U.S. Department
of Transportation
Federal Transit Administration

REGION VIII
Colorado, Montana,
North Dakota,
South Dakota,
Utah and Wyoming

1961 Stout Street
Suite 13301
Denver, Colorado 80294
(303) 362-2400 (voice)

August 5th, 2025

Mr. Carlos Braceras
Executive Director
Utah Department of Transportation
4501 South 2700 West
P.O. Box 141265
Salt Lake City, UT 84114-1265

Re: NEPA Approval for the **FrontRunner Forward Program – North of Provo Double Track Project**

Dear Mr. Braceras:

Thank you for providing the environmental documentation for the FrontRunner Forward Program – North of Provo Double Track project. The project is planning to utilize Federal Transit Administration (FTA) Capital Investment Grants (CIG) Program funding to add 0.7 mile of new double track to the existing FrontRunner commuter rail system from north of Provo Central Station to just north of 900 West in Provo in Utah County, Utah.

FTA funding is requested for new double track along the existing commuter rail system. The proposed track work consists of approximately 0.7 mile of a new UTA mainline (ML) track number (No.) 2, shifting approximately 700 linear feet of the existing ML No.1 track, constructing an approximately 1,200 linear-foot retaining wall, extending one storm drain culvert to accommodate the widened track bed, removing existing turnouts at both ends of the project extent, relocating utilities including three signal houses, and widening the existing track bed. A universal crossover, consisting of two back-to-back crossovers, is proposed between the 500 West and South Freedom Boulevard/200 West grade crossings.

Based on the findings of the Categorical Exclusion (CE) for the project, FTA understands the following mitigation measures will be implemented:

- All acquisition and construction easements will be conducted in accordance with the provisions in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC §61 and the implementing regulation 49 CFR 24). Following these provisions will ensure just compensation for all properties and will minimize any impacts on the current owners and residents.
- A detailed noise assessment including the feasibility of noise mitigation will be conducted during final design.
- A detailed vibration assessment will be conducted during final design and will consider both infrastructure changes and service increase to determine reasonable and feasible mitigation. In addition, any ballast mat under existing track will be replaced where existing track is being shifted.
- In accordance with FTA's standard operating procedures and applicable regulatory requirements, UTA and UDOT will conduct environmental due diligence by ATSM standards during the final design of the Project to identify whether hazardous materials are present before property acquisitions and construction occur.
- Plans for hazardous materials handling and disposal will be developed for the project and will comply with the Materials Management Plan for Utah Transit Authority Rail Corridor (January 14, 2025). Developing these plans will include coordination with state and federal agencies with jurisdiction over the properties.

- If contamination is identified (after completion of the Phase I ESA and Phase II [if needed] ESA), a soil and groundwater management plan will be developed before construction.
- Prior to demolition, buildings will be surveyed for asbestos containing materials, lead-based paints, and other potentially hazardous materials, as warranted. After inspection and testing, if needed an abatement plan will be developed for the safe removal, handling, and disposal of any identified hazardous materials.
- Coverage under Utah's Construction General Permit UTRC00000 (CGP) will be applied for as required for the project. In compliance with this permit, a stormwater pollution prevention plan (SWPPP) will be developed for the construction phase of the project.
- Coverage will be obtained +for construction dewatering under Utah's General Permit for Construction Dewatering or Hydrostatic Testing (UTG070000) or a Ground Water Discharge Permit pursuant to state groundwater protection rules (Utah Administrative Code R317-6), as required.
- Any shrub, tree, or tree limb removal will occur outside a general bird nesting season from April 15 to July 31. If removal must occur during this period, a qualified biologist will perform preconstruction nesting surveys of affected trees. If active nests are found, removal cannot occur until young have been confirmed to have fledged.
- All utility relocations will be coordinated with the utility owner during the final design of the project to ensure the safety and continuity of utility service during construction.
- Work will be scheduled to minimize impacts to the passengers and roadway traffic (nights, weekends, holidays). If necessary, bus bridges will be provided for continuation of service.
- Mitigation to control fugitive dust and stormwater runoff will be implementation during construction. UTA and UDOT (or its construction contractor) will submit a Fugitive Dust Control Plan to the Utah Division of Air Quality.
- A public communication plan will be developed to coordinate construction activities with local residents, stakeholders, and businesses that could be affected by construction. Any changes to transit service due to construction will be communicated to riders.
- Construction will comply with UDOT's Standard Specification Section 02498 (Vibration Monitoring during Construction) that will direct monitoring vibration at susceptible facilities adjacent to construction areas where construction activities are generating high-intensity vibrations (pile driving, heavy compaction equipment, or demolition).
- UTA's standard commuter rail design criteria will be followed to ensure that the Project meets safety and security requirements. These criteria include the supplemental safety measures (SSM) and/or alternative safety measures (ASM) at each affected grade crossing to maintain the established quiet zone. UTA's activation processes will be followed; these processes include several safety and security reviews and a potential hazard analysis to ensure that the design includes typical and site-specific safety and security measures.

Based on the documentation provided by your office, FTA concurs with the finding that the proposed project meets the definition of a CE pursuant to 23 CFR §771.118(d) "other". If you have any questions regarding this finding, please contact Robyn Kullas in my office at Robyn.Kullas@dot.gov or (303)362-2389. Please keep FTA informed of any changes to the project, should they occur.

Sincerely,

David Beckhouse
Deputy Regional Administrator

Cc:
Brian Allen, Utah Department of Transportation
Jay Fox, Utah Transit Authority
Janelle Robertson, Utah Transit Authority
Patti Garver, Utah Transit Authority
Autumn Hu, Utah Transit Authority

FTA REGION 8
CATEGORICAL EXCLUSION WORKSHEET

FTA Region 8 provides this Categorical Exclusion (CE) worksheet to help project sponsors (recipients) comply with the National Environmental Policy Act (NEPA). The information collected will help to better define the project scope for environmental analysis, identify potential impacts, and determine if other environmental laws and permits apply. If sufficiently completed, it can enable FTA to determine that the project does not result in significant environmental impacts and meets the criteria for a CE. All activities and projects to be supported with federal funds require a NEPA environmental finding as a prerequisite to award of funds.

This CE Worksheet should be completed for C-List projects involving construction and *all* D-List projects. **If a C-List project does not involve construction, you do not need to complete this worksheet.** All parts below must be completed prior to FTA review. Compliance with other environmental requirements must also be completed before FTA will issue a determination that the project meets the criteria for a CE. Certain project activities may not begin until this process is complete. For guidance on completing this worksheet, please refer to the CE Worksheet Instructions.

Prior to transmitting a grant application, complete and submit this CE Worksheet using the CE Worksheet Instructions allowing sufficient time for FTA review, especially if other environmental laws or permits apply. For assistance, please contact your assigned FTA Region 8 Pre-Award Manager, or you may call the office at 303-362-2400. To "check" a box, double-click on the box and select "checked" under default value.

PART A: PROJECT INFORMATION

Project Sponsor *Utah Department of Transportation*	FTA Application No/FAIN *CIG*
Project Contact (include mailing address, email address and phone number) *Autumn Hu, NEPA Project Administrator* *Utah Transit Authority* *669 West 200 South* *Salt Lake City, Utah 84101* *ahu@rideuta.com* *(385) 419-9189* *Brian Allen, Transit Project Director* *Utah Department of Transportation* *4501 South 2700 West* *Taylorsville, Utah 84129* *brianja@utah.gov* *(385) 414-1092*	
Project Title *North of Provo Double Track Project – FrontRunner Forward Program*	

Project Description

The Utah Transit Authority (UTA) and Utah Department of Transportation (UDOT) are proposing to lengthen and shift the existing double track in the North of Provo section of the FrontRunner commuter rail system in the city of Provo in Utah County, Utah, to create a true double-track alignment through this area. See the Vicinity Map in Attachment A.1, Vicinity Map for the North of Provo Double Track Project.

The North of Provo Double Track Project (Project) is one of several projects included in the first phase of long-term improvements under the FrontRunner Forward program (the first phase is also known as the FrontRunner 2X project); however, the Project has independent utility and can be constructed with or without the other projects. Further details about investments associated with the FrontRunner Forward Program are included in a separate report, FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL) (UTA 2025).

The double-track would be constructed north of Provo Central Station and extend along the FrontRunner corridor until merging with the existing double track just north of 900 West in Provo. The Project extends from UTA milepost S 43.2 south to UTA milepost S 43.9, a distance of about 0.7 mile.

Constructing this Project would complete the double track from Orem Central Station to Provo Central Station. The anticipated track work would consist of constructing a new UTA mainline (ML) track number (No.) 2 south of the existing UTA ML No.1, shifting approximately 700 linear feet of UTA ML No. 1 track, constructing an approximately 1,200 linear-foot retaining wall, extending one storm drain culvert to accommodate the widened track bed, removing existing turnouts at both ends of the project extent, relocating utilities including three signal houses, and widening the existing track bed. A universal crossover, consisting of two back-to-back crossovers, is proposed between the 500 West and South Freedom Boulevard/200 West grade crossings. At multiple locations in the Projects double track section, the proposed top of rail is about 4 to 6 feet above the existing ground, resulting in the bottom of the proposed subballast being above the existing ground surface, clean fill would be imported to make up the difference. However, some excavation could still be required to provide suitable track embankment support depending on the existing ground conditions, to relocate utilities, and to provide surface water crossing and storm drainage infrastructure. The estimated depth of excavation for utilities ranges from 7 to 8 feet.

