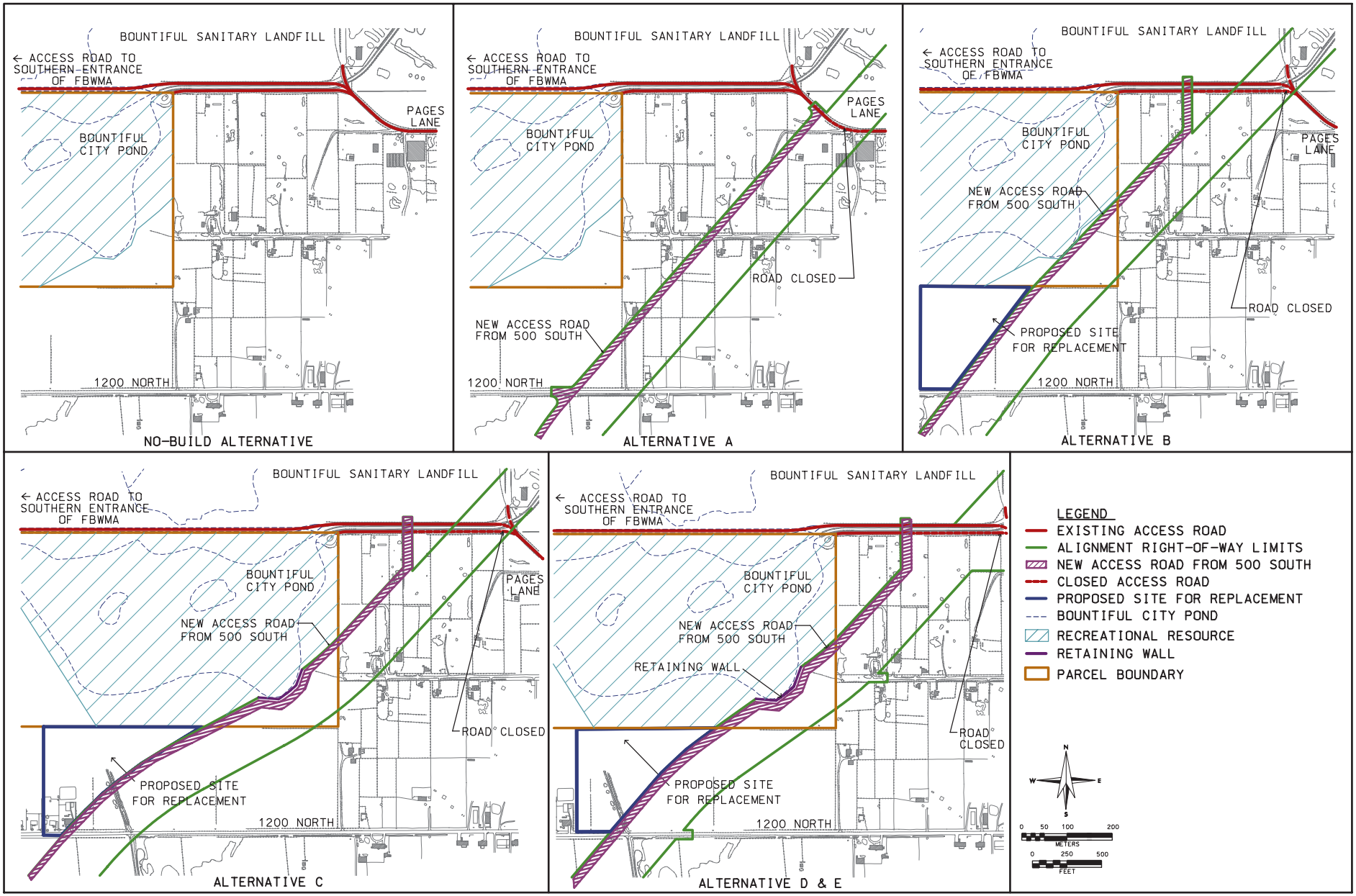

Figure 5-6
Impacts and Replacement Land
FBWMA's Southern Entrance and Bountiful City Pond

Table 5-5 Results of Updated Noise Analysis for FBWMA

	dBA of Alternatives (increase in dBA from existing conditions)					
Location	No-Build (Existing Condition)	A	B	C	D	E*
25-ha (63-ac) Property	56	63 (7)	72 (16)	68 (12)	63 (7)	63 (7)
Eastern Edge	56	63 (7)	72 (16)	68 (12)	63 (7)	63 (7)
Southern Entrance	46	56 (10)	59 (13)	62 (16)	61 (15)	61 (15)

Note:

* Change in dBA under the Parkway Facility Adjacent to Redwood Road Alternative would be the same as under Alternative E.

As stated in 23 CFR 771.135(p)(4)(i), a constructive use attributable to noise occurs when

> ...the projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a resource protected by section 4(f), such as hearing the performances at an outdoor amphitheater, sleeping in the sleeping area of a campground, enjoyment of a historic site where a quiet setting is a generally recognized feature or attribute of the site's significance, or enjoyment of an urban park where serenity and quiet are significant attributes.

Also according to 23 CFR 771.135(p)(5)(ii), a constructive use attributable to noise does not occur when

> ...the projected traffic noise levels of the proposed highway project do not exceed the FHWA noise abatement criteria as contained in Table 1, 23 CFR part 772, or the projected operational noise levels of the proposed transit project do not exceed the noise impact criteria in the [Urban Mass Transportation Act] guidelines.

As described in the Final EIS, there is a wide range of recreation activities available at the FBWMA, including hunting and boating, which are seasonal and noisy activities. Aircraft overflights from the Salt Lake City International Airport occur on a daily basis year round. The FBWMA does not qualify as an activity category A facility (23 CFR 772). Activity category A facilities are "lands on which serenity and quiet are of extraordinary significance and serve as an important public need, and where the preservation of those qualities is essential if the area is to continue to serve it's intended purpose." This has not changed since publication of the Final EIS.

The FBWMA qualifies as an activity category B resource. Activity category B includes areas such as picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals. Under activity category B, a noise receptor experiences a noise impact if the noise level at that receptor approaches or exceeds the FHWA noise abatement criteria threshold of 67 dBA. This noise threshold would not be met or exceeded for any noise receptors in the FBWMA under Alternatives A, E, and the Parkway Facility Adjacent to Redwood Road Alternative, but it would be exceeded under Alternatives B and C. Alternatives B and C require a direct use of the FBWMA, and as such do not constitute a constructive use of the FBWMA, even though the threshold of 67 dBA would be exceeded under these two alternatives. Further, FHWA considers a substantial increase over existing conditions to be a noise impact; and UDOT noise policy defines a threshold of 65 dBA and a substantial increase as being a 10-dBA increase over existing noise levels. At the southern entrance of the FBWMA, noise levels would increase by 10 dBA or more under all build alternatives. Table 5-5 lists the noise levels and increases in dBA from the existing conditions at the southern entrance of the FBWMA.

The increase in noise levels could slightly reduce use of the FBWMA by both people and wildlife in areas next to the proposed action. This reduction is expected to be small. The expected increase in noise levels also occurs near entrance and parking areas, locations within the FBWMA that experience higher levels of human and vehicular activity than the other areas; these areas do not offer the waterfowl/wildlife habitat functions that are present in other parts of the FBWMA. In addition, the area affected by the increased noise is relatively small compared to the overall size of the FBWMA. Therefore, as stated in the Final EIS, there would be no constructive use attributable to noise.

Aesthetics

As described in the Final EIS, there would be no constructive use attributable to aesthetics because the FBWMA is not a park where the value of the park is substantially in its setting. There have been no changes to this discussion since publication of the Final EIS. There would be no constructive use attributable to aesthetics for Alternatives A , E, or the Parkway Facility Adjacent to Redwood Road Alternative.

Access

As described in the Final EIS, all entrances to the FBWMA were to be maintained. The Final EIS stated that access to the southern entrance was to be maintained by a frontage road on the western side of the alignment from 500 South in West Bountiful and by construction of a pedestrian, bicyclist, and equestrian overpass at Pages Lane. In the Final EIS, the eastern entrance and 25-ha (63-ac) property access would change under Alternatives B and C. The eastern entrance was to be maintained from the north via a relocated Sheep Road. The 25-ha (63-ac) property was to be accessible only from the north, via Sheep Road. Access to the northeastern entrance would not change.

Since publication of the Final EIS, the pedestrian, bicyclist, and equestrian overpass at Pages Lane has been eliminated by the City of West Bountiful due to feasibility and cost (HDR Engineering, Inc. 2003). However, access to the FBWMA would be maintained via the frontage road from 500 South. Overall, with the frontage road access, there would be no constructive use of the FBWMA by Alternatives A, E, or the Parkway Facility Adjacent to Redwood Road Alternative as a result of access restrictions.

Vibration

As described in the Final EIS, the FBWMA has no structures in the study area and would experience no constructive use by Alternatives A, D (Final EIS Preferred Alternative), E, or the Parkway Facility Adjacent to Redwood Road Alternative attributable to vibration. This has not changed since publication of the Final EIS.

Ecological Intrusion

As described in the Final EIS, there would be no constructive use attributable to ecological intrusion by Alternatives A, D (Final EIS Preferred Alternative), E, or the Parkway Facility Adjacent to Redwood Road Alternative and none of the build alternatives would interfere with migratory waterfowl access to the FBWMA. This discussion has not changed since publication of the Final EIS.

Bountiful City Pond (Section 4[f] Property)

Figure 5-6 shows the location of the proposed build alternatives in relation to the Bountiful City Pond property. Reductions in the right-of-way width are too minor to be readily apparent in the figure.

Direct Use

Direct use of the Bountiful City Pond property has changed since publication of the Final EIS because of the adopted change in the right-of-way width, modifications of the final design of Alternative D (Final EIS Preferred Alternative) during the design-build process, and the addition of the Parkway Facility Adjacent to Redwood Road Alternative to the range of alternatives evaluated. Modifications of the final design included constructing retaining walls to avoid any fill in the pond and associated wetlands. These modifications have now been incorporated into the final design of all build alternatives currently under consideration.

As described in the Final EIS, the land that would be required for Alternatives B, C, and D (Final EIS Preferred Alternative), as well as for Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative, is in the southeastern corner of the property. This area is not used for recreation and, as discussed above in Section 5.4.1, the City of Bountiful considers this area reserved for the proposed action. As stated in a letter dated September 23, 2004, the City of Bountiful feels that the proposed Legacy Parkway project and the resulting improved access are beneficial for the recreation facilities located on the Bountiful City Pond property. Modifications made to the final design for the reduction in the right-of-way width, construction of retaining walls, and the City of Bountiful's implementation of a management plan that includes specific areas for recreation and other areas for municipal purposes have eliminated the direct use required by Alternatives B, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative. Areas developed and managed as public recreation areas on the property would not be incorporated into the proposed action.

As described in the Final EIS, the City of Bountiful agreed to accept 4 ha (10 ac) as replacement land (see memorandum of the meeting with the City of Bountiful dated November 30, 1999, in the Final EIS Appendix E, *Section 4(f)/6(f) Properties*) as compensation for the use of the 2.4-ha (5.9-ac) portion of land from the southeast corner of the property by Alternative D (Final EIS Preferred Alternative). Since publication of the Final EIS and as a result of the reduction in the right-of-way width, Alternative B would require 1.7 ha (4.2 ac) of land, Alternative C 2.38 ha (5.88 ac) of land, and Alternative E would require 2.12 ha (5.24 ac). The Parkway Facility Adjacent to Redwood Road Alternative would require the same amount of land from the property as Alternative E. As described in the paragraph above the area incorporated into the proposed action is not considered to be a direct use of Section 4(f) property. Figure 5-6 is an update of Figure 5-3b in the Final EIS and shows the location of the replacement land. The agreement with the City of Bountiful for the replacement land remains in place.

Constructive Use

As described in the Final EIS, Alternative A would not result in a direct use of land from this property, but because of its proximity to the pond and recreation facilities, it was evaluated for constructive use impacts. Although evaluations were updated for all the build alternatives, there has been no change in constructive use of the Bountiful City Pond property since publication of the Final EIS. An updated noise analysis has been completed since publication of the Final EIS.

In the Final EIS, Alternatives B, C, and D (Final EIS Preferred Alternative) required a direct use of land from the Bountiful City Pond property, and therefore were not reviewed for constructive use impacts. Since publication of the Final EIS, modifications to the final design of the proposed action would eliminate the direct use of the pond and other recreation facilities located on the property required by Alternatives B, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative. Therefore, these alternatives were reviewed for constructive use impacts in this Supplemental EIS.

Noise

As described in the Final EIS, Bountiful City Pond was not a noise-sensitive facility where quiet and serenity are significant attributes. The recreation activities are widely dispersed, and noisy activities such as hunting and certain types of boating are allowed. Therefore, there was no constructive use attributable to noise under Alternative A in the Final EIS.

The noise analysis has been updated since the Final EIS, and the results are listed in Table 5-6.

Table 5-6 Updated Noise Analysis for Bountiful City Pond

	dBA of Alternatives (increase in dBA from existing conditions)					
Location	No-Build (Existing Condition)	A	B	C	D	E*
Eastern edge Bountiful City Pond	46	65 (19)	73 (27)	73 (27)	74 (28)	74 (28)

Note:

* Change in dBA under the Parkway Facility Adjacent to Redwood Road Alternative would be the same as under Alternative E.

See the FBWMA constructive use discussion of noise that describes what constitutes a constructive use attributable to noise.

The pond and recreation facilities are not noise-sensitive facilities; however, they do qualify as an activity category B resource. Excavation of the pond provided fill material for the adjacent Bountiful City landfill, and the pond serves as mitigation through a Section 404 Permit for the wetland impacts associated with construction of the landfill. The pond is located immediately adjacent to the landfill and is subject to noise from heavy equipment approaching and leaving the landfill as well as equipment used in the daily operations of the landfill. Hunting is allowed on the property and FBWMA on a seasonal basis, and when allowed contributes to noise disturbance. The pond and recreation facilities could experience noise impacts under all the build alternatives because noise levels at the eastern edge of the property would exceed the FHWA noise abatement criteria threshold of 67 dBA, and noise levels would increase by at least 10 dBA over the existing levels, as shown in Table 5-6.

However, based on a review of the setting of the pond and the recreation use at the site, FHWA has determined that the expected increase in noise levels would not substantially impair the recreation function of the facility. FHWA has determined that there would be no constructive use from noise under any build alternative.

Aesthetics

As described in the Final EIS, there would be no constructive use attributable to aesthetics because the pond and recreation facilities are not a park where the value of the park is based substantially on its setting. The pond and recreation facilities are also located adjacent to the Bountiful Landfill, which frequently uses heavy equipment in daily operations. There have been no changes to this discussion since publication of the Final EIS, except that only the pond and recreation facilities, not the entire Bountiful City Pond property, are considered Section 4(f) resources. It was determined that there would be no constructive use attributable to aesthetics under any build alternative.

Access

The Final EIS described two direct access points to the Bountiful City Pond property, a frontage road from 500 South in West Bountiful and an overpass for pedestrians, bicyclists, and equestrians at Pages

Lane. Since publication of the Final EIS, the City of West Bountiful has decided not to construct the pedestrian, bicyclist, and equestrian overpass at Pages Lane because of feasibility and cost concerns (HDR Engineering, Inc. 2003). The pedestrian, bicycle, and equestrian overpass was a planned access enhancement for the Bountiful City Pond. Currently, the property only has one access point; with the elimination of the overpass, there would only be one access point following development of the proposed action. There would be a slight increase in travel distance and time, but this minor increase is not expected to affect use of the recreation facilities. Because access would be maintained via the frontage road from 500 South in West Bountiful and the pedestrian overpass was not constructed, there would be no constructive use attributable to access impacts under any build alternative. As stated in a letter dated September 23, 2004, the City of Bountiful feels that the proposed Legacy Parkway project and the resulting improved access from the FBWMA road at 500 South are beneficial for the pond and recreation facilities on the property.

Vibration

Since publication of the Final EIS, restroom facilities have been constructed adjacent to the parking area for the pond. Vibration levels from a transportation facility such as the proposed action are not typically great enough to affect the structural integrity of a building or substantially diminish the utility of a building. As a result of and including the discussion under constructive use above, it was determined that there would be no constructive use attributable to vibration under any build alternative.

Ecological Intrusion

As described in the Final EIS, there would be no constructive use attributable to ecological intrusion. Migratory waterfowl access to the pond would not be altered. This discussion has not changed since publication of the Final EIS, except that, as a result of the discussion under constructive use above, Alternatives B, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative were evaluated for constructive use impacts. It was determined that there would be no constructive use attributable to ecological intrusion under any build alternative.

Based on the considerations described above, FHWA has determined that the proposed build alternatives would not require either a direct or a constructive use of the specific areas of this property that are eligible for protection under Section 4(f). Therefore, the Bountiful City Pond is not discussed further in this evaluation.

Utah State Parks Land, including Jordan River Off-Highway Vehicle Center (Section 4[f] and 6[f] Property)

Overall, there has been no change to the discussion or need for direct use of land from this resource, except that an additional alternative was evaluated, the Parkway Facility Adjacent to Redwood Road Alternative, which would result in the same use of this resource under Section 4(f) as Alternative E. Also since publication of the Final EIS, the amount of land and right-of-way required for design of the interchange has been revised to reflect additional land requirements identified during final design of Alternative D (Final EIS Preferred Alternative). Figure 5-7 is an update of Figure 5-3c of the Final EIS. The changes described below are too minor to be seen in the figure.

Direct Use

As described in the Final EIS, all the build alternatives would require a direct use of land from the Jordan River OHV Center. In the Final EIS, two design options for the interchange were described for this area. One design option would provide route continuity on I-215 through the interchange and the other would

provide route continuity from I-215 to Legacy Parkway through the interchange. Since publication of the Final EIS, the design option providing route continuity from I-215 to Legacy Parkway through the interchange was selected. The land required from the Jordan River OHV Center is located in the area where the transition to a wider right-of-way is needed for the design of the interchange. Because the property is located in an interchange area, the reduction in the right-of-way width for the build alternatives does not apply. In addition, due to the location of this property in an interchange area, there is no reasonable avoidance alternative to the use of land from the Jordan River OHV Center.

Since publication of the Final EIS, it was determined that additional land would be required from the Jordan River OHV Center. These calculations have been revised to reflect this change and the selection of the design option for the interchange. These revised calculations are listed in Table 5-7.

Table 5-7 Revised Direct Use of Land from Utah State Parks Land (Jordan River OHV Center)

Alternative				
A	B	C	D	E*
1.46 ha (3.6 ac)	3.64 ha (9.0 ac)	1.46 ha (3.6 ac)	1.46 ha (3.6 ac)	1.46 ha (3.6 ac)

Note:

* Direct use of land under Parkway Facility Adjacent to Redwood Road Alternative would be the same as under Alternative E.

As described in the Final EIS, a portion of the raceway track in the Jordan River OHV Center would be relocated. This part of the track is unimproved and would be relocated by users as they take a slightly different route, creating a new alignment along this section. None of the buildings, motocross courses, or participant or observer facilities would be affected. This has not changed since publication of the Final EIS.

Constructive Use

All the build alternatives and the Parkway Facility Adjacent to Redwood Road Alternative would result in the direct use of land from the Jordan River OHV Center; therefore, there is no constructive use of this resource. This has not changed since publication of the Final EIS, except for the addition of the Parkway Facility Adjacent to Redwood Road Alternative to the range of alternatives evaluated.

5.5.2 Historic Resources

Historic resources evaluated and eligible for protection under Section 4(f) have changed since publication of the Final EIS and are described above in Section 5.4.2.2. Use of these resources and changes that have occurred since publication of the Final EIS are described below.

White House at 10 North 650 West, Farmington (Section 4[f] Property)

Figure 5-8 is an update of Figure 5-3e in the Final EIS. This figure shows the location of the historic structure, the property boundary, and right-of-way required for the build alternatives. Only the historic structure, a residence, was eligible for NRHP listing, not the land on which it was located.

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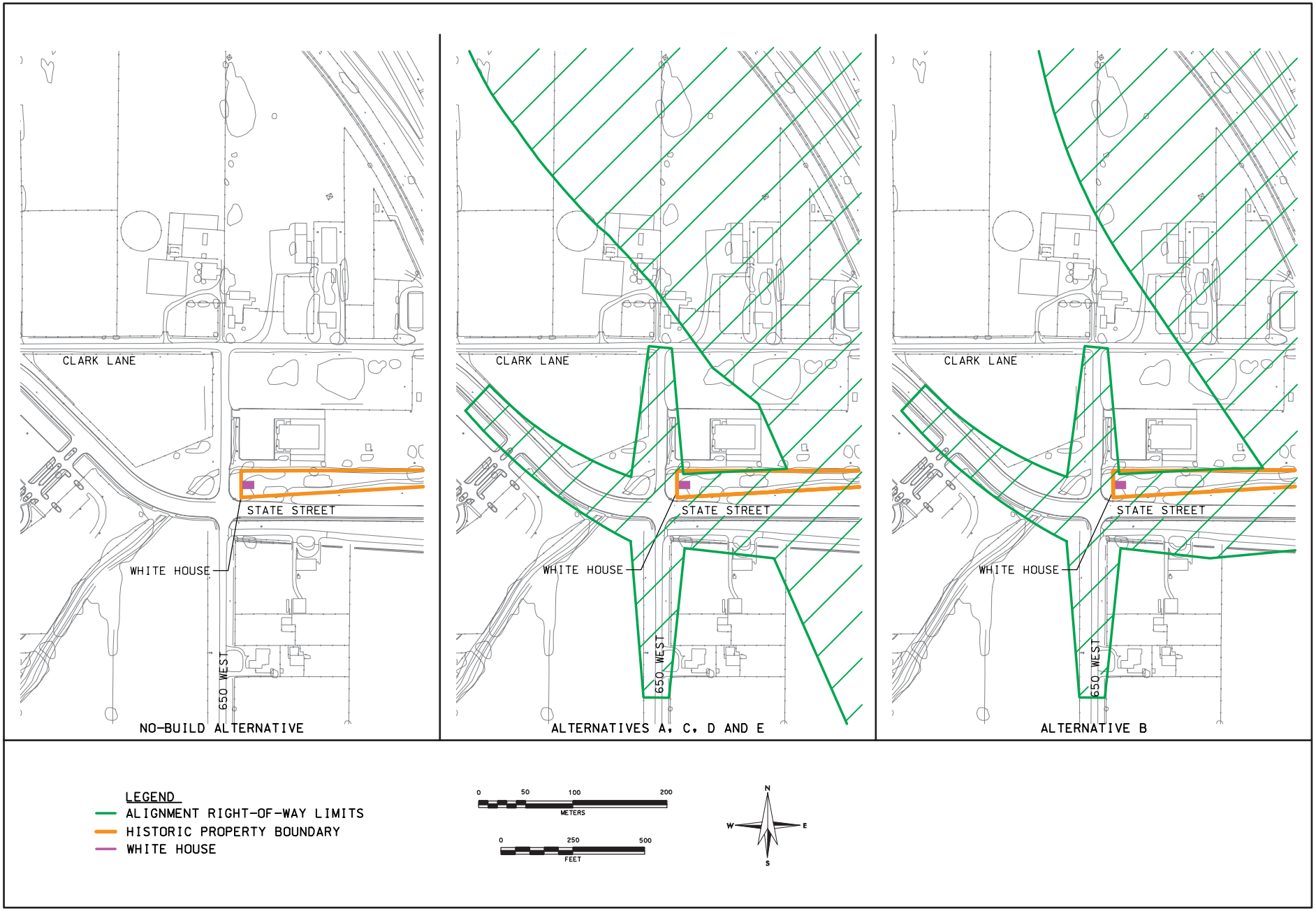
Figure 5-7
Impacts
Jordan River Off-Highway Vehicle Center (OHVC)



03076.03 (11-04) SEIS

Figure 5-8
Impacts, White House Historic Building

Direct Use

As described in the Final EIS, all the build alternatives required the acquisition of the 0.6 ha (1.5 ac) property and demolition of the White House at 10 North 650 West in Farmington.

After the Final EIS was published, an ILS form was completed in accordance with U.S. Secretary of Interior's Standards and Guidelines for documentation (48 FR 44728-37). The site documentation was submitted to SHPO on February 21, 2001. SHPO approved the site documentation on March 8, 2001 (Appendix A). The structure was subsequently demolished. These actions were coordinated and concurred with by SHPO and the Advisory Council on Historic Preservation (ACHP).

Because the documentation and demolition of this structure have already been completed, a direct use of this property has already occurred. The White House is not discussed further in this evaluation.

Constructive Use

The structure has been demolished as a result of direct use by all the build alternatives, and therefore a constructive use could not occur.

Clark Lane Historic District, Farmington (Section 4[f] Property)

Since publication of the Final EIS, the design of the overpass at State Street has been revised in coordination with and as requested by the City of Farmington (Appendix A). The reconstruction of the overpass would be the same under all build alternatives, including the Parkway Facility Adjacent to Redwood Road Alternative. Revision of the overpass design has eliminated the need to acquire property from any contributing element of the CLHD. However, the driveways of three properties within the CLHD—399 W. State Street, 393 W. State Street, and 398 W. State Street—would require minor regrading to connect with the new overpass, as shown in Figure 5-9. These modifications, described in more detail under *Direct Use* below, were determined to have no adverse effect under Section 106 of the National Historic Preservation Act (NHPA) because of the design and mitigation measures included in the revised draft MOA between FHWA, UDOT, and SHPO.

As described in the Final EIS and as listed in Table 5-2 above, the property at 399 W. State Street in Farmington was not affected by the original proposed design of the overpass. Of the three properties affected, only 399 W. State Street contributes to the CLHD and is individually eligible for NRHP listing; 393 W. State Street does not contribute to the CLHD, and. 398 W. State Street does not contribute and is "out of period" for the district.

Avoidance alternatives and measures to minimize harm are not presented for the CLHD in this Section 4(f) and 6(f) evaluation because the proposed action would result in a temporary occupancy of the CLHD, not a direct or constructive use. The following discussions provide more detail.

Direct Use

None of the build alternatives (including the Parkway Facility Adjacent to Redwood Road Alternative) would require a permanent direct use of the CLHD or structures in the CLHD because design and minimization measures have been developed and included in the revised draft MOA to avoid a permanent direct use of the CLHD. Realignment of existing curbs and gutters, along with a more gradual tapering of the road cross section from east to west, would affect the driveways that access the three properties. Therefore, reconstruction would alter only the footprint of the properties at 399 W. State Street, 398 W. State Street, and 393 W. State Street, and not the structures on the properties.

According to 23 CFR 771.135(p)(7): "A temporary occupancy of land is so minimal that it does not constitute a direct use within the meaning of Section 4(f) when the following conditions are satisfied."

- Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land.
- Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) resource are minimal.
- There are no anticipated permanent adverse physical impacts, nor will there be interference with the activities or purpose of the resource, on either a temporary or permanent basis.
- The land being used must be fully restored, i.e., the resource must be returned to a condition which is at least as good as that which existed prior to the project.
- There must be documented agreement of the appropriate federal, state, or local officials having jurisdiction over the resource regarding the above conditions.

Stipulations in the revised draft MOA include the provision "to return the conditions of the CLHD and its contributory elements to their original pre-construction condition." Modifications to the sidewalk and driveway would not alter features critical to the historical significance of the CLHD or its contributory elements. The temporary occupancy of the CLHD would meet all the criteria outlined in 23 CFR 771.135(p)(7), and therefore the proposed action would result in a temporary occupancy of the CLHD, not a direct use.

The Temporary occupancy or construction easements on the three properties are described in Table 5-8 and shown in Figure 5-9.

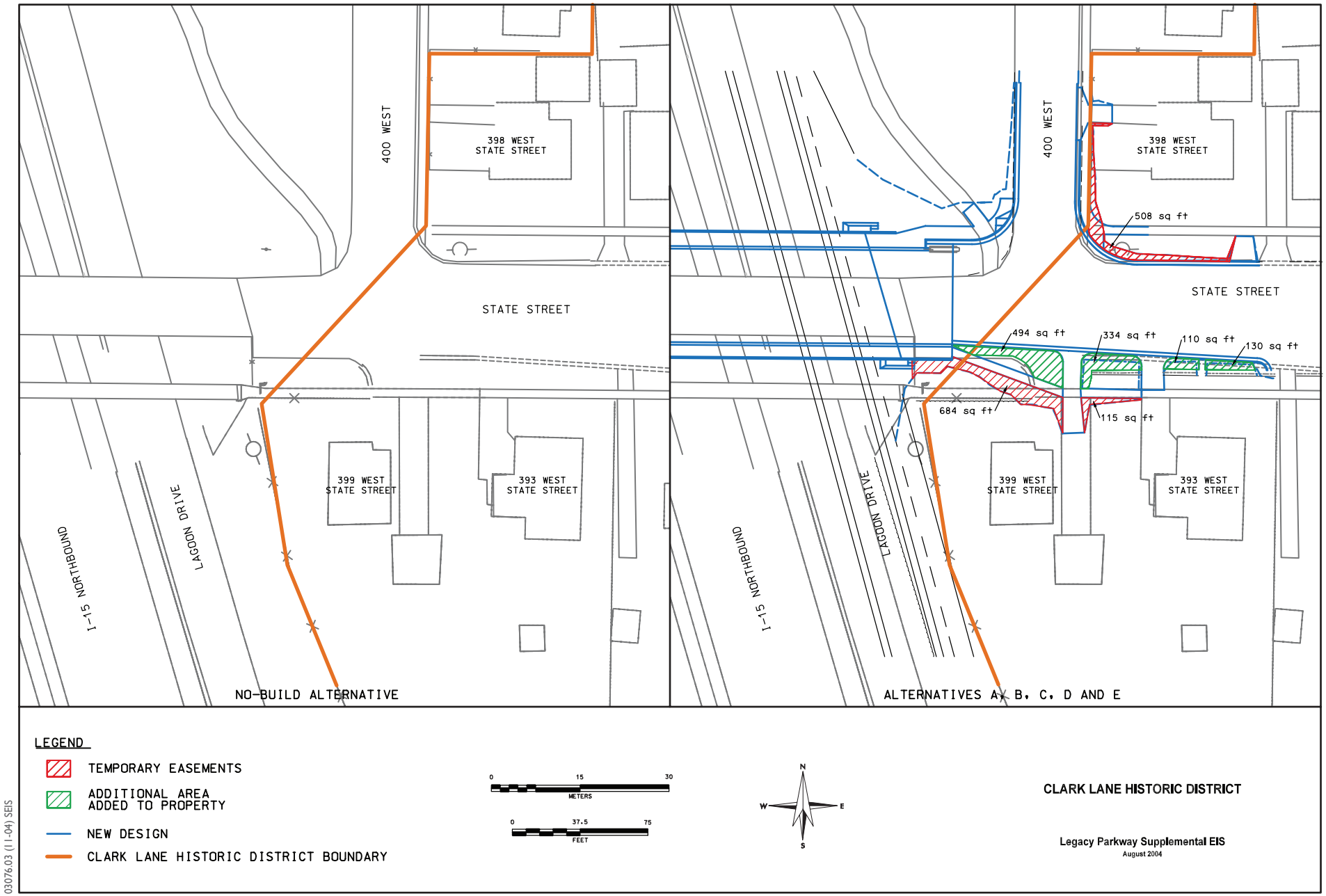


Figure 5-9
Temporary Easements, Clark Lane Historic District (Farmington)

Table 5-8 Temporary Easements on CLHD Properties Resulting from State Street Overpass Reconstruction

Address	Area of Existing Property Affected, sq meters (sq ft)	Additional Area Added to Property, sq meters (sq ft)	Comment
393 W. State St.	NA	22 (240)	An increase in area totaling 12 sq m (130 sq ft) east of the walkway and 10 sq m (110 sq ft) to the west of the walkway.
398 W. State St.	47 (508)	NA	Affected area is a continuous strip along the east margin of 400 West and along the north margin of State Street, totaling 47 sq m (508 sq ft).
399 W. State St.	74 (799)	77 (828)	There are two areas affected, one east of the driveway and one west of the driveway. The affected area on the east side of the driveway is 11 sq m (115 sq ft) and on the west side of the driveway 63 sq m (684 sq ft). An increase in area totaling 46 sq m (494 sq ft) on the west of the driveway and 31 sq m (334 sq ft) on the east of the driveway.
Total	121 (1,307)	99 (1,068)	

A total of 121 square meters (sq m) (1307 square feet [sq ft]) of the properties at 399 W. State Street and 398 W. State Street would be modified through regrading and fill placement to provide new, permanent driveway access to both properties (red hatching in Figure 5-9). The footprints of the properties at 399 W. State Street and 393 W. State Street would be increased by a total of 99 sq m (1,068 sq ft) because of realignment of the existing curbs and gutters and a more gradual tapering of the road cross section from east to west (green hatching in Figure 5-9). A temporary easement would affect a total of 47 sq m (508 sq ft) of the footprint of the property at 398 W. State Street (red hatching in Figure 5-9).

Constructive Use

Noise

The CLHD is located on the east side of and adjacent to I-15 (Figure 5-1). The CLHD is located in a suburban setting and currently experiences noise from traffic on I-15 and State Street in Farmington. The existing sound walls near 399 W. State Street would remain in place, and no additional lanes were added to State Street. There would be no constructive use attributable to the build alternatives.

Aesthetics

Design and minimization measures, such as preserving the mature trees and adding additional green space, developed to avoid a permanent direct use of the CLHD also serve to protect the existing setting and location. Therefore, there would be no constructive use attributable to aesthetics under any proposed build alternative.

Access

Access to the CLHD would not be altered by any proposed build alternative.

Vibration

After publication of the Final EIS, CLHD residents voiced concerns over vibration issues resulting from reconstruction of the overpass that might affect the structural integrity of their homes along State Street. UDOT conducted vibration monitoring and determined that vibration levels associated with the trucks were not high enough to affect any structures. SHPO challenged that determination on the grounds that the proposed vibration limits were potentially inappropriate because of the elderly nature of the CLHD structures. In addition, SHPO suggested that the demolition and reconstruction of the State Street overpass might cause higher vibration levels, attributable to pile driving, than those previously considered. A reevaluation of vibration levels was performed in 2003. Three structures within the CLHD—399 W. State Street, 398 W. State Street, and 393 W. State Street—are within 61 m (200 ft) of the proposed pile-driving location for the State Street overpass. On April 14, 2004, FHWA and UDOT held a meeting with residents of CLHD to discuss and take recommendations on minimizing these potential impacts on the district. In response to these challenges, a revised draft MOA has been developed between SHPO, FHWA, and UDOT. The revised draft MOA includes measures to minimize harm to the district from vibration such as not using State Street as a principal haul route, pre-drilling of pilings, limiting energy of pile driving hammers, monitoring of vibration, and establishing a vibration threshold. Potential vibration impacts on structures are addressed in detail in Section 4.20, *Construction Impacts*, and measures to minimize harm are detailed in the revised draft MOA (Appendix A.).

Ecological Intrusion

There would be no constructive use attributable to ecological intrusion on the CLHD by any proposed build alternative.

1300 Glovers Lane, Farmington (Section 4[f] Property)

Since publication of the Final EIS, the animal facility located at 1300 Glovers Lane in Farmington has been identified as a historic structure eligible for protection under Section 4(f).

Direct Use

Construction of Alternative B would require the acquisition and demolition of the animal facility located at 1300 Glovers Lane. None of the other build alternatives would result in a direct use of the structure.

Constructive Use

Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative are at a minimum distance of 3.2 km (2 mi) east of the animal facility and would not result in a constructive use impact. Alternative B is not evaluated for constructive use because it requires a direct use through the acquisition and demolition of the structure.

662 West Clark Lane, Farmington (Section 4[f] Property)

The facility at 662 West Clark Lane, in Farmington, is an unoccupied animal facility located adjacent to an existing highway and US-89 interchange.

Direct Use

Construction of Alternatives A, C, E, or the Parkway Facility Adjacent to Redwood Road Alternative would require the acquisition of all or part of the historic property at 662 West Clark Lane. Alternatives A

and C would require use of 0.024 ha (0.061 ac) and construction of a retaining wall to avoid demolition of the structure. Alternatives E and the Parkway Facility Adjacent to Redwood Road Alternative would require use of 0.084 ha (0.207 ac) and demolition of the structure. Alternative B is the only alternative that does not require a direct use of the structure.

Constructive Use

Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative are not evaluated for constructive use because they require direct use through the acquisition and demolition of the structure. Alternative B does not require a direct use of 662 West Clark Lane and was evaluated for potential constructive use.

Noise

A constructive use attributable to noise would not occur because the animal facility is not a noise-sensitive resource and is located adjacent to an existing highway and interchange.

Aesthetics

There would be no constructive use attributable to aesthetics because the animal facility is located adjacent to an existing interchange.

Access

Access to the animal facility would not change.

Vibration

There would not be a constructive use attributable to vibration because vibration levels would not be significantly increased by this alternative.

Ecological Intrusion

There would be no constructive use attributable to ecological intrusion.

Therefore, Alternative B would not result in a constructive use of 662 West Clark Lane attributable to noise, aesthetics, access, vibration or ecological intrusion.

D&RG Railroad (Section 4[f] Property)

In the Final EIS, the build alternatives were designed to span the D&RG Railroad tracks at Parrish Lane and 1250 West through Centerville. This approach has changed, as described above in Section 5.4.2.

Direct Use

All the build alternatives, including the Parkway Facility Adjacent to Redwood Road Alternative would result in a direct use of the D&RG Railroad. The segments of the D&RG Railroad that would be used are of equal quality under all the build alternatives because there are no contributing features or elements present other than the railroad grade. Figures 5-10 and 5-11 show the locations where the direct use would occur under each build alternative. Direct use of the D&RG Railroad by any build alternative would not occur on any section of the railway currently being used for operations.

Alternatives A, E, and the Parkway Facility Adjacent to Redwood Road Alternative would require two at-grade crossings: one just south of Parrish Lane in Centerville and the other just north of Chase Lane in Centerville near the relocated 1250 West. The first crossing includes the north- and southbound travel lanes as well as the northbound off-ramp to Parrish Lane and the southbound on-ramp to the proposed Legacy Parkway and the proposed trail. The second crossing is an access road that extends westerly from the northern termini of the relocated 1250 West to join Sheep Road; this road provides access to the Utah Power and Light and Bountiful City power sub-stations. Both of these designed crossings would fill the D&RG Railroad grade and incorporate a total of approximately 335 linear meters (1,100 linear feet) of the D&RG Railroad grade into the roadway embankment. Alternative A requires the direct use of 1.4 ha (3.5 ac), and Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative require 1.7 ha (4.3 ac).

Alternative B would cross the D&RG Railroad at grade three times, once near Parrish Lane, once at Shepard Lane, and once at Glovers Lane. One of these crossings would result in a direct use of a 4-km (2.5-mi) segment of the D&RG Railroad between Parrish Lane and Glovers Lane in Farmington. In addition, the three at-grade crossings would incorporate a total of approximately 550 linear meters (1,800 linear feet) of the D&RG Railroad grade into the roadway embankment. Alternative B requires a direct use of 15.1 ha (37.3 ac) from this resource.

Alternative C would cross the D&RG Railroad twice at-grade, once near Parrish Lane and once at Lund Lane, and requires the direct use of 1.4 ha (3.4 ac).

SHPO has concurred that crossing the D&RG Railroad at grade would result in no adverse effect (see the Determination of Effect and Finding of Effect, November 2004, in Appendix A).

Constructive Use

None of the build alternatives, including the Parkway Facility Adjacent to Redwood Road Alternative would have a constructive use on the D&RG Railroad because they all require a direct use through the construction of at grade crossings.

Historic Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only

As noted in Section 5.3.2, this alternative has the same alignment as Alternative E in the vicinity of the I-215 interchange area and again from approximately 1.6 km (1 mi) north of 500 South in Woods Cross. The Parkway Facility Adjacent to Redwood Road Alternative would require the direct use of the following eight historic structures in addition to the use of those Section 4(f) and 6(f) resources previously described for Alternative E.

Direct Use

Construction of the Parkway Facility Adjacent to Redwood Road Alternative would require the acquisition and demolition of the following eight structures.

- 836 South Redwood Road, Woods Cross. The World War II-era cottage would be demolished and the entire 0.4-ha (1-ac) property incorporated into the right-of-way.
- 918 South Redwood Road, Woods Cross. The cross-wing house would be demolished and the entire 0.4-ha (1-ac) property incorporated into the right-of-way.

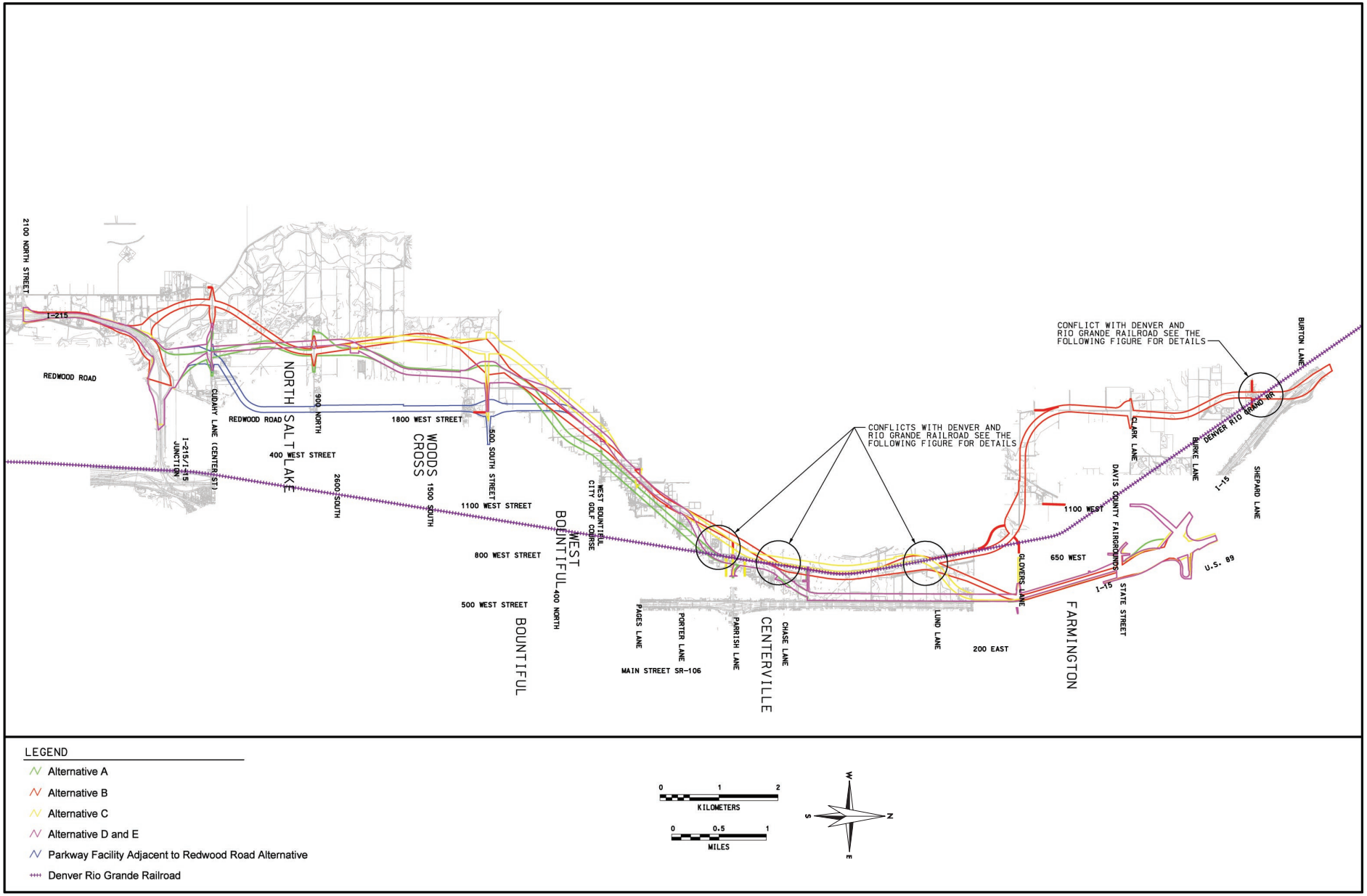


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Figure 5-10
Impacts, D&RG Railroad

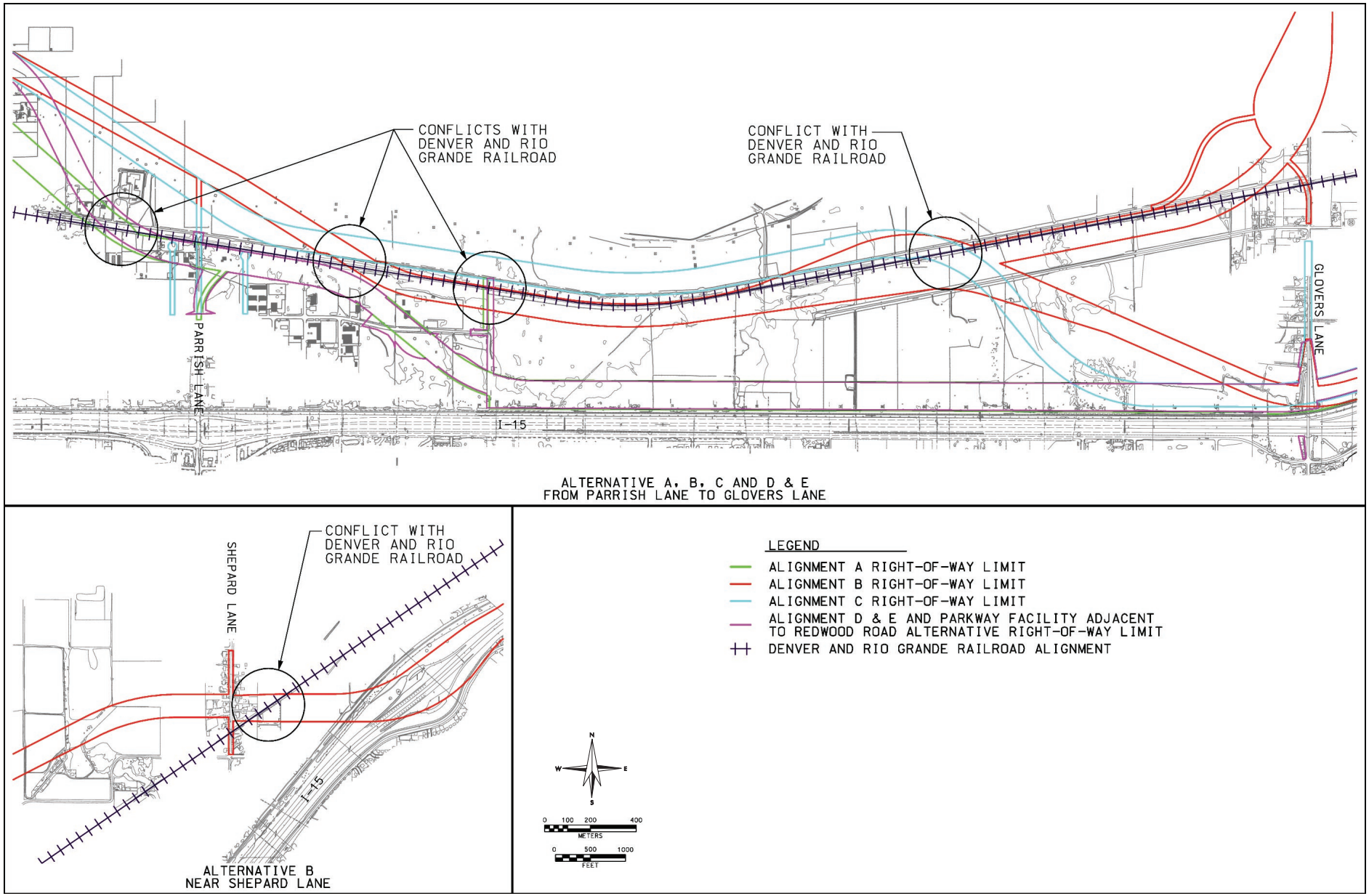

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Figure 5-11
Detail of Impacts, D&RG Railroad

- 946 South Redwood Road, Woods Cross. The bungalow would be demolished and entire 0.4-ha (1-ac) property incorporated into the right-of-way.
- 974 South Redwood Road, Woods Cross. The bungalow would be demolished and the entire 0.4-ha (1-ac) property incorporated into the right-of-way.
- 1650 South Redwood Road, Woods Cross. The Victorian-elect World War II-era cross-wing structure and one contributing outbuilding would be demolished and the entire 1.9-ha (4.8-ac) property incorporated into the right-of-way.
- 2018/2020 South Redwood Road, Woods Cross. The cross-wing would be demolished and the entire 0.5-ha (1.2-ac) property incorporated into the right-of-way.
- 2408 South Redwood Rd, Woods Cross. The World War II-era cottage and contributing outbuilding would be demolished and the entire 0.6-ha (1.4-ac) property incorporated into the right-of-way.
- 1095 North Redwood Rd, North Salt Lake. The World War II-era cottage would be demolished and the entire 0.5-ha (1.3-ac) property incorporated into the right-of-way.

None of the other build alternatives considered would impact these eight structures. Figures 5-1 and 5-3 show the locations of these structures and property boundaries in relation to the alignment.

Constructive Use

Alternatives A, B, C, E are at a minimum distance of 0.8 km (0.5 mi) west of the historic structures listed above and would not result in constructive use impacts. The Parkway Facility Adjacent to Redwood Road Alternative would not have a constructive use on these structures because a direct use is required through the acquisition and demolition of these structures.

5.5.3 Archaeological Resources

Since publication of the Final EIS archaeological resources evaluated and eligible for protection under Section 4(f) have changed and are described in Section 5.4.2.2. Use of these resources is described below.

Site 42Dv2 (Section 4[f] Property)

Direct Use

Partial excavation has already occurred at Site 42Dv2, as previously described in Section 5.5.3. Additional excavation of this site is not anticipated under any build alternatives being considered. However, because the site is located within the right-of-way acquired for the southern interchange with I-215 for Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative, a direct use of 2.9 ha (7.2 ac) would still occur. This direct use would occur because the site would be incorporated into the transportation facility, even though these alternatives would not have further impacts on the site. Alternative B is the only build alternative that would not require a direct use of this site by incorporation into the right-of-way, because the southern interchange for this alternative is in a different location further to the south and east.

Constructive Use

There would not be a constructive use of this resource under Alternatives A, C, E, or the Parkway Facility Adjacent to Redwood Road Alternative because they all require a direct use. Alternative B is the only alternative that has the potential for a constructive use of Site 42Dv2. FHWA has determined that Site 42Dv2 warrants preservation in place based on the significance of the site and sanctity of grounds containing human remains. Site 42Dv2 is not a noise-sensitive resource, nor is it subject to aesthetic impacts, vibration impacts, access impacts, or ecological intrusion; therefore, a constructive use would not occur under Alternative B.

Site 42Dv94 (Section 4[f] Property)

Direct Use

Excavation has already occurred at Site 42Dv94, as previously described in Section 5.5.3. Additional impacts on this site are not anticipated under any build alternative being considered. However, because the site is located within the right-of-way acquired for the southern interchange for Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative, a direct use of 0.02 ha (0.04 ac) would still occur. This direct use would occur because the site would be incorporated into the transportation facility, even though these alternatives would not further affect the site. Alternative B is the only build alternative that would not require a direct use of this site by incorporation into the right-of-way because the southern interchange for this alternative would be located further south and east.

Constructive Use

There would not be a constructive use of this resource under Alternatives A, C, E, or the Parkway Facility Adjacent to Redwood Road Alternative because they all require a direct use. Alternative B is the only alternative that has the potential for a constructive use of Site 42Dv94. FHWA has determined that Site 42Dv94 warrants preservation in place because there is sufficient potential for additional remains to be present in the area and because of the sanctity of grounds containing human remains. Site 42Dv94 is not a noise-sensitive resource, nor is it subject to aesthetic impacts, vibration impacts, access impacts, or ecological intrusion; therefore, a constructive use would not occur with Alternative B.

Archaeological Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only

Site 42Dv67 (Section 4[f] Property)

Direct Use

The Parkway Facility Adjacent to Redwood Road Alternative would require a direct use of 0.6 ha (1.4 ac) of this site, as described in Section 5.5.3, through acquisition and incorporation into the right-of-way. Any structures and archaeological components would be removed through excavation, according to the revised draft MOA developed by SHPO, UDOT, and FHWA.

Constructive Use

Alternatives A, B, C, and E are at a minimum distance of 0.8 km (0.5 mi) west of the Site 42Dv67 and would not result in constructive use impacts. The Parkway Facility Adjacent to Redwood Road Alternative would not have a constructive use of this site because a direct use is required through the acquisition and incorporation of this site into the right-of-way.

5.5.4 Summary of Use of Section 4(f) and 6(f) Properties by Alternative

Table 5-9 summarizes use of Section 4(f) and 6(f) properties by alternative. The table shows the use from both the Final EIS and this Supplemental EIS. The acreage of property required under each alternative includes adjustments for the minimization measures described in Section 5.6. This table displays the total acreage used under Section 4(f), not the total acreage associated with the individual property that may be acquired for the project. There is no constructive use attributable to any proposed build alternatives.

Table 5-9 Summary of Use of Section 4(f) and 6(f) Properties by Alternative

Section 4(f)/6(f) Property	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Parkway Facility Adjacent to Redwood Road
Recreation Areas						
FBWMA eastern entrance and parking area	0.0 ha (0.0 ac)	0.02 ha (0.04 ac)	1.2 ha (2.9 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)
Jordan River OHV Center	1.5 ha (3.6 ac)	3.7 ha (9.0 ac)	1.5 ha (3.6 ac)	1.5 ha (3.6 ac)	1.5 ha (3.6 ac)	1.5 ha (3.6 ac)
Total Area Recreation Use	1.5 ha (3.6 ac)	3.7 ha (9.0 ac)	2.6 ha (6.5 ac)	1.5 ha (3.6 ac)	1.5 ha (3.6 ac)	1.5 ha (3.6 ac)
Total Area 6(f) Use	0.3 ha (0.8 ac)	1.0 ha (2.5 ac)	0.3 ha (0.8 ac)	0.3 ha (0.8 ac)	0.3 ha (0.8 ac)	0.3 ha (0.8 ac)
Historic Resources						
White House	Demolished 0.6 ha (1.5 ac)	Demolished 0.6 ha (1.5 ac)	Demolished 0.6 ha (1.5 ac)	Demolished 0.6 ha (1.5 ac)	Demolished 0.6 ha (1.5 ac)	Demolished 0.6 ha (1.5 ac)
1300 Glovers Lane	0.0 ha (0.0 ac)	Demolition of structure 1.2 ha (2.9 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)
662 West Clark Lane	0.02 ha (0.06 ac)	0.0 ha (0.0 ac)	0.02 ha (0.06 ac)	Demolition of structure 0.08 ha (0.21 ac)	Demolition of structure 0.08 ha (0.21 ac)	Demolition of structure 0.08 ha (0.21 ac)
D&RG Railroad	2 crossings 1.4 ha (3.4 ac)	3 crossing 15.1 ha (37.3 ac)	2 crossing 1.4 ha (3.4 ac)	2 crossings 1.7 ha (4.3 ac)	2 crossings 1.7 ha (4.3 ac)	2 crossings 1.7 ha (4.3 ac)
836 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.4 ha (1.0 ac)

Section 4(f)/6(f) Property	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Parkway Facility Adjacent to Redwood Road
918 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.4 ha (1.0 ac)
946 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.4 ha (1.0 ac)
974 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.4 ha (1.0 ac)
1650 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 1.9 ha (4.8 ac)
2018/2020 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.5 ha (1.2 ac)
2408 South Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.6 ha (1.4 ac)
1095 North Redwood Road	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	Demolition of structure 0.530 ha (1.310 ac)
Total Area Historic Use	2.1 ha (5.1 ac)	16.9 ha (41.7 ac)	2.0 ha (4.9 ac)	2.4 ha (6.0 ac)	2.4 ha (6.0 ac)	7.6 ha (18.7 ac)
Archaeological Resources						
Site 42Dv2	2.9 ha (7.2 ac)	0.0 ha (0.0 ac)	2.9 ha (7.2 ac)	2.9 ha (7.2 ac)	2.9 ha (7.2 ac)	2.9 ha (7.2 ac)
Site 42Dv94	0.02 ha (0.04 ac)	0.0 ha (0.0 ac)	0.02 ha (0.04 ac)	0.02 ha (0.04 ac)	0.02 ha (0.04 ac)	0.02 ha (0.044 ac)
Site 42Dv67	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.0 ha (0.0 ac)	0.6 ha (1.4 ac)
Total Area Archaeo Use	2.9 ha (7.2 ac)	0.0 ha (0.0 ac)	2.9 ha (7.2 ac)	2.9 ha (7.2 ac)	2.9 ha (7.2 ac)	3.5 ha (8.6 ac)
Total Area 4(f) Use	6.4 ha (15.9 ac)	20.5 ha (50.7 ac)	7.6 ha (18.7 ac)	6.8 ha (16.8 ac)	6.8 ha (16.8 ac)	12.5 ha (30.9 ac)
Total Number Properties	6 properties	5 properties	7 properties	6 properties	6 properties	15 properties

Alternative A uses the least area of Section 4(f) resources, as summarized below.

- Six Section 4(f) resources, total area 6.4 ha (15.9 ac).
- One recreation resource, total area 1.5 ha (3.6 ac).
- Three historic NRHP-eligible resources, total area 2.1 ha (5.1 ac).
- Two NRHP-eligible archaeological resources, total area 2.9 ha (7.2 ac).

Alternative B uses the most land, but the least number of Section 4(f) resources, as summarized below.

- Five Section 4(f) resources, total area 20.5 ha (50.7 ac).
- Two recreation resources, total area 3.7 ha (9.0 ac).
- Three NRHP-eligible historic resources, total area 16.9 ha (41.7 ac).

Alternative C uses Section 4(f) resources as summarized below.

- Seven Section 4(f) resources, total area 7.6 ha (18.7 ac).
- Two recreation resources, total area 2.6 ha (6.5 ac).
- Three NRHP-eligible historic resources, total area 2.0 ha (4.9 ac).
- Two NRHP-eligible archaeological resources, total area 2.9 ha (7.2 ac).

Alternative E uses Section 4(f) resources as summarized below.

- Six Section 4(f) resources, total area 6.8 ha (16.8 ac).
- One recreation resource, total area 1.5 ha (3.6 ac).
- Three NRHP-eligible historic resources, total area 2.4 ha (6.0 ac).
- Two NRHP-eligible archaeological resources, total area 2.9 ha (7.2 ac).

The Parkway Facility Adjacent to Redwood Road Alternative uses the greatest number of Section 4(f) resources, as summarized below.

- Fifteen Section 4(f) resources, total area 12.5 ha (30.9 ac).
- One recreation resource, total area 1.5 ha (3.6 ac).
- Eleven NRHP-eligible historic resources, total area 7.6 ha (18.7 ac).

- Three NRHP-eligible archaeological resources, total area 3.5 ha (8.6 ac).

Alternative B uses the most area of Section 6(f) resource at 1.0 ha (2.5 ac). All the other alternatives use the same amount, 0.3 ha (0.8 ac).

5.6 Avoidance Alternatives for Section 4(f) and 6(f) Properties

5.6.1 Farmington Bay Waterfowl Management Area (Section 4[f] Property)

There have been no changes in the alternatives that avoid this resource since publication of the Final EIS. The Final EIS described how direct use of the FBWMA eastern entrance and parking lot would be avoided under Alternatives A and D (Final EIS Preferred Alternative); this now applies to Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative. The eastern entrance and parking lot would also be avoided by shifting Alternative B entirely to the eastern side of the D&RG Railroad (a Section 4[f] historic resource identified since publication of the Final EIS) or by elevating Alternative B or C over the parking lot and small area north of the lot. Section 5.4.1 of the Final EIS described these avoidance alternatives and impacts associated with these avoidance alternatives.

5.6.2 Utah State Parks Land, including Jordan River Off-Highway Vehicle Center (Section 4[f] and 6[f] Property)

There have been no changes in the avoidance alternatives that avoid this resource since publication of the Final EIS. As described in the Final EIS, all the build alternatives would require a direct use of some of the Jordan River OHV Center land. Alternative B would require the most land, and the other alternatives would all require the same amount of land (Table 5-9). The land required from the Jordan River OHV Center is located in the area needed to accommodate route continuity between I-215 and the Legacy Parkway interchange area. Because the property is located in this area, the adopted change in the right-of-way width for the build alternatives does not apply. To avoid using land from this resource, the interchange would have to be designed with sub-standard geometrics that would not be consistent with current design guidelines established by AASHTO. Because the impacts would be minor on both the trail and operations of the Jordan River OHV Center and the land would be replaced (see Figure 5-12), it is not prudent to use the sub-standard geometric design at this interchange. With the exception of the revised calculations, selection of the design option, and evaluation of the Parkway Facility Adjacent to Redwood Road Alternative, this discussion has not changed since publication of the Final EIS.

5.6.3 1300 Glovers Lane, Farmington (Section 4[f] Property)

Alternative B would result in a direct use of the historic animal facility located at 1300 Glovers Lane in Farmington. The entire property lies within the right-of-way for Alternative B. There is no prudent avoidance alternative other than Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative in this area.

Selection of Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative would avoid a direct use of the historic animal facility at 1300 Glovers Lane. However, selection of any of these

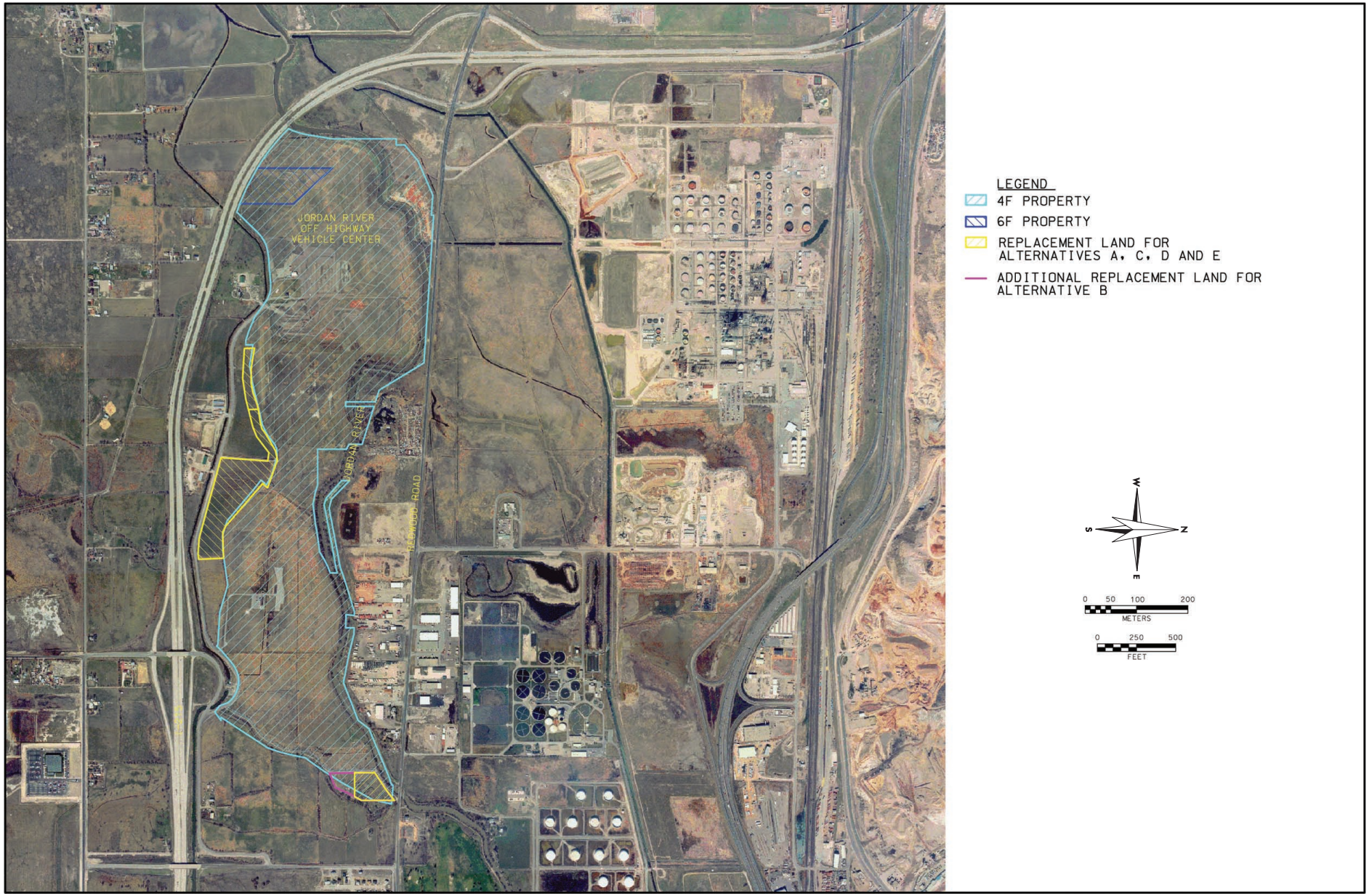

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Figure 5-12
Replacement Land
Jordan River Off-Highway Vehicle Center

build alternatives to avoid using the animal facility would result in a direct use of 662 West Clark Lane in Farmington, which is also a Section 4(f) property.

5.6.4 662 West Clark Lane, Farmington (Section 4[f] Property)

The northern interchange area for Alternatives E and the Parkway Facility Adjacent to Redwood Road Alternative with I-15 and US-89 could not be constructed without a direct use of the historic animal facility at 662 West Clark through acquisition of 0.08 ha (0.21 ac) of property and demolition of the structure. The direct use of this property would be due to the connector ramps to/from Legacy Parkway to I-15 and US-89. There are no avoidance alternatives for use of this structure by these alternatives because it is located in the area required for the northern interchange, which is a system-to-system connection between Legacy Parkway, I-15, and US-89. Avoiding the direct use of this property by Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative would require relocating the entire northern interchange, which is not prudent.

Alternative B does not require a direct use of 662 West Clark Lane because it connects to I-15 in Kaysville where the right-of-way required for the interchange is smaller. While Alternative B would avoid the direct use of the historic animal facility, it would result in a direct use of the historic structure at 1300 Glovers Lane in Farmington, also a Section 4(f) property.

Alternatives A and C would avoid demolishing the historic structure by constructing retaining walls, but the direct use of 0.02 ha (0.06 ac) from the historic property boundary could not be avoided because of the right-of-way required for the northern interchange, a system-to-system connection that cannot be further reduced in this area.

5.6.5 D&RG Railroad (Section 4[f] Property)

All the build alternatives considered would require a direct use of the D&RG Railroad due to the construction of at-grade crossings, as described above in Section 5.5.2.

An avoidance alternative to the direct use of the D&RG Railroad right-of-way for Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative would be to span both crossings with a roadway bridge. The D&RG Railroad grade could be spanned with 3 m (10 ft) of vertical clearance at these two locations using a roadway bridge. These bridges would avoid a direct use of the historic resource and maintain the D&RG Railroad grade for future development of a recreation trail on the railway alignment. Spanning these two crossings would require additional earthwork to raise the grade to and from the roadway bridge, as well as retaining walls to maintain the embankment within the permitted right-of-way and as additional barriers for safety. The cost to implement this avoidance alternative is estimated at approximately $8,000,000. This is roughly 23 times the estimated $350,000 cost for the two at-grade crossings (HDR Engineering, Inc. 2004b).

Shifting the alignment further west, between Parrish Lane and Glovers Lane, and spanning the D&RG Railroad where the proposed Legacy Parkway connects with US-89 could provide an avoidance alternative for Alternative B. However, shifting the Alternative B alignment further west to avoid the D&RG Railroad would result in a direct use of the FBWMA near the eastern entrance on Sheep Road and the FBWMA 25-ha (63-ac) property. SHPO has concurred that crossing at grade would not have an adverse effect on the historic resource; therefore, a direct use of FBWMA (also a Section 4[f] Property) to avoid a direct use of the D&RG Railroad is not prudent.

