

5.0 SUMMARY OF MITIGATION MEASURES

This chapter describes UTA's proposed mitigation commitments, based on the Final ESR findings for the Preferred Alternative. The final mitigation measures will be included with a Decision Document that UTA will adopt after the release of the Final ESR, and before UTA initiates final design and construction. In addition to the mitigation commitments, UTA is also committed to obtaining all permits and approvals required under local, state and federal law to build and operate the light rail system.

The mitigation measures address impacts identified in the following Final ESR topic areas:

- Land Use
- Socioeconomic Conditions and Impacts
- Air Quality
- Noise
- Ground-Borne Vibration
- Water Resources
- Biological Resources (Wetlands, Vegetation, Wildlife/Fisheries, Threatened & Endangered Species)
- Hazardous Materials and Hazardous Waste
- Historical and Archaeological and Paleontological Sites
- Parklands, Open Space and Recreational Resources
- Visual
- Public Safety and Security
- Construction Impacts
- Transportation

5.1 Land Use

In general, with the exception of direct total and partial acquisition of properties discussed in **Section 3.2**, the overall land use impacts within the project corridor and at proposed station locations would be positive under the Preferred Alternative. Since no major adverse land use impacts are identified, **no mitigation measures are required.**

5.2 Socioeconomic Conditions and Impacts

No adverse effects to socioeconomic conditions would occur, except for impacts related to property acquisitions, displacements and relocations. For all property owners and residents affected by property acquisition, UTA will provide appropriate compensation and assistance, in accordance with applicable law and UTA policy. No individual or family will be required to relocate until adequate, decent, safe, and sanitary housing is available, and relocation assistance will be provided to businesses in finding new space. As UTA does not have the power of eminent domain, UTA will work with West Valley City, South Salt Lake City, and the State of Utah to acquire necessary properties or easements.

5.3 Air Quality

The Utah Air Quality Rules require a dust control plan from all sources whose activities or equipment have the potential to produce fugitive dust or airborne dust along the Wasatch Front. Dust control plans, as outlined in R307-309, are required to minimize fugitive dust on-site from pits, yards, storage areas, and areas of operation and to prevent greater than 10 percent opacity from fugitive dust at the property boundary. The fugitive dust rule, R307-309, addresses storage and handling of aggregate materials, construction/demolition activities on greater than one-quarter acre, roadways, mining activities, and tailings piles and ponds (UDAQ 1999). A plan must be submitted to UDAQ no later than 30 days after the source becomes subject to the rule (UDAQ 2002a). UTA will develop a dust control plan for the construction phase of the proposed project. The dust control plan also pertains to the construction phase of all new parking lots. Dust control measures may include planting vegetative cover, providing synthetic cover, providing watering and/or chemical stabilizations, and/or providing windbreaks. These measures or others will be implemented during construction activities as appropriate.

5.4 Noise

Potential mitigation measures for reducing noise impacts from LRT operation are as follows:

- **Noise Barriers:** This is a common approach to reducing noise impacts from surface transportation sources. The primary requirements for an effective noise barrier are that (1) the barrier must be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) the barrier must be of an impervious material with a minimum surface density of four lb/sq. ft., and (3) the barrier must not have any gaps or holes between the panels or at the bottom. Because numerous materials meet these requirements, the selection of materials for noise barriers is usually dictated by aesthetics, durability, cost, and maintenance considerations. Depending on the proximity of the barrier to the tracks and the track elevation, transit system noise barriers typically range in height from four to eight feet.
- **Track Lubrication at Curves:** Trackside lubrication can be effective in avoiding wheel squeal, which often occurs as light rail vehicles traverse tight-radius curves. Such a system is in fact currently in service on the UTA University TRAX Line. This installation automatically deposits a small amount of biodegradable lubricant on the top of the rail, and has effectively eliminated wheel squeal and associated complaints from nearby residents.
- **Building Sound Insulation:** Sound insulation of residences and institutional buildings to improve the outdoor-to-indoor noise reduction has been widely applied around airports but has seen limited application for transit projects. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable, and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to windows, by sealing any holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened.