UTA ML No. 2 would be constructed with 15-foot track spacing south from UTA ML No. 1. Currently, the existing UTA ML No. 1 is designed for 45 miles per hour (mph) through the entire section. The curves and spirals for the proposed UTA ML No. 2 through this section would also be designed for a 45-mph design speed. However, the proposed crossovers would have a 30-mph design speed because the space available is constrained. Communications and signal modifications, including new signal houses, within the existing and proposed UTA right-of-way would be required. Required utility relocations will be determined during final design. The concept design is based on the 30% design plans that were submitted to UTA in February 2025. For the conceptual design plans, see Attachment A.2, Conceptual Design Plans for the North of Provo Station Section.

Throughout this worksheet and associated technical reports, the term "project extent" is used to describe the general study location and limits of the Project. The term "evaluation area" is used to describe the area within which a specific resource was evaluated for potential impacts due to operating and constructing the Project. In all cases, the evaluation area is defined under each applicable resource discussion. In the case of cultural, historic, and archaeological resources, the "area of potential effects" serves as the evaluation area. The term "design footprint" is used to describe the concept project design. The design footprint was used to assess direct impacts to resources and includes the anticipated limits of physical disturbance, including space for potential temporary construction workspaces, and the limits of anticipated right-of-way and temporary easement acquisition.

Project Location (Include physical address)

The Project is a linear project along the FrontRunner corridor between UTA milepost S 43.2 south to UTA milepost S 43.9 in Provo, in Utah County, Utah.

See the Vicinity Map in Attachment A.1, Vicinity Map for the North of Provo Double Track Project.

Is this project included in the current approved TIP and/or STIP?

☒ YES – TIP/STIP ID/Page No.: ☐ NO – When will it be added?

The North of Provo Double Track Project is included in the Mountainland Association of Governments Transportation Improvement Program (TIP) (PIN 20253, UDOT PIN 21213).

Is this a re-evaluation of a project previously evaluated/approved or currently under construction?

☒ NO
☐ YES

PART B: PROPOSED CATEGORICAL EXCLUSION DETERMINATION

Select the CE category under 23 CFR 771.118(c) or (d) that best describes the proposed project (select only one). FHWA and FRA CEs also may be used, if applicable. CE descriptions are included in the CE Worksheet Instructions.

CE (e.g., C-9 or D-6): *FTA D-Other.*

PART C: ENVIRONMENTAL EVALUATION

For each of the following resources, identify, evaluate and describe any adverse impacts to the built (including social and economic) and natural environment resulting from the proposed project. Select NO, if a resource is not present on or near the proposed project area, or if there are no adverse impacts. Select YES, if a resource is present and will be impacted; and succinctly describe the impacts, any mitigation necessary to minimize impacts, and any permits required. Please explain your answer. The level of detail you provide should be commensurate with the complexity of the project. For guidance on how to evaluate each resource for impacts, see the CE Worksheet Instructions. If, through your evaluation, you believe the project *will* result in significant environmental impacts or you aren't sure, and/or it is likely to generate substantial controversy on environmental grounds, contact FTA Region 8.

1. Land Use and Zoning

Is the proposed project incompatible or inconsistent with existing or future land use and/or zoning in the project area? Describe the surrounding land use and zoning. Provide a map with project location and surrounding land uses.

☐ NO
☒ YES

The Project is located in a developed area with urban and agricultural land uses and a mix of residential, manufacturing, public facilities, and commercial zoning types in the immediate vicinity of the project extent. The land use and zoning evaluation area is defined by a 0.5-mile buffer around the project extent. The Project would convert approximately 2.8 acres of urban land use to transportation use. The zoning types along the project extent that would be converted consist primarily of residential, interim transit-oriented development, and commercial land uses.

Part of the land conversion includes relocating five residential, multi-unit buildings on the west side of the FrontRunner corridor that are in the residential conservation (RC) residential zone (see Section 2 below for more detail). The RC zone is defined as a zone intended to encourage the conservation of existing housing by limiting the use of a given lot or parcel to the legal use existing. Although the conversion of RC zoning to a transportation use is not consistent with the intent of the RC zone, the residential parcels are located immediately adjacent to the FrontRunner corridor, and the conversion of these residential parcels to a transportation use would occur along an existing and active rail line and is compatible with surrounding land uses.

While the majority of the proposed Project facilities (track and related infrastructure) would be constructed within the existing rail corridor, minor land use changes needed to accommodate the Project would be consistent with local and state priorities and regional transportation plans for the area.

See Attachment B.1, Land Use and Zoning, for maps showing the surrounding land uses and zoning.

2. Land/Property Acquisition, Relocation, Leases and Easements

Does the proposed project require any land/property acquisition, easement or permit? Note: for acquisitions over $1 million, FTA concurrence with the property's valuation is also required (see Circular 5010.E). Explain.

☐ NO
☒ YES

Permanent property acquisition would be needed for the Project, and temporary construction easements would be required for demolishing buildings, constructing retaining walls, grading, and access.

The Project would require about 2.46 acres of permanent right-of-way and would relocate five multi-unit residential buildings that together include 20 individual residences. The right-of-way would be acquired from Provo City and residential and from owners of commercial properties adjacent to the railroad corridor.

At this preliminary level of design, UTA and UDOT do not know exactly where all temporary construction easements would be needed. However, the design footprint used to assess impacts to right-of-way includes the anticipated limits of physical disturbance, including space for potential temporary construction workspaces, and the limits of any anticipated right-of-way and temporary easement acquisition. Actual locations of all temporary construction easements will be determined during the final design of the Project. UTA and UDOT will compensate the property owners for the temporary use of the property, and the restored property will be returned to the owner when the use of the property is no longer needed.

UTA and UDOT will conduct acquisitions in accordance with the provisions in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC §61 and the implementing regulation

49 CFR Part 24). Following these provisions will ensure just compensation for all properties and will minimize any impacts on the current owners and residents.

See the Land and Property Acquisition, Relocation, and Easements for the North of Provo Double Track Project memorandum in Attachment B.2.

3. Community Impacts

☒ NO

☐ YES

Because the FrontRunner commuter rail system and freight track are already in place and operating, adding double track would not significantly change the area's character. UTA and UDOT anticipate that the Project would not adversely impact neighborhoods or communities because the communities were built around Union Pacific's railroad corridor (constructed in 1883), which still operates freight service today and is adjacent to the existing FrontRunner rail corridor. Provo City personnel said, at a meeting held in August 2024, that the Project would not have a major effect on the community.

Much of the urban development in this part of Provo built up around the existing rail corridor, meaning that the Project would not impact the physical or social fabric of the broader community. The project would not isolate any portion of a neighborhood nor would the Project affect community cohesion because the existing neighborhoods and communities in the evaluation area were built on both sides of and adjacent to the existing rail corridor and the Project would not result in new or different physical or psychological barriers. The Project would not isolate any portion of a neighborhood and would not separate residents from community facilities near the project extent.

The Project would require the relocation of five existing multi-unit residential buildings (four at the Mountain View Condominiums and one at 674 West Meadow Drive) that abut the south side of the FrontRunner corridor and that are discussed in more detail in Attachment B.2. During the preliminary design, the track configuration through this area was evaluated to compare and minimize impacts of expanding the rail to the south and west versus to the north and east. UTA and UDOT determined that expanding the rail to the south and west to accommodate the double track would result in fewer community impacts compared to expanding to the north and east, which would partially impact both a newly constructed multi-unit residential building with 58 units and an existing Amtrak train station.

UTA and UDOT expect that the Project would benefit people living in surrounding neighborhoods by improving FrontRunner transit service capacity and reliability. The Project would improve operational reliability and rail capacity, which would provide regional transportation benefits to the surrounding communities.

In the short term, there would be temporary construction-related traffic, noise, and air quality impacts from the Project, but these temporary impacts will be mitigated as described in Section 18, Construction Impacts.

4. ***Cultural, Historic and Archaeological Resources***

Are there any cultural, historic or archaeological resources on or near the proposed project site? If yes and the proposed project has the potential to affect such resources, the Section 106 process must be followed and a Section 4(f) evaluation may be required. Explain, including what steps were taken to make the determination.

☐ NO

☒ YES

An archaeological inventory and selective reconnaissance-level historical buildings inventory was conducted in the fall of 2024. One archaeological site – [redacted]

[redacted]

If YES resources are present, does Section 106 apply? Explain.

☐ NO

☒ YES – Provide Section 106 Consultation Documentation

*FTA determined that the Project would result in **no historic properties affected** to the* [redacted] *and **no historic properties affected** to two historic structures under Section 106.*

The Project would have no impact to the [redacted]

The Utah State Historic Preservation Office concurred with these findings on June 19, 2025.

If YES resources are present, does Section 4(f) apply? Explain.

X NO

☐ YES – Provide Section 4(f) Evaluation

*Based on the findings of effect for the archaeological site and historic properties under Section 106, FTA finds that the Project would result in **no use** under Section 4(f).*

Additional information regarding Section 106 consultation is included in Attachment B.4, Cultural, Historic, and Archaeological Resources.

In addition, corridor-wide cultural resources surveys were conducted to evaluate the potential cumulative impacts along the FrontRunner corridor. The corridor-wide surveys are documented in separate reports, A Cultural Resources Survey for the Utah Transit Authority's FrontRunner Forward Double Track and Rail Realignment Project; Davis, Salt Lake, and Utah Counties, Utah (UTA 2022); and Cultural Resources Survey for FrontRunner Program (UTA 2025); and summarized in the PEL (UTA 2025).

5. Visual/Aesthetics

Will the proposed project degrade the existing visual/aesthetic character or quality of the site, its surroundings, and/or recognized view sheds? Explain.

☒ NO

☐ YES

Surrounding views near the project extent are suburban and include dense residential and commercial development. The FrontRunner corridor at the east end of the project extent is oriented east to west and begins to curve northward near 900 West. This project extent includes the existing Provo Amtrak station, which has a small, covered waiting area. The visual backdrop from the project extent includes the Wasatch Mountains to the east and the Lake Mountains across Utah Lake to the west.

The area around 500 West in particular is built out with development that directly abuts the existing FrontRunner corridor. The Project would require the relocation of five existing multi-unit residential buildings (four at the Mountain View Condominiums and one at 674 West Meadow Drive) that abut the south and west side of the FrontRunner corridor and that are discussed in more detail in Attachment B.2. The visual environment for the remaining multi-unit residential buildings directly to the south of the buildings proposed for relocation would change. Rather than viewing other residential buildings across the parking lot, the views from the remaining buildings would now be of the FrontRunner corridor and its associated infrastructure. New FrontRunner infrastructure includes the ML No. 2 track, a short,

approximately 1,200-foot long retaining wall and a relocated signal house at the existing at-grade crossing of 500 West. No overhead signals are proposed. However, the visual backdrop of the Wasatch Mountains would no longer be blocked for the remaining buildings.

Aside from those described above, most of the project improvements would be made within an existing transportation facility, and the Project would not result in substantive changes to the landscape or viewshed proximate to the project extent. The Project is not anticipated to degrade the existing visual/aesthetic character or quality of the area around the project extent, its surrounding, and/or recognized view sheds.

6. Park and Recreation Resources

Are there any public parks and/or recreation resources on or near the proposed project area that would be impacted? If the proposed project has the potential to impact publicly-owned parks or recreation areas, a Section 4(f) evaluation may be required. If a park is funded with LWCF funds, Section 6(f) may apply. Explain.

☒ NO
☐ YES

If YES, does Section 4(f) apply? Explain.

☐ NO
☐ YES – Provide Section 4(f) Evaluation

If YES, does Section 6(f) apply? Explain.

☐ NO
☐ YES – Provide documentation

There are no public parks or recreation resources in or near the project extent.

7. Noise and Vibration

Are there any noise and/or vibration sensitive receptors located near the proposed project that would be impacted? Explain.

☐ NO
☒ YES

Noise

Based on aerial images of the project extent, preliminary project design schematics, and site visits, UTA and UDOT identified multiple Category 2 residential land use areas near the project extent. These residences consist of both single and multifamily housing units that are adjacent to the UTA and UP rail corridor. No Category 1 or 3 receptors were identified near the project extent.

Because noise-sensitive receptors were identified near the project extent, a General Noise Assessment was conducted using the FTA methodology in the FTA Transit Noise and Vibration Impact Assessment Manual (September 2018) to determine impacts from infrastructure changes at the current 30-minute service. The results of this noise analysis are provided in Attachment B.7.

There would be 9 moderate and 3 severe noise impacts as a result of the Project. However, 5 buildings (multi-family units) where noise impacts were identified would be demolished and residents relocated by the Project, including all 3 of the severely impacted buildings.

In addition, a corridor level noise and vibration analysis has been conducted to evaluate potential impacts of the future anticipated service increase from 30 minutes to 15 minutes along the FrontRunner corridor. The corridor level noise and vibration analysis is documented in a separate report, FrontRunner Forward Corridor Level Noise Analysis Memorandum (May 2025) and summarized in the PEL (May 2025). The

corridor-level analysis determined that 6 additional residential receptors (1 single-family residence and 5 multi-family units) would experience moderate noise impacts. In addition to the service increase, this analysis accounted for the removal of the 5 multi-family buildings that would be demolished and currently provide shielding to some second-row noise receptors.

A detailed noise assessment including the evaluation of the feasibility of noise mitigation will be conducted during final design. Noise barriers would be the first option for mitigation. At locations where barriers are not feasible, sound insulation (enhancing windows and door) is also an option.

Vibration

A General Vibration Assessment using the FTA methodology found in the FTA Transit Noise and Vibration Impact Assessment Manual (September 2018) was conducted to evaluate vibration impacts at Category 2 land uses near the project extent. The assessment method used was for a project in an area with existing rail activity and existing vibration. Source adjustments for distance, speed, and track treatments were applied as discussed in the FTA manual. This vibration assessment was conducted to determine impacts from infrastructure changes at the current 30-minute service. The results are provided in Attachment B.7.

The Project would result in vibration impacts to 14 Category 2 residential receivers. Five of these multi-family buildings would be acquired with residents relocated as part of the Project.

In addition, the corridor level assessment for service increase from 30-minute to 15-minute concluded that because of the high frequency and length of Union Pacific UP freight trains in the corridor, the additional FrontRunner trains would not be enough to double the total train volume in the corridor, and therefore there would be no vibration impacts due to the service increase throughout the corridor (May 2025).

A detailed vibration assessment will be conducted during final design and will consider both infrastructure changes and service increase to determine reasonable and feasible mitigation. In addition, any ballast mat under existing track will be replaced where existing track is being shifted.

8. Air Quality

Is the proposed project located in an Environmental Protection Agency (EPA)-designated non-attainment or maintenance area?

☐ NO
☒ YES – indicate the criteria pollutant and contact FTA to determine if a hot spot analysis is necessary.

- ☒ Carbon Monoxide (CO)
- ☐ Sulfur Dioxide (SO_2)
- ☐ Lead (Pb)
- ☐ Nitrogen Dioxide (NO_2)
- ☒ Ozone (O_3)
- ☒ Particulate Matter (PM_{10})
- ☒ Particulate Matter ($PM_{2.5}$)

Does the proposed project require a conformity analysis or regional analysis under 40 CFR Part 93?

☐ NO
☒ YES

If the non-attainment area is also in a metropolitan area, is the proposed project required to be and included in the MPO's air quality conformity analysis for the Transportation Improvement Program (TIP)?

☐ NO
☒ YES – Date of FHWA/FTA conformity finding

The air quality evaluation area is in Utah County. Utah County is an attainment area for NO2, sulfur dioxide (SO2), and lead (Pb); a moderate nonattainment area for O3; a serious nonattainment area for

PM2.5; and a maintenance area for PM10. Utah County is also an attainment area for CO, with the exception of Provo, which is a maintenance area.

Because the Project would be located in a nonattainment area and is not exempt from a conformity analysis under 40 CFR Section 93.126, a conformity determination is needed, and the Project must be listed on a conforming regional transportation plan (RTP) and transportation improvement program (TIP). The Mountainland Association of Governments (MAG) is the metropolitan planning organization for Utah County. Amendment 1 of TransPlan50, MAG's 2023–2050 RTP (MAG 2023), includes the North of Provo Double Track Project (RTP project: T15). MAG's approved Conformity Determination Report (MAG 2024) confirms that MAG's 2023–2050 RTP and Amendment 1 are consistent with and conform to the SIP or the U.S. Environmental Protection Agency's (EPA) interim conformity guidelines. The North of Provo Double Track Project is also included MAG's 2025–2029 TIP (MAG 2025).

Hot-spot analyses are required only for specific types of projects located in PM2.5, PM10, or CO nonattainment and maintenance areas. Projects requiring quantitative hot-spot analysis are listed in the transportation conformity regulations at 40 CFR Section 93.123(b)(1) and for PM and at 40 CFR Section 93.123(a)(1) for CO. Because the Project does not meet any of the criteria to be considered a project of air quality concern, quantitative hot-spot analyses are not required.

The Project is not a project of air quality concern and UTA and UDOT do not expect the Project to adversely affect local compliance with the National Ambient Air Quality Standards (NAAQS).

See the Air Quality Review in Attachment B.8, Air Quality.

In addition, a corridor-wide air quality analysis was conducted to evaluate the impacts of the future anticipated service increase along the FrontRunner corridor. The corridor-wide air quality analysis is documented in a separate report, FrontRunner Forward Corridor-level Air Quality Technical Memorandum (UTA 2025), and summarized in the PEL (UTA 2025).

9. Hazardous Materials

Is there any known or potential contamination at the proposed project site that would be impacted? Describe the steps taken to make the determination (Phase I ESA, etc.) and results. Note the mitigation and clean-up measures that will be taken to remove hazardous materials from the project site, if applicable.

☐ NO
☒ YES

The Utah Geospatial Resource Center's Land-Related Contaminant and Cleanup database, the Utah Department of Environmental Quality's (UDEQ) online database, and an Environmental Data Resources, Inc. (EDR), report were reviewed for sites with known or suspected contamination in the hazardous materials evaluation area for the Project, which consisted of a 0.5-mile radius around the project extent. Based on the site screening, several sites with known or suspected contamination are within and close to the project extent.

Two of these sites present moderate risks to the Project. Residual contamination from these sites could remain in soil, groundwater, or soil vapor and could be encountered during construction. The two sites of moderate concern are:

- *The site of the former Backman Foundry & Machine Inc. business at 565 South 900 West, Provo, Utah is within the hazardous materials evaluation area described above. No right-of-way acquisition from this parcel is expected. Three petroleum storage tanks (PSTs) were closed, decommissioned, and removed from the ground in 2017. A No Further Action for Underground Storage Tanks letter was submitted in 2018. The letter stated that the contaminant concentrations are below the State of Utah's cleanup levels (UAC, R311-211-6). No corrective action was required;*

*however, corrective action might be needed in the future if contamination is found that exceeds State of Utah cleanup levels. The contaminants of concern at this site are petroleum hydrocarbons and volatile organic compounds (VOCs). Based on the available information and because the site is in close proximity, this site presents a **moderate risk** that residual contamination in soil, groundwater, or soil vapor would be encountered during construction.*

- *The site of contamination at the Denver & Rio Grande Western Railroad is located north of the UP tracks at about 400 W. & 600 S., in the project extent in Provo, Utah. One leaking underground storage tank (LUST) incident is documented at this site. The LUST case was closed in 1997, and residual contamination has been reported. Information from UDEQ indicates that any detectable petroleum contamination at the site complies with state UST rules. Based on these rules, there appears to be no threat to human health or the environment. Corrective action might be needed in the future if contamination is found. The contaminants of concern at this site are petroleum hydrocarbons. Based on the available information and because the site in the project extent, this site presents a **moderate risk** that residual contamination would be encountered during construction.*

In accordance with FTA's standard operating procedures and applicable regulatory requirements, UTA and UDOT will conduct environmental due diligence by ASTM standards during the final design of the Project to identify whether hazardous materials are present before property acquisitions and construction occur. Plans for hazardous materials handling and disposal will be developed for the Project and will comply with the Materials Management Plan for Utah Transit Authority Rail Corridor (January 14, 2025). Developing these plans will include coordination with state and federal agencies with jurisdiction over the properties.

If contamination is found (after completion of the Phase I ESA and Phase II [if needed] ESA), a soil and groundwater management plan will be developed before construction. This plan will describe the necessary investigations needed to characterize contaminant concentrations in the project extent, if any; describe, based on the results of the investigation, the protection measures that will be used to prevent the spread of contamination; communicate the health risks to construction workers; define appropriate handling and disposal or treatment methods for contaminated media; and help UTA better identify construction-related impacts.

In addition, prior to demolition, buildings will be surveyed for asbestos containing materials, lead-based paints, and other potentially hazardous materials, as warranted. After inspection and testing, if needed an abatement plan will be developed for the safe removal, handling, and disposal of any identified hazardous materials.

See Attachment B.9, Hazardous Waste, for maps showing the sites of moderate risk.

10. Farmland

Are there any prime or unique farmlands located at the proposed project site that would be impacted? Explain.

☒ NO
☐ YES

The project extent is located in areas defined as "urbanized areas" by the U.S. Census Bureau Map (https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-urban-areas.html). Per 7 CFR Section 658.2, farmland does not include land already in or committed to urban development. Farmland already in urban development includes lands identified as urbanized areas on the Census Bureau Map.

11. Floodplains

Is the proposed project located within the Federal Emergency Management Agency (FEMA) 100-year floodplain or within the floodway? If yes, this project may require further evaluation under EO 11988. Explain.

☒ NO
☐ YES

A review of the Federal Emergency Management Agency's (FEMA) National Flood Hazard Layer shows that the project extent is located in a Flood Zone X, or an area of minimal flood hazard, and is not regulated by FEMA or any other agency from a floodplains perspective. Project is located in FIRM 49049C0531F, effective June 19, 2020.

12. Water Resources and Water Quality

Are there any surface or ground water resources present, including an EPA-designated sole source aquifer (SSA), near the proposed project that would be impacted? Explain.

☒ NO
☐ YES

There are no surface water resources present near the project extent.

Is there an increase in impervious surface (e.g., roofs, driveways, streets, parking lots, etc.) or restored pervious surface greater than one acre? If YES, a NPDES/storm water permit may be needed and must be acquired prior to construction. Explain.

☐ NO
☒ YES

The project would result in a minor increase in impervious surface area and a slight increase in stormwater runoff. However, the Project is not expected to contribute a substantial amount of pollutants.

A long-term facility storm water permit would not be required. The existing FrontRunner system already has infrastructure in place to handle any stormwater runoff from the ballasted track and embankments, and the project team anticipates that this infrastructure could be analyzed and expanded, if needed, to handle the additional runoff.

Construction of the Project would disturb more than 1 acre of ground surface, which would require coverage under the Utah Pollutant Discharge Elimination System (UPDES) Construction General Permit UTRC00000 (CGP). Coverage under the CGP will be obtained prior to construction through the Utah Division of Water Quality. In compliance with this permit, a stormwater pollution prevention plan (SWPPP) will be developed for the construction phase of the Project.

13. Wetlands and Waters of the U.S.

Are there any wetlands or waters of the U.S. on or adjacent to the proposed project area that would be temporarily or permanently impacted? Explain.

☒ NO
☐ YES

If YES, is a permit from the US Army Corps of Engineers required? Explain.

☐ NO
☐ YES

A field reconnaissance was conducted on April 10, 2024 and it was determined that there are no wetlands or other waters of the U.S in or near the project extent.

14. Threatened and/or Endangered Species

Are there any listed threatened and/or endangered species (plant or animal) or critical habitat present on or near the proposed project area that would be impacted? How was this determined? If yes, Section 7 of the Endangered Species Act may apply. Explain.

☒ NO
☐ YES

There are no listed threatened and/or endangered species or critical habitat in or near the biological resources evaluation area that would be impacted.

See Attachment B.14, Biological Resources.

15. Natural and Biological Resources

Are there any natural areas, biological resources (fish, birds, wildlife and habitat) or sensitive areas present on or near the proposed project area that would be impacted? If the proposed project has the potential to impact wildlife or waterfowl refuges, a Section 4(f) evaluation may be required. Explain.

☒ NO
☐ YES

If YES, does Section 4(f) apply? Explain.

☐ NO
☐ YES – Provide Section 4(f) Evaluation

No natural areas, biological resources, or sensitive areas in or near the biological resources evaluation area would be impacted.

See the Biological Resources Report in Attachment B.14.

Any shrub, tree, or tree limb removal will occur outside a general bird nesting season from April 1 to July 31. If removal must occur during this period, a qualified biologist will perform preconstruction nesting surveys of affected trees. If active nests are found, removal cannot occur until young have been confirmed to have fledged. Following these measures, the Project is not anticipated to result in direct or incidental take under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

16. Traffic and Parking

Does the proposed project have the potential to permanently impact traffic and/or parking (on and off street) in the project area? Explain.

☒ NO
☐ YES

The Project would not permanently impact either traffic or parking and does not include major changes to existing roadways.

The Project includes 3 public at-grade crossings that will need to be modified to accommodate the new UTA ML No. 2. The crossings are located at the following locations:

- *900 West in Provo*
- *700 West in Provo*
- *500 West in Provo*

Minor modifications at the three at-grade crossings include constructing new concrete crossings, relocating existing gates, reconfiguring pedestrian crossings, adjusting roadway and sidewalk profile, and restriping. No roadway realignments are needed. With no increase in the number of train-crossing events, the addition of the second track is not expected to impact traffic at the at-grade crossings.

A corridor-wide traffic and safety analysis has been conducted to evaluate the potential impacts of the future anticipated service increase along the FrontRunner corridor. The corridor-wide traffic and safety analysis is documented in a separate report, FrontRunner Forward Corridor-level Traffic and Safety Technical Memorandum (May 2023), and summarized in the PEL (UTA 2025).

17. Utilities

Are there any utilities that could be impacted by the proposed project? Explain.

☐ NO
☒ YES

Several utilities would be impacted by the Project. UTA and UDOT would further determine the effects on these utilities and appropriate utility treatments by working with local jurisdictions during the final design of the Project. With the current design progress, the anticipated utility impacts are:

Provo City. *Multiple surface and subsurface utilities, owned and maintained by Provo City, would need to be relocated to accommodate constructing the Project. An existing fire hydrant located at the north end of 400 West, an irrigation structure located at the southwest corner of 500 West and the rail corridor, a water line and sewer line at 500 West, a sewer line paralleling the south side of rail corridor (from 500 West to Meadows Drive), and a waterline and associated manhole would conflict with the construction of the proposed UTA ML No.2. Most of these utilities would be relocated outside of the proposed UTA right-of-way to allow Provo City to access them. Some utilities could potentially be protected in place by extending existing casings or, for power lines, raising the elevation of the electrical line.*

Enbridge Gas. *Multiple subsurface utilities, owned and maintained by Enbridge Gas (formerly Dominion Energy), might need to be relocated to accommodate constructing the Project, including 1.25-inch and 2-inch high pressure plastic gas lines located at 500 West and a 4-inch steel gas line located at about 800 West. These utilities would likely stay within the same footprint but at an increased depth compared to existing conditions.*

Comcast Fiber Optic Line. *One subsurface segment of fiber optic line owned and maintained by Comcast would be relocated to accommodate constructing the Project. This line totals approximately 220 feet and parallels UTA ML No. 1. This line would need to be relocated outside the rail alignment to the south.*

Centurylink Fiber Optic Line. *One subsurface segment of fiber optic line owned and maintained by Centurylink would be relocated to accommodate constructing the Project. This line totals approximately 270 feet and parallels UTA ML No. 1. This line would need to be relocated south outside the rail alignment.*

Google Fiber Optic Line. *One subsurface segment of fiber optic line owned and maintained by Google would be relocated to accommodate constructing the Project. This line totals approximately 220 feet and parallels UTA ML No. 1. This line would need to be relocated south outside the rail alignment.*

Rocky Mountain Power*. There are some overhead power lines owned and operated by Rocky Mountain Power within the project extent. The required vertical clearance from power lines and horizontal clearance from poles will be verified during final design.*

All utility relocations will be coordinated with the utility owners during the final design of the Project to ensure the safety of and minimal disruptions to utility service during construction.

18. Construction Impacts

Will the proposed project result in impacts (e.g., noise, air, water, staging, parking, traffic detours, etc.) during construction? Explain.

☐ NO
☒ YES – Provide mitigation commitments

As with most construction projects, there would be some minor impacts during construction. Construction equipment such as trucks, bulldozers, graders, and rollers would add nominal noise to an already loud, active freight and commuter rail corridor.

If temporary construction access is needed from a private property owner, it will be obtained through the proper federal right-of-way acquisition process. Minor temporary utility disruptions could occur for utility relocations or new service installations. These outages will be coordinated with the utility provider and customers that could be affected.

Installation of switches would require temporary track shutdown that could disrupt FrontRunner service. Work will be scheduled to minimize impacts to passengers (nights, weekends, and/or holidays). If necessary, bus bridges will be provided for the continuation of service.

The contractor will be required to control fugitive dust and stormwater runoff (see additional details in Section 21, State and Local Permits). A public communication plan will be developed to coordinate construction activities with local residents, stakeholders, and businesses that could be affected by the Project. Changes to transit service due to construction will be communicated to riders.

19. Public Outreach and Agency Coordination

Was any public outreach and/or agency coordination conducted? Explain.

☐ NO
☒ YES

UTA and UDOT are committed to involving state and local agencies, area stakeholders, and the public throughout project design, construction, and operation. The project team has coordinated with MAG, Utah County, and the city of Provo. UTA and UDOT have developed an engagement plan to steer involvement activities throughout the project evolution. Engagement will be tailored based on the needs and potential impacts of the Project and could include a combination of corridor-level communication and project-specific meetings.

20. Safety and Security

Are any measures required for the safe and secure operation of the proposed project after its construction? Explain.

☒ NO
☐ YES

The project would not change how employees or passengers would interact with the FrontRunner corridor and would not impact safety of those users. The Project would not impact the security of the FrontRunner facilities and would not have potential construction safety concerns on those facilities.

UTA's standard commuter rail design criteria will be followed to ensure that the Project meets safety and security requirements. This includes the Supplemental Safety Measures (SSM) and/or Alternative Safety Measures (ASM) at each affected grade crossing to maintain the established quiet zone. UTA's activation processes will be followed, which include several safety and security reviews and a potential hazard analysis to ensure that the design includes typical and site-specific safety and security measures.

A corridor-wide traffic and safety analysis has been conducted to evaluate the potential impacts of the future anticipated service increase along the FrontRunner corridor. The corridor-wide traffic and safety analysis is documented in a separate report, FrontRunner Forward Corridor-level Traffic and Safety Technical Memorandum (May 2023), and summarized in the PEL (UTA 2025).

21. State and Local Permits, Policies and Ordinances

Does the proposed project require compliance with any applicable state and local permits, policies and ordinances? Explain.

☐ NO
☒ YES

The project will require the following permits:

- *UPDES CGP from the Utah Division of Water Quality – Construction of the Project would disturb more than 1 acre of ground surface. UTA and UDOT (or its construction contractor) will apply for coverage under Utah's CGP (UTRC00000). In compliance with this permit, a SWPPP will be developed for the construction phase of the Project.*

- *If excavations for utility relocations encounter shallow groundwater, UTA and UDOT (or its construction contractor) will need to obtain coverage for construction dewatering under Utah's General Permit for Construction Dewatering or Hydrostatic Testing (UTG070000) or a Ground Water Discharge Permit pursuant to state groundwater protection rules (Utah Administrative Code R317-6). The groundwater testing will be tested and the results will be used to evaluate feasible groundwater management strategies, if needed. The management plan will present these strategies, support the previously mentioned permit application(s), and address other applicable laws and regulations.*
- *UTA and UDOT (or its construction contractor) will submit a Fugitive Dust Control Plan to the Utah Division of Air Quality.*
- *Construction will comply with UDOT's Standard Specification Section 02498 (Vibration Monitoring during Construction) that will direct monitoring vibration at susceptible facilities adjacent to construction areas where construction activities are generating high-intensity vibrations (pile driving, heavy compaction equipment, or demolition).*

WORKSHEET COMPLETED BY (RECIPIENT NAME AND TITLE): **DATE SUBMITTED:**

Autumn Hu *NEPA Project Administrator* *Utah Transit Authority*	*6/24/2025*

Note: CE Worksheet must be signed by the Recipient of Funds

North of Provo Double Track Project
FrontRunner Forward Program

Attachments

Attachment A Vicinity Map and Conceptual Design Plans

Attachment A.1 Vicinity Map for the North of Provo Double Track Project

Attachment A.2 Conceptual Design Plans for the North of Provo Station Section

Attachment B Resource Reports and Memos

Attachment B.1 Land Use and Zoning

Attachment B.2 Land/Property Acquisition, Relocation, Leases, and Easements

Attachment B.4 Cultural, Historic, and Archaeological Resources

Attachment B.7 Noise and Vibration

Attachment B.8 Air Quality

Attachment B.9 Hazardous Waste

Attachment B.14 Biological Resources

The numbering in Attachment B refers to the resource number in Part C, Environmental Evaluation, of the CE worksheet.

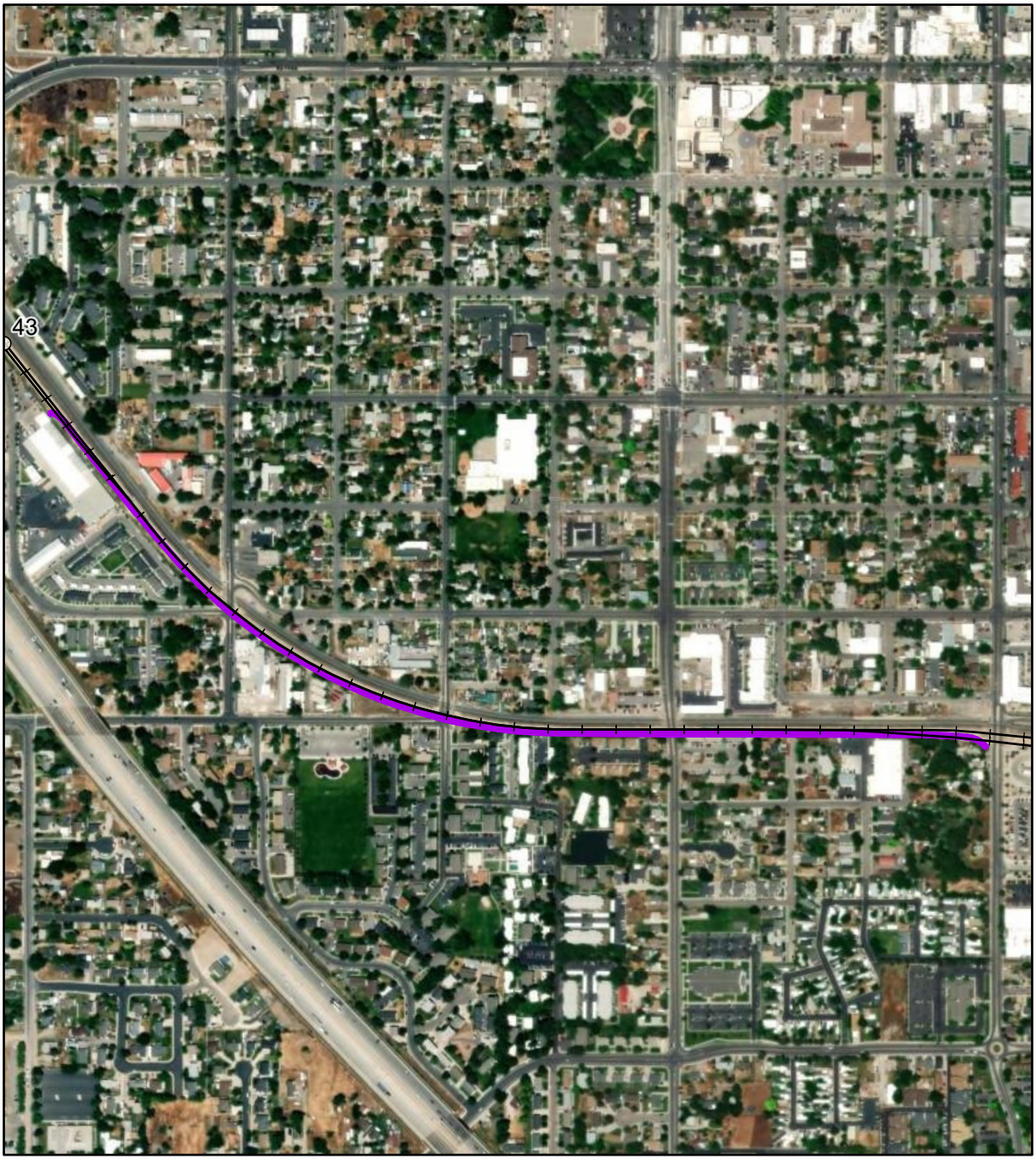
ATTACHMENT A
Vicinity Map and Conceptual Design Plans

ATTACHMENT A.1
Vicinity Map for the North of Provo Double Track Project

Legend

Project Extent

0 4 8 12 Miles



UTA

UDOT Keeping Utah Moving

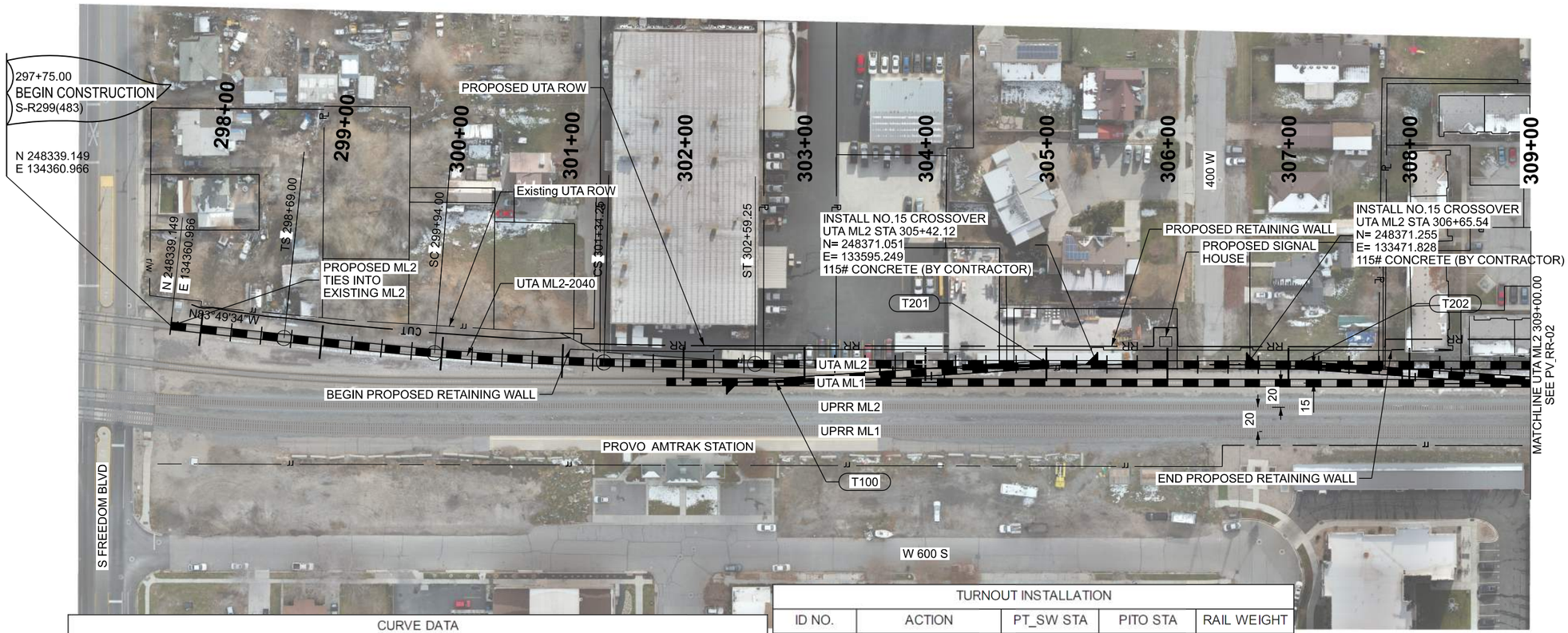
Legend

- FrontRunner Mile Posts
- FrontRunner Existing
- FrontRunner Station
- Project Extent

N

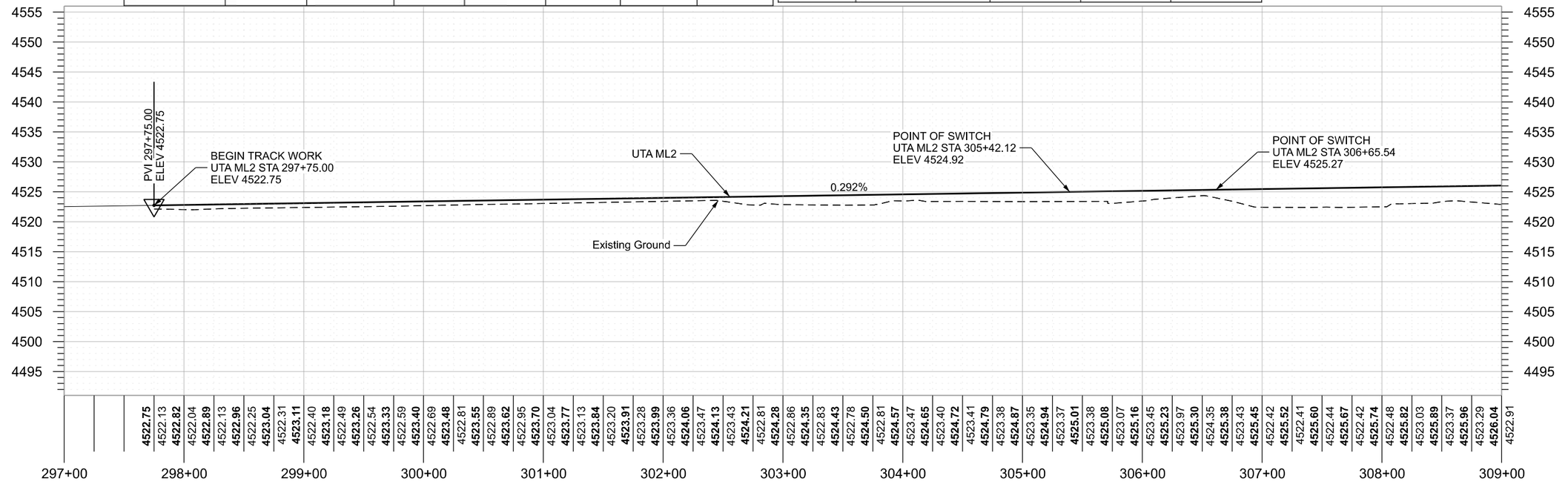
0 500 US Feet

ATTACHMENT A.2
Conceptual Design Plans for the North of Provo Station Section



CURVE DATA							
ID NO.	R	Dc	LS-IN	LS-OUT	Ea (INCH)	Eu (INCH)	V (MPH)
UTA ML2-2040	2,500.00	2°17'30.59"	125.00	125.00	0.75	0.69	30

TURNOUT INSTALLATION				
ID NO.	ACTION	PT_SW STA	PITO STA	RAIL WEIGHT
T201	INSTALL #15 LH TO	305+42.12	305+02.15	115
T202	INSTALL #15 LH TO	306+65.54	307+05.30	115



UTA ML2

REVISIONS

NO.	DATE	APPROVED BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
HDR

DRAWN BY AMG
QC CHECKED BY JS
DATE

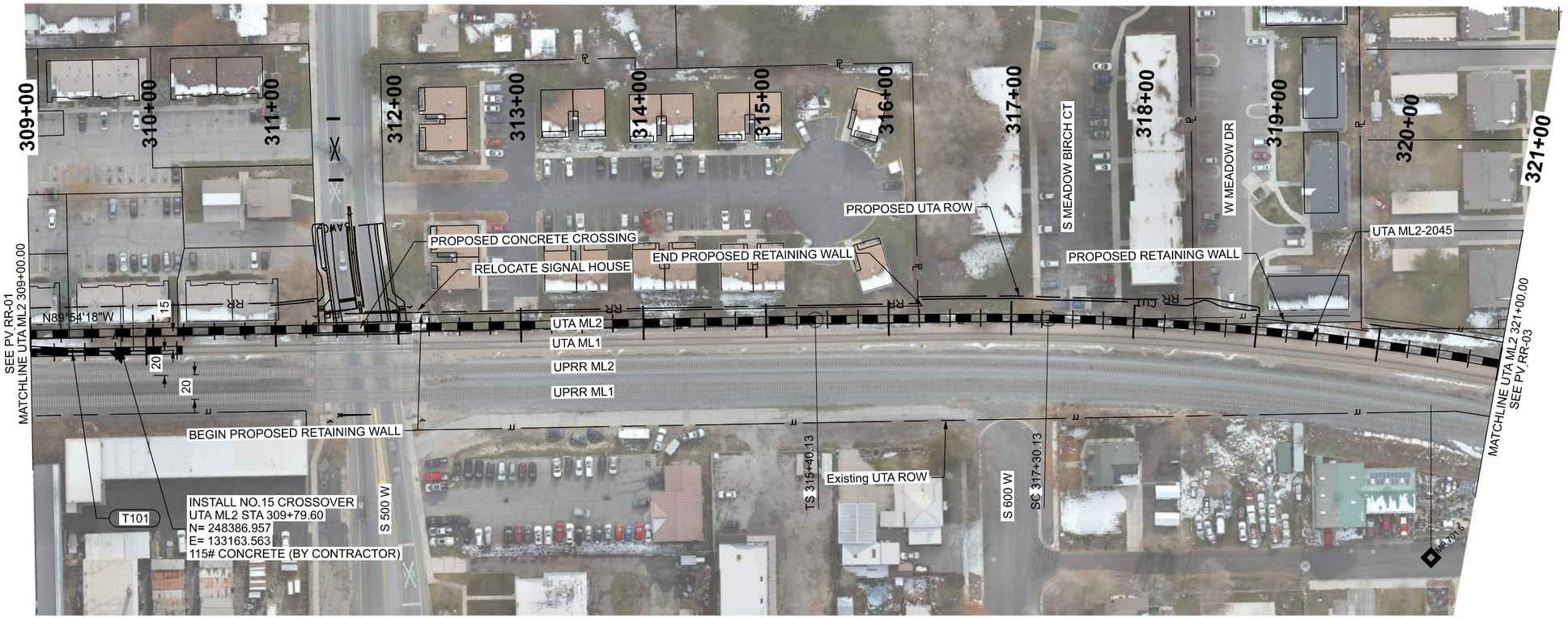
APPROVED
PROFESSIONAL ENGINEER

PROJECT: FRONTRUNNER PROVO SEGMENT
PROJECT NUMBER: S-R299(483)
PIN: 21213

TRACK PLAN AND PROFILE

SHEET NO. PV_RR-01

PV_RR-01.dgn
2/11/2025



CURVE DATA							
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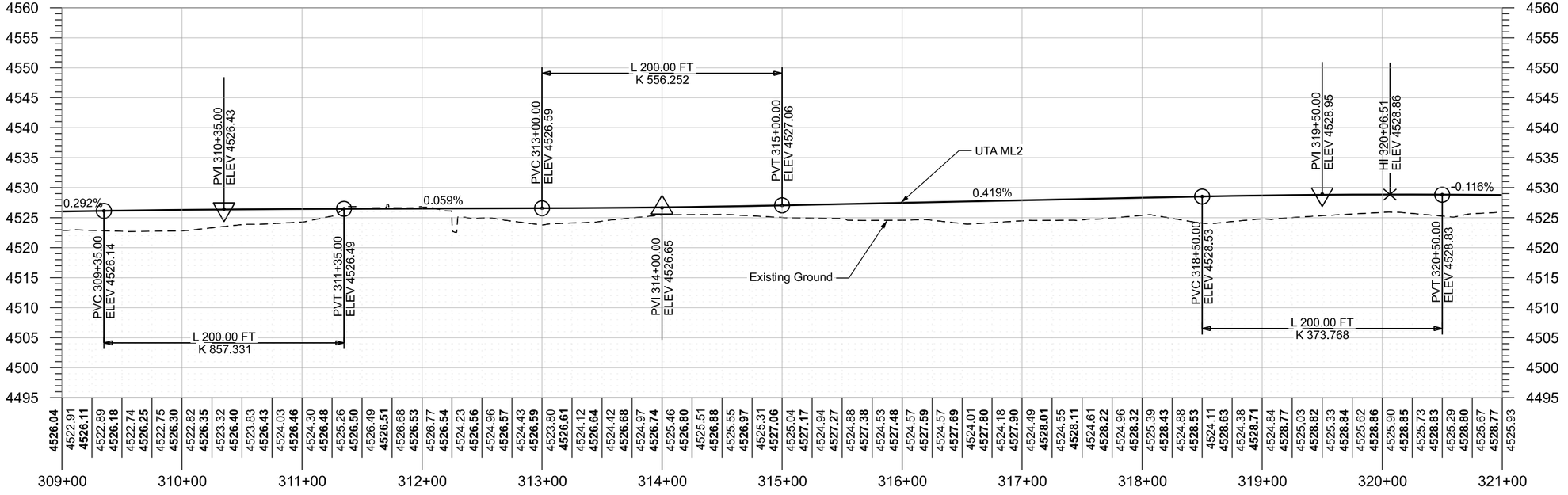
UTA ML2-2045	2,365.80	2°25'18.59"	190.00	190.00	0.00	3.43	45



UTA ML2

REVISIONS

NO.	DATE	APPROVED BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
HDR

DRAWN BY AMG
QC CHECKED BY JS
DATE

APPROVED

PROFESSIONAL ENGINEER

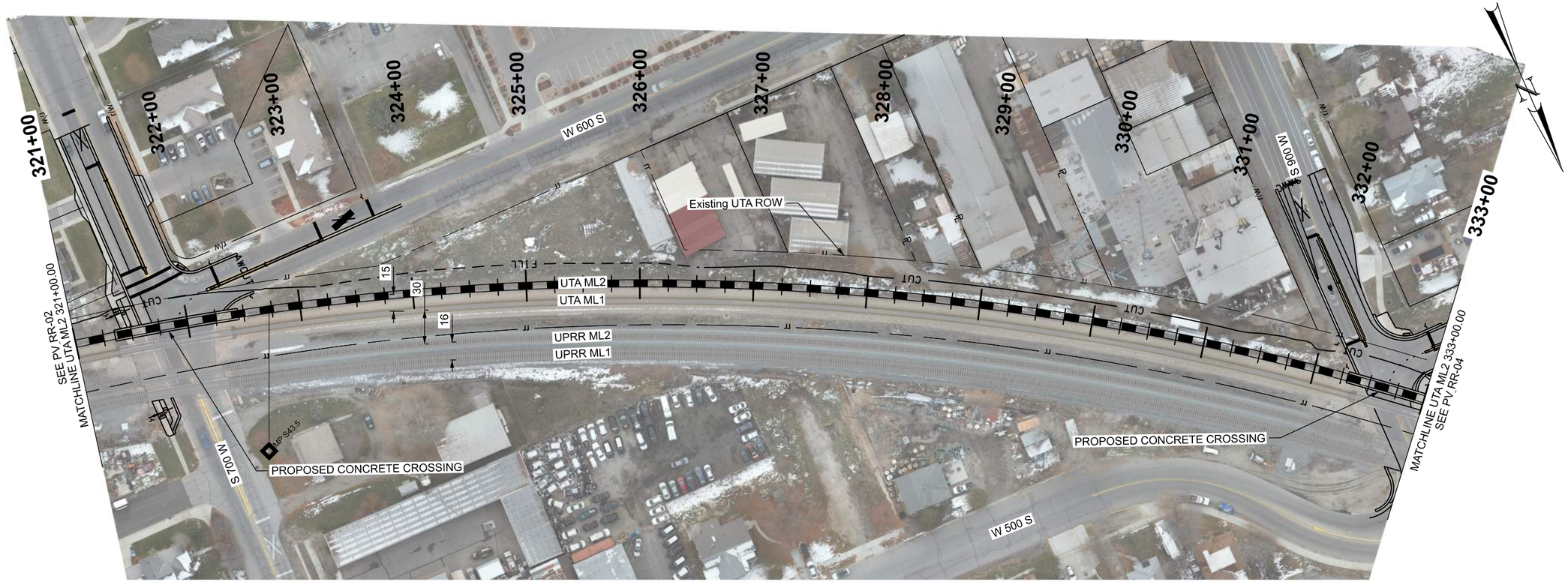
FRONTRUNNER
PROVO SEGMENT

PROJECT
PROJECT NUMBER
S-R299(483)
PIN 21213

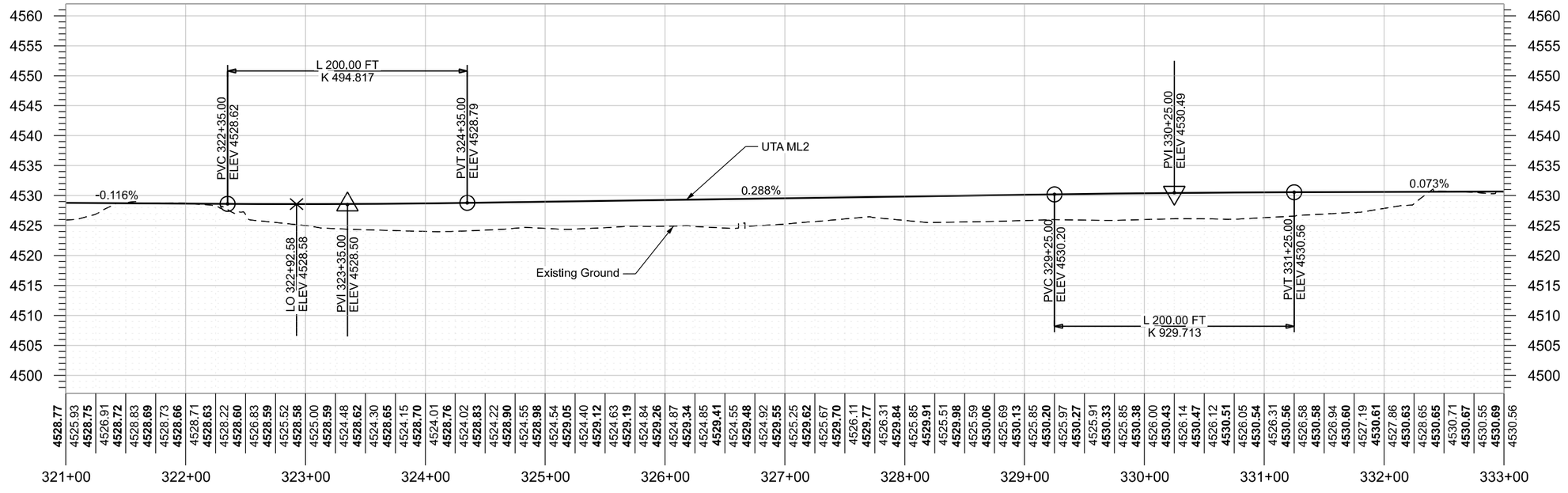
TRACK PLAN AND PROFILE

SHEET NO. PV_RR-02

PV_RR-02.dgn
2/11/2025



CURVE DATA							
ID NO.	R	Dc	LS-IN	LS-OUT	Ea (INCH)	Eu (INCH)	V (MPH)
UTA ML2-2045	2,365.80	2°25'18.59"	190.00	190.00	0.00	3.43	45



UTA ML2

PV_RR-03.dgn

2/11/2025

REVISIONS

NO.	DATE	APPROVED BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

HDR

DRAWN BY AMG

QC CHECKED BY JS

DATE

APPROVED

PROFESSIONAL ENGINEER

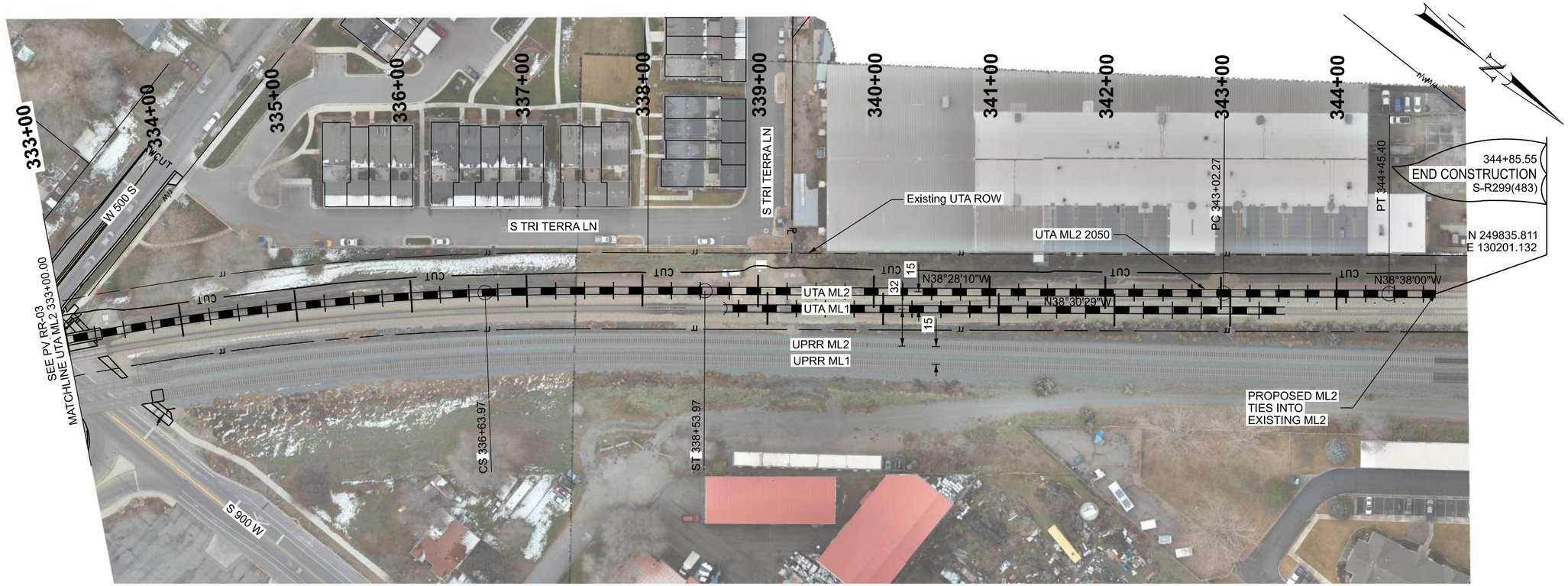
PROJECT: FRONTRUNNER PROVO SEGMENT

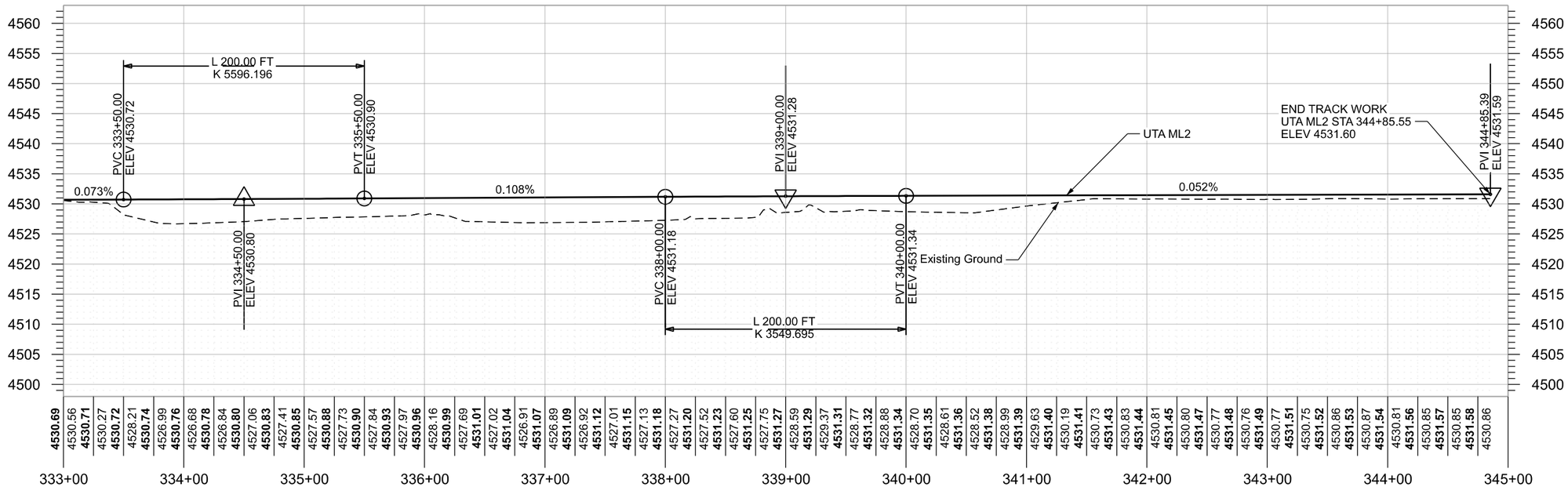
PROJECT NUMBER: S-R299(483)

PIN: 21213

TRACK PLAN AND PROFILE

SHEET NO. PV_RR-03





UTA ML2

REVISIONS

NO.	DATE	APPROVED BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
HDR

DRAWN BY AMG
QC CHECKED BY JS
DATE

APPROVED
PROFESSIONAL ENGINEER

PROJECT: FRONTRUNNER PROVO SEGMENT
PROJECT NUMBER: S-R299(483) PIN 21213

TRACK PLAN AND PROFILE