UDOT and UTA have consulted on ways to provide connection between the Legacy Parkway Trail and the future D&RG Railroad trail (see Section 5.4.2). UTA agrees that access to and from the Legacy Parkway Trail and the future D&RG Railroad trail can be provided at minimal public expense, if the proposed Legacy Parkway alignment crosses the D&RG Railroad at grade. With the at-grade crossings, these two trails could connect, and the D&RG Railroad trail could continue along the same route as the Legacy Parkway Trail. This would eliminate the need for UTA to develop and maintain this 0.40-km (0.25-mi) joint segment because it would be developed and maintained by UDOT.

SHPO has concurred there would be no adverse effect as a result of the direct use of the D&RG Railroad by crossing it at grade. Therefore, the historic resource would not benefit by being spanned at a cost of an additional $8 million. In addition, by spanning the D&RG Railroad, the proposed trail system between the Legacy Parkway Trail and the future D&RG Railroad trail would lack connectivity, and the two trails would be developed in the same 0.40-km (0.25-mi) segment, but providing trail users the ability to access the other trail would not be included. UTA, owner of the D&RG Railroad, has agreed to the at-grade crossings of the D&RG Railroad, and UDOT has already paid UTA $10,000,000 for those crossing rights (allowing UDOT to cross at grade). All these factors in combination should be considered "unique problems." As stated in 23 CFR 771.135(a)(2): "Supporting information must demonstrate that there are unique problems or unusual factors involved in the use of alternatives that avoid these properties [this property] ...." Considering these unique problems, implementation of the avoidance alternatives proposed is not prudent.

5.6.6 Historic Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only (Section 4[f] Properties)

The Parkway Facility Adjacent to Redwood Road Alternative is the only alternative that would result in the demolition of the following eight NRHP eligible historic structures.

- 836 South Redwood Road, Woods Cross.
- 918 South Redwood Road, Woods Cross.
- 946 South Redwood Road, Woods Cross.
- 974 South Redwood Road, Woods Cross.
- 1650 South Redwood Road, Woods Cross.
- 2018/2020 South Redwood Road, Woods Cross.
- 2408 South Redwood Rd, Woods Cross.
- 1095 North Redwood Rd, North Salt Lake.

The Parkway Facility Adjacent to Redwood Road Alternative could not be constructed without the demolition and acquisition of these structures. Modifications to the Parkway Facility Adjacent to Redwood Road Alternative alignment to avoid these historic structures would result in the same alignment described for Alternative E. Alternative E, as well as Alternatives A, B, and C, avoid the direct use of these historic structures and are prudent avoidance alternatives to the Parkway Facility Adjacent to Redwood Road Alternative.

5.6.7 Site 42Dv2 (Section 4[f] Property)

As discussed above in Section 5.5.3, partial excavation has already occurred at Site 42Dv2. The excavation resulted in the determination that the site is a Section 4(f)-protected resource and that the direct use of this site is a result of incorporation into the right-of-way for the southern interchange with I-215. Alternative B would not require a direct use of Site 42Dv2 because the southern interchange is in a different location further to the south and east. Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative would all require a direct use of this site by incorporation into the right-of-way because the southern interchange is in the same location for these alternatives.

Site 42Dv2 is located in the area acquired for construction of the right-of-way for the southern interchange and the proposed trail in this area. No further work would take place in the boundaries of the site. Site 42Dv2 is located between the proposed interchange and the proposed trail. Because of the existing facilities associated with I-215 and to maintain connectivity of the proposed trail with the existing trail system, the property containing Site 42Dv2 must be acquired for use as right-of-way.

The Alternative B southern interchange alignment would avoid the incorporation of Site 42Dv2 into the right-of-way, while the southern interchange for Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road would incorporate Site 42Dv2. However, the Alternative B southern interchange would result in impacts on other resources. The Alternative B southern interchange would affect 13 ha (33 ac) of prime farmland, while the other build alternatives would not affect any prime farmland. The Alternative B southern interchange would require 6 ha (15 ac) of land from a century farm compared to 2 ha (5 ac) for the other build alternatives, and Alternative B would affect two multigenerational farms that the other alternatives would not affect. Because of the additional impacts required by the Alternative B southern interchange on other resources in the area and the fact that Site 42Dv2 would remain untouched within the right-of-way, the Alternative B southern interchange is not considered a prudent alternative to the direct use of Site 42Dv2.

5.6.8 Site 42Dv94 (Section 4[f] Property)

As discussed above in Section 5.5.3, partial excavation has already occurred at Site 42Dv94. The excavation resulted in the determination that the site is a Section 4(f)-protected resource and that the direct use of this site is a result of incorporation into the right-of-way for the southern interchange with I-215. Alternative B would not require a direct use of Site 42Dv94 because the southern interchange is in a different location further to the south and east. Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative would all require a direct use of this site by incorporation into the right-of-way because the southern interchange is in the same location for these alternatives.

Site 42Dv94 is located the area acquired for construction the right-of-way for the southern interchange and the proposed trail. No further work would take place within the boundaries of the site. Site 42Dv94 is located between the proposed interchange and the proposed trail. Because of the existing facilities associated with I-215 and to maintain connectivity of the proposed trail with the existing trail system, the property containing Site 42Dv94 must be acquired for use as right-of-way.

The Alternative B southern interchange avoids the incorporation of Site 42Dv94 into the right-of-way, while the southern interchange for Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road, would incorporate Site 42Dv94. However, the Alternative B southern interchange would result in impacts on other resources. The Alternative B southern interchange would affect 13 ha (33 ac) of prime farmland while the other build alternatives would not affect any prime farmland. The Alternative B southern interchange would require 6 ha (15 ac) of land from a century farm compared to 2 ha (5 ac) for

the other build alternatives, and Alternative B would affect multigenerational farms not affected by the other alternatives. Because of the additional impacts required by the Alternative B southern interchange on other resources in the area and the fact that Site 42Dv2 would remain untouched within the right-of-way, the Alternative B southern interchange is not considered a prudent alternative to the direct use of Site 42Dv94.

5.6.9 Archaeological Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only (Section 4[f] Properties)

Site 42Dv67 (Section 4[f] Property)

The Parkway Facility Adjacent to Redwood Road Alternative is the only alternative that requires a direct use of Site 42Dv67. This alternative could not be implemented without the acquisition and incorporation of this archaeological site into the right-of-way for this alternative. Modifications to the Parkway Facility Adjacent to the Redwood Road Alternative alignment to avoid this resource would result in the same alignment described for Alternative E. Therefore, Alternatives A, B, C, and E are considered reasonable and prudent avoidance alternatives to the Parkway Facility Adjacent to Redwood Road Alternative to avoid the direct use of Site 42Dv67.

Based on the above considerations, there is no alternative that would not require a direct use or would avoid use of all the Section 4(f) and 6(f) resources. Measures to minimize harm are therefore discussed in the following section.

5.7 Measures to Minimize Harm to Section 4(f) and 6(f) Properties

5.7.1 Farmington Bay Waterfowl Management Area (Section 4[f] Property)

The FBWMA is primarily used as a waterfowl management area, although it is also used for recreation activities. Noise levels in the FBWMA fluctuate as a result of seasonal activities, such as hunting and boating, and year-round aircraft overflights. Noise abatement measures are only considered necessary in areas where “frequent human use occurs and a lowered noise level would be of benefit”(23 CFR 772.35). The FBWMA does not qualify as a noise-sensitive facility (see Section 5.5.1) where quiet and serenity are required significant attributes for the enjoyment or use of the area for recreation, nor are these attributes necessary for the area to serve its intended purpose as a waterfowl management area or waterfowl refuge.

The width of the right-of-way has been revised for all the build alternatives. Land required by Alternatives B and C from the eastern entrance and parking area of the FBWMA (as discussed in Section 5.5.1) would be replaced and the parking area relocated. The land would be replaced with land of equal value, location, and usefulness, and the parking lot would be relocated (as shown in Figure 5-5). This would not diminish the use of the property for waterfowl management/waterfowl refuge or recreation. If Alternative B or C were adopted, all planning to minimize further harm to this resource would be included.

5.7.2 Utah State Parks Land, including Jordan River Off-Highway Vehicle Center (Section 4[f] and 6[f] Property)

There has been no change in the measures to minimize harm to this resource since publication of the Final EIS. This discussion is the same as that presented in Section 5.6.2 for this resource. With the exception of the revised calculations, selection of the design option, and evaluation of the Parkway Facility Adjacent to Redwood Road Alternative, this discussion has not changed since publication of the Final EIS.

Alternative D (Final EIS Preferred Alternative) was identified in the Final EIS as the alternative that would least harm this resource. For this supplemental evaluation the current design is the minimum right-of-way width feasible in this location, and Alternative E (and therefore the Parkway Facility Adjacent to Redwood Road Alternative) would least harm this resource.

5.7.3 1300 Glovers Lane, Farmington (Section 4[f] Property)

Alternative B is the only alternative that requires a direct use of this property. If Alternative B was selected, the direct use of this structure would be minimized through the completion of an ILS form in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). All actions would be coordinated with SHPO and ACHP in accordance with the revised draft MOA. The right-of-way required for Alternative B in this area was reviewed for any potential to minimize the direct use of this structure, however the current design is the minimum right-of-way width feasible in this location.

5.7.4 662 West Clark Lane, Farmington (Section 4[f] Property)

Alternative E and the Parkway Facility Adjacent to Redwood Road Alternative require the direct use of the historic structure (as described in Section 5.5.2), while Alternatives A and C require the direct use of the historic part of the property's boundary. Construction of a retaining wall for Alternatives A and C would minimize the impact on 662 West Clark Lane and would allow the structure to remain in place, but it would not eliminate the direct use of 0.02 ha (0.06 ac) from the historic property boundary because of the interchange configuration in this area. No other minimization measures are possible for Alternatives A and C. If Alternative E or the Parkway Facility Adjacent to Redwood Road Alternative were selected, the direct use on this resource would be minimized through the completion of an ILS form in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). All actions would be coordinated with SHPO and ACHP in accordance with the revised draft MOA.

5.7.5 D&RG Railroad (Section 4[f] Property)

All the build alternatives require a direct use of this historic railroad. Impacts on the D&RG Railroad would be minimized through the selection of Alternative A, C, E, or the Parkway Facility Adjacent to Redwood Road Alternative because the impacts of these alternatives on the D&RG Railroad are due to isolated at-grade crossings. Alternative B would require the incorporation of a 4.0-km (2.5-mi) long segment of the D&RG Railroad as shown in Figure 5-11. Retaining walls would be required in this area due to the location of the Parrish Lane interchange for Alternative B, and further measures to reduce the width of the crossings are not feasible in this area. Given the considerations discussed in Section 5.6.5 and because SHPO concurred there would be no adverse effect on the historic railroad by crossing it at grade, further minimization measures are not described.

5.7.6 Historic Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only (Section 4[f] Properties)

The Parkway Facility Adjacent to Redwood Road Alternative could not be implemented without the acquisition and demolition of the eight NRHP-eligible historic structures listed below.

- 836 South Redwood Road, Woods Cross.
- 918 South Redwood Road, Woods Cross.
- 946 South Redwood Road, Woods Cross.
- 974 South Redwood Road, Woods Cross.
- 1650 South Redwood Road, Woods Cross.
- 2018/2020 South Redwood Road, Woods Cross.
- 2408 South Redwood Rd, Woods Cross.
- 1095 North Redwood Rd, North Salt Lake.

To add the capacity necessary to meet the project purpose and need along Redwood Road, the acquisition and demolition of these eight structures is required. Alternatives A, B, C, and E would all avoid any adverse effects on these structures. As shown in Figure 5-3 and discussed in Section 5.6.6, the Parkway Facility Adjacent to Redwood Road Alternative requires the incorporation and demolition of the historic structures and properties in their entirety. Shifting the alignment to the west would result in Alternative E, a prudent avoidance alternative. Shifting the alignment to the east would directly affect the industrial development along the eastern edge of Redwood Road, including the airport. If the Parkway Facility Adjacent to Redwood Road Alternative were selected, the direct use of these structures would be minimized through the completion of an ILS form in accordance with the U.S. Secretary of Interior's *Standards and Guidelines* for documentation (48 FR 44728-37). All actions would be coordinated with SHPO and ACHP in accordance with the revised draft MOA.

5.7.7 Site 42Dv2 (Section 4[f] Property)

Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative all require a direct use of Site 42Dv2. While no further use of or impacts on this site are anticipated during this project, any possible impacts could be minimized through the completion of archaeological data recovery in that portion of the site that was directly used upon discovery, as outlined in the revised draft MOA. Archaeological data recovery would be completed in accordance with the U.S. Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716). All actions would continue to be coordinated with SHPO, ACHP, and consulting parties in accordance with the revised draft MOA.

Additional minimization measures for this site would include fencing the site during construction of Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative. These alternatives would require construction activity adjacent to the site but would not require any additional direct use of this site. SHPO and consulting parties would also be given the opportunity to review construction plans.

5.7.8 Site 42Dv94 (Section 4[f] Property)

Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative all require a direct use of Site 42Dv94. While no further use of or impacts on this site are anticipated during this project, any possible impacts could be minimized through the completion of archaeological data recovery in the portion of the site that was directly used upon discovery, as outlined in the revised draft MOA. Archaeological data recovery would be completed in accordance with the U.S. Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716). All actions would continue to be coordinated with SHPO, ACHP, and consulting parties in accordance with the revised draft MOA.

Additional minimization measures for this site would include fencing the site during construction of Alternatives A, C, E, and the Parkway Facility Adjacent to Redwood Road Alternative. These alternatives would require construction activity adjacent to the site but would not require any additional direct use. SHPO and consulting parties would also be given the opportunity to review construction plans.

5.7.9 Archaeological Resources Used by Parkway Facility Adjacent to Redwood Road Alternative Only

Site 42Dv67 (Section 4[f] Property)

The Parkway Facility Adjacent to Redwood Road Alternative is the only alternative that requires a direct use of Site 42Dv67. If the Parkway Facility Adjacent to Redwood Road Alternative is selected the impact would be minimized through the completion of archaeological data recovery in that portion of the site to be directly used. This archaeological data recovery would be completed in accordance with the U.S. Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716). Alternatives A, B, C, and E would all avoid any direct use of Site 42Dv67.

5.8 Coordination

As described in the Final EIS, all Section 4(f) and 6(f) property owners and officials with jurisdiction over the properties were involved in the discussion of use of Section 4(f) and 6(f) properties. Listed below are the relevant Section 4(f) and 6(f) resources and their respective agencies. The Final EIS summarized the concerns of the agencies listed below with regard to the resources and impacts of the project (see the Final EIS, Section 5.6).

- FBWMA—UDNR, Division of Wildlife Resources.
- Bountiful City Pond—City of Bountiful, the Corps and UDNR, Division of Wildlife Resources.
- Utah State Parks Land (Jordan River OHV Center)—UDNR, Division of Parks and Recreation and the U.S. Department of the Interior.
- Historic and archaeological resources—Utah SHPO and ACHP.
- Archaeological resources—Native American Groups.

As part of this supplemental evaluation, additional coordination has occurred and is listed below.

- FBWMA—UDNR, Division of Wildlife of Wildlife Resources.

- Bountiful City Pond—Modifications to the final design that were developed during the design-build process and that avoid impacts on the pond have been incorporated into the proposed action. The City of Bountiful and FHWA have updated the status of portions of the property that are eligible for protection under Section 4(f).

- White House at 10 North 650 West, Farmington—The White House was documented to Utah State ILS standards. The site documentation was submitted to SHPO on February 21, 2001. SHPO approved the site documentation on March 8, 2001 (Appendix A), and the structure was demolished. These actions were coordinated and concurred with by SHPO and ACHP).

- Clark Lane Historic District—Residents of CLHD voiced concerns regarding the potential for vibration impacts (as described in Section 5.5.2) from hauling materials and pile driving on structures in the CLHD. These potential impacts were studied and documented in *Vibration Impacts on Historic Structures Final Technical Report* (HDR Engineering, Inc. 2004h). In addition, a meeting was held between residents of the CLHD, FHWA, and UDOT on April 14, 2004, to discuss potential impacts on the district from reconstruction of the overpass. During the meeting, UDOT provided an overview of the potential for vibration impacts on the historic structures, and UDOT and FHWA took recommendations from the residents to minimize impacts. These minimization measures are incorporated into the revised draft MOA (see Appendix A). The overpass at State Street has been revised in coordination with the City of Farmington (letters, August 30, 2002, and August 9, 2002).

- Historic and archaeological resources—Since publication of the Final EIS, FHWA and UDOT in consultation with SHPO and other consulting parties determined that the following historic and archaeological resources were eligible for protection under Section 4(f). The revised draft MOA is included in Appendix A.

  - 1300 Glovers Lane in Farmington.

  - 662 West Clark Lane in Farmington.

  - D&RG Railroad.

  - Site 42Dv2.

  - Site 42Dv94.

  - Historic and archaeological resources used by the Parkway Facility Adjacent to Redwood Road Alternative only:

    - 836 South Redwood Road, Woods Cross.

    - 918 South Redwood Road, Woods Cross.

    - 946 South Redwood Road, Woods Cross.

    - 974 South Redwood Road, Woods Cross.

    - 1650 South Redwood Road, Woods Cross.

- 2018/2020 South Redwood Road, Woods Cross.
- 2408 South Redwood Rd, Woods Cross.
- 1095 North Redwood Rd, North Salt Lake.
- Site 42Dv67.

- Trails—A series of meetings was held with representatives from each of the jurisdictions in the study area—North Salt Lake City, Woods Cross, West Bountiful, Centerville, Farmington, and Davis County—to discuss topics pertaining to the Supplemental EIS, including joint development opportunities, and to review trail master plans that have been updated or revised since the Final EIS was published. These meetings were held in July and September 2003. Table 4.1-1 in Section 4.1, *Land Use*, provides information on the dates and attendees of the meetings.

Chapter 6

List of Preparers

Chapter 6

List of Preparers

6.1 Lead Agencies

Name, Title	Project Role	Education (Highest Degree)
Greg Punske, P.E., Environmental Program Manager	Co-lead agency project manager, Federal Highway Administration	Master of Civil Engineering
Nancy Kang, Chief, Utah Regulatory Office	Co-lead agency project manager, U.S. Army Corps of Engineers	B.S., botany
Harlan Miller, Planning Engineer	Traffic engineering quality assurance/quality control (QA/QC) review	M.S., civil engineering
Paul Garrett, Ph.D., Ecologist	Wildlife and wetlands analysis QA/QC review	Ph.D., botany (limnology)

6.2 Jones & Stokes (Consultant to Lead Agencies and Document Preparation)

Name, Title	Project Role	Education (Highest Degree)
Christy Corzine, Principal Environmental Planner	Project manager, National Environmental Policy Act (NEPA) compliance, purpose and need, alternatives	M.S., natural resource economics
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Name, Title	Project Role	Education (Highest Degree)
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Jennifer Hales, Environmental Planner	Impacts summary table, travel patterns and accessibility, and mitigation summary	B.S., public policy management and planning
Ed West, Ph.D., Lead Wildlife Biologist	Wildlife	Ph.D., zoology
Ted Beedy, Ph.D., Ornithologist, Wildlife Biologist	QA/QC, wildlife impacts analysis, threatened and endangered species	Ph.D., zoology
Rob Preston, Ph.D., Senior Botanist/Wetlands Ecologist	Wetlands	Ph.D., botany
Ron Bass, J.D., Environmental Attorney	QA/QC, land use, farmland, social, relocation, economic, joint development, cumulative impacts	J.D., law; AICP
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Richard Beyak, P.E., Chemical Engineer	Hazardous waste	M.S., chemical engineering
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Dana McGowan, Senior Archaeologist	Historic and archaeological resources	M.A., anthropology
Tom Trexler, Hydrologist	Water quality, floodplains	M.S., hydrology and aquatic chemistry
Jim Wilder, P.E., Senior Air Quality Specialist	Air quality, energy	M.S., environmental engineering
John Durnan, Graphics Supervisor	Graphic Design	B.S., biochemistry

6.2.1 Fehr & Peers Associates (Subconsultant to Jones & Stokes)

Name, Title	Project Role	Education (Highest Degree)
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Lee Kellar, Senior Transportation Engineer	Integration topics, sequencing topics, travel demand studies, pedestrian and bicyclist considerations, travel patterns and accessibility	M.A., urban planning

Name, Title	Project Role	Education (Highest Degree)
Dawn Guegan, P.E., Senior Transportation Engineer	Travel demand forecasting	M.S., civil engineering
David Goeres, P.E., Associate in Charge	Traffic planning and operations analysis	B.S., civil engineering

6.3 Technical Assistance

6.3.1 Utah Department of Transportation

Name, Title	Project Role	Education (Highest Degree)
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Bryan Adams, P.E., Project Manager	Legacy Parkway team	B.S., civil engineering
Byron Parker, P.E., Director, Legacy Nature Preserve	Legacy Parkway team	B.S., civil engineering
Jerry Chaney, P.E., Environmental Engineer	NEPA compliance QA/QC review	B.S., civil engineering

6.3.2 HDR Engineering (Consultant to Utah Department of Transportation)

Name, Title	Project Role	Education (Highest Degree)
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Vincent Izzo, Environmental Resource Section Manager	Purpose and need, alternatives	B.A., geography
Bethany Shingleton, P.E. Design Engineer	Right-of way issues analysis, Denver and Rio Grande corridor evaluation	B.S., civil engineering
John Lazarra, P.E. Transportation Engineer	Purpose and need, alternatives, travel patterns and accessibility, travel demand technical appendix	B.S., civil engineering
Shanna Adams, Water Resources Engineer, EIT	Joint development, permits and clearances, energy, travel patterns and accessibility	B.S., civil engineering
Curt Overcast, Noise and Air Quality Specialist	Air quality, noise	M.S., environmental science

Name, Title	Project Role	Education (Highest Degree)
Terry Warner, P.E., Environmental Engineer	Hazardous materials, floodplains, Denver and Rio Grande corridor evaluation	B.S., civil and environmental engineering
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Mike Madson, Cultural Resources Project Manager	Cultural resources	M.S., industrial archaeology
Heidi Spoor, Project Engineer	Visual	B.S., civil engineering
Kelly Farrell, Environmental Scientist	Section 4(f) and 6(f) properties	B.S., natural resources
Richard Gorton, Senior Engineer	Sequencing of the Shared Solution	M.S., civil engineering
George Oamek, Ph.D., Senior Economist	Land use, social, relocation, economic, pedestrians/bikes, socioeconomics QA/QC	Ph.D., economics
Carrie Ulrich, Technical Editor	Technical report editing	B.S., environmental studies
Rick Black, Ph.D., Senior Ecologist	QC biology	Ph.D., ecophysiology
Shawn Frye, GIS Specialist	Graphics	B.S., Geography

6.3.3 Interplan Co. (Consultant to Utah Department of Transportation)

Name, Title	Project Role	Education (Highest Degree)
Matt Riffkin, Principal Transportation Planner	Travel demand technical appendix	B.S., engineering B.A., economics

Chapter 7

Distribution

Chapter 7
Distribution

The following entities are receiving copies of this Draft Supplemental EIS.

7.1 Federal Agencies

- Advisory Council on Historic Preservation
- Department of Defense
  - Hill Air Force Base
  - Tooele Army Depot
- Department of the Interior
  - U.S. Fish and Wildlife Service, Utah Field Office
  - U.S. Geological Survey, Utah District
- Federal Emergency Management Agency
- Federal Transit Administration, Region 8
  - Utah Transit Authority
- Natural Resource Conservation Service
- U.S. Environmental Protection Agency, Office of Federal Activities
  - U.S. Environmental Protection Agency, Region 8
- Utah Resource Mitigation Conservation Commission

7.2 State of Utah Agencies

- Governor's Office
- Department of Agriculture and Food
- Department of Community and Economic Development, Division of Indian Affairs
- Department of Environmental Quality
  - Division of Air Quality
  - Division of Drinking Water
  - Division of Environmental Response and Remediation
  - Division of Solid and Hazardous Waste
  - Division of Water Quality
- Department of Natural Resources
  - Division of Forestry, Fire and State Lands
  - Division of Office of Planning
  - Division of Oil, Gas and Mining
  - Division of Parks and Recreation
  - Division of Utah Geological Survey
  - Division of Water Resources
  - Division of Water Rights
  - Division of Wildlife Resources
    - Farmington Bay Waterfowl Management Area
- Department of Public Safety, Division of Comprehensive Emergency Management, Flood Loss Reduction Section
- Department of Transportation
  - Central Environmental Unit
  - Legacy Parkway Team

  - Region 1
  - Region 2
- Resource Development Coordinating Committee
- Utah State Historic Preservation Office

7.3 Local Agencies

- City of Bountiful
- City of Centerville
- City of Farmington
- City of Fruit Heights
- City of Kaysville
- City of North Salt Lake
- City of West Bountiful
- City of Woods Cross
- Davis County
- City of Salt Lake City
- Salt Lake County
- Wasatch Front Regional Council

7.4 Interested Nongovernmental Organizations

- Farmington Bay Advocates
- Friends of the Great Salt Lake
- Future Moves Coalition
- Great Salt Lake Audubon Society
- League of Women Voters of Salt Lake
- National Audubon Society

- National Wildlife Federation
- The Nature Conservancy
- New State Duck Club
- PacifiCorp
- Sierra Club
- Utahns for Better Transportation

7.5 Native American Tribes

- Goshute Indian Tribe
- Northwestern Band of Shoshone Tribe
- Paiute Indian Tribe of Utah
- Skull Valley Band of Gosiute Indians
- Ute Indian Tribe
- Hopi Tribe

7.6 Libraries

- Brigham Young University Library
- Davis County Library
  - Main Branch
  - South Branch
- Kaysville City Library
- Salt Lake City Library, Main Branch
- University of Utah Library
- Utah State University Library
- Weber State University Library

Chapter 8

References Cited

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References

Printed References

Advisory Council on Historic Preservation. 2000. *Section 106 Memorandum of Agreement Regarding the Legacy Parkway Project.* June 21. Washington, DC.

Aldrich, T. W., and D. S. Paul. 2002. Avian ecology of Great Salt Lake. Pages 343–374 in *Great Salt Lake: an Overview of Change*. Special Publication. Salt Lake City: Utah Department of Natural Resources.

American Association of State Highway and Transportation Officials. 1999. *Guide for Development of Bicycle Facilities.* Washington, DC.

———. 2001. *A Policy on Geometric Design of Highways and Streets*. 4th Edition. Washington, DC. (Also referred to as the Green Book.).

———. 2002. *Roadside Design Guide.* Washington, DC.

Anderson, B. W., and R. D. Ohmart. 1986. Vegetation. Pages 639–660 in A. Y. Cooperrider, R. J. Boyd, and H.R. Stuart. (eds.), *Inventory and Monitoring of Wildlife Habitat.* Denver, CO: Bureau of Land Management Service Center.

Balle, W. 1994. *Clark Lane Historic District Nomination Form*. On file at the State Historic Preservation Office, Salt Lake City, UT.

Baseline Data, Inc. 1998. *A Cultural Resource Inventory of the Proposed Legacy West Davis Highway in Davis and Salt Lake Counties, Utah*. (Research Report U97-5.) April 15. American Fork, UT. Prepared by Arlene Colman and Quint. A. Colman.

———. 2000. *Legacy Parkway Wetland Final HGM Technical Report.* Orem, Utah. Prepared by Bryan Young. Prepared for Utah Department of Transportation.

———. 2003. *Supplemental Cultural Resources Report for the Proposed Legacy Highway Project from Salt Lake City, Salt Lake County to Kaysville, Davis County, Utah.*

Baseline Data, Inc. et al. 1998. *Wetland Delineation, Legacy West Davis Highway.* Technical Report and Volumes I, II, and III of Data Forms.

Baskin, R. L., K. M. Waddell, S. A. Thiros, E. M. Giddings, H. K. Hadley, D. W. Stephens, and S. J. Gerner. 2002. *Water-Quality Assessment of the Great Salt Lake Basins, Utah, Idaho, and Wyoming—Environmental Setting and Study Design.* (Water Resources Investigations Report 02-4115.) Prepared for U.S. Geological Survey.

Brinson, M. M. 1993. *A Hydrogeomorphic Classification for Wetlands.* (Technical Report WRP-DE-4.) Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Brinson, M. M., and R. Rheinhardt. 1996. The Role of Reference Wetlands in Functional Assessment and Mitigation. *Ecological Applications* 6(1):69–76.

Canter, L. W. 1996. *Environmental Impact Assessment.* 2nd Edition. New York: McGraw-Hill.

Clairain, Jr., E. J. 2002. Introduction and Overview of the Hydrogeomorphic Approach. Chapter 1 in *Hydrogeomorphic Approach to Assessing Wetland Functions: Guidelines for Developing Regional Guidebooks.* (ERDC/EL TR-02-3.) Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Coalition for Utah's Future, Envision Utah. 2002. *Producing a Vision for the Future of the Greater Wasatch Area.* Salt Lake City**.**

Colorado Department of Transportation, Regional Transportation District, Federal Highway Administration, and Federal Transit Administration. 2004. Real Time Traffic Information. Available: <http://www.trexproject.com/>. Accessed: September 2004.

Cooper Engineering, Inc. 1985. *Final Environmental Impact Report, Los Angeles City Energy Recovery (Lancer) Project.* April.

Council on Environmental Quality. 1997. Considering Cumulative Effects under the National Environmental Policy Act. January. Washington, DC: Council on Environmental Quality, Executive Office of the President.

Davis County Council of Governments. 2001. *Davis County Shorelands, Comprehensive Land Use Master Plan*. In partnership with the Nature Conservancy and Envision Utah. Davis County, UT.

Davis, S. C., and S. W. Diegel. 2003. *Transportation Energy Data Book*. 23rd Edition. Center for Transportation Analysis; Engineering, Science, and Technology Division. Oak Ridge, TN: Oak Ridge National Laboratory.

EDAW, Inc. 1997. *Landscape Aesthetic Concept Report, Legacy West Davis Highway*.

Environmental Data Resources. 2003. GIS files on hazardous waste sites provided by Paul Izokaitis, GIS Specialist with Environmental Data Resources. July 11.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual.* (Technical Report Y-87-1.) Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Envision Utah. 1999. *Envision Utah Growth Scenarios.* October. Salt Lake City**.**

———. 2000. Quality Growth Strategy and Technical Review. Available: <www.envisionutah.org/january2000.pdf>. Accessed: May 2004.

———. 2002. Wasatch Front Transit Oriented Development Guidelines. Available: <http://envisionutah.org/tod1.pdf>.

Federal Emergency Management Agency. 2001. Flood Insurance Rate Maps (FIRM) Davis County, Utah (Unincorporated Areas), Community Panel No. 490038 0160B. Revised to reflect Letter of Map Revision (LOMR), December 14.

Federal Highway Administration. 1987a. *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. (FHWA Technical Advisory T66408.A.) Washington DC: Office of Environmental Policy.

———. 1987b. *Sources and Migration of Highway Runoff Pollutants*. June. (FHWA Report No. FHWA/RD-84-057-060.) Washington DC.

———. 1989. Sept. 24, 1987 (Revised June 7, 1989). Section 4(f) Policy Paper.

———. 1993. *The Association of Median Width and Highway Accident Rates*. (Highway Safety Information System Summary Report FHWA-RD-93-046.) McLean, VA.

———. 1995. *Highway Traffic Noise Analysis and Abatement Policy and Guidance*. Washington, DC.

———. 1996. *Evaluation and Management of Highway Runoff Water Quality*. (Publication No. FHWA-PD-96-032.)

———. 2003. Traffic Noise Model, Version 2.1. February.

———. 2004. Last revised: April 16, 2004. Context Sensitive Design/Thinking Beyond the Pavement. Available: <www.fhwa.dot.gov/csd/>.

Federal Highway Administration Office of Field Management and Operation. 2002.

Federal Highway Administration and U.S. Army Corps of Engineers. 2003. *Legacy Parkway Supplemental Environmental Impact Statement Scoping Report*. Prepared by Jones & Stokes, Sacramento, CA.

Federal Highway Administration and Utah Department of Transportation. 1998. *I-15 North Corridor Draft Environmental Impact Statement (Kaysville to Salt Lake City)*. Salt Lake City. Prepared by BRW.

Federal Transit Administration and Utah Transit Authority. 2004 <pg. 2.3-13>

Federal Highway Administration, U.S. Army Corps of Engineers, and Utah Department of Transportation. 1998. *Legacy Parkway Draft Environmental Impact Statement and Section 4(f), 6(f) Evaluation*. Prepared by HDR Engineering. North Salt Lake, Utah.

———. 2000. *Legacy Parkway Final Environmental Impact Statement and Section 4(f), 6(f) Evaluation*. Prepared by HDR Engineering. North Salt Lake, Utah.

Fehr & Peers Associates. 2004. *Legacy Parkway Technical Memorandum: Integration of Mass Transit with the Legacy Parkway*. Salt Lake City.

Findlay, S. E. G., E. Kiviat, W. C. Nieder, and E. A. Blair. 2002. Functional Assessment of a Reference Wetland Set as a Tool for Science, Management And Restoration. *Aquatic Science* 64:107–117.

Forman, R. T. T., D. Sperling, J. A. Bissonette, A. P. Clevenger, C. D. Cutshall, V. H. Dale, L. Fahrig, R. France, C. R. Goldman, K. Heanue, J. A. Jones, F. J. Swanson, T. Turrentine, and T. C. Winter. 2003. *Roadside Ecology: Science and Solutions.* Island Press: Washington, DC.

Gharabegian, A., K. M. Cosgrove, J. R. Pehrson, and T. D. Trinh. 1985. Forest Fire Fighters Noise Exposure. *Noise Control Engineering Journal* 25(3):96–111.

Global Security.Org. 2003. Strategic Highway Network (STRAHNET). Available: <www.globalsecurity.org/military/facility/strahnet.htm>. Accessed: July 28, 2003.

Green, L. C., E. A. C. Crouch, M. R. Ames, T. L. Lash. 2002. What's Wrong with the National Ambient Air Quality Standard for Fine Particulate Matter ($PM_{2.5}$)? *Regulatory Toxicology and Pharmacology* 35(3):327–337.

Harris Miller Miller and Hanson Inc. 1995. *Transit Noise and Vibration Impact Assessment*. Final Report. April. Burlington, MA. Prepared for the Federal Transit Administration by Miller & Hanson, Inc.

Hartgen, D. 2003. *Highways and Sprawl in North Carolina*. Professor of Transportation Studies, University of North Carolina at Charlotte. September 24.

HDR Engineering, Inc. 2000. *Environmental Field Investigation Report: Refinery Effluent Ditch, Hogan and Associates, and Drainage Canal*. June. Salt Lake City, UT.

HDR Engineering, Inc. 2003a. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6424, (City of Woods Cross). July10, 2003.

———. 2003b. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6425, (City of West Bountiful). July 10, 2003.

———. 2003c. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6431, (City of Farmington). July 8, 2003.

———. 2003d. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6426, (City of Centerville). July 8, 2003.

———. 2003e. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6436, (City of North Salt Lake). July 15, 2003.

———. 2003f. D&RG Technical Memorandum Community Impact Survey Minutes DM No. 6432, (Davis County). July 11, 2003.

———. 2003g. Centerville City Land Use Meeting Minutes. September 16.

———. 2003h. Farmington City Land Use Meeting Minutes. September 16.

———. 2003i. North Salt Lake Land Use Meeting Minutes. September 15.

———. 2003j. West Bountiful Land Use Meeting Minutes. September 16.

———. 2003k. Woods Cross Land Use Meeting Minutes. September 15.

———. 2004a. *Legacy Parkway Technical Memorandum: Right-of-Way Issues*. Salt Lake City.

———. 2004b. *Legacy Parkway Technical Memorandum: Denver & Rio Grande Corridor Evaluation*. Salt Lake City[Fill in reference, add letter to citations in Sec 3.0, Sec 3.2.]

———. 2004c. *Legacy Parkway Technical Memorandum: Sequencing of the North Corridor Shared Solution.* Salt Lake City

———. 2004d. *Economics Final Technical Report-Legacy Parkway Environmental Reevaluation.* May.

———. 2004e. *Legacy Parkway Environmental Re-evaluation, Noise Final Technical Report.* May. Prepared for the Utah Department of Transportation.

———. 2004f. *Legacy Parkway Environmental Re-Evaluation, Permits and Clearances Technical Report.* North Salt Lake, Utah. January.

———. 2004g. *Cultural Resources Final Technical Report.* North Salt Lake, UT.

———. 2004h. *Vibration Impacts on Historic Structures Final Technical Report*. Salt Lake City, Utah.

Hendricks, Rudy. 2002. Transportation Related Earthborne Vibrations. February 20. (Tech Advisory, Vibration, TAV-02-01-R9601.) Prepared for California Dept of Transportation, Division of Environmental Analysis, Sacramento, CA.

Hughes, J. M. 1999. Northern Goshawk (*Accipiter gentiles)*. In A. Poole and F. Gill (eds.), *The Birds of North America*. (No. 506). Philadelphia: The Academy of Natural Sciences.

Jones & Stokes. 2004. *Legacy Parkway Wildlife Impacts Analysis Technical Memorandum.* Sacramento, CA.

Martin, S. G., and T. A. Gavin. 1995. Bobolink (*Dolichonyx oryzivorus*). In A. Poole and F. Gill (eds.), *The Birds of North America.* (No. 176.) Philadelphia, PA: The Academy of Natural Sciences.

National Cooperative Highway Research Program. 2004. *Improved Guidelines for Median Safety*. Draft Report of Analysis Findings. February. Vienna, VA.

National Park Service. [1995] 1997. National Register Bulletin: Defining Boundaries for National Register Properties. Revised 1997. U.S. Department of the Interior, National Park Service, Washington, DC.

New Jersey Department of Transportation. 2003. Crash Records. Available: <www.state.nj.us/ transportation/refdata/accident/>. Accessed: January 2004.

Nixon, W. A. 2001. Use of Abrasives in Winter Maintenance at the County Level. *Transportation Research Record* 1741:42–46. (Paper No. S00-0025.)

Oregon State Department of Energy. 2003. Conversion Factors. Available: <www.energy.state.or.us/ rcm/Conversion Factors.doc>. Accessed: December 15, 2003.

Overstreet, M. A., T. B. Seacat, and J. R. Allison. 2004. *Supplemental Cultural Resources Report for the Proposed Legacy Parkway Highway Project from Salt Lake City, Salt Lake County to Kaysville, Davis County, Utah*. (Research Report No. 03-32.) Prepared by Baseline Data, Inc. American Fork, UT. Updated by HDR in 2004.

Parsons Brinckerhoff Quade and Douglas, Inc. 1998. *Western Transportation Corridor Major Investment Study*. January. Prepared for Wasatch Front Regional Council, Murray, UT.

Ryser, F. A. 1985. *Birds of the Great Basin.* Reno: University of Nevada Press.

Salt Lake County Board of Realtors. 2003. First Quarter 2003 Home Sales Statistic. Available: <http://www.slrealtors.com/index.htm>. Accessed: March 12, 2004.

Samet, J. M., F. Dominici, F. C. Curriero, I. Coursac, and S. L. Zeger. 2000. Fine Particulate Air Pollution and Mortality in 20 U.S. Cities, 1987–1994. *New England Journal of Medicine* 343(24):1742–1749.

Sansalone, J. J., and S. G. Buchberger. 1999. Characterization of Metals and Solids in Urban Highway Winter Snow and Spring Rainfall-Runoff. *Transportation Research Record* 1523:147–159.

Sansalone, J. J., J. M. Koran, J. A. Smithson, and S. Buchberger. 1998. Physical Characteristics of Urban Roadway Solids Transported during Rain Events. *Journal of Environmental Engineering* 124(5):427–440.

Schlup, U. and B. Ruess. 2002. Abrasives and Salt: New Research on Their Impact on Security, Economy, and the Environment. *Transportation Research Record* 1741:47–53. (Paper No. S00-0010.)

Schwartz, J. 1999. Air Pollution and Hospital Admissions for Heart Disease in Eight U.S. Counties. *Epidemiology* 10(1):17–22.

Smith, R. D, and J. S. Wakely. 2001. Developing Assessment Models. Chapter 4 in *Hydrogeomorphic Approach to Assessing Wetland Functions: Guidelines for Developing Regional Guidebooks.* (ERDC/EL TR-01-30.) Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Smith, R. D., A. Ammann, C. Bartoldus, and M. M. Brinson. 1995. *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices*. (Technical Report WRP-DE-9.) Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Sorenson, D. L., V. Mortenson, and R. Zolinger. 1995. *Determining the Impact of Salting Operations on Water Quality, Interim Report*. March. Logan, UT: Utah Water Research Laboratory, Utah State University. Prepared for the Utah Department of Transportation Research and Development Division.

———. 1996. *A Review and Synthesis of the Impacts of Road Salting on Water Quality*. July. Logan, UT: Utah Transportation Center and the Utah Water Research Laboratory, Utah State University.

Squires and Ruggiero. 1995.

State of Utah. 2002. *Utah State Implementation Plan,* Section IX, Part A. Fine Particulate Matter (PM10). Salt Lake City.

SWCA Environmental Consultants. 2002. *Legacy Parkway Pipeline Relocation Project Final Class III Cultural Resources Inventory Letter Report*. July 15. (SWCA Cultural Resources Report No. 02-164.) Prepared for Questar Gas Company, Salt Lake City, UT.

———. 2003a. *Site 42Dv94: A Human Remains Discovery in the Jordan River Wetlands, Davis County, Utah.* September. (SWCA Cultural Resources Report No. 2003-273.) Prepared for Questar Gas Company, Salt Lake City Utah.

———. 2003b. Site 42Dv98: IMACS Site Form. January 16.

———. 2004a. *Draft: Industrial Debris and Bottle Louse: Data Recovery at the Lagoon Drive Discovery Site (42Dv93) on the Legacy Parkway Project, Farmington, Davis County, Utah.* July. (SWCA Cultural Resources Report No. 2003-4268.) Prepared for the Utah Department of Transportation—Region One.

———. 2004b. *Final Documentation of the Woodman Townsite, the Antelope Island Improvement Company Boat Landing, the Lake Shore Bathing Resort, and Associated Features for the Legacy Parkway Pipeline Project in Davis County, Utah.* August 27. (SWCA Cultural Resources Report No. 2004-288.) Prepared for the Utah Department of Transportation Complex.

Thompson, A. 2003. Salt Lake City Congestion Management System.

Toth, W. J. 1979. *Noise Abatement Techniques for Construction Equipment.* (HS-803 293; DOT-TSC-NHTSA-79-45: PB-300 948.) Washington, DC: U.S. Department of Transportation, National Highway Traffic Safety Administration.

Transportation Research Board. 2000. *Highway Capacity Manual: 2000*. Washington DC: National Research Council.

Trott, K. L., M. M. Davis, L. M. Grant, J. W. Beever, R. K. Evans, B. E. Gunsalus, S. L. Krupa, C. V. Noble, and K. J. Liudahl. 1997. *Peninsular Florida Herbaceous Depressional Wetlands Hydrogeomorphic (HGM) Regional Guidebook.* Draft. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

U.S. Census Bureau. 2000. Census 2000. Data Set: Census 2000 Summary File 3 (SF3) – Sample Data. Tables P1, P7, P30, P53, and P92.

U.S. Department of Energy, Energy Information Administration. 2003a. Annual Energy Outlook 2004 (Early Release). Available: <www.eia.doe.gov/oiaf/aeo/>. Accessed: December 16, 2003.

———. 2003b. Table A1: Total Energy Supply and Disposition Summary. Available: <www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf>. Accessed: October 20, 2003.

———. 2004. Table 28, Transportation Efficiency and Travel in the *CEF-JL* Moderate and Advanced Cases, 2010 and 2020. Available: <http:///www.eia.doe.gov/oiaf/servicerpt/eppats/table28.html>. Accessed: August 23, 2004.

U.S. Department of Transportation. 1985. *Effects of Highway Runoff.*

U.S. Department of Transportation, Bureau of Transportation Statistics. 2002. *National Transportation Statistics 2001,* Table 4-23: Average Fuel Efficiency of U.S. Passenger Cars and Light Trucks. July. (BTS02-6.) Washington, DC: U.S. Government Printing Office.

U.S. Department of Transportation, Federal Highway Administration, and the Utah Department of Transportation. 1996. *US-89 I-15/Farmington to Harrison Boulevard/South Ogden, Davis and Weber Counties, Utah. Final EIS.* September.

U.S. Environmental Protection Agency. 1971. *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* (NTID300.1.) Washington, DC: U.S. Government Printing Office. Prepared by Bolt, Beranek, & Newman, Boston, MA.

———. 1998. *Final Report: Sources of Lead in Soil: A Literature Review.* February. (EPA 747-R-98-001a.) Washington, DC: Office of Pollution Prevention and Toxics.

———. 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents.* May. (EPA 315-R-99-002.) U.S. Environmental Protection Agency, Office of Federal Activities (2252A).

———. 2000. *Technical Support Document: Control of Emissions of Hazardous Air Pollutants From Motor Vehicles and Motor Vehicle Fuels.* December. (EPA 420-R-00-023.)

———.2002. *Inventory of Greenhouse Gas Emissions and Sinks: 1990–2000.* April. (EPA 430-R-02-003.) Office of Atmospheric Programs.

———. 2003a. Lead in Paint, Dust, and Soil. Last Revised: August 21, 2003. Available: <http://www.epa.gov/lead>. Accessed: October 31, 2003.

———. 2003b. National Ambient Air Quality Standards (NAAQS). Available: <www.epa.gov/air/criteria.html>. Accessed May 9, 2004.

———. 2003c. EPA STORET database. Available: <http://www.epa.gov/STORET/>. Accessed: October 2003.

U.S. Environmental Protection Agency, Certification and Compliance Division, Office of Air Transportation and Air Quality. 2000. *Federal and California Exhaust and Evaporative Emission Standards for Light-Duty Vehicles and Light-Duty Trucks.* February. (EPA 420-B-00-001). Washington, DC.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. 2001. Memorandum Concerning Isolated Waters from the General Counsel of the Environmental Protection Agency [Gary Guzy] and the Corps Chief Counsel [Robert M. Andersen].

U.S. Fish and Wildlife Service. 1999a. *Final Formal Biological Opinion for Project Number SP-0067, Legacy Parkway, Salt Lake and Davis Counties, Utah*. Letter report from Reed Harris, Utah Field Supervisor, U.S. Fish and Wildlife Service, to William Gedris, Federal Highway Administration. February 11.

———. 1999b. *Amendment to Biological Opinion for Project Number SP-0067, Legacy Parkway, Salt Lake and Davis Counties, Utah*. Letter report from Reed Harris, Utah Field Supervisor, U.S. Fish and Wildlife Service, to William Gedris, Federal Highway Administration. September 17.

———. 2003. Policy for Evaluation of Conservation Efforts When Making Listing Decisions

U.S. Geological Survey. 2003. *The National Highway Runoff Data and Methodology Synthesis, Volume I – Technical Issues for Monitoring Highway Runoff and Urban Stormwater*. July. (Publication No. FHWA-EP-03-054.)

University of Utah, Bureau of Economic and Business Research. 2004. Economic Indicators for Davis County, 1998–2002. Available: <http://www.business.utah.edu/bebr/Counties/davis.htm>.

Utah Conservation Data Center. n.d. Utah Conservation Data Center Web Site. Available: <www.dwrcdc.nr.utah.gov/ucdc/>. Accessed: November 7 to November 19, 2003, and March 29, 2004.

Utah Department of Agriculture and Food. 2000. Conversion of Farmland during National Agriculture Week. Available: <Ag.utah.gov/pressrel/agday2k.html>.

Utah Department of Environmental Quality. 2004. PM10 Data Summary. Available: <www.airmonitoring.utah.gov/pm10-sum.htm>. Accessed: September 14, 2004.

Utah Department of Environmental Quality, Division of Air Quality. 1997. Utah State Implementation Plan for Salt Lake and Davis Counties. Available: <http://www.airquality.utah.gov/SIP/Sipcm4s.htm>. Accessed: August 2004.

———. 2002. Utah State Implementation Plan, Section IX, Part A, Fine Particulate Matter (PM10). Adopted July 3. Available: <http://www.airquality.utah.gov/SIP/SIPPDF/2002%20PM10--24593.pdf>. Accessed: August 2004.

Utah Department of Environmental Quality, Division of Drinking Water. 2003. GIS shapefiles (Filenames lgcywells, lgcydgtwells, and lgcyzone) electronically transmitted from Mark Jensen, Utah Department of Natural Resources, showing public water supplies in the study area. November 6.

Utah Department of Environmental Quality, Division of Environmental Response and Remediation. 2003. UST site list map generated from ArcIMS 3.0 Viewer. Available: <http://utsteqmgis1.eq.ex.state.ut.us/website/utdeq/default_ie.htm?Title=ArcIMS%203.0%20Viewer>. Accessed: October 2, 2003.

Utah Department of Environmental Quality, Division of Water Quality. 2004. Utah's 2004 303(d) List of Impaired Waters. Last revised: April 1, 2004. Available: <http://waterquality.utah.gov/public%20notices/2004303dlist-01-15-04.pdf>. Accessed: April 26, 2004.

Utah Department of Natural Resources, Division of Water Resources. 2003. *Water-Related Land Use Data Inventory Map.*

Utah Department of Natural Resources, Division of Water Rights. 2004. GIS Data and Related Tables. Last revised: February 18, 2004. Available: <www.waterrights.utah.gov/gisinfo/wrcover.htm>. Accessed: March and September 2004.

Utah Department of Natural Resources, Division of Wildlife Resources. 2002. Mission Statement of the Division of Wildlife Resources. Available: <www.wildlife.utah.gov/about/mission.html>. Accessed: April 2004.

———. 2003 a. Utah Sensitive Species List. Available: <www.dwrcdc.nr.utah.gov/ucdc/ViewReports/SSL&Appendices121803.pdf>. Accessed: February 11, 2004.

———. 2003b. *Bountiful Pond Statewide Urban Fishery Development Grant Number:F-100D, Nov. 2001–Dec. 2003.*

———. 2004a. Utah's State Listed Species by County. Last revised: February 27, 2004. .Available: <www.dwrcdc.nr.utah .gov/ucdc/ViewReports/sscounty_20040227.pdf>. Accessed: March 24, 2004.

———. 2004b. *Annual Legacy Nature Preserve Progress Report.*

Utah Department of Natural Resources, Division of Wildlife Resources, and Utah Reclamation Mitigation Conservation Commission. 2000. *Beyond Kids and Signs: A Comprehensive Wetlands Education Master Plan for the Greater Great Salt Lake Ecosystem*. Prepared by the Utah State University Wetlands Education Team. April.

Utah Department of Transportation. 1995. Utah Accident Data. UDOT Maintenance Division Database Highway Reference System. Volume 1 and 2.

———. 1999. *North Corridor I-15 North/Legacy Parkway Interchange Modification/Justification Report.* August.

———. 2001a. *Traffic on Utah Highways.*

———. 2001b. *Statewide Pedestrian and Bicycle Plan*. Element of the *Statewide Long-Range Transportation Plan*. February.

———. 2003a. *Statewide Accident Data Spread Sheet for a 5-Year Average Ending in 2002.* Salt Lake City, Utah.

———. 2003b. *State of Utah Long Range Transportation Plan*. Final Draft. Salt Lake City, Utah

———. 2003c. Air Quality "Hot-Spot" Manual. Available: <http://www.udot.utah.gov/downlad.php/tid=232/AirQualityHotSpotManual.pdf>. Accessed: August 2004.

———. 2004. 2004 Standard Drawings (DD4 – Geometric Design for Freeways). Available: <http://www.udot.utah.gov/index.php/m=c/tid=728>. Accessed: March 15, 2004.

Utah Governor's Office of Planning and Budget. 2002. Utah Department of Workforce Services, 2002 Baseline Projections, UPED Model System. Available: <http://governor.utah.gov/dea/LongTermProjections.html>. Accessed: October 22, 2003.

Utah Governor's Office of Planning and Budget, Demographic and Economic Analysis Section (DEA). 2003. *Demographic and Economic Analysis 2003 Economic Report to the Governor.*

Utah Rails.Net. 2003. Rio Grande Events and History. Last revised: September 14, 2003. Available: <http://www.utahrails.net/drgw/rg-events-index.php>.

Utah State Tax Commission. 2003. *Utah Property Tax 2002 Annual Statistical Report*. August. Salt Lake City, Utah.

Utah State Tax Commission, Property Tax Division. 2004. *Standard 3 – Tax Relief and Abatement Standards of Practice.* Last revised: May 2004. Available: <http://www.propertytax.utah .gov/standards/standard03.pdf>.

Utah Transit Authority. 2003. Utah Closes on Union Pacific Rail Facility. Last revised: September 3, 2004. Available: <http://www.rideuta.com/calendarAndNews/pressReleases.aspx>.

———. 2004. *Weber County to Salt Lake Commuter Rail Project: Draft Environmental Impact Statement and 4(f) Evaluation*. Prepared for Federal Transit Administration.

Vickery, P.D. 1996. Grasshopper Sparrow (*Ammodramus savannarum*). In A. Poole and F. Gill (eds.), *The Birds of North America.* (No. 239). Philadelphia: The Academy of Natural Sciences.

Wasatch Front Regional Council. 1997. *Surveillance of Socio-Economic Characteristics, 1995 Supplement (Updated 2020 Projections).* March.

Wasatch Front Regional Council. 2002. Salt Lake and Ogden-Layton Urbanized Areas Congestion Management System. June. Salt Lake City.

———. 2003a. *Wasatch Front Urban Area Long Range Transportation Plan: 2004–2030.* (Technical Report #43.) December. Salt Lake City.

———. 2003b. *Wasatch Front Region Small Area Socioeconomic Projections: 2002–2030.* (Technical Report No. 42 [for Davis, Morgan, Salt Lake, Tooele, and Weber Counties]). October. Salt Lake City.

———. 2003c. Report No. 18: Conformity Analysis for the Updated 2030 Long-Range Plan for the Wasatch Front Region. Available: <http://www.wfrc.org/reports/lrp.htm>. Accessed: December 2003.

———. 2004. *Salt Lake and Ogden-Layton Urbanized Areas Congestion Management System.* June. Salt Lake City.

———. In preparation a. *South Davis County Transit Needs Analysis.* Salt Lake City.

———. In preparation b. *Congestion Management System Plan*. Salt Lake City.

Wasatch Front Regional Council, Mountainland Association of Governments, Utah Transit Authority, and the Utah Department of Transportation. 2002. *Inter-Regional Corridor Alternatives Analysis.* Salt Lake City.

Wright, A. M. T. Seddon, and J. Christen. 2001. *Class III Cultural Resource Inventory of 255 acres for the Legacy Nature Preserve, Davis County, Utah*. (SWCA Cultural Resources Report No. 01-160.) Prepared by SWCA Environmental Consultants, Inc. Salt Lake City, Utah.

Younk and Bechard. 1992. Effects of Gold Mining Activity on Northern Goshawks Breeding in Nevada'a Independence and Bull Run Mountains. Annual Report. Boise: Raptor Research Center, Boise State University.

Zeits, R. 2003. Low Cost Solutions Yield Big Savings. *Public Roads* 67(3).

Zeveloff, S.I., and F.R. Collett. 1988. *Mammals of the Intermountain West.* Salt Lake City: University of Utah Press.

City References

Centerville City. 1996. *General Plan for Centerville City*. Centerville City, UT.

City of Layton. 2003. *West Layton General Plan Study.*

City of North Salt Lake. 2001. North Salt Lake Land Use Development and Management Act.

———. 2002. Operating Budget. Available: <http://www.nslcity.cc/index.htm>. Accessed: October 22, 2003.

City of West Bountiful. 1992. *West Bountiful City Master Plan 1990–2000.*

———. 1997a. *City of West Bountiful General Plan, Draft Transportation Element.*

———. 1997b. *West Bountiful City Planning District No. 6 Plan.*

Farmington City. 1993. *Comprehensive General Plan, Farmington, Utah.*

———. 1998. *Farmington City Master Transportation Plan.*

———. 2003. Farmington Master Trails Map. Last revised: November 2003. Available: <http://www.farmingtonut.com/p_trailsdetails.asp>.

Kaysville City. 2002. *Kaysville City General Plan, as Amended*. August.

Salt Lake City. 1992. *Northwest Jordan River/Airport Master Plan.*

———. 1994a. *Salt Lake City Visionary Gateway Plan.*

———. 1994b. *Beck Street Gateway Vision Plan.*

———. 1995. *Salt Lake City Downtown Plan.*

———. 1996. *Salt Lake City Transportation Master Plan.*

———. 1998a. *Gateway Specific Plan, Draft.*

———. 1998b. *Gateway Development Master Plan.*

———. 2000. *Transportation Advisory Board Salt Lake City Transportation Action Plan Update.* January.

Salt Lake City Corporation, Transportation Division. 2002. *Bicycle and Pedestrian Master Plan.* August.

Woods Cross City. 2003. *Woods Cross City General Plan*. June. Prepared by Landmark Design, Inc.

Personal Communications

Abeggien, Leann. **.** Utah Transportation Commission. August 6, 2004—personal communication between Abeggien and Laynee Jones of HDR Engineering Inc regarding consideration of a highway west of the Salt Lake City International Airport.

Adams, Bryan. Legacy design oversight manager. Utah Department of Transportation, Salt Lake City. 2003—personal communication between Adams and Mike Perkins of HDR Engineering regarding floodplain development permits for Davis County, North Salt Lake City, Woods Cross City, West Bountiful, Centerville City, and Farmington City.

Adams, Stan. Environmental engineer. Utah Department of Transportation, Salt Lake City. November 2003—telephone conversation with Curt Overcast of HDR Engineering regarding sound wall construction costs.

Anderson, Doug. Office team leader. Redmond Minerals, Redmond, UT. November 10, 2003—telephone conversation between Anderson; Rusty Bastion Stoddard, vice-president, Redmond Minerals; and Laynee Jones of HDR Engineering regarding deicing salt composition.

Barr, Nancy. State of Utah Floodplain Office. November 5, 2003—telephone conversation with Terry Warner of HDR Engineering regarding FIRM revisions since 2000.

Bell, Erin. Area soil scientist. U.S. Department of Agriculture Natural Resources Conservation Service. October 2, 2003—telephone conversation with Laynee Jones of HDR Engineering regarding specially designated farmland.

Berhard, Lynn. Maintenance methods engineer. Utah Department of Transportation. November 10, 2003—telephone conversation with Laynee Jones of HDR Engineering regarding UDOT's deicing practices.

Boes, Jim. Aviation planner. Wasatch Front Regional Council. September 3, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding updated information the *Salt Lake City Airport Master Plan.*

Bird, Bryce. Branch manager. Utah Division of Air Quality, Salt Lake City, Utah May 26, 2004—telephone conversation with Curt Overcast of HDR Engineering regarding the status of the State PM2.5 standard.

Burton, Barry (a). Assistant director of community and economic development. Davis County, UT. November 7, 2003—email communication with Laynee Jones of HDR Engineering regarding Agricultural Protection Areas.

——— (b). Recreation planner. Davis County, UT. September 17 and 22, 2004—telephone conversation with George Oamek of HDR Engineering regarding completion of Jordan River Parkway.

Campagna, Rick. Legacy Parkway construction manager. Utah Department of Transportation, Salt Lake City. 2004. April 23, 2004—personal conversation with Laynee Jones of HDR Engineering regarding design-builder construction activities.

Christensen, Jim. October 4, 2004—Personal communication.

Flanders, Bill. City engineer. City of West Bountiful, UT. January 14, 2004—telephone communication with Brock Hoegh of HDR Engineering regarding the City of West Bountiful trail system.

Gentry, Jim (a). Weber County Planning Commission, Weber County, UT. September 17, 2003—email communication with Brock Hoegh of HDR Engineering regarding how land use patterns in Weber County would change with or without the proposed Legacy Parkway Project.

——— (b). Weber County Planning Commission, Weber County, UT. January 5, 2004—email communication with Brock Hoegh of HDR Engineering regarding the direct, indirect, and cumulative impacts within Weber County from the North Corridor Improvement Projects, including the Legacy Parkway.

Hall, Kimbell. Finance director. City of West Bountiful, UT. September 22, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding 2002 operating budget for the City of West Bountiful.

Hess, Darin. Weber Basin Water Conservancy District, Layton, UT. October 22, 2003—personal communication with Shanna Moosman of HDR Engineering regarding the development of a water treatment plant and pipeline.

Hogg, Chris**.** Weber Basin Water Conservancy District, Layton, UT. November 12, 2003—personal communication with Shanna Moosman of HDR Engineering regarding the development of a water treatment plant and pipeline.

Jensen, Aric. Community Development Director. Centerville City, UT. December 18, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding pre-Legacy land uses and current build alternative impacts on current land use.

Johnson, Keith. Finance director. Farmington City, UT. September 22, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding 2002 operating budget for Farmington City.

Law, Diane. Clerk. Auditors office, Davis County, UT. September 24, 2003—fax to Brock Hoegh of HDR Engineering regarding indigent abatement households in the study area.

Lizotte, Christopher (a). Archaeologist and NEPA specialist. Utah Department of Transportation, Salt Lake City**.** March 12, 2001—letter to James Kykmann, State Historic Preservation Office, regarding Site 42Dv70.

——— (b). Archaeologist and NEPA specialist.. Utah Department of Transportation, Salt Lake City. September 20, 2001—letter to the State Historic Preservation Officer regarding Legacy Parkway haul routes for construction. .

——— (c). Archaeologist and NEPA specialist. Utah Department of Transportation, Salt Lake City. February 21, 2001—letter to the State Historic Preservation Officer regarding submission of ILS documentation for the White House at 650 West State Street, Farmington City, UT.

——— (d). Archaeologist and NEPA Specialist. Utah Department of Transporation, Salt Lake City. March 26, 2004—telephone conversation between Lizotte, April Zohn of Jones & Stokes, and Greg Punske of the Federal Highway Administration, regarding current status of Section 106 Memorandum of Agreement, vibration studies for Clark Lane Historic District, and ongoing consultations with Goshute tribe.

Lutz, Blain. Finance director. Centerville City, UT. September 22 and October 1, 2003—telephone conversations with Brock Hoegh of HDR Engineering regarding 2002 operating budget for Centerville City.

Maddox, Henry. Utah field supervisor. U.S. Fish and Wildlife Service. December 3, 2003—letter to Mike Perkins of HDR Engineering regarding updated species list for the proposed action study area.

Martin, Wilson. AHPO. February 7—letter to Christopher Lizotte, archaeologist and NEPA specialist, Utah Department of Transportation, regarding Site 42Dv2.

Moellmer, Bill. Utah Division of Water Quality. November 6, 2003—telephone conversation with Laynee Jones of HDR Engineering regarding contaminants of concern in the Legacy Parkway project study area.

Montgomery, Greg. City of Ogden, UT. January 7, 2004—email communication with Brock Hoegh of HDR Engineering regarding the direct, indirect, and cumulative impacts of the North Corridor Improvement Projects, including Legacy Parkway, within Ogden.

Murphy, Barbara (a). Preservation Planner. State Historic Preservation Office, Salt Lake City. October 19, 2001—letter to Christopher Lizotte, Utah Department of Transportation, regarding Legacy Parkway haul routes for construction.

——— (b). Preservation Planner. State Historic Preservation Office, Salt Lake City. March 8, 2001—letter to Christopher Lizotte, Utah Department of Transportation, regarding submission of ILS documentation for the White House at 650 West State Street, Farmington City, UT.

Parker, Byron (a). Utah Department of Transportation, Salt Lake City. October 30, 2001—letter to Brooks Carter, U.S. Army Corps of Engineers, regarding water quality mitigation measures. .

——— (b). Utah Department of Transportation, Salt Lake City. August 9, 2002—letter to Max Forbush, city manager for Farmington City, regarding the roundabout at intersection of 650 West and State Street, Equestrian Trail Termination at 650 West.

Perkins, Mike. Wildlife biologist. HDR Engineering. November 11, 2003—letter to Anne Axel, wildlife biologist, Utah Department of Water Resources, requesting updated state species lists for the proposed Legacy Parkway study area.

Preston, Robert. Botanist/wetland ecologist. Jones & Stokes, Sacramento, CA. March 24, 2004—letter to Nancy Kang, U.S. Army Corps of Engineers, regarding reverification of the wetland delineation for the Legacy Parkway preferred alternative.

Riffkin, Matt (a). Traffic engineer. InterPlan Co, Midvale, UT. May 2004—telephone conversation with Curt Overcast of HDR Engineering regarding Legacy Parkway traffic volumes.

——— (b). Traffic engineer. InterPlan Co, Midvale, UT. 2004—personal communication with Shanna Moosman/John Lazzara of HDR Engineering regarding traffic numbers.

Sadik-McDonald, H. Environmental scientist. Utah Department of Transportation. February 19, 2004—memorandum to Legacy Parkway Team regarding sample results for lead from Legacy termini.

Sommerkorn, Wilf (a). Director of community and economic development. Davis County, UT. May 6, 2004—personal communication with Laynee Jones of HDR Engineering regarding growth rates in Davis County.

——— (b). Director of community and economic development. Davis County, UT. April 22, 2004—telephone conversation with George Oamek of HDR Engineering regarding development trends in Davis County.

———(c). Director of community and economic development. Davis County, UT. May 3, 2004—telephone conversation with Laynee Jones of HDR Engineering regarding Davis County building permits.

Sorensen, Ella. Wildlife biologist. Utah Department of Transportation, Salt Lake City. 2003—telephone conversation with Ed West of Jones & Stokes regarding yellow-billed cuckoos in the study area.

St. Jeor, Wally. Woods Cross City, UT. February 12, 2004—telephone conversation with Laynee Jones of HDR Engineering regarding Woods Cross City DWSP plans.

Stephens, Tim. Woods Cross City, UT. December 18, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding pre-Legacy land use and current build alternative impacts on current land use.

Stoddard, Scott. U.S. Army Corps of Engineers. March 11, 2004—telephone conversation with Terry Warner of HDR Engineering regarding updates to the Corps floodplain study since 1998.

Thompson, Andy. City Engineer. City of Kaysville, UT. September 25, 2003—email communication with Brock Hoegh of HDR Engineering regarding land use plans with and without the Legacy Parkway.

Toronto, Tom. Farmington City, UT. January 14, 2004—personal communication between Toronto and Brock Hoegh of HDR Engineering regarding Farmington City's trail system.

Uresk, Gary (a). Finance director. Woods Cross City, UT. September 22, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding 2002 operating budget for Woods Cross City.

——— (b). Finance director. Woods Cross City, UT. March 10, 2004—personal communication between Uresk and Katy Spellerberg of HDR Engineering regarding the status of the A-1 Drain Trail.

Watanabe, Judy. Utah State Floodplains Manager. September 18, 2003—telephone conversation with Terry Warner of HDR Engineering regarding FIRM revisions since 2000.

Weber, Thomas. A. Deputy chief of programs. U.S. Department of Agriculture, Natural Resources Conservation Service. April 30, 1999—memorandum to NRCS regional conservationists and state conservationists.

West, David (a). Real estate specialist and Legacy Parkway right-of-way manager. Utah Department of Transportation, Salt Lake City. September 29, 2003—telephone conversation with Boyd Pickering of HDR Engineering regarding Legacy Parkway revised right-of-way impacts and relocation.

——— (b). Real estate specialist and Legacy Parkway right-of-way manager. Utah Department of Transportation, Salt Lake City. March 4, 2004—telephone conversation with George Oamek of HDR Engineering regarding Legacy Parkway revised right-of-way impacts and relocations.

——— (c). Right-of-way manager. Utah Department of Transportation, Salt Lake City. September 2003—telephone conversation with Terry Warner of HDR Engineering regarding Legacy Parkway revised right-of-way acquisitions.

———(d). Real estate specialist and Legacy right-of-way manager. Utah Department of Transportation, Salt Lake City. September 17, 2003—personal communication between West and Mike Perkins of HDR Engineering regarding water rights deed changes during the right-of-way acquisition phase.

Wheelwright, Doug. Deputy planning director. Salt Lake City, UT. March 10, 2004—telephone conversation with Katy Spellerberg of HDR Engineering regarding updates to Salt Lake City's open space plan.

Wood, Rod (a). City Planner. North Salt Lake City, UT. December 18, 2003—telephone conversation with Brock Hoegh of HDR Engineering regarding pre-Legacy land use and current build alternative impacts on current land use.

——— (b). City Planner. North Salt Lake City, UT. December 1, 2003—telephone communication with Brock Hoegh of HDR Engineering regarding acres of undeveloped land along I-215 and Redwood Road.