As discussed in **Section 3.4.1**, FTA states that in implementing noise impact criteria, severe impacts should be mitigated unless there are truly extenuating circumstances which prevent it. At the moderate impact level, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation.

The recommended residential noise mitigation treatments are presented in **Table 5.4-1**, along with the number of residual impacts that are projected after mitigation. Based on the results of the noise assessment, two mitigation measures are recommended as follows:

Construction of noise barrier walls is recommended to shield some of the areas where noise impact is projected. **Table 5.4-1** indicates the approximate noise barrier locations, lengths, and side of track. At

some affected locations, such as those near grade crossings or in isolated locations, it was determined that noise barriers would not be practical in terms of either noise reduction performance or cost effectiveness.

Sound insulation is recommended for locations where noise barriers would not be practical and where severe noise impact is projected. **Table 5.4-1** indicates one residence that has been identified as a candidate for sound insulation.

Although potential noise impact has been identified at the Redwood Nature Area for the Preferred Alternative, such impact would only occur for prolonged exposure at locations in close proximity to the tracks. Given the transient nature of human activity in this area, and because it would be impractical to reduce LRT noise in such an environment, noise mitigation is not proposed for this nature area. A permit has not yet been issued for the proposed school at the site adjacent to the Islamic Center, and UTA has advised the center that the light rail project will be developed there; thus, noise mitigation is not warranted at this location.

Finally, because LRT wheel squeal is likely to occur at the five proposed 90-degree curves, it is recommended that provision for trackside lubricators be made during project design so that they can be installed if needed after project completion. During final design, details of the mitigation measures will be further refined.

Table 5.4-1: Recommended Residential Noise Mitigation Treatments

Segment	Side of Track	Civil Station	Mitigation Measure	Length (Feet)	Number of Residential Impacts		
					Without Mitigation		Residual Moderate Impacts with Mitigation ²
					Mod.	Sev.	
3100 South	NB	55	None ¹	N/A	2	0	2
Redwood Road to Redwood Nature Area	SB	118 to 124	Noise Barrier	600	3	2	2
	SB	124+50 to 130	Noise Barrier	550	7	0	1
	NB	119 to 124	Noise Barrier	500	3	0	1
	NB	125	Sound Insulation	N/A	0	1	0
	NB	125	None ¹	N/A	1	0	1
Chesterfield Street to Parkway Avenue	SB	153	None ¹	N/A	1	0	1
TOTAL:				1650	17	3	8

¹ Moderate impact noise barrier not practical

² No residual service impacts

5.5 Ground-Borne Vibration

The assessment assumes that the LRT vehicle wheels and track are maintained in good condition with regular wheel truing and rail grinding. Beyond this, there are several approaches to reduce ground-borne vibration from LRT operation, as described below.

- **Ballast Mats:** A ballast mat consists of a pad made of rubber or rubber-like material placed on an asphalt or concrete base with the normal ballast, ties, and rail on top. The reduction in ground-borne vibration provided by a ballast mat is strongly dependent on the frequency content of the vibration and design and support of the mat.
- **Tire Derived Aggregate (TDA):** Also known as shredded tires, a typical TDA installation consists of an underlayment of 12 inches of nominally 3-inch size tire shreds or chips wrapped

with filter fabric, covered with 12 inches of sub-ballast and 12 inches of ballast above that to the base of the ties. Tests suggest that the vibration attenuation properties of this treatment are midway between that of ballast mats and floating slab track. While this is a low-cost option, it has only recently been installed on two U.S. light rail transit systems (San Jose and Denver), and its long-term performance is unknown.

