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

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.

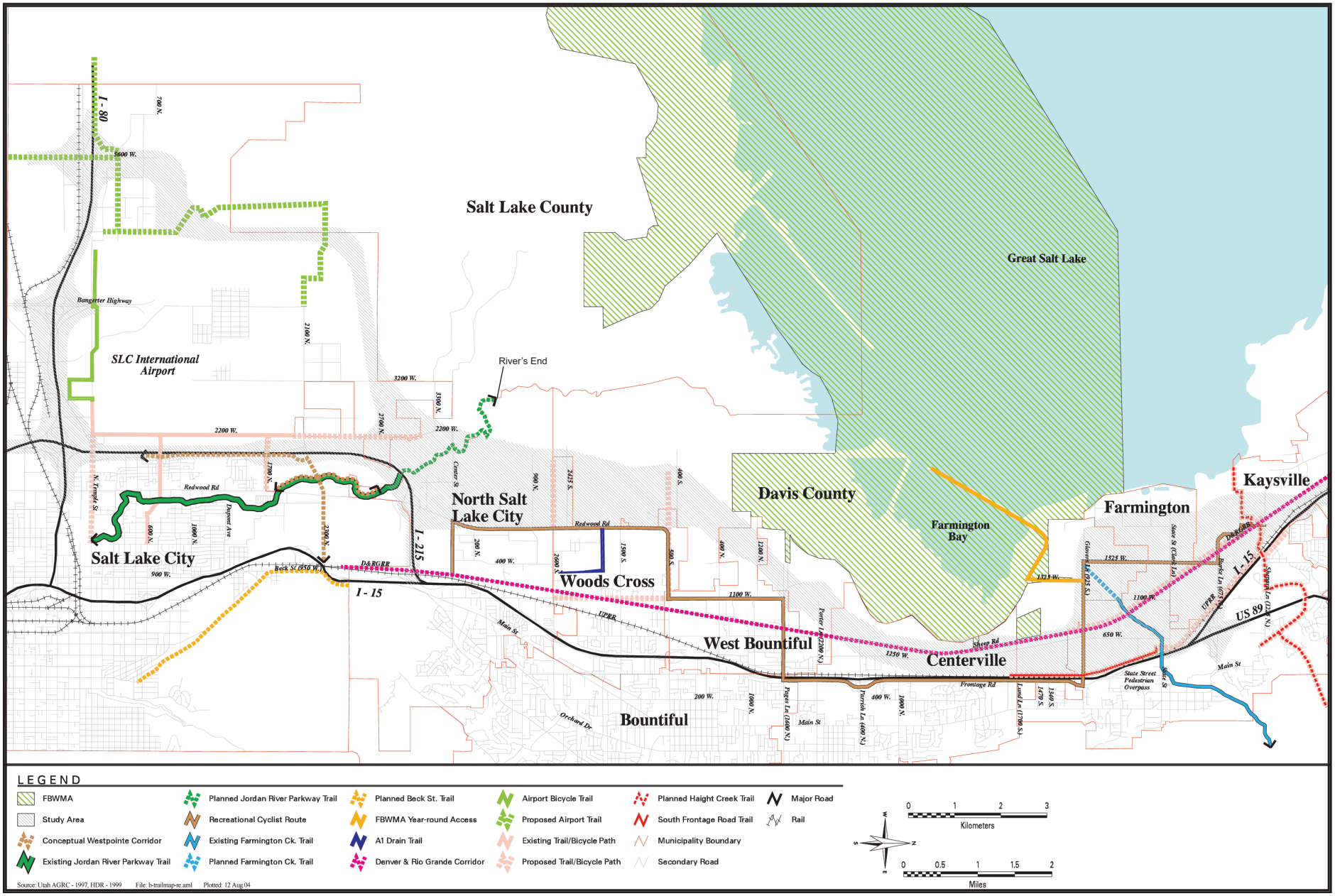

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Figure 4.6-1
Joint Development Opportunities
with Proposed Legacy Parkway Trails and Other Trails

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.