——— (c). City Planner. North Salt Lake City, UT. January 14, 2004—telephone conversation with Brock Hoegh of HDR Engineering regarding the Hughes and Foxboro trails.

Yoshinaga, Susan. Residential appraiser and supervisor. Greenbelt Division, Salt Lake County Assessor's Office, Salt Lake County, UT. July 17, 2003—telephone conversation with Shawn Frye of HDR Engineering regarding Agricultural Protection Areas.

Additional Literature Reviewed for Water Quality Reevaluation

Burtwell, M. 2001. Assessment of the Performance of Prewetted Salt for Snow Removal and Ice Control. *Transportation Research Record* 1741:68–74. (Paper No. S00-0052.)

Chui, T. W., B. W. Mar, and R. R. Horner. 1982. Pollutant Loading Model for Highway Runoff. *Journal of Environmental Engineering* 108(EE6).

Dahlen, J., and T. Vaa. 2001. Winter Friction Project in Norway. *Transportation Research Record* 1741:34–41. (Paper No. S00-0004.)

Deletic, A. B. and C. T. Maksimovic. 1998. Evaluation of Water Quality Factors in Storm Runoff from Paved Areas. *Journal of Environmental Engineering* 124(9):869–879.

Durrans, S. R. and P. A. Brown. 2001. Estimation and Internet-Based Dissemination of Extreme Rainfall Information. *Transportation Research Record* 1743:41–48.

Fonnesbech, J. K. 2001. Ice Control Technology with 20 Percent Brine on Highways. *Transportation Research Record* 1741:54–59. (Paper No. S00-0036.)

Granato, G. E., C. Zenone, and P.A. Cazenas (eds.). *National Highway Runoff Water-Quality Data and Methodology Synthesis, Volume I–Technical Issues for Monitoring Highway Runoff and Urban Stormwater.* (Federal Highway Administration Report No. FHWA-EP-03-054.) Washington, DC: U.S. Department of Transportation, Federal Highway Administration.

Huber, W. C., P. O. Nelson, N. N. Eldin, K. J. Williamson, and J. R. Lundy. 2001. Environmental Impact of Runoff from Highway Construction and Repair Materials; Project Overview. *Transportation Research Record* 1743:1–9.

Kaighn, Jr., R., and S. L. Yu. 1996. Testing of Roadside Vegetation for Highway Runoff Pollutant Removal. *Transportation Research Record* 1523:116–123.

Kayhanian, M., K. Murphy, L. Regenmorter, and R. Haller. 2001. Characteristics of Storm-Water Runoff from Highway Construction Sites in California. *Transportation Research Record* 1743:33–40.

Kobringer, N.P. 1984. *Sources and Migration of Highway Runoff Pollutants.* Volume 1. (Federal Highway Administration Report No. FHWA/RD-84-057-060.) Milwaukee: Federal Highway Administration, Rexnord, EnviroEnergy Technology Center.

Legret, M. and V. Colandini. 1999. Effects of a Porous Pavement with Reservoir Structure on Runoff Water: Water Quality and Fate of Heavy Metals. *Water Science and Technology* 39(2):111–117.

Lippner, G., J. Johnston, S. Combs, K. Walter, and D. Marx. 2001. Results of California Department of Transportation Litter Management Pilot Study. *Transportation Research Record* 1743:10–15.

Nelson, P. O., K. J. Williamson, M. F. Azizian, P. Thayumanavan, W. C. Huber, and N. N. Eldin. 2001. Environmental Impact of Construction and Repair Materials on Surface Water and Groundwater: Screening and Evaluation Methodology. *Transportation Research Record* 1743:16–24.

Pagotto, C., M. Legret, and P. Le Cloirec. 2000. Comparison of the Hydraulic Behaviour and the Quality of Highway Runoff Water According to the Type of Pavement. *Water Resources* 34(18):4446–4454.

Raukola, T., and M. Terhela. 2001. Do Salting Operations Match Road and Weather Conditions? Results of Finnish Follow-Up Study. *Transportation Research Record* 1741:29–33. (Paper No. S00-0014.)

S. Roger, M. Montrejaud-Vignoles, M. C. Andral, L. Herremans and J. P. Fortune. 1998. Mineral, Physical and Chemical Analysis of the Solid Matter Carried by Motorway Runoff Water. *Water Resources* 32(4):1119–1125.

Sansalone, J. J. and S. G. Buchberger. 1997. Characterization of Solid and Metal Element Distributions in Urban Highway Stormwater. *Water Science and Technology* 36(8–9):155–160.

Shinya, M., T. Tsuchinaga, M. Kitano, Y. Yamada, and M. Ishikawa. 2000. Characterization of Heavy Metals and Polycyclic Aromatic Hydrocarbons in Urban Highway Runoff. *Water Science and Technology* 42(7–8):201–208.

Thayumanavan, P., P. O. Nelson, M. F. Azizian, K. J. Williamson, and J. R. Lundy. 2001. Environmental Impact of Construction and Repair Materials on Surface Water and Groundwater: Detailed Evaluation of Waste-Amended Highway Materials. *Transportation Research Record* 1743:25–32.

Thomas J. Martinelli and Robert R. Blackburn. 2001. Anti-Icing Operations with Prewetted Fine-Graded Salt. *Transportation Research Record* 1741:60–67. (Paper No. S00-0005.)

Wu, J. S., C. J. Allan, W. L. Saunders, and J. B. Evett. 1998. Characterization and Pollutant Loading Estimation for Highway Runoff. *Journal of Environmental Engineering*, 124(7):584–592.

Young, G. K., S. Stein, P. Cole, T. Kammer, F. Graziano, and F. Bank. 1996. Evaluation and Management of Highway Runoff Water Quality. (Federal Highway Administration Report No. FHWA-PD-96-032.)

Acronyms and Abbreviations

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AASHTO	American Association of State Highway and Transportation Officials
ac	acres
ACHP	Advisory Council on Historic Preservation
AM	morning
APE	area of potential effect
AST	Aboveground storage tanks
BARD	Bay Area Refuse Disposal
BLM	Bureau of Land Management
BMPs	Best management practices
BO	biological opinion
BRT	bus rapid transit
C	candidate
CAA	Clean Air Act
CAS	Conservation Agreement Species
CBD	central business district
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CH4	methane
CLHD	Clark Lane Historic District
CMAQ	Congestion Mitigation/Air Quality
CMS	Congestion Management System
CO	carbon monoxide
CO2	carbon dioxide
COE,	U.S. Army Corps of Engineers
Corps	U.S. Army Corps of Engineers
CPIC	community planning information committee
CPIC	community planning information committee
CSS	context-sensitive solution
CWA	federal Clean Water Act
D&RG	Denver & Rio Grande
.dB	decibel
dBA	A-weighted decibel scale
DERR	Division of Environmental Response and Remediation
DMU	diesel multiple units
DoD	Department of Defense
DOI	U.S. Department of the Interior’s
DOT	Departments of Transportation
DWSP	drinking water source protection
E	endangered
EMC	Emissions Control Plan
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	federal Endangered Species Act
FBWMA	Farmington Bay Waterfowl Management Area
FCI	Functional Capacity Index
FCUs	functional capacity units
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration

Acronyms and Abbreviations (Continued)

FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
Final EIS	Final Environmental Impact Statement
FINDS	Facility Index System
FIRM	flood insurance rate maps
FRS	Facility Registry System
ft	foot
FTA	Federal Transit Administration
FTTS	FIFRA/TSCA Tracking System
GIS	geographic information systems
GOPB	Governor's Office of Planning and Budget
GSLE	Great Salt Lake Ecosystem
ha	hectares
HBC	home-based college
HBO	home-based other
HBW	home-based work
HCM	Highway Capacity Manual
HGM	hydrogeomorphic
HOT	high-occupancy toll
HOV	high-occupancy vehicle
HSIS	Highway Safety Information System
HUD	Housing and Urban Development
I-15	Interstate 15
I-215	Interstate 215
ID	identification
IJR	interchange design/justification report
ILS	intensive-level survey
IRCAA	Inter-Regional Corridor Alternatives Analysis
ITS	intelligent transportation systems
JEDI	Justice Economic Dignity and Independence
JVWCD	Jordan Valley Water Conservancy District
km	kilometers
KOPs	key observation points
kph	kilometers per hour
LDS	Church of Jesus Christ of Latter-day Saints
Leq	equivalent sound level
LOS	level of service
LPA	Locally Preferred Alternative
LUST	Leaking underground storage tanks
LWCF	Land and Water Conservation Fund Act
m	meter
MAG	Mountainland Association of Governments
MBTA	Migratory Bird Treaty Act
MCD	multi-county district
mg/kg	milligrams per kilogram
mi	miles
MINES	Open or closed mines
MIS	Major Investment Study
MOA	memorandum of agreement
mpg	miles per gallon
MPO	metropolitan planning organization

Acronyms and Abbreviations (Continued)

MSAT	mobile-source air toxics
MSID	Modified Stratified Iterative Dis-aggregation
MTMCTEA	Military Traffic Management Command Transportation Engineering Agency
N2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHB	non-home-based
NHPA	National Historic Preservation Act
NO	nitric oxide
NO2	nitrogen dioxide
NOI	notice of intent
NOx	nitrogen oxides
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O3	ozone
OHV	Off-Highway Vehicle
OSHA	Occupational Safety and Health Administration
P	proposed for listing
Pb	lead
PCEs	passenger-car equivalents
Pcphpl	passenger car equivalents per hour per lane
pcpl	passenger car equivalents per lane
PM	particulate matter
PM10	PM with a diameter of 10 microns or less
PM2.5	2.5 microns or less
Preserve	Legacy Nature Preserve
QA/QC	quality assurance/quality control
RCRIS	Resource Conservation and Recovery Information System
RCRIS-LQG	Large-Quantity Generators
RCRIS-SQG	Small-Quantity Generators
RCRIS-TSDF	Treatment, Storage, or Disposal Facilities
ROD	Records of Decision
RP	Reference Post
SCDOT	South Carolina Department of Transportation
SE	Substantial Exceedance
SHPO	State Historic Preservation Office
SID	Stratified Iterative Dis-aggregation
SL impact	Sound Level
SOR	statement of responsibilities
SOV	single-occupancy vehicles
SOx	oxides of sulfur
SPC	State of Utah species of special concern
sq ft	square feet

Acronyms and Abbreviations (Continued)

sq m	square meters
STRAHNET	Strategic Highway Network
STT	science technical team
Supplemental EIS	supplemental environmental impact
SVOCs	semivolatile organic compounds
SWANCC	Solid Waste Agency of Northern Cook
SWLF	Solid Waste Landfills database
T	threatened
TAZ	Traffic Analysis Zone
TCPU	transportation, communications, and public utilities
TCRIS	Toxic Chemicals Release Inventory System
TDM	transportation demand management
TDS	total dissolved solids
TEA-21	Transportation Equity Act
TNM	FHWA traffic noise model
TOD	transit-oriented development
TSCA	Toxic Substance Control Act
TSM	transportation systems management
TSS	Total suspended solids
UBT	Utahns for Better Transportation
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation
UPDES	Utah Pollutant Discharge Elimination System
UPED	Utah Process of Economic and Demographic
UPRR	Union Pacific Railroad
URAA	Uniform Relocation Assistance and Real Property Acquisition Policies Act
URMCC	Utah Reclamation Mitigation Conservation Commission
US-89	U.S. Highway 89
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USIECR	U.S. Institute for Environmental Conflict Resolution
UST	Underground storage tanks
UTA	Utah Transit Authority
VMT	vehicle-miles traveled
VOC	volatile organic compounds
WBWCD	Weber Basin Water Conservancy District
WFRC	Wasatch Front Regional Council
WTT	wildlife technical team

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Technical Appendices

Appendix A

Consultation and Coordination

Appendix A

Consultation and Coordination

This appendix contains a summary of correspondence and consultation pertinent to this Supplemental EIS and its preparation. The contents are listed in chronological order.

Date	From	To	Regarding
September 16, 1999	Utah Department of Transportation	Utah Division of Parks and Recreation	Agreement for Section 4(f) and 6(f) Land Exchange
June 22, 2000	Federal Highway Administration	State Historic Preservation Office	Section 106 Memorandum of Agreement Regarding Legacy Parkway Project
February 21, 2001	Christopher Lizotte (Utah Department of Transportation)	Barbara L. Murphy (State Historic Preservation Office)	Submission of ILS Documentation for 650 West State Street, Farmington
March 8, 2001	Barbara L. Murphy (State Historic Preservation Office)	Christopher Lizotte (Department of Transportation)	ILS Documentation for 650 West State Street, Farmington
September 20, 2001	Christopher Lizotte (Utah Department of Transportation)	Barbara Murphy (State Historic Preservation Office)	Legacy Parkway Haul Routes for Construction
October 19, 2001	Barbara Murphy (State Historic Preservation Office)	Christopher Lizotte (Utah Department of Transportation)	Legacy Parkway Haul Routes for Construction
August 9, 2002	Byron Parker (Utah Department of Transportation)	Max Forbush (Farmington City)	Roundabout at Intersection of 650 West and State Street, Equestrian Trail Termination at 650 West
August 30, 2002	David Connors (Farmington City)	Byron Parker (Utah Department of Transportation)	Roundabout at Intersection of 650 West and State Street
January 24, 2003	David Gibbs (Federal Highway Administration) and Brooks Carter (U.S. Army Corps of Engineers)	Robert Roberts (Environmental Protection Agency) Lee Waddleton (Federal Transit Administration) Ralph Morgenweck (U.S. Fish and Wildlife Service)	February 21, 2003, Meeting Invitation and Cooperating Agency Request

Date	From	To	Regarding
April 11, 2003	Nancy Kang (U.S. Army Corps of Engineers)	See List of Recipients following letter	Invitation to Participate in Environmental Scoping Process
April 17, 2003	Chadwick Greenhalgh (Clark Lane Historic District)	Federal Highway Administration	Request for Review of Potential Construction Effects on Historic District
May 2, 2003	Henry Maddux (U.S. Fish and Wildlife Service)	Greg Punske (Federal Highway Administration)	Comments on Notice of Intent
May 20, 2003	Mary Henry (U.S. Fish and Wildlife Service)	David Gibbs (Federal Highway Administration)	Acceptance of Invitation to Be a Cooperating Agency
June 10, 2003	Leon Bear, THPO Skull Valley Band of Gosiute Indians	Greg Punske, (Federal Highway Administration)	Scoping Comments
June 13, 2003	Nancy Kang (U.S. Army Corps of Engineers)	See List of Local Government Recipients (following letter)	Participation Opportunities in Preparation of Supplemental Environmental Impact Statement
June 13, 2003	Nancy Kang (U.S. Army Corps of Engineers)	See List of Recipients (following letter)	Participation Opportunities in Preparation of Supplemental Environmental Impact Statement
October 2, 2003	Nancy Kang (U.S. Army Corps of Engineers)	Nancy Keate (Utah Department of Natural Resources)	Review of Revised Wetland Section
November 18, 2003	Mike Perkins (Legacy Parkway Team)	Field Supervisor (U.S. Fish and Wildlife Service)	Environmental Re-Evaluation of Final Environmental Impact Statement
December 3, 2003	Henry Maddux (U.S. Fish and Wildlife Service)	Mike Perkins (Legacy Parkway Team)	Environmental Re-Evaluation of Final Environmental Impact Statement
July 15, 2004	Utah Department of Transportation and Utah Transit Authority		Weber County to Salt Lake City Commuter Rail Project Partnering Charter
September 23, 2004	Mark W. Franc (Bountiful City Engineering Department)	John Thomas (Utah Department of Transportation)	Bountiful Recreation Pond South of Bountiful Sanitary Landfill
November 3, 2004	Federal Highway Administration and Utah Department of Transportation	Wilson Martin (State Historic Preservation Office)	Determination of Eligibility and Finding of Effect for Legacy Parkway
November 4, 2004	Federal Highway Administration	State Historic Preservation Office	Draft Memorandum of Agreement Regarding the Legacy Parkway Project

Date	From	To	Regarding
November 4, 2004	Ray Grow (Natural Resources Conservation Service)	Laynee Jones (Legacy Parkway Team)	Farmland Conversion Impact Rating for Corridor Type Projects
November 8, 2004	Nancy Kang (U.S. Army Corps of Engineers)	John Thomas (Utah Department of Transportation)	Reverification of Wetland Delineation

AGREEMENT

THE UNDERSIGNED hereby agree to the following:

UTAH DEPARTMENT OF TRANSPORTATION (UDOT) has taken possession of the following described property which it acquired for exchange of land owned by the Utah Division of Parks and Recreation(DPR) further identified as the "Jordan River OHV Park" located between I-215 and the Jordan River, approximately 2600 North Rosepark Lane, Salt Lake City, Salt Lake County, Utah.

The legal description of the "UDOT parcel(s)" are attached to and made part of this Agreement and identified as Parcel No. 0067:1B and 0067:1D.

It is understood and agreed that "DRP"will transfer title to "UDOT" those certain lands identified by the Utah Department of Transportation under the "Legacy Parkway" project as needed for right of way from the area of the "Jordan River OHV Park," identified as 4F and 6F properties. Said exchange will take place when the following conditions are met: 1) A "Record of Decision"(ROD) is received from the Federal Highway Administration which (a) approves an alignment which would require the acquisition of the property subject to this agreement.

It is understood and agreed that said exchange will be based upon acreage for acreage. Excess land remaining, if any; from the parcel 1B/1D exchange will be acquired by "DPR" at the purchase price "UDOT" paid of $14,000 per acre, provided that the exchange occurs within the 5 year time frame contemplated under this agreement, and/or exchanged for certain parcels of land identified and agreed upon by both parties to this agreement. Transfer of titles between said parties will be by "Quit Claim Deed."

It is understood and agreed that if the conditions for acquisition are not met within 5 years from the date this agreement is signed, the "DPR" agrees to acquire the properties at the current "Fair Market Value" at time of transfer of title, and/or exchange for certain parcels of lands identified and agreed upon by both parties to this agreement. Said exchange will be based upon "value for value" at the "current fair market value," at time of transfer of title.

"UDOT" agrees to allow the "DPR" to lease parcel 0067:1B and 0067:1D for $1.00 per year, commencing at the date this agreement is signed. Said "DPR" agrees not to sublease, encumber or to construct permanent structures or change the characteristic of the property without the written permission of UDOT.

Witness the hands of said UNDERSIGNED DATED this 16th day of SEPT 1999

Courtland Nelson

Utah Division of Parks and Recreation (DPR)

STATE OF UTAL)
) ss.
COUNTY OF SL)

On the date first above written personally appeared before me,

COURTLAND NELSON signer__ of the within instrument, who duly acknowledge to me that _he_ executed the same.

Lana Hadlock

NOTARY PUBLIC

Residing at: SALT LAKE CITY

LANA HADLOCK
Notary Public
State of Utah
My Comm. Expires Dec 15, 1999
[illegible] SLC UT 84116

****

Utah Department of Transportation (UDOT)

STATE OF UTAH)
) ss.
COUNTY OF SL)

On the date first above written personally appeared before me,

LYLE MC MILLAN signer__ of the within instrument, who duly acknowledge to me that _he_ executed the same.

Doris H. Fleming

NOTARY PUBLIC

Residing at: SALT LAKE CITY

Salt Lake County

Parcel No. 0067:1B:T
Project No. SP-0067( )0

in Salt Lake County, State of Utah, to-wit:

An undivided 58.45% interest in two tracts of land in fee, being all of an entire tract of property situate in the NW¼SW¼ and the W½NW¼ of Section 15, T. 1 N., R. 1 W., S.L.B & M. The boundaries of said tracts of land are described as follows:

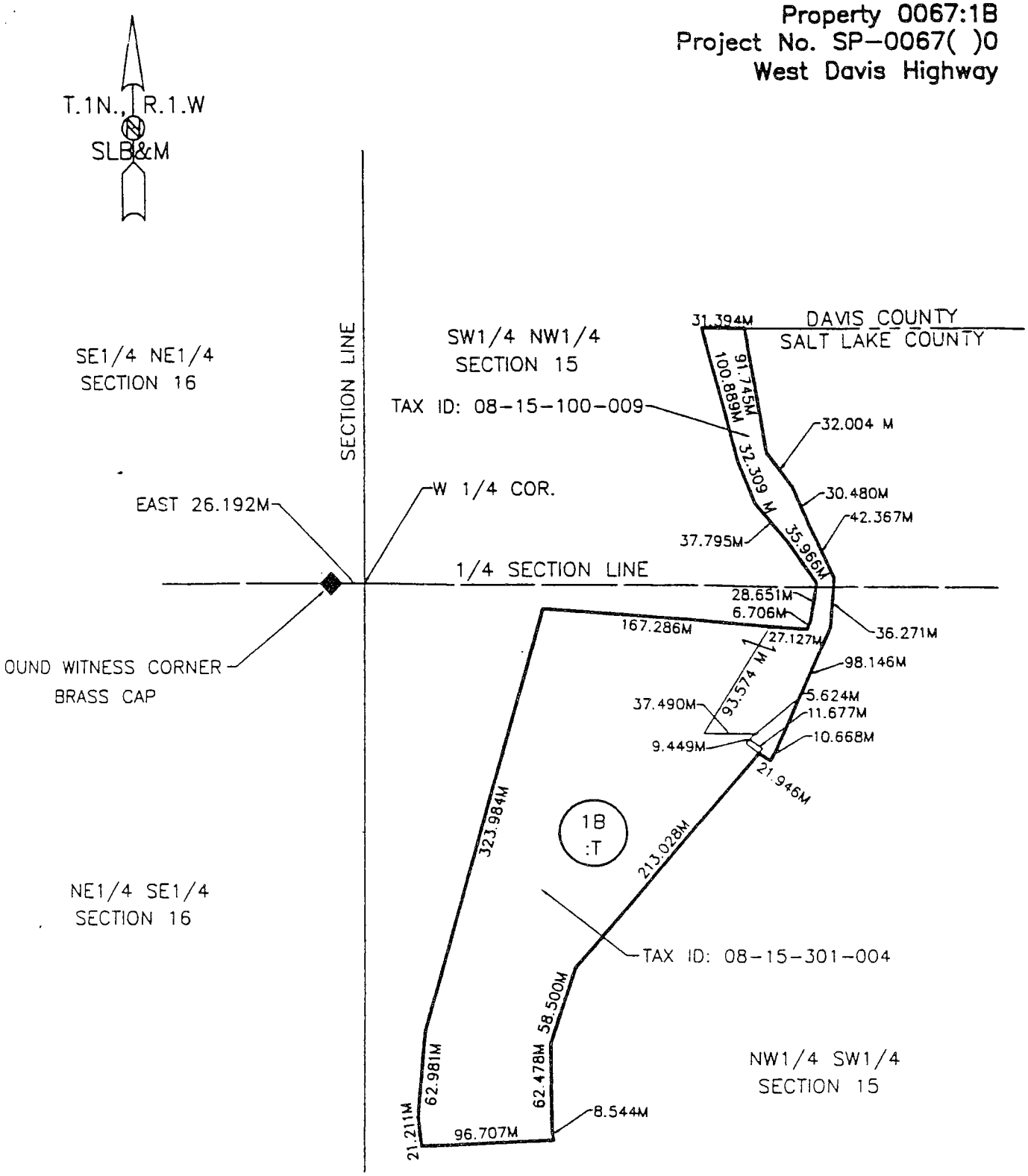
Beginning at a Northwest corner of said entire tract, which point is 19.970 m (65.52 ft.) S 0°33'38" E and 129.378 m (424.47 ft.) N 89°26'22" E from the West Quarter corner of said Section 15; running thence S 85°45'40" E 167.286 m (548.84 ft.) along a northerly boundary line of said entire tract; thence S 31°45'49" W 93.574 m (307.00 ft.) along a southeasterly boundary line of said entire tract; thence N 89°45'49" E 37.490 m (123.00 ft.) along a northerly boundary line of said entire tract; thence S 38°42'49" W 5.624 m (18.45 ft.) along a southeasterly boundary line of said entire tract; thence S 55°38'54" E 11.677 m (38.31 ft.) along a northeasterly boundary line of said entire tract to the east bank of the original Jordan River, also being the easterly boundary line of said entire tract; thence along said easterly boundary line the following four (4) courses and distances: (1) S 40°19'42" W 213.028 m (698.91 ft.); thence (2) S 17°40'52" W 58.500 m (191.93 ft.); thence (3) S 0°46'35" E 62.478 m (204.98 ft.); thence (4) S 8°35'36" E 8.544m (28.03 ft.); thence S 87°30'00" W 96.707 m (317.28 ft.) along the southerly boundary line of said entire tract to an easterly right of way fence line of the existing frontage road of record; thence along said easterly right of way fence line the following three (3) courses and distances: (1) N 7°10'48" W 21.211 m (69.59 ft.); thence (2) N 4°32'07" E 62.981 m (206.63 ft.); (3) N 15°30'22" E 323.984 m (1,062.94 ft.) to the point of beginning. The above described tract of land contains 51,070.9 square meters (12.62 acres), more or less.

ALSO:

Beginning at a northwest corner of said entire tract at a point 268.834 m (882 ft.) east and 168.554 m (553 ft.) north (by record, but measures 246.5 m (808.73 ft.) east and 186.2 m (610.85 ft.) north) from said West Quarter corner of Section 15; running thence along a westerly boundary line of said entire tract the following six (6) courses: (1) S 15°07' E 100.889 m (331 ft.); thence (2) S 22°20' E 32.309 m (106 ft.); thence (3) S 40°49' E 37.795 m (124 ft.); thence (4) S 35°40' E 35.966 m (118 ft.); thence (5) S 8°40' W 28.651 m (94 ft.); thence (6) S 26°56' W 6.706 m (22 ft.); thence N 85°30' W 27.127 m (89 ft.) along a northerly boundary line of said entire tract; thence S 32° W 93.574 m (307 ft.) along a northwesterly boundary line of said entire tract; thence East 37.490 m (123 ft.) along a south boundary line of said entire tract; thence S 38°57' W 9.449 m (31 ft.), more or less, along a northwesterly boundary line of said entire tract; thence S 54° E 21.946 m (72 ft.) to an easterly boundary line of said tract; thence along said easterly boundary line the following seven (7) courses: (1) N 28°01' E 10.668 m (35 ft.); thence (2) N 24°02' E 98.146 m (322 ft.); thence (3) N 4°29' E 36.271 m (119 ft.); thence (4) N 25°40' W 42.367 m (139 ft.); thence (5) N 23°58' W 30.480 m (100 ft.); thence (6) N 37°16' W 32.004 m (105 ft.); thence (7) N 9°48' W 91.745 m (301 ft.), more or less, to a north boundary line of said entire tract; thence West 31.394 m (103 ft.), more or less, along said north boundary line to the point of beginning. The above described tract of land contains 9,712.4 square meters (2.40 acres), more or less.

Both tracts of land contain a total of 60,783.3 square meters (15.02 acres), more or less.

Property 0067:1B
Project No. SP-0067( )0
West Davis Highway



WNER:	LAWRY J. BOWDEN, 58.45%; CHRIS J. BOWDEN, 13.85%						
WNER:	JAMES J. BOWDEN, 13.85%; NANCY BOWDEN REGIER, 13.85%.						
'CEL NO.	NET SQ. m	SQ. FT.	ACRES	EXIST. R/W SQ. m IN DEED	OWNERSHIP SQ. m	REMAINING SQ. m LEFT	REMAINING SQ. m RIGHT
7:1B:T	60,783.3	654,271.2	15.02	NONE	60,783.3	NONE	NONE

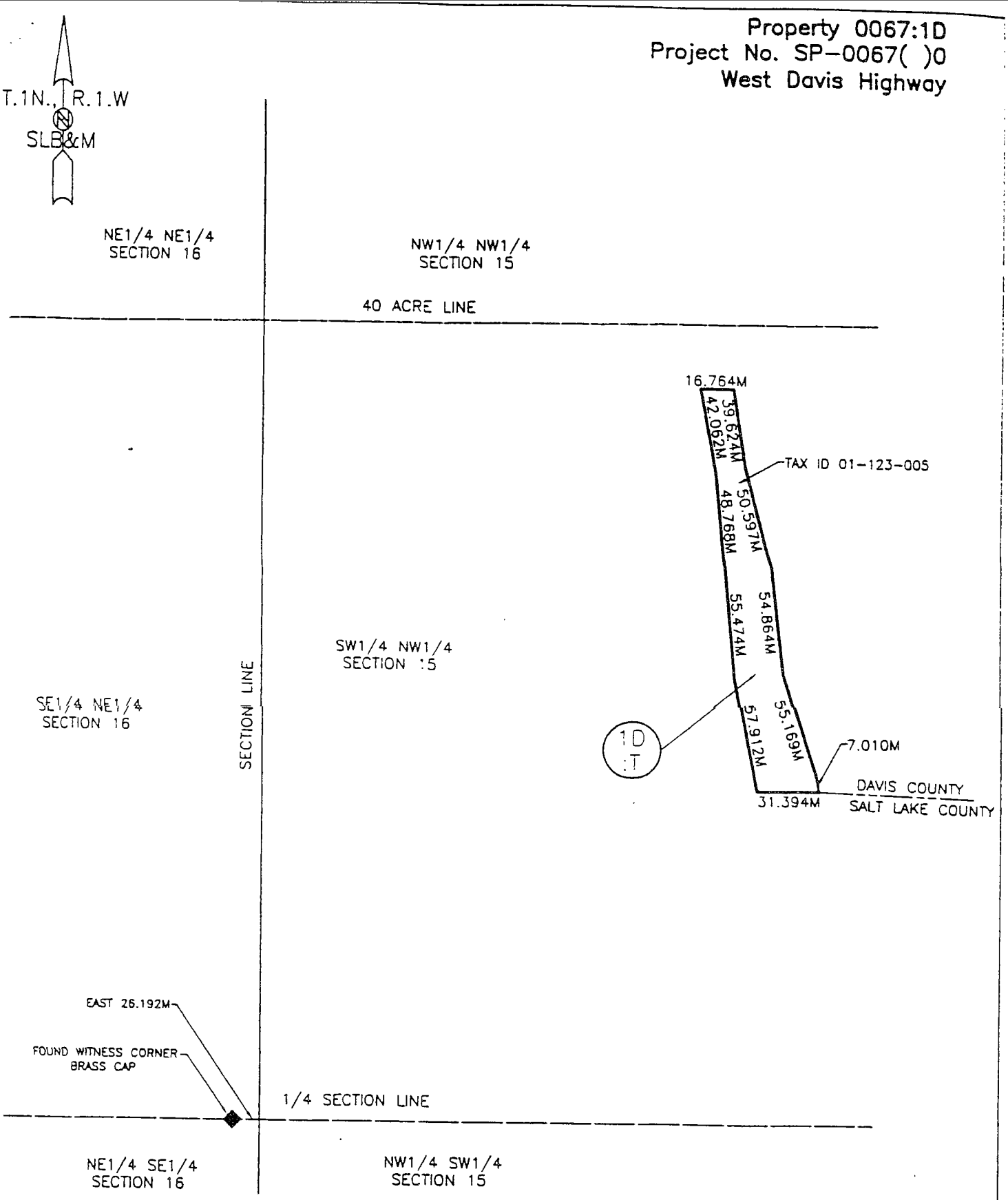
in Davis County, State of Utah, to-wit:

An undivided 58.45% interest in a tract of land in fee, being all of an entire tract of property situate in the SW¼NW¼ of Section 15, T. 1 N., R. 1 W., S.L.B & M. The boundaries of said tract of land are described as follows:

Beginning in the south line of Davis County at the southwest corner of said entire tract at a point 3.048 (10 ft.) east of a county boundary monument. Said point of beginning is also 268.834 m (882 ft.) east and 168.554 m (553 ft.) north (by record, but measures 246.5 m (808.73 ft.) east and 186.2 m (610.85 ft.) north) from the West Quarter corner of said Section 15; running thence along the westerly boundary line of said entire tract, and along the west bank of the abandoned Jordan River channel the following four (4) courses and distances: (1) N 11°07' W 57.912 m (190 ft.); thence (2) N 5°25' W 55.474 m (182 ft.); thence (3) N 6°14' W 48.768 m (160 ft.); thence (4) N 11°15' W 42.062 m (138 ft.), more or less, to the north boundary fence line of said entire tract, adjoining the Clyde S. Hill, et.al., property; thence East 16.764 m (55 ft.) along said north boundary fence line to the easterly boundary line of said entire tract, which is the east bank of said abandoned Jordan River channel; thence along said easterly boundary line and east bank the following five (5) courses and distances: (1) S 9°29' E 39.624 m (130 ft.); thence (2) S 15°59' E 50.597 m (166 ft.); thence (3) S 6°41' E 54.864 m (180 ft.); thence (4) S 17°31' E 55.169 m (181 ft.); thence (5) S 9°48' E 7.010 m (23 ft.), more or less, to said county line; thence West 31.394 m (103 ft.) along said county line to the point of beginning. The above described tract of land contains 4,653.8 square meters (1.15 acres), more or less.

Together with any and all water rights appurtenant to the above described tract of land.

Property 0067:1D
Project No. SP-0067( )0
West Davis Highway



OWNER: LAWRY J. BOWDEN, 58.45%; CHRIS J. BOWDEN, 13.85%; JAMES J. BOWDEN, 13.85%;
OWNER: NANCY BOWDEN REGIER, 13.85%.

ARCEL NO.	NET SQ. m	SQ. FT.	ACRES	EXIST. R/W SQ. m IN DEED	OWNERSHIP SQ. m	REMAINING SQ. m	
						LEFT	RIGHT
)67:1:D	4,653.8	50,094.0	1.15	NONE	4,653.8	NONE	NONE

Appendix O

Section 106 Memorandum of Agreement Regarding the Legacy Parkway Project

Signers:

Advisory Council on Historic Preservation

Federal Highways Administration

Utah State Historic Preservation Officer

Utah Department of Transportation

Utah Division of Indian Affairs

Tribal Concurrence:

The Northwest Band of Shoshoni of Idaho and Utah

The Shoshone Bannock Tribes of Idaho

The Ute Indian Tribe (of the Uintah-Ouray Agency)

Confederated Tribes of the Goshute (Ibapah)

Skull Valley Goshute Tribe

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

JUN 21 2000

Mr. David C. Gibbs, P.E.
Division Administrator
Federal Highway Administration
2520 West 4700 South, Suite 9A
Salt Lake City, UT 84118-1847

REF: Legacy Parkway
Project No. SP-0067( )
Davis and Salt Lake Counties, Utah

Dear Mr. Gibbs:

Enclosed are your copies of the fully executed Memorandum of Agreement for the referenced project. By carrying out the terms of the Agreement, you will have fulfilled your responsibilities under Section 106 of the National Historic Preservation Act and the Council's regulations for this project. We recommend that you also provide a copy of the fully-executed agreement to the Utah State Historic Preservation Officer, the Utah Department of Transportation, the Utah Division of Indian Affairs, the Northwest Band of Shoshoni, the Shoshone Bannock Tribe, the Ute Indian Tribe, the Confederated Tribes of the Goshute, and the Skull Valley Goshute Tribe. We have retained an original version of the agreement in this office where it will remain on file.

Should you have need to discuss this matter further, you may contact MaryAnn Naber at (202) 606-8534. We appreciate your cooperation.

Sincerely,

for Don L. Klima
Director
Office of Program Review

Enclosure

MEMORANDUM OF AGREEMENT REGARDING THE LEGACY PARKWAY PROJECT

WHEREAS, the Federal Highway Administration Utah Division has determined that the Legacy Parkway Project between the I-215 Interchange, northern Salt Lake County, Utah and Burton Lane north of Farmington, Davis County, Utah (hereinafter called the Project) will have an effect upon **42DV2, 42DV70, and 10N 650 W. Clark Lane Farmington, Utah** properties included in or eligible for inclusion in, the National Register of Historic Places, and has consulted with the Utah State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f) and Section 4(f) of the Department of Transportation Act of 1966 (23 CFR 771.135); and

WHEREAS, the Project constitutes a federal action and requires compliance under federal statutory requirements; and the Federal Highway Administration, Utah Division (hereinafter called the FHWA) is the lead Federal Agency, will carry out the terms of this agreement (hereinafter called Agreement); and

WHEREAS, the Utah Department of Transportation (UDOT) is the agency coordinating this project, and has participated in the consultation, and been invited to concur in this Memorandum of Agreement (MOA); and

WHEREAS, the FHWA and UDOT recognize that the Shoshone Bannock Tribes of Idaho are a sovereign government located outside the exterior boundaries of the State of Utah, and that technical and government to government consultation will be directly with the Shoshone Bannock Tribes of Idaho ; and

WHEREAS, the Project is large and complex, with a potential for the discovery of additional properties eligible for inclusion in, the National Register of Historic Places, the UDOT intends to use the provisions of this Agreement to address all activities that may result in impacts to both known and inadvertently discovered historic properties; and

WHEREAS, the Project area of potential effect (hereinafter called APE) for this undertaking includes all lands subject to project activities or activities directly funded by the Project as delineated in Appendix A.

WHEREAS, All areas within the APE were surveyed for cultural resources as detailed in ***A Cultural Resources Inventory of the proposed Legacy/West Davis Highway in Davis and Salt Lake Counties Utah (Colman and Colman 1998)***; and

WHEREAS, the Northwest Band of Shoshone of Idaho and Utah the, the Ute Indian Tribe of the Uintah-Ouray, Utah, Confederated Tribes of the Goshute (Ibapah), Utah, the Skull Valley Goshute Tribe and the Shoshone Bannock Tribes of Idaho (hereafter called Tribes) participated in the technical coordination and consultation and have been invited to concur in this Memorandum of Agreement; and

WHEREAS, the Utah Division of Indian Affairs (DIA) is the agency responsible for Native American graves protection and repatriation for the State of Utah and the tribes located in the State of Utah, which has participated in the consultation and has been invited to be party to this Memorandum of Agreement; and

WHEREAS, the consulting parties have considered the applicable requirements of the Utah Native American Graves Protection and Repatriation Act of 1992 (U.C.A. 9-9-401, et seq., hereinafter called NAGPRA, and its implementing Rule R230-1), and the Utah Code 76-9-704, in the course of consultation; and

WHEREAS, the parties to this agreement recognize that every reasonable effort should be made to protect, from possible harm by the project, Traditional Cultural Properties it is incumbent upon the tribes, or such interested party(ies), to identify any TCP's believed to exist within the project APE.

WHEREAS, the definitions given in Appendix B are applicable throughout this Memorandum of Agreement; and

NOW, THEREFORE, the FHWA, the Utah SHPO, and the Council agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of Legacy Parkway Project on historic properties.

STIPULATIONS

The FHWA, shall ensure that the following measures are carried out:

I. MITIGATION OF PROJECT IMPACTS TO KNOWN SITES: 42DV2, 42DV70, and 10N 650 W. Clark Lane Farmington, Utah.

A. Historic Structures

The UDOT, or its consultant will complete a Full Utah Intensive Level Survey Form (ILS) form for each eligible and contributory structure.

1. Photographs: Photographs are required of all buildings or structures on the property at 10N 650 W. Clark Lane Farmington, Utah.. This means at least one photograph of all elevations, of professional quality black/white 35 millimeter photographs (3x5 prints with accompanying negatives) to show all exterior elevations (where possible to obtain all elevations), the street scape, and detailed photographs of all areas to be impacted by the adverse effect. Photographs of exterior architectural trim/decorations shall be

submitted. Photographs shall be numbered and labeled with address (street and city) and date the photograph was taken, and keyed to a site plan and floor plan. All prints and negatives shall be submitted in archival quality protective storage pages.

2. Drawings: Sketch floor plans of all eligible buildings on the properties at 10N 650 W. Clark Lane Farmington, Utah shall be submitted. The plans must be based on an accurate footprint (e.g., Sanborn maps, tax card drawings, or measurements taken on site) and show all existing construction. Rooms shall be labeled by use. These non-measured drawings are to be on 8.5 " x 11 " or 11 " x 17" sheets. A site sketch plan showing subject buildings and all out buildings is also required.

3. Research Materials: A legible photocopy of the entire historic tax card of the property and a 5x7 inch black and white, 35mm print and negative of the historic tax card photo shall be submitted. Label and submit print and negative as described above.

4. Repository: All materials shall be submitted to the Division of State History, Historic Preservation Office to be placed on file.

B. Archaeological Sites

1. Data recovery: The FHWA shall ensure that a data recovery plan is developed in consultation with the SHPO for the recovery of archeological data from 42DV2, and 42DV70. The plan shall be consistent with the Secretary of the Interior's Standards and Guidelines for Archeological Documentation (48 FR 44734-37) and take into account the Council's publication, Treatment of Archeological Properties (Advisory Council on Historic Preservation, 1980), subject to any pertinent revisions the Council may make in the publication prior to completion of the data recovery plan and to relevant SHPO or other guidance. It shall specify, at a minimum:

   a. the research questions to be addressed through the data recovery, with an explanation of their relevance and importance;

   b. the methods to be used, with an explanation of their relevance to the research questions;

   c. the methods to be used in analysis, data management, and

dissemination of data, including a schedule;

d. the proposed disposition of recovered materials and records;

e. proposed methods for involving the interested public in the data recovery;

f. proposed methods for disseminating results of the work to the interested public;

g. proposed methods by which the tribes or other interested parties will be kept informed of the work and afforded the opportunity to participate;

h. a proposed schedule for the submission of progress reports to the SHPO, the Council, and the tribes at their request; and

i. The data recovery plan shall be submitted by the UDOT to the SHPO, and also to the tribes at their request, for 30 days review. Unless these parties object within 30 days after receipt of the plan, the FHWA through the UDOT shall ensure that it is implemented.

C. Reporting: The FHWA shall ensure that any/all reports on activities carried out pursuant to this agreement are provided to the SHPO, the Council, and upon request, to the Tribes or any other interested parties, following completion of the activities stipulated in the agreement.

D. Personnel Qualifications: The FHWA shall ensure that all historic work carried out pursuant to this agreement is completed by or under the direct supervision of a person or persons meeting or exceeding the Secretary of interior's Standards for History or Archaeology as appropriate (36 CFR 61 Appendix A).

II. THE PLAN OF ACTION FOR INADVERTENT DISCOVERY OF CULTURAL RESOURCES

The UDOT has developed a plan of action in consultation with the Tribes and SHPO regarding inadvertent discovery, of historic properties potentially eligible to the NRHP. The plan detailed below describes

coordinating efforts among UDOT, the Tribes, and USHPO; assessment of effects to historic properties (not affecting Utah NAGPRA related issues); inventory and evaluation process; treatment of TCPs, identified within the APE and mitigation strategies.

A. In the Event that cultural resources are discovered:

1. work will stop in the immediate area of the discovery in accordance with UDOT Standard Specification 104.15 as detailed in Appendix D. The UDOT will notify the parties to the Agreement.

2. The discovered resources will be evaluated for NRHP eligibility.

   a. The UDOT will initiate internal coordination with their contractor.

      (1) Designated contractor will prepare draft inventory reports and recommendations regarding the NRHP eligibility of identified properties.

      (2) Content and scope of Draft and final report(s) on the results of the evaluation studies will follow state guidelines as found in the UDOT's Consultant Guidelines.

   b. In consultation with USHPO, the UDOT will apply the NRHP criteria (36 CFR 60.4) to all archaeological cultural resources discovered during the project with regard to their potential for inclusion in the NRHP. This evaluation shall take into account the guidance found in all applicable National Register Bulletins.

3. Determinations of effect will be made for all discovered NRHP eligible properties.

   a. In situations affecting historic properties, application of the criteria of effect and adverse effect described in 36 CFR 800.9 (a) and (b) will be implemented.

   b. A Determination of Eligibility and Finding of Effect (DOE-FOE) will be submitted to the USHPO and to the Tribes along with appropriate documents relative to the stipulations of this Agreement.

4. Treating Effects

a. If the undertaking might affect historic properties as defined by 36 CFR 800.2 (e), the UDOT, will develop site specific treatment plans to minimize or mitigate the effects of the historic properties located within the area of the discovery in coordination with the USHPO, the Tribes, and other interested parties as follows:

(1) Human remains and the associated cultural items will be treated in accordance with the Utah NAGPRA (See Appendix C of this Agreement).

(2) The preferred alternative to mitigation is avoidance of impact to historic properties.

(3) Project redesign will be implemented when technically, economically, and environmentally feasible, to avoid the placement of the facility, or related construction activities in a manner that may affect historic properties.

(4) Development of site-specific mitigation plans/strategies for individual areas of effect will include:

(a) full analysis and documentation of the materials and data resulting from the studies according to a Research Design drafted in consultation with the SHPO.

(b) Submition of appropriate documents relative to the stipulations of this Agreement to the USHPO and to the Tribes.

(c) All properties identified during the inventory will be recorded or updated on Utah cultural resources inventory forms. Inventories completed after the initial scope of work is completed will follow the stipulations established in this document. All site documents, except as noted in Section III E,

will be included with each report as a detached appendix that is not available for public distribution in accordance with this Agreement and other statutory obligations including ARPA (43 CFR 7.18).

III. ADMINISTRATIVE STIPULATIONS

A. Changes in the undertaking.

1. Changes in the Project will not relieve the UDOT of the responsibility of completing resource evaluations.

2. If, during the Project planning or implementation, modification and/or changes in the undertaking are proposed in ancillary areas that have not been previously inventoried for historic properties, the UDOT shall ensure that the area is inventoried and that historic properties are evaluated in a manner consistent with the inventory, evaluation, and standards identified in this Agreement. The UDOT will prepare a draft report(s) of the inventory results and submit said document(s) to the parties of this Agreement for review and comment. A final report incorporating the comments of the said parties will be prepared. Final reports will be provided to the parties of this Agreement.

3. The applicable Research Design shall be modified or appended, as appropriate by the contractor (s) under the direction of the UDOT, in consultation with USHPO, to incorporate treatment and management measures for previously unevaluated historic properties consistent with the Agreement. The Tribes may request participation to review and comment on the Research Design upon written notice to the UDOT.

4. The parties to this Agreement shall be afforded an opportunity to comment within 30 days on documents prepared in response to revisions to the undertaking.

B. Tribal Consultation Process

Tribal Consultation will occur between the UDOT and the Tribes throughout the project. In general, consultation will take place on two levels: Technical Interaction and Formal Government to Government

Consultation.

1. Technical Interaction. This means coordination between the technical staff of the parties to this Agreement. Such interaction may occur through communication by informal means, i.e. telephone conversations, etc. and/or formal interaction and correspondence. This level also may include seeking advise and opinion from other governmental agencies that share an interest or responsibility.

2. Formal Government to Government Consultation. Government to Government Consultation is considered consultation by definition. This involves interaction and communication between the policy/decision maker representatives of the parties to this Agreement, such as the UDOT, USHPO, ACHP, the Utah Division of Indian Affairs, and the respective Tribes. This process will be initiated by formal correspondence/notification as required by Utah NAGPRA or other applicable laws. At this point, after formal notification, the technical staff shall advise the government level representatives of the issue and make recommendations toward a viable decision/resolution.

C. Traditional Cultural Properties (TCP's)

1. If a TCP is identified to the UDOT, the UDOT and/or its contractor shall immediately secure the identified site from any potential impacts and notify the SHPO of such TCP. SHPO notification will occur within I working day. The UDOT and/or its contractor shall make an initial determination of possible effect to the identified TCP, and take reasonable steps to protect the TCP. Consultation with the affected tribal interest will be initiated. At the discretion of the UDOT and the party that identified the TCP, a formal consultation process, as described in section III B, may be utilized in this effort. If a dispute results, the Dispute Resolution described in section III G will be initiated.

2. In accordance with Section III A(5), if the party identifying the TCP provides the UDOT with a written request to safeguard the confidentiality of the identified TCP, the UDOT will make every reasonable effort to protect the confidentiality of the identified TCP.

D. Curation

1. Cultural material (artifact) curation. Upon discovery and gathering of cultural items within the Project APE, exclusive of Utah NAGPRA items as defined by that act, the UDOT will ensure that the items will be placed in an appropriate repository facility as described in 36 CFR 79.

2. Reporting and documentation curation. Upon the UDOT finalizing the documentation of the Project, all reports and documentation will accompany the cultural material consistent with the provisions described in 36 CFR 79. Upon written request of the Tribes, a copy of said documentation shall be provided for the tribal archives.

3. The cultural material, records, and other material resulting from the implementation of this Agreement and the Project will be subject to the provisions of the Freedom of Information Act, unless otherwise specified within this Agreement.

E. Confidential Safeguards

In accordance with 36 CFR 79 AND Section 304 of the National Historic Preservation Act, all applicable information will be safeguarded and not provided to the general public.

F. Public Participation

1. The UDOT will afford interested parties with an adequate opportunity to receive information and to express their views regarding the Project. Public notice will be coordinated through NEPA as articulated in 23 CFR 771.

G. Dispute Resolution

1. Should the USHPO, the tribes,or DIA, or the Council, object within 30 days to any documentation provided for review pursuant to this agreement, the UDOT shall consult with the objecting party to resolve the objection. If the UDOT determines that the objection cannot be resolved, the UDOT shall request the further comments of the Council pursuant to 36 CFR § 800.6(b). Any Council comment provided in response to such a request will be taken into account by the UDOT in accordance with 36 CFR § 800.6(c)(2) with reference only to the subject of the dispute; the UDOT 's

responsibility to carry out all actions under this agreement that are not the subjects of the dispute will remain unchanged.

2. The Utah Division of Indian Affairs State NAGPRA Review Committee will arbitrate disputes relative to Utah NAGPRA in accordance with U.C.A. 9-9-405 (3)(c), if consultation fails to resolve the dispute.

H. Time Frames

1. Document Review. Unless otherwise stated, document review shall be 30 days following receipt of said document submitted for review. The UDOT may assume failure of any party to respond within 30 days indicates their concurrence.

2. Amendment. The UDOT will provide copies of written request(s) for amendment from any signatory party to all other signature parties within 3 days, and the parties agree to begin discussions regarding proposed amendments immediately.

I. Amendments

1. Any signature party to this Agreement may request an amendment (s), whereupon the other signature parties will consult to consider such amendment(s).

2. Any proposed amendment to this Agreement must be submitted to the UDOT in writing, with an explanation as to the reasoning for the requested change. The UDOT will initiate consultation with the signature parties for their consideration of the proposed amendment(s) under the time provisions as set forth in III Section H2.

J. Monitoring

1. A monitoring plan will be included in the Research Design(s). Project monitoring will ensure all parties to this Agreement that the activities and provisions of this Agreement are in compliance. Monitoring will also ensure that all parties to this Agreement will have oversight and updates to the Project as the Project commences.

2. After completion of the fieldwork component of the data recovery

provided for in Section I, the UDOT will ensure that particular care is taken during construction to avoid affecting any other archeological remains that may be associated with the sites recorded during the initial survey. Restrictions on construction work in all areas not previously cleared in the original Determination of Eligibility and Finding of Effect will be accomplished by erection of a temporary fence and flagging as necessary. Suitable arrangements for archeological monitoring, and any additional survey deemed necessary, will be made in consultation with the SHPO prior to construction in the APE. An archeologist meeting the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9) will monitor the construction activities. The Tribes will be invited to assist in the monitoring in conjunction with the authorized archaeologist. At a minimum, such monitoring will include recording and reporting of major features or artifact concentrations uncovered, and recovery and curation of a sample of uncovered remains where practicable.

Execution of this Memorandum of Agreement and implementation of its terms evidence that the FHWA has afforded the Council an opportunity to comment on the Legacy Parkway Project and its effects on historic properties, and that FHWA has taken into account the effects of the undertaking on historic properties.

ADVISORY COUNCIL
ON HISTORIC PRESERVATION

By: Beatrice N. Brown for John Fowler
John M. Fowler, Executive Director

Date: 6-21-00

FEDERAL HIGHWAYS ADMINISTRATION

By: David C. Gibbs
David C. Gibbs, P.E., Division Administrator

Date: 5/22/00

UTAH STATE HISTORIC PRESERVATION OFFICER

By: Max J. Evans
Max J. Evans, Utah SHPO

Date: 3/15/2000

UTAH DEPARTMENT OF TRANSPORTATION

By: Thomas R. Warne
Thomas R. Warne, Executive Director

Date: 2-24-00

UTAH DIVISION OF INDIAN AFFAIRS

By: Forrest S. Cuch
Forrest S. Cuch, Director

Date: 5-11-00

Concur:

THE NORTHWEST BAND OF SHOSHONI OF IDAHO AND UTAH

By: Gwen T. Davis
Gwen T. Davis, Chairman

Date: 3-31-2000

THE SHOSHONE BANNOCK TRIBES

By:_____
Duane Thompson, Chairman

Date:_____

THE UTE INDIAN TRIBE (OF THE UINTAH-Ouray AGENCY)

By:_____
Roland McCook, Chairman

Date:_____

CONFEDERATED TRIBES OF THE GOSHUTE (IBAPAH)

By:_____
David Pete, Chairman

Date:_____

SKULL VALLEY GOSHUTE TRIBE

By:_____
Leon Bear, Chairman

Date:_____

APPENDIX B - DEFINITIONS

"Area of Potential Effects" (APE) is defined as geographic area within which an undertaking and/or connected action may cause changes in the character or use of heritage resource properties. Although treatment of properties may vary with land status, the area of potential effects was determined without regard for land status and includes both state and private lands as delineated in (Exhibit A). In defining the area of potential effect, the UDOT included all lands potentially affected by the proposed project within a thousand foot (1000') wide corridor between the I-215 interchange and Burton Lane north of Farmington.

"Associated Funerary items" are defined as items that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later, with or near individual human remains.

"Data Recovery Plan" is a planning document that provides details for the recovery of information from historic properties on a site by site basis. Data recovery is a specific form of treatment usually associated with 36 CFR 60.4, Criterion D.

"Day" is defined as calendar day throughout this document.

"Discovery Situation" is an occurrence whereby human remains or an historic property are identified as a result of the process described in the Monitoring Plan, or during construction.

The Legacy/West Davis Highway Research Design (Research Design) is a planning document that is consistent with State and Federal technical standards which produces reliable, understandable and up-to-date information for decision making related to the identification, evaluation, and protection/treatment of historic properties and traditional cultural properties.

"Historic Property" is any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes artifacts, records, and remains related to or located within such properties. This term also includes properties associated with traditional life-way values when such values are considered eligible for inclusion in the National Register. For the purposes of this agreement, a traditional life-way value must be associated with a definite location.

"Interested Parties" are defined as those organizations and individuals that are concerned with the effect of an undertaking on historic properties as defined in 36 CFR 800.5 (e)(1).

"Monitoring Plan" identifies the methods for assuring that historic properties discovered during the land disturbance activities of an undertaking will be subject to the provisions of the Agreement This planning document is incorporated into the Research design.

"National Register of Historic Places" (NRHP) refers to the national register of districts, sites, buildings, structures, and objects significant in history, architecture, archaeology, engineering and culture. The National Historic Preservation Act of 1966, as amended, authorizes the Secretary of interior to amend and maintain this register.

"Objects of cultural patrimony" means items having ongoing historical, traditional, or cultural importance central to the Indian tribe itself.

"Traditional Cultural Property" (TCP) is defined generally as one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. For the purposes of this agreement the communities or social groups are the Northwest Band of Shoshone of Idaho and Utah, the Shoshoni Bannock Tribes, and The Ute Indian Tribe (Of the Uintah-Ouray Agency), and Confederated Tribes of the Goshute (Ibapah), individually or collectively.

"UDOT" (the Utah Department of Transportation**)** is the agency responsible for the project and is the lead agency for purposes of compliance with the terms and regulations stipulated in this agreement as designated by the Federal Highway Administration, Utah Division (FHWA)

"Tribe(s)" is defined as The Northwest Band of Shoshone of Idaho and Utah, The Ute Indian Tribe (Of the Uintah-Ouray Agency) Confederated Tribes of the Goshute (Ibapah) and Skull Valley Goshute Tribe, and the Shoshone Bannock Tribes of Idaho. Although the collective term "Tribe" is applied within this agreement, each Tribe which participated in the consultation and concurs in this agreement, and will be notified individually for any and all actions described.

APPENDIX C

I. IMPLEMENTING UTAH NAGPRA U.C.A. 9-9-401 *et. seq.* AND ITS IMPLEMENTING RULE R230-1 AND UTAH CODE 76-9-704 ABUSE OR DESECRATION OF A DEAD HUMAN BODY

A. Purpose:

1. Purpose: The Parties to the Agreement intend to respect and be sensitive to the cultural perspectives and responsibilities, the religious and ceremonial rights, and sacred practices of the Tribes in fulfilling tribal interests in the discovery of Utah NAGPRA related items identified during the Project.

B. Objectives:

1. To implement the legislative provisions of Utah law specifically, U.C.A. 76-9-704 and 9-9-401 et. seq. within the intent of such legislation.

2. To implement legal requirements, while respecting and maintaining the dignity of the individual and the Utah NAGPRA related cultural items potentially discovered during the Project's construction, and in conjunction with the best interests of, the UDOT, the SHPO, and the Tribes.

3. To facilitate UDOT compliance with Utah NAGPRA, respective to decisions that must be made, and actions taken, regarding curation, disposition, re interment, data recovery, consultation and notification, and treatment, of human remains and cultural items as defined by Utah NAGPRA.

4. To provide guidance for UDOT construction personnel regarding the discovery and notification process upon location of human remains and cultural items as defined by Utah NAGPRA

C. Implementation of Objectives:

1. The UDOT will provide the construction personnel supervisors with a set of procedures to be followed in the event of an inadvertent discovery of human remains as detailed in Figure 1 of this Appendix.

2. In accordance with UDOT Standard Specification 104.15 (Appendix D), upon discovery of human remains (including cultural items as defined by Utah NAGPRA), construction activities within the immediate area of discovery shall cease, the site will be secured, and notification of law enforcement, Division of Indian Affairs and USHPO Antiquities Section as required by U.C.A.9-9-403, and U.C.A. 76-9-704, will commence immediately.

   (1) If the site is determined not to contain Native American remains, UDOT will advise the Tribes of such determination. Work will resume at the direction of the UDOT archaeologist.

   (2) If the site is determined to contain Native American remains, UDOT will provide notification to the Tribes according to the consultation and notification procedures outlined in section III B (1) of this agreement and applicable requirements of Utah NAGPRA [9-9-403(4)b and R-230-1-6(4)].

3. At such time a discovery of human remains is made and construction ceases in the area of the discovery, and having satisfied the requirements of U.C.A. 76-9-704:

   a. If the remains are in immediate danger of harm, or in the event that construction could not move, they will be excavated in accordance with R-230-1-7(1)a. All records and documentation will be afforded as much confidentiality as desired by the tribes and allowable by such laws and regulations as apply according to Stipulation E III.

b. If the site at which the remains are located can remain intact and free from immediate harm, the site will be secured and a preservation plan will be implemented according to R-230-1-7-1.

4. Any excavated Native American remains will remain in the custody of the UDOT or its consultant pending consultation and determination of ownership.

5. The repatriation of the individual will be consistent with, Utah NAGPRA [9-9-403 and R-230-1-13 et. seq.].

II. GENERAL PROVISIONS:

A. Dispute Resolution: Disputes on non Utah NAGPRA related issues will be resolved according to the dispute resolution procedures as described in the Agreement Section III G. The Utah NAGPRA Review Committee will resolve all Utah NAGPRA related disputes.

B. Treatment of Utah NAGPRA related items and human remains:

1. Human Remains

a. Any and all human remains that have been damaged or removed due to construction activity will be immediately returned to accompany the remains still present in the site.

2. Associated Funerary Items/Items of Cultural Patrimony

a. Unless otherwise identified, Associated Funerary Items/Items of Cultural Patrimony found near or about the discovery of human remains will be immediately returned to accompany the human remains. Associated Funerary items are defined as items that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later, with or near individual human remains. Objects of cultural patrimony means items having ongoing historical, traditional, or cultural importance central to the Indian tribe itself. If they are so identified,

documentation of these materials will be included in the reports as funerary objects and/or items of cultural patrimony.

Legacy Parkway Project

Procedure for Implementing Utah NAGPRA and Section 106

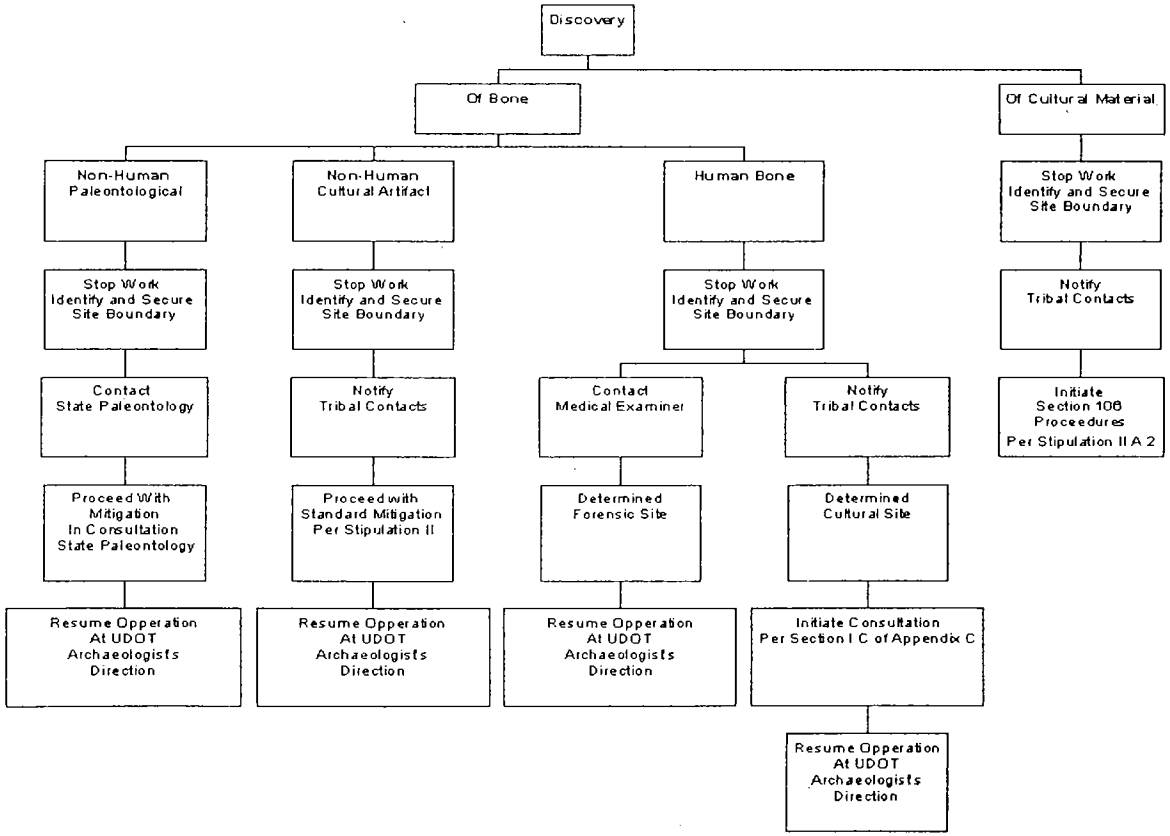


Figure 2. Outline of UDOT Discovery Procedure.

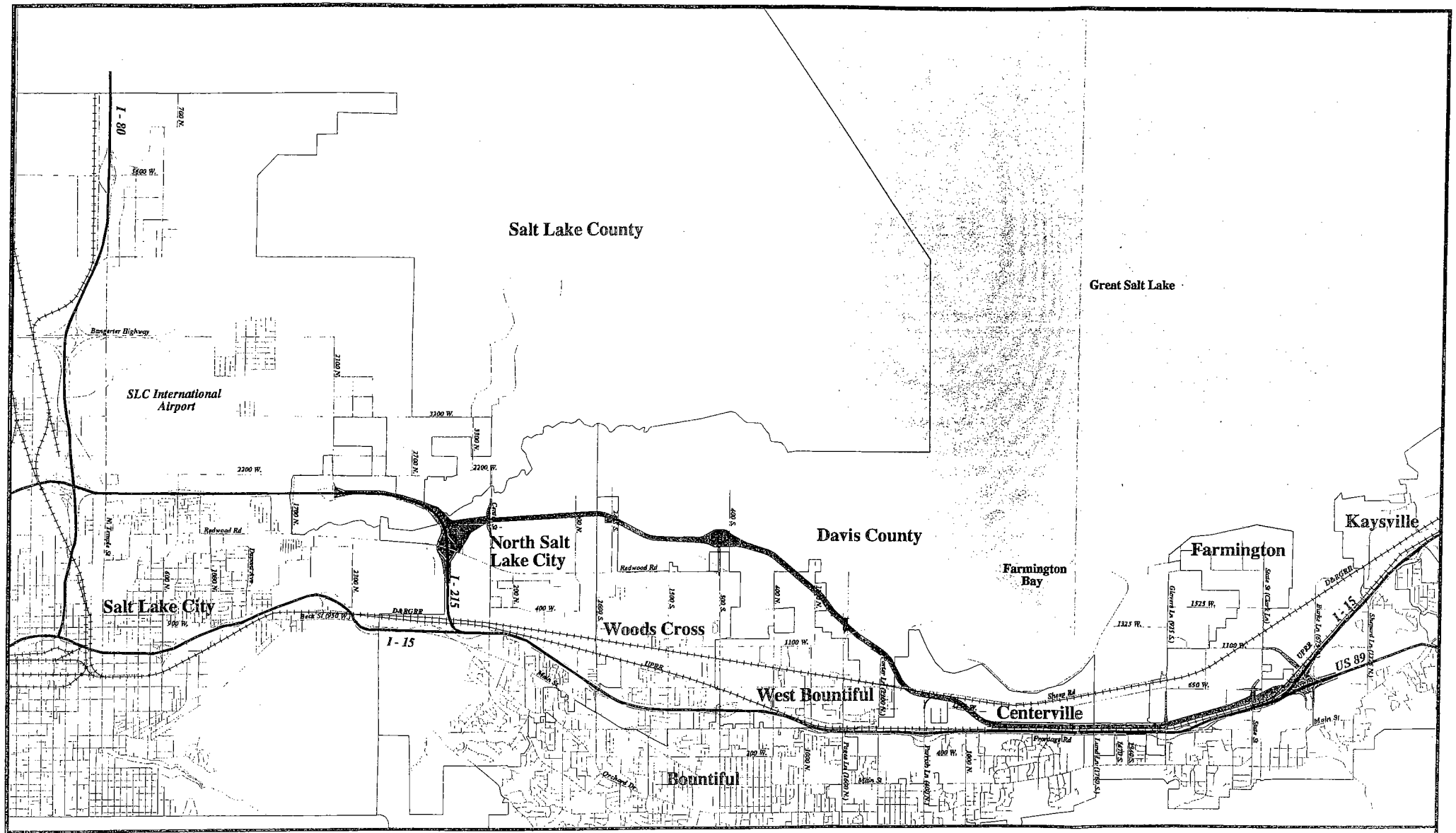
APPENDIX D

UDOT STANDARD SPECIFICATION FOR DISCOVERY OF HISTORIC, ARCHEOLOGICAL OR PALEONTOLOGICAL OBJECTS

104.15 Discovery of Historic, Archeological or Paleontological Objects:

If a suspected historic, archeological or paleontological item, feature, or site is encountered, construction operations shall be immediately stopped in the vicinity of the discovery and the ENGINEER shall be verbally notified of the nature and exact location of the findings. The CONTRACTOR shall not damage the discovered objects and shall provide written confirmation of the discovery to the ENGINEER within 2 calendar days.

After operations in the vicinity of the discovery have been restricted, the ENGINEER will keep the CONTRACTOR informed concerning the status of the restriction. The CONTRACTOR should be aware that the time necessary for the DEPARTMENT to handle the discovered item, feature, or site is variable and is dependent on the nature and condition of the discovered item, feature, or site. It is possible that a delay of as much as 2 weeks in the vicinity of the discovery can be expected. The ENGINEER will inform the CONTRACTOR when the restriction is terminated, with written confirmation following within 2 calendar days. If a changed condition is approved, it will be controlled in accordance with Subsection 104.2: Differing Site Conditions.