- **Floating Slabs:** Floating slabs consist of thick concrete slabs supported by resilient pads on a concrete foundation; the tracks are mounted on top of the floating slab. Most successful floating slab installations are in subways, and their use for at-grade track is less common. Although floating slabs are designed to provide vibration reduction at lower frequencies than ballast mats, they are extremely expensive.
- **Special Trackwork at Crossovers and Turnouts:** Because the impact of LRT wheels over rail gaps at track turnout locations increases LRT vibration by about 10 VdB, turnouts are a major source of vibration impact when they are located in sensitive areas. If turnouts cannot be relocated away from sensitive areas, another approach is to use spring-rail, flange-bearing, or moveable-point frogs in place of standard rigid frogs at turnouts. These devices allow the flangeway gap to remain closed in the main traffic direction for revenue service trains.
- **Property Acquisitions or Easements:** Additional options for avoiding vibration impacts (and noise impacts also) are for the transit agency to purchase residences likely to be impacted by train operations or to acquire easements for such residences by paying the homeowners to accept the future train vibration conditions. These approaches are usually taken only in isolated cases where other mitigation options are either infeasible, impractical, or too costly.

Vibration impacts that exceed FTA criteria are considered to be significant and to warrant mitigation, if reasonable and feasible. **Table 5.5-1** indicates the locations along the corridor where mitigation is recommended to reduce the vibration levels. The recommended mitigation measure is the installation of TDA for track vibration isolation at specific locations. It is projected that this treatment could eliminate all of the projected ground-borne vibration and noise impacts. During final design details of the mitigation measures will be further refined.

Table 5.5-1: Recommended Locations for Vibration Mitigation

Location Description	Civil Station Location	Recommended Treatment	Treatment Length (feet)
Decker Lake Drive and Research Way	102 – 108	Track vibration isolation (TDA)	600
Redwood Road to Redwood Nature Area	122 – 126	Track vibration isolation (TDA)	400

5.6 Water Resources

Surface Water

As a first step in mitigating impacts to surface water resulting from the Preferred Alternative, the project design and construction teams will identify specific measures to minimize short-term impacts (during construction) and long-term impacts from new facilities. In addition to following applicable regulatory guidelines (some of which are outlined), the project team will implement minimization measures including, but not limited to, the following:

Short-term:

- Minimizing land disturbance and clearing during construction, especially in the vicinity of open channels

- Implementing appropriate construction BMP's developed in conjunction with regulatory agencies and as specified in local ordinances
- Restoring disturbed sites subsequent to the completion of construction
- Maintaining flows in the Jordan River and all canals

Long-term:

- Minimizing activities that would permanently alter the banks, slopes, and riparian areas of surface waterbodies
- Where possible, locating structures outside of the Jordan River Meander Corridor
- Ensuring that all structures that span surface waterbodies (especially the Jordan River) do not have structures located within the ordinary high water level, provide the greatest width practicable for channel migration, and have the COE required 3-feet of freeboard from the 100-year flood elevation to the bottom cord of the bridge
- Meeting or exceeding all flood control and stormwater management requirements
- Notifying and consulting all ditch and canal owners and operators to ensure the Preferred Alternative and its construction do not interfere with their operation

Floodplains

Final design should incorporate measures to avoid adverse effects to floodplain dynamics through construction and/or operation of the proposed project. In accordance with FEMA, berms on which the light rail will be located would be designed to allow floodplain waters to flow around and/or under the elevated track. This system would consist of a configuration of pipes beneath and/or through the light rail's structures, designed to maintain the integrity of the structure while allowing the continued functionality of the floodplain. Additionally, all storage lost due to fill (primarily associated with the track's berm) must be mitigated by creating additional floodplain storage. Finally, the facilities located below the 100-year flood elevation will be designed to minimize the potential for damage that would require extensive repair or cause long-term service disruptions.

Salt Lake County administers the FEMA floodplain ordinance as well as local floodplain ordinances for the Jordan River. According to the Salt Lake County ordinance, any changes to bridge structures along the Jordan River must not increase the 100-year flood event more than one vertical foot. The West Valley LRT Project will comply with all applicable floodplain regulations.