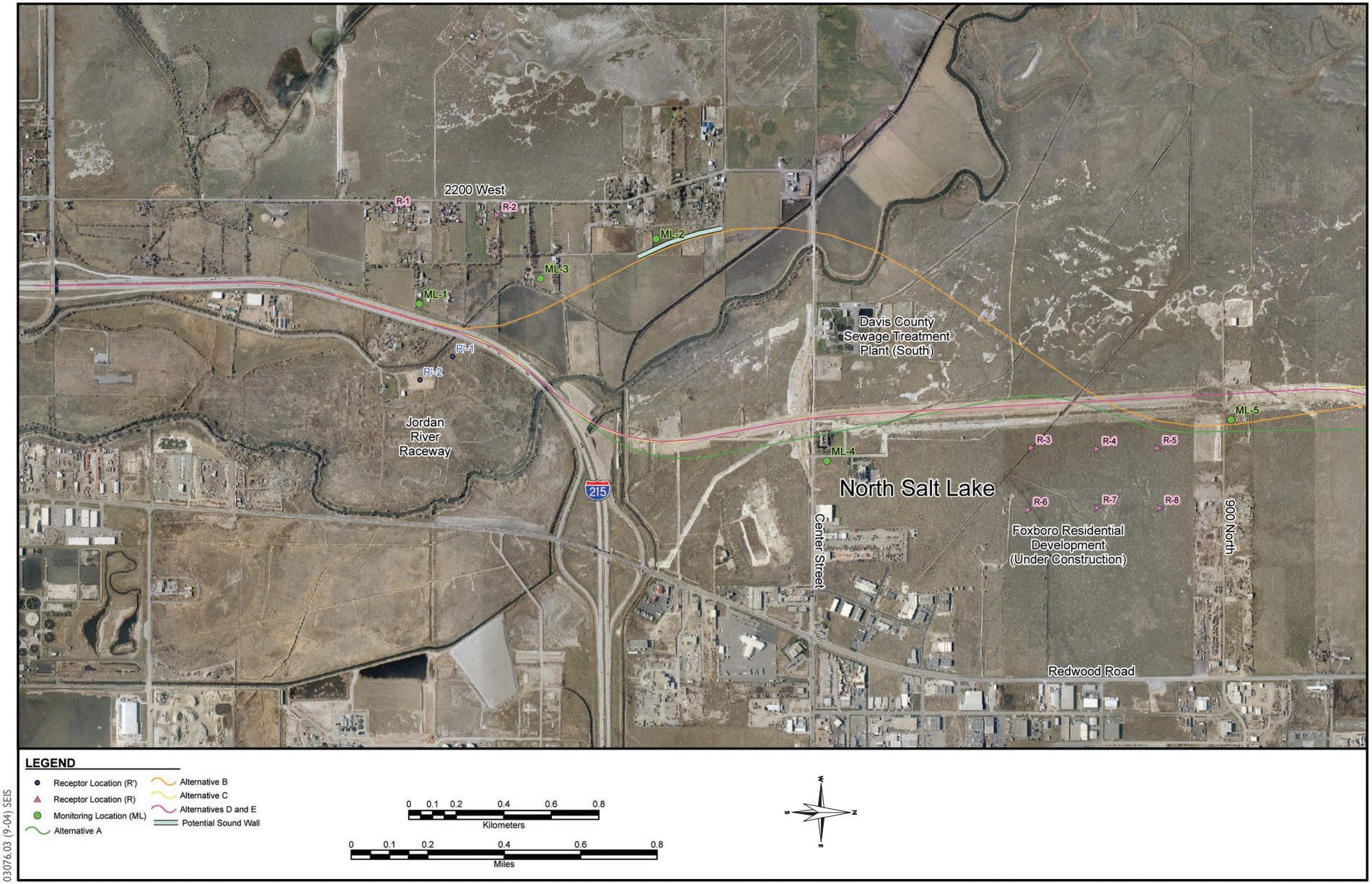
4.9.1.3 Regulatory Requirements

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.