Source: Utah AGRC -1997, HDR -1999 File: /home2/projects/utah/westdavis/arm/b-apdx.amp.aml Plotted: 17 Dec 99

Appendix A
AREA OF POTENTIAL EFFECT
Legacy Parkway Preferred Alternative
Section 106 Memorandum of Agreement

UDOT GOING THE EXTRA MILE

Michael O. Leavitt
Governor
Thomas R. Warne
Executive Director
John R. Njord
Deputy Director

State of Utah
DEPARTMENT OF TRANSPORTATION

Ahmad O. Jaber, Director
Region One
169 North Wall Avenue
P.O. Box 12580
Ogden, UT 84412-2580
801-399-5921
FAX: 801-399-5926
www.sr.ex.state.ut.us/r1

FILE COPY

Commission
Glen E. Brown
Chairman
James G. Larkin
Hal M. Clyde
Stephen M. Bodily
Jan C. Wells
Bevan K. Wilson
Kenneth L. Warnick

February 21, 2001

Ms. Barbara L. Murphy
Preservation Planner
State Historic Preservation Office
300 Rio Grande
Salt Lake City, UT 84101-1182

RE: Project No. SP-0067(1)0: Legacy Parkway. Salt Lake and Davis Counties, Utah.
Case #: 97-0375

Submission of ILS Documentation for 650 West State Street Farmington

Dear Ms. Murphy

In accordance with the MOA for the Legacy Parkway Project, please find enclosed an ILS package for **650 West State Street Farmington** a property which will be adversely affected by the project.

Thank you for your efforts on our behalf. If you have any questions, please call me at 399-5921 ext. 371.

Sincerely,

Christopher Lizotte

Christopher Lizotte, M.A.
Preservation Specialist
Region One

enclosure

cc: w/o enclosure
Byron Parker, P.E., Legacy Team
Vince Izzo, P.E., HDR Engineering, Inc.
Asa Nielson Baseline Data Inc. 789 East Bamberger Hwy. American Fork 84003

C:\FILES\All Projects\LEGACY\650 w State Street ILS.wpd

State of Utah

Department of Community and Economic Development
Division of State History
Utah State Historical Society

Michael O. Leavitt
Governor
Max J. Evans
Director

300 Rio Grande
Salt Lake City, Utah 84101-1182
(801) 533-3500 FAX: 533-3503 TDD: 533-3502
ushs@history.state.ut.us http://history.utah.org

March 8, 2001

Christopher Lizotte, M.A.
Preservation Specialist
Region One
Utah Department of Transportation
169 North Wall Avenue
P.O. Box 12580
Ogden UT 84412-2580

RE: Project No. SP-0067(1)0: Legacy Parkway - ILS Documentation for 650 West State Street, Farmington

In Reply Please Refer to Case No. 97-0375

Dear Mr. Lizotte:

Thank you for the submission of the documentation specified in the Memorandum of Agreement for the above referenced project. These materials will be placed on file in the Preservation Office of the Division of State History.

This information is provided to assist with Section 106 responsibilities pursuant to §36CFR800. If you have questions, please contact me at (801) 533-3563. My email address is: bmurphy@history.state.ut.us

Sincerely,

Janice Reed Campbell

for Barbara L. Murphy
Preservation Planner
State Historic Preservation Office

BLM:97-0375 DOT

Michael O. Leavitt
Governor
John R. Njord
Executive Director
Carlos M. Braceras
Deputy Director

State of Utah

DEPARTMENT OF TRANSPORTATION

Ahmad O. Jaber, Director
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Commission
Glen E. Brown
Chairman
James G. Larkin
Hal M. Clyde
Stephen M. Bodily
Jan C. Wells
Bevan K. Wilson
Kenneth L. Warnick

September 20, 2001

Ms. Barbara L. Murphy
Preservation Planner
State Historic Preservation Office
300 Rio Grande
Salt Lake City, UT 84101-1182

RE: Case #: 97-0375 Legacy Parkway Haul Routes for Construction

Dear Ms. Murphy:

The Utah Department of Transportation (UDOT or Department) has started construction on the Legacy Parkway. The UDOT has considered the effects of this undertaking on any historic or archeological resources which could be eligible for the State or National Registers, and to afford the Utah State Historic Preservation Office (USHPO) an opportunity to comment on the undertaking and its effects, as outlined in U.C.A. 9-8-404. In addition, the UDOT is complying with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulation, 36 CFR Part 800. This compliance is being conducted by UDOT on behalf of the Federal Highway Administration, Utah Division (FHWA). Please review this letter and the attached materials and, providing you agree with the finding contained herein, sign and date the signature line at the end of this letter.

The UDOT Contractor on the Legacy Parkway is a consortium of Fluor Daniel, Ames Construction, and Edward Kraemer and Sons (FAK), has identified a route to haul material from an existing commercial borrow site in Weber County to the Legacy Parkway. A notification regarding the haul route was provided to the public in the affected area at the end July 2001. Several comments were received from the public regarding potential impacts to historic structures along the haul route from vibration caused by the haul trucks.

The requirements for haul routes are identified in the contract between the Department and FAK In July, FAK identified this particular haul road based on the limitations placed on them in the contract. The requirements include the need to minimize impacts to motorists, and to avoid congested areas around the Lagoon Amusement Park, during its peak operating season.

A key limitation in the contract requires FAK to limit their operations to State Roads, to avoid impacts to municipal roads not designed for truck traffic. Both State and Main Streets in Farmington are State Routes, regularly traveled by heavy trucks. And unlike other non-UDOT, non-project trucks on these roads, project trucks are weighed to insure no over-load violations. And the travel speed of the project trucks along this haul route is also monitored. These steps help to limit truck vibration and noise.

The possibility of vibration damage to structures is not a new issue to UDOT. UDOT regularly monitors vibration impacts at adjacent structures during the course of construction. UDOT employs a full time seismic operator, Jerry Ryan to monitor vibration effects. There are no mandated national or FHWA standards for vibration. Jerry and many FHWA people rely on research funded by the United States Department of Transportation. That research claims that in most soils, the *possibility* of architectural damage from traffic does not start until vibration reaches about .2 inches per second. And although plaster cracks have been recognized as low as .2 in/sec., actual damage is not to be expected until the vibration reaches a full two

(2) inches per second.

Consistent with normal Department practices, UDOT has monitored haul route traffic along the entire corridor for potential vibration impacts from haul trucks. This was accomplished by setting up seismic monitors along the project haul routes, including areas with historic structures (Attachment 1 and 3). The monitors were placed immediately behind the curb of the road approximately 20 to 30 feet from the residences along the route. The monitors were placed at the curb next to the road to detect the highest possible vibration level. Monitors on this route were operating over several days for a 2 hour period at each location during which time trucks, including Legacy Parkway haul trucks, were tracked (Attachments 2 and 4). In order to test the possibility of vibration damage to structures, Jerry set up his monitor at a setting of .15 in/sec. Vibration was so low, he could not get a reading, even at this lower setting and even in such close proximity to the vibration source.

Results of the monitoring showed that none of the seismic monitors registering any vibration at the curb that exceeded the conservative threshold level we established (.15 inches per second) at which the monitors were set to read. Therefore, the UDOT has determined that there will be **No Historic Properties Affected** from vibration associated with this material hauling operation.

Please note that this route is used by numerous other trucks, not associated with the Legacy Parkway. And UDOT also monitored noise associated with the truck haul route and found no increase from the FAK truck noise over the other traffic on the route.

Consistent with standard UDOT practices we will continue to monitor for project impacts. I will keep you informed of any findings if they occur. If you have any questions, please contact me at 399-5921 ext. 371.

Sincerely,

Christopher Lizotte

Christopher Lizotte, M.A.
Archaeologist and NEPA Specialist
Region One

I concur with the finding of **No Historic Properties Affected** from vibration associated with this material hauling operation on State Street Farmington, Davis County, Utah. Further, the UDOT has taken into account the effects of the proposed project on historical and archaeological resources, as required by Section 106 and U.C.A. 9-8-404.

_____

Barbara L. Murphy, Preservation Planner Date

CC:
Byron Parker, P.E. Legacy Parkway Team
Vince Izzo, HDR Engineering, Inc.

Department of Community and Economic Development
Division of State History
Utah State Historical Society

UTAH STATE HISTORICAL SOCIETY

Michael O. Leavitt
Governor
Max J. Evans
Director

300 Rio Grande
Salt Lake City, Utah 84101-1182
(801) 533-3500 FAX 533-3503 TDD 533-3502
mail@history.state.ut.us http://history.utah.org

October 19, 2001

Christopher Lizotte, M.A.
Archaeologist and NEPA Specialist
Region One
Utah Department of Transportation
169 North Wall Avenue
P.O. Box 122580
Ogden UT 84412-2580

RE: Legacy Parkway Haul Routes for Construction

In Reply Please Refer to Case No. 97-0375

Dear Mr. Lizotte:

There are a number of issues we would like to address regarding the haul route through Farmington for the Legacy Parkway project. Many of these issues have been raised by residents of Farmington who have expressed deep concern about the affect of this particular undertaking and of future activities related to the parkway project.

As you are aware, the "undertaking" of intensive hauling of material for the Legacy Parkway along State and Main Streets in Farmington, where a number of historic properties exist, was well underway before consultation was initiated with our office. This precluded any ability on our part or on the part of consulting parties to participate in the discussion of avoidance through the use of other routes or in the exploration of mitigation options.

The vibration study conducted by UDOT a few weeks after the trucks were rolling was a sincere attempt on the part of UDOT to determine the vibration effects of this undertaking. However, the methodology and standards used in this study may not be appropriate for the resources involved. These historic buildings, constructed primarily in the late nineteenth century of unreinforced masonry, are far more vulnerable to vibrations than new buildings would be. Instead of the 0.2 inches per second standard that has been used as a benchmark for possible damage to new buildings, some experts, including the German Institute of Standards, have recommended 0.08 in/sec for historic structures *in good condition*. The UDOT vibration study apparently did not take into account the condition and characteristics (height, footprint, materials, etc.) of the buildings. Nor did it conduct any measurements on the buildings

themselves, as vibration studies conducted in other states have done, in order to more accurately measure the potential "whipping action" created on the buildings by the ground movement. The issues involved with road vibrations seem to be more complex than what this study addressed.

We are concerned that your letter of September 20, 2001, does not address future hauls along this route or hauls along other routes during the course of the construction project. We are aware of at least one other historic district near the parkway corridor (along Onion Street in West Bountiful), and, depending on which haul routes might be selected, numerous other historic properties might be affected. We would like there to be a clear understanding among all parties about how the routes will be selected and how impacts might be avoided or mitigated.

We are also concerned about other construction activities that have not been addressed in either your September 20 letter or in the MOA that was signed for this project. For example, the proposed demolition and reconstruction of the State Street overpass would likely create much greater ground vibrations than those generated by the haul. As a result, it is very likely that historic buildings in the Clark Lane Historic District, especially those on the west end of the district, would be adversely affected.

Due to the extent and complexity of this overall project we feel that it is appropriate to amend the existing MOA to include undertakings that were overlooked and potential issues that might yet surface. This will ensure that the project is in full compliance with both Section 106 of the National Historic Preservation Act and U.C.A. 9-8-404.

We look forward to working with you on an amended MOA that will address the full range of issues involved with this project.

This information is provided to assist with Section 106 responsibilities as specified in §36CFR800. If you have questions, please contact Roger Roper at (801) 533-3561 or myself at (801) 533-3563. My email address is: bmurphy@history.state.ut.us

Sincerely,

Barbara Murphy

Barbara L. Murphy
Preservation Planner
State Historic Preservation Office

BLM:97-0375

August 9, 2002

Mr. Max Forbush
City Manager
Farmington City
130 North Main
P.O. Box 160
Farmington City, Utah 84025-0160

Re: Roundabout at the Intersection of 650 West and State Street
Equestrian Trail Termination at 650 West

Dear Max,

The Legacy Parkway design team recently met with Horrocks Engineers to discuss the roundabout the City desires at the intersection of 650 West and State Street. After reviewing the design information provided by Horrocks it appears the roundabout can be incorporated into our design at this location without requiring additional right-of-way or causing major conflicts with utility relocations. If this change is to be incorporated into the Legacy Parkway project UDOT will need to issue a changeorder to FAK on the Legacy Parkway contract, because this is a change to the scope of work and FAK has completed much of the required design in this area.

UDOT will need written verification of the following items should Farmington City desire UDOT issue a changeorder to FAK for the roundabout at the intersection of 650 West and State Street:

1. Written notice from the City confirming their approval of a roundabout at this location.
2. Evidence the City has contacted the Whitakers and they approve of their property access within the roundabout.
3. Verification of the new narrower typical section required for State Street.
4. Acknowledgement that it will be the City's continual responsibility to maintain the roundabout.
5. Documentation of the design expenditures to Horrocks Engineers if the City desires reimbursement from UDOT for their services.

Farmington City's request for relocation of the equestrian trail termination from 650 West to Clark Lane will also be incorporated with the changeorder for the roundabout,

because this is also a change in scope of work for FAK and the trail termination occurs within the same project design area.

It is imperative that we receive the outlined items from the City by August 30, 2002, if the City desires to move forward with the design of a roundabout in this location. There is still time to incorporate this change into our design/build contract with FAK, but the window of opportunity is becoming narrower.

We appreciate the opportunity to work with the City to develop transportation solutions that meet the City's goals as well as the Department's goals.

Sincerely,

4197.tif

Byron Parker, P.E.
Project Director

RECEIVED SEP 06 2002

Historic beginnings

David M. Connors
Mayor

MAX FORBUSH
City Manager

KEITH JOHNSON
Finance Director

MARGY L. LOMAX
Recorder

GLORIA B. ANDERSON
Treasurer

Farmington City
1847

130 North Main
P. O. Box 160
Farmington, Utah 84025-0160
Telephone (801) 451-2383

DAVID S. HALE
BOB HASENYAGER
LARRY W. HAUGEN
SUSAN TANNER HOLMES
ED JOHNSON
Council Members

August 30, 2002

Byron Parker, P. E.
Project Director
Legacy Parkway
360 North 700 West, Suite F
North Salt Lake, Utah 84054

Re: **Roundabout at Intersection of 650 West and State Street.**

Dear Byron:

I am responding on behalf of members of the Farmington City Council regarding requested documentation pertaining to the proposed roundabout at the intersection of 650 West and State Street. The documentation you requested is included as follows.

Confirmation of City Approval of Roundabout.

The City Council has approved the conceptual design and layout of the roundabout and width of east State Street as shown on drawings prepared by Horrocks Engineers based on certain conditions.

1) That the entire roundabout be constructed of concrete at a depth sufficient to support heavy truck and bus traffic.

2) That the City be permitted additional input into final detailed plans, including but not limited to, cross slopes, angle, side and center treatments (stamped concrete) and landscaping.

Whitaker Family Support for the Proposed Roundabout.

This family is in support of the proposal. See enclosed letter written to the Farmington City Council from Don and Donna Whitaker dated August 22, 2002.

Cross Section of State Street Bridge Structure.

It is the City's understanding that the planned pavement section of the State Street bridge structure is 52 feet in width. The City requests 8 ½ foot shoulders, two 11-foot lanes with a 13-foot

center turn lane. The City also requests that the sidewalk treatment on both sides remains as planned – 6 ½ feet on the south side and 8 feet on the north side.

City's Commitment to Maintain the Roundabout.

The City Council in their approving vote agreed to maintain the roundabout once completed and the final Legacy Project accepted by UDOT.

Horrocks' Design Engineering Expenses.

We appreciate your agreement to reimburse the City on these costs. The City is asking a deferral of the time requirement for sending the reimbursement request for costs accrued on this project by Horrocks Engineers. These costs are still being submitted. Once the final invoice is submitted and paid by the City, a request for reimbursement will be sent.

I trust this information meets the requirements of your previous letter. If not, please call Max Forbush and advise him of any deficiencies.

Sincerely,

David M. Connors
Mayor

MF/ml

cc: Members of the City Council
Max Forbush, City Manager
Russell Youd, Horrocks Engineers

Don and Donna Whitaker
P.O.Box 857
601 W State Street (Whitaker Lane)
Farmington, Utah 84025
451-6159

August 22, 2002.

Farmington City Council
130 North Main
P.O.Box 160
Farmington, Utah 84025-0160

To Whom It May Concern:

On August 15th, 2002, we met with Max Forbush to discuss the "roundabout" concept being proposed for the State Street and 650 West intersection. We were shown a concept drawing and it was explained to us.

We like the concept, as it was explained to us at that time. Provided there are no major design changes, we would be in favor of a roundabout at this intersection. We see several very favorable aspects of this type of design for this location. It would maintain the size and integrity of the State Street overpass and help keep this area safer for pedestrians. By keeping the bridge size down, it would also help to control the speed of traffic coming off the bridge and entering that intersection. We think this would be beneficial to both sides of the freeway. We have driven on this type of design in several different locations and found it very functional. We understand it has worked well in many other states.

One of our concerns, is that there be yield signs in place, and not stop signs on the roundabout. This would provide for a smoother traffic flow. It would slow traffic, possibly decreasing the amount of traffic at this intersection and provide a safer access point for our road, as long as the size and number of lanes feeding into it did not increase. Because traffic would be flowing smoother and hopefully slower, we feel that it would make it much nicer for larger vehicles like buses, delivery vans and horse trailers to make the turn without interferring with other lanes of traffic making turns.

We have watched traffic flow after major events, and it is not that intersection that causes traffic jams, but the vehicles turning on the east side of the overpass. By slowing traffic at 650 West, we think that traffic would not become so jammed up.

We would like the city council to know that in our opinion, this would be a good design and it would work very well for this location at this time.

Don + Donna
Whitaker

U.S. Department
of Transportation

Federal Highway
Administration

US Army Corp
of Engineers

FHWA Utah Division
2520 West 4700 South, Suite 9A
Salt Lake City, UT 84118

U.S. Army Corps of Engineers
Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, UT 84010

January 24, 2003

Mr. Robert Roberts
Regional Administrator
Environmental Protection Agency, Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466

Dear Mr. Roberts:

Subject: Legacy Parkway, Davis and Salt Lake Counties, Utah
Supplemental Environmental Impact Statement
February 21, 2003, Meeting Invitation and Cooperating Agency Request

To continue to enhance the working relationships between Federal agencies, Dr. Christine Johnson, Director of Field Services, Federal Highway Administration (FHWA) and Colonel Conrad of the Army Corps of Engineers (ACOE) invite you and your staff to participate in a Federal agency partnering meeting for the proposed Legacy Parkway project in Utah. The meeting has been scheduled for February 21, 2003, from 9:00 am to 12:00 pm in the Rocky Mountain Room of the EPA Conference Center, 999 18th Street, Denver - 2nd floor. Mr. Lee Waddleton, Federal Transit Administration, Regional Administrator and Mr. Ralph Morgenweck, U.S. Fish and Wildlife Service, Regional Director, have also been invited to attend.

The objective of this meeting is to establish an environmental stewardship framework (expectations and process), with the endorsement of senior management, for the preparation of the Supplemental Environmental Impact Statement (SEIS) for the Legacy Parkway project that is consistent with the Executive Order, "Environmental Stewardship and Transportation Infrastructure Project Reviews." Our goal is to have an open discussion that allows all agencies to discuss their expectations and concerns for this high profile project and to identify improvements to the process previously used to develop the original Environmental Impact Statement (EIS).

The Legacy Parkway is a proposed four-lane, limited access, divided highway extending from I-215 at 2100 North in Salt Lake City northward 14 miles to the interchange of I-15 and U.S. 189 in Farmington. The Final Environmental Impact Statement (FEIS) was completed in June 2000. On September 16, 2002, the Tenth Circuit Court issued an opinion finding the EIS inadequate and remanded the FEIS to the District Court for additional consideration in the following five areas:

1. The Denver & Rio Grande (D&RG) as an alternative alignment.
2. Alternative sequencing of the Shared Solution.
3. Integration of the Legacy Parkway and transit solutions.
4. Impacts to wildlife.
5. A narrower median as a practicable alternative.

Currently, preliminary work is underway for the preparation of a SEIS to address the Tenth Circuit Court's opinion. The SEIS will focus on addressing the above five issues identified in the Tenth Circuit Court's decision. However, a formal re-evaluation of the original FEIS will be prepared to determine whether there have been changes in the project, its surroundings and impacts, or any new issues identified since the FEIS.

Because of your agency's expertise and jurisdiction regarding wetland issues that pertain to the SEIS, we are requesting that your agency be a cooperating agency. In accordance with the provisions of 40 CFR, Part 1501.6, your role would include:

- Consulting on relevant technical studies required for the project.
- Reviewing project information, including study results, and agreeing on a time frame for your review.
- Expressing your views on subjects within your jurisdiction and/or expertise.
- Participating in joint public involvement activities.
- Identifying EIS content necessary to discharge your National Environmental Policy Act (NEPA) responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

We look forward to discussing your agency's participation in this project at our February 21, 2003 meeting. We would like to collaborate with your staff in developing the meeting agenda. If you have any questions regarding meeting, please have your staff contact Greg Punske, FHWA Environmental Program Manager at (801) 963-0078 x 237.

Sincerely,

David Gibbs, P.E.
FHWA Division Administrator
Salt Lake City, Utah

Brooks Carter
ACOE Intermountain
Regulatory Section Chief
Bountiful, Utah

cc: Cynthia Cody, EPA Region 8, Chief NEPA Unit

U.S. Department
of Transportation

**Federal Highway
Administration**

**US Army Corp
of Engineers**

FHWA Utah Division
2520 West 4700 South, Suite 9A
Salt Lake City, UT 84118

U.S. Army Corps of Engineers
Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, UT 84010

January 24, 2003

Mr. Lee Waddleton
Regional Administrator
Federal Transit Administration, Region 8
216 16th St., Suite 650
Denver, CO 80202-5120

Dear Mr. Waddleton:

Subject: Legacy Parkway, Davis and Salt Lake Counties, Utah
Supplemental Environmental Impact Statement
February 21, 2003, Meeting Invitation and Cooperating Agency Request

To continue to enhance the working relationships between Federal agencies, Dr. Christine Johnson, Director of Field Services, Federal Highway Administration (FHWA) and Colonel Conrad of the Army Corps of Engineers (ACOE) invite you and your staff to participate in a Federal agency partnering meeting for the proposed Legacy Parkway project in Utah. The meeting has been scheduled for February 21, 2003, from 9:00 am to 12:00 pm in the Rocky Mountain Room of the EPA Conference Center, 999 18th Street, Denver - 2nd floor. Mr. Robert Roberts, Environmental Protection Agency, Regional Administrator and Mr. Ralph Morgenweck, U.S. Fish and Wildlife Service, Regional Director, have also been invited to attend.

The objective of this meeting is to establish an environmental stewardship framework (expectations and process), with the endorsement of senior management, for the preparation of the Supplemental Environmental Impact Statement (SEIS) for the Legacy Parkway project that is consistent with the Executive Order, "Environmental Stewardship and Transportation Infrastructure Project Reviews." Our goal is to have an open discussion that allows all agencies to discuss their expectations and concerns for this high profile project and to identify improvements to the process previously used to develop the original Environmental Impact Statement (EIS).

The Legacy Parkway is a proposed four-lane, limited access, divided highway extending from I-215 at 2100 North in Salt Lake City northward 14 miles to the interchange of I-15 and U.S. 189 in Farmington. The Final Environmental Impact Statement (FEIS) was completed in June 2000. On September 16, 2002, the Tenth Circuit Court issued an opinion finding the EIS inadequate and remanded the FEIS to the District Court for additional consideration in the following five areas:

1. The Denver & Rio Grande (D&RG) as an alternative alignment.
2. Alternative sequencing of the Shared Solution.
3. Integration of the Legacy Parkway and transit solutions.
4. Impacts to wildlife.
5. A narrower median as a practicable alternative.

Currently, preliminary work is underway for the preparation of a SEIS to address the Tenth Circuit Court's opinion. The SEIS will focus on addressing the above five issues identified in the Tenth Circuit Court's decision. However, a formal re-evaluation of the original FEIS will be prepared to determine whether there have been changes in the project, its surroundings and impacts, or any new issues identified since the FEIS.

Because of your agency's expertise regarding transit issues that pertain to the SEIS, we are requesting that your agency be a cooperating agency. In accordance with the provisions of 40 CFR, Part 1501.6, your role would include:

- Consulting on relevant technical studies required for the project.
- Reviewing project information, including study results, and agreeing on a time frame for your review.
- Expressing your views on subjects within your jurisdiction and/or expertise.
- Participating in joint public involvement activities.
- Identifying EIS content necessary to discharge your National Environmental Policy Act (NEPA) responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

We look forward to discussing your agency's participation in this project at the February 21, 2003 meeting. If you have any questions regarding meeting, please have your staff contact Greg Punske, FHWA Environmental Program Manager at (801) 963-0078 x 237.

Sincerely,

David Gibbs, P.E.
FHWA Division Administrator
Salt Lake City, Utah

Brooks Carter
ACOE Intermountain
Regulatory Section Chief
Bountiful, Utah

U.S. Department
of Transportation

Federal Highway
Administration

US Army Corp
of Engineers ®

FHWA Utah Division
2520 West 4700 South, Suite 9A
Salt Lake City, UT 84118

U.S. Army Corps of Engineers
Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, UT 84010

January 24, 2003

Mr. Ralph O. Morgenweck
Regional Director
U.S. Fish and Wildlife Service, Region 6
134 Union Boulevard
Lakewoood, CO 80228-1807

Dear Mr. Morgenweck:

Subject: Legacy Parkway, Davis and Salt Lake Counties, Utah
Supplemental Environmental Impact Statement
February 21, 2003, Meeting Invitation and Cooperating Agency Request

To continue to enhance the working relationships between Federal agencies, Dr. Christine Johnson, Director of Field Services, Federal Highway Administration (FHWA) and Colonel Conrad of the Army Corps of Engineers (ACOE) invite you and your staff to participate in a Federal agency partnering meeting on the proposed Legacy Parkway project in Utah. The meeting has been scheduled for February 21, 2003, from 9:00 am to 12:00 pm in the Rocky Mountain Room of the EPA Conference Center, 999 18th Street, Denver - 2nd floor. Mr. Robert Roberts, Environmental Protection Agency, Regional Administrator and Mr. Lee Waddleton, Federal Transit Administration, Regional Administrator have also been invited to attend.

The objective of this meeting is to establish an environmental stewardship framework (expectations and process), with the endorsement of senior management, for the preparation of the Supplemental Environmental Impact Statement (SEIS) for the Legacy Parkway project that is consistent with the Executive Order, "Environmental Stewardship and Transportation Infrastructure Project Reviews." Our goal is to have an open discussion that allows all agencies to discuss their expectations and concerns for this high profile project and to identify improvements to the process previously used to develop the original Environmental Impact Statement (EIS).

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2. Alternative sequencing of the Shared Solution.
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Because of your agency's expertise regarding wildlife and migratory bird issues that pertain to the SEIS, we are requesting that your agency be a cooperating agency. In accordance with the provisions of 40 CFR, Part 1501.6, your role would include:

- Consulting on relevant technical studies required for the project.
- Reviewing project information, including study results, and agreeing on a time frame for your review.
- Expressing your views on subjects within your jurisdiction and/or expertise.
- Participating in joint public involvement activities.
- Identifying EIS content necessary to discharge your National Environmental Policy Act (NEPA) responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

We look forward to discussing your agency's participation in this project at our February 21, 2003 meeting. We would like to collaborate with your staff in developing the meeting agenda. If you have any questions regarding meeting, please have your staff contact Greg Punske, FHWA Environmental Program Manager at (801) 963-0078 x 237.

Sincerely,

David Gibbs, P.E.
FHWA Division Administrator
Salt Lake City, Utah

Brooks Carter
ACOE Intermountain
Regulatory Section Chief
Bountiful, Utah

cc: Mr. Henry Maddux, Utah Field Supervisor

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO ATTENTION OF

Regulatory Branch

April 11, 2003

Mr. Wayne Norwall, Regional Director
Bureau of Indian Affairs
P.O. Box 10
Phoenix, AZ 85001

Dear Mr. Norwall:

This letter is to inform you that the environmental scoping process is currently under way for a Supplemental Environmental Impact Statement (SEIS) for the Utah Department of Transportation's (UDOT's) proposed construction of the Legacy Parkway Project. The U.S. Army Corps of Engineers (Corps) and the Federal Highway Administration (FHWA), as federal joint lead agencies under the National Environmental Policy Act (NEPA), are interested in your comments about the content of the Legacy Parkway Project SEIS and invite you to participate in the scoping process.

Project Description
The proposed Legacy Parkway Project is one component of the planned three-part "Shared Solution" for addressing transportation needs between Salt Lake City and Kaysville. The "Shared Solution" strategy includes expansion of public transit, improvements to the existing Interstate 15 (I-15) freeway, and construction of the Legacy Parkway project. The Legacy Parkway is intended to help meet the projected peak-hour traffic needs in the north corridor area through 2020. The proposed parkway would include a four-lane, limited access, divided highway extending approximately 14 miles from Interstate 215 (I-215) in Salt Lake City northward to I-15 in Farmington City. A multiple-use trail for pedestrians, bicyclists, and equestrians would parallel the highway, and a large nature preserve is also planned.

Supplemental Environmental Impact Statement
The SEIS will supplement the June 2000 Legacy Parkway Final EIS (FEIS) (FHWA-UT-EIS-98-02-F), which was the subject of litigation and a court decision in *Utahns for Better Transportation et al. v. U.S. Department of Transportation et al.* (305 F.3d 1152 (10th Cir. 2002)). To address concerns identified by the court, the Corps and FHWA are directing and managing the development of an SEIS.

In accordance with the court decision, several specific aspects of the FEIS require further study. The Corps and FHWA have made a preliminary decision to consider the following in the SEIS based on the court ruling: (1) the Denver & Rio Grande railroad (D&RG) alignment,

(2) a narrower right-of-way (ROW) for the proposed alignment, (3) alternative sequencing for construction of the various component projects of the Shared Solution, (4) concurrent integration of construction of the Legacy Parkway with expansion of public transportation, and (5) impacts to wildlife. In addition, the FEIS will be reevaluated to determine whether any other information should be updated and revised as part of the SEIS process.

Agency Roles

As a joint lead agency, the Corps must make a decision on UDOT's permit application pursuant to Section 404 of the Clean Water Act (CWA). The FHWA, as a joint lead agency must make a decision on the request to connect the proposed project to I-215 and I-15. As joint lead agencies, the Corps and FHWA are responsible for the SEIS and have selected an independent consultant to ensure the SEIS process is effective and objective. UDOT is the project applicant and proponent of the Legacy Parkway. As project proponent, UDOT will provide information and answer questions related to the proposed Legacy Parkway Project. The U.S. Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), and Federal Transit Administration (FTA) have agreed to serve as cooperating agencies in the preparation and review of the SEIS. As cooperating agencies, EPA, USFWS, and FTA are responsible for providing input to the lead agencies throughout the development of the SEIS. All agencies are committed to fully informing and engaging interested parties and agencies throughout the SEIS process.

Participation in the Supplemental Environmental Impact Statement Process

An open house has been scheduled to provide information about the SEIS process and to solicit input. All interested parties are invited to attend this open-house-style scoping meeting. Please drop by anytime on Thursday, April 17, 2003, between 4 p.m. and 8 p.m. to talk directly with agencies and consultants at a variety of information stations. The scoping meeting will be held at Woods Cross High School Auditorium, 600 West 2200 South, Woods Cross, Utah.

The following additional topic-specific focus group meetings are open to the public, and are planned for late April: (1) D&GR alignment corridor (Monday, April 28, 2003, 9 – 11 a.m.), (2) narrower ROW impact evaluation (Monday, April 28, 2003, 1 – 3 p.m.), (3) wildlife impacts (Tuesday, April 29, 2003, 9 – 11 a.m.), and (4) sequencing and integration (Tuesday, April 29, 2003, 1 – 3 p.m.). These meetings will be held at Davis County Fairpark, Building 1, 151 South 1100 West, Farmington, Utah.

Information is also available by calling our Information Hotline at (801) 951-1039. The hotline will be available throughout the SEIS process and will include general information, updates, and opportunities for public involvement.

We are interested in obtaining your input on the scope of the SEIS. You are welcome to attend any of the public meetings or focus group sessions. If you would like to submit written comments on the scope and content of the SEIS, please submit them directly to the Corps or FHWA by June 1, 2003, at the following addresses:

Nancy Kang
Chief, Utah Office
U.S. Army Corps of Engineers
533 W. 2600 S., Suite 150
Bountiful, UT 84010

Greg Punske
Environmental Program Manager
Federal Highway Administration
2520 W. 4700 S., Suite 9A
Salt Lake City, UT 84118

Your input is critical and important in this process. We look forward to hearing from you. If you have any questions regarding this request, please feel free to contact me by telephone at (801) 295-8380 extension 14, or by email at nancy.kang@usace.army.mil.

Sincerely,

Nancy Kang
Chief, Utah Regulatory Office

cc: Greg Punske, Project Development Engineer, FHWA
Andrew Gemperline, UDOT

List of Recipients

Federal Transit Administration

Federal Transit Administration
Don Cover
Region 8
216 16th Street, Suite 650
Denver, CO 80202-5120

Federal Emergency Management Agency

Mr. David Maurstad, Regional Director
Federal Emergency Management Agency
Region VIII
Building 710, Box 25267
Denver, CO 80225-0267
(303) 235-4800
(303) 235-4976 FAX

Bureau of Indian Affairs

Mr. Wayne Norwall, Regional Director
Bureau of Indian Affairs
P.O. Box 10
Phoenix, AZ 85001
(602) 379-4413
(602) 379-4413 FAX

U.S. Fish and Wildlife Service

Mr. Henry Maddux
U.S. Fish and Wildlife Service
2369 West Orton Circle, Suite 50
West Valley City, UT 84119
(801) 975-3330
(801) 975-3331 FAX

U.S. Geological Survey

U.S. Geological Survey
Utah District
2329 Orton Circle
(2329 West 2390 South)
West Valley City, Utah
84119-2047
Phone: (801) 908-5000
Fax: (801) 908-5001

Environmental Protection Agency

Cynthia Cody, NEPA Program Chief
EPA Region 8 (EPR-N)
999 18th Street, Suite 300
Denver, CO 80202-2466

Natural Resources Conservation Service

Phillip Nelson
Utah State Office
Natural Resources Conservation Services
125 S. State St.
Suite 4425
Salt Lake City, UT 84111

State Agencies

Forrest Cuch
Community and Economic Development, Division of Indian Affairs
324 South State Street
Suite 500
Salt Lake City, UT 84114

Ursula Truman
Department of Environmental Quality, Division of Air Quality
168 North 1950 West
Salt Lake City, UT 84116

Kevin Brown
Utah Division of Drinking Water
P.O. Box 144830
Salt Lake City, UT 84114-4830

Kent Gray, Director
Utah Division of Environmental Response and Remediation
168 North 1950 West (Building #2)
First Floor Box 144840
Salt Lake City, UT 84114-4840

Don Ostler
Utah Division of Water Quality
P.O. Box 144870
Salt Lake City, UT 84114-4870

Robert L. Morgan
Utah Department of Natural Resources
1594 West North Temple
Suite 3710
Salt Lake City, UT 84114

Greg Mladenka
Utah Division of Water Rights
1594 West North Temple
Suite 220
Salt Lake City, UT 84114-6300

Tharold E. Green, Jr.
Utah Division of Parks and Recreation
1594 West North Temple
Suite 116
Salt Lake City, UT 84114-6001

Judy Watanabe
Dept. of Public Safety, Division of Comprehensive Emergency Management
Flood Loss Reduction Section
1110 State Office Building
Salt Lake City, UT 84114

Carolyn Wright
Governor's Office, Resource Development
Coordinating Committee, Dept. of Natural Resources
1594 West North Temple
Salt Lake City, UT 84102

James Dykemann
State Historic Preservation Office
300 South Rio Grande
Salt Lake City, UT 84114

Larry Anderson
Utah Division of Water Resources
1594 W. North Temple
Suite 310
Salt Lake City, UT 84114

Kevin Conway
Utah Division of Wildlife Resources
1594 West North Temple
Suite 2110
Salt Lake City, UT 84114-6301

Dick Buehler
Utah Division of Forestry, Fire & State Lands
1594 W. North Temple
Suite 3520
Salt Lake City, UT 84114-5703

Native American

David Pete
Goshute Indian Tribe
BIA Hwy #1
Ibapah, UT 84034 (Box 6104)

Ivan Wongan
Northwestern Band of Shoshone Tribe
427 N. Main, Suite 101
Pocatello ID 83204

Geneal Anderson
Paiute Indian Tribe of Utah
440 N. Paiute Dr
Cedar City, UT 84720

Leon Bear
Skull Valley Band of Goshute Indians
3359 S. Main, #808
SLC UT 84115

Ron Wopsock, Administration
Ute Indian Tribe
988 S. 7500 E.,
Fort Duchesne UT 84026

New MO

CLARK LANE HISTORIC DISTRICT

April 17, 2003

Dear members of the Federal Highway Administration,

As Davis County's only nationally recognized historic district, we would like to point out some potential adverse affects that Legacy Highway construction could have on the homes in our neighborhood. We also request that a complete and thorough Section 106 review of these affects be studied in cooperation with the Utah State Historic Preservation Officer.

The Clark Lane Historic District occupies both sides of State Street in Farmington, from the State Street overpass over I-15 east to 200 West. The homes in the district were constructed between the 1850s through the 1920s. Most are extremely fragile, as they were built of soft adobe and/or un-reinforced masonry and fieldstone foundations.

Some of the potential adverse affects we're concerned about include:

- Damage caused by ground borne vibrations during pile driving during the reconstruction of the State Street overpass
- Adverse affects to historic landscapes and properties during reconstruction of the State Street Overpass, including:
    - Removal of street trees
    - Changes in grade and elevations
    - Changes in street width and elevation
- Damage caused by ground borne vibrations of heavy trucks hauling fill materials

We appreciate the current willingness of the FHA, UDOT, and FAK to utilize the frontage road and "jug handle" near the State Street Overpass an alternate haul route to hauling materials through the historic district.

We believe the best way to mitigate affects on our historic homes is to NOT rebuild the State Street overpass. With the newly completed Burke Lane overpass just to the north, and the Glover's Lane overpass to the south, the State Street overpass seems unnecessary. It would certainly be prudent to study the necessity of this overpass before spending the money to rebuild it or risking damage to these nationally recognized properties during pile driving, etc.

We appreciate your willingness to involve us in the project and will do everything we can to help.

Much success,

Chadwick Greenhalgh
208 West State Street
Farmington, UT 84025
801.245.1219
chadwick.greenhalgh@eurorscg.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
03-0616

May 2, 2003

RECEIVED
MAY - 6 2003
BY: NK

Greg Punske
Environmental Program Manager
Federal Highway Administration
2520 West 4700 South, Suite A
Salt Lake City, Utah 84118

Dear Mr. Punske

The U.S. Fish and Wildlife Service (Service) has reviewed the April 1, 2003, Federal Register Notice of Intent to Prepare a Supplemental Environmental Impact Statement (SEIS) for the Utah Department of Transportation's proposed construction of the Legacy Parkway project in Salt Lake and Davis Counties, Utah. The purpose of the project is to solve future traffic problems in Salt Lake and Davis Counties by implementing a three part "Shared Solutions" strategy that includes: 1) Constructing the Legacy Parkway; 2) improving and expanding Interstate 15; and 3) expanding the public transit system. This project will involve the construction of a roughly 14 mile highway from Interstate 215 in the south to U.S. 89 near Farmington, Utah in the north. A multiple use trail for pedestrians, bicyclists, and equestrians would parallel the highway. The SEIS is being prepared because the courts found certain aspects of the original EIS insufficient, including the wildlife impact analysis. The SEIS will build upon the EIS and specifically address the court-identified deficiencies.

The Service has agreed to be a cooperating agency for purposes of NEPA compliance for this project. We expect to assist the lead agencies in evaluating the potential impacts to fish and wildlife resources and developing measures to avoid, minimize, and compensate for unavoidable impacts. We are providing the following comments as general guidelines for wildlife issues we believe should be addressed. These comments are not meant to be exhaustive, however, because we expect to be closely involved with identification of wildlife issues, determining appropriate evaluation methodology, and interpreting results.

In Section 1 of this letter we convey our concerns that should be addressed in the SEIS. Section 2 of this letter addresses your responsibilities under section 7 of the Endangered Species Act (ESA) of 1973, 16 U.S.C. § 1536.

Section 1.

We recommend that the SEIS evaluate the following potential direct, indirect, and cumulative impacts on fish and wildlife resources:

Direct Effects

Mortality due to project implementation, construction, and maintenance.

Mortality due to ongoing activities associated with project (vehicle collisions with vehicles, contamination of soils/waters from road treatments, automotive fluids, truck spills, etc.).

Displacement of individuals/populations due to project implementation, construction, maintenance, and ongoing activities associated with the project. In particular, you should evaluate whether and to what extent organisms may be displaced to areas where fitness is reduced and/or mortality rates increased (population sinks).

Habitat loss/gain due to project implementation, construction, and maintenance.

Habitat loss/gain due to ongoing activities associated with project (contamination of soils/waters from road treatments, automotive fluids, truck spills, etc.).

Habitat fragmentation and its effects on mate search/selection, gene flow, predation rate, dispersal success, colonization events (as they pertain to metapopulation dynamics), and overall population size.

Effects on individual fitness (reduced nesting success, brood size, fledging success, number of matings, etc.) due to project implementation, construction, and maintenance.

Effects on individual fitness (nesting success, brood size, fledging success, number of matings, etc.) due to ongoing activities associated with project (vehicle collisions with vehicles, contamination of soils/waters from road treatments, automotive fluids, truck spills, etc.).

Effects to habitat and species diversity, both spatial and temporal, due to project implementation, construction, and maintenance.

Indirect Effects

Effects on hydrology, both temporal and spatial that relate directly with quantity, quality, and distribution of habitats.

Effects on hydrology, both spatial and temporal, that may convert one type of wetland to another, thus changing its habitat function.

Effects on water quality as it relates to habitats for wildlife and fish.

Effects on air quality due to project implementation, construction, and maintenance.

Effects on air quality due to the ongoing activities associated with the project (vehicle emissions, increased air temperatures, etc.)

Effects of ground disturbance and ongoing activities (vehicular, bike, and horse traffic, trail/berm/median maintenance) that may facilitate the introduction of invasive/exotic/noxious species.

Effects of noise on wildlife populations and individuals. Possibilities include effects on mate identification, nest location, prey location, predator location, and territory defense.

Effects of an increase of human access/activity to formerly isolated wildlife habitats on wildlife populations, mating success, mortality, foraging/hunting opportunities, etc.

Effects on development opportunities that may further reduce/impair/eliminate wildlife habitats in the project area.

Effects of increased lighting during nighttime hours on predator/prey interactions, foraging behavior, and dispersal behavior.

Cumulative Effects

Effects of continued degradation, fragmentation, and removal of wetlands in the Great Salt Lake ecosystem as it pertains to wildlife populations.

Effects of increased development and other economic opportunities as a result of improved access (induced or facilitated development) as it pertains to wildlife populations.

Effects of perpetuating single person/single vehicle transportation on future air quality, water quality, and habitat value inside and outside of the project area.

Section 2. Federal agencies have specific additional responsibilities under Section 7 of the ESA. To help you fulfill these responsibilities, we are providing an updated list of threatened (T) and endangered (E) species that may occur within the area of influence of your proposed action.

County	Species	Status
DAVIS		
Bald Eagle[1,3]	*Haliaeetus leucocephalus*	T
SALT LAKE		
Bald Eagle[1,3]	*Haliaeetus leucocephalus*	T

[1] Nests in this county of Utah.
[3] Wintering populations (only four known nesting pairs in Utah).

The proposed action should be reviewed and a determination made if the action will affect any listed species or their critical habitat. If it is determined by the Federal agency, with the written concurrence of the Service, that the action is not likely to adversely affect listed species or critical habitat, the consultation process is complete, and no further action is necessary.

Formal consultation (50 CFR 402.14) is required if the Federal agency determines that an action is "likely to adversely affect" a listed species or will result in jeopardy or adverse modification of critical habitat (50 CFR 402.02). Federal agencies should also confer with the Service on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10). A written request for formal consultation or conference should be submitted to the Service with a completed biological assessment and any other relevant information (50 CFR 402.12). Candidate species have no legal protection under the Endangered Species Act (ESA). Candidate species are those species for which we have on file sufficient information to support issuance of a proposed rule to list under the ESA. Identification of candidate species can assist environmental planning efforts by providing advance notice of potential listings, allowing resource managers to alleviate threats and, thereby, possibly remove the need to list species as endangered or threatened. Even if we subsequently list this candidate species, the early notice provided here could result in fewer restrictions on activities by prompting candidate conservation measures to alleviate threats to this species.

Only a Federal agency can enter into formal Endangered Species Act (ESA) section 7 consultation with the Service. A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment by giving written notice to the Service of such a designation. The ultimate responsibility for compliance with ESA section 7, however, remains with the Federal agency.

Your attention is also directed to section 7(d) of the ESA, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

Please note that the peregrine falcon which occurs in all counties of Utah was removed from the federal list of endangered and threatened species per Final Rule of August 25, 1999 (64 FR 46542). Protection is still provided for this species under authority of the Migratory Bird Treaty Act (16 U.S.C. § 703-712) which makes it unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs. When taking of migratory birds is determined by the applicant to be the only alternative, application for federal and state permits must be made through the appropriate authorities. For take of raptors, their nests, or eggs, Migratory Bird Permits must be obtained through the Service's Migratory Bird Permit Office in Denver at (303) 236-8171.

We recommend use of the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (Romin and Muck, January 2002) which were developed in part to provide consistent application of raptor protection measures statewide and provide full compliance with environmental laws regarding raptor protection. Raptor surveys and mitigation measures are provided in the Raptor Guidelines as recommendations to ensure that proposed projects will avoid adverse impacts to raptors, including the peregrine falcon.

If we can be of further assistance or if you have any questions, please feel free to contact Chris Witt, Ecologist, at the letterhead address or (801) 975-3330 extension 133.

Sincerely,

Henry R. Maddux
Utah Field Supervisor

cc: Nancy Kang, Chief, Utah Office, U.S. Army Corps of Engineers, 533 West 4700 South, Suite 9A, Salt Lake City, Utah 94010

UDWR – Salt Lake City, Ogden

Regional Office – Region 6 (Attn: NEPA Coordinator)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:

FWS/R6

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

MAY 2 0 2003

David Gibbs, P.E.
Federal Highway Administration
Utah Division
2520 West 4700 South, Suite 9A
Salt Lake City, Utah 84118

Dear Mr. Gibbs:

The U.S. Fish and Wildlife Service has received your letter of January 24 inviting us to be a cooperating agency in preparation of a Supplemental Environmental Impact Statement for the proposed Legacy Parkway project in Davis and Salt Lake Counties, Utah. (An identical letter has been sent to Brooks Carter, U.S. Army Corps of Engineers.) We appreciate, and accept, the invitation. As described in your letter, our role would include:

- Consulting on relevant technical studies required for the project.
- Reviewing project information including study results and agree on a time frame for our review.
- Expressing our views on subjects within our jurisdiction or expertise.
- Participating in joint public involvement activities.
- Identifying Environmental Impact Statement content necessary to discharge our National Environmental Policy Act responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

The Utah Ecological Services Field Office will be the lead office for the FWS on this project. Your principal FWS contact will be Dr. Lucy Jordan, Supervisory Fish and Wildlife Biologist, telephone: (801) 975-3330 extension 143; e-mail: lucy_jordan@fws.gov. The project biologist will be Chris Witt, Ecologist, at extension 133; email: chris_witt@fws.gov.

Again, we appreciate the opportunity to participate in the preparation of a Supplemental Environmental Impact Statement for the Legacy Parkway project.

Sincerely,

for Mary Henry
Assistant Regional Director
Ecological Services

Identical letter to:
Brooks Carter
U.S. Army Corps of Engineers

THPO
Skull Valley Band of Gosiute Indians
3359 S. Main Street #808
Salt Lake City, UT 84115
thpo@earthlink.net

Greg Punsky
USDOT/FHWA
Utah Division
2520 West 4700 South, STE. 9A
SLC, UT 84118-1847

June 10, 2003

RE: NA Consultation

Mr. Punsky,

We appreciate the USDOT/FHWA (FHWA) recent consultation requests. The following discusses procedures, compliance with HPL, and pressing issues that require resolution. For the immediate future until the relationship with the UDOT improves we request that FHWA continue consultation responsibilities for the Federally Funded State Agency. Please keep in mind DOT 186-99 "U.S. Transportation Secretary Slater Signs Order Establishing New Policy For Working with Native Americans".

First, We are extremely concerned with the Legacy Highway Project in the areas of environmental, sacred, and Cultural Resources issues. We understand that the USDOT/FHWA is a Joint Lead Agency. There are numerous compliance issues that arose during the original phase of this project which involve cultural resource and NAGPRA concerns.

As we understand two sets of skeletal remains and numerous archaeological sites were located during the original project. Federal Funding allows the FHWA and Army Corps of Engineers to be Lead Agencies for the Environmental Impact Statement. For these reasons and the expenditure of Federal Funding for the oversight of two sister Agencies, it is of utmost importance for your Agency to comply with relevant Historic Preservation Law. As we understand the State will utilize Federal Grants to build the proposed highway if approved. We expect Federal Oversight to continue throughout all phases of this project.

During January 2003 the Band sent your agency an Indigenous Lands Cultural Patrimony Map. We request that your Agency consult with the Band on all projects within this area. As can be gleaned from the map,

the Wasatch Front area between Ogden, and North of Utah Lake is an area the Gosiute utilized along with the Northern Ute and Northwest Band of the Shoshone Indians. We recommend in this area that all three Tribes be consulted.

Concerning skeletal remains unearthed and desecrated due to project planning for the proposed Legacy Highway Project, we request that these remains and associated and un-associated funerary objects be repatriated to the Band as soon as possible. Due to the use of Federal Funding for oversight of the project, the jurisdiction of the NAGPRA related human remains and objects falls within Federal Jurisdiction.

This is an official claim for the repatriation of skeletal remains, associated and unassociated funerary items and sacred objects desecrated and removed from ancestral land, in this case the Federal Law takes precedence due to the use of Federal Oversight. It is the responsibility of the Lead Agencies to comply with Historic Preservation Law before the expenditure for funding and license or permit of any project.

This repatriation claim is made under the authority of the Native American Grave Protection and Repatriation Act (NAGPRA: Public Law 101-601' 104 Stat. 3048: 25USC3001).

Our intention is to repatriate all, NAGPRA protected materials. We are basing this cultural affiliation claim on reserved Treaty Rights, Indian Claims Commission findings an historical documentation of ancestral lands, human rights, religious freedom, spirituality, and the preponderance of scientific evidence. As provided under NAGPRA 25 USC - Sec 2 - Sec 3 (1) (2) (a-b-c (1), we request the immediate return of these ancestors and material culture objects.

No consumptive analysis of these remains is permitted or authorized and we are firm in our conclusions that the above referenced scientific an historical evidence supports this claim. Any further scientific analysis used to support undocumented scientific findings is unnecessary and would be a violation of NAGPRA.

As has been gleaned from recent NA Consultation requests from your Agency between November 26, 2003 and May 25, 2003 the following concerns are related.

Sacred, Spiritual, Religious concerns: Particular geography or power centers that emanate from Grandmother earth are cave

openings, rock-shelters, caves, springs, ponds, streams, lakes, rock overhangs, outcrops, canyons, mountain tops, volcanic vents, hot springs, geologic hoodoos, large trees, ancient trees, and so on, within striking natural features. Sacred Earth Matrix is considered holy places where "prayer offerings, and ceremonies take place. Any excavation or looting of these sites is extreme reasons for concern with the Band. In the future we would like to work with your staff in identifying sacred items removed from the matrix through excavation within the Gosiute ancestral land.

As is usually the case in areas where extreme disturbance and Urban Sprawl has occurred, many cultural resources are located through undertaking activities. We are concerned that when project oversight leaves the watchful oversight of the Federal Lead Agencies that the same care and protection provided by our Nations Historic Preservation Law is not considered fully. We request that Federal Oversight of entire project phases be done, so as to allow for compliance.

The following discusses specific concerns with undertakings.

A recurrent problem in reports is that the contemporary mainstream Culture History of the archaeology in the area is void of Gosiute modulation and orientation before 1,350 A.D. We do not agree with the Culture History. We are writing a Band Culture History for ancestral lands scheduled for completion in December of 2003 (Brewster, Dissertation 2003). However, this document is expected to change as new data are added. We would appreciate having an equal voice in the scientific analysis of our ancestral lands and at this time we require that a disclaimer be added to reports:

> Presently, the Skull Valley Band of Gosiute Indians does not agree with the current Eastern Great Basin archaeological culture history due to its exclusion of Gosiute thought and disconnection from ancestors. A Band Culture History is in development to offer a Gosiute and Shoshone view on the history of its ancestors in the Region. For the present purpose, the Gosiute and Shoshone assert that the archaeology of the Region supports an in situ development for 12,000+ years.

We request a copy of final archaeological reports for our files. In addition, we will review in house projects only, in keeping with Cultural Resource Management compliance procedure. However, we urge the FHWA in the future, that contract Archaeological Consultant companies

and proponents write Native American Consultation fees into their proposals for work within ancestral Gosiute land.

The Band THPO has, it's own Principal Investigator and these fees are set at the standard rate of $50.00 per hour. Field visits for complex projects with potential site visits include the standard mileage, field rates, and hourly wage for providing services.

Concerning "inadvertent discoveries", of skeletal remains and associated funerary objects and/or cached prayer offerings. We require immediate notification by phone so we can process and coordinate spiritual responsibilities of the Band toward ancestors.

We are planning a training August 28, 2003 for Federal, State, Public and Tribal Cultural Resources Management managers and government. The training concerns Compliance with Historic Preservation Law. We will contact you with the official notification for this training that will be held at the Indian Walk in Center. The Advisory Council on Historic Preservation will also provide a Lecture concerning the compliance at this training.

Please contact us at your earliest convenience and if you require further data please do not hesitate to contact us at the above address.

Thank You,

LEON BEAR
Band Executive

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Regulatory Branch

June 13, 2003

Mayor Rick Miller
Fruit Heights
910 S. Mountain Road
Fruit Heights, UT 84037

RE: Participation Opportunities for Preparation of the Legacy Parkway Supplemental Environmental Impact Statement (SEIS)

Dear Mr. Mayor:

The U.S. Army Corps of Engineers (Corps) and Federal Highway Administration (FHWA) invite you to take an active role in the development of the supplemental environmental impact statement (SEIS) for the Legacy Parkway project.

Community Planning and Information Committee (CPIC)
At the Legacy Parkway public scoping meetings in April 2003, the citizens and communities informed us of their desire to be involved in the Legacy SEIS process. We are therefore forming a Community Planning and Information Committee (CPIC) to help us better collect and share information that is critical to our technical work on the environmental analysis.

Concurrent with the development of the Legacy SEIS, FHWA is reevaluating the draft environmental impact statement (DEIS) for the I-15 North project. Both the Legacy Parkway project and the I-15 North project are components of the "Shared Solution" for transportation issues in the north corridor. Since both projects are related and dependent upon one another, we'll be using the CPIC meetings to gather information for the I-15 North project as well. We welcome your participation in this effort, and ask that you designate two persons from your organization's Planning and Development Department or Public Works Department to participate in the CPIC and to attend the meetings. (No more than two representatives per organization please.)

CPIC Meetings
We currently anticipate three CPIC meetings this year related to the Legacy Parkway and I-15 North projects. In addition to these meetings, the Legacy Parkway team will be holding more meetings once development of the Legacy SEIS is initiated, and the I-15 North team will be holding more meetings as their process progresses.

The first CPIC meeting is scheduled for Thursday, July 10, 2003, from 2:00 to 4:00 p.m., at the Bountiful City Hall, 790 South 100 East, Bountiful, Utah. The first meeting will provide a status update on the I-15 North reevaluation and an opportunity to address Legacy Parkway topics,

including the proposed trail, the narrower right-of-way, and the D&RG Regional Alignment. The following issues will be covered:

- How would a roadway alignment within the D&RG corridor impact your community?

- Where would you like to see a trail in your community, if a trail is not proposed adjacent to the Legacy Parkway?

The second CPIC meeting is proposed for late July or early August. The meeting will address the findings of the I-15 North reevaluation and sequencing and integration of the Legacy Parkway project.

Your Response
We request your response to our invitation by Thursday, June 26, 2003. You may respond by calling or emailing Kimberly Stevens at 801-951-1026 ext. 317 or kstevens@jsanet.com. If you have any questions about the CPIC, please call Nancy Kang at the Corps (801-295-8380 ext. 14) or Greg Punske at FHWA (801-963-0078 ext. 237).

Sincerely,

Nancy Kang
Chief, Utah Regulatory Office
U.S. Army Corps of Engineers

cc: Greg Punske, Project Development Engineer, FHWA
Andrew Gemperline, UDOT

enclosure

Local Government Recipient List

Commissioner Dannie R. McConkie
Davis County
Davis County Memorial Courthouse
P.O. Box 618
Farmington, UT 84025

Mayor Carl Martin
West Bountiful City
550 North 800 West
West Bountiful, UT 84087

Mayor Joe Johnson
Bountiful City
P.O. Box 369
Bountiful, UT 84010-0369

Mayor Mike Deamer
Centerville City
3500 South Main, Suite 206
Salt Lake City, UT 84115

Mayor Kay Briggs
North Salt Lake City
P.O. Box 208
North Salt Lake, UT 84054

Mayor Jerry Larrabee
Woods Cross City
466 North 900 West
Kaysville, UT 84037

Mayor David Connors
Farmington City
P.O. Box 160
Farmington, UT 84025-0160

Mayor Nancy Workman
Salt Lake County
2001 S. State, Suite N2100
Salt Lake City, UT 84190

Mayor Rocky Anderson
Salt Lake City Corporation
451 S. State
Salt Lake City, UT 84111

Mayor Brian Cook
Kaysville City
23 E. Center
Kaysville, UT 84037

Mayor Rick Miller
Fruit Heights
910 S. Mountain Road
Fruit Heights, UT 84037

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Regulatory Branch

June 13, 2003

Mick Crandall
UTA
221 West 2100 South
Salt Lake City, UT 84115

RE: Participation Opportunities for Preparation of the Legacy Parkway Supplemental Environmental Impact Statement (SEIS)

Dear Mr. Crandall:

The U.S. Army Corps of Engineers (Corps) and Federal Highway Administration (FHWA) invite you to take an active role in the development of the supplemental environmental impact statement (SEIS) for the Legacy Parkway project.

Community Planning and Information Committee (CPIC)
At the Legacy Parkway public scoping meetings in April 2003, the citizens and communities informed us of their desire to be involved in the Legacy SEIS process. We are therefore forming a Community Planning and Information Committee (CPIC) to help us better collect and share information that is critical to our technical work on the environmental analysis.

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Sincerely,

Nancy Kang
Chief, Utah Regulatory Office
U.S. Army Corps of Engineers

cc: Greg Punske, Project Development Engineer, FHWA
Andrew Gemperline, UDOT

enclosure

Recipient List

Chuck Chappell
Wasatch Front Regional Council
295 N. Jimmy Doolittle Road
Salt Lake City, UT 84116

Mick Crandall
UTA
221 West 2100 South
Salt Lake City, UT 84115

Stephen Holbrook
Executive Director
Envision Utah
254 S. 600 E.
Salt Lake City, UT 84102

David Schaller
8P-R
US EPA, Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466

Roger Borgenicht
Chair, Future Moves Coalition for
Utahns for Better Transportation
218 E. 500 S.
Salt Lake City, UT 84111

Nina Dougherty
Sierra Club
Utah Chapter Office
2120 S. 1300 E.
Suite 204
Salt Lake City, UT 84106-3785

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

RECEIVED OCT 0 6 2003

REPLY TO
ATTENTION OF

October 2, 2003

Regulatory Branch (200350493)

Nancy Keate
Utah Department of Natural Resources
Division of Wildlife
1594 West North Temple, Suite 2110
P.O. Box 146301
Salt Lake City, Utah 84114-6301

Dear Dr. Keate:

The Corps of Engineers and the Federal Highway Administration are developing a Supplemental Environmental Impact Statement (SEIS) to re-evaluate the environmental effects of the Legacy Parkway Project proposed by Utah Department of Transportation. As you are aware, the project was subject to litigation and a court decision. This SEIS will be used to address limited deficiencies identified by the Court and, where needed, will update, when needed, portions of the original Final EIS (FEIS) dated June 2000.

We are currently reviewing our assessment of the project's impacts to wetlands made in the FEIS. In accordance with Nation Environmental Policy Act regulations (40 CFR 1502.9(c)), we are required to supplement our original environmental document if we determine (1) there were substantial changes in the proposed action that are relevant to environmental concerns; or, (2) there are significant new circumstances or information relevant to the environmental concerns and bearing on the proposed action or its impacts.

Although the Court upheld our reliance on the functional analysis methodology used in the original FEIS, we still must consider whether there is significant new information to warrant a supplement. As you are recognized as the State's leading wetland scientist and technical expert on the hydrogeomorphic functional assessment (HGM) methodology, we would like your assessment on whether recent improvements to the Great Salt Lake Ecosystem Slope Wetlands HGM model would constitute "significant new circumstances or information."

Under separate cover we have sent a copy of the original FEIS sections related to wetlands, including the technical appendix of the original HGM analysis for your review. While the decision to revise the wetland section is under the authority of the Corps of Engineers, we would appreciate your expert input.

Thank you for your cooperation. If you have any questions, please contact me at our Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, or email Nancy.Kang@usace.army.mil, or telephone 801-295-8380, extension 14.

Sincerely,

ORIGINAL SIGNED

Nancy Kang
Chief, Utah Regulatory Office

Copy furnished:

✓Andrew Gemperline, P.E., Utah Department of Transportation, 360 North 700 West, Suite F 2nd Floor, North Salt Lake, Utah 84054
Greg Punske, P.E., Federal Highway Administration, 2520 West 4700 South, Suite 9A, Salt Lake City, Utah 84118-1847

November 18, 2003

Field Supervisor
United States Department of the Interior
Fish And Wildlife Service
2369 West Orton Circle
West Valley City, Utah 84119

RE: Environmental Re-Evaluation of the Legacy Parkway Final Environmental Impact Statement

Dear Field Supervisor:

The proposed Legacy Parkway would be a four-lane, limited-access, divided highway extending approximately 22.5 kilometers (14 miles) from Interstate 215 at 2100 North in Salt Lake City northward to I-15 and U.S. 89, near Farmington, Utah (see attached project location figures). The primary purpose of the Legacy Parkway project is to provide a portion of the transportation facilities needed in the North Corridor to accommodate the safe and efficient movement of people and goods projected for the year 2020.

A Final Environmental Impact Statement (FEIS) for the Legacy Parkway was released in June 2000, however, The United States Court of Appeals, 10th Circuit remanded the FEIS in September 2002 for further consideration. Under direction of the Federal Highway Administration and U.S. Army Corps of Engineers, an Environmental Re-evaluation of the Legacy Parkway Final Environmental Impact Statement (FEIS) is being prepared to support drafting of the Legacy Parkway Supplemental Environmental Impact Statement (SEIS).

Section 4.15 of the FEIS presented the following as federally listed Threatened or Endangered species potentially affected:

Species			
Common Name	**Scientific Name**	**Status**	**Known or Potential Effect**
Ute ladies' tresses	*Spiranthes diluvialis*	Threatened	No effect; not located in study area
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	Likely to be affected
Mountain Plover	*Charadrius montanus*	Proposed Threatened	Not likely to be affected because distribution is outside study area

A Final Formal Biological Opinion for the Legacy Parkway project was received from the USFWS, dated February 11, 1999, wherein the Service concurred with a biological assessment that the proposed project may affect and is likely to adversely affect the bald eagle and peregrine falcon (*Falco peregrinus*). The Biological Opinion also states that the Legacy Parkway is not likely to jeopardize the continued existence of the bald eagle and that no critical habitat has been designated for the bald eagle in Utah, so none would be affected.

A letter from the USFWS dated September 17, 1999, acknowledged the removal of the peregrine falcon from the federal list of endangered and threatened wildlife, and stated that the terms and conditions of its former Biological Opinion are no longer considered nondiscretionary with respect to the peregrine falcon. Nevertheless, the USFWS still recommended implementing all strategies outlined in the Biological Opinion to prevent any violations under the Migratory Bird Treaty Act.

Please let us know if the USFWS still concurs with the determination outlined in the Biological Opinion and whether information provided from the FEIS remains current for the subject proposed project.

Sincerely,

HDR, Inc.

Mike Perkins
Biologist
Legacy Parkway Team
360 North 700 West, Suite F
North Salt Lake, UT 84054

cc: project files

United States Department of the Interior

FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
04-0221

December 3, 2003

Mike Perkins
Biologist
Legacy Parkway Team
360 North 700 West, Suite F
North Salt Lake, UT 84054

Dear Mr. Perkins:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter of November 18, 2003 requesting concurrence outlined in the February 11, 1999 Biological Opinion (BO) for the Legacy Parkway Final Environmental Impact Statement. The Service maintains that the BO is still in effect. However, your document lists the mountain plover (*Charadrius montanus*) as Proposed Threatened. At this time, the mountain plover is no longer proposed for listing and can be removed from the species list for your project area.

We appreciate the opportunity to provide these comments. If you need further assistance, please contact Chris Witt, Ecologist, at the letterhead address or (801) 975-3330 ext. 133.

Sincerely,

For Henry R. Maddux
Utah Field Supervisor

cc: UDWR - SLC
FHWA - Attn: Greg Punske
COE - Attn: Nancy Kang

Weber County to Salt Lake City Commuter Rail Project
Partnering Charter
July 15, 2004

Mission:

We agree to work together as a team to complete the design and construction of the Weber County to Salt Lake City Commuter Rail Project in a way that meets the transit, highway and freight railroad needs in a safe, efficient and cost-effective manner.

The success of our efforts on behalf of the Commuter Rail project will be measured by the public in their acceptance and use of commuter rail and by the stakeholders, including neighborhoods and communities, as the commuter rail operates as part of an integrated and complementary transportation system that provides for the safe and efficient movement of people, goods and services.

Objectives:

Safety: We agree to design, construct, and operate a project that will provide safe conditions for transit and highway system patrons, construction workers, pedestrians, freight railroad employees, highway construction and maintenance crews, and the people living and working adjacent to the corridor.

Teamwork: We agree to work together to achieve our mutually agreeable and beneficial goals in a spirit of cooperation, positive reinforcement, trust, respect and accountability and to work together in making decisions in a timely manner.

Cost-Effectiveness: We agree to maintain a strong focus on finding and implementing the most cost-effective solutions to the design and construction of the project and performing the work within the agreed budgets. All team members will continue to look for value engineering opportunities early on without compromising the integrity of the railroad, highway and transit systems.

Quality: We agree to design and construct the project in accordance with recognized standards which meet the long-term needs for transit users, communities, and adjacent railroad and highway systems, offers value for the investment, is compatible with the environment and provides a safe, reliable, clean, quiet, efficient and comfortable riding experience.

Schedule: We agree to make the on-time completion of the project a high priority by developing and adhering to a mutually agreeable schedule, timely resolving problems, and utilizing resources appropriately.

Communication: We agree to establish and maintain clearly defined channels of communication between the stakeholders and the public, and communicate in an open and positive manner.

Construction Impacts: We agree to collaborate as a team in minimizing construction impacts to the stakeholders and their customers.

Issue Resolution: We agree to seek early identification and timely resolution of differences in an atmosphere of openness, accessibility, fairness, understanding, mutual agreement, listening, mutual respect and attention to details.

Environmental Awareness: We agree to pursue the design, construction and operation of this system with conformance to the commitments within the environmental document and to existing laws, regulations and community concerns. Special attention will be given to communicating with the permitting/regulatory agencies.

UDOT CONNECTING COMMUNITIES UTA UNION PACIFIC

Andrew Hyperline

Randy Wagner

Shannon T. Ogee

Jerry Lirhart

Tony K Lore

Al Farrow

Carter Hill

Kevin J. Farley

Michael J. Bass

Alan Bach

Dave Orrell

Michael A. Fortner

M J Christensen

Wm. Jeff Jeffery.

Mark C. Cain

Al Pillé

Kevin Sag McSell

Roger L. Muse

Howard J. Anderson

Ted Lutkers

Mike Frazier

Jim Bolin

Paul M Dawley

Tony W. Armstrong

Rick Campagna

Steve Nagle

RECEIVED SEP 27 2004

BOUNTIFUL

City of Beautiful Homes and Gardens

JOE L. JOHNSON
MAYOR

CITY COUNCIL
BARBARA HOLT
R. FRED MOSS
JOHN S. PITT
J. GORDON THOMAS
TOM TOLMAN

CITY MANAGER
TOM HARDY

September 23, 2004

John Thomas, P.E.
Legacy Parkway Project Manager
360 N. 700 West Suite F
North Salt Lake, UT 84054

RE: Bountiful Recreation Pond
South of Bountiful Sanitary Landfill

Dear Mr. Thomas

By letter of December 11, 1997 and a follow-up letter of September 2, 1999, we provided HDR Engineering, then the Utah Department of Transportation's (UDOT's) contractor for the Legacy Parkway Environmental Impact Statement, with information concerning the Bountiful Recreation Pond (the "Pond") and our views on possible impacts of the planned Legacy Parkway on this property. We asked that "impacts of the proposed highway should be kept as minimal as possible" and presented our views on several specific items.

In the years since those letters, we have been pleased to maintain an open dialogue with UDOT and the federal agencies working on the Legacy Parkway. We believe that the Legacy Parkway has been designed and planned to have no impacts to the Pond. Bountiful fully supports prompt development of the Legacy Parkway at the location known as the Preferred Alternative. To assist in the ongoing review of this project, Bountiful City offers additional information concerning the pond property.

The property upon which the Pond is located was originally acquired by Bountiful City with the intent of using the property in landfill operations, specifically as an area to mine clay cover soil for use at the landfill and/or possible landfill expansion or equipment and materials storage. In 1991 Bountiful received a 404 permit from the U.S. Army Corps of Engineers which allowed us to excavate over 650,000 cubic yards of clay soil from the property for use in our landfill operations. As part of this construction project, Barton/Stone creek was concrete lined and diverted into the excavation. This is how and why the Pond was created. At that point people began using the area for recreational purposes such as fishing and bird watching. These activities were not encouraged by the City and the property was not managed as a recreational facility by the City.

In December 2001 Bountiful City applied for and obtained a grant to improve and construct some recreational facilities at the Pond location. We previously submitted to you a copy of the grant agreement and a site plan which shows the improvements at the pond. The site plan clearly shows the areas which the City determined would be the most appropriate for recreational development

Mark W. Franc P. E.
Bountiful City Engineering Deparment
790 South 100 East • P.O. Box 369 • Bountiful, Utah 84011-0369 • (801) 298-6125 • FAX (801) 298-6033 • mfranc@bountifulutah.gov

and areas which would be most appropriate for potential other uses (the undeveloped areas). As part of the grant agreement Bountiful City agreed to maintain the recreational facilities for at least the next 30 years which we intend to do.

In addition to maintaining the designated recreational facilities at the property, the City intends to use other parts of the property for other municipal purposes as needed. These may include equipment and/or materials storage, staging, or as a source for additional clay soil. This multiple use management is necessary because Bountiful City cannot predict whether parts of the pond property may be needed for these or other municipal purposes.

Under current and future planned management, no recreational improvements or activities are existing or planned in the southeast corner of the Pond property. This area is unused acreage within the property boundary that Bountiful has long decided will be part of the Legacy Parkway Preferred Alternative alignment. The City approached the design of the recreational facilities and the ongoing management of the facilities with full knowledge and intent that this part of the property should be used for the Legacy Parkway and as future access to the recreational facilities.

It is our understanding that the current design for the Legacy Parkway does not impact any portion of the Pond and/or any recreational features associated with the Pond. We feel that our recreational facility and our ability to manage it as such will not be negatively impacted by construction of the Legacy Parkway as currently designed at the location known as the Preferred Alternative. In fact, we feel that the Parkway and the included frontage road adjacent to the Pond property will improve and create planned access to recreational areas of the property that currently have limited access.

We have taken steps in obtaining and administering the funds from the grant to carefully consider how the property can best be used under a multiple use management system. We understand that, based on our prior letters, the federal agencies considered the entire Pond property to be a significant recreational resource. As owners and managers of the property, we believe that conclusion is not correct. We would be happy to provide any additional information that you may find useful.

Sincerely,
Bountiful City Engineering Dept.

Mark W. Franc, P.E.
Asst. City Engineer

DETERMINATION OF ELIGIBILITY
AND
FINDING OF EFFECT

for

PROJECT NO. SP-0067(1)0: LEGACY PARKWAY
(FORMER LEGACY WEST DAVIS HIGHWAY)
SALT LAKE AND DAVIS COUNTIES, UTAH

Prepared by the

FEDERAL HIGHWAY ADMINISTRATION, UTAH DIVISION

and the

UTAH DEPARTMENT OF TRANSPORTATION

Submitted to the

UTAH STATE HISTORIC PRESERVATION OFFICE

Wilson Martin, State Historic Preservation Officer

November 3, 2004

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Exhibit 2 – Map of Historic Structures in Northern Half of the Corridor

Exhibit 3 – Map of Historic Structures in Southern Half of the Corridor

SUMMARY SHEET

1.	Project:	SP-0067(1)0: Legacy Parkway	
2.	Location	Salt Lake to Farmington, Salt Lake and Davis Counties, Utah	
3.	Funding:	State	
4.	Lead Federal Agency:	Federal Highway Administration & U.S. Army Corps of Engineers	
5.	Inventory/Evaluation Reports:	Author(s)	Title
		(Colman and Coleman et. al. 1998	*A Cultural Resources Inventory of the Proposed Legacy-West Davis Highway in Davis and Salt Lake Counties, Utah*
		(Colman 1999)	*Cultural Resource Inventory of Wetland Mitigation Areas for the Legacy Parkway*,
		(Overstreet, Seacat et. al., 2004)	*Supplemental Cultural Resources Report for the Proposed Legacy Highway Project from Salt Lake City, Salt Lake County to Kaysville, Davis County, Utah*
		(Wright 2001),	*Class III Cultural Resource Inventory for the Legacy Nature Preserve, Davis County, Utah*
		(Elsken 2004),	*Documentation of the Woodman Townsite, the Antelope Island Improvement Company Boat Landing, the Lake Shore Bathing Resort, and Associated Features for the Legacy Parkway Project in Davis County, Utah*
		(Seddon & Lundin, 2003),	*Site DV94: A Human Remains Discovery in the Jordan River Wetlands, Davis County, Utah*
		(Seddon, et. al. 2004)	*Industrial Debris and the Bottle Louse: Data Recovery at the Lagoon Drive Discovery Site (42DV 93) on the Legacy Parkway project, Farmington, Davis County, Utah*
6.	Historic Properties:	See Table 1.	
7.	Affected Historic Properties:	Alt. A	42Dv2, 42Dv94, 42Dv97, D&RG railroad, 10 N 650 W, Farmington, Clark Lane Historic District, 662 W Clark Lane, Farmington
		Alt. B	42Dv2, 42Dv70, 42Dv77, 42Dv90, 42Dv94, D&RG railroad, 1300 Glover Lane, Farmington, Clark Lane Historic District, Farmington, 662 W Clark Lane, Farmington, 10 N 650 W, Farmington

		Alt. C	42Dv2, 42Dv94, 42Dv97, D&RG railroad, Clark Lane Historic District, Farmington, 662 W Clark Lane Farmington, 10 N 650 W, Farmington
		Alt. D&E	42Dv2, 42Dv94, 42Dv97, D&RG railroad, Clark Lane Historic District, Farmington, 662 W Clark Lane Farmington, 10 N 650 W, Farmington
		Redwood Alt.	42Dv2, 42Dv67, 42Dv94, 836 S Redwood Woods Cross, 918 S Redwood, Woods Cross, 946 S Redwood, Woods Cross, 974 S Redwood, Woods Cross, 1650 S Redwood, Woods Cross, 2018/2020 S Redwood, Woods Cross, 2408 S Redwood, Woods Cross, 1095 N Redwood, North Salt Lake, D&RG railroad, Clark Lane Historic District, Farmington, 662 W Clark Lane Farmington, 10 N 650 W, Farmington
		Alt. A	42Dv2, 42Dv94, 662 W Clark Lane, Farmington, 10 N 650 W, Farmington
8.	Project Effect: Adverse Effect	Alt. B	42Dv70, 42Dv77, 42Dv90, 1300 Glover Lane, Farmington, 662 W Clark Lane Farmington, 10 N 650 W, Farmington
		Alt C	42Dv2, 42Dv94, 662 W Clark Lane, Farmington, 10 N 650 W, Farmington
		Alt D&E	42Dv2, 42Dv94, 662 W Clark Lane, Farmington, 10 N 650 W, Farmington
		Redwood Alt.	42Dv2, 42Dv67, 42Dv94, 836 S Redwood Woods Cross, 918 S Redwood, Woods Cross, 946 S Redwood, Woods Cross, 974 S Redwood, Woods Cross, 1650 S Redwood, Woods Cross, 2018/2020 S Redwood, Woods Cross, 2408 S Redwood, Woods Cross, 1095 N Redwood, North Salt Lake, 662 W Clark Lane, Farmington, 10 N 650 W, Farmington

Table 1: Sites Recorded during the Surveys

In-Period Historic Structures					
Address	City	Year	Type	Eligibility	
326 Burke Lane	Farmington	1920	Hall Parlor House	N	
1300 Glover Lane	Farmington	1950	Animal Facility	Y	
415 S 650 W	Farmington	1950	Animal Facility	Y	
637 S 650 W	Farmington	1910	Cross Wing House/Animal Facility	Y	*
2120 S 650 W	Farmington	1930	Animal Facility	Y	
1515 N 1100 W	W. Bountiful	1920	Foursquare House	Y	
2125 N 1100 W	W. Bountiful	1940	Animal Facility	Y	
772 S Redwood	Woods Cross	1930	Bungalow House	N	
808 S Redwood	Woods Cross	1930	Bungalow House	N	
836 S Redwood	Woods Cross	1950	WWII Era Cottage	Y	
864 S Redwood	Woods Cross	1930	Bungalow House	N	#
918 S Redwood	Woods Cross	1920	Cross Wing House	Y	
946 S Redwood	Woods Cross	1950	WWII Era Cottage	Y	*
974 S Redwood	Woods Cross	1920	Bungalow House	Y	
1430 S Redwood	Woods Cross	1920	Cross Wing House	N	*
1452 S Redwood	Woods Cross	1950	WWII Era Cottage	Y	
1650 S Redwood	Woods Cross	1920	Cross Wing House	Y	*
2018/2020 S Redwood	Woods Cross	1920	Cross Wing House	Y	
2408 S Redwood	Woods Cross	1950	WWII Era Cottage	Y	
1095 N Redwood	N. Salt Lake	1950	WWII Era Cottage	Y	
ca. 900 N Redwood	N. Salt Lake	1905	Foursquare House	Y	
3290 N 2200 W	N. Salt Lake	1950	Ranch House	Y	
3200 N 2200 W	N. Salt Lake	1955	Ranch House	Y	
2790 N 2200 W	N. Salt Lake	1950	WWII Era Cottage	N	#
2770 N 2200 W	N. Salt Lake	1920	Foursquare House	Y	
2704 N 2200 W	N. Salt Lake	1950	WWII Era Cottage	N	
2662 N 2200 W	N. Salt Lake	1930	Bungalow House	Y	
2650 N 2200 W	N. Salt Lake	1950	WWII Era Cottage	Y	
2664 N Rose Park Lane	N. Salt Lake	1910	Foursquare House	Y	
393 W State Street	Farmington	1910	Cross Wing House	N	
Clark Lane Historic District	Farmington	Varies	District	Y	*
662 W Clark Lane/ 650 W. Clark Lane	Farmington	1950	Animal Facility	Y	*
10 N. 650 West	Farmington	1910	Temple Form House	Y	*
453 W Glovers Lane	Farmington	1955	WWII Era Cottage	N	

Archaeological Sites			
Site Number	Type	Eligibility	
42Dv2	Prehistoric	Y	*
42Dv3	Prehistoric	?	
42 Dv4	Prehistoric	?	
42 Dv22	Prehistoric	N	
42 Dv35	Prehistoric	Y	
42Dv67	Historic	Y	*
42Dv68	Historic	N	*
42Dv69	Historic	N	#
42Dv70	Prehistoric	Y	*
42Dv71	Historic	N	*
42Dv72	Prehistoric	Y	*
42Dv73	Historic	N	*
42Dv74	Multi-Component	Y	*
42Dv75	Historic	N	*
42Dv76	Prehistoric	Y	*
42Dv77	Prehistoric	Y	*
42Dv80	Prehistoric	Y	***
42Dv88	Prehistoric	Y	***
42Dv89	Historic	N	#
42Dv90	Historic	Y	
42Dv91	Historic	N	**
42Dv92	Historic	N	**
42Dv93	Historic	N	
42Dv94	Prehistoric	Y	
42Dv97	Historic	Not Evaluated	
42Dv98	Multi-Component	Y	
42Dv102	Historic	N	
42Dv103	Historic	N	
42Dv112	Historic	N	
42Dv113	Historic	N	
42Sl154/182	Multi-Component	Y	*
42Sl155	Prehistoric	N	*
42Sl197	Prehistoric	N	
42Sl241	Historic	N	*
42Sl242	Multi-Component	Y	*
42Sl243	Historic	N	*
42Sl244	Prehistoric	N	*
42Sl245	Multi-Component	N	*
42Sl246	Prehistoric	Y	*
42Sl247	Historic	N	*
42Sl248	Prehistoric	Y	*
42Sl249	Prehistoric	N	*
42Sl250	Historic	N	*

42Sl251	Historic	N	*
42Sl252	Prehistoric	N	*
42Sl253	Historic	N	*
42Sl254	Historic	N	*
42Sl255	Historic	Y	*
D&RG Railroad	Historic	Y	
UP Railroad	Historic	Y	
* = Eligibility determined with SHPO concurrence in August 31, 1998 DOE/FOE			
** = Eligibility determined with SHPO concurrence in July 18, 2002 DOE/FOE			
*** = Eligibility determined with SHPO concurrence in June 5, 2002 DOE/FOE			
# = Change in eligibility determination from previous DOE/FOE			

Introduction

This documentation is a Determination of Eligibility and Finding of Effect (DOE/FOE) for State highway project No. SP-0067(1)0; Legacy Parkway, Salt Lake and Davis Counties, Utah. This project will comply with all federal regulations because it has the potential to use Federal-aid highway funds. This document specifies the consideration given to historic properties in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended, and 36 CFR 800: Protection of Historic Properties. The Federal Highway Administration, Utah Division (FHWA) and the U.S. Army Corps of Engineers are the lead federal agencies for purposes of Section 106. The Utah Department of Transportation (UDOT) is the state highway agency coordinating this project, and is the applicant for federal funds. A summary sheet condensing pertinent project data is provided at the beginning of this document to expedite Section 106 reviews.

A DOE/FOE was prepared for the Legacy Parkway project originally on August 31, 1998. A lawsuit was filed subsequent to the Record of Decision on the Environmental Impact Statement (EIS) prepared for the project. Based upon the results of the lawsuit, a Supplemental EIS will be prepared. This DOE/FOE re-examines and re-evaluates site eligibility and effects based upon proposed project design changes and the passage of time. This DOE/FOE replaces the August 31, 1998 DOE/FOE and will be used to evaluate impacts to historic properties in the Supplemental EIS. Differences in the reporting of historic properties between this document and the 1998 DOE/FOE are the result of additional inventories, more properties becoming in-period, and non-project related demolition/removal of historic standing structures. It should be noted that several sites eligible for the NRHP have been affected by construction work that took place on the project prior to the injunction. Portions of 42Dv2 have been excavated. Additional DOE/FOEs have been prepared for actions related to the project. They include a DOE/FOE dated July 18, 2002 for the Legacy Nature Preserve Questar Gas Utility Relocation and a June 5, 2002 DOE/FOE for a Cultural Resource Inventory of the Legacy Nature Preserve. Sites that have had prior eligibility determinations with SHPO concurrence are noted in Table 1.

Based upon the Record of Decision issued on the initial Legacy Parkway project, one historic property determined to be adversely affected was documented and removed, in accordance with the provisions of the associated Memorandum of Agreement (MOA). That property is the White House at 10N 650 W in Farmington. Please note that the White House has been completely removed. For the purposes of this document, and the Supplemental EIS, this property will be listed as having an adverse effect from all alternatives. Additionally,

because impacts to 42Dv2 and 42Dv94 have already occurred, these sites will be listed as having an adverse effect from all alternatives.

Project

The proposed project consists of constructing a new four-lane facility with median and shoulders. The Legacy Parkway project area runs from approximately 2100 North in North Salt Lake to just north of Burton Lane north of Farmington. Several build alternatives and a No Action Alternative are being considered. Each of the build alternatives are four-lane, divided, limit-access highways, but each are on different alignments. This DOE/FOE will determine eligibility of historic properties within the project area and the effects that the various alternatives will have on those properties eligible for the National Register of Historic Places (NRHP).

Project Alternatives

The build alternatives are shown in the attached map(s). The build alternatives are identified by the following titles: Alternative A, Alternative B, Alternative C, Alternative D & E, and the Redwood Road Alternative. Alternative D & E are combined in this discussion as they follow an identical alignment. The difference is that D includes a 328-foot right-of-way width and E has a 312-foot width. Impacts to Historic and Archaeological resources are the same, regardless of the reduction of width. The Redwood Road Alternative is receiving a cursory evaluation based upon existing data. Should this alternative be selected, additional cultural resource surveys would need to be performed in accordance with the provisions for phased identification in 36 CFR 800.4(b)(2).

Historic and Archaeological Resources

The effort to identify and evaluate all historic and archaeological resources within the area of potential effects (APE), as defined by 36 CFR 800.2(c), has been completed and reported in several volumes. These volumes are:

Author(s)	Title
Colman and Coleman et. al. 1998	*A Cultural Resources Inventory of the Proposed Legacy-West Davis Highway in Davis and Salt Lake Counties, Utah*
Colman 1999	*Cultural Resource Inventory of Wetland Mitigation Areas for the Legacy Parkway*
Overstreet, Seacat et. al., 2004	*Supplemental Cultural Resources Report for the Proposed Legacy Highway Project from Salt Lake City, Salt Lake County to Kaysville, Davis County, Utah*
Wright 2001	*Class III Cultural Resource Inventory for the Legacy Nature Preserve, Davis County, Utah*
Elsken 2004	*Documentation of the Woodman Townsite, the Antelope Island Improvement Company Boat Landing, the Lake Shore Bathing Resort, and Associated Features for the Legacy Parkway Project in Davis County, Utah*
Seddon & Lundin, 2003	*Site DV94: A Human Remains Discovery in the Jordan River Wetlands, Davis County, Utah*
Seddon, et. al. 2004	*Industrial Debris and the Bottle Louse: Data Recovery at the Lagoon Drive Discovery Site (42DV 93) on the Legacy Parkway*

The inventory and evaluation efforts have been conducted in accordance with the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 Federal Register Part IV).

Inventory

A total of 85 in-period structures and sites were identified during the inventories for this project. Many more structures are located within the project area, but only those historic or archaeological resources dating prior to 1959 were included for evaluation in the inventories. Included in the various reports for this project, there are a total of 50 prehistoric and historic sites and 35 historic standing structures. Of these properties, 20 prehistoric and historic sites and 25 historic standing structures are considered eligible for the NRHP under one or more criteria. Two prehistoric sites remain unevaluated for eligibility. Two could not be located in the field (42Dv3 and 42Dv4) and the other will require additional testing to make a determination (42Dv97).

Evaluation

In accordance with 36 CFR 800.4(a-d), the NRHP criteria have been applied to all 83 in-period sites. All of the sites are identified below by either an address or a site number. The UDOT/FHWA has made determinations on each of the sites below based upon NRHP requirements

For a complete list of the sites located during the Legacy Parkway surveys, both eligible and non-eligible, see Table 1. All sites from Table 1 are described briefly below and are accompanied by an eligibility determination. A more thorough discussion of each of the sites can be found in the attached reports.

Historic Structures

All of the standing historic structures are determined eligible under criterion C. Because they are eligible for their architecture, boundaries of these historic properties only include the structural elements that contribute to the properties significance.

326 Burke Lane – This is a 1920's hall parlor house that has had substantial alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

1300 Glover Lane, Farmington – This is a ca. 1950's animal facility consisting of several outbuildings. The UDOT/FHWA has determined this site eligible for the NRHP under criterion C.

415 S 650 W, Farmington – This is a ca. 1950's barn. The UDOT/FHWA has determined this site eligible for the NRHP under criterion C.

637 S 650 W, Farmington – This originally was a cross wing house from 1910 that has since been used to house animals. The UDOT/FHWA has determined this site eligible for the NRHP under criterion C.

2120 S 650 W, Farmington – This is a ca. 1930's barn. The UDOT/FHWA has determined this site eligible for the NRHP under criterion C.

1515 N 1100 W, West Bountiful – This is a 1920's Foursquare house. The UDOT/FHWA has determined this site eligible for the NRHP under criterion C.

2125 N 1100 W, West Bountiful—This is a 1940's era animal facility. The UDOT/FHWA has determined this eligible for the NRHP under criterion C.

772 S. Redwood Road, Woods Cross –This is a 1930's bungalow with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

808 S. Redwood Road, Woods Cross – This is a 1930's bungalow with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

836 S Redwood Road, Woods Cross – This is a 1950's World War II (WWII) Era Cottage. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

864 S. Redwood Road, Woods Cross -- This is a 1930's bungalow with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

918 S Redwood Road, Woods Cross – This is a 1920's Cross Wing House. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

946 S Redwood Road, Woods Cross – This is a 1950's WWII Era Cottage. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

974 S Redwood Road, Woods Cross – This is a 1920's Bungalow house. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

1430 S Redwood Road, Woods Cross – This is a 1920's Cross Wing House with alterations. The UDOT/FHWA has determined the house ineligible for the NRHP.

1452 S Redwood Road, Woods Cross – This is a 1950's WWII Era Cottage. The UDOT/FHWA has determined the house eligible for the NRHP under criterion C.

1650 S Redwood Road, Woods Cross -- This is a 1920's Cross Wing House. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

2018/2020 S Redwood Road, Woods Cross -- This is a 1920's Cross Wing House. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

2408 S Redwood Road, Woods Cross -- This is a 1950's WWII Era Cottage. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

1095 N Redwood Road, North Salt Lake -- This is a 1950's WWII Era Cottage. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

ca. 900 N Redwood Road, North Salt Lake – This is a 1900's Foursquare house. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

3290 N 2200 W, North Salt Lake – This is a 1950's Ranch style house. The UDOT/FHWA has determined this house eligible for the NRHP under criterion C.

3200 N 2200 W, N. Salt Lake –This is a 1950's era ranch style house. The UDOT/FHWA has determined it eligible for the NRHP under criterion C.

2790 N 2200 W, N. Salt Lake – This is a 1950's WWII era cottage with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

2770 N 2200 W, N. Salt Lake – This is a 1920's foursquare home. The UDOT/FHWA has determined it eligible for the NRHP under criterion C.

2704 N 2200 W, N. Salt Lake – This is a 1950's WWII era cottage with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

2662 N 2200 W, N. Salt Lake – This is a 1930's bungalow style house. The UDOT/FHWA has determined it eligible for the NRHP under criterion C.

2650 N 2200 W, N. Salt Lake – This is a 1950's WWII era cottage. The UDOT/FHWA has determined it eligible for the NRHP under criterion C.

2664 N Rose Park Lane, N. Salt Lake – This is a 1910's era foursquare house. The UDOT/FHWA has determined it eligible for the NRHP under criterion C.

393 W State Street, Farmington –This is a 1910's era cross wing house with alterations. It is located in the Clark Lane Historic District. The UDOT/FHWA has determined that it does not contribute to the district and it is individually not eligible for the NRHP.

Clark Lane Historic District, Farmington – This is a listed historic district.

662 W. Clark Lane, Farmington – This is a 1950's era animal facility. The UDOT/FHWA determines that the structure is eligible for the NRHP under criterion C.

10 N 650 W, Farmington – This was a 1910 era Temple Form home. It was removed as part of the initial Legacy Highway effort in accordance with the MOA.

453 W Glovers Lane, Farmington – This is a 1950's WWII era cottage with alterations. The UDOT/FHWA has determined it ineligible for the NRHP.

Archaeological Resources

42Dv2 – This property is a large Prehistoric campsite spanning both the prehistoric and historic periods. Excavation were begun in accordance with the original MOA. Excavations were halted prior to completion. During the excavation, human remains were encountered. This site is determined eligible for the NHRP under criterion D.

42Dv3 – This site was identified in the literature search. Site forms did not provide sufficient information to locate the site in the field. Because it could not be located, its eligibility is undetermined.

42Dv4 – This is a prehistoric site that was encountered in the literature search but was not found in the field. Location information was insufficient to locate it and as such, eligibility is undetermined.

42Dv22 – This is a prehistoric human burial located during the earthmoving activities at the Bountiful city dump. The burial was removed and the site is not eligible for the NRHP.

42Dv35 – Is a prehistoric lithic and groundstone scatter. It has previously been determined eligible for the NRHP under criterion D.

42Dv67 – This is a homestead site west of Woods Cross in the Salt Lake Valley. It consists of a collapsed stone, brick, and frame house and the remains of eight outbuildings. Historic trash is present. Data recovery potential is high. It is eligible for the NRHP under criteria C and D.

42Dv68 – This site consists of six structures, two brick and four metal. There are debris mounds indicative of three other structures that are now collapsed. A rail spur runs directly into the site. This site has been removed in association with the Foxboro Development. The UDOT/FHWA has determined the site ineligible for the NRHP.

42Dv69 – This site appears to be associated with 42 DV 68. It also contains six structures, two of brick and four of metal. The site has been removed in association with the Foxboro Development. The UDOT/FHWA has determined the site ineligible for the NRHP.

42Dv70 – Auger testing revealed subsurface artifacts at this site including mano fragments, lithic tools and debris, and a diagnostic Fremont sherd. The UDOT/FHWA has determined the site eligible for the NRHP under criterion D.

42Dv71 – This is a well consisting of a large metal pipe extending about 20 cm above the ground, a stump of a wooden pole and a long, curved piece of metal. There is little potential for subsurface deposits, data recovery potential is minimal, and no association can be made to a person or event. Because of this, the UDOT/FHWA has determined the site ineligible.

42Dv72 – This site is an open camp site near the Jordan River. The site surface exhibited lithic debitage, fire-cracked rock, and groundstone fragments. Diagnostic Fremont sherds were also present. The UDOT/FHWA has determined the site eligible for the NRHP under criterion D.

42Dv73 – This site consists of over 100 shards of glass. In addition, the site contains 20 pieces of white stoneware, all apparently from a single plate. The site bears no indication of buried deposits. Because of the limited potential for data recovery and the lack of association with a person or event, the UDOT/FHWA has determined this site ineligible.

42Dv74 – This is a multi-component site containing lithic material, fire-cracked rock, faunal bone and groundstone fragments. The historic component is a stone and brick foundation, shards of historic glass, and an irrigation ditch and two ponds. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv75 – This site is the remains of a water conveyance system. It includes 12-18 inch wide open metal pipe held in place by a 2 x 4 inch wooden slat framework. The site exhibits low potential for yielding new information on the region's history and is not connected with a person or event of note. Because of this, the UDOT/FHWA has determined this site ineligible.

42Dv76 – Auger testing revealed diagnostic late prehistoric body and rim sherds, chipped stone debitage, and faunal bone. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv77 – Auger testing revealed this site after an obsidian flake was observed on the surface. Thirteen artifacts were recovered including unburned faunal bone, a McKean Lancolate point base of obsidian, and lithic debitage. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv80 –This is an lithic and ceramic scatter located on an old Jordan River channel. Purple glass fragments are also associated with the site. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv88 –This site is a prehistoric lithic and ceramic scatter. Artifacts include lithic debitage and tools, prehistoric ceramics, and fire-cracked rock. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv89 – This site consists of two historic earthen and rock slag berms associated with 24 wooden posts located on the marshy eastern shore of Farmington Bay. The elements may relate to a rail spur and dock associated with the Lake Shore Resort. In a determination made June 5, 2002, the UDOT then determined this site eligible for the NRHP. However, because this site does not appear to contain significant cultural data, and there is little potential for this site to contribute to specialized research questions, the UDOT/FHWA has determined this site ineligible.

42Dv90 – This site consists of a buried historical debris deposit, burned structural material and three concrete foundations. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Dv91 -- This is a earthen water diversion ditch. No structures or features associated with the ditch were located. Because of the lack of association with any important person or event, the UDOT/FHWA has determined this site ineligible.

42Dv92 -- This is an earthen water diversion ditch. No structures or features associated with the ditch were located. Because of the lack of association with any important person or event, the UDOT/FHWA has determined this site ineligible.

42Dv93 – This is a historic trash scatter located by construction monitoring of the Legacy Parkway project. The site consists of a historical/trash debris deposit of glass, ceramics, and metal. Because it was discovered during construction, data recovery and excavation has taken place. The UDOT/FHWA has determined this site ineligible for the NRHP because data recovery has provided a valid sample of the deposit and physical remains capable of yielding relevant information.

42Dv94 – This site consists of human remains discovered eroding from the margins of the City Drain Canal in North Salt Lake City, Utah. The human remains have been fully excavated, but because there is sufficient potential for additional remains to be present in the area, the UDOT/FHWA has determined this site eligible for the NRHP.

42Dv97 -- This is a privy located at 1395 W. Parish Lane, Centerville that was discovered during property acquisition. In consultation with the Utah SHPO, it was determined that testing

would be necessary to determine the eligibility of the site. Because the current injunction prohibits ground disturbance, the UDOT/FHWA has decided to test the site when and if the injunction is lifted. If testing occurs, the UDOT/FHWA will determine eligibility at that time.

42Dv98 – This is a multi-component site consisting of a prehistoric lithic and ceramic scatter and a historical trash scatter. The prehistoric assemblage consists of one ceramic fragment, one groundstone fragment, one projectile point tip and approximately 20 lithic flakes. The historic component contains four ironstone plate fragments and three glass fragments. The historic debris was scattered across the site. A 1 x 1 meter test pit was dug to test the prehistoric component. Prehistoric artifacts were recovered from the pit to a depth of 25 cm. Based upon this information, the UDOT/FHWA has determined the prehistoric component of the site eligible for the NRHP under criterion D and the historic component is determined to be a non-contributory part of the site.

42Dv102 – This is a historic artifact scatter consisting of glass and ceramics. Rodent burrowing and utility excavation have heavily impacted the site. The UDOT/FHWA has determined this site ineligible for the NRHP.

42Dv103 – This is a historic abandoned sewer line located in the Legacy Nature preserve. The site consists of to 685 m long east-west oriented rows of concrete risers and two concrete frames. Overall, the site is in poor condition due to decay and dismantling. The UDOT/FHWA has determined this site ineligible for the NRHP.

42Dv112 – This is the townsite of Woodman. This includes five east/west blocks and four north/south blocks laid out in a grid pattern. Apparently all that was done with the townsite was to blade the roads. Two capped wells may be related to the townsite as well. Because it is unlikely that the site contains buried deposits, and no additional surface artifacts are associated with the site, the UDOT/FHWA has determined this site ineligible for the NRHP.

42Dv113 –This site is a historic boat landing consisting as an earthen and slag berm. Because this site does not appear to contain significant cultural data, and there is little potential for this site to contribute to specialized research questions, the UDOT/FHWA has determined this site ineligible for the NRHP.

42Sl154/182 – This is a multi-component site consisting of a prehistoric lithic scatter and an historic glass scatter. Based upon testing, the prehistoric component appears to be an open Archaic site. The UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

42Sl155 – This site is an open lithic scatter. Two possible diagnostic projectile points were recovered from the site, but testing showed there was no depth to the cultural deposits. Because the potential for data recovery is limited, the UDOT/FHWA has determined this site ineligible.

42Sl197 – This is a Fremont site recorded in 1994 located near North Temple and west of Redwood Road. Little information is available from the site form and it has been determined ineligible for the NRHP.

42Sl241 – This is a historic trash scatter containing glass shards, bricks, metal strips, ceramic sherds, and other metal objects. Because the site lacks buried cultural deposits and is not associated with a noteworthy person or event, the UDOT/FHWA has determined the site ineligible.

42Sl242 – This is a multi-component site consisting of an open prehistoric camp and an historic trash scatter. A test pit revealed buried cultural deposits and data recovery potential for the prehistoric component of the site. The UDOT/FHWA has determined the site eligible for the NRHP under criterion D.

42Sl243 – This is an historic open trash scatter consisting of glass, ceramics, and terra cotta ceramics. The site lacks depth of cultural fill and no association can be made with any noteworthy event or person. The UDOT/FHWA has determined the site ineligible.

42Sl244 – This is a prehistoric open camp. The site contains two manos. Interviews with the property owner revealed that the land has been plowed over many times and the owner does not recollect seeing any other type of artifact besides groundstone. Two test pits were dug, recovering quartizite shatter, faunal bone, a charcoal sample, and historic metal. Because of the limited amount of artifacts on the surface, the instability of the site, and the lack of artifact recovery from the test pits, the UDOT/FHWA has determined the site ineligible.

42Sl245 – This multi-component site contains a prehistoric open lithic scatter and a historic trash scatter. The site is located in a plowed alfalfa field. Three test pits were dug, with only one groundstone fragment being recovered. The lack of artifacts in the test pits suggests limited potential for data recovery. In addition, the agricultural modifications to the land have affected the integrity of the site. Because of this, the UDOT/FHWA has determined this site ineligible.

24Sl246 – This site is a prehistoric open lithic scatter containing three diagnostic projectile points, lithic flakes, and groundstone. Two test pits were dug with additional artifacts being recovered. Based upon the buried cultural deposits, the diagnostic points, and other artifacts, the UDOT/FHWA has determined this site eligible under criterion D.

42Sl247 – This is a historic trash scatter located in an alfalfa field. The artifacts included numerous glass fragments and sherds from ceramic plates. The site has no evidence for cultural depth and has been perpetually disturbed by agricultural activities. The UDOT/FHWA has determined this site ineligible.

42Sl248 – This is a prehistoric lithic scatter consisting primarily of lithic debitage. Two test pits were dug revealing additional lithic material. Because of the large quantity of chipped stone on the surface and test pits, the UDOT/FHWA has determined this site eligible under criterion D.

42Sl249 – This is a prehistoric lithic scatter with chipped stone and fire-cracked rock. Three test pits were dug with very few artifacts recovered. Because of the lack of cultural depth, the UDOT/FHWA has determined this site ineligible.

42Sl250 – This is a historic trash scatter with cans, glass, metal fragments, milled wood, and white-ware ceramics. Data recovery potential is low and it is unlikely to be able to link this site with a person or event of importance. The UDOT/FHWA has determined this site ineligible.

42Sl251 – This is a historic foundation. Erosion has revealed portions of two wall courses are still attached to the foundation. The first course consists of two red sandstone blocks and several yellow bricks. The second course consists entirely of yellow bricks. This site has limited data recovery potential because of the lack of diagnostic elements. In addition, the site

stability is in jeopardy due to an adjacent canal. The UDOT/FHWA has determined this site ineligible.

42Sl252 – This is a prehistoric lithic scatter containing lithic debitage and groundstone. It is located on top or on the north slope of an old railroad grade. Two test pits were dug revealing additional lithic material and groundstone. Because of the location on the railroad grade, the site was disturbed during the rail line construction and site integrity has been destroyed. The UDOT/FHWA has determined this site ineligible.

42Sl253 – This is a historic, single episode trash dump. It is located in a 3 x 3 meter area and consists of glass fragments, tin can fragments, chicken bones, a piece of ceramic pipe, ceramic dish fragments, and other items. Because the site is not associated with any known historical person or event and is unlikely to lend new information to the history of the region, the UDOT/FHWA has determined it ineligible for the NRHP.

42Sl254 – This is historic construction debris consisting of concrete forms, milled wood, cinder block fragments, slag, fencing, fence post, steel bar and other items. The site has no known association with important people or events and has no data recovery potential. The UDOT/FHWA has determined the site ineligible for the NRHP.

42Sl255 – This is a historic structural site consisting of a pond, a ditch, and four depressions. One of the depressions contains much trash, bottles, and ceramics. Trash is also scattered throughout other areas of the site. Because of the large quantities of surface artifacts and also the presence of the depressions suggest buried cultural deposits, the UDOT/FHWA has determined this site eligible for the NRHP under criterion D.

Denver and Rio Grande Railroad – The grade is present throughout the project area. In some places, rails and ties are present. This site is determined eligible for the NHRP under criteria A and D.

Union Pacific Railroad – This railroad is currently operational throughout the entire corridor. Because of its importance to the history and development of Utah, the UDOT/FHWA has determined the railroad eligible for the NRHP under criteria A and D.

Assessment of Avoidance

The attached exhibits illustrate the relationship of the build alternatives design to all potentially affected NRHP eligible historic properties. In general, the eligible sites listed above are considered avoided by the project under the various alternatives if they are at least over 15 feet distant from the toe of slope or top of cut, and are determined NRHP eligible only under criterion C (a type, period, or method of construction) or criterion D (information potential only).

None of the build alternatives would avoid all NRHP eligible historic properties located along the corridor. Please refer to the attached maps to see the relationship of the sites to the various build alternatives. All sites (both eligible and ineligible) are plotted on the map, with their current boundaries, except for those that are not located within the boundaries of the map. Sites not plotted include all of the Salt Lake County sites with the exception of 42Sl243, 42Sl244, 42Sl245,and 42Sl247. Implementation of Alternative A would impact 4 NRHP eligible

properties, Alternative B would impact 7, Alternative C would impact 6, Alternative D&E would impact 6, and the Redwood Road Alternative would impact 12 properties eligible for the NRHP. As expected, the various alternatives affect different sites. The sites impacted by each alternative are shown in the table below.

Table 2

Property	A	B	C	D&E	Redwood
42Dv2	X		X	X	X
42Dv67					X
42Dv70		X			
42Dv72					
42Dv74					
42Dv76					
42Dv77		X			
42Dv80					
42Dv88					
42Dv90		X			
42Dv94	X	X	X	X	X
42Dv97	X			X	
42Dv98					
42Sl154/182					
42Sl242					
42Sl246					
42Sl248					
42Sl285					
D&RG Railroad	X	X	X	X	X
UP Railroad					
1300 Glover Lane, Farmington		X			
415 S 650 W, Farmington					
637 S 650 W, Farmington					
2120 S 650 W, Farmington					
1515 N 1100 W, W. Bountiful					
2125 N 1100 W, W. Bountiful					
836 S Redwood Road, Woods Cross					X
918 S Redwood Road, Woods Cross					X
946 S Redwood Road, Woods Cross					X
974 S Redwood Road, Woods Cross					X
1452 S Redwood Road, Woods Cross					
1650 S Redwood Road, Woods Cross					X
2018/2020 S Redwood Road, Woods Cross					X
2408 S Redwood Road, Woods Cross					X
1095 S Redwood Road, North Salt Lake					X
Ca. 900 N. Redwood Road, North Salt Lake					
3290 N 2200 W, North Salt Lake					

3200 N 2200 W, North Salt Lake					
2770 N 2200 W, North Salt Lake					
2662 N 2200 W, North Salt Lake					
2650 N 2200 W, North Salt Lake					
2664 N Rose Park Lane, North Salt Lake					
Clark Lane Historic District, Farmington	X	X	X	X	X
662 W Clark Lane, Farmington	X	X	X	X	X
10 N 650 West, Farmington	X	X	X	X	X
Totals	7	9	7	7	15

Finding of Effect

The UDOT/FHWA has determined that 24 of the 45 eligible properties will not be impacted by any of the build alternatives. Eligible sites that will not be impacted by any alternative have a grey background on Table 2. Based upon this, the UDOT/FHWA has determined that implementation of any build alternative will have **no effect** on those 24 properties listed above pursuant to 36 CFR 800.5(a-d). Below the impacts of the various alternatives are outlined. All effect determinations are made in accordance with 36 CFR 800.5(a-d).

As described earlier, each alternative will result in an **Adverse Effect** on 42Dv2, 42Dv94 and 10 W 650 N, Farmington. Impacts to each of these properties have already occurred from previous work on the project. Mitigation, in accordance with the previous MOA, has been performed on 10 W 650 N, Farmington. Excavations of both 42Dv2 and 42Dv94 have also taken place.

Each build alternative will also impact 662 W Clark Lane, Farmington, requiring the removal of the structure resulting in an **Adverse Effect**. Each build alternative will also impact the D&RG railroad with an at-grade crossing, resulting in a **No Adverse Effect**. Additionally, each build alternative will require temporary use of property in the Clark Lane Historic District. Extensive coordination has taken place to minimize disturbances and will result in a **No Adverse Effect**. Any additional effect determinations on each of the alternatives is described below.

Alternative A will impact 42Dv97. The eligibility of 42Dv97 is still undetermined and will be resolved by testing should the injunction be lifted.

Alternative B will impact 42Dv70, 42Dv77, 42Dv90, and 1300 Glover Lane, Farmington,. This alternative would result in an **Adverse Effect** for 42 DV 70, 42 DV 77, and 42 DV 90. In addition, the alternative would require the removal of the structures at 1300 Glover Lane, resulting in an **Adverse Effect**.

Alternative C will impact 42Dv97. The eligibility of 42Dv97 is still undetermined and will be resolved by testing should the injunction be lifted.

Alternatives D & E will impact 42Dv97. The eligibility of 42Dv97 is still undetermined and will be resolved by testing should the injunction be lifted

The Redwood Road Alternative will impact 42Dv67, 836 S Redwood Road, Woods Cross, 918 S Redwood Road, Woods Cross, 946 S Redwood Road, Woods Cross, 974 S Redwood Road, Woods Cross, 1650 S Redwood Road, Woods Cross, 2018/2020 S Redwood Road, Woods Cross, 2408 S Redwood Road, Woods Cross, and 1095 S Redwood Road, North Salt Lake. This alternative would result in an **Adverse Effect** for 42Dv67. The alternative would require the removal of the properties at 836 S Redwood Road, Woods Cross, 918 S Redwood Road, Woods Cross, 946 S Redwood Road, Woods Cross, 974 S Redwood Road, Woods Cross, 1452 S Redwood Road, Woods Cross, 1650 S Redwood Road, Woods Cross, 2018/2020 S Redwood Road, Woods Cross, 2408 S Redwood Road, Woods Cross, and 1095 N Redwood Road, North Salt Lake, resulting in an **Adverse Effect**.

In summary, implementation of all of the build alternatives would impact different historic properties and the overall project finding of effect will be **adverse** for each alternative.

To ensure the implemented build alternative will have no effect on the historic properties not directly impacted by the project, a special provision will be added to the construction contract. This special provision prohibits any ground-disturbing activities by the construction contractor outside of the right-of-way, as shown in the design plans and as exhibited by orange fencing in the field. Archaeological monitoring will occur during construction.

Finally, pursuant to 36 CFR 800.13, the UDOT and FHWA have planned for post-review discoveries using UDOT Standard Specification Section 01355, part 1.10.

Proposed Mitigation

Pursuant to 36 CFR 800.6, the following measures are offered to facilitate consultation with the USHPO regarding methods to minimize the effects of the project on the historic qualities of these properties. The UDOT/FHWA is in the process of soliciting the views of interested parties. Further, the UDOT/FHWA recommends the historic properties eligible under criterion A and C be documented to Utah State Intensive Level Survey (ILS) standards in advance of relocation or demolition and that a marketing plan be developed and implemented in applicable cases.

Section 4(f) considerations

The UDOT/FHWA consider the following properties to be Section 4(f) resources. They are included in Table 3.

Table 3.

Property
42Dv2
42Dv67
42Dv94
D&RG Railroad
UP Railroad

1300 Glover Lane, Farmington
415 S 650 W, Farmington
637 S 650 W, Farmington
2120 S 650 W, Farmington
1515 N 1100 W, W. Bountiful
2125 N 1100 W, W. Bountiful
836 S Redwood Road, Woods Cross
918 S Redwood Road, Woods Cross
946 S Redwood Road, Woods Cross
974 S Redwood Road, Woods Cross
1452 S Redwood Road, Woods Cross
1650 S Redwood Road, Woods Cross
2018/2020 S Redwood Road, Woods Cross
2408 S Redwood Road, Woods Cross
1095 S Redwood Road, North Salt Lake
Ca. 900 N. Redwood Road, North Salt Lake
3290 N 2200 W, North Salt Lake
3200 N 2200 W, North Salt Lake
2770 N 2200 W, North Salt Lake
2662 N 2200 W, North Salt Lake
2650 N 2200 W, North Salt Lake
2664 N Rose Park Lane, North Salt Lake
Clark Lane Historic District, Farmington
662 W Clark Lane, Farmington
10 N 650 West, Farmington

42Dv2 is a Section 4(f) property important to remain in place because of the potential for additional human remains and the fact that it is perhaps the last remaining archaeological site of its magnitude along the Wasatch Front. 42Dv67 is a Section 4(f) property because of the architectural value of the remaining standing structures. 42Dv94 is also a Section 4(f) property important to remain in place because of the potential for additional human remains. The D&RG and UP rail lines are Section 4(f) properties because of their contribution to the development of Utah. The remaining Section 4(f) properties are buildings valued for their architecture.

DRAFT
MEMORANDUM OF AGREEMENT

Regarding the

LEGACY PARKWAY PROJECT

Project No. SP-0067(1)0
Salt Lake and Davis Counties, Utah

WHEREAS, the Federal Highway Administration, Utah Division (FHWA) has determined that the Legacy Parkway Project between the I-215 Interchange, northern Salt Lake County, Utah and Burke Lane north of Farmington, Davis County, Utah (hereinafter called the Project) may have an effect upon properties included in or eligible for inclusion in, the National Register of Historic Places (NRHP), and has consulted with the Utah State Historic Preservation Officer (USHPO) in accordance with 36 CFR 800.6(b)(1), regulations implementing Section 106 of the National Historic Preservation Act (NHPA)(16 U.S.C. 470f) to resolve the adverse effects; and

WHEREAS, the Utah Department of Transportation (UDOT) is the agency coordinating this Project on behalf of the FHWA and has participated in the consultation, the FHWA has invited them to sign this Memorandum of Agreement (MOA) pursuant to 36 CFR 800.6(c)(2) as an invited signatory; and

WHEREAS, the Northwestern Band of Shoshone of the Shoshone Nation, Idaho and Utah; the Ute Indian Tribe of the Uintah-Ouray, Utah; the Confederated Tribes of the Goshute (Ibapah), Utah; the Skull Valley Band of Gosiute, Utah; and the Shoshone Bannock Tribes, Idaho (hereafter called Tribes); participated in the technical coordination and consultation and have been invited by FHWA to sign this MOA pursuant to 36 CFR 800.6(c)(3) as concurring parties; and

WHEREAS, the residents of the Clark Lane Historic District (CLHD), Farmington, have participated in the technical coordination and consultation and have been invited by FHWA to sign this MOA pursuant to 36 CFR 800.6(c)(3) as a concurring party; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), the FHWA will notify the Advisory Council on Historic Preservation (Council) of its adverse effect determination, with specified documentation, and invite the Council to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii); and

WHEREAS, a legal injunction halted archaeological and construction activities done under a prior MOA for this Project, the parties to this MOA agree that upon execution, all stipulations and conditions contained within this MOA will take precedence over the previously executed MOA for the Project; and

WHEREAS, the Project is large and complex, with a potential for the discovery of additional properties eligible for inclusion in the NRHP, the FHWA intends to use the provisions of this MOA to address all activities that may result in impacts to both known and inadvertently discovered

historic properties; and

WHEREAS, the Project's area of potential effect (APE) for this undertaking includes all lands subject to Project activities or activities directly funded by the Project as delineated by Alternatives A, B, C, D, E, and Redwood in Appendix A; and

WHEREAS, the parties to this MOA have considered the applicable requirements of the Utah Native American Graves Protection and Repatriation Act of 1992 (Utah NAGPRA)(U.C.A. 9-9-401, et seq., and its implementing Rule R230-1), and the Utah Code 76-9-704 in the course of consultation; and

WHEREAS, the parties to this MOA recognize that every reasonable effort should be made to protect Traditional Cultural Properties (TCP) from possible harm by the Project, it is incumbent upon the tribes or such interested party(ies), to identify any TCPs believed to exist within the Project APE;

NOW, THEREFORE, the FHWA, the UDOT and the USHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the Project on historic properties.

STIPULATIONS

The FHWA shall ensure that the following measures are carried out. To aid the signatories of this MOA, the stipulations are organized in the following order:

1. Environmental Control Supervisor
2. Clark Lane Historic District
3. Archaeological Testing
4. Archaeological Data Recovery
5. Historic Structures
6. Inadvertent Discovery of Cultural Resources
7. Project Specific Procedures for Implementing Utah NAGPRA
8. Administrative Stipulations

1. ENVIRONMENTAL CONTROL SUPERVISOR

An Environmental Control Supervisor (ECS) will be required for the Project. The ECS will be responsible for monitoring and ensuring compliance with the stipulations and mitigation commitments contained within this MOA. The ECS's contact information will be provided to the FHWA, the UDOT, the USHPO, the Tribes, and the homeowner(s) and tenant(s) located at 393, 398, and 399 W. State Street, Farmington, UT prior to the resumption of construction activity.

2. CLARK LANE HISTORIC DISTRICT (CLHD)

2.1 *Design Measures to Minimize Harm*

The following measures have been developed to ensure that project-related impacts from the Project are minimized and stipulations are in place to return the conditions of the CLHD and its contributory elements to their original pre-construction condition.

- No Change in Capacity or Function of Bridge. The existing bridge over I-15 and Lagoon Drive will be replaced with a structure of similar design and orientation, thereby maintaining a 2-lane configuration and not altering appearance or traffic patterns in the area.
- Lighting and Associated Safety Concerns. Standard lighting fixtures have been incorporated into the design of the new bridge.
- No Haul Route Traffic. Truck traffic and associated impacts will be reduced during construction by not allowing State Street to be used as the principle haul route for the Project. Construction vehicle traffic will occur around the juncture of Clark Lane and State Street while removing and replacing existing traffic and pedestrian bridges.
- Minimal Grade Change. Efforts have been made to design a new bridge with as little grade change to State Street as possible. The new grade height is estimated at 18" on the east side of the bridge and will taper to existing road grade in front of 393 W. State Street. The change in height for 399 W. State Street is estimated at 12". The driveways of 393 and 399 W. State Street will be tapered to the new State Street grade.
- Sidewalk Moved. Sidewalks will be incorporated within the new bridge structure, requiring the redesign of the sidewalk in front of 399 W. State Street. This redesign moves the sidewalk further from the house and improves control of water runoff.
- Water Control. Several water catchments will be added to the east of the new bridge structure, which in conjunction with the new curbs, will improve the management of water runoff so as not to impact the yards or foundations of the historic homes.
- Pavement Converted to Green Space. The new State Street design east of the new bridge will convert approximately 1068 square feet of pavement within existing right-of-way to green space within right-of-way. Existing homeowner irrigation lines will be extended to water this new green space with homeowner's approval. If no irrigation system exists, or if the homeowners do not want to extend their irrigation lines to the new green space, then appropriate landscaping will be used.
- Mature Trees Protected. The mature trees in front of 393 and 399 W. State Street will be protected from fill through the use of short block (or rock) walls surrounding the trunks. Material to be used in the construction of these small walls will be determined in consultation with the property owner.
- No Historic Property Takes. There will be no property takes from any of the historic properties. Temporary easements will be needed to move the sidewalk, slope (or terrace) the yard towards the new sidewalk, taper the driveways of 393 and 399 W. State Street and add curb and gutter on the northeast of State Street and Clark Lane.
- No Change to Sound Walls. Existing sound walls will be left in place along the west side of 399 W. State Street.

- Maintain Existing Landscape Features. The existing landscape wall and associated plantings in the front of 399 W. State Street will be protected to the extent possible during construction. Upon removal of the sidewalk, new landscaping will take into consideration the existing wall and match with in-kind materials to the extent possible.

2.2 *Measures to Minimize Potential Harm from Construction-Related Vibration*

The following measures are included within the MOA to reduce the likelihood of potential impacts caused by construction-related vibration. In the unlikely event that the ECS or homeowner(s)/tenant(s) believe such harm has occurred, the responsibilities of all parties is described below.

- Pre-drilled Pilings an Option. Pre-drilling of pilings may be used by the contractor to increase the distance from piles to the historic homes thereby reducing the potential for vibration effects on the homes.
- Energy of Pile-Driving Hammers Limited. The maximum rated energy of pile-driving hammers will be limited to 54,000 foot-pounds for all impact-driven piles within 200 feet of the buildings within the CLHD.
- Homeowner and Tenant Notification. The homeowner(s) and tenant(s) at 393, 398, and 399 W. State Street will be notified of any pile-driving activities five (5) days in advance.
- Pre- and Post-Construction Surveys of Structures. A pre-and post-construction survey of all buildings or structures located on the property of 393, 398, and 399 W. State Street will be required. The survey will consist of photo and written documentation of the structures' exterior and interior condition to the extent possible. This means at least one photograph of all elevations from all cardinal directions, of professional quality black/white 35 mm photographs (3 x 5" prints with accompanying negatives) to show all exterior elevations (where possible to obtain all elevations), the streetscape, and detailed photographs of all areas most sensitive to vibration effects. Photographs of exterior architectural trim/decorations shall also be submitted. Photographs shall be numbered and labeled with address (street and city) and date the photograph was taken, and keyed to a site plan and floor plan. All prints and negatives shall be submitted in archival quality protective storage pages. When allowed by owners, interior photographs shall be taken of each wall in every room of these structures for the purposes of documenting present conditions.
- Vibration Monitoring. A vibration monitor will be placed on the foundation and upper elevation of the home at 399 W. State Street and record vibration levels throughout the duration of pile driving activities within two hundred (200) feet of the home. The vibration monitor will be set to read vibration levels at 0.12 in/sec.
- Exceeding Vibration Threshold of 0.12 in/sec. Pile-driving activities will stop and other less vibration-intense activities must be employed if the vibration monitor readings exceed 0.12 in/sec or if there is visual evidence that the pile driving is causing damage to a structure. The selection of alternative methods will be made between the contractor and UDOT with input from the ECS and approval from FHWA when necessary. Such methods may include using smaller pile drivers or continuing

with pre-drilled piles.

- Identification of Damage. If damage to the structures located at 393, 398, or 399 W. State Street is observed by the ECS, the ECS will be responsible for identifying and stopping the responsible activity if known and within the control of the Project team.
- Notification of Damage. If the homeowner(s) and/or the tenant(s) of 393, 398, or 399 W. State Street observe damage or believe damage to be caused by pile driving activities, they are responsible for notifying the ECS as soon as possible within the next twenty-four (24) hours. The ECS will assess the claim and report to the homeowner(s) and/or tenant(s) within twenty-four (24) hours.
- Resolving Damage Claims: If it is agreed amongst the UDOT and the homeowner(s) that damage has occurred to a structure as a result of the activities of the Project, the damage will be documented and the structures must be restored to the documented condition existing before damage occurred with in-kind materials and workmanship.
- Contact Information: If any of the homeowner(s) or tenant(s) within the CLHD believes that the terms of this MOA are not being met, or that their concerns are not being heard or addressed by the Project's ECS, they may contact the Legacy Project Office or the FHWA Utah Division Office directly.

Legacy Parkway Office
360 N. 700 W., Suite F
North Salt Lake, UT 84054
(801) 951-1026
(800) 483-4587

U.S. Department of Transportation
Federal Highway Administration
Utah Division
2520 West 4700 South, Suite 9a
Salt Lake City, UT 84118-1847
(801) 963-0182

3. ARCHAEOLOGICAL TESTING

Site 42Dv97 (Historic Privy) will be tested subsurface to make a final determination of eligibility or assess data recovery potential. A written testing plan will be developed by UDOT and submitted to the USHPO for review and comment. If Site 42Dv97 is subsequently determined by FHWA to meet NRHP eligibility requirements for its information potential and will be adversely effected by the Project, then significant deposits at the site will undergo archaeological data recovery in accordance with Stipulation 4.

4. ARCHAEOLOGICAL DATA RECOVERY

Data Recovery: The FHWA shall ensure that a data recovery plan is developed by UDOT in consultation with the USHPO, the Tribes, and consulting parties for the recovery of archeological data from NRHP eligible sites adversely effected by the final alignment of the Project. The plan shall be consistent with the Secretary of the Interior's Standards and Guidelines for Archeological Documentation (48 FR 44734-37) and take into account the Council's publication, Treatment of Archeological Properties (Advisory Council on Historic Preservation, 1980), subject to any pertinent revisions the Council may make in the publication prior to completion of the data recovery plan and to relevant USHPO or other guidance.

The Data Recovery Plan shall specify, at a minimum:

- the research questions to be addressed through the data recovery, with an explanation of their relevance and importance;

- the methods to be used, with an explanation of their relevance to the research questions;

- the methods to be used in analysis, data management, and dissemination of data, including a schedule;

- the proposed disposition of recovered materials and records;

- proposed methods for involving the interested public in the data recovery, including an invitation to Utah State Archaeological Society (USAS) members to volunteer where safe conditions present themselves;

- proposed methods for disseminating results of the work to the interested public, including;
  - Offering to present a talk to the local USAS chapter;
  - Preparing an article for publication in a local paper; and
  - Preparing a scripted slide show for FHWA/UDOT for future use in public education programs;

- proposed methods by which the Tribes or other consulting parties will be kept informed of the work and afforded the opportunity to participate, including;
  - Extending an invitation to the Tribes (including school age children) to tour the sites while fieldwork is ongoing and where safe conditions present themselves,
  - Offering to make a presentation about the project findings to all interested Tribes at a location convenient to the Tribes;
  - Recognizing the benefits of 'Multiple Voices' by offering Tribes and Tribal members an opportunity to present interpretations and views that may augment or counter current archaeological theory, findings, and interpretation.

- a proposed schedule for the submission of progress reports to the FHWA, the UDOT, and the USHPO; and

- The data recovery plan shall be submitted by the UDOT to the USHPO, and also to the Tribes, for 30 days review. Unless these parties object within 30 days after receipt of the plan, the FHWA through the UDOT shall ensure that it is implemented.

Table 1 identifies archaeological sites potentially impacted by the Project. However, only those sites located within the APE of the preferred alternative identified in FHWA's Record of Decision and adversely effected will undergo data recovery.

Table 1. NRHP Eligible Archaeological Sites Impacted by Project (Listed by Alternative).

Site Number	A	B	C	D	E	Redwood
42Dv2	X		X	X	X	X
42Dv67						X
42Dv70		X				
42Dv77		X				
42Dv90		X				
42Dv94	X	X	X	X	X	X
42Dv97	X			X	X	

Of special note are sites 42Dv2 and 42Dv94:

42Dv2 – This property is a large site spanning both the prehistoric and historic periods. Excavations were begun in accordance with the original MOA but were halted prior to completion. During the excavation, human remains were encountered. This site is determined eligible for the NHRP under Criterion D and warrants Section 4(f) protection due to the presence of human remains and the sanctity of these burial grounds. The sacred nature of burials has been formally communicated to FHWA on numerous occasions specifically by Dr. Brewster, Director of the Tribal Historic Preservation Office of the Skull Valley Band of the Gosiutes. The site limits will be delineated and protected from construction activities through the use of construction fencing. If portions of the site are deemed necessary for the current Project at a later time, then additional consultation with the USHPO, the Tribes, and consulting parties will become necessary.

Although future work within the APE of the current Project will avoid the site, prior impacts have already adversely effected the site. In addition, a future I-15 ramp may tie into the present Project and may further impact the site. Because the I-15 ramp is a foreseeable action, its potential impacts are disclosed in this document. However, additional data recovery for potential impacts to 42Dv2 will not take place until the need for the ramp is determined and final design and environmental clearance of the ramp is complete. Avoidance, minimization, and if necessary, mitigation measures for these future impacts will be evaluated as part of the I-15 project development. Mitigation for past impacts to 42Dv2 as a result of the present Project will include completion of the archaeological analysis and reports already underway.

42Dv94 – This site consists of human remains discovered eroding from the margins of the City Drain Canal in North Salt Lake City, Utah. The identified human remains have already been fully excavated. However, because there is sufficient potential for additional remains to be present in the site vicinity, the UDOT/FHWA has determined this site eligible for the NRHP and warrants preservation in place, and thus Section 4(f) protection, due to the sanctity of the potential burials. Like 42Dv2, site 42Dv94 lies in an area potentially impacted by a future I-15 ramp connecting into the Project. For the purposes of the current Project, a 50-foot buffer zone around 42Dv94 site limits will be delineated and protected from construction activities through the use of construction fencing. If portions of the site are deemed necessary for the current Project at a later time, then additional consultation with the USHPO, the Tribes, and consulting parties will become necessary.

5. HISTORIC STRUCTURES AND RAILROADS

Table 2 identifies Historic Structures and Railroads potentially impacted by the Project. However, only those properties located within the APE of the preferred alternative identified in FHWA's Record of Decision and adversely effected will require the Full Intensive Level Survey.

Table 2. Historic Structure and Railroad Impacts (Listed by Alternative).

Property	A	B	C	D	E	Redwood
1300 Glover Lane, Farmington		X				
836 S Redwood Road, Woods Cross						X
918 S Redwood Road, Woods Cross						X
946 S Redwood Road, Woods Cross						X
974 S Redwood Road, Woods Cross						X
1650 S Redwood Road, Woods Cross						X
2018/2020 S Redwood Road, Woods Cross						X
2408 S Redwood Road, Woods Cross						X
1095 S Redwood Road, North Salt Lake						X
Clark Lane Historic District, Farmington	X	X	X	X	X	X
662 W Clark Lane, Farmington	X	X	X	X	X	X
10 N 650 West, Farmington	X	X	X	X	X	X
D&RG Railroad	X	X	X	X	X	X

Of special note is 10 N 650 West, Farmington (The White House). This historic property was comprised of a 1910 era Temple Form home. It was razed following recordation according to the stipulations of the original MOA. For the purposes of the Supplemental Environmental Impact Statement for the Project, this property is being recognized as an adverse effect. However, the property is no longer extant and has been fully mitigated per the requirements of the original MOA, therefore, the property does not warrant further work.

5.1 *Intensive Level Survey*: An ILS (Historic Site Form) will be completed for any Historic Property that will be adversely affected by the Project.

5.2 *Photographs*: Photographs are required of all buildings or structures on the property. An adequate number of professional quality black-and-white photographs (3x5 prints with accompanying negatives) to show all exterior elevations (where possible to obtain all elevations), streetscapes, all outbuildings, detailed photographs of all areas to be impacted by the adverse effect, and photographs of exterior architectural trim/decorations, shall be submitted. Photographs shall be numbered and labeled with address (street and city) and date photograph was taken, and keyed to a site plan and floor plan. All prints and negatives shall be submitted in archival stable protective storage pages.

5.3 *Floor Plans*: Sketch floor plans of all eligible buildings shall be submitted. The plans must be based on an accurate footprint (e.g., Sanborn maps, tax card drawings, or measurements taken on site) and show all existing construction. Rooms shall be labeled by use. These non-

measured drawings are to be on 8.5x11 or 11x17 sheets. A site sketch plan showing subject buildings and all outbuildings is also required.

5.4 *Research*: A legible photocopy of the entire historic tax card of the property and a 5x7 black-and-white print and negative of the historic tax card photo (if available) shall be submitted. Label and submit print and negative as described above. Other research shall be conducted as necessary to obtain complete information on the property; sources include the title abstracts, Sanborn maps, building permits, architects' file, city directories, family histories, and others.

5.5 *Filing*: All materials shall be submitted to the Utah Division of State History, Preservation Section, to be placed on file.

6. INADVERTENT DISCOVERY OF CULTURAL RESOURCES

The FHWA and the UDOT have developed a plan of action for consultation with the Tribes and the USHPO regarding inadvertent discovery of historic properties potentially eligible to the NRHP. The plan detailed below describes coordinating efforts among the FHWA, the UDOT, the Tribes, and the USHPO; assessment of effects to historic properties (not affecting Utah NAGPRA related issues); inventory and evaluation processes; and mitigation strategies.

In the event that cultural resources are discovered:

6.1 *Cease Activity*: Work will stop in the immediate area of the discovery in accordance with UDOT Standard Specification 01355, Part 1.10 as detailed in Appendix B. The UDOT will notify the USHPO and FHWA. The FHWA will subsequently notify the Council and Tribes. If Human Remains are encountered, the contractor will follow procedures detailed in Stipulation 7 below.

6.2 *Evaluate Resource*: The UDOT will initiate internal coordination with their contractor to evaluate the resource for NRHP eligibility. The designated contractor will prepare draft inventory reports and recommendations regarding the NRHP eligibility of identified properties. The content and scope of the draft and final report(s) on the results of the evaluation studies will follow state guidelines as found in the UDOT's Consultant Guidelines.

6.3 *Determine Eligibility*: In consultation with the USHPO, the UDOT will apply the NRHP criteria (36 CFR 60.4) to all cultural resources discovered during the Project with regard to their potential for inclusion in the NRHP. This evaluation shall take into account the guidance found in all applicable National Register Bulletins.

6.4 *Assessment of Effect*: In situations affecting historic properties, application of the criteria of effect and adverse effect described in 36 CFR 800.9 (a) and (b) will be implemented. A Determination of Eligibility and Finding of Effect (DOE-FOE) will be submitted to the USHPO and to the Tribes along with appropriate documents relative to the stipulations of this MOA.

6.5 *Treating Effects*: If the undertaking might affect historic properties as defined by 36 CFR 800.2 (e), the UDOT will develop site specific treatment plans to minimize or mitigate the effects of the historic properties located within the area of the discovery in coordination with the USHPO, the Tribes, and other interested parties as follows:

- Human remains and the associated cultural items will be treated in accordance with the Utah NAGPRA (See Stipulation 7 of this MOA).

- The preferred alternative to mitigation is avoidance of impacts to historic properties.

- Project redesign will be implemented when technically, economically, and environmentally feasible and prudent, to avoid the placement of the facility, or related construction activities in a manner that may affect historic properties.

6.11 *Data Recovery*: The FHWA shall ensure that a data recovery plan is developed in accordance with Stipulation 4 of this MOA.

6.12 *Reporting*: The FHWA shall ensure that all reports on activities carried out pursuant to this MOA are provided to the USHPO, the Council, the Tribes, and upon request to any other consulting parties, following completion of the activities stipulated in the MOA.

6.13 *Personnel Qualifications*: The FHWA shall ensure that all historic work carried out pursuant to this MOA is completed by or under the direct supervision of a person or persons meeting or exceeding the Secretary of interior's Standards for History or Archaeology as appropriate (36 CFR 61 Appendix A).

7. PROJECT SPECIFIC PROCEDURES FOR IMPLEMENTING UTAH NAGPRA (U.C.A. 9-9-401 *et. seq.* AND ITS IMPLEMENTING RULE R230-1 AND UTAH CODE 76-9-704)

7.1 *Purpose*

7.1.1 The Parties to the MOA intend to respect and be sensitive to the cultural perspectives and responsibilities, the religious and ceremonial rights, and sacred practices of the Tribes in fulfilling tribal interests in the discovery of Utah NAGPRA related items identified during the Project.

7.1.2 If circumstances warrant and a determination is made by FHWA that federal NAGPRA applies to a discovery case during construction, then FHWA will ensure that all applicable federal procedures and requirements are met.

7.2 *Objectives*

7.2.1 To implement the legislative provisions of Utah law, specifically U.C.A. 76-9-

704 and 9-9-401 et. seq. within the intent of such legislation.

7.2.2 To implement legal requirements, while respecting and maintaining the dignity of the individual and the Utah NAGPRA related cultural items potentially discovered during the Project's construction, and in conjunction with the best interests of the Tribes.

7.2.3 To facilitate UDOT compliance with Utah NAGPRA, respective to decisions that must be made, and actions taken, regarding curation, disposition, re-interment, data recovery, consultation and notification, and treatment of human remains and cultural items as defined by Utah NAGPRA.

7.2.4 To provide guidance for construction personnel regarding the discovery and notification process upon location of human remains and cultural items as defined by Utah NAGPRA.

7.3 *Implementation of Objectives*

7.3.1 The UDOT will provide the Project ECS with a set of procedures to be followed in the event of an inadvertent discovery of human remains.

7.3.2 In accordance with UDOT Standard Specification 01355, Part 1.10 (Appendix B), upon discovery of human remains (including cultural items as defined by Utah NAGPRA), construction activities within the immediate area of discovery shall cease, the site will be secured, and notification of law enforcement, Division of Indian Affairs and USHPO Antiquities Section as required by U.C.A.9-9-403, and U.C.A. 76-9-704, will commence immediately. In addition, Tribes desiring to be notified at this time will be included on the contact list.

7.3.3 If the site is determined not to contain Native American remains, the UDOT will contact the FHWA, and the FHWA will notify the Tribes of such determination. Work will resume at the direction of the UDOT archaeologist.

7.3.4 If the site is determined to contain Native American remains, the UDOT will contact FHWA within one (1) working day. The FHWA will provide notification to the Tribes within one (1) working day and invite the Tribes to visit the site containing the remains. If contact with the FHWA cannot be made within this timeframe, the UDOT may contact the Tribes directly for the purposes of expediting notification. The Tribes will be allowed access to the remains for the purpose of performing ceremonies, discussing treatment options, and monitoring excavation if removal is deemed necessary.

7.3.5 The Tribes will be compensated for expenses incurred to visit the burial site and/or perform ceremonies. Compensation will be based on and limited to those activities included within FHWA's Native American Tribal Consultation

Policies and Guidelines.

7.4 *Excavation versus Preservation in Place*: At such time a discovery of human remains is made and construction ceases in the area of the discovery, and having satisfied the requirements of U.C.A. 76-9-704:

7.4.1 If the remains are in immediate danger of harm, or in the event that construction could not move, they will be excavated in accordance with R-230-1-7(1)a.

7.4.2 If the site at which the remains are located can remain intact and free from immediate harm, the site will be secured and a preservation plan will be implemented according to R-230-1-7-1.

7.5 *Custody of Remains*: Any excavated Native American remains will remain in the custody of the UDOT pending:

7.5.1 Consultation and determination of ownership by the Native American Remains Review Committee (NARRC) pursuant to Utah NAGPRA [9-9-403 and R-230-1-13 et. seq.], or

7.5.2 In the event of multiple requests for repatriation, the requesting parties agree upon its disposition, or

7.5.3 The dispute is otherwise resolved by a court of competent jurisdiction.

7.6 *Repatriation*: The repatriation of the individual will be consistent with Utah NAGPRA [9-9-403 and R-230-1-13 et. seq.]. It is incumbent upon all parties to this MOA to work towards the repatriation of human remains in as timely manner as allowable by law. FHWA is responsible for ensuring that the UDOT and its consultants follow state law procedures and the stipulations contained herein.

7.8 *Status Inquiry*: At any time in the process, the Tribes may inquire with FHWA as to the status of human remains associated with this Project. It is the responsibility of the FHWA to address the questions and concerns of any Tribe within five (5) working days. If the Tribes are interested in verifying the physical condition and storage treatment of any human remains, a verbal or written request must be submitted to FHWA. FHWA is responsible for arranging a meeting within five (5) working days, or at the earliest convenience of the interested Tribe(s).

7.9 *Dispute Resolution*: Disputes on non-Utah NAGPRA related issues will be resolved according to dispute resolution procedures described in this MOA (Stipulation 8.5). The Utah NARRC Committee will resolve all Utah NAGPRA related disputes.

7.10 *Treatment of Utah NAGPRA Related Items and Human Remains*

7.10.1 Human Remains

- Any and all human remains that have been damaged or removed due to construction activity will be immediately returned to accompany the remains still present in the site.

- Pursuant to Utah NAGPRA, scientific study of human remains may be carried out only with approval of the owner of the human remains as established in 9-9-403(1) and (2). If ownership is unknown, scientific study shall be restricted to that sufficient to identify ownership but will be limited to non-destructive analysis.

7.10.2 Associated Funerary Items/Items of Cultural Patrimony

- Unless otherwise identified, Associated Funerary Items/Items of Cultural Patrimony found near or about the discovery of human remains will be immediately returned to accompany the human remains. Associated Funerary items are defined as items that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later, with or near individual human remains. Objects of cultural patrimony means items having ongoing historical, traditional, or cultural importance central to the Indian tribe itself. If they are so identified, documentation of these materials will be included in the reports as funerary objects and/or items of cultural patrimony.

8. ADMINISTRATIVE STIPULATIONS

8.1 *Changes in the Undertaking*

8.1.1 Changes in the Project will not relieve the FHWA or UDOT of the responsibility of completing resource evaluations.

8.1.2 If, during the Project planning or implementation, modification and/or changes in the undertaking are proposed in ancillary areas that have not been previously inventoried for historic properties, the UDOT shall ensure that the area is inventoried and that historic properties are evaluated in a manner consistent with the inventory, evaluation, and standards identified in Stipulation 6 of this MOA. The UDOT will prepare a draft report(s) of the inventory results and submit said document(s) to the parties of this MOA for review and comment. A final report incorporating the comments of the said parties will be prepared. Final reports will

be provided to the parties of this MOA.

8.1.3 The applicable Research Design shall be modified or appended, as appropriate by the contractor (s) under the direction of the UDOT, in consultation with the USHPO and the Tribes, to incorporate treatment and management measures for previously unevaluated historic properties consistent with the MOA.

8.1.4 The parties to this MOA shall be afforded an opportunity to comment within 30 days on documents prepared in response to revisions to the undertaking.

8.2 *Tribal Consultation Process*: Unless otherwise agreed upon, Tribal consultation will occur between the FHWA and the Tribes throughout the Project.

8.3 *Curation*

8.3.1 Cultural material (artifact) curation. Upon discovery and gathering of cultural items within the Project APE, exclusive of Utah NAGPRA items as defined by that act, the UDOT will ensure that the items will be placed in an appropriate repository facility as described in 36 CFR 79.

8.3.2 Report and Documentation curation. Upon the UDOT finalizing the documentation of the Project, all reports and documentation will accompany the cultural material consistent with the provisions described in 36 CFR 79. Upon written request of the Tribes, a copy of said documentation shall be provided for the tribal archives.

8.4 *Dispute Resolution*

8.4.1 Should the USHPO, the Tribes, the DIA, or the Council, object within 30 days to any documentation provided for review pursuant to this MOA, the FHWA shall consult with the objecting party to resolve the objection. If the FHWA determines that the objection cannot be resolved, the FHWA shall request further comments of the Council pursuant to 36 CFR § 800.6(b). Any Council comment provided in response to such a request will be taken into account by the FHWA in accordance with 36 CFR § 800.6(c)(2) with reference only to the subject of the dispute; the FHWA/UDOT's responsibility to carry out all actions under this MOA that are not the subject of the dispute will remain unchanged.

8.4.2 The Utah Division of Indian Affairs State Native American Remains Review Committee (NARRC) will arbitrate disputes relative to Utah NAGPRA in accordance with U.C.A. 9-9-405 (3)(c), if consultation fails to resolve the dispute.

8.5 *Document Review*. Unless otherwise stated, document review shall be 30 days following

receipt of said document submitted for review. Unless notified, the FHWA may assume failure of any party to respond within 30 days indicates their concurrence.

8.6 *Amendment*

8.6.1 Any signatory party to this MOA may request an amendment (s), whereupon the other signature parties will consult to consider such amendment(s).

8.6.2 Any proposed amendment to this MOA must be submitted to the FHWA in writing, with an explanation as to the reasoning for the requested change. The FHWA will initiate consultation with the signature parties for their consideration of the proposed amendment(s) under the time provisions as set forth in 8.7.3.

8.6.3 The FHWA will provide copies of written request(s) for amendment from any signatory party to all other signature parties within 3 days, and the parties agree to begin discussions regarding proposed amendments immediately.

8.7 *Monitoring*

8.7.1 A monitoring plan will be included in the Research Design(s). Project monitoring will ensure all parties to this MOA that the activities and provisions of this MOA are in compliance. Monitoring will also ensure that all parties to this MOA will have oversight and updates to the Project as the Project commences.

8.7.2 The UDOT will ensure that particular care is taken during construction to avoid affecting any other archeological remains that may be associated with the sites recorded during the initial survey. Restrictions on construction work in all areas not previously cleared in the original Determination of Eligibility and Finding of Effect will be accomplished by erection of a temporary fence and flagging as necessary. Suitable arrangements for archeological monitoring, and any additional survey deemed necessary, will be made in consultation with the USHPO prior to construction in the APE. An archeologist meeting the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-9) will monitor the construction activities. At a minimum, such monitoring will include recording and reporting of major features or artifact concentrations uncovered, and recovery and curation of a sample of uncovered material where practicable.

8.7.3 The Tribes will be invited to assist in the monitoring in conjunction with the authorized archaeologist and will be compensated for their participation in such monitoring activities based on FHWA's compensation policies. Compensation is restricted to FHWA approved and authorized activities and allowances.

Execution of this Memorandum of Agreement and implementation of its terms evidence that the FHWA has afforded the Council an opportunity to comment on the **Legacy Parkway Project**, **Project No. SP-0067(1)0, Salt Lake and Davis Counties, Utah** and its effects on historic properties, and that FHWA has taken into account the effects of the undertaking on historic properties.

SIGNATORIES

FEDERAL HIGHWAY ADMINISTRATION

By:

Mr. David C. Gibbs, P.E., Division Administrator

Date:_____

UTAH STATE HISTORIC PRESERVATION OFFICER

By:

Mr. Wilson Martin, State Historic Preservation Officer

Date:_____

INVITED SIGNATORIES

UTAH DEPARTMENT OF TRANSPORTATION

By:

Mr. John Njord, Director

Date:_____

CONCURRING PARTIES

CLARK LANE HISTORIC DISTRICT

By:

Date:_____

UTAH DIVISION OF INDIAN AFFAIRS?

By:

Forrest S. Cuch, Director

Date:_____

Northwestern Band of Shoshone of the Shoshone Nation, Idaho and Utah?

Ute Indian Tribe of the Uintah-Ouray, Utah?

Confederated Tribes of the Goshute (Ibapah), Utah?

Skull Valley Band of Gosiute, Utah?

Shoshone Bannock Tribes, Idaho?

APPENDIX A - AREA OF POTENTIAL EFFECT (APE)

Includes:

Cultural and 4(f) Sites Under Discussion (11x 17)
Historic Structures Under Discussion (11 x 17)
Historic Structures Under Discussion-Continued (11 x 17)

APPENDIX B

UDOT STANDARD SPECIFICATION FOR DISCOVERY OF HISTORIC, ARCHEOLOGICAL OR PALEONTOLOGICAL OBJECTS

Standard Specification Section 01355, Part 1.10, Discovery of Historical, Archaeological or Paleontological Objects

Standard Specification Section 01355, Part 1.10, Discovery of Historical, Archaeological or Paleontological Objects, will be enforced during this project. This specification stipulates procedures to be followed should any archaeological, historic, or paleontological resources be discovered during construction of the project. These procedures are as follows:

1. Immediately suspend construction operations in the vicinity of the discovery if a suspected historic, archeological or paleontological item, feature, prehistoric dwelling sites or artifacts of historic or archeological significance are encountered.

2. Notify the ENGINEER verbally of the nature and exact location of the findings.

3. The ENGINEER will contact the State archeological authorities who will determine their disposition.

4. Protect the discovered objects and provide written confirmation of the discovery to the ENGINEER within 2 calendar days.

5. The ENGINEER will keep the CONTRACTOR informed concerning the status of the restriction.

    - The time necessary for the DEPARTMENT to handle the discovered item, feature, or site is variable and dependent on the nature and condition of the discovered item.
    - Expect a two (2) week or more delay in the vicinity of the discovery.
    - Written confirmation will be given by the ENGINEER when the restriction is terminated.

6. If a changed condition is approved, it will be controlled in accordance with Section 00725, paragraph: Differing Site Conditions.

Should a discovery occur, the FHWA will consult with the USHPO/THPO, and the Council in accordance with 36 CFR 800.13(b)(3) toward developing and implementing an appropriate treatment plan prior to resuming construction.

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
Murray Field Office
1030 W. 5370 S. Suite100
Murray, Ut. 84123
1 801 263-3204
FAX: 1801 263-3667

NOV 0 9 2004

Laynee G. Jones
Legacy Parkway Project Manager
HDR Engineering, Inc.

Dear Laynee,

The enclosed CPA 106 forms are for your use as requested. Let me know if there are questions

Sincerely,

Ray Grow

Ray Grow, NRCS Murray, Utah

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 9/24/04 — 4. Sheet 1 of 2
1. Name of Project Legacy Parkway	5. Federal Agency Involved FHWA, UDOT
2. Type of Project Roadway Preferred Alternative (Corridor E)	6. County and State Davis and Salt Lake Counties; Utah
PART II *(To be completed by NRCS)* Applicant's	1. Date Request Received by NRCS 9/27/04 — 2. Person Completing Form Ray Grow
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐	4. Acres Irrigated 27,768 — Average Farm Size 114.5
5. Major Crop(s) alfalfa, grain, corn, vegetables, grass hay, p	6. Farmable Land in Government Jurisdiction Acres: 148,124 % 1.3 — 7. Amount of Farmland As Defined in FPPA Acres: 11,320 % 1.3
8. Name Of Land Evaluation System Used Utah NRCS LE	9. Name of Local Site Assessment System none — 10. Date Land Evaluation Returned by NRCS

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	338	501	240	315
B. Total Acres To Be Converted Indirectly, Or To Receive Services	43	7	10	17
C. Total Acres In Corridor	381	508	250	332
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	23	88	28	31
B. Total Acres Statewide And Local Important Farmland	0	2	0	0
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0	0	0	0
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	5	5	5	5
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	79	86	79	79

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points	Corridor A	Corridor B	Corridor C	Corridor D
1. Area in Nonurban Use	15	0	0	0	0
2. Perimeter in Nonurban Use	10	0	0	0	0
3. Percent Of Corridor Being Farmed	20	8	9	4	6
4. Protection Provided By State And Local Government	20	0	20	0	0
5. Size of Present Farm Unit Compared To Average	10	9	9	9	9
6. Creation Of Nonfarmable Farmland	25	2	25	6	2
7. Availablility Of Farm Support Services	5	5	5	5	5
8. On-Farm Investments	20	5	10	6	5
9. Effects Of Conversion On Farm Support Services	25	5	10	6	5
10. Compatibility With Existing Agricultural Use	10	10	10	10	10
TOTAL CORRIDOR ASSESSMENT POINTS	160	44	98	46	42
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	79	86	79	79
Total Corridor Assessment (From Part VI above or a local site assessment)	160	44	98	46	42
TOTAL POINTS *(Total of above 2 lines)*	260	~~44~~ 123	~~98~~ 184	~~46~~ 125	~~42~~ 121

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☑ NO ☐

5. Reason For Selection:

Ray Grow (NRCS part)
Signature of Person Completing this Part:

DATE 11/04/04

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
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FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 9/27/04 — 4. Sheet 1 of 2
1. Name of Project Legacy Parkway	5. Federal Agency Involved FHWA, UDOT (this form shows alt. E under Corridor A)
2. Type of Project Roadway preferred alternative (corridor E)	6. County and State Davis and Salt Lake Counties; Utah

PART II *(To be completed by NRCS)* Applicant's	1. Date Request Received by NRCS 9/27/04	2. Person Completing Form Ray Grow
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☑ NO ☐		4. Acres Irrigated 27,768 — Average Farm Size 114.5
5. Major Crop(s) alfalfa, grain, corn, vegetables, grass hay, p	6. Farmable Land in Government Jurisdiction Acres: 148,124 % 1.3	7. Amount of Farmland As Defined in FPPA Acres: 11320 % 1.3
8. Name Of Land Evaluation System Used Utah NRCS LE	9. Name of Local Site Assessment System none	10. Date Land Evaluation Returned by NRCS

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor ~~A~~ E	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	307			
B. Total Acres To Be Converted Indirectly, Or To Receive Services	16			
C. Total Acres In Corridor	323	0	0	0
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	29			
B. Total Acres Statewide And Local Important Farmland	0			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	5			
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	78			

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points				
1. Area in Nonurban Use	15	0			
2. Perimeter in Nonurban Use	10	0			
3. Percent Of Corridor Being Farmed	20	6			
4. Protection Provided By State And Local Government	20	0			
5. Size of Present Farm Unit Compared To Average	10	9			
6. Creation Of Nonfarmable Farmland	25	2			
7. Availablility Of Farm Support Services	5	5			
8. On-Farm Investments	20	5			
9. Effects Of Conversion On Farm Support Services	25	5			
10. Compatibility With Existing Agricultural Use	10	10			
TOTAL CORRIDOR ASSESSMENT POINTS	160	42	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100	78			
Total Corridor Assessment (From Part VI above or a local site assessment)	160	42	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	~~42~~ 120	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☑ NO ☐

5. Reason For Selection:

Ray Grow (NRCS part)
Signature of Person Completing this Part: DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ?
(Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

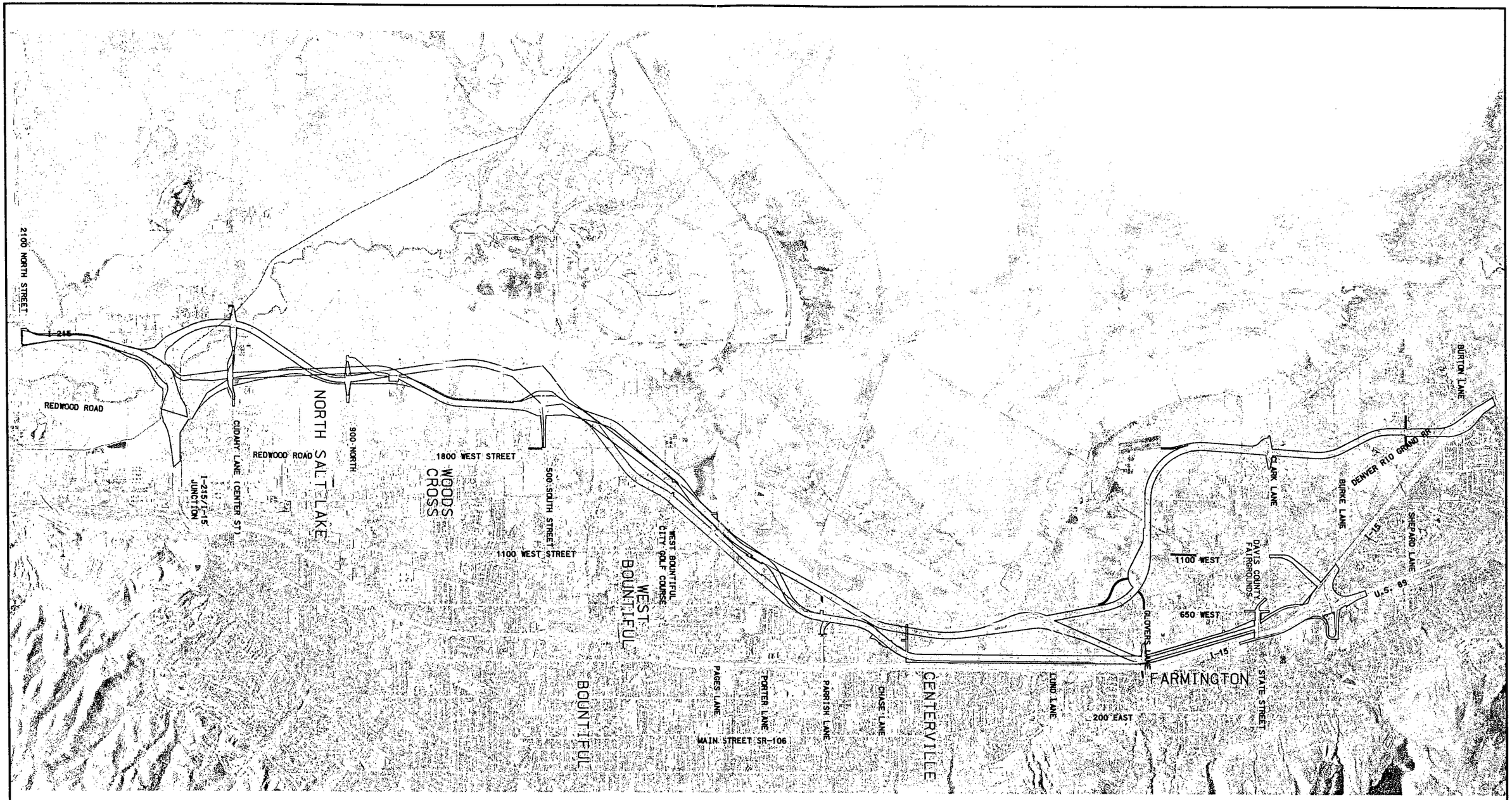
(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s).
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points



LEGEND

- Alternative A
- Alternative B
- Alternative C
- Alternative D and E

E is 321 ft. wide
D is 328 ft. wide

0 1 2
KILOMETERS

0 0.5 1
MILES

W S N E

LEGACY PARKWAY

Form NRCS-CPA-106
Identification Number: UT-2004-0002
Davis and Salt Lake Counties, Utah
Federal Agency Involved: FHWA
September 27, 2004

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

November 8, 2004

Regulatory Branch (199650197) (200350493)(FJD)

Mr. John Thomas, P.E.
Utah Department of Transportation
360 North 700 West
Suite F 2nd Floor
North Salt Lake, Utah 84054

Dear Mr. Thomas:

We are responding to your request to reverify the original jurisdictional determination for the UDOT Legacy Parkway Project. We issued Permit 199750197 in January 2001, authorizing UDOT to fill up to 114 acres of wetlands for the construction of the Legacy Parkway. Portions of the right-of-way were cleared and filled before construction was halted in November 2001. Therefore, the area disturbed by this construction needed specific study to determine to what extent wetlands have changed subsequent to the impact analysis performed for the June 2000 *Legacy Parkway Final Environmental Impact Statement*. The survey area is located in the cities of Salt Lake, North Salt Lake, West Bountiful, Woods Cross, Centerville and Farmington, in Davis County, Utah.

Based on available information and the March 24, 2004 reverification report prepared by Jones and Stokes, Inc., we hereby reverify the original delineation, *Wetland Delineation, Legacy-West Davis Highway* (Baseline Data, Inc. et al, February 18, 1998) and its 1999 update with the following modification:

> Within the right-of-way, 47.9 acres have been filled. Adjacent to the right-of-way, up to 4.5 acres have been filled; this includes 4.2 acres of wetlands were filled by activities not associated with the Legacy Parkway. (This figure does not include 12.9 acres of wetlands filled in association with the Foxboro project at the northwest corner of Center Street and Redwood Road, in North Salt Lake.) We concur with the acreage tally on the enclosed Table 1 from the Jones and Stokes reverification report.

These waters are regulated under Section 404 of the Clean Water Act since they are either tributary and/or adjacent to the Great Salt Lake (GSL), a waters of the United States in accordance with 33 CFR 328(a)(5) and (7). Adjacent means neighboring, bordering or contiguous. We consider wetlands that form complexes on the low terraces surrounding the GSL to be wetlands adjacent to the GSL.

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. A *Notification of Administrative Appeal Options and Process and Request for Appeal* form is enclosed. If you wish to appeal this approved jurisdictional determination, please follow the procedures on the form. You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

Please refer to identification number 200350493 in any correspondence concerning this project. If you have any questions, please contact me at our Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, email *Nancy.Kang@usace.army.mil*, or telephone 801-295-8380, extension 14. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Nancy Kang

Nancy Kang
Chief, Utah Regulatory Office

Enclosure(s)

Copy furnished without enclosure(s):

Greg Punske, P.E., Federal Highway Administration, 2520 West 4700 South, Suite 9A, Salt Lake City, Utah 84118-1847
Christy Corzine, Jones and Stokes, 2600 V Street, Sacramento, CA 95818-1914.

Appendix B

Travel Demand

Appendix B

2020 Travel Demand Analysis

B1 Introduction and Setting

This document presents the travel demand methodology used for evaluating transportation improvements as part of the Legacy Parkway supplemental environmental impact statement (Supplemental EIS). The Legacy Parkway Supplemental EIS identifies the need for major highway improvements in the North Corridor, together with maximum future transit improvements as part of a coordinated multi-modal program (Shared Solution). The detailed discussions of the travel demand model that follow have as their starting point the Wasatch Front Regional Council (WFRC) travel demand model (version 3.2) (released February 2004) and various WFRC documentation including a memo describing "What's new in Version 3.1" by WFRC staff.

B1.1 Purpose and Organization of Report

This report has five sections.

- Section 1, Introduction and Setting, describes the purpose of the report.
- Section 2, Model Input and Assumptions, outlines the inputs and assumptions of the WFRC travel demand forecasting model, such as socio-economic projections and highway and transit networks.
- Section 3, Travel Demand Modeling Process, reports the procedures that were used to develop travel demand forecasts for the Legacy Parkway project, using the WFRC model, and explains the basic process used by WFRC, and the changes in the modeling process that were incorporated by the study team led by FHWA and the Corps.
- Section 4, Changes to the WFRC Model and Processing Model Results, highlights specific post-model adjustments to the WFRC model incorporated to:
  - Account for factors not considered by the model
  - Process raw traffic volumes and transit assignments in the WFRC travel demand model to create "passenger car equivalent volumes" consistent with the procedures in the 2000 *Highway Capacity Manual* (Transportation Research Board 2000).
- Section 5, Supporting Alternatives Analysis, was added at the request of the lead federal agencies to provide a richer understanding of the traffic analysis evaluated to understand and compare alternatives.

Note that it is difficult to separate the WFRC travel demand model from modeling performed specifically for the Legacy Parkway Project. The WFRC travel demand model refers to all modeling processes and data inputs. In order to test alternatives, certain data inputs have been changed but all other data inputs and modeling processes have not been changed. This report describes both the WFRC modeling processes and data inputs and will highlight, where appropriate, data inputs have been changed to reflect modeling performed specifically for the Legacy Parkway Supplemental EIS.

B1.2 Background of Modeling Domain

In the past, WFRC maintained two separate models, one covering the modeling domain of the Salt Lake Urbanized Area and one covering the modeling domain of the Ogden Urbanized Area. In addition, the Mountainland Association of Governments (MAG) maintained a travel model of the Provo-Orem Urbanized Area. The Salt Lake Urbanized Area consisted of the southern portion of Davis County, generally south of but including portions of Farmington, as well as urbanized areas of Salt Lake County. The modeling domain for the Ogden Urbanized Area was contiguous to and north of the Salt Lake Urbanized Area. The modeling domain for the Provo-Orem Urbanized Area was contiguous to and south of the Salt Lake Urbanized Area.

Beginning in approximately 1999, WFRC and MAG began a process to combine the three separate models into a single regional travel demand model, built upon a less formal process that began earlier within WFRC to combine the models for the Salt Lake and Ogden Urbanized Areas. The less formal process began by ensuring that “external trips” from the Salt Lake model and the Ogden Urbanized Area model were identical. The more formal process reviewed individual trip purposes and redefined the definition of “external trip” as well as other improvements facilitated through consultant support. Now one single travel model covers the four contiguous counties. Salt Lake, Davis, and Weber Counties are within the WFRC planning area, and Utah County is within the MAG planning area. The following discussion includes data reported across the four-county area, relating to totals from the entire modeled area. Data reported from the WFRC area covers only Salt Lake, Davis, and Weber Counties.

B1.3 Description of the North Corridor

The North Corridor is explained in detail elsewhere in the Supplemental EIS, but from a modeling standpoint, it generally refers to the area that parallels I-15 from Kaysville to the northern part of Salt Lake City. The North Corridor includes all or parts of Salt Lake City, Salt Lake County, North Salt Lake, Woods Cross, Bountiful, West Bountiful, Centerville, Farmington, Kaysville, and Davis County. Figures 1-1 (Regional Location) and 1-2 (North Corridor) in the Legacy Parkway Final EIS illustrate the regional location and the specific limits of the North Corridor, respectively. It is pointed out that the modeling domain includes the four urban counties: Salt Lake, Davis, Weber, and Utah County. Consequently, this report will utilize, as needed, information from the four urban counties, the three urban counties that fall within the WFRC planning area, or just the North Corridor. The use of four county total values is typically included as a matter of convenience in summarizing the results of the entire modeling domain, but smaller geography results are provided where necessary based on consistent geographic definitions built from the Traffic Analysis Zone (TAZ) level of detail.

B2 Model Input Assumptions

The WFRC travel demand model uses a variety of input data as the basis for forecasting future traffic and ridership volumes in the North Corridor. The three key inputs are:

- Land use and socio-economic data (as a basis for estimating trip generation);
- Highway network definition, including the physical and operating characteristics of highways and arterial streets within the model area; and
- Transit network definition, describing the transportation modes, service levels, and operating characteristics of the public transit system.

Additional information on modeling input and assumptions is included in Section B3.2.2 (*Transit Network Assumptions*).

B2.1 Land Use and Socio-Economic Projections

B2.1.1 Source of the Projections

The socio-economic data sets developed and maintained by WFRC in coordination with local governments are the basis of estimating future travel demand within the region. These data also support a variety of other comprehensive planning activities throughout the region. This section describes the development and application of the socio-economic data, in particular the forecast population and employment.

To provide reliable projections of population, land use, and other parameters for planning, the counties and communities of the Wasatch Front region have maintained a cooperative process through WFRC for nearly thirty years. The process has generally relied on the state's Utah Process of Economic and Demographic (UPED) model for regional and county control totals of population and employment. Regional and county totals need to be assigned to more specific locations, which respect land constraints at the small area level by WFRC. In April 1992, WFRC published *Wasatch Front Regional Planning Projections Technical Report 29*, which introduced the Stratified Iterative Dis-aggregation (SID) method of projecting socioeconomic data on geographic areas smaller than the county level. The basic concept underlying SID is to use historical growth rates to produce TAZ level projections, which are then summed to county and regional control totals. The latest TAZ projections developed by WFRC were produced during 2003 using a modification of the SID method, with control totals published in the *2003 Economic Report to the Governor*, and are the basis of the travel demand projections used in the February 2004 WFRC model provided for the Legacy Parkway Supplemental EIS project.

B2.1.2 Methodology for Developing Projections

There are four basic components to the projections methodology: collecting base data, obtaining control totals, calculating projections, and reviewing projections. These are discussed below.

Collecting Base Data

Base data for population and households come from the 2000 Census SF1 dataset at the census block level. Census blocks are summed to the TAZ and census tract levels.

Base employment data originally came from the 3rd Quarter, 2001 Utah Department of Workforce Services ES 2002 database for the WFRC model development and calibration. WFRC periodically inputs updated data as it becomes available. Once base population and employment were collected, the land supply was examined and mapped. Land that was deemed un-developable due to environmental constraints was taken out of the total and density was calculated using the total land available for development. The developable land was further classified as residential or commercial using the master plans from each city and county.

Obtaining Control Totals

Control totals for the years 2002–2030 for population, households, and employment were provided at the county level by the Governor's Office of Planning and Budget (GOPB), as published in the *2003 Economic Report to the Governor* (Governor's Office of Planning and Budget 2003). Both GOPB and WFRC staffs collaborate on the review of these county level totals before their publication. The UPED is a hybrid economic-demographic model. UPED integrates a cohort-component demographic model with an economic base employment model. It generates long term demographic (population) and economic (employment) forecasts. The demographic component of UPED produces projections of births, deaths, and non-employment related in- and out-migration, while the economic component generates projections of employment and employment related net migration. **The single most important driver of population growth or decline in this model is the growth rate of employment associated with a region's economic base.**

The demographic component of the model employs the cohort survival population projection technique combined with econometric techniques for projecting the migration portion of population change. The UPED model begins with a census count base-year population distributed by age and gender. The model then incorporates specific assumptions with regard to survival and fertility rates for each age and gender group and projects the change in population over the next five-year period. This produces a natural increase in population notwithstanding in- or out- migration. Non-employment related migrants, such as retirees or students, are added or subtracted to the base year population such that the result is a first approximation of the end of period population, that is, the expected end of period population in the absence of employment related migration. This value becomes input to the economic side of the model.

The economic component of UPED is an economic base employment model with the organizing concept of a labor market that controls employment related migration. The central premise of this model is that external demand for a region's exports is the primary driving force behind the region's economic and demographic growth or decline. This demand is registered in the model as basic employment, which is used to produce goods and services for export. Estimates and projections of basic employment by industry sector are input to the model.

The population in the region also demands goods and services. Local production of goods and services for local consumption requires labor. The demand for this labor is represented in the model as population-dependent employment. As the population of the region changes, this population-dependent employment will change in a like direction. In the model, the following factors determine the level of this category of employment.

- The population size and age structure.
- Trends in national per capita employment by industry (reflecting changes in national consumption patterns and productivity).
- The local differences from national production rates (reflecting regional differences in consumption patterns as compared with the U.S.) and the region's import structure.

The total demand for labor, measured in jobs, is the sum of basic and population-dependent employment.

Population (age and gender components), labor force participation rates, and multiple job holding rates determine the supply of labor (measured in terms of the number of jobs). Given the population from the demographic component of the model, if the supply of labor exceeds the demand for labor in sufficient numbers to yield an unemployment rate, which exceeds the equilibrium rate, employment related net out-migration occurs. On the other hand, if the unemployment rate is less than the equilibrium rate, employment related net in-migration results. If the labor market is in equilibrium, i.e., the unemployment rate is sufficiently close to the equilibrium rate, no migration occurs and the model proceeds to the next projection year. Non-employment related migration is also projected in this section of the model, since the population base for this category of migration is the natural increase population plus employment related to net migration.

In the event of migration, the size and composition of the population changes, this, in turn, affects the population-dependent demand for labor, thus inducing further migration. This is solved iteratively. When equilibrium is achieved, the model proceeds to the next projection year. The ending population of the current year becomes the beginning population of the following year.

UPED makes projections at the multi-county district (MCD) level. GOPB and WFRC then disaggregate the MCD projections to counties based on growth trends, available land, etc. The UPED does not have a land supply component as part of the model structure, thus the process of disaggregating the regional control totals provided by GOPB into county, city, and TAZ level forecasts is the responsibility of WFRC (or each appropriate Association of Governments). Final products from UPED include population by age and gender, components of population change, households, household size, and 66 sectors of employment.

Calculation of Projections

These control totals are used by WFRC to make TAZ projections using the Modified Stratified Iterative Dis-aggregation (MSID) process with several (off model/on model) enhancements (also by WFRC). Small area projections were controlled to the regional control totals of UPED but were initially allocated to each area using the Census 2000 population values, the Utah Department of Workforce Services employment values, as well as the zonal density for each data item. A growth rate for each variable is applied based on its density and corresponding historical growth trends from 1980 to 2000. The annual growth rates are applied for five years. At each five-year interval, densities are recalculated using the new population and employment and new growth rates are applied to the next five-year period. This process is repeated until the horizon year (2030) is reached. For more information, refer to *Wasatch Front Region Small Area Socioeconomic Projections: 2002-2030 Technical Report #42*. The accuracy of past land use forecasts is controlled in several steps by the accuracy of the control totals provided by the Utah Office of Planning and Budget and the small area forecasts developed by the WFRC. Each of these agencies, as well as the individuals who assist these agencies, has tracked historic accuracy by various statistical and

non-statistical means. As part of the WFRC Technical Report # 39, a brief review of historic accuracy was offered. In this report, a brief review of historic projections in Salt Lake County concluded, "Historically, the projections have tracked well with the actual trends." Although the Supplemental EIS uses an updated set of socio-economic forecasts included in Technical Report #42, the methodology and results are considered consistent with earlier forecasts. The Utah Office of Planning and Budget also provides *An Analysis of the Accuracy of UPED's Historical Projection Work* (April 2001), which makes several observations, notably that "Utah's projection history includes periods of both over and under projecting population."

Interim year projections, such as projections used for the Legacy Supplemental EIS, make use of published interim year projections of WFRC (and MAG). At the time of the Legacy Final EIS, the year 2020 was the horizon year of WFRC Small Area Projections. In order for the Supplemental EIS to remain consistent with the Final EIS, the interim year 2020 of the WFRC projection horizon (year 2030) has been used. The *Wasatch Front Urban Area Long Range Transportation Plan Update, 2004–2030* (WFRC long range plan) (Wasatch Front Regional Council 2003) includes projects and projections to the year 2030. The Legacy Parkway Supplemental EIS used the year 2020 land use projections and applied those to the list of highway and transit projects included in Phase I and Phase II of the three-phased transportation plan. Phase II of the plan extends to the year 2022, which was considered consistent with the year 2020 land use projections. A comparison between the population and employment projections in the Final EIS and those included in the Supplemental EIS are presented in Table B-1a and B-1b, respectively.

Table B-1a. Comparison of Final EIS and Supplemental EIS Population Data and Forecasts

	Final EIS Base Year 1995 Population	Supplemental EIS Base Year 2002 Population	Final EIS Forecast 2020 Population	Supplemental EIS Forecasts 2020 Population
Salt Lake County	819,000	924,000	1,302,000	1,284,000
Davis County	218,000	250,000	355,000	347,000
Weber County	174,000	200,000	284,000	287,000
Urban Area Total	1,211,000	1,374,000	1,941,000	1,918,000

Note: Population summaries in the travel demand models may vary slightly from published values due to rounding of disaggregate forecasts of household size. Population and employment are rounded to the nearest 1,000.

Table B-1b. Comparison of Final EIS and Supplemental EIS Employment Data and Forecasts

	Final EIS Base Year 1995 Employment	Supplemental EIS Base Year 2002 Employment	Final EIS Forecast 2020 Employment	Supplemental EIS Forecasts 2020 Employment
Salt Lake County	447,800	522,000	753,600	734,000
Davis County	73,000	89,000	133,200	124,000
Weber County	76,500	84,000	126,200	129,000
Urban Area Total	597,300	695,000	1,013,000	987,000

Note: Population summaries in the travel demand models may vary slightly from published values due to rounding of disaggregate forecasts of household size. Population and employment are rounded to the nearest 1,000.

Review of Projections

The projections were subject to several rounds of review and revision. The projections are reviewed by individual jurisdictions (cities and counties within WFRC) for consistency with boundaries, the land use element of their Master Plans, and reasonableness. By forming a Working Group, WFRC allowed the review of the final socio-economic projections by local "experts" including experienced land use planners in the region, state government economists, and other interests. The following list identifies the entities that comprised the WFRC Working Group. According to WFRC, the Working Group concluded that the methodology was sound and the results were reasonable at the regional level. The following entities comprise the working group.

- Weber County
- Davis County
- Sierra Club
- Envision Utah
- Town of Herriman
- Homebuilders Association of Greater Salt Lake
- Utah Department of Transportation
- Utah Transit Authority
- State Data Center
- Greater Ogden Area Board of Realtors
- West Valley City
- Bureau of Economic and Business Research
- Sandy City
- Governor's Office of Planning and Budget

In addition to land use, population, and employment, auto ownership is also an important variable in forecasting future travel demand, but is calculated from other socio-economic data. The socio-economic and land use forecasts have been updated from those used in the demand forecasts performed for the Legacy Parkway Final EIS and I-15 North Corridor Draft EIS. A more detailed discussion of current land-use and socio-economic forecasts, by county, city and TAZ, along the Wasatch Front is included in *Technical Report #42: Wasatch Front Region Small Area Socioeconomic Projections: 2002-2030* (Wasatch Front Regional Council 2003).

B2.1.3 Summary of Socio-Economic Projections in Wasatch Front

Population

Population along the Wasatch Front (Weber, Davis, and Salt Lake Counties) is expected to grow from about 1,374,000 in 2002 to approximately 1,918,000 in 2020, an increase of 40%. Increases in population density are also projected throughout much of Davis County resulting from a combination of infill development in the more developed areas of the county and the continued spread of development in the presently undeveloped portions of the county. This increase in population, and to a lesser extent population density, will contribute to increased traffic volumes on the major transportation facilities in Davis County.

Households

Households for the three-county area are projected to increase from about 450,000 in 2002 to over 677,000 in 2020, or over 50%. The growth rate for households is higher than population because household size is forecast to continue to decrease over time. According to the WFRC, national trends support a declining household size, with a more significant reduction in household sizes in the Davis County, according to the Utah Office of Planning and Budget, due to the increasing urbanization of the area and the increasing loss of vacant or under-developed land.

Employment

Employment for the three-county area is projected to increase at close to, but slightly above the rate of population growth. Employment projections in Salt Lake County represents a slightly smaller share of the three-county employment as compared from the Final EIS to the Supplemental EIS, but remains the dominant employment location.

B2.1.4 Summary Results

Overall, the growth projections for both population and employment in the Supplemental EIS for the year 2020 are slightly below growth projections in the Final EIS for the same year. This is due to revised regional control totals offered by the GOPB. The Utah Governors Office of Planning and Budget presently maintains growth forecasts to the year 2030 for which the year 2020 forecasts represent an interim year. During the Final EIS, growth forecasts for the year 2020 represented the furthest future year of official forecasts.

B3 Travel Demand Modeling Process for Legacy Parkway Project

The travel demand model, its input data, and its application methodologies have changed since the Legacy Parkway Final EIS and I-15 North Draft EIS were prepared. The Legacy Parkway Supplemental EIS used the February 2004 WFRC regional travel demand model with changes to the highway and transit input networks as described in this memo. Consequently, the traffic forecasts used are not the same as those published in the earlier environmental documents. Developments to the WFRC travel demand model have been implemented by WFRC to improve the accuracy of forecasts produced. Selected application methodologies have changed in the WFRC model to reflect updated standards and recommendations from peer reviews. Updates to input data by WFRC have been made to better reflect current plans, and forecasts. The Legacy Parkway modeling included all of the latest advancements of the

WFRC model and methodologies with changes made to the input networks for the Legacy Parkway Supplemental EIS. The verification of the accuracy of the WFRC modeling process can be found in several internal documents to the WFRC, most recently including the "Wasatch Front Regional Council Speed Study," December 2003. Informal model calibration efforts are often done on a model-by-model basis. The *Legacy Parkway Technical Memorandum: Integration of Mass Transit with Legacy Parkway* (Fehr & Peers 2004) also offers a brief review of the accuracy of the WFRC model for application in the North Corridor.

The travel demand models used for the I-15 and Legacy Parkway environmental studies in 1998-2000 were described in detail in their respective supporting documentation. Major differences between those models, input data, and methodologies are included in the discussion of the structure and four steps within the model that follow.

B3.1 Land Use and Induced Growth

Land use projections for all of the alternatives are the official 2020 data set for WFRC model, version 3.2. The Supplemental EIS transportation analysis does not vary the land use assumptions from one transportation alternative to another. The WFRC model predicts future travel demand based on a full range of relevant factors, including projected land use. The model is not designed to address the concept of "induced growth," which can be described as variations in where and when growth may occur in relation to enhancements of transportation systems. Rather, the model projects future travel demand using land use projections of the local communities combined with the data described above from the GOPB. WFRC model analysis utilizes the following in projecting total travel demand.

- The future land use inputs to the WFRC model are based on plans that include Legacy Parkway and based on input from each community in the corridor.
- The calibrated base year conditions include future trip rates and peak period factors that are unchanged from the base year.
- The WFRC model was calibrated to base year conditions that generally have low to moderate congestion.

Therefore, the total travel demand generated in the north corridor for the Shared Solution represents a reasonable maximum level. As described in Section 5.1 of this appendix, land use in the corridor for the No-Build Alternative could vary from the WFRC estimates because the No Build would make more land available for development in the corridor than anticipated by WFRC. Under a Legacy Parkway No-Build scenario, the 800 acres of developable land within the Legacy Parkway right-of-way and preserve would become available for development. Section 5.1 describes the sensitivity of the No-Build travel forecasts to the possible development of these acres.

Given the use of consistent land use assumptions in the analysis of all of the alternatives, the main variations in corridor travel demand from one alternative to the next relate to the different levels of accessibility and travel ease offered by the respective alternatives. Specific travel routes and mode used by the total travel demand will be affected by the Shared Solution as discussed in Section B3.3.4 of this appendix.

B3.2 Highway and Transit Networks

B3.2.1 Highway Networks

Highway networks include links defining all freeways, highways, arterial and collectors in each of the four counties. TAZs are connected into the highway network by links called "centroid connectors." Centroid connectors represent local streets and driveways in the model and serve to connect trips to the transportation network. The parameters that define a highway link generally are:

- Distance
- Free-flow travel speed
- Number of lanes
- Lane capacity
- Functional classification

Highway networks for the entire four-county region (including Utah County) as developed by WFRC and MAG were held constant for each of the alternatives evaluated for the Legacy Parkway Supplemental EIS except for changes necessary to reflect each alternative in the North Corridor. Highway networks in both the build and no-build conditions included a combination of programmed and non-programmed projects as included in the WFRC long range plan as included in the "end of phase II" model set. The extension of Legacy Parkway north of the project limits is also included in the WFRC Long Range Plan, but was excluded from all model runs so as not to bias the results by including an extension of a project still being evaluated.

As part of applying the travel demand forecasting process for the Legacy Parkway Supplemental EIS, the Legacy Parkway project developed a 2020 highway network, using the WFRC information and model to represent no-build conditions as well as to provide a background for evaluating the build alternatives. The "no-build" highway network was defined to include all of the projects included in Phase I (year 2012) and Phase II (year 2022) of the entire transportation system as described by the WFRC 2030 long range plan (adopted December 2003) with the exception of the Legacy Parkway between I-215 and US-89, the Legacy North project, and major improvements to I-15 between 600 North in Salt Lake City and 200 North In Kaysville. I-15 improvements in the south Davis County study area are actually included in Phase III of the WFRC 2030 long range plan, so this project was not removed to define the no-build as much as it was added to reflect several of the build alternatives, in order to remain consistent with the alternatives included in the Final EIS.

Phase I and Phase II of the WFRC long range plan include highway and transit projects projected to be financially feasible by the year 2022. The long range plan also includes a third phase of projects, which are projected to be financially feasible by the year 2030. In order for the Supplemental EIS to be consistent with the design year of the Final EIS, only the first two phases of the three-phase plan were included in the No-Build network to approximate the transportation system in the year 2020. Land use projections for the year 2020, as provided by the WFRC, were modeled on this base transportation system.

The most notable projects included in the no-build network are:

- Widening of Redwood Road from two to four lanes from 1000 North in Salt Lake City to 500 South in Woods Cross, which WFRC plans between 2013 and 2022.
- Widening of 500 South in Woods Cross to four lanes from I-15 to Legacy Parkway by 2012.
- Widening of Parrish Lane in Centerville to four lanes from I-15 to Legacy Parkway by 2012.
- Construction of Mountain View Corridor from I-80 to 13400 South in Riverton Jordan, which WFRC plans in varying stages beginning with SR-201 to 6200 South prior to 2012, 6200 South to 13400 South prior to the year 2022.

A capacity enhancement project is programmed for 2004 on I-15 between Beck Street and I-215 that will construct a short segment of general purpose lanes in order to relieve a bottleneck in the highway system. This improvement project is also included in the no-build highway network.

As part of the modeling for the Legacy Parkway Supplemental EIS, the WFRC model was modified to reflect various alternative "build" possibilities. It should be noted that the model structure, including all of the mathematical coding which is part of the WFRC regional travel model, remained unchanged for the Legacy Parkway analysis as compared to the WFRC long range plan. Changes to the model were limited to the inputs, which define the level and type of transportation infrastructure in the year 2020.

For the Legacy Parkway Supplemental EIS modeling, which included "I-15 build" alternatives, I-15 was coded as four general purpose lanes plus an HOV lane. The HOV lane was included in the distribution and assignment portions of the analysis. Various other projects were also analyzed as alternatives to Legacy Parkway. The most notable newly evaluated highway alternative included what was termed a "Redwood Road Arterial." The Redwood Road Arterial Alternative assumed four lanes in each direction on Redwood Road in its existing alignment (and then extending north to the I-15/US-89 interchange). Speeds and capacities for Redwood Road assumed a limited access, at-grade, signalized facility similar in operational characteristics to Bangerter Highway. The Redwood Road Arterial Alternative modeled for the Legacy Parkway Supplemental EIS included a capacity of 797 cars per lane per hour (with four lanes in each direction) and a coded free flow speed of 47.4 miles per hour from I-215 to Parrish Lane and 51.4 miles per hour from Parrish Lane to US-89. Roadway link speeds and capacities are inputs to the regional travel demand model. Since these inputs often require estimates of future conditions that do not have corresponding data, the WFRC employs a process of assigning speeds and capacities based on functional classification, area type, and a more subjective variable based on the degree of access control. For the Redwood Road Arterial Alternative, model inputs were patterned after Bangerter Highway.

Table B-2 provides a brief description of the components of each alternative analyzed as part of the Supplemental EIS. Alternative names included in the table are provided as a convenience of the modelers and are not intended to over-simplify or otherwise alter the value of each alternative. Specific model coding assumptions as well as further descriptions of specific alternatives are discussed elsewhere in this appendix.

Table B-2. Modeled Alternative Summary

Alternative	I-15 Configuration	Legacy Parkway	Transit	Arterial Street Plans	Demand Year
Existing 2001	Highway and transit network as they existing in 2001 as per the calibrated WFRC model				2001
Shared Solution	8 Lanes + 2 HOV	4 Lanes	Maximum Future	WFRC Long Range Plan[1]	2020
No-Build	8 Lanes	Not Built	WFRC Long Range Plan	WFRC Long Range Plan[1]	2020
Redwood Road Arterial Alternative w/out I-15	8 Lanes	Not Built	Maximum Future	WFRC Long Range Plan plus Eight-Lane Redwood w/ Access Control[1]	2020
Maximum Future Transit w/out I-15	8 Lanes	Not Built	Maximum Future	WFRC Long Range Plan[1]	2020
Maximum Future Transit	8 Lanes + 2 HOV	Not Built	Maximum Future	WFRC Long Range Plan[1]	2020
Redwood Road Arterial Alternative	8 Lanes + 2 HOV	Not Built	Maximum Future	WFRC Long Range Plan plus Eight-Lane Redwood w/ Access Control[1]	2020
I-15 Improvements Beyond Ten Lanes	10 Lanes + 2 HOV	Not Built	Maximum Future	WFRC Long Range Plan[1]	2020

[1] WFRC long range plan used for the modeling was modified based on changes described in the text above.

Detailed modeling results of each alternative in Table B-2 are not always presented in this appendix in order to simplify the results for the reader. For example, the results of the Redwood Road Arterial and Maximum Future Transit Alternatives without I-15 improvements generally do not result in improvements in any performance measure evaluated over their respective comparisons with I-15 improvements included. Therefore, this appendix provides a comprehensive description of the travel modeling and modeling results, but does not comprehensively present the results of all alternatives not carried forward past the alternative screening.

B3.2.2 Transit Network Assumptions

The existing transit network was coded into the WFRC model to reflect current UTA operating plans. The future transit network as planned by WFRC is also represented in the WFRC model to reflect programmed transit projects as well as other transit projects included in the WFRC long range plan. The networks used in the Supplemental EIS analysis represent the highway and transit systems at the end of Phase 2 of the current WFRC long range plan. Projected completion date for Phase 2 projects is 2022. As the WFRC population and estimates represent 2020 projections, the Supplemental EIS analysis is termed a 2020 case, although travel conditions would be marginally worse in 2020 than predicted herein if key transportation network projects are delayed until 2022.

Below are listed the most notable transit projects included in the WFRC 2020 transit networks (the same for the build alternatives and the No-Build Alternative).

- Commuter rail operation from Salt Lake City to Ogden along the Union Pacific right-of-way, west of I-15.
- Increased express bus and local bus service on existing routes.
- Increased transit coverage by the extension of existing routes and addition of new routes.
- Provision of feeder bus service to commuter rail stations in Salt Lake, Davis, and Weber Counties.
- Several new light rail lines in Salt Lake County, including:
  - Mid-Jordan light rail serving Midvale and West Jordan.
  - Extension of the north-south TRAX line into Draper.
  - Airport light rail.
  - Light rail line into West Valley connecting east-west into the Sugar House area of Salt Lake City.
- Several new bus rapid transit lines, including:
  - North-south line connecting Davis County to the Salt Lake City central business district (CBD).
  - Additional bus rapid transit serving the proposed Mountain View Corridor, Redwood Road, and Salt Lake County, and 1300 East in Salt Lake County.

A “maximum future transit” analysis was coded for the Legacy Parkway modeling to reflect the more aggressive transit assumptions for the integration of mass transit with Legacy Parkway. The following bullets briefly define “maximum future transit” for the purpose of performing the Legacy Parkway travel modeling under the WFRC travel model (version 3.2) (February 2004).

- Transit routes estimated to be affordable by the year 2030 in the WFRC long range plan were assumed to be in place by the year 2020 (all transit *.LIN files based on “End of Phase 3” of the WFRC long range plan).
- No changes to walk access from WFRC Code.
- Double parking costs of all zones from WFRC Code ($0 parking remains $0).
- No premium transit fares (all express and rail mode fares equal to local bus, in contrast to WFRC Code).
- Commuter rail set to 15-minute headway north of Salt Lake City during rush hours (approximately 6-9 AM and 4-7 PM) in contrast to WFRC 20 minute-headway during rush hours.
- South Davis BRT time factor set to 0.8 (from 1.0) but otherwise as coded (mode 7) reflective of a higher speed bus system with travel times that are 80% of travel time of a “typical” bus line.

- Maximum wait time equal to 1 minute at the following additional nodes (2070, 3404, 3415, 3440, 3463, 3470, 3473, 3548, 3646, 3739, 5506, 5516, 5640, 12631, 12633, 12636, 12637, 12642, 12652, 12661, 12707) to reflect a seamless transfer service for transit routes, in contrast to WFRC coding, which assumes transfers occur between two uncoordinated services, but does include a maximum wait time of 10 minutes (or one half of the headway).

- Post model adjustments to account for the effects of transit-oriented development ("3/4 D" land use) around transit stations as defined by the Integration Analysis (Fehr & Peers 2004), since the WFRC model does not account for transit oriented development at the sub-traffic analysis zone level.

- Peak hour, peak direction transit riders calculated as a fraction of daily riders as defined by the Integration Analysis (Fehr & Peers 2004).

- No other changes to WFRC travel demand model (version 3.2).

Wasatch Front Regional Council is presently completing a transit needs analysis study for south Davis County, with the final report expected to be complete by the end of 2004 (Wasatch Front Regional Council in preparation). The study suggests that a bus rapid transit (BRT), possibly a streetcar, is feasible and should be constructed in an exclusive lane along the US-89-Main Street-200 West alignment, at least up to Pages Lane in Centerville. Year 2030 ridership is anticipated to be around 7,000 to 8,000 passengers per day. These results are roughly consistent with a portion of the definition of maximum future transit for the Legacy Parkway Supplemental EIS. The BRT alignment recommended in the South Davis study is the same as the BRT alignment defined in the Supplemental EIS integration analysis between the start of the line in the Salt Lake City CBD and Pages Lane. The alignments deviate slightly from Pages Lane through Centerville, but re-join at State and Main Streets in Farmington, and continue together through Farmington to the Commuter Rail station. The ridership forecasts are also in general agreement. The South Davis ridership estimate of 7000 to 8000 riders in 2030 includes riders whose trips both board and alight without traveling across the Woods Cross screenline. The total number crossing the screenline in 2030 is projected to be about 4500 daily. When expressed as 2020 peak hour or peak period northbound ridership, the South Davis Study total screenline BRT ridership is similar to the Legacy Parkway integration analysis BRT estimate, and total transit ridership in the South Davis County Study is somewhat lower than the fully integrated maximum future transit system included in the Supplemental EIS.

Compared with the transit ridership forecasts prepared for the commuter rail Draft EIS, the fully enhanced and integrated maximum future transit system, including higher frequencies and lower fares on commuter rail, generates higher ridership in comparable service years.

B3.3 Trip Generation

Trip generation within the WFRC model estimates the number of person-trips, produced in and attracted to each zone based on the socio-economic data characteristics and household characteristics (number of persons and automobile ownership) of that zone. Person-trips are estimated for internal-to-internal zones, internal-to-external, and external-to-internal zones. Eight trip purposes are defined in the trip generation module:

- Home-based work

- Home-based other
- Home-based school
- Home-based shopping
- Home-based personal business
- Non-home-based, work-related
- Non-home-based, non-work-related
- Commercial

Modeling for the Legacy Parkway Supplemental EIS did not change the trip generation process of the WFRC (and MAG) model as described in this section. Reference to base year calibration results generally refers to calibration efforts from WFRC on a regional basis, unless otherwise noted. Base year model calibration was generally performed for either a 2001 or a 2002 base year due to the lag of available socio-economic data and highway network traffic counts.

B3.3.1 Socio-economic Data

The 2000 Census was used by WFRC to classify households by size (people in the household), income quartile, and workers per household. Census curves are fitted to basic zonal information such as the total households, average household size, and average zonal income, to determine the total number of households in combinations of these categories: 6 HH size categories (1 person to 6+ person), 4 worker categories (0 to 3+), and 4 income quartile categories. This then becomes basic input to Auto Ownership, Trip Generation, and Mode Choice modules of the WFRC model.

B3.3.2 Person-Trips

The WFRC trip generation module estimates person-trips (productions and attractions) by trip purposes. Trip productions are estimated using a cross-classification household trip rate matrix based on information collected during the most recent home interview survey. Households are classified by the six household size categories and by car ownership. Four car ownership categories (0-car, 1-car, 2-car, and 3-or-more-car households) have been defined. WFRC estimated the trip rates for each class of households using information derived from the 1993 Home Interview Survey responses.

A “home interview” travel survey is relatively common practice in the travel demand modeling industry. Experience gained within the industry allows for a statistical sampling of households as opposed to extensive in-home interviews. The 1993 Home Interview Survey, performed by WFRC relied on advanced practice sampling techniques and activity based travel responses, which were coordinated with FHWA. The 1993 travel survey was an update of 30-year old survey data collected in the 1960s.

Despite statistical sampling techniques, travel surveys remain expensive undertakings and are not generally performed at frequencies sooner than every 10 years. The goal of travel surveys is to define travel attributes to specific demographic characteristics. For example, the number of trips generated by larger households with more vehicles as compared to smaller households with fewer vehicles is quantified by the survey. The actual numbers of households that fall into each socio-economic variable classification

can then be updated based on more recent data and forecasts of WFRC. Therefore, the trip rates of households of the same characteristics do not change, but the changing socio-economic characteristics of households within the four-county region will indicate changes in travel. The survey techniques and application to the travel model were successfully reviewed as part of the 1999 Peer Review of the WFRC travel model developed as part of the MPO Certification Process of the WFRC performed by FHWA/FTA as well as a more recent (2002) in-house Peer Review performed by WFRC. Peer Review attendees and summary findings are available from WFRC summarizing the 1999 FHWA Peer Review and the 2002 In-House Peer Review.

Trip attraction is a regression analysis that uses zonal trip attraction and socio-economic data. A regression analysis is performed for each of the eight trip purposes considering the following variables:

- Population
- Total (occupied) dwelling units
- Single-family (occupied) dwelling units
- Multifamily (occupied) dwelling units
- Total employment
- Retail employment
- Industrial employment
- Other employment

Following the estimation of person-trips, internal-to-external/external-to-internal (IX-XI) vehicle trips are calculated. These are trips that have one end (origin or destination) in a TAZ within the four-county model area, and the other end outside the (four-county) model area, as represented by the cordon stations. IX-XI trips are estimated by WFRC based on zonal factors developed from the *1993 Home Interview Survey* responses and the estimated total internal trips in each zone. External-to-internal trips are estimated to be attracted to each TAZ in the region by total TAZ employment, and distributed by travel time from the external stations. Since survey methods employed by WFRC to estimate travel demand did not directly survey trips that were based outside of the four-county region, external-to-internal productions are estimated by WFRC to match available survey data by factoring IX trips included in the home based survey and matching the total external station counts provided by the Utah Department of Transportation (UDOT).

B3.3.3 Special Generators

Certain TAZs require special trip generation techniques because the intensity of activity is not accurately modeled with basic trip generation methods or with survey methods that determine trip making at the home-based level. These “special generator” TAZs are facilities such as large business parks, Hill Air Force Base, regional shopping malls, high-density urban zones such as the CBD and sports complexes. WFRC performs the calculations for all special generators and no additional analysis or adjustment of special generators was performed for the Legacy Parkway Supplemental EIS modeling. Special

generators affecting the study area include the Salt Lake City CBD, Hill Air Force Base, Lagoon Amusement park, and the Salt Lake International Airport.

B3.3.4 External Trips

External-external trips are those trips with both ends outside of the region. External-to-external trips are accounted for in the WFRC model via a fixed origin-destination vehicle trip matrix. For the model calibration year, 2001, the number of external-to-external trips crossing an external station plus the number of internal-to-external plus external-to-internal trips crossing the same station equals the average annual weekday volume crossing that station in 2001. Year 2002 data was also reviewed by WFRC to incorporate changes from 2001 data to 2002. Because of the I-15 reconstruction project in Salt Lake, the model calibration was performed in 2001 but model results were compared to both 2001 and 2002 traffic counts.

B3.3.5 Unique Trip Tables

Some major generators in the region have a trip distribution pattern that the current WFRC gravity trip distribution model would not adequately determine on its own. Each major college, Salt Lake International Airport and the Lagoon amusement park are examples where special generator trip data were available and the gravity model distribution was adjusted by WFRC to use pre-determined trip distribution matrices. Each of these special generator land uses has fixed trip tables created by WFRC that describe the distribution of trips across the region for current and future years. The Legacy Parkway modeling utilized these unique trip tables.

B3.4 Trip Distribution

B3.4.1 Travel Time Impedance

Using the highway network, a matrix is created of the travel times from each TAZ to every other TAZ in the network. This is referred to as an impedance (or “skim”) table, and is one of the key input elements to the trip distribution model. In the WFRC modeling process, this table is created and updated iteratively through the feedback loop in the model process. The initial skim tables are created based on the free-flow link speeds assumed in the network. This skim table represents the travel times between TAZs during assumed uncongested conditions. This skim table is then used as one of the bases for distributing trips between TAZs, and the modeling process continues through assignment.

Following the assignment of trips to the highway network, link travel speeds are recalculated to reflect the relationship between traffic volume along a network and the capacity of that network—in other words, congestion. Skim tables are then developed using this “loaded” network containing capacity-constrained travel speeds output from trip assignment. These skim tables, containing travel times between zones under capacity-constrained or congested conditions, are fed back into the trip distribution process as one of the bases for distributing home-based work trips between TAZs. Home-based-work trips are assigned by the WFRC model to reflect congested conditions in the AM peak period assignment. Other trip purposes are assigned in the WFRC modeling process by the capacity constrained conditions of the mid-day assignment, where congestion has less of an impact on travel distribution patterns. The assignment process does not change the total number of trips generated in each period, it only changes the facility that origin and destination pairs travel on due to congestion. Since there is feedback between the assignment and distribution process, assignment and the effects of congestion will also change how trip production and trip attractions are paired into trip origins and trip destinations.

This more realistically represents the conditions under which drivers (particularly commuters) make travel decisions. Because travel time (more than travel distance) is a key factor for a driver in determining the reasonableness of a trip, basing the estimate of travel time on congested conditions will more realistically represent the spatial distribution between the home end of the work trip and the work destination.

Terminal and intrazonal times are added to the travel time for each interchange prior to distribution. The terminal times are based primarily on the parking situation in the TAZ. Normally a 1 minute terminal time is added at the origin and destination end of each travel time. For TAZs in the CBC or at other locations where the distance from parking to the ultimate destination is expected to be longer, additional time is added at the terminal end. Intrazonal times are derived from the area of the TAZ, assuming all traffic moves at 20 mph and that all traffic originates at a distance inside the TAZ boundary equal to ½ the square root of the TAZ's area.

Calibration efforts by WFRC beginning in the initial four-county regional model development in 1999 revealed that the region has four distinct geographic areas between which observed travel behavior patterns are different than predicted. For example, in attempting to reproduce observed volumes, the WFRC model initially predicted substantially more trips between Salt Lake County and Utah County than were observed. The model had no ability to account for perceived geographic barriers, or local preferences to live, work, and shop in the same county. WFRC adjusted the model to address this using a fixed "time penalty." This time penalty, as applied by WFRC, represents a relatively common model practice to account for certain social biases, such as different geographic versions of the Sunday newspaper, which are not described by other socio-economic variables. WFRC calibrated the regional model using fixed time penalties to achieve calibration to the year 2002 external station counts. These travel time penalties, as calibrated by WFRC, were used in the Legacy Supplemental EIS modeling.

B3.4.2 Trip Distribution Analysis

The WFRC model performs trip distribution using a gravity methodology. The original eight trip purposes are collapsed into five trip purposes in distribution. Home based other trip distribution includes the home based school, home based shopping, and home based personal business trips. Non-home based trips include all non-home based work related and non-home based non-work related trips. Internal-external and external-internal trips are also distributed separately since part of their trip length is not captured in the regional model domain. These changes from trip purposes generated to the trip purposes distributed are based on available data and accepted modeling practice in the WFRC model. Separate trip distribution is performed for each of the five trip types.

- Home-based work
- Home-based other
- Non-home-based
- Internal-external/external-internal
- Commercial trips

The impedance matrices developed based on highway travel times are input to the trip distribution process. For home-based work trips, travel time impedances are based on assumed congested speeds in

the AM peak period. For other trip purposes, the travel times are based on less congested conditions of the mid-day period, outside of either the AM or the PM peak. This is equivalent to saying that people choose the location of work based on a consideration of traffic congestion in the morning peak, but people choose the location of shopping, schools, and all other destinations based on uncongested conditions. In reality, these decisions may be much more complex, but the travel model is not locating jobs and schools and land uses, only matching up trips of previously estimated destinations. Home-based college trips are also deducted from the aggregate totals of home-based "other" trips based on student enrollment data collected by WFRC for each college and university. Home-based college trips are distributed based on a pre-established distribution created by WFRC to match base year enrollment distribution by zip code.

Friction factors define people's propensity to make a trip based on the purpose of the trip and the length of the trip, as defined by travel time. The friction factors used in the WFRC travel demand models were developed and were calibrated by comparing (for each trip purpose) observed trip length frequency distributions obtained through responses to the 1993 Home Interview Survey to those estimated by the model. Work is presently underway by WFRC to review the reasonableness of trip length frequencies derived from highway travel times to account for transit trips, as derived from more recent transit on-board surveys. While there is no timeline for the completion of this work, other model checks and calibration performed by WFRC, such as aggregate work trip analysis resulting from the 2000 Census results, confirm that the trip length frequencies from the 1993 Survey along with screenline adjustments of the fixed time penalty, produce adequate model results of base year (2001 and 2002) conditions.

B3.4.3 Average Trip Lengths

Table B-3 (Average Trip Length) summarizes the average trip lengths of the WFRC model as run for the Legacy Parkway analysis, by trip purpose, for the base year 2001 and forecast years 2020 no-build conditions and the 2020 build alternatives. The average trip lengths are presented in minutes, actually representing the average duration of a trip, across the entire system (daily traffic volumes at the Woods Cross screenline are presented in Table B-5 below.). Results are presented for both Davis County (including north Davis County) and the entire four-county region as included in the WFRC model. As is typically the case, people are willing, on average, to travel further to work than they are willing to travel for non-work-related trips such as shopping or personal business. The similarities between average trip lengths for each purpose when comparing year 2001 data to year 2020 scenarios indicates that the trip distribution model is able to create future year origin-destination trip matrices that are able to replicate base-year observed trip length frequency distributions.

Table B-3. Average Trip Length (Minutes)

Type of Trip	2001		No-Build		Shared Solution	
	Davis Co.	Region	Davis Co.	Region	Davis Co.	Region
HBW (Home-Based Work)	20.11	20.17	21.47	20.58	19.50	20.20
HBC (Home-Based College)	27.50	16.66	29.14	17.32	27.29	17.22
HBO (Home-Based Other)	10.60	11.36	10.82	11.52	10.79	11.51
NHB (Non-Home-Based)	13.48	13.66	13.76	13.94	13.71	13.93
IX (Internal-to-External)	27.34	24.21	27.76	24.38	27.64	24.35
XI (External-to-Internal)	25.92	34.72	26.39	34.22	26.28	34.18
COMM (Commercial)	9.93	10.63	10.07	10.72	10.04	10.72
XX (External-to-External)	N.A.	45.19	N.A.	45.25	N.A.	45.15

Model Version 3.2 (Interplan 2004).

The current 2004 WFRC travel model (version 3.2) includes feedback loops that inform trip distribution of congested highway travel times resulting from assignment. As highway travel times increase due to congestion, trip distribution matches production TAZs to attraction TAZs that are closer together to maintain a reasonable pattern of trip lengths. This mechanism, along with mode choice, results in a varying total number of trips across any location, such as the Woods Cross screenline, that displays congestion.

This concept of varying distribution based on the feedback of traffic congestion resulting from the assignment step into the distribution step is one of the major improvements made by the WFRC to the travel model in recent years. Feedback from assignment to distribution was introduced into the WFRC model prior to the release of the Legacy Parkway Final EIS, but was not used in the Draft EIS. This is the reason that traffic volumes at the Woods Cross screenline were identical for all model alternatives in the Final EIS since no model feedback existed during the initial analysis. The concept of “unmet demand” was estimated from the model results, after the completion of the modeling, to estimate the number of passenger car equivalent trips that exceeded a level of service (LOS) D. Under the current WFRC model (version 3.2) as used in the Legacy Parkway Supplemental EIS, the number of passenger car equivalent trips across the Woods Cross screenline varies based on the congestion level of each alternative highway and transit network.

The feedback process used in the Legacy Parkway Supplemental EIS allows for speeds to become slower based on the effects of congestion which results in a different matching of origin and destination pairs which essentially removes trips from the Woods Cross screenline as congestion increases, but still matches those trip pairs to other (less congested) locations in the four county regional model. Although congestion begins at LOS D and becomes increasingly greater at worsening levels of service, the WFRC model does not prohibit trip pairs across the Woods Cross screenline based on congestion; it simply allows for the affects of congestion to alter the location and mode of a fixed number of trips (estimated in the WFRC model trip generation step).

Because the current WFRC model alters location and mode of trips in response to congestion, the Supplemental EIS no longer uses the concept of “unmet demand” which was used in the Final EIS. The concept of “unmet demand” was used in the Final EIS to compare projected travel demand against the capacity of future transportation systems. Changes in the WFRC model now vary total demand in direct

response to the capacities of the transportation system, making the concept of "unmet demand" less useful for the Supplemental EIS.

The varying of total demand is accounted for in both the distribution step of the WFRC model and the mode choice step of the WFRC model. Varying demand could be described in terms of "suppressed demand" or, its converse, "induced demand." The terms describe opposite perspectives of the same phenomenon: as transportation system capacity is improved, additional trips make use of the enhanced capacity. Such trips can be viewed as suppressed demand: trips that would have been taken initially had the system offered sufficient mobility. Alternatively, they can be viewed as induced demand: trips that the traveling public finds attractive because mobility has been improved. The capacity-enhancing elements of the Shared Solution may result in demand levels increasing compared to the No-Build Alternative due to potential shifts in route or mode in the North Corridor. This is travel demand that would be "suppressed," or not accommodated under the No-Build Alternative, but that would be accommodated under the Shared Solution. For the purposes of this study, demand accommodated under the Build alternatives that would not be accommodated under the No-Build is referred to as "suppressed demand."

B3.4.4 Suppressed Demand

The Final EIS used the concepts of "unmet demand" and "latent demand" to describe the effects of traffic capacity and congestion on travel demand. Changes in the WFRC model make using the "unmet demand" concept less useful for the Supplemental EIS for three reasons. First, the overall level of 2020 travel demand in the corridor is lower than in the Final EIS due to updates to the WFRC socio-economic forecasts. Second, the current WFRC model varies total demand depending upon the capacities of the transportation system, and alters location and mode of trips in response to congestion. As a result, the model better reflects typical traveler behavior and allows trips to be redistributed to other destinations or modes of travel rather than defining the demand as unmet. Third, the analysis now recognizes demand in excess of capacity in terms of worsening degrees of LOS F congestion and further reduced traffic speeds and associated impacts, rather than simply in terms of unmet demand. Consequently, the Supplemental EIS no longer uses the concept of "unmet demand" used in the Final EIS.

The varying of total demand is accounted for in both the distribution step and the mode choice step of the WFRC model. Decreases and increases in demand in response to increasing or decreasing congestion described in terms of "suppressed demand" or, its converse, "induced demand." The terms describe opposite perspectives of the same phenomena. As transportation service levels decline, the propensity to travel also reduces; trips become shorter or redirected, rely on alternate modes, or occur at less convenient times of day. As transportation system capacity is improved, some of the suppressed trips will be renewed, or induced, in response to the enhanced capacity. Those trips can be viewed as suppressed demand, reflecting trips that the traveling public would have taken had the capacity been there. Or they can be viewed as induced demand, or manifest latent demand, reflecting trips that the traveling public finds attractive because the capacity has been enhanced. To capture both mirror-image phenomena, this study uses the term "suppressed demand."

The build alternatives would increase roadway capacity and reduce travel times in the north corridor. The reduction in travel time is analogous to a reduction in travel cost. In measuring this change, the most significant effect would be a potential shift in travel routes for some drivers and a potential shift in mode choice. Other travel demand effects such as increased trip generation or time of day shifts (including peak spreading), due to capacity increases do not have as significant effects for analyzing the Shared Solution. The WFRC model captures suppressed demand and incorporates it as a part of total projected demand.

Given the use of consistent land use assumptions in the analysis of all of the alternatives, the main variations in corridor travel demand from one alternative to the next relate to the different levels of accessibility and travel ease offered by the respective alternatives. Specific travel routes and modes used by the total travel demand model will be affected by the Shared Solution. The WFRC model forecasts these types of demand changes, projecting that generally less than 3% of the total travel demand reflects suppressed demand. The WFRC model was tested specifically for its sensitivity to these types of changes. In November 2003, UDOT completed an analysis of the elasticity of demand estimated with the WFRC travel models (version 2.1) to changes in capacity. These changes occur due to trip distribution, mode choice, and trip assignment steps of the model. According to UDOT's sensitivity analysis (Cambridge Systematics, November 2003, WFRC Model Sensitivity Study):

> *"Model elasticities fall within the expected range of expected range of acceptability based on comparisons with elasticity cited in a variety of research papers…Vehicle miles traveled generally increase with the addition of specific roadway projects while vehicle hours generally decreased."*

Figure B-1 displays the changes in the Woods Cross screenline volume with various alternatives to Legacy Parkway evaluated in the Supplemental EIS in the PM peak period. The use of the Woods Cross screenline and the use of the PM peak period are explained later in this memorandum. As shown, total screenline demand increases relative to increases in screenline capacity, from about 51,300 under the No-Build to about 52,600 with the Shared Solution. The route and mode shifts associated with suppressed travel from Legacy Parkway are measurable, although generally less than 3% of total screenline volume, and are accounted for in the WFRC travel model.

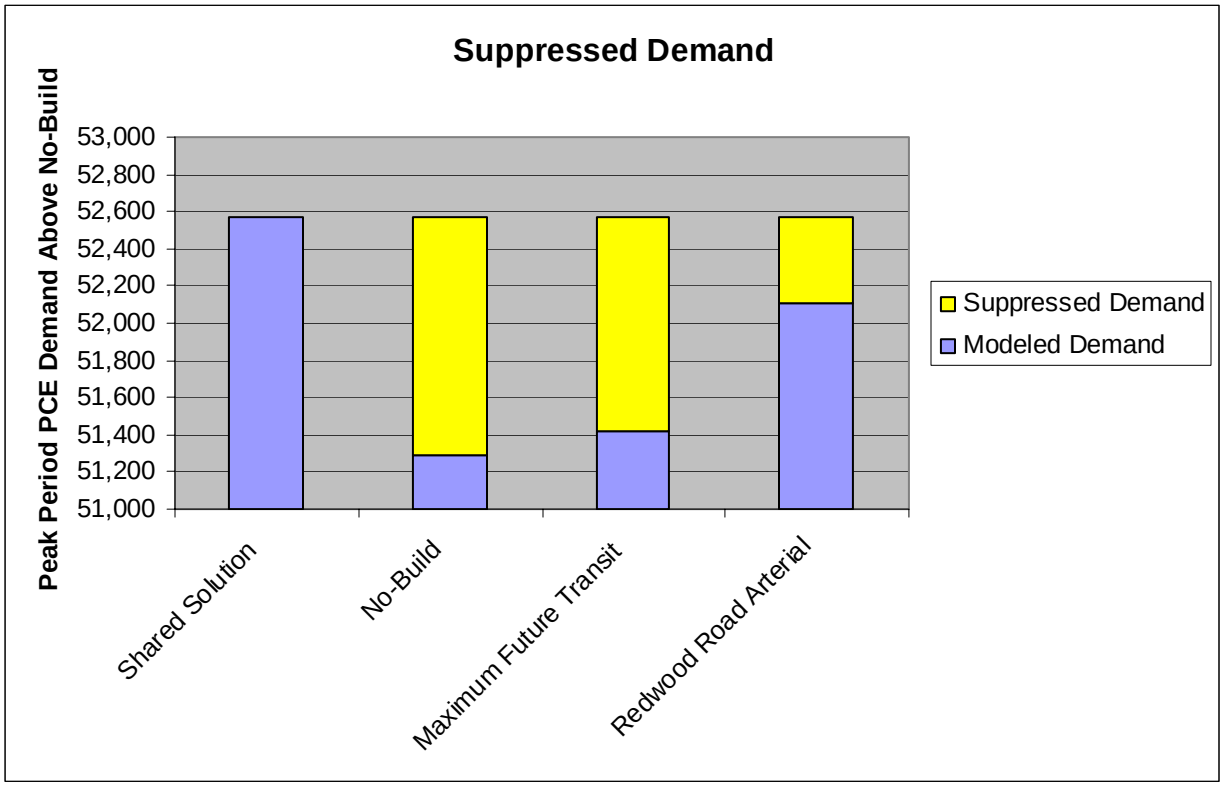
B3.5 Mode Choice

B3.5.1 Method of Mode Choice Analysis

Transit ridership forecasting methodologies used to prepare the Legacy Parkway Supplemental EIS differ from those used in the preparation of the Legacy Parkway Final EIS. While the WFRC model used for the Final EIS had a mode choice model, output of that model was evaluated but the results were not directly used in developing the mode specific traffic volume forecasts presented in the Final EIS. Instead, the concept of an extraordinary transit system was estimated based on an aggressive projection developed with UTA. Four methods were actually examined in the Final EIS including the use of the WFRC mode split step of the WFRC travel model, as well as experience in other areas. The Final EIS selected the highest transit capacity of the four methods not as a prediction of future transit ridership, but rather as a maximum level of transit ridership that could occur given the financial and other assumptions in the plan.

The recommendation of the lead federal agencies in the Legacy Parkway Supplemental EIS was to estimate transit ridership based on the mode split step of the regional travel demand model. Therefore, while the Final EIS included transit capacity as the maximum reduction of highway use that could be accommodated by the transit system, the Supplemental EIS uses the mode choice model to estimate the passenger-car equivalent demand of transit use. The modeling for the Supplemental EIS continued to use the WFRC mode choice step of the WFRC model, but with coding changes, as described in the Section B3.2.2 *Transit Network Assumption*, to account for a more "robust" level of transit supply.

Figure B-1. Peak Period Peak Direction Woods Cross Screenline Suppressed Demand



Source: WFRC travel model ver. 3.2 (Feb. 2004) as modified. Note: Total Demand includes transit vehicle equivalent ridership showing the full extent of Latent Demand through both the Distribution step and the mode choice step.

B3.5.2 Available Modes

Modal choice is the third step of the four-step travel demand modeling process. Productions and attractions of the trip generation module are linked in trip distribution, creating zone-to-zone person trip movements. These trips are then apportioned to the available travel modes through the application of the mode choice module.

The current WFRC mode choice module is calibrated to local data gathered for all modes that currently exist along the Wasatch Front as part of an on-board survey of transit riders conducted by UTA in 2002. The travel market that has mode choices available is segmented into four trip purposes; home-based work (HBW), home-based college (HBC), home-based other (HBO) and non-home-based (NHB). The trip purposes included in the mode choice analysis vary from the original trip generation and trip distribution purposes. Home-based college trips represent a sub-set of home-based other trips that have been found, through on-board surveys of the WFRC, to represent a reasonable portion of transit trips to estimate directly (as opposed to indirectly through home-based other trips). Commercial trips are generated as vehicle trips by definition, so no mode split component is necessary. Each trip purpose included in mode choice is also segmented in to three auto-ownership classes (zero-, one-, and two-car households) and two income classes (average/high and low) with the exception of non- home-based as by definition this purpose cannot be segmented by household data. As mentioned, HBC was subtracted from the HBO totals based on the data collected by each college and university. HBC is also a subset of Home-based

school trips, which include high school and lower grades as originally reported in the 1993 Home Interview Survey.

An independent nested logit mode choice module exists for each trip purpose. These modules specifically address the following modes.

- Drive Alone: single-occupant auto trips.
- Shared Ride 2: double-occupancy auto trips.
- Shared Ride 3+: auto trips with three or more occupants.
- Transit - Walk to Local Bus.
- Transit - Walk to Express Bus.
- Transit - Walk to Light Rail.
- Transit - Walk to Commuter Rail.
- Transit - Drive to Local Bus.
- Transit - Drive to Express Bus.
- Transit - Drive to Light Rail.
- Transit - Drive to Commuter Rail.
- Walk trips.
- Bicycle trips.

Auto-occupancy for HBW, HBC, HBO and NHB trips is defined via mode choice before trips are assigned to the highway. This differs from the auto-occupancy methodology included in models used for the Legacy Parkway Final EIS. With the current model, trips are not assumed to occur in vehicles of fixed auto-occupancy, with a reduction to account for transit; rather all trips for HBW, HBC, HBO and NHB purposes choose (per the logit nesting structure) to make either a motorized or non-motorized trip. If the trip is motorized, it is either transit or auto-based. If an auto trip is chosen, it is either a single or multiple-occupant vehicle. If a multiple-occupant vehicle is chosen, it is either a two-person carpool, or a three- or more person carpool. Similar decision processes occur for the other modes. This description of the mode choice portion of the model applies to the modeling done for the Legacy Parkway Supplemental EIS, except in the coding of transit networks as described earlier in this memorandum.

B3.6 Peak-Period Trip Tables

In the updated WFRC regional travel demand model, peak-period trip tables are developed by applying factors, by purpose, to the daily person-trip tables. For example, the number of AM peak-period, home-based work trips are estimated as:

[daily HBW $trips_{ZONE}$ i,j) X (AM peak $factor_{HBW-P}$)] + [daily HBW $trips_{ZONE}$ j,i) X (AM peak $factor_{HBW-A}$)]

The AM and PM peak periods within the model have a three hour duration. The three hour forecast can therefore include trips that would spread from the peak one hour into the preceding, or following, shoulder hour and be accounted for in the peak period projection. The AM and PM peak-period factors were developed based on the 1993 Home Interview Survey. Table B-4 (Peak-Period Factors) shows the factors applied to each trip purpose to create the morning (AM) peak period and evening (PM) peak-period person-trip tables. Peak period factors are developed statically in the WFRC model, which means they do not change from the existing year to the future, and represent peak period demand as captured in the revealed (1993) data. Trip tables developed by WFRC were unchanged for the Legacy Parkway Supplemental EIS alternatives analysis.

Table B-4. Peak-Period Factors

	AM Peak Period	PM Peak Period
HBW – P	0.35	0.02
HBW – A	0.03	0.26
HBC – P	0.35	0.02
HBC – A	0.03	0.26
HBO – P	0.14	0.10
HBO – A	0.02	0.16
NHB	0.03	0.13
IX	0.02	0.22
XI	0.25	0.06
COMM	0.03	0.13

HBW - P = Home-based work trips—productions (commuters leaving homes and traveling to work)
HBW - A = Home-based work trips—attractions (work opportunities that attract travel by people)
HBC - P = Home-based college trips—productions (students leaving homes and traveling to college)
HBC - A = Home-based College trips—attractions (classrooms that attract college students)
HBO - P = Home-based other trips—productions (people leaving homes and traveling to places other than work)
HBO - A = Home-based other trips—attractions (places other than work that attract travel by people)
NHB = Non-home-based trips
IX/XI = Internal-external /external-internal
COMM = Commercial

Source: WFRC Travel Demand Model, February 2004.

B3.7 Highway Assignment

The highway assignment in the WFRC travel demand process is performed using a capacity- restrained, equilibrium-assignment technique. Capacity restraint is a general expression about the process of using congestion, and its impacts on travel time, as a means of simulating driver behavior under real-life conditions. All person trips that choose to travel in single occupancy vehicles, 2 person carpool or 3-plus

person carpool in mode choice are factored to reflect the number of vehicles those trips would be made in (i.e., two-person carpool person trips, divided by two equals the number of vehicle trips).

Internal-to-external, external-to-internal, external-to-external and commercial trips are calculated in vehicle trips throughout the modeling process. Non-motorized and transit trips resulting from mode choice are not assigned to the highway network. Bus routing, which is irrespective of mode choice results, generally has an insignificant impact on highway assignment (in the range of four vehicle trips per hour for a high frequency bus route). Initially, all vehicle trips are assigned to paths with minimum travel times, based on free-flow travel speeds. After all trips are assigned, the volume on each link is compared to its capacity and the travel time impedance is adjusted, based on the volume-to-capacity ratio on that link. The assignment process is repeated with the adjusted travel times. In an equilibrium assignment, this process is repeated iteratively until all trips are traveling along the optimum path, based on specified closure criteria.

The resulting output from the highway assignment process is a “loaded” highway network containing link volumes and travel speeds based on the volume-to-capacity ratio of the link. Statistics on vehicle miles of travel and vehicles hours of travel are also reported.

For each alternative analyzed, highway assignments are performed for:

- AM peak period
- Mid-day period
- PM peak period
- Evening period

The assignment periods included in the travel model include multi-hour periods representative of various levels of congestion throughout the day, but large enough to capture the effects of peak spreading that may occur in the future. Specifically, both the AM and PM peak periods represent 3 hour periods supported by data from the 1993 Home Interview Survey which reflects the highest level of trip making and the potentially greatest traffic congestion. The PM peak period, used in subsequent peak hour analysis, includes the peak hour and two “shoulder” hours just before and after the highest peak hour.

The traffic volume forecasts for each portion of the day are summed to provide daily traffic volumes on each segment of highway modeled. The data from the AM and PM peak periods were factored to provide AM peak hour and PM peak hour traffic volumes, respectively. This process was completed for each of the alternatives analyzed. The Legacy Parkway Supplemental EIS modeling used the WFRC assignment portion of the travel model, with only the adjustments discussed previously being made to highway network coding to reflect the alternative being analyzed. Actual link impedance functions were recently re-calibrated by WFRC staff based on on-going speed data collection activities and described in the *Wasatch Front Regional Council Speed Study*, completed December 18, 2003 as an internal report by the WFRC staff. Impedance functions of the WFRC model are based on modifications of the original Bureau of Public Roads impedance functions as recommended in the *Highway Capacity Manual* (Transportation Research Board 2000) by functional road classification and as developed by WFRC to achieve base year (2001 and 2002) speed calibration.

B3.7.1 Average Daily Traffic Volume Forecasts

The Legacy Parkway Final EIS analyzed average daily traffic volumes for the North Corridor on a "screenline" basis. A screenline is an imaginary line through a travel corridor that crosses all generally parallel highways and roadways that carry traffic through that corridor. The screenline used was between 2600 South and 500 South (in Woods Cross). This screenline location was selected for use in the Final EIS because it carried the greatest traffic volume, was central to the Legacy Parkway and I-15 North Corridor study areas, and was considered to indicate the share of traffic that is expected to be carried by each of the roadway facilities for each alternative.

The same approach was used for the Supplemental EIS. Table B-5 (Traffic Volumes at Screenlines [2020]—Average Daily) shows the average daily traffic volumes along the roadway segments within the screenlines, and the total forecast volume across the screenlines for the no-build and build Legacy Parkway alternatives as determined by current forecasting methods. Although only northbound volumes are reported, both northbound and southbound volumes are included in the total.

Table B-5. Traffic Volumes At Woods Cross Screenline (2020)—Average Daily

	No Build		Shared Solution	
South of 500 South:	Northbound	Total	Northbound	Total
Legacy Parkway	0	0	35,100	71,900
Redwood Road	9,100	18,100	5,900	11,900
1100 West	1,000	1,500	500	600
800 West	4,300	8,400	4,200	8,000
I-15	110,200	221,000	86,300	171,300
U.S. 89	11,300	24,200	9,400	18,800
500 West	2,200	2,700	500	1,100
Orchard Road	5,900	11,600	5,100	10,500
Davis Boulevard	3,700	7,500	3,600	7,200
Bountiful Blvd.	5,200	10,300	4,900	9,700
Screenline Total	152,900	305,300	155,500	311,000

Source: WFRC travel model ver. 3.2 (2004) as modified and run by InterPlan Co. Model data traffic volumes represent number of vehicles not converted to passenger-car equivalents and are rounded to the nearest hundred.

B3.7.2 Peak-Period Traffic Volumes

To estimate peak-period traffic in the region and within the North Corridor specifically, the peak- period trip tables were assigned to the highway networks for each alternative. The assignment process is consistent with the WFRC PM peak-period assignment, and was used as a basis for determining peak period demand in the Legacy Parkway Supplemental EIS. Analysis of peak- period conditions is important because peak-period travel tends to be more concentrated and, in most urbanized areas, has substantial directional imbalances (e.g., inbound traffic towards activity centers during the morning peak-period, and outbound, from activity centers towards residential areas, during the evening peak-period).

The peak-period assignments in the WFRC travel demand model represent 3-hour durations for the AM and PM peak periods. The screenline traffic volumes for these peak periods are shown in Table B-6a, Traffic Volumes at Screenlines (2020)—AM Peak-Period, and Table B-6b, Traffic Volumes at Screenlines (2020)—PM peak period.

B3.7.3 Selection of the Woods Cross Screenline

The Woods Cross Screenline was selected for analysis in the Final EIS. The use of this screenline in the Final EIS was developed after a thorough consideration of all sections of the corridor and based on traffic volumes on all facilities in the corridor. After consideration, Woods Cross was chosen as being a representative section where traffic volumes and subsequent demand were the highest.

Table B-6a. Traffic Volumes At Screenlines (2020)—AM Peak-Period

	No-Build		Shared Solution	
South of 500 South:	Northbound	Southbound	Northbound	Southbound
Legacy Parkway	0	0	4604	10158
Redwood Road	1331	2953	537	1402
1100 West	63	275	55	34
800 West	554	1122	551	890
I-15	13972	27613	10518	24127
U.S. 89	1554	4583	1572	1524
500 West	88	119	86	60
Orchard Road	532	1823	539	1600
Davis Boulevard	438	909	442	748
Bountiful Boulevard	502	1473	505	1235
Screenline Total	19,034	40,870	19,409	41,778

Source: WFRC travel model ver. 3.2 (Feb. 2004) as modified and run by InterPlan Co. Model data traffic volumes represent number of vehicles not converted to passenger-car equivalents and are shown in table.

Table B-6b. Traffic Volumes At Screenlines (2020)—PM Peak-Period

	No-Build		Shared Solution	
South of 500 South:	Northbound	Southbound	Northbound	Southbound
Legacy Parkway	0	0	10155	7721
Redwood Road	3730	2008	1783	1571
1100 West	678	150	194	32
800 West	1446	975	1347	889
I-15	31222	23420	28851	17997
U.S. 89	4556	3066	2606	2508

500 West	1680	179	134	173
Orchard Road	2420	1202	1597	1063
Davis Boulevard	1093	845	1082	808
Bountiful Boulevard	1998	1153	1729	1040
Screenline Total	48,823	33,078	49,478	33,802

Source: WFRC travel model ver. 3.2 (Feb. 2004) as modified and run by InterPlan Co. Model data traffic volumes represent number of vehicles not converted to passenger-car equivalents and are shown in table.

Selection of the Woods Cross Screenline for the Supplemental EIS was chosen primarily for consistency with the Final EIS and because it is representative of the corridor. However, a comparison of volumes at the Woods Cross Screenline was made against the Farmington Screenline, also presented in the Final EIS, to determine that the Woods Cross Screenline remained the point where the highest volumes were projected through the corridor. Table B-7 displays the total PM peak period traffic volume at both the Farmington Screenline and Woods Cross Screenline for existing (2001) conditions, the 2020 No Build, and the 2020 Shared Solution. All other alternatives fall within the range of the Shared Solution and No Build results.

Table B-7. PM Peak Period Highway Network Screenline Comparison

	Farmington Screenline		Woods Cross Screenline	
	Northbound	Total	Northbound	Total
Existing (2001)	25,082	40,015	34,933	56,821
No Build	37,725	61,045	48,823	81,821
Shared Solution	38,495	62,419	49,478	83,280

Source: WFRC model ver. 3.2 (Feb. 2004) as modified. Model data traffic volumes have not been adjusted.

B3.8 Vehicle-Miles and Vehicle-Hours of Travel (VMT and VHT)

Vehicle miles of travel can also be displayed as a result of the modeling analysis. Table B-8 includes the regional vehicle miles of travel for the No-Build and Shared Solution. This table updates a similar table (P-11) included in the Final EIS. It indicates that, even when measured at a regional scale, the Shared Solution reduces miles of travel by providing a more direct route for through traffic, and vehicle hours by reducing congestion. At a regional level average travel speeds improve by about 4% to 5% during peak travel periods.

Table B-8. Regional and Study Area Vehicle-Miles of Travel (VMT) and Vehicle-Hours of Travel (VHT) for 2020

	Regional		Study Area	
Period	No-Build	Shared Solution	No-Build	Shared Solution
Daily				
VMT	57,413,217	57,330,753	3,917,840	3,884,047
VHT	1,520,693	1,483,723	99,828	76,504

	Regional		Study Area	
Period	No-Build	Shared Solution	No-Build	Shared Solution
Speed (mph)	37.8	38.6	39.2	50.8
AM Peak Period				
VMT	11,034,276	11,002,139	766,855	764,030
VHT	288,510	277,358	21,619	14,923
Speed (mph)	38.2	39.7	35.5	51.2
PM Peak Period				
VMT	15,469,820	15,449,640	1,053,417	1,043,053
VHT	508,752	484,666	37,358	21,542
Speed (mph)	30.4	31.9	28.2	48.4

Note: WFRC Model (version 3.2) (Feb. 2004) as modified and run by InterPlan Co.

Regional totals included the four county area (Salt Lake, Utah, Davis, and Weber Counties) included in the model, study area is medium district 10 with VMT and VHT totals excluding centroid connectors.

B4 Post-Model Adjustments

Processing of model outputs are more commonly referred to as “post model adjustments.” Post model adjustments can be undertaken to “correct” model results, such as in the case of travel demand behavior that is not adequately addressed by the modeling process, or to allow the model outputs to be in consistent units necessary for capacity analysis. For the purpose of this section, any processing of model results that resulted in numbers that are not directly found as an output of the WFRC travel demand model, including model outputs resulting from the Legacy Parkway Supplemental EIS application of the WFRC travel demand model, as described, shall be termed a “post model adjustment.” The Legacy Parkway Supplemental EIS modeling process employed both types of post model adjustments, those that result in a more accurate answer than those supplied by the travel model and/or those that are necessary to achieve results that can be analyzed using methods identified in the HCM 2000.

B4.1 Traffic Capacity Analysis

Traffic capacity analysis is a separate science than traffic forecasting, despite the fact that traffic forecasting requires some estimate of traffic capacity. On non-freeway road segments, traffic capacity is analyzed based on detailed signal timing and intersection movements at each intersection. This level of precision is unreasonable for 30-year forecasts of traffic as required for application in travel demand modeling. The travel demand model assumes generalized link based capacities to account for the detailed operations at each intersection.

Traffic capacity analysis is used to formalize and quantitatively compare the operation of two facilities. At its most simple level, traffic engineers must analyze even existing traffic counts to determine the various performance measures at each location, since the performance measures are typically not estimated directly from field observations. The HCM provides a standard means for objectively estimating the performance measures based on the collection of data such as traffic counts. The use of micro-simulation as a means of estimating performance measures based on collected (or forecast) traffic

data is gaining popularity as an advanced practice in traffic capacity analysis, but does not replace the need to develop separate traffic forecasts that can then be applied to the traffic capacity analysis simulation model(s). At the national level, much research is being applied to merging the use of econometric travel demand models at the macro (regional) level with micro-simulated capacity analysis, but there are no metropolitan areas that presently use a single model for both macro level forecasting and micro level traffic capacity analysis.

B4.2 Model Adjustments

The Legacy Parkway Final EIS included an adjustment of demand to account for TSM/TDM/ITS as an after model analysis. A review of the adequacy of the model to capture and include relevant components of TSM/TDM/ITS for the Supplemental EIS was conducted as part of the analysis prepared for the Integration Technical Memo. As a result, primary elements of TSM/TDM/ITS are included in the current analysis through their inclusion in the new versions of WFRC travel demand model, or through in-model assumptions or post-model adjustments to capture the effects of the maximum future transit alternative developed for the Legacy Parkway Supplemental EIS. Several ITS and TSM measures are not included quantitatively in the analysis because they are primarily effective during traffic incidents rather than under the average weekday PM peak hour conditions addressed in the Supplemental EIS capacity and LOS analysis.

Table B-9 displays various TSM, TDM, and ITS components and identifies the manner in which they were addressed in the Legacy Parkway Supplemental EIS analysis, indicating those included in the travel model application, post model adjustments, or non-quantitative assessment of incident scenarios.

TSM is the acronym for Transportation Systems Management and generally refers to highway infrastructure optimization activities that do not require significant new infrastructure. Examples include ramp metering and reversible lanes. Since Legacy Parkway represents a new construction and I-15 is proposed to be reconstructed, the primary capacity enhancements associated with these facilities have been coded into the WFRC travel demand model by WFRC. The Supplemental EIS post-model analysis further refined the capacity analysis to incorporate relevant optimization associated with TSM operational improvements.

TDM is the acronym for travel demand management and includes a wide range of driver behavior related to avoiding peak travel periods or changing modes. Examples include parking pricing, carpool promotion and flex-time work hours. Most TDM elements are now incorporated in the utility functions of the WFRC mode choice model or captured in the calibration of the mode choice model to existing behavior. For example, the models reflect traveler response to parking prices and employer adoption and employee participation levels in telecommuting and variable work hours. The model extrapolates current trends associated with these factors into the future, allowing that any higher levels of adoption at large employers would be off-set by the overall trend towards smaller, more dispersed employment centers. ITS is the acronym for Intelligent Transportation Systems and includes a host of advancing technologies related to “smart cars” and “smart systems.” While it is difficult to predict future technologies, the primary focus of these technologies has been to provide better real time information to motorists in order to reduce the impacts of incidents and better utilize the available capacity. These applications are especially effective when capacity-reducing incidents occur, and when reasonable alternate travel routes are available. The quantitative capacity and Level of Service analysis performed for this Supplemental EIS addresses peak period conditions on a typical 2020 weekday, not conditions during major incidents. The benefits of information-based ITS elements are addressed through discussion of incident management issues in the corridor.

Because regional travel models such as the WFRC model do not focus in detail on neighborhood conditions, post-model adjustments are used to capture the TDM effects of land use clustering around transit stations, and localized density and land use mixing and associated with transit-oriented development (TOD). Therefore, the analysis of maximum future transit in the Supplemental EIS Integration analysis used post-model adjustments to increase transit, walk and bike shares and reduce automobile passenger car equivalents in the roadway capacity and LOS analysis. This accounted for sub-traffic zone level changes in land use to reflect TOD. For comparability, the increase in transit ridership was converted to transit "passenger car equivalents", a calculated number of passenger cars that would otherwise be occupied by a number of transit riders.

B4.3 Model Adjustment for HCM Analysis

Various model adjustments were performed to allow the volume results reported in the travel model to be directly compared with methods included in the *Highway Capacity Manual*. These necessary adjustments include the following:

- Conversion of the 3-hour peak period to a peak hour,
- Heavy vehicle factor adjustments, and
- Peak-hour factor adjustments.

Each of the adjustments made were discussed amongst the Integration Analysis Technical Group upon review of data gathered locally. The Integration Analysis Technical Group included representation from FHWA, the Corps, UDOT, UTA, WFRC, and the consultant team.

B4.3.1 Peak Hour Conversion

Conversion from the PM peak period to the PM peak hour was made by applying a 0.36 factor. Since the PM peak period encompasses the peak three hours in the afternoon, the conversion from the peak period to the peak hour must be greater than 0.333. The review of traffic counts (Fehr & Peers 2004) indicated that the existing peak hour was 36% of the peak three hours. The Final EIS used a factor of 0.34 for the peak hour based on conditions at that time and assumptions regarding traffic leveling strategies for 2020. Discussions with WFRC model developers indicated that a 36% peak hour conversion from the peak period is now common through the model area. Further, assuming a 0.36 peak hour, the hours on either side of the peak would average 32% of the peak period. The hours on either side of the peak hour, within the modeled peak period were termed "the peak shoulder." The peak-period factors shown in Table B-4 are used to relate the peak-period to the daily volumes based on trip purposes, and thus do not directly correlate to the peak hour conversion. Although peak hour traffic volumes are reported in the Supplemental EIS based on the best available data of 36% of the peak period occurring in the peak hour, analysis of the project is based on the entire three-hour peak period. This methodology eliminates the range of peak hour percentages in the future from consideration in the project purpose and need or alternatives analysis.

Table B-9. TSM/TDM/ITS Review

Category	Technique	Analysis Considerations	Method of Incorporation in Modeling
TSM	Ramp Metering	Effects on highway segments between interchanges accounted for in lane capacity assumptions.	Reflected in post-model capacity analysis, by assuming dense uniform flow downstream of on-ramps.
ITS	Variable Message Signs	SEIS capacity analysis represents conditions on days when no incidents occur. Variable message signs would help mitigate incident effects on days when they do occur, but would not make conditions better than incident-free days.	Addressed in discussion of need for alternate route to respond to incident and emergency needs, not in quantitative analysis of average-day conditions.
ITS	On-Board Navigation	SEIS capacity analysis represents conditions on days when no incidents occur. On board navigation would help mitigate incident effects on days when they do occur, but would not make conditions better than incident-free days.	Addressed in discussion of need for alternate route to respond to incident and emergency needs, not in quantitative analysis of average-day conditions.
TSM	Incident Management	SEIS capacity analysis represents conditions on days when no incidents occur. Incident management would help mitigate incident effects on days when they do occur, but would not make conditions better than incident-free days.	Addressed in discussion of need for alternate route to respond to incident and emergency needs, not in quantitative analysis of average- day conditions.
TSM	Auxiliary Lanes	Auxiliary lanes specifically accounted for in highway segment capacity analysis.	Accounted for in model highway networks and in post-model capacity analysis
TDM	Transit Promotion	Transit fare discounts and other TDM accounted for in modeling and off-model adjustments.	Accounted for in model transit networks and operating parameters, including fare structure and transit frequencies.
TDM	Carpool Promotion	Current levels of promotion, along with parking pricing and carpool lanes accounted for in modeling.	Accounted for in model networks and operating characteristics, including presence of HOV lanes and parking pricing.
TDM	Variable Work Hours	Existing rate captured in model calibration.	Variable work arrival/departure times accounted for in post-model analysis of demand spread over three-hour peak period.
TDM	Telecommuting	Existing rate captured in model calibration.	Existing levels of telecommute adoption accounted for in model trip generation rates for different employment types and trip purposes.
TSM	Signal Coordination	Arterial capacity assumptions used in analysis assume reasonable levels of signal coordination.	Accounted for in model network capacities and post-model capacity analysis.
TSM	Dynamic Signal Systems	Arterial capacity assumptions used in analysis assume reasonable achievable levels of dynamic traffic signal management.	Accounted for in model network capacities and post-model capacity analysis.
TDM	Truck Restrictions	Effects of trucks included in capacity analysis through heavy vehicle factor.	Included in post-model capacity analysis.

Category	Technique	Analysis Considerations	Method of Incorporation in Modeling
TDM	Van Pool Incentives	Current levels of promotion, along with parking pricing and new HOV lanes accounted for in modeling.	Accounted for in model networks and operating characteristics, including presence of HOV lanes and parking pricing.
TDM	Transit Financial Incentives	Transit fare discounts included in modeling of Maximum Future Transit.	Modeling included reduction of premium transit fares.
TDM	Parking Costs	Potential for increased parking cost included in modeling analysis.	Modeling included increased parking costs by 50% to 100% above inflation-based increase.
TDM	HOV Lanes	HOV lanes accounted for in modeling and in post-model analysis of assigning traffic to each lane.	Accounted for in modeling and in post-model analysis of lane utilization and capacity.
TSM	HOT Lanes*	Strategy not considered.	Not assumed in modeling.
TDM	Park and Ride Construction	Included in modeling.	Included in transit access mode coding within model.
TSM	Peak Spreading	Accounted for through averaging of peak-period demand over three-hour period.	Model estimates peak-period demand as a percentage of daily. Post-model capacity analysis addressed traffic spread over the three-hour peak period rather than concentrated in a single peak hour.
TSM	Reversible Lanes	Included in modeling (as appropriate to the alternative).	Accounted for in model networks and in post-model analysis of lane utilization and capacity.
TDM	Non-Motorized Travel	Post-model adjustments applied for scenarios that include higher levels of accommodation for bike and walk modes than presently found in similar areas of the region.	Empirical evidence on the reduction in auto travel resulting from increased development density, land use mix and urban design used to factor vehicle trips to lower levels than standard model trip generation rates.

* HOT lanes are high-occupancy toll lanes. Under this strategy, high-occupancy vehicle (HOV) lanes are made available to single-occupancy vehicles (SOV) at a price. Tolls are charged to SOV's based on time-of-day and level of congestion, so that the value of travel time savings correlates with the cost of toll.

Concern was raised about the accuracy of the peak hour considering the issues surrounding peak spreading. The WFRC model relies on a 3-hour peak period and the factoring of this period to a constrained hour would be arbitrary. This concern was expressed in the initial Supplemental EIS scoping meetings related to the greater ability of transit to serve a significant mode percentage in the peak hour and peak direction than in daily or peak period conditions. Transit and highways are estimated based on consistent factors from the peak hour to the peak period and presents a useful comparison of the maximum reasonable transit use over the peak period.

Capacity estimates expressed throughout this report, and used in the Supplemental EIS, based on peak period values are based on screening level capacities. These capacity estimates are supported by procedures in the *Highway Capacity Manual* but reflect average conditions over a peak period. Micro simulation capacity analysis is rapidly gaining acceptance in the traffic engineering community and represents a preferred method of detailed capacity analysis after screening. Micro simulation results will

not vary from the screening results over the peak period, but will allow for a more meaningful display of the actual peaks based on the abilities traffic queues to build and dissipate over time based on a simulation of the true variation of traffic flow.

B4.3.2 Heavy Vehicle Factor

Capacity analysis for freeways as per the methods of the *Highway Capacity Manual* (HCM) (Transportation Research Board 2000, Chapter 23, page 23-7) recommends the division of hourly volumes by a peak hour factor, a heavy vehicle factor, and a driver population factor to account for the percentage of large (heavy) vehicles using a freeway. These heavy vehicles affect traffic flow. These factors assume "level terrain" as defined by the HCM and do not apply to arterial streets. Table B-10 presents the truck data (Fehr & Peers 2004) that supports the use of a 0.99 Heavy Vehicle Factor.

Table B-10. Heavy Vehicle Adjustment Factor

Period	Percentage Heavy Vehicles	Heavy Vehicle Factor
Peak Hour	Average Over Hour	0.99
Peak Hour	Highest Percent in Hour	0.99
Peak 3 Hour Period	Average Over Period	0.98
Peak 3 Hour Period	Highest Percent In Period	0.98
Recommended 2020 Peak Hour		0.99

B4.3.3 Peak Hour Factor

Capacity and LOS analysis in the HCM normally addresses conditions in the peak 15-minutes of the peak hour of a typical or "design" day. UDOT's objectives for the north corridor are to provide acceptable traffic LOS on average through the peak hour or three-hour peak period on a typical weekday. Other State Departments of Transportation, including Florida, Arizona, Colorado, and Oregon also suggest that LOS goals should apply over average extended periods of time rather than to all traffic over all time periods as short as 15 minutes. Based on scoping for the Supplemental EIS, UDOT has not utilized the most congested 15 minutes of the peak hour for the Legacy Parkway. Therefore, Level of Service Analysis presented for the Legacy Parkway reflects an average peak hour and average peak period condition.

B4.3.4 Driver Population Factor

A driver population factor of 1.0 was used to reflect the commuter nature of the area, as suggested in the HCM, 2000.

B4.3.5 HOV Analysis

Limited analysis of HOV lanes is presently supported by the WFRC travel demand model. Through both the distribution and assignment step of the WFRC travel model, the presence of HOV lanes is recognized by a decrease in available capacity necessary to ensure that the HOV lane operates at an improved level as compared to the general purpose lanes. A manual step is required to ensure that the assumed capacity of the HOV lane can be efficiently utilized with 2 or 3 person carpools. The HOV lane was coded to achieve a maximum capacity without congestion coded as 1680 passenger car equivalents per hour. The full use of this HOV lane was assumed to reduce the demand of other general purpose lanes, thereby allowing the HOV lane to achieve its desired policy affect of reducing anticipated congestion in the general purpose lanes by encouraging shifts in driver behavior.

B5 Supporting Results

Significant analysis was developed which aided in the understanding of each alternative to the Legacy Parkway. Some of the alternatives included in this write-up were addressed but not advanced in the Supplemental EIS. Although these alternatives were not advanced, it was the opinion of the lead federal agencies that full disclosure of all analysis was appropriate.

B5.1 Possible Land Use Shifts under No-Build Alternative

As discussed in land use topic in the Supplemental EIS Section 4.1.3.3 (*Impacts on Growth within and beyond the North Corridor)*, approximately 800 acres of developable land would become available for development in North Salt Lake, Centerville, Farmington, Woods Cross, Bountiful, and West Bountiful if Legacy Parkway were not built. The land is located within the protected right-of-way for the Legacy Parkway, and within the proposed project-sponsored nature Preserve, generally west of existing and developing areas. Under the No-Build Alternative, UDOT would lack authority to keep the right-of-way or the Preserve; thus the land would be available for development. Based on a review of historic zoning and on interviews with planning staff with each City, an estimated 100 to 200 acres would be developed under residential uses at approximately five units per acre. The remainder of the 800 acres would develop under retail, commercial, business-park, warehouse and manufacturing use. City planning representatives also state that real estate market activity within their communities and the properties' strategic location within the region, near the airport and regional CBD suggest that the land would develop in the relatively near term, prior to 2020. The planners also believe that the development would represent net additional development within their communities rather than spreading the same amount of development that would otherwise occur at lower densities over larger areas.

There are no official assessments of the degree to which these changes in land availability might effect the officially adopted regional land use projections and city-by-city allocations prepared by the Utah Governor's Office of Planning and Budget and Wasatch Front Regional Council. The 800 additional acres represents a very small percentage of county wide and regional development over the study period. It is equivalent to less than 6% of the projected 2000 to 2020 regional growth within the Study Area (a 20-year total of about 14,000 acres at the rates projected by local planners in Section 4.1.2.1 *Current Land Use and Development Trends in the Study Area*), and about less than 1% of Wasatch Front four-county population growth. Considering the regional land supply, variations in economic conditions and land values and variable demand for specific types of use at specific locations, it is uncertain the extent to which the additional land will:

- reduce development densities within the corridor
- delay market absorption of certain corridor lands until beyond 2020
- slow some development in cities north of the North Corridor until beyond 2020
- shift development into the additional corridor lands from other parts of the region

It is unlikely that the small percentage increase in available land within the region will affect the amount of population or employment within the region. Therefore, the change will result in changes in development within the North Corridor cities ranging from:

- Negligible - if the consequences are primarily reduced development densities within the corridor and/ or no increase in market absorption rates for corridor lands.

- Additional 800 acres of residential, commercial and industrial development – if densities remain unchanged and absorption rates increase. The additional development could amount to up to 500 additional dwelling units and up to 8,700 commercial and industrial employees within the developable areas of the right-of-way and Preserve.

If additional 800 acres do develop within the corridor by 2020, there would be an equivalent reduction in development elsewhere in the region. While no official projections have been performed, it is possible that some of the development shifted into the corridor would come from areas north of the corridor, including north Davis and Weber Counties. About 20% of the region's growth is predicted to occur in these areas; so on a simple proportional basis, about 20% of the development shifted into the corridor would be shifted from north Davis and Weber Counties. This would translate to 100 fewer dwelling units and 1,500 fewer employees in north Davis and Weber Counties than under the build alternatives. At the other extreme, 100% of the shift could come from north Davis and Weber Counties. In that case, reductions of 500 dwelling units and up to 8,700 commercial and industrial employees could occur in north Davis County, Ogden and Weber County, with the development instead shifted to the Legacy Parkway right-of-way and nature Preserve.

Under this assumption, the development shifted into south Davis County would generate about 9,500 additional peak period trips in south Davis (based on WFRC model trip generation rates) and reduce trip generation in north Davis and Weber Counties by a similar amount: up to 9,500 peak period trips. If the development were to remain located in north Davis and Weber Counties, the majority of the generated traffic would remain local and would not traversed I-15 through the North Corridor. WFRC model trip distribution and directional percentages indicate that removing 800 acres or 9,500 peak-period trips from north Davis and Weber Counties translates to a reduction of roughly 600 peak-period, peak-direction passenger-car equivalents (pces) on I-15 at the Woods Cross screenline. However, these pces would be more than fully replaced by pces added to I-15 by the new trips generated by the additional 800 additional acres of development within the Legacy Parkway right-of-way and preserve.

Based on the WFRC model, the additional 800 acres of development in the Legacy Parkway right-of-way and preserve would generate an additional 9,500 peak period trips in the western portions of the North Corridor communities. This traffic would circulate on new local streets built within the Legacy Parkway right-of-way and Preserve and on existing surface streets such as Redwood Road, 500 South and Parrish Lane, resulting in higher impacts on those streets than under the Build Alternative. According to WFRC model trip distribution and directional percentages, approximately 30% of the additional generated traffic would use I-15 in peak direction in the southern part of the North Corridor. This would more than off-set the reduced traffic from north Davis and Weber Counties. The net increase in pces in the peak period, peak direction at the Woods Cross screenline would be approximately 1,100 pces or about 4 to 5% of the total pces that I-15 is projected to carry in 2020. This increase would worsen the LOS, which even without the land use shift would be LOS F in 2020 under the No-Build Alternative.

Consequently, by not assuming development in the land occupied by the right of way and the Preserve, the land use assumptions used in this Supplemental EIS for the No-Build Alternative represent the low end of the range of the potential 2020 conditions on I-15 and a potentially favorable assessment of the potential traffic conditions on surface streets in western areas of North Corridor communities. On I-15 at the Woods Cross screenline, the land use shifts resulting from the additional 800 acres of developable North Corridor land in the No-Build Alternative would range from:

- An increase of 1,100 PM peak period peak direction pces (or 4%) above the traffic projected for the land use case analyzed in this Supplemental EIS, if the 800 acres of new corridor land use is drawn from development potential further north of the North Corridor.

- An increase of 1,500 PM peak period peak direction pces (or 5%) above the traffic projected for the land use case analyzed in this Supplemental EIS, if the new North Corridor land use is drawn from other parts of the region.

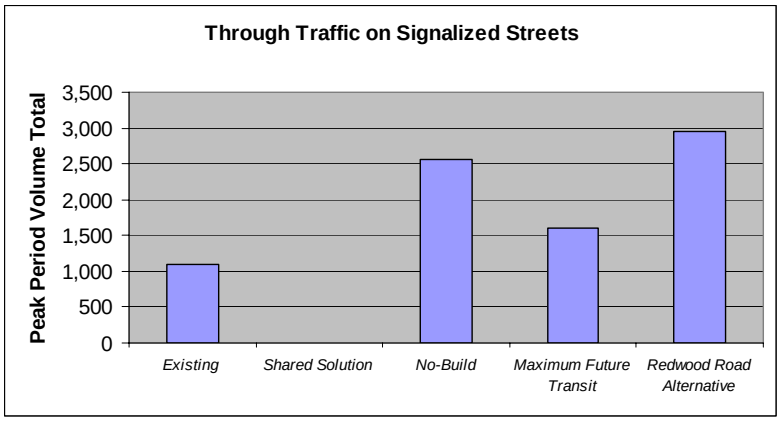
In both cases, the land use shift would worsen the 2020 LOS on I-15 at Woods Cross screenline to a worse LOS F than reported in Table 1-2 and Table 3-2 for the No-Build Alternative.

Also, in both cases, relinquishment of the land within the Legacy Parkway right-of-way and Preserve would increase traffic generation and local street construction in the western portions of North Salt Lake, Woods Cross, Centerville, Bountiful, West Bountiful and Farmington.

B5.2 Through Traffic on Local Streets

The travel model can identify traffic from various geographic origins and destinations. A useful analysis was to identify the component of traffic that had neither an origin nor a destination in the south Davis Study area. Traffic that passed through the study area but had neither an origin nor a destination in the area was termed “through” traffic. According to the AASHTO Green Book, traffic traveling distances or ten miles or more (i.e., through traffic) should be afforded high-speed facilities with some degree of access control. Accident rates collected by UDOT reveal that limited access facilities, those facilities which do not have traffic signals, have accident rates that are less than one third those of signalized streets. However, like travel times, there is no binary threshold which is readily accepted as a pass-fail criteria to screen alternatives. Figure B-2 displays that the Shared Solution can eliminate through traffic on signalized streets, representing a measure of safety of the North Corridor transportation system.

Figure B-2. Peak Period Peak Direction Through Traffic on Signalized Streets.



B.5.3 Geographic Travel Markets

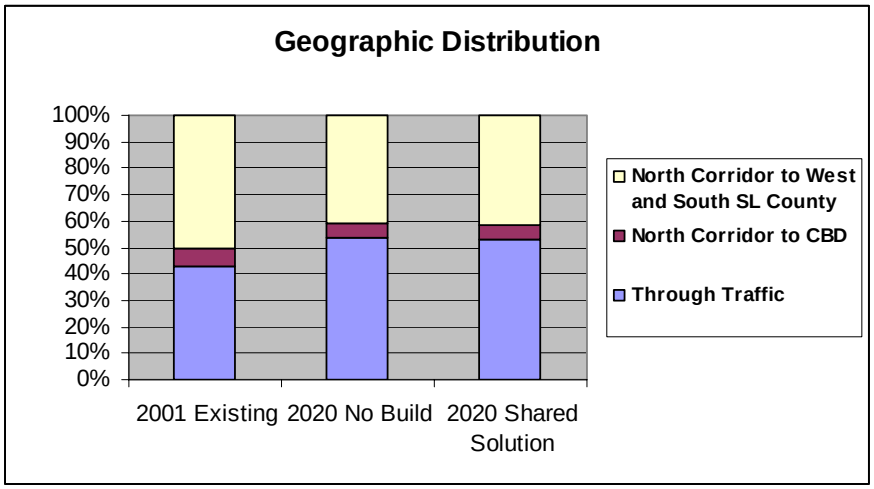
The geographic market of travel across the Woods Cross screenline was examined in order to gain a deeper understanding of the travel demand in the North Corridor. The geographic markets were examined

using the WFRC "City-X" script, which allows for the origin and destination traffic zone pairs of each trip to be identified. Three origin-destination pairs were identified as follows:

- Through traffic including all traffic with neither an origin nor destination in the North Corridor,
- CBD to and from North Corridor traffic, and
- Utah County and all of Salt Lake County outside of the CBD to and from the North Corridor.

The geographic distribution of total traffic generally follows the observed socio-economic trends of the area represented by a decline in the share of travel to and from the Salt Lake CBD and a corresponding growth of travel to and from north Davis and Weber County as well as south and west Salt Lake County. According to Figure B-3, travel from the CBD to the North Corridor is almost 7% of the total travel across the Woods Cross Screenline in 2001 but declines to approximately 5% in the year 2020. Through travel grows from less than 45% of the total travel across the Woods Cross screenline in 2001 to over 50% of the total travel in the year 2020. This 50% relates to all travel crossing the Woods Cross screenline on I-15 as well as surface streets. On I-15 itself, the through traffic percentage is higher: 65%. In the year 2020, changes in geographic travel markets can be observed between alternatives, but are generally very small such that each alternative in the year 2020 basically serves the same geographic market regardless of the construction of various facilities.

Figure B-3. Geographic Distribution of Total Travel across the Woods Cross Screenline.



In addition to the shift in the geographic markets over time from 2001 to 2020, another observation about the geographic travel markets is related to the use of each component of the Shared Solution in the year 2020, compared with facility-by-facility use under the No-Build Alternative. As shown in Figures B-4a and B-4b, each component of the Shared Solution serves a different set of travel markets. Under the Shared Solution, traffic on Legacy Parkway is made up almost entirely of through traffic and traffic to and from the North Corridor to western and southern Salt Lake County. By contrast, almost one quarter of travel demand using mass transit across the Woods Cross screenline is represented by the CBD to North Corridor geographic demand. The No-Build Alternative results in approximately 65% of the screenline demand on I-15 as through traffic, whose trips neither begin nor end in south Davis County. Due to the resulting congestion on I-15, the No-Build Alternative also produces approximately 15% of the travel on signalized arterial and collector streets as through traffic. This compares to the Shared Solution for which

the additional capacity on the Legacy Parkway results in only 50% of the I-15 traffic to be through traffic, and no through traffic is served by signalized arterial and collector streets at the Woods Cross screenline. Figures B-4a and B-4b display the relative geographic demand of each facility type in the peak period and peak direction based on passenger car equivalents in the year 2020 under the No-Build and Shared Solution, respectively.

Figure B-4a. Geographic Distribution of Each Facility in the 2020 No Build

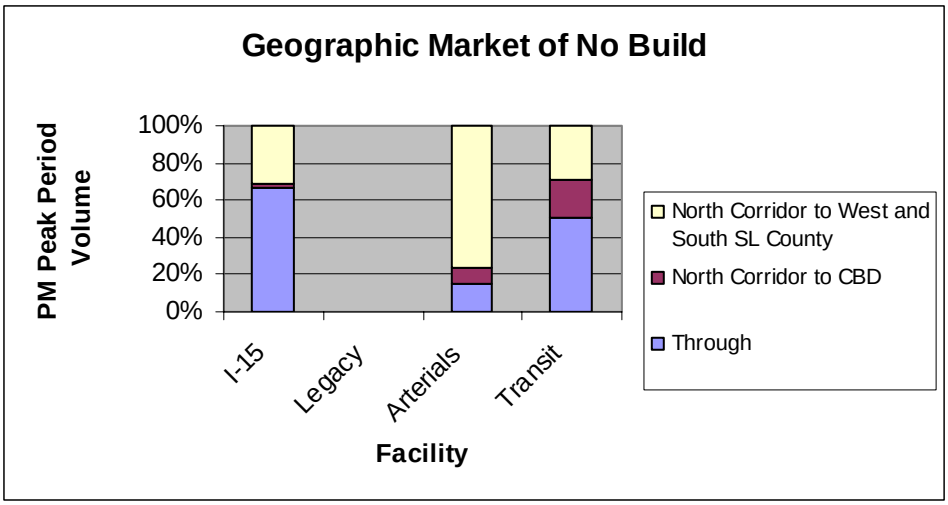
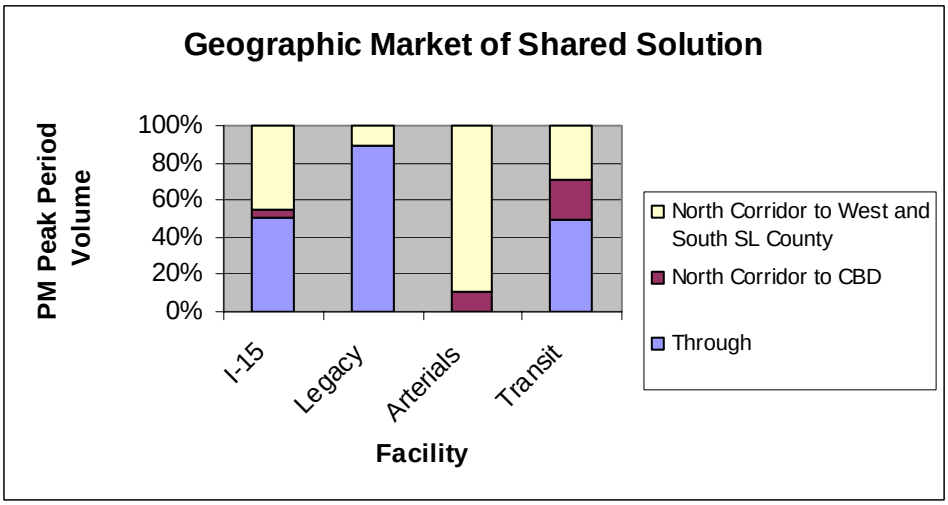


Figure B-4b. Geographic Distribution of Each Facility in the 2020 Shared Solution.



References

American Association of State Highway and Transportation Officials. 2001. A Policy on Geometric Design of Highways and Streets. 4th Edition. Washington, DC. (Also referred to as the Green Book.).

Cambridge Systematics. 2003. WFRC Model Sensitivity Testing and Training Study. November. Salt Lake City.

Federal Highway Administration and Federal Transit Authority. 1999. Peer review of the WFRC travel model developed as part of the MPO Certification Process of the WFRC.

Fehr & Peers. 2004. Legacy Parkway Technical Memorandum: Integration of Mass Transit with the Legacy Parkway. North Salt Lake.

State of Utah. January 2002. 2002 Economic and Demographic Projections, Baseline Highlights. Utah Governor's Office of Planning and Budget. Salt Lake City.

Transportation Research Board. 2000. Highway Capacity Manual: 2000. Washington DC: National Research Council.

U.S. Census Bureau. 2000. Census 2000 population values.

Utah Department of Workforce Services. year Employment values. Page 5. Salt Lake City.

_____. Year. 3rd Quarter 2001 ES 2002 database. Salt Lake City.

Utah Governor's Office of Planning and Budget, Demographic and Economic Analysis Section (DEA). 2003. Demographic and Economic Analysis 2003 Economic Report to the Governor. Salt Lake City.

Utah Governor's Office of Planning and Budget. 2001. An Analysis of the Accuracy of UPED's Historical Projection Work . April. Salt Lake City.

_____. 2002. Utah Department of Workforce Services, 2002 Baseline Projections, UPED Model System. Available: <http://governor.utah.gov/dea/LongTermProjections.html>. Accessed: October 22, 2003.

Wasatch Front Regional Council. 1992. Wasatch Front Regional Planning Projections Technical Report 29. April. Salt Lake City.

_____. 1993. 1993 Home Interview Survey. Salt Lake City.

_____. 2002. In-house peer review. Salt Lake City.

_____. 2003. Speed Study. December. Salt Lake City.

_____. 2003. Wasatch Front Region Small Area Socioeconomic Projections: 2002–2030. Technical Report #42. October. Salt Lake City.

_____. 2003. Wasatch Front Urban Area Long Range Transportation Plan Update. December. Salt Lake City.

_____. 2003. Wasatch Front Urban Area Long Range Transportation Plan: 2004–2030. Technical Report #43. December. Salt Lake City.

_____. In preparation. South Davis County Transit Needs Analysis. Salt Lake City.

_____. Revised April 4, 2002. Travel Demand Model Workshop Summary January 7–8, 2002. San Francisco, California. Prepared by PB Consult, Inc.

Appendix C

Noise

<Organization?>
Curt Overcast

7 May 2004
TNM 2.1
Calculated with TNM 2.1

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Legacy Reevaluation
RUN: Pref.Alt - Revised Run (4/14/04)
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ML-1 (6 residences)	5	6	67.0	68.8	65	1.8	10	Snd Lvl	68.8	0.0	5	-5.0
ML-2 (7 residences)	6	7	53.0	54.4	65	1.4	10	----	54.4	0.0	5	-5.0
ML-3 (2 residences)	7	2	56.0	57.8	65	1.8	10	----	57.8	0.0	5	-5.0
ML-4 (Industrial/Commercial)	8	1	57.0	72.9	72	15.9	10	Both	72.9	0.0	5	-5.0
ML-5 (Vacant)	10	1	50.0	75.8	65	25.8	10	Both	75.8	0.0	5	-5.0
ML-6 (1 residence)	11	1	50.0	69.1	65	19.1	10	Both	69.1	0.0	5	-5.0
ML-7 (5 residences)	12	5	44.0	77.8	65	33.8	10	Both	77.8	0.0	5	-5.0
ML-8 (Bountiful Pond - Recreation)	13	1	46.0	78.2	65	32.2	10	Both	78.2	0.0	5	-5.0
ML-9 (6 residences)	14	6	41.0	74.0	65	33.0	10	Both	74.0	0.0	5	-5.0
ML-10 (3 residences)	15	3	48.0	74.6	65	26.6	10	Both	74.6	0.0	5	-5.0
ML-12 (3 residences)	16	3	60.0	72.4	65	12.4	10	Both	72.4	0.0	5	-5.0
ML-11(Undeveloped)	17	1	57.0	69.2	65	12.2	10	Both	69.2	0.0	5	-5.0
ML-13 (Glovers Park - Recreation)	18	1	56.0	64.7	65	8.7	10	----	64.7	0.0	5	-5.0
ML-14 (6 residences)	19	6	62.0	70.6	65	8.6	10	Snd Lvl	70.6	0.0	5	-5.0
ML-15 (12 residences)	20	12	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
ML-16 (6 residences)	21	6	58.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
ML-17 (8 residences)	22	8	49.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R-1 (7 residences)	23	7	54.0	53.6	65	-0.4	10	----	53.6	0.0	5	-5.0
R-2 (3 residences)	24	3	54.0	52.8	65	-1.2	10	----	52.8	0.0	5	-5.0
R-3 (3 residences - Foxboro Dev.)	25	3	47.0	73.2	65	26.2	10	Both	73.2	0.0	5	-5.0
R-4 (3 residences - Foxboro Dev.)	26	3	48.0	72.6	65	24.6	10	Both	72.6	0.0	5	-5.0
R-5 (3 residences - Foxboro Dev.)	27	3	52.0	72.3	65	20.3	10	Both	72.3	0.0	5	-5.0
R-6 (3 residences - Foxboro Dev.)	28	3	43.0	67.7	65	24.7	10	Both	67.7	0.0	5	-5.0

						Legacy Reevaluation						
R-7 (3 residences - Foxboro Dev.)	29	3	43 0	67.5	65	24.5	10	Both	67.5	0.0	5	-5.0
R-8 (3 residences - Foxboro Dev.)	30	3	44.0	67.2	65	23.2	10	Both	67.2	0.0	5	-5.0
R-9 (2 residences)	31	2	45.0	66.9	65	21.9	10	Both	66.9	0.0	5	-5.0
R-10 (3 residences)	32	3	40.0	65.9	65	25.9	10	Both	65.9	0.0	5	-5.0
R-11 (2 residences)	33	2	40.0	64.9	65	24.9	10	Sub'l Inc	64.9	0.0	5	-5.0
R-12 (2 residences)	34	2	39.0	64.0	65	25.0	10	Sub'l Inc	64.0	0.0	5	-5.0
R-13 (3 residences)	35	3	40.0	64.8	65	24.8	10	Sub'l Inc	64.8	0.0	5	-5.0
R-14 (2 residences)	36	2	40.0	65.6	65	25.6	10	Both	65.6	0.0	5	-5.0
R-15 (3 residences)	37	3	38.0	63.1	65	25.1	10	Sub'l Inc	63.1	0.0	5	-5.0
R-16 (2 residences)	38	2	39.0	64.0	65	25.0	10	Sub'l Inc	64.0	0.0	5	-5.0
R-17 (2 residences)	39	2	41.0	65.6	65	24.6	10	Both	65.6	0.0	5	-5.0
R-18 (2 residences)	40	2	41.0	66.9	65	25.9	10	Both	66.9	0.0	5	-5.0
R-19 (1 residence)	41	1	53.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R-20 (1 residence)	42	1	50.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R'-1 (Raceway at I-215)	43	1	50.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R'-2 (Raceway at Parking Lot)	44	1	45.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R'-3 (FBWMA - W. of Lake Bountiful)	45	1	40.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
R'-4 (FBWMA - Isolated Parcel)	46	1	61.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
Receiver47	47	1	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
Receiver48	48	1	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
Receiver49	49	1	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
Receiver50	50	1	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0
Receiver51	51	1	44.0	0.0	65	0.0	10	inactive	0.0	0.0	5	0.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	132	0.0	0.0	0.0
All Impacted	75	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

<Organization?>
Curt Overcast

7 May 2004
TNM 2.1

INPUT: RECEIVERS
PROJECT/CONTRACT: Legacy Reevaluation
RUN: Pref.Alt - Revised Run (4/14/04)

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
ML-1 (6 residences)	5	6	15,187.2	106,385.7	1,287.60	1.50	67.00	65	10.0	5.0	Y
ML-2 (7 residences)	6	7	14,914.1	107,383.9	1,289.52	1.50	53.00	65	10.0	5.0	Y
ML-3 (2 residences)	7	2	15,081.0	106,895.5	1,288.70	1.50	56.00	65	10.0	5.0	Y
ML-4 (Industrial/Commercial)	8	1	15,848.6	108,103.0	1,287.04	1.50	57.00	72	10.0	5.0	Y
ML-5 (Vacant)	10	1	15,675.7	109,805.1	1,289.57	1.50	50.00	65	10.0	5.0	Y
ML-6 (1 residence)	11	1	16,476.7	112,754.1	1,288.91	1.50	50.00	65	10.0	5.0	Y
ML-7 (5 residences)	12	5	17,053.1	114,665.5	1,288.78	1.50	44.00	65	10.0	5.0	Y
ML-8 (Bountiful Pond - Recreation)	13	1	17,538.6	115,078.1	1,287.20	1.50	46.00	65	10.0	5.0	Y
ML-9 (6 residences)	14	6	19,058.6	116,288.7	1,287.34	1.50	41.00	65	10.0	5.0	Y
ML-10 (3 residences)	15	3	18,562.1	115,993.6	1,287.85	1.50	48.00	65	10.0	5.0	Y
ML-12 (3 residences)	16	3	19,674.5	121,713.5	1,294.49	1.50	60.00	65	10.0	5.0	Y
ML-11(Undeveloped)	17	1	19,544.0	119,577.6	1,292.57	1.50	57.00	65	10.0	5.0	Y
ML-13 (Glovers Park - Recreation)	18	1	19,249.7	121,844.0	1,294.49	1.50	56.00	65	10.0	5.0	Y
ML-14 (6 residences)	19	6	19,358.9	122,784.5	1,296.52	1.50	62.00	65	10.0	5.0	Y
ML-15 (12 residences)	20	12	16,780.1	123,294.2	1,288.35	1.50	44.00	65	10.0	5.0	
ML-16 (6 residences)	21	6	16,819.5	124,884.0	1,290.13	1.50	58.00	65	10.0	5.0	
ML-17 (8 residences)	22	8	16,555.5	125,827.6	1,297.07	1.50	49.00	65	10.0	5.0	
R-1 (7 residences)	23	7	14,788.4	106,266.9	1,286.32	1.50	54.00	65	10.0	5.0	Y
R-2 (3 residences)	24	3	14,812.7	106,715.9	1,288.77	1.50	54.00	65	10.0	5.0	Y
R-3 (3 residences - Foxboro Dev.)	25	3	15,793.0	108,966.5	1,288.11	1.50	47.00	65	10.0	5.0	Y
R-4 (3 residences - Foxboro Dev.)	26	3	15,798.6	109,243.4	1,288.11	1.50	48.00	65	10.0	5.0	Y
R-5 (3 residences - Foxboro Dev.)	27	3	15,794.9	109,497.8	1,288.11	1.50	52.00	65	10.0	5.0	Y

INPUT: RECEIVERS

Legacy Reevaluation

R-6 (3 residences - Foxboro Dev.)	28	3	16,054.9	108,953.4	1,288.11	1.50	43.00	65	10.0	5.0	Y
R-7 (3 residences - Foxboro Dev.)	29	3	16,045.6	109,245.3	1,288.11	1.50	43.00	65	10.0	5.0	Y
R-8 (3 residences - Foxboro Dev.)	30	3	16,047.4	109,507.2	1,288.11	1.50	44.00	65	10.0	5.0	Y
R-9 (2 residences)	31	2	18,604.5	115,540.3	1,288.77	1.50	45.00	65	10.0	5.0	Y
R-10 (3 residences)	32	3	18,702.1	115,536.6	1,288.77	1.50	40.00	65	10.0	5.0	Y
R-11 (2 residences)	33	2	18,813.1	115,539.0	1,288.77	1.50	40.00	65	10.0	5.0	Y
R-12 (2 residences)	34	2	18,805.7	115,409.8	1,288.77	1.50	39.00	65	10.0	5.0	Y
R-13 (3 residences)	35	3	18,727.7	115,441.5	1,288.77	1.50	40.00	65	10.0	5.0	Y
R-14 (2 residences)	36	2	18,689.9	115,491.5	1,288.77	1.50	40.00	65	10.0	5.0	Y
R-15 (3 residences)	37	3	18,832.6	115,306.1	1,288.77	1.50	38.00	65	10.0	5.0	Y
R-16 (2 residences)	38	2	18,726.5	115,336.6	1,288.77	1.50	39.00	65	10.0	5.0	Y
R-17 (2 residences)	39	2	18,627.7	115,417.1	1,288.77	1.50	41.00	65	10.0	5.0	Y
R-18 (2 residences)	40	2	18,572.8	115,493.9	1,288.77	1.50	41.00	65	10.0	5.0	Y
R-19 (1 residence)	41	1	18,272.8	121,767.5	1,288.94	1.50	53.00	65	10.0	5.0	
R-20 (1 residence)	42	1	17,536.3	121,784.4	1,288.35	1.50	50.00	65	10.0	5.0	
R'-1 (Raceway at I-215)	43	1	15,410.0	106,527.6	1,287.60	1.50	50.00	65	10.0	5.0	
R'-2 (Raceway at Parking Lot)	44	1	15,508.2	106,390.2	1,287.60	1.50	45.00	65	10.0	5.0	
R'-3 (FBWMA - W. of Lake Bountiful)	45	1	16,715.7	115,338.9	1,288.78	1.50	40.00	65	10.0	5.0	
R'-4 (FBWMA - Isolated Parcel)	46	1	19,057.2	120,331.1	1,292.57	1.50	61.00	65	10.0	5.0	
Receiver47	47	1	16,928.5	114,667.5	1,288.00	1.50	44.00	65	10.0	5.0	
Receiver48	48	1	16,886.8	114,664.7	1,288.00	1.50	44.00	65	10.0	5.0	
Receiver49	49	1	16,851.9	114,665.8	1,288.00	1.50	44.00	65	10.0	5.0	
Receiver50	50	1	16,821.1	114,663.7	1,288.00	1.50	44.00	65	10.0	5.0	
Receiver51	51	1	16,966.3	114,668.5	1,288.00	1.50	44.00	65	10.0	5.0	

<Organization?>
Curt Overcast

7 May 2004
TNM 2.1

INPUT: ROADWAYS
PROJECT/CONTRACT: Legacy Reevaluation
RUN: Pref.Alt - Revised Run (4/14/04)

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
Roadway 1 - Northbound	7.3	0	121	15,121.1	104,777.7	1,286.40				Average	
		1	122	15,105.7	105,653.9	1,288.60				Average	
		2	123	15,118.5	105,852.3	1,287.60				Average	
		3	124	15,172.7	106,080.4	1,286.30				Average	
		4	125	15,317.0	106,567.4	1,287.60				Average	
		5	126	15,398.1	106,736.2	1,288.20				Average	
		6	127	15,508.9	106,876.6	1,288.70				Average	
		7	128	15,608.2	106,999.0	1,289.20				Average	
		8	129	15,707.4	107,140.8	1,289.60				Average	
		9	130	15,766.6	107,294.1	1,289.50				Average	
		10	131	15,783.4	107,489.9	1,288.80				Average	
		11	132	15,703.5	107,876.5	1,287.20				Average	
		12	133	15,668.7	108,113.5	1,287.00				Average	
		13	134	15,551.5	110,166.1	1,289.60				Average	
		14	135	15,559.2	110,305.2	1,289.90				Average	
		15	136	15,612.0	110,467.6	1,289.70				Average	
		16	137	15,984.4	111,171.1	1,289.40				Average	
		17	138	16,037.2	111,305.1	1,289.70				Average	
		18	139	16,059.1	111,433.9	1,289.60				Average	
		19	140	16,136.4	112,928.5	1,288.90				Average	
		20	141	16,176.4	113,136.0	1,288.20				Average	
		21	142	16,347.7	113,647.5	1,287.40				Average	
		22	143	16,401.8	113,762.2	1,257.70				Average	
		23	144	16,474.0	113,866.5	1,287.70				Average	
		24	145	17,202.0	114,718.2	1,288.80				Average	

		25	146	17,348.9	114,841.9	1,288.40				Average	
		26	147	17,499.6	114,946.2	1,287.90				Average	
		27	148	17,660.7	115,091.8	1,287.20				Average	
		28	149	18,096.2	115,591.8	1,288.80				Average	
		29	150	18,214.7	115,746.4	1,288.90				Average	
		30	151	18,415.7	116,041.4	1,287.80				Average	
		31	152	18,533.0	116,156.1	1,287.40				Average	
		32	153	18,632.2	116,216.7	1,287.00				Average	
		33	154	18,954.3	116,375.1	1,287.30				Average	
		34	155	19,029.0	116,428.0	1,287.80				Average	
		35	156	19,124.4	116,516.9	1,288.40				Average	
		36	157	19,222.3	116,671.5	1,288.20				Average	
		37	158	19,268.7	116,814.5	1,287.40				Average	
		38	159	19,361.4	117,377.6	1,287.70				Average	
		39	160	19,397.5	117,503.8	1,287.70				Average	
		40	161	19,461.9	117,622.4	1,287.30				Average	
		41	162	19,732.5	117,950.9	1,287.30				Average	
		42	163	19,809.8	118,072.1	1,288.00				Average	
		43	164	19,856.2	118,200.9	1,288.50				Average	
		44	165	19,873.0	118,324.6	1,288.00				Average	
		45	166	19,888.4	121,611.5	1,292.70				Average	
		46	167	19,869.1	121,782.8	1,294.50				Average	
		53	168	19,458.1	123,196.3	1,296.50				Average	
		54	169	19,402.7	123,423.0	1,297.10				Average	
		55	170	19,346.0	123,553.2	1,301.80				Average	
		56	171	19,254.5	123,673.0	1,308.70				Average	
		57	172	19,187.5	123,763.2	1,311.20				Average	
		58	173	19,137.2	123,908.8	1,311.20				Average	
		59	174	19,112.8	124,116.2	1,310.50				Average	
		60	175	19,080.6	124,229.6	1,309.00				Average	
		61	176	19,007.1	124,345.6	1,304.90				Average	
		62	177	18,878.3	124,446.1	1,297.70				Average	
		63	178	18,734.0	124,505.3	1,295.60				Average	
		64	179	18,013.7	125,027.2	1,297.60				Average	
		65	180	17,464.8	125,512.9	1,303.70					
Roadway 2 - Southbound	7.3	0	181	15,105.5	104,778.7	1,286.40				Average	
		1	182	15,092.2	105,653.0	1,288.50				Average	
		2	183	15,105.5	105,853.0	1,287.40				Average	

		3	184	15,164.6	106,083.5	1,286.20				Average	
		4	185	15,309.3	106,567.3	1,287.60				Average	
		5	186	15,385.5	106,740.7	1,288.10				Average	
		6	187	15,492.2	106,891.2	1,288.70				Average	
		7	188	15,589.4	107,001.7	1,289.10				Average	
		8	189	15,694.1	107,148.3	1,289.60				Average	
		9	190	15,749.4	107,295.0	1,289.50				Average	
		10	191	15,768.4	107,489.3	1,288.80				Average	
		11	192	15,690.3	107,877.9	1,287.20				Average	
		12	193	15,656.0	108,114.1	1,287.00				Average	
		13	194	15,537.9	110,160.0	1,289.60				Average	
		14	195	15,547.5	110,304.7	1,289.80				Average	
		15	196	15,598.9	110,472.4	1,289.70				Average	
		16	197	15,968.4	111,163.8	1,289.40				Average	
		17	198	16,023.7	111,304.8	1,289.70				Average	
		18	199	16,046.5	111,440.0	1,289.60				Average	
		19	200	16,122.7	112,935.4	1,288.90				Average	
		20	201	16,164.6	113,143.0	1,288.20				Average	
		21	202	16,330.4	113,636.4	1,287.40				Average	
		22	203	16,389.4	113,765.9	1,287.70				Average	
		23	204	16,486.6	113,903.1	1,287.60				Average	
		24	205	17,193.3	114,726.0	1,288.80				Average	
		25	206	17,341.9	114,851.7	1,288.40				Average	
		26	207	17,488.5	114,960.3	1,287.90				Average	
		27	208	17,663.8	115,118.4	1,287.10				Average	
		28	209	18,058.1	115,569.8	1,288.60				Average	
		29	210	18,206.7	115,762.2	1,288.90				Average	
		30	211	18,399.1	116,044.1	1,287.90				Average	
		31	212	18,532.4	116,173.7	1,287.30				Average	
		32	213	18,625.7	116,230.8	1,287.00				Average	
		33	214	18,902.0	116,368.0	1,287.10				Average	
		34	215	19,006.7	116,427.0	1,287.70				Average	
		35	216	19,115.3	116,529.9	1,288.40				Average	
		36	217	19,214.4	116,684.2	1,288.20				Average	
		37	218	19,265.8	116,876.6	1,287.10				Average	
		38	219	19,343.9	117,381.4	1,287.70				Average	
		39	220	19,383.9	117,509.0	1,287.70				Average	
		40	221	19,446.7	117,627.1	1,287.30				Average	

		41	222	19,721.1	117,966.2	1,287.30				Average	
		42	223	19,795.3	118,078.6	1,288.00				Average	
		43	224	19,839.2	118,202.4	1,288.50				Average	
		44	225	19,852.5	118,326.2	1,288.00				Average	
		45	226	19,873.4	121,612.1	1,292.70				Average	
		46	227	19,850.6	121,777.8	1,294.50				Average	
		53	228	19,182.0	123,726.5	1,303.00				Average	
		54	229	19,138.2	123,819.9	1,307.60				Average	
		55	230	19,121.0	123,909.4	1,310.00				Average	
		56	231	19,096.2	124,073.2	1,310.10				Average	
		57	232	19,048.6	124,174.2	1,307.10				Average	
		58	233	18,970.5	124,258.0	1,301.70				Average	
		59	234	18,597.2	124,534.2	1,296.90				Average	
		60	235	18,000.9	125,008.5	1,297.70				Average	
		61	236	17,452.3	125,490.5	1,303.50					

<Organization?>
Curt Overcast

7 May 2004
TNM 2.1

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: Legacy Reevaluation
RUN: Pref.Alt - Revised Run (4/14/04)

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
Roadway 1 - Northbound	0	121	3024	110	168	110	168	110	0	0	0	0
	1	122	3024	110	168	110	168	110	0	0	0	0
	2	123	3024	110	168	110	168	110	0	0	0	0
	3	124	3024	110	168	110	168	110	0	0	0	0
	4	125	3024	110	168	110	168	110	0	0	0	0
	5	126	3024	110	168	110	168	110	0	0	0	0
	6	127	3024	110	168	110	168	110	0	0	0	0
	7	128	3024	110	168	110	168	110	0	0	0	0
	8	129	3024	110	168	110	168	110	0	0	0	0
	9	130	3024	110	168	110	168	110	0	0	0	0
	10	131	3024	110	168	110	168	110	0	0	0	0
	11	132	3024	110	168	110	168	110	0	0	0	0
	12	133	3024	110	168	110	168	110	0	0	0	0
	13	134	3024	110	168	110	168	110	0	0	0	0
	14	135	3024	110	168	110	168	110	0	0	0	0
	15	136	3024	110	168	110	168	110	0	0	0	0
	16	137	3024	110	168	110	168	110	0	0	0	0
	17	138	3024	110	168	110	168	110	0	0	0	0
	18	139	3024	110	168	110	168	110	0	0	0	0
	19	140	3024	110	168	110	168	110	0	0	0	0
	20	141	3024	110	168	110	168	110	0	0	0	0
	21	142	3024	110	168	110	168	110	0	0	0	0
	22	143	3024	110	168	110	168	110	0	0	0	0

	23	144	3024	110	168	110	168	110	0	0	0	0
	24	145	3024	110	168	110	168	110	0	0	0	0
	25	146	3024	110	168	110	168	110	0	0	0	0
	26	147	3024	110	168	110	168	110	0	0	0	0
	27	148	3024	110	168	110	168	110	0	0	0	0
	28	149	3024	110	168	110	168	110	0	0	0	0
	29	150	3024	110	168	110	168	110	0	0	0	0
	30	151	3024	110	168	110	168	110	0	0	0	0
	31	152	3024	110	168	110	168	110	0	0	0	0
	32	153	3024	110	168	110	168	110	0	0	0	0
	33	154	3024	110	168	110	168	110	0	0	0	0
	34	155	3024	110	168	110	168	110	0	0	0	0
	35	156	3024	110	168	110	168	110	0	0	0	0
	36	157	3024	110	168	110	168	110	0	0	0	0
	37	158	3024	110	168	110	168	110	0	0	0	0
	38	159	3024	110	168	110	168	110	0	0	0	0
	39	160	3024	110	168	110	168	110	0	0	0	0
	40	161	3024	110	168	110	168	110	0	0	0	0
	41	162	3024	110	168	110	168	110	0	0	0	0
	42	163	3024	110	168	110	168	110	0	0	0	0
	43	164	3024	110	168	110	168	110	0	0	0	0
	44	165	3024	110	168	110	168	110	0	0	0	0
	45	166	3024	110	168	110	168	110	0	0	0	0
	46	167	3024	110	168	110	168	110	0	0	0	0
	53	168	3024	110	168	110	168	110	0	0	0	0
	54	169	3024	110	168	110	168	110	0	0	0	0
	55	170	3024	110	168	110	168	110	0	0	0	0
	56	171	3024	110	168	110	168	110	0	0	0	0
	57	172	3024	110	168	110	168	110	0	0	0	0
	58	173	3024	110	168	110	168	110	0	0	0	0
	59	174	3024	110	168	110	168	110	0	0	0	0
	60	175	3024	110	168	110	168	110	0	0	0	0
	61	176	3024	110	168	110	168	110	0	0	0	0
	62	177	3024	110	168	110	168	110	0	0	0	0
	63	178	3024	110	168	110	168	110	0	0	0	0

	64	179	3024	110	168	110	168	110	0	0	0	0
	65	180										
Roadway 2 - Southbound	0	181	3024	110	168	110	168	110	0	0	0	0
	1	182	3024	110	168	110	168	110	0	0	0	0
	2	183	3024	110	168	110	168	110	0	0	0	0
	3	184	3024	110	168	110	168	110	0	0	0	0
	4	185	3024	110	168	110	168	110	0	0	0	0
	5	186	3024	110	168	110	168	110	0	0	0	0
	6	187	3024	110	168	110	168	110	0	0	0	0
	7	188	3024	110	168	110	168	110	0	0	0	0
	8	189	3024	110	168	110	168	110	0	0	0	0
	9	190	3024	110	168	110	168	110	0	0	0	0
	10	191	3024	110	168	110	168	110	0	0	0	0
	11	192	3024	110	168	110	168	110	0	0	0	0
	12	193	3024	110	168	110	168	110	0	0	0	0
	13	194	3024	110	168	110	168	110	0	0	0	0
	14	195	3024	110	168	110	168	110	0	0	0	0
	15	196	3024	110	168	110	168	110	0	0	0	0
	16	197	3024	110	168	110	168	110	0	0	0	0
	17	198	3024	110	168	110	168	110	0	0	0	0
	18	199	3024	110	168	110	168	110	0	0	0	0
	19	200	3024	110	168	110	168	110	0	0	0	0
	20	201	3024	110	168	110	168	110	0	0	0	0
	21	202	3024	110	168	110	168	110	0	0	0	0
	22	203	3024	110	168	110	168	110	0	0	0	0
	23	204	3024	110	168	110	168	110	0	0	0	0
	24	205	3024	110	168	110	168	110	0	0	0	0
	25	206	3024	110	168	110	168	110	0	0	0	0
	26	207	3024	110	168	110	168	110	0	0	0	0
	27	208	3024	110	168	110	168	110	0	0	0	0
	28	209	3024	110	168	110	168	110	0	0	0	0
	29	210	3024	110	168	110	168	110	0	0	0	0
	30	211	3024	110	168	110	168	110	0	0	0	0
	31	212	3024	110	168	110	168	110	0	0	0	0
	32	213	3024	110	168	110	168	110	0	0	0	0

	33	214	3024	110	168	110	168	110	0	0	0	0
	34	215	3024	110	168	110	168	110	0	0	0	0
	35	216	3024	110	168	110	168	110	0	0	0	0
	36	217	3024	110	168	110	168	110	0	0	0	0
	37	218	3024	110	168	110	168	110	0	0	0	0
	38	219	3024	110	168	110	168	110	0	0	0	0
	39	220	3024	110	168	110	168	110	0	0	0	0
	40	221	3024	110	168	110	168	110	0	0	0	0
	41	222	3024	110	168	110	168	110	0	0	0	0
	42	223	3024	110	168	110	168	110	0	0	0	0
	43	224	3024	110	168	110	168	110	0	0	0	0
	44	225	3024	110	168	110	168	110	0	0	0	0
	45	226	3024	110	168	110	168	110	0	0	0	0
	46	227	3024	110	168	110	168	110	0	0	0	0
	53	228	3024	110	168	110	168	110	0	0	0	0
	54	229	3024	110	168	110	168	110	0	0	0	0
	55	230	3024	110	168	110	168	110	0	0	0	0
	56	231	3024	110	168	110	168	110	0	0	0	0
	57	232	3024	110	168	110	168	110	0	0	0	0
	58	233	3024	110	168	110	168	110	0	0	0	0
	59	234	3024	110	168	110	168	110	0	0	0	0
	60	235	3024	110	168	110	168	110	0	0	0	0
	61	236										

Appendix D

Wetlands Functional Assessment

Appendix D

Wetlands Functional Assessment

This appendix presents supplemental information about wetland types in the study area and provides further clarification about how the wetlands functional assessment was performed, including the type of data used, the rationale for the approach to assessing indirect impacts on wetland functions, and the method for scaling the variables used in the assessment models. As a result, this section reiterates some of the information presented in the Final EIS to provide context for the supplemental information.

In addition, this appendix presents a series of tables illustrating indirect impacts on wetlands in the study area by hydrogeomorphic (HGM) wetland class and wetland cover type, as well as impacts on wetland functions for each wetland class and cover type.

D.1 Wetland Classes and Cover Types

The area of wetlands within the proposed build alternative rights-of-way and proposed Legacy Nature Preserve (Preserve) that would be subject to direct and indirect effects encompasses 987 ha (2,439 ac) of wetlands in three HGM wetland classes (depressional, groundwater slope, lacustrine fringe) and seven wetland cover types (forested wetland, shrub-scrub, marsh, wet meadow, playa, unconsolidated shore, and open water).

The Final EIS based all discussion of wetland functions, impacts, and mitigation on the three wetland classes. This document, however, separates wetland functions, impacts, and mitigation according to wetland cover types to provide additional ecological context by which to interpret the analysis. Table D-1, which updates and supplements Table 3-30 in the Final EIS, summarizes the quantities and functional ratings that make up these wetland classes and cover types.

Table D-1 Wetland Cover Types, Quantities, and Functional Ratings for Study Area

HGM Class	Wetland Cover Type	Quantity in Hectares (acres)*											
		Total		High		High-to-Medium		Medium		Medium-to-Low		Low	
Depressional	Forested Wetland	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.2	(0.4)	0.0	(0.0)	0.0	(0.0)	0.2	(0.4)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Depressional	Shrub-Scrub	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		1.4	(3.6)	0.0	(0.0)	1.4	(3.6)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Depressional	Marsh	14.5	(35.8)	0.7	(1.7)	5.5	(13.6)	8.0	(19.7)	0.3	(0.8)	0.0	(0.0)
Groundwater Slope		42.3	(104.5)	6.4	(15.8)	2.1	(5.3)	26.3	(64.9)	7.5	(18.5)	0.0	(0.0)
Lacustrine Fringe		233.2	(576.1)	0.0	(0.0)	206.3	(509.7)	26.9	(66.4)	0.0	(0.0)	0.0	(0.0)
Depressional	Wet Meadow	115.3	(284.9)	2.6	(6.5)	84.0	(207.6)	26.7	(66.0)	1.9	(4.8)	0.0	(0.0)
Groundwater Slope		152.4	(376.6)	80.8	(199.6)	18.2	(45.1)	48.9	(120.9)	4.5	(11.1)	0.0	(0.0)
Lacustrine Fringe		148.1	366.0	0.0	(0.0)	98.9	(244.5)	49.2	(121.5)	0.0	(0.0)	0.0	(0.0)
Depressional	Playa	46.4	(114.6)	3.5	(8.6)	31.3	(77.3)	10.5	(26.0)	0.0	(0.0)	1.1	(2.6)
Groundwater Slope		18.1	(44.7)	15.2	(37.6)	0.0	(0.0)	2.7	(6.6)	0.2	(0.4)	0.0	(0.0)
Lacustrine Fringe		124.5	(307.6)	0.0	(0.0)	99.7	(246.3)	24.8	(61.3)	0.0	(0.0)	0.0	(0.0)

HGM Class	Wetland Cover Type	Quantity in Hectares (acres)*											
		Total		High		High-to-Medium		Medium		Medium-to-Low		Low	
Depressional	Unconsolidated Shore	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		38.9	(96.2)	0.0	(0.0)	36.5	(90.1)	2.5	(6.1)	0.0	(0.0)	0.0	(0.0)
Depressional	Open Water	2.5	(6.2)	0.0	(0.0)	1.4	(3.5)	1.1	(2.7)	0.0	(0.0)	0.0	(0.0)
Groundwater Slope		0.1	(0.2)	0.0	(0.0)	0.0	(0.0)	0.1	(0.2)	0.0	(0.0)	0.0	(0.0)
Lacustrine Fringe		49.4	(122.1)	0.0	(0.0)	25.1	(62.0)	24.3	(60.1)	0.0	(0.0)	0.0	(0.0)
Total		987.2	(2439.3)	109.2	(269.8)	610.5	(1508.5)	252.1	(622.9)	14.4	(35.5)	1.1	(2.6)

*Definitions defined below

Functional Rating	Average Functional Value
High	0.88 to 1.0
High-to-Medium	0.63 to 0.87
Medium	0.38 to 0.62
Medium-to-Low	0.18 to 0.37
Low	0.00 to 0.17

The following section presents information on the seven wetland cover types found in these wetland classed in the study area—forested wetland, shrub-scrub, marsh, wet meadow, playa, unconsolidated shore, and open water.

D.1.1 Marsh

Marsh is a wetland plant community characterized by tall, emergent, perennial, herbaceous monocots. Plant species most commonly observed in marsh within the study area include hard stem bulrush (*Scirpus acutus*), alkali bulrush (*Scirpus maritimus*), three square bulrush (*Scirpus americanus* and *Scirpus pungens*), cattail (*Typha latifolia*), creeping spikerush (*Eleocharis palustris*), reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), blister buttercup (*Ranunculus sceleratus*), water buttercup (*Ranunculus aquatilis*), and Nebraska sedge (*Carex nebrascensis*). Marsh is the second most abundant wetland type in the study area. There are 290 ha (716 ac) of marsh in the study area, most of which is associated with the lacustrine fringe of Great Salt Lake.

The hydrology of the marsh cover type is provided by groundwater and/or surface water. Water covers the ground surface for long periods of time during the growing season. Depths can range from a few centimeters to almost a meter, but they are not deep enough to restrict the growth of emergent plant species. Areas where marsh is supported primarily by groundwater are typically located in depressions where the ground surface drops below the level of the water table. During the spring months, when the water table is high due to snowmelt and precipitation, these areas are inundated. As the level of the water table drops in the summer months, the marsh areas may no longer be inundated, although the soils remain saturated.

D.1.2 Wet Meadow

Wet meadow is a wetland plant community characterized by grasses and other low-growing, perennial monocots. Although the soil may be saturated for long durations, the vegetation is generally not emergent. Plant species most commonly observed in wet meadows in the study area include Baltic rush (*Juncus balticus*), creeping spikerush, clustered field sedge (*Carex praegracilis*), Nebraska sedge, rabbitfoot grass (*Polypogon monspeliensis*), foxtail barley (*Hordeum jubatum*), little barley (*Hordeum pusillum*), curly dock (*Rumex crispus*), and saltgrass (*Distichlis spicata*). Wet meadow is the most common wetland type in the study area. There are 416 ha (1028 ac) of wet meadow in the study area, distributed more or less evenly throughout all three HGM wetland classes.

The hydrology of the wet meadow cover type is provided primarily by groundwater, although surface water plays an important role in many of the areas. Wet meadow typically occurs in areas that are in close proximity to the water table. Early in the growing season the level of the water table may be higher than the ground surface, causing inundation. However, this inundation occurs less frequently and for a shorter duration than in marsh. Like marsh, wet meadows found in the study area typically occur in depressional wetlands, but unlike marsh, the water table level is just below to only slightly above the depression bottom. Because of this difference, wet meadows may be inundated only for brief periods, although the soils may be saturated at the surface for extended periods. As the water table drops in the summer months, the wet meadows become drier, and upland species may begin to grow by late summer.

D.1.3 Playa

Vegetation in the playa cover type is usually sparse, typically between 5 and 30 percent aerial cover. The vegetation is not uniformly distributed across the playas but tends to be concentrated around the margins. Typical species include western seepweed (*Suaeda occidentalis*), slender seepweed (*Suaeda depressa*), pickleweed (*Salicornia europaea*), saltgrass, iodinebush (*Allenrolfea occidentalis*), fat-hen saltbush (*Atriplex patula*), and Nuttall alkali grass (*Puccinellia nuttalliana*). Playa soils are extremely saline/alkaline, which suppresses the growth of most plant species. There are 189 ha (467 ac) of playa in the study area. About 66 percent of the playa habitat is associated with the lacustrine fringe of Great Salt Lake, and about 25 percent occurs in depressional wetlands.

The hydrology of playas in the study area is provided primarily by surface water. Playas are typically located in the lowest topographic positions of areas with internal drainage. They collect much of the runoff from adjacent areas following a precipitation event, and because of the high clay content of the soils, the water will pond. Following a precipitation event, playas may be inundated with several centimeters of water. Most of the standing water in playas is removed through evaporation, which deposits salts from the soils on the surface.

D.1.4 Scrub-Shrub

The scrub-shrub cover type is characterized by an overstory of woody shrubs, typically less than three meters in height. In some instances, this cover type is successional to forested wetlands. In the study area, the overstory of scrub-shrub wetlands is composed of tamarisk (*Tamarix ramosissima*), box-elder (*Acer negundo*), and/or coyote willow (*Salix exigua*). Understory plant species are similar to those found in wet meadow, including saltgrass, Baltic rush, common reed, reed canary grass, foxtail barley, and little barley. Only four small areas of scrub-shrub wetland are present in the study area, comprising 1.4 ha (3.6 ac).

The hydrology of scrub-shrub wetlands is provided by both surface and groundwater sources. Some of the scrub-shrub wetlands are adjacent to small streams, and their wetland hydrology is derived from the stream. Others are located in areas that are close to the water table and receive their moisture from groundwater.

D.1.5 Forested Wetland

The forested wetland cover type is characterized by an overstory of large trees. The overstory of this forested wetland is composed of narrow-leaf cottonwood (*Populus angustifolia*) and Russian olive (*Elaeagnus angustifolia*). The understory plant species is reed canary grass. Forested wetland is found at only one location in the study area, comprising 0.2 ha (0.4 ac). Wetland hydrology for this wetland is provided by a nearby stream.

D.1.6 Unconsolidated Shore

Within the study area, unconsolidated shore areas represent areas that have (1) unconsolidated substrates with less than 75 percent aerial cover of stones, boulder, or bedrock, and (2) less than 30 percent aerial cover of vegetation, other than pioneering plants. This is primarily an aquatic habitat but is included here because a small amount of vegetation may be present when water levels are low. This habitat is found along the fringe of depressional open water and/or lacustrine systems. There are 39 ha (96 ac) of unconsolidated shore in the study area.

D.1.7 Open Water

Open water includes areas of surface water where the depth to bottom is unknown or there is standing water with no emergent vegetation present. These areas are less than 8.2 ha (20 ac) in size. This is an aquatic habitat but is included here because submerged aquatic vegetation may be present. These areas sometimes become dry during the summer, which allows emergent vegetation to grow for a short period. There are 52 ha (128 ac) of open water in the study area, most of which is associated with the lacustrine fringe of Great Salt Lake.

D.2 Wetland Functions

D.2.1 Wetlands Functional Assessment

As presented in the Final EIS, the wetlands functional assessment for the Legacy Parkway wetlands was a modification of the hydrogeomorphic (HGM) method for evaluating wetland functions initially developed by the Corps (Brinson 1993). The HGM method categorizes wetlands by their water sources, hydrodynamics, and geomorphic setting, and then evaluates wetland functions based on physical and biological attributes.

Under the HGM method, wetland functions are assessed by comparing the wetlands under investigation with a set of reference wetlands (Brinson and Rheinhardt 1996). Reference wetlands are sites within a specified geographic region chosen to encompass the range of variation within a group or class of wetlands. The sites with the highest level of wetland function are selected as the reference standards. Based on these reference wetlands, regional guidebooks are created, which provide protocols for collecting data and scaling the variables and mathematical models for determining numerical ratings for each wetland function.

No regional guidebooks have been created yet for wetlands in the Legacy Parkway study area. However, an interdisciplinary assessment team (A-Team) was developing draft regional HGM models for the State of Utah at the time the Final EIS was published. The A-Team developed low-resolution wetlands assessment models for the Legacy Parkway project. Low-resolution models require few variables and rely on indirect measures and indicators, which makes them more efficient, quicker, and less expensive to prepare than higher resolution models but somewhat reduces their accuracy and precision (Smith and Wakely 2001). At the time this Supplemental EIS was prepared, the state regional HGM model was not complete enough to offer the accuracy or precision needed to update the HGM model information presented in the Final EIS. As a result, the updated wetlands functional assessment analysis presented in this document continues to be based on the wetlands functional assessment conducted for the Final EIS. Information on this model is summarized below.

Application of Hydrogeomorphic Method

The variables used for the Legacy Parkway wetlands assessment were based on indicators that correlate with wetland functions rather than measured wetland characteristics. The indicators were based on land use within and adjacent to the wetlands and on the presence of roads and other barriers; this information was determined from aerial photographs and field observations. Under the HGM approach, land use in the wetland watershed is an important variable in many wetland function indices. Because the wetland watershed is not always easily determined, some models use the adjacent land within a specific distance of the wetland as a surrogate for the watershed. For the Legacy Parkway project, adjacent land was

defined as the land within 305 m (1,000 ft) of the wetland perimeter (see Section D.3 below for discussion of the 305-m [1,000-ft] distance).

The wetland function indicators were assigned numerical values using best professional judgment guided by data developed for a draft HGM regional guidebook for depressional wetlands in peninsular Florida (Trott et al. 1997). Although regional guidebooks are developed for specific regions and wetland classes (Clairain 2002), the A-Team judged that, based on the low resolution of the wetlands assessment models, the numerical values from the Florida model would be similar to those that would be expected for depressional wetlands in the Legacy Parkway study area. Also, broad wetland classes were used rather than the more specific wetland cover types because the models were too general to capture the differences between cover types.

Study area wetlands judged to have the highest level of wetland function were selected as the reference standards against which all wetland indicators were scaled. Under the HGM approach, reference standards are based on wetlands that have not been subject to long-term anthropogenic disturbance (Smith et al. 1995). However, because wetlands in the Legacy Parkway study area have been subject to long-term disturbance, selection of reference standards was limited to available wetlands (Findlay et al. 2002).

For each wetland in the study area, indicators were assigned and then entered into the models to calculate a functional capacity index (FCI) for five wetland functions. An FCI is a numerical estimate of the ability of a wetland to carry out a specific function. The FCI is not an assessment of the actual level at which the wetland performs the function but an assessment of the relative level of function compared to the reference standards. The FCI is scaled from 0 (no function) to 1 (highest function). Wetland functions were quantified as functional capacity units (FCUs), a measure that incorporates both the size of a wetland and its ability to carry out wetland functions. The FCUs for each wetland function were calculated by multiplying the area of each wetland by each FCI.

In June 2000, the Corps approved the results of the wetlands functional assessment. A discussion of the development and use of indicators and models for the wetlands functional assessment is presented in the *Legacy Parkway Wetland Final HGM Technical Report* (Baseline Data Inc. 2000) and in Appendix B2 of the Final EIS.

D.2.2 Wetland Functions

For this Supplemental EIS, the lead agencies reviewed the wetlands functional assessment conducted for the Final EIS and all available information pertinent to the nature and function of the wetlands in the study area. This section summarizes information from the Final EIS and provides, as appropriate, general information clarifying the particular functions being described. As described in Section 4.12, *Wetlands*, the Final EIS based all discussion of wetland functions on the three HGM wetland classes listed above (depressional, slope, and lacustrine fringe). The wetland functions were separated according to wetland cover types to provide additional ecological context by which to interpret the analysis.

Wetlands in the study area perform functions in the following three basic categories.

- Hydrology.
- Biogeochemistry.
- Flora and fauna habitat support.

Each of these categories includes specific functions, which are described below. Table D-2, which updates Table 3-29 in the Final EIS, lists specific functions that wetlands perform in the study area and shows how these functions pertain to the three HGM wetland classes. It was not feasible to assess all possible functions that wetlands perform in the study area. Therefore, the analysis in the Final EIS and in this document focuses on those functions that directly or indirectly affect the ecosystem. Other functions, such as the visual enjoyment and recreational value of wetlands are not discussed in this section.

Table D-2 Wetland Functions

Function	Groundwater Slope	Depressional	Lacustrine Fringe
Hydrology			
Surface Water Detention and Storage	−	+	+
Maintain Wetland Hydrology	+	+	+
Energy Dissipation	−	−	+
Biogeochemistry			
Particulate Retention	−	+	−
Elements/Compounds Retention, Conversion, and Release	+	+	+
Net Organic Compound Accumulation and Element Cycling	+	+	+
Organic Carbon Export	+	−	+
Flora and Fauna Habitat Support			
Maintain Characteristic Vegetation	+	+	+
Maintain Characteristic Invertebrate Food Webs	+	+	+
Maintain Characteristic Vertebrate Habitats	+	+	+
Maintain Landscape-Scale Biodiversity	+	+	+
Maintain Habitat Interspersion and Connectivity	+	+	+

Notes:
+ carries out function
− does not carry out function to a substantial degree

Table D-3 lists the wetland functional capacity units for each HGM wetland class and cover type under existing conditions according to five different functions.

- Function 1: Wetland hydrology maintenance.
- Function 2: Dissolved elements and compounds removal.
- Function 3: Particulate retention.
- Function 4: Habitat structure.
- Function 5: Habitat connectivity, fragmentation, and patchiness.

The FCUs in Table D-3 are numerical representations of the capacity for wetlands in the study area to carry out wetland functions. FCUs provide little information, however, about how wetlands in the study area may function. Therefore, general information describing the five functions listed above and in Table D-3 is presented in the following sections.

This table provides the information on FCUs in this format for convenience only. Because functional capacity measures the degree to which a wetland performs a specific function, the functional capacities of different wetland functions are not equivalent or additive (Smith et al. 1995). FCUs do not represent a "common currency" that can be used to compare functions and impacts between different wetland categories or wetland types (Smith et al. 1995, Brinson and Rheinhardt 1996).

Table D-3 Wetlands Functional Capacity Units—Existing Conditions

		Functional Capacity Units				
HGM Wetland Class	Wetland Cover Type	Function 1	Function 2	Function 3	Function 4	Function 5
Depressional	Forested Wetland	0	0	0	0	0
Groundwater Slope		0	0	0	0	0
Lacustrine Fringe		0	0	0	0	0
Depressional	Shrub-Scrub	0	0	0	0	0
Groundwater Slope		0	0	0	0	0
Lacustrine Fringe		3	3	3	2	2
Depressional	Marsh	24	25	27	18	22
Groundwater Slope		56	59	55	62	57
Lacustrine Fringe		410	516	410	345	355
Depressional	Wet Meadow	217	203	229	154	188
Groundwater Slope		302	253	277	279	283
Lacustrine Fringe		236	283	236	199	204
Depressional	Playa	87	85	95	66	75
Groundwater Slope		41	32	34	37	39
Lacustrine Fringe		226	231	204	159	183
Depressional	Unconsolidated Shore	0	0	0	0	0
Groundwater Slope		0	0	0	0	0
Lacustrine Fringe		68	83	62	49	53
Depressional	Open Water	4	4	5	3	4

HGM Wetland Class	Wetland Cover Type	Functional Capacity Units				
		Function 1	Function 2	Function 3	Function 4	Function 5
Groundwater Slope		0	0	0	0	0
Lacustrine Fringe		56	93	64	63	57

The occurrence and distribution of wetlands in the study area have been affected by grazing, drainage, irrigation, cropping, and/or urban and industrial development, and wetland functions have been degraded in many of the wetlands. The capacity of these wetlands to carry out wetland functions varies greatly, depending on the land use and proximity to existing large wetland complexes associated with Great Salt Lake, FBWMA, duck clubs, and other naturally occurring wetlands. The majority of wetlands found in agricultural areas are grazed and/or cropped. The more intensely these wetlands are subjected to agricultural activities, the lower their ability to perform their natural functions, including wildlife support. The presence of other development also reduces the ability of wetlands to perform their natural functions.

Hydrology

Wetland hydrology comprises “all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season” (Environmental Laboratory 1987). Hydrology is regarded as the most important category of wetland functions because wetland hydrology is the basis for all wetland functions. Although not all wetland categories provide the same functions or level of function, wetlands in the study area carry out three general hydrologic functions.

- Short- and long-term surface storage.
- Maintenance of wetland hydrology.
- Dissipation of the energy in moving water.

Depressional wetlands provide both short- and long-term surface water storage. This short-term water storage decreases the amount and velocity of runoff, reducing peak floods and distributing storm flows over longer periods. The stored water provides habitat for aquatic organisms and helps maintain the physical and biogeochemical processes. Water stored in wetland basins percolates into the soil or into the groundwater table, which helps maintain the wetland hydrology of both the depressional wetlands and other adjacent wetlands. The surface water storage function of lacustrine fringe wetlands varies with the rise and fall of the water level in Great Salt Lake. Because they are part of a larger lacustrine system, lacustrine fringe wetlands primarily provide long-term surface water storage. However, when lake levels are low, lacustrine fringe wetlands possessing a basin also provide short-term water storage. Because groundwater slope wetlands lack a basin, they have little or no surface water storage function.

Maintenance of wetland hydrology depends on the ability of wetlands to intercept groundwater and surface water. Groundwater slope wetlands are dependent primarily on groundwater. Groundwater recharge in the study area results from precipitation that percolates into the soil. Processes that either reduce the amount of precipitation, such as drought, or increase the tendency for water to run off rather than percolate lower the groundwater table and adversely affect the ability of wetlands to intercept groundwater. Depressional wetlands depend primarily on surface runoff. The amount of precipitation is important, but processes that reduce the amount of runoff or divert the runoff to other locations also affect

the ability of depressional wetlands to intercept surface flows. Lacustrine fringe wetlands are dependent on floodwater from Great Salt Lake, and so maintenance of wetland hydrology is subject to the annual rise and fall of the lake level more than to short-term events. However, during an extended period of drought, when lake levels fall below a level capable of maintaining the wetland hydrology, the ability to intercept groundwater or surface runoff becomes important.

The dissipation of energy in moving water lessens its erosive impact and contributes to reducing downstream particulate loading. This function is provided primarily by vegetated wetlands associated with riverine, lacustrine, and tidal ecosystems. In the study area, lacustrine fringe wetlands vegetated by marsh or wet meadow provide this function, although the ability to carry out this function has been negatively affected by grazing, which removes the vegetation.

Function 1: Wetland Hydrology Maintenance

The FCI for hydrologic functions is an estimate of the ability of the wetlands in the study area to maintain their characteristic wetland hydrology. This function was modeled on two indicators, land use adjacent to the wetlands and the presence of roads and other barriers within the wetlands. Land use affects both the amount of surface runoff that occurs and the amount of groundwater recharge. Decreases or increases in surface runoff attributable to changes in land use can degrade this wetland function. Barriers can prevent the movement of water into, through, or out of a wetland, which can also degrade wetland function by making all or part of the wetland drier or wetter.

In the study area, highly functional wetlands are surrounded by ungrazed rangeland, which has low runoff potential. Other land uses with low runoff potential, such as field crops or improved pasture with rotational grazing, are not expected to substantially alter the amount of surface runoff or groundwater recharge. In contrast, paved roadways and developed areas have high runoff potential, which have adverse effects on both surface runoff and groundwater recharge. Increased runoff adversely affects slope wetlands because it decreases groundwater recharge. In contrast, increased runoff may increase the depth or duration of inundation in depressional wetlands, altering the characteristic vegetation.

Highly functional wetlands also have no barriers to prevent groundwater or surface water from moving freely between all portions of the wetlands. Small modifications to the hydrology, such as unpaved roads or utility easements, are expected to lower the hydrologic functions to a moderate level, whereas extreme modifications, such as four-lane paved roads, large dikes, or large drainage channels, are expected to reduce the hydrologic functions to a low level.

The FCUs that represent how wetlands in the study area maintain wetland hydrology under existing conditions are provided above in Table D-2, and the functional ratings are shown in Figure 3-24a of the Final EIS.

Biogeochemistry

The biogeochemistry function addresses the ability of wetland ecosystems to transport and transform chemicals. Wetlands remove dissolved substances from water through various mechanisms such as absorption, adsorption, solubilization, oxidation, biological transformation, and precipitation. Wetlands, by definition, are vegetated, and it is the vegetation that is responsible for a wide range of physical and biochemical processes. Vegetation slows the velocity of water, reducing the ability to hold particles in suspension. Growing vegetation removes dissolved nutrients and compounds from the water and soil, often metabolizing them and sometimes sequestering them within plant tissues. Bacteria growing in the soil or in plant roots also break down or alter these substances so that they are removed from the water, either by plants or as a gas. The nutrients and carbon fixed by the plants are cycled through the wetlands

when the plants are eaten by herbivores or when the plants die and decompose. The flow of water through wetlands provides for the efficient movement and distribution of nutrients and energy throughout the entire ecosystem.

Watershed basins that have more wetlands tend to have lower specific conductance (a measure of the total concentration of dissolved substances) and lower concentrations of chloride, lead, inorganic nitrogen, suspended solids, and total and dissolved phosphorus than do watershed basins with fewer wetlands. Also, certain wetland vegetation is adept at removing heavy metals. Wetlands, therefore, improve water quality by removing both dissolved substances and suspended particulates. Two FCIs were generated for biogeochemical functions, one for removal of dissolved elements and compounds, and one for particulate retention.

Function 2: Dissolved Elements and Compounds Removal

The FCI for removal of dissolved elements and compounds is an estimate of the ability of a wetland to removed dissolved substances from water. This function was modeled on two indicators, land use within the wetland and land use adjacent to the wetland. An individual wetland can process only a finite amount of dissolved elements and compounds before the functional capacity is degraded. Existing land use affects both the type and amount of dissolved elements and compounds released into wetlands, and land uses that increase the amount of dissolved elements and compounds are expected to adversely affect wetland function.

In the study area, highly functional wetlands are unaltered and ungrazed. Grazed wetlands have reduced functional capacity due to increased nutrient loading from animal waste and soil disturbance. Farmed wetlands have increased loading of dissolved substances due to use of farm chemicals and from soil disturbance. Both of these activities also change or remove the vegetation, which reduces the wetlands' ability to remove dissolved substances.

In the study area, highly functional wetlands are also surrounded by ungrazed rangeland. As land becomes developed or placed into agriculture, the amount of dissolved materials increases, as does the amount of runoff conveying the dissolved materials. Therefore, wetlands with a greater proportion of the surrounding land under development or agriculture are expected to have a correspondingly lower ability to remove dissolved substances. Different land use types have varying degrees of impact on this functional indicator; for example agriculture and low density development are expected have less effect than high density development or highways.

The FCUs for removal of dissolved elements and compounds by wetlands in the study area under existing conditions are provided in Table D-3, and the functional ratings are shown in Figure 3-24b in the Final EIS.

Function 3: Particulate Retention

The FCI for particulate retention is an estimate of the ability of a wetland to remove particulates from the water column. The presence of vegetation is critical to this function, since it is the reduction in water flow velocity that causes particulates to drop out of suspension. By removing particulates from surface water flows, wetlands function as filters that improve water quality.

Wetlands generally have limited capacity to remove sediments. Unless inflow of particulates, such as sediment, is balanced by outflow, a wetland will eventually lose all wetland functions, including the ability to retain particulates,. and become upland. As a result, for this function to be sustainable, a wetland must function in a way that slows the movement of particles through the ecosystem, changing a pulse of particulates (such as follows a rain storm) to a lower level of particulates released gradually over a longer

period of time. In the study area, this function is carried out primarily in marsh and wet meadow in groundwater slope wetlands. Other wetland cover types are less able to carry out this function. Playa wetlands have low vegetation cover and do not have much capacity to carry out this function. In depressional wetlands, water flow is primarily one-way, flowing into the wetland. As a result, they can continue to function as wetlands only under very low levels of particulate inflow.

The models for depressional wetlands and groundwater slope wetlands used two indicators, land use adjacent to the wetland and the presence of roads and other barriers within the wetland. For lacustrine fringe wetlands, where water flows both into and out of the wetland, this function was modeled on three indicators, land use within the wetland, land use adjacent to the wetland, and the presence of roads and other barriers within the wetlands.

Existing land use affects both the type and amount of particulates released into wetlands, and land uses that increase or decrease the amount of particulates are expected to adversely affect wetland function. In the study area, highly functional wetlands are surrounded by ungrazed rangeland. As land becomes developed or placed into agriculture, the amount of particulates suspended in runoff increases, as does the amount of runoff conveying the particulates. Therefore, wetlands with a greater proportion of the surrounding land under development or agriculture are expected to have a correspondingly lower ability to remove particulates. Different land use types have varying degrees of impact on this functional indicator; for example, agriculture and residential development are expected to have less effect than commercial or industrial development.

In the study area, highly functional wetlands are unaltered and ungrazed. Grazed and farmed wetlands have increased loading of particulates due to soil disturbance and vegetation removal. Soil disturbance, in conjunction with vegetation removal, increases the potential for particulate export and erosion. Similarly, in the study area, highly functional wetlands lack internal barriers to water flow. The presence of barriers within a wetland affects the ability for particulates to circulate within a wetland. For example, a barrier within a wetland may cause part of the wetland to infill, and part to erode.

The FCUs for particulate retention by wetlands in the study area under existing conditions are provided in Table D-3, and the functional ratings are shown in Figure 3-24b in the Final EIS.

Flora and Fauna Habitat Support

Wetlands within the Legacy Parkway study area are located along the eastern edge of the GSLE (See Section 4.0.2, *Great Salt Lake Ecosystem*). This ecosystem is noteworthy because it is the largest inland saline lake in the nation. The wetlands around Great Salt Lake support millions of animals, including more than 250 species of birds, 64 species of mammals, 16 species of reptiles and amphibians, 23 species or subspecies of fish, and a host of diverse invertebrates including flies, mosquitoes, and brine shrimp. Great Salt Lake wetlands are a funneling point for migratory birds using the western half of the continent. Wetlands of Great Salt Lake have been identified in the Western Hemisphere Shorebird Reserve Network as a migratory habitat of hemispheric significance. These wetlands provide not only resting and staging areas for migratory birds, but also breeding and nesting areas for many waterfowl, shorebirds, and amphibians that stay in the area. Section 4.13, *Wildlife,* provides a more detailed discussion of wildlife habitat in the study area.

Wetlands are productive environments that provide diversity in the landscape. The flux of nutrients and energy in wetlands is relatively high because of the high growth rate and rapid turnover of the wetland vegetation. Nutrients and compounds in wetlands are broken down into organic compounds by bacterial action, which provides food for invertebrates. These invertebrates are the foundation of the food web that

supports vast and varied numbers of wildlife species, from shorebirds to amphibians. Wetlands provide habitat where many plants and animals can fulfill one or more life cycle stages.

The ecotone along the eastern shore of Great Salt Lake is a mosaic of slope and depressional wetlands and upland habitats. This ecotone provides a large number of niches and habitats for organisms. These characteristics allow wetlands in the study area to provide a diverse array of trophic levels (i.e., feeding levels) within both the wetland and surrounding upland environments. Many species utilize the wetlands for feeding and uplands for nesting. The wetlands are also important to wildlife by virtue of their abundance and the combined functions they serve. Small isolated wetlands also provide value to different species during certain times of the year, such as resting places for migratory shorebirds and waterfowl. Connectivity between the wetlands and surrounding uplands is an important component of the habitat support function of wetlands.

Two FCIs were generated for flora and fauna habitat support functions, one for habitat structure and one for habitat connectivity, fragmentation, and patchiness. The models do not assess the extent to which the wetlands provide habitat or whether the habitat is even utilized by wildlife. Instead, the ability of wetlands to provide habitat for wildlife is assumed, and the models are intended solely to assess the quality of wetland habitat support that presently exists and to evaluate changes over time that can be predicted from landscape-level changes.

Function 4: Habitat Structure

The FCI for habitat structure is an estimate of the ability of a wetland to maintain characteristic vegetation, invertebrate food webs, and vertebrate habitat. This function was modeled on two indicators, land use within the wetland and land use within the adjacent habitat. The more intensely land use disturbs the landscape, the more the characteristic vegetation can change. In the study area, wetlands that provide the highest level of habitat structure are unaltered and ungrazed. With disturbance from grazing, plowing, or grading, the characteristic vegetation can also be susceptible to invasive species (both native and exotic). When wetlands are farmed or overgrazed so that the existing wetland vegetation is removed from the soil surface, wildlife usage changes. Habitat for some species is diminished because there is insufficient vegetation to provide food, shelter or nesting opportunities. However, in some instances, the removal of vegetation results in open areas used by certain shore birds that frequent Great Salt Lake.

Many of the wetlands in the study area are surrounded by ungrazed rangeland. Life cycles of many wildlife species require both wetlands and uplands for feeding, loafing, nesting, and reproduction. Most of the species that utilize both wetlands and adjacent upland habitats fulfill much of their life cycles within 300 meters (1,000 feet) of the wetland perimeter. Changing land uses adjacent to wetlands alters their function as upland habitat.

The FCUs for habitat structure by wetlands in the study area under existing conditions are provided in Table D-3, and the functional ratings are shown in Figure 3-24c in the Final EIS.

Function 5: Habitat Connectivity, Fragmentation, and Patchiness

The FCI for habitat connectivity, fragmentation, and patchiness is an estimate of the capability for wildlife movement within a wetland, and between the wetland and adjacent upland habitat. This function was modeled on four indicators, the presence of roads and other barriers within the wetland, land use adjacent to the wetland, the ability of the study area wetlands to maintain their characteristic wetland hydrology (Function 1), and land use within the wetland.

Wetlands in the study area that provide the highest level of capability for wildlife movement within a wetland, and between the wetland and adjacent upland habitat, are unaltered, ungrazed, and surrounded

by ungrazed rangeland. Barriers between the wetlands and the adjacent uplands prevent some species from moving into or out of the wetlands, making them unable to reproduce or compete their life cycle. Animal species such as large mammals, birds, fish and flying insects are less affected by these barriers. Changing land uses adjacent to wetlands, in addition to altering their function as upland habitat, limit the ability of wildlife to move throughout that habitat. Maintaining the characteristic wetland hydrology is important to this function because many of the wetlands in the study area are part of larger wetland complexes that have hydrologic connections. Altering the wetland hydrology of part of a wetland complex may create a barrier that prevents some species from moving between the wetlands. Changing land uses within wetlands, in addition to altering their function as wetland habitat, limits the ability of wildlife to move throughout that habitat.

The FCUs for habitat connectivity, fragmentation, and patchiness by wetlands in the study area under existing conditions are provided in Table D-3, and the functional ratings are shown in Figure 3-24c in the Final EIS.

D.3 Environmental Consequences

As described in the Final EIS, all the build alternatives would affect wetland resources in the study area. Two categories of wetland impacts would take place, direct and indirect, characterized according to which wetland functions are being affected. The Final EIS based all discussion of wetland impacts on the three HGM wetland classes described in Section 4.12.2.1. This section separates wetland impacts according to wetland cover types to provide additional ecological context by which to interpret the analysis.

D.3.1 Direct Impacts

For the initial impact analysis calculations made for the Final EIS, it was assumed that direct impacts associated with the build alternatives would be limited to the area within the proposed action right-of-way and that all the area within the project right-of-way would be directly affected. The impact analysis was carried out by assuming that all wetlands within the project right-of-way would be filled, based on the preliminary design. A separate analysis was carried out for each proposed build alternative.

Fifty-eight wetlands were entirely or partially filled by the initial clearing and grading for the Legacy Parkway or by Legacy-related construction activities associated with the I-15/US-89 interchange in Farmington; the total extent of project-related fill was 19.4 ha (47.9 ac). Five other wetlands were partially filled by construction of temporary access roads in the Legacy Nature Preserve; the total extent of project-related fill in the Preserve was 0.1 ha (0.3 ac). Because these wetlands were filled in conjunction with the Legacy Parkway project, their condition prior to the construction activities was used for assessing baseline conditions.

Table D-4, which updates Table 4-20 in the Final EIS, summarizes the potential direct impacts in terms of the total area affected by each proposed build alternative. Figures 4-14a through 4-14d in the Final EIS show the wetland polygons that would be directly affected by the right-of-way of each build alternative, assuming a 100-m (328-ft) right-of-way.

Table D-4 Direct Impacts on Wetlands by Wetland Class and Wetland Cover Type (for 100-m [328-ft] Right-of-Way

Wetland Class	Wetland Cover Type	Area in Hectares (Acres)							
		Alternative A		Alternative B		Alternative C		Alternative D	
Depressional	Forested Wetland	0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope		0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	0	(0)	0	(0)	0	(0)
Depressional	Shrub-Scrub	0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope		0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	1	(3)	0	(0)	0	(0)
Depressional	Marsh	1	(2)	2	(4)	1	(2)	1	(3)
Groundwater Slope		1	(2)	4	(10)	1	(4)	1	(3)
Lacustrine Fringe		8	(19)	16	(38)	7	(17)	7	(18)
Depressional	Wet Meadow	17	(43)	15	(38)	17	(42)	17	(42)
Groundwater Slope		8	(19)	11	(26)	7	(16)	6	(14)
Lacustrine Fringe		4	(9)	7	(16)	9	(23)	4	(9)
Depressional	Playa	2	(5)	4	(10)	6	(14)	5	(12)
Groundwater Slope		0	(0)	2	(5)	1	(4)	1	(2)
Lacustrine Fringe		1	(2)	2	(5)	6	(14)	2	(4)
Depressional	Unconsolidated Shore	0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope		0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	6	(15)	5	(13)	0	(0)
Depressional	Open Water	0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope		0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		3	(7)	7	(16)	0	(0)	3	(7)
Totals*		44	(108)	76	(187)	60	(148)	46	(114)

Note:
* Includes acreage of wetlands already filled during previous construction activities.

D.3.2 Indirect Impacts

Indirect impacts are impacts that occur later and impacts that could affect the function of wetlands located outside the project footprint. The impact analysis determined the area of indirect effects on wetlands by assuming that all wetlands within 305 m (1,000 ft) of the right-of-way would be indirectly affected by a proposed build alternative. For the Legacy Parkway project, the distance of 305 m (1,000 ft) was selected based on the draft *Peninsular Florida Herbaceous Depressional Wetlands Hydrogeomorphic (HGM) Regional Guidebook* (Trott et al. 1997) and on other studies (Anderson and Ohmart 1986). The severity of each indirect impact would vary according to the type of effect and the distance from the road (Forman et al. 2003). In general, indirect impacts are greatest adjacent to the road and attenuate with distance. Some impacts, such as the effects of dissolved substances and suspended particles, may be manifested primarily within a few tens of meters of the road in uplands but up to 100 to 300 m (328 to 984 ft) in wetlands. Other indirect impacts may extend for thousands of meters, such as the introduction of invasive exotics or effects on wildlife use and movement through the wetland habitat. Although the effects of some indirect impacts may spread well beyond 305 m (1,000 ft), the strength of indirect effects, on average, was assumed to drop to undetectable levels at 305 m (1,000 ft). A separate analysis was carried out for each alternative. Table D-5 summarizes quantitatively the potential indirect impacts in relation to the total area affected under each proposed alternative.

Table D-5 Area of Wetlands Indirectly Affected by Legacy Parkway

		Area in Hectares (Acres)							
Wetland Class	Wetland Cover Type	Alternative A		Alternative B		Alternative C		Alternative D	
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Forested Wetland	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	0	(0)	0	(0)	0	(0)
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Shrub-Scrub	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		0	(0)	0	(1)	0	(0)	0	(0)
Depressional		5	(12)	6	(14)	4	(10)	8	(20)
Groundwater Slope	Marsh	14	(34)	13	(31)	14	(35)	13	(33)
Lacustrine Fringe		31	(76)	83	(205)	75	(185)	26	(63)
Depressional		43	(106)	66	(163)	51	(126)	45	(112)
Groundwater Slope	Wet Meadow	45	(112)	78	(193)	61	(150)	45	(111)
Lacustrine Fringe		24	(60)	64	(159)	58	(143)	31	(78)
Depressional		17	(42)	22	(55)	17	(41)	13	(32)
Groundwater Slope	Playa	2	(5)	12	(29)	15	(37)	2	(5)
Lacustrine Fringe		5	(12)	21	(52)	28	(70)	9	(23)

		Area in Hectares (Acres)							
Wetland Class	Wetland Cover Type	Alternative A		Alternative B		Alternative C		Alternative D	
Depressional		0	(0)	0	(0)	0	(0)	0	(0)
Groundwater Slope	Unconsolidated Shore	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		11	(27)	24	(60)	25	(61)	19	(47)
Depressional		1	(3)	2	(5)	1	(3)	1	(3)
Groundwater Slope	Open Water	0	(0)	0	(0)	0	(0)	0	(0)
Lacustrine Fringe		20	(48)	18	(44)	18	(46)	19	(47)
Totals		218	(539)	409	(1011)	367	(907)	233	(575)

D.3.3 Impacts on Wetland Functions

Impacts on wetland functions were quantified using the wetlands functional assessment models developed for the Final EIS (discussed in Section 4.12.1.2). These impacts were determined by using the wetlands functional assessment to calculate the changes in functional capacity index (FCI) for each wetland under both existing and post-build conditions. The change in wetland function was calculated as the difference between pre-build and post-build FCIs. The impact was calculated as the change in wetland function multiplied by the affected area of wetland. All wetland functions would be reduced to zero for wetlands or portions of wetlands that would be directly affected within the right-of-way. For indirect impacts, each wetland function would be reduced in proportion to the distance from the wetland to the right-of-way. This is because the wetlands functional assessment was based on land use change in the area adjacent to the wetland, and the closer the wetland is to the right-of-way, the greater the area that would be affected.

Because wetlands in the study area are connected hydrologically and are functionally integrated as part of a larger wetland ecosystem, adverse effects on one part of a wetland are expected to spread throughout each wetland complex. The wetlands functional assessment models, therefore, determined the change in each function for an entire wetland. Because the indirect impacts were assumed to drop to undetectable levels at 305 m (1,000 ft), only the area within 305 m (1,000 ft) of the right-of-way was included in the impact calculation. The indirect impact was calculated as the change in wetland function multiplied by the area of the wetland within 305 m (1,000 ft) of the project right-of-way.

Impacts on wetland functions were prepared for each wetland category and each wetland cover type and are summarized below by alternative. Tables D-6 to D-10, which update and supplement Tables 4-20 and 4-22 in the Final EIS, present these impacts quantitatively by wetland function. As noted in Section D.2.2, the information on indirect impacts is presented in this format for convenience only. The functional capacities of different wetland functions are not equivalent or additive.

It should be noted that the wetlands functional assessment models did not incorporate proposed measures for project design features to minimize or avoid project impacts, such as placement of culverts to allow surface flows between the east and west sides of the proposed highway. Because the location and efficacy of these features are not known, the models could not account for any reduction in the expected adverse project effects. Therefore, the results of the wetlands functional assessment represent a worst-case

scenario. Additional details of the wetlands functional assessment are presented in the *Legacy Parkway Wetland Final HGM Technical Report* (Baseline Data Inc. 2000) and in Appendix B2 of the Legacy Parkway Final EIS.

Table D-6 Impacts on Function 1—Maintain Wetland Hydrology

		Loss in Functional Capacity Units (FCUs) (Direct/Indirect Impact)			
Wetland Classes	Wetland Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Forested Wetland	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	0/0	0/0	0/0
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Shrub-Scrub	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	2/1	0/0	0/0
Depressional		1/0	3/1	1/0	1/1
Groundwater Slope	Marsh	0/6	6/5	2/5	1/4
Lacustrine Fringe		6/19	23/63	13/54	5/16
Depressional		32/12	29/19	31/11	30/11
Groundwater Slope	Wet Meadow	11/19	19/50	10/28	8/14
Lacustrine Fringe		3/12	12/53	16/37	4/13
Depressional		2/3	8/7	8/4	6/3
Groundwater Slope	Playa	0/1	4/7	3/9	1/1
Lacustrine Fringe		0/2	3/14	10/16	2/3
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Unconsolidated Shore	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/7	13/15	12/23	0/18
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Open Water	0/0	0/0	0/0	0/0
Lacustrine Fringe		2/4	5/4	0/4	2/4

Table D-7 Impacts on Function 2—Removal of Dissolved Elements and Compounds

		Loss in Functional Capacity Units (FCUs) (Direct/Indirect Impact)			
Wetland Class	Wetland Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Forested Wetland	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	0/0	0/0	0/0
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Shrub-Scrub	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	2/0	0/0	0/0
Depressional		2/1	3/1	1/1	2/2
Groundwater Slope	Marsh	1/5	6/5	2/3	2/2
Lacustrine Fringe		11/5	30/28	14/28	10/6
Depressional		28/9	26/3	27/12	30/13
Groundwater Slope	Wet Meadow	11/19	18/39	10/12	8/16
Lacustrine Fringe		6/2	14/17	20/9	4/3
Depressional		3/2	7/1	8/3	6/2
Groundwater Slope	Playa	0/1	3/4	2/5	1/1
Lacustrine Fringe		1/0	4/4	13/2	2/1
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Unconsolidated Shore	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/3	13/7	12/15	0/12
Depressional		0/0	0/-1	0/0	0/0
Groundwater Slope	Open Water	0/0	0/0	0/0	0/0
Lacustrine Fringe		4/0	9/0	0/1	4/0

Table D-8 Impacts on Function 3—Particulate Retention

		Loss in Functional Capacity Units (FCUs) (Direct/Indirect Impact)			
Wetland Class	Wetland Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Forested Wetland	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	0/0	0/0	0/0
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Shrub-Scrub	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	2/0	0/0	0/0
Depressional		1/1	3/0	1/0	1/2
Groundwater Slope	Marsh	0/6	5/4	2/3	1/3
Lacustrine Fringe		8/13	24/47	12/32	7/9
Depressional		31/15	29/6	30/15	30/12
Groundwater Slope	Wet Meadow	10/20	19/43	9/13	8/10
Lacustrine Fringe		4/6	12/36	17/18	5/6
Depressional		2/7	8/4	8/6	6/5
Groundwater Slope	Playa	0/2	3/5	2/4	1/1
Lacustrine Fringe		1/1	3/10	11/7	2/1
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Unconsolidated Shore	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/7	11/10	10/15	0/14
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Open Water	0/0	0/0	0/0	0/0
Lacustrine Fringe		3/0	7/4	0/1	2/0

Table D-9 Impacts on Function 4—Habitat Structure

		Loss in Functional Capacity Units (FCUs) (Direct/Indirect Impact)			
Wetland Class	Wetland Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Forested Wetland	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	0/0	0/0	0/0
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Shrub-Scrub	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	2/0	0/0	0/0
Depressional		1/1	2/1	1/0	1/2
Groundwater Slope	Marsh	1/5	7/5	2/4	2/3
Lacustrine Fringe		8/-1	21/39	9/27	8/8
Depressional		19/6	19/11	19/7	18/7
Groundwater Slope	Wet Meadow	12/15	19/37	11/18	9/10
Lacustrine Fringe		4/-2	10/27	13/17	4/5
Depressional		2/2	5/2	5/2	4/1
Groundwater Slope	Playa	0/1	3/4	3/5	1/1
Lacustrine Fringe		1/-1	3/8	9/8	2/1
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Unconsolidated Shore	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	7/12	7/12	0/9
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Open Water	0/0	0/0	0/0	0/0
Lacustrine Fringe		3/-4	7/1	0/1	3/0

Table D-10 Impacts on Function 5—Habitat Connectivity, Fragmentation, and Patchiness

		Loss in Functional Capacity Units (FCUs) (Direct/Indirect Impact)			
Wetland Class	Wetland Cover Type	Alternative A	Alternative B	Alternative C	Alternative D
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Forested Wetland	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	0/0	0/0	0/0
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Shrub-Scrub	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/0	2/0	0/0	0/0
Depressional		1/2	2/2	1/0	1/2
Groundwater Slope	Marsh	1/6	6/4	2/5	2/4
Lacustrine Fringe		7/7	20/44	10/29	7/9
Depressional		26/15	24/22	25/15	24/15
Groundwater Slope	Wet Meadow	11/20	19/44	10/34	8/16
Lacustrine Fringe		4/2	10/34	14/23	4/8
Depressional		2/4	6/5	6/3	5/3
Groundwater Slope	Playa	0/1	4/7	3/11	1/1
Lacustrine Fringe		1/0	3/9	9/12	2/2
Depressional		0/0	0/0	0/0	0/0
Groundwater Slope	Unconsolidated Shore	0/0	0/0	0/0	0/0
Lacustrine Fringe		0/3	9/10	8/12	0/12
Depressional		0/0	0/1	0/0	0/0
Groundwater Slope	Open Water	0/0	0/0	0/0	0/0
Lacustrine Fringe		2/-1	6/1	0/2	2/1

D.4 Mitigation Measures

Note: In the Final SEIS, the Wetland Technical Appendix will include a discussion of the adequacy of mitigation measures. This discussion is being developed in consultation with the Corps.

D.4.1 Credit For Preservation

To determine the benefits of preservation on wetland functions, the Final EIS calculated preservation credits for each of the alternative preserve concepts by calculating the difference between FCUs under existing conditions and FCUs under the No-Build Alternative (future 2020 conditions). The future conditions No-Build Alternative described in the Final EIS made the assumption that future development could proceed without filling wetlands, but that there would be a substantial loss of wetland functions resulting from development of adjacent uplands. The wetlands functional assessment models were used to predict the level of loss of wetland functions, based on the assumption that at the current rate of development, all the developable uplands in the study area would be developed by 2020. Under the No-Build Alternative, most wetland functions in the preserve areas would be reduced from 30 to 50 percent by indirect impacts by 2020, even if no wetlands were filled. The prevention of this loss of wetland functions represents the preservation benefit offered by the Legacy Nature Preserve.

In the Final EIS, the number of preservation credits counted for mitigation was discounted by one-half because future development would not be expected to occur all at once and would be spread out between the present and the expected 2020 build-out. The net benefit of preservation would be proportional to the pace of development, i.e., the sooner that development would occur, the greater the benefit would be provided by preservation. Assuming that development would proceed at a linear pace, the benefit at any given time would average one-half that which would be expected if all the development were to occur immediately.

D.4.2 Credit For Restoration

As described in the Final EIS, the wetlands functional assessment models were used to analyze the restoration potential of wetlands in the Preserve. Restoration credits were determined by calculating the difference between FCUs under restored conditions and FCUs under existing conditions. The analysis determined that the amount of restoration possible within the mitigation preserve varied among the build alternatives, ranging from an average increase in wetland function of 34 percent for Alternative B to an average increase of 59 percent for Alternative D. The Final EIS recognized that, because some wetlands in the mitigation preserve were within 305 m (1,000 ft) of Legacy Parkway, there would be indirect impacts from the parkway that would reduce the effectiveness of the mitigation measures. Accordingly, the mitigation credits were debited by the amount of FCUs that would be lost due to the influence of the parkway, as determined from the wetlands functional assessment.