Groundwater

Groundwater rights locations will be verified to ensure that effects to existing points of diversion are avoided and/or mitigated for. Mitigation would include coordinating alternative access points that are suitable to both the Utah Division of Water Rights and the water right holder.

No impacts to groundwater aquifers are anticipated. However, if during construction, groundwater is encountered in areas of known soil contamination, the project will ensure that BMPs and construction methods are implemented that prevent the mixing and potential cross-contamination of soil and groundwater at all appropriate depths.

5.7 Biological Resources (Wetlands, Vegetation, Wildlife/Fisheries, Threatened & Endangered Species)

All impacted jurisdictional wetlands and other waters of the U.S. areas would be mitigated in accordance with the current COE mitigation policies and the conditions of the COE Section 404 Permit. The mitigation strategy for wetlands (in order of preference) is to avoid, minimize, and compensate. All impacted jurisdictional wetlands would be mitigated at a ratio negotiated with the COE, and all mitigation

plans would be developed in coordination with the COE and other appropriate agencies during the Section 404 permitting process.

Per the October 31, 2001, COE Regulatory Guidance Letter (No. 01-1), the COE is taking a holistic “watershed approach” to the mitigation of impacts to waters of the U.S. The letter states that:

“all mitigation required by the [COE] should be based on a consideration of regional aquatic resource requirements. Districts should take an ecosystem approach to the formulation of compensatory mitigation projects, considering the resource needs of immediate and nearby watersheds. Mitigation that includes a mix of habitats such as open water (e.g., streams) as well as wetlands and adjacent uplands is normally more ecologically sustainable.”

Additionally, according to this guidance letter, “compensatory mitigation plans for projects in or near streams or other open waters should normally include a requirement for the establishment and maintenance of vegetated buffers next to open waters on the project site.” The goal of compensatory mitigation would be to improve the overall ecology of the area by replacing the major wetland functions, vegetation communities, and area lost as a result of the project.

In general, a mitigation site would include grading, excavating, seeding herbaceous vegetation, planting woody vegetation (willows and alders), installing check dams to reduce stream flow velocities, and/or other landscaping techniques (including vegetated buffers) to encourage the development of wetland and riparian vegetation.

Potential mitigation sites include an area near the confluence of the Jordan River and Decker Lake Drainage Canal, the Decker Lake area, the Redwood Nature Area, or other lands adjacent to the Jordan River.

The Decker Lake area could provide opportunities for mitigation sites. The areas south and southwest of the lake have been considerably altered by fill and other modifications. The properties to the south of the lake are privately owned and their use would be dependant upon owner cooperation. A property to the southwest of the lake is publicly owned. Mitigation in this area would require an inter-governmental agreement or other arrangement. Existing wetland areas could be enhanced, new wetland areas could be created, and/or former wetland conditions could be restored on this property.

Redwood Nature Area, owned by Salt Lake County, is another potential mitigation site. The NWI mapped a palustrine emergent, seasonally flooded wetland in this area. Existing wetland areas could be enhanced, new wetland areas could be created, and/or former wetland conditions could be restored on this property.

There may be additional opportunities along the Jordan River, Decker Lake Drainage Canal, or near Decker Lake. Further, if available, existing mitigation banks may be used to mitigate project impacts.

5.8 Hazardous Materials and Hazardous Waste

The potential for a hazardous materials impact to occur exists at four locations within the West Valley City LRT corridor due to the presence of hazardous materials releases adjacent to the project corridor.

The project construction will be approached and implemented in a manner that is consistent with applicable state and federal regulations for hazardous materials, and appropriate precautions will be taken against exposure of the public or workers to contaminated materials. Additionally, construction methods will be used to prevent mixing and potential cross-contamination of soil and groundwater from differing depths and locations.

Soil and groundwater sampling should be completed at areas along the project corridor that may already be impacted by hazardous materials and where construction may occur. These data will be used to delineate areas containing hazardous materials so that construction methods may be defined to minimize the potential for adverse impact and to mitigate contaminated areas as necessary for completion of the project. Additionally, in areas known to contain hazardous materials, the project design will focus on

avoiding contact with impacted media. Engineering controls (e.g., dust mitigation, temporary soil covers, and groundwater extraction) and personal protective equipment for construction workers will be used to reduce the potential for public or worker exposure to hazardous materials.

If media containing regulated contaminants is encountered during construction, coordination with Utah Department of Environmental Quality (UDEQ) and EPA will be implemented. If contaminant concentrations in the media exceed state or federal action levels, the areas involved will be evaluated for appropriate response actions. All actions will be coordinated with the appropriate state and/or federal regulatory agencies. It should also be noted that if contact with hazardous materials occurs during construction, completion of the Preferred Alternative will result in a condition of decreased potential for future exposure because of removal and capping (pavement, clean material, new railroad track, and ballast) of hazardous materials.

5.9 Historical and Archaeological and Paleontological Sites

There is some potential for discovery of prehistoric or historic archaeological resources during construction activities. Therefore, prior to construction, a program for monitoring the site for discovery of potential archaeological resources would be developed. Ongoing coordination with the SHPO would be maintained for the duration of the project. In the event such discoveries are made, work would stop and the SHPO would be notified at the earliest possible time with details of the discovery. A response to the discovery would be developed by UTA officials in coordination with the SHPO. Tribal representatives, Ms. Timbimboo Madsen, cultural resource director for the Northwestern Band of the Shoshone Nation, and Leon Bear, chairman of the Skull Valley Band of the Goshute, requested to be notified in the event of any unanticipated discoveries during the construction of the transit project. The Memorandum of Agreement (MOA) with the SHPO outlines specific stipulations for mitigation measures to be agreed upon by the UTA, SHPO, and other parties.

Appropriate mitigation of impacts to listed and eligible cultural resources is being coordinated with the SHPO and representatives of the affected communities. Proposed measures to minimize the effects of the project on the historic qualities of these properties include: ensure the impacted properties are documented to Utah State Intensive Level Survey Standards and further documentation in an Intermountain Antiquities Computer System site format.

To further ensure that implementing the Preferred Alternative would not impact historic, archaeological, or paleontological properties indirectly, a special provision (Limitation of Operations) will be added to the construction contract. This special provision prohibits any ground-disturbing activities by the construction contractor outside of the area of effect, as shown in the design plans. Archaeological monitoring will occur during construction. The UTA has planned for “discovery” situations by developing a formal process outlined in their discovery procedures.

5.10 Parklands, Open Space, and Recreational Resources

West Valley City Crosstowne Trail (Crosstowne Trail)

With replacement of the trail, no long-term impacts are anticipated, and no mitigation would be required.

Jordan River Parkway Regional Trail.

No impacts are anticipated and no additional mitigation would be required.

Redwood Nature Area

While the project may require revisions to the Chesterfield Street access point to the Redwood Nature Area, access is expected to be maintained, and no further mitigation is anticipated. Mitigation for the use of the triangular parcel owned by the county would be developed in negotiation with Salt Lake County as a condition for the use of the county’s property.

During construction for the Preferred Alternative, there may be periods of time when access to these recreational resources is disrupted. Public notification and appropriate signs would be strategically placed to inform users of these facilities and to suggest alternative facilities or access routes. The construction impacts are not expected to be high, since most trail users are moving along the trail either on foot, bicycle, or rollerblades, and the disturbance would only be temporary. This would be similar to periods when the county conducts dredging and other waterway maintenance activities along the Jordan River and Decker Lake Drainage Canals, when heavy equipment is in operation.

5.11 Visual

The project would feature several urban design elements that would minimize the visual change that would be introduced by the project. For instance, the project would include landscaping and hardscapes around the stations, and the addition of decorative lighting. In corridors where landscaping and groundcover would be removed (such as along city streets or in the Redwood Nature Area), UTA would work with the local jurisdiction to determine appropriate replanting and relandscaping treatments. Impacts would also be reduced by revegetation and restoration measures within the Redwood Nature Area, particularly near streams and wetlands, which would help screen the corridor from adjacent areas. The revegetation measures would be developed consistent with the mitigation recommendations for water resources and biological resources. Along portions of the Crosstowne Trail corridor, noise walls will be required to mitigate noise impacts, and fencing would be needed to separate the rail right-of-way from the LRT. These features would help to screen the corridor from nearby properties. UTA will work with West Valley City and neighborhood residents to determine design treatments for the walls and fencing that could help enhance visual continuity along the corridor and reflect the neighborhood context. In the West Valley City Center Station area, light impacts from trains on trail tracks could be mitigated by screening with a train bumper or other physical screening or by other measures to reduce the effect of train headlights on nearby residences.

5.12 Public Safety and Security

Police and Fire Protection Services

Under the Preferred Alternative, UTA would work cooperatively with local emergency service providers to ensure that adequate numbers of police, fire, and other emergency response personnel will be available to respond to events along the light rail line. Such fire/life/safety programs are already in place throughout the TRAX system, and would be expanded to include the West Valley LRT project and the local jurisdictions involved. The new stations would be designed to incorporate measures known to deter criminal activities. This includes measures to provide for effective lighting and high levels of openness and visibility at the station, and adjacent areas. Fencing or berms would be installed along open areas on the length of the tracks to reduce public access. At-grade crossings would be designed using elements such as tactile strips, signing, gates, bells, or other warning devices to alert pedestrians and vehicular traffic to the presence of oncoming trains.

The project is already minimizing impacts of right-in and right-out restrictions by adding mid-block signalized intersections when applicable, which would be designed to allow U-turns. The effects on the emergency vehicle transit time in the area of the transit corridor would be expected to be minimal. UTA will work with the fire and police departments of both cities to maintain adequate emergency access where light rail would alter conditions. On an ongoing basis, UTA will coordinate with emergency service providers through UTA's existing fire/life/safety committee to develop plans, procedures, and training for light rail emergencies. At site-specific locations where access would be restricted or altered and where unique conditions for emergency response exists, including at the UPRR Roper Yard, UTA will work with local emergency service providers to identify alternative access routes, and develop localized emergency response plans and procedures.

Schools

The project will incorporate traffic control devices where applicable to minimize potential conflicts. The Lester Street crossing will be served by vehicular crossing gates and warning lights/bells. These devices will also warn pedestrians of oncoming trains. This crossing will be designed to meet safety standards for school children and other pedestrians or bicyclists needing to cross the light rail line at Lester Street. Pedestrians and school children crossing 2700 West and/or 3100 South to get to Stansbury Elementary School would be served by a traffic signal. Maple Way will be signalized and will also include a two-quadrant gate system installed to stop vehicles. Pedestrians will be warned of approaching trains by flashers and bells installed in each direction. Additionally, pedestrian flashers and bells will be installed on the east sidewalk of 2700 West, where the train will turn 90 degrees onto the south side of 3100 South. UTA also conducts outreach to local schools to provide education about light rail systems and to reinforce safe pedestrian behavior. UTA will use the Light Rail safety presentations from the National Operation Lifesaver Program to educate schools in both driver and pedestrian safety along railroad corridors. Through this cooperative program, students will be taught how to safely cross the railroad corridor. They will also be taught that it is illegal to walk on the tracks and that it is a dangerous place to be, similar to a busy street. UTA will implement a media campaign using “Train for Safety” to alert the public and schools before opening the new line.

5.13 Construction Impacts

Air Quality

Construction activities would result in fugitive dust emissions along the project corridor. The Utah Air Quality Rules require a dust control plan from all sources whose activities or equipment have the potential to produce fugitive dust or airborne dust along the Wasatch Front. Dust control plans would be developed and implemented to minimize fugitive dust on-site from pits, yards, storage areas, and areas of operation, and to prevent greater than 10 percent opacity from fugitive dust at the property boundary.

Noise and Vibration

The construction process for the Preferred Alternative would involve the use of equipment and vehicle operations that result in high noise levels and, less commonly, high vibration levels adjacent to the construction sites. Based on average equipment levels published by the EPA, the levels expected at 50 feet from the construction would be over 80 dBA, a significant increase over existing levels in the study corridor. The use of especially noisy equipment, such as pavement breakers, scrapers, and pneumatic tools, would be common. Vibration level increases could also be significant for a few of the construction operations, and vibration may become perceptible in buildings adjacent to the work. **Table 5.13-1** shows typical construction equipment noise levels at 50 feet.

Table 5.13-1: Typical Construction Equipment Noise Levels at 50 Feet

Equipment Type	Peak Noise Level (dBA)	
	Range	Average
Backhoes	74-92	83
Front End Loaders	75-96	85
Dozers	65-95	85
Graders	72-92	84
Scrapers	76-98	87

Source: Highway Construction Noise: Measurement, Prediction and Mitigation, Special Report HEV-21, US Department of Transportation, FHWA, Office of Environmental Policy, 1977.

Several means are available for the control of noise impacts during construction. Noise control devices, such as engine or exhaust mufflers or acoustic casing enclosures, are commonly used. Physical barriers along the edge of the construction zone could be added for most operations (noise from trucks, mixers,

etc., could not be controlled in this way). Together, these means would reduce noise levels 5 to 10 dBA and bring noise levels below 80 dBA for the majority of the construction equipment.

Vibration impacts generally would be less severe than noise impacts, since levels created by normal movement of construction vehicles would be on the same order of magnitude as that created by heavy trucks and buses that already operate on the streets. These levels are generally imperceptible in buildings and produce little or no impact. Vibration caused by pavement breakers and vibrators may be more significant, but not to the point of causing building damage.

Construction specifications would clearly spell out limitations on activities expected to cause high levels of both noise and vibration. Included in this should be careful scheduling of construction activities in sensitive areas.

Impacts during the construction period are expected to be minor throughout the corridor. There are areas in which the construction activities would be very close to residences in the vicinity of the Decker Lake Drainage Canal and Crosstowne Trail and along 3100 South and 2700 West.

The use of high-noise construction tools, such as pavement breakers, scrapers, and pneumatic tools, would occur during daytime hours as much as possible. Additionally, where sound walls are required to address long term impacts, they should be installed as early in the construction process as possible to minimize the impact on local residents. UTA would also follow all local noise ordinances.

Surface Water

During construction, temporary degradation of water quality in the Jordan River and nearby canals is anticipated due to sedimentation increases from stream/canal bank disturbance and increased sediment in stormwater runoff. These disturbed areas may also cause an increase in suspended solids and nutrient loading from exposed areas. Construction activities may also introduce pollutants such as oil and grease from construction equipment. Implementation of temporary and permanent BMPs would help mitigate any impacts to water quality from construction activities. The following actions would be implemented:

- Implementation of a stormwater pollution prevention plan that reduces sediment production and flow, and addresses all state and federal stormwater requirements.
- Revegetation of exposed soil to help minimize the establishment of non-native species to disturbed areas, along with construction of erosion and sediment control features such as fiber mats, catch basins, silt fences, and sediment barriers.
- Where construction activities will disturb one acre of land or more, the design will comply with the Utah Pollutant Discharge Elimination System permit requirements as regulated by the Utah Division of Water Quality

Vegetation

Corridor and station construction activities would result in temporary and permanent impacts to vegetation. Some vegetation would be removed during cut and fill and other construction activity, but the affected areas would be revegetated at the end of construction as appropriate.

Hazardous Materials

The possibility of encountering contamination exists at all UST, LUST, and CERCLIS sites in the project area. If contamination were encountered during construction, mitigation and disposition of any hazardous material would take place according to UDEQ guidelines.

Utilities

There may be temporary utility impacts such as service disruption during construction activities. All affected utility companies would be contacted, and proper coordination would ensure minimum disturbance to system users.

Historic and Cultural Resources

A MOA between UTA and SHPO regarding mitigation of impacts to historic properties (including Native American archaeological resources) is pending and will govern UTA's responsibilities for mitigation. If any cultural resources were encountered during construction, construction would cease, and materials would be evaluated in accordance with Section 9-8-307 Utah Code Annotated and the terms of the MOA.

5.14 Transportation

Station Area

Given the measures already incorporated within the project, added mitigation is not needed. Project features include; station access restrictions, traffic control, and signal control at the access points. These measures include not only controls for automobiles, but for bikes/pedestrians as well. Particular design care and access management attention will be given to stations that are in the center of the road to allow people to move efficiently and safely to and from the LRT while maintaining operation of through vehicle and pedestrian traffic.

Traffic Impact Analysis at Crossings

The impact of the West Valley City LRT corridor on the at-grade roadway crossings was evaluated using traffic volumes, operational characteristics of the transit system, and roadway geometry.

The widening of Constitution Boulevard to accommodate the LRT and four lanes of traffic may make it difficult to maintain some back-yard accesses due to the potential elevation differential between the road and the properties. During final design, UTA will work with individual property owners with separate private residential properties with minor accesses onto Constitution Boulevard to determine if access can be maintained or if other mitigation is needed.

Mitigation of the impacts includes appropriate design of interchange signal modifications at 900 West and widening of Constitution Boulevard to maintain two travel lanes in each direction. Both of these measures are part of the Preferred Alternative.

E Center Special Events

In order to allow for the continued use of the north E Center access onto 3100 South for event traffic, a gate will be provided at the north access/egress driveway. This will maintain the ability to use the north access as a traffic release valve after major events. UTA will also coordinate with West Valley City/E Center staff to modify the E Center event traffic management plans and procedures to specifically accommodate light rail. Typical features for light rail include signage, lighting, and training for traffic control personnel.

Parking

For off-street parking loss, UTA will provide for replacement or will provide compensation as described for property acquisitions discussed in **Section 5.2**. No mitigation is required. For on-street parking, signage around LRT stations to prohibit parking can be used, especially where sight distances might be impacted if automobiles were located along the streets. To reduce the potential for transit parking in residential streets, limited-duration parking or other measures could be applied, in coordination with West Valley City.

Bicycle and Pedestrian Facilities

With the design features of the Pictured Alternatives, no long term impacts would require mitigation. The construction period is the critical time when disruptions are likely to occur along bicycle and pedestrian facilities. Detours may be warranted at certain crossings during the construction phase. If detours are implemented during construction, they must be made as convenient as possible, keeping safety as the top priority. Additional signage around LRT crossings would also help mitigate possible problems where bicycle routes cross LRT tracks, such as at Redwood Road, Constitution Boulevard, and 3100 South.

UTA would continue to coordinate with Salt Lake County Parks and Recreation as well as city governments on the design of pedestrian and bicycle facilities, in conjunction with the transportation improvements described in the Preferred Alternative.

Mitigation for impacts to existing trails would consist of temporary trail detours that would maintain the use of the trails during construction, and new connections would be provided after the project is constructed.

Railroad Operations

With the proposed design, potential impacts to safety are minimized, and no additional mitigation is required.

Construction Mitigation

With the development of construction traffic control plans and the use of best practices for signage, flagging, and traffic control and staging, construction traffic impacts would be minimized. No added mitigation is recommended.