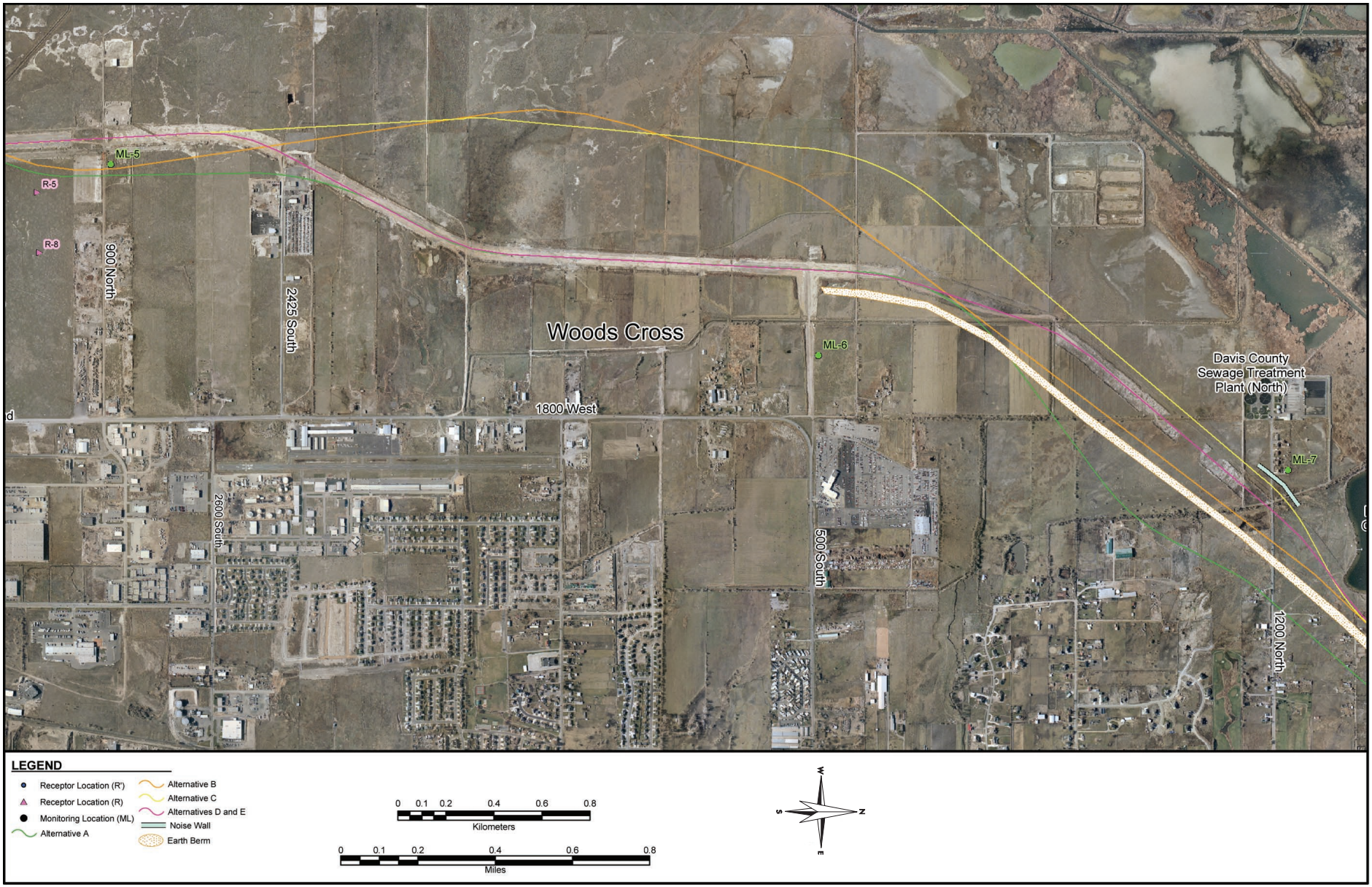
Under 23 CFR 772, a traffic noise is considered an impact when a predicted traffic noise level approaches or exceeds the NAC (see Table 3-21 in the Final EIS) or when the predicted traffic noise level substantially exceeds the existing noise levels. 23 CFR 772 does not specifically define what constitutes 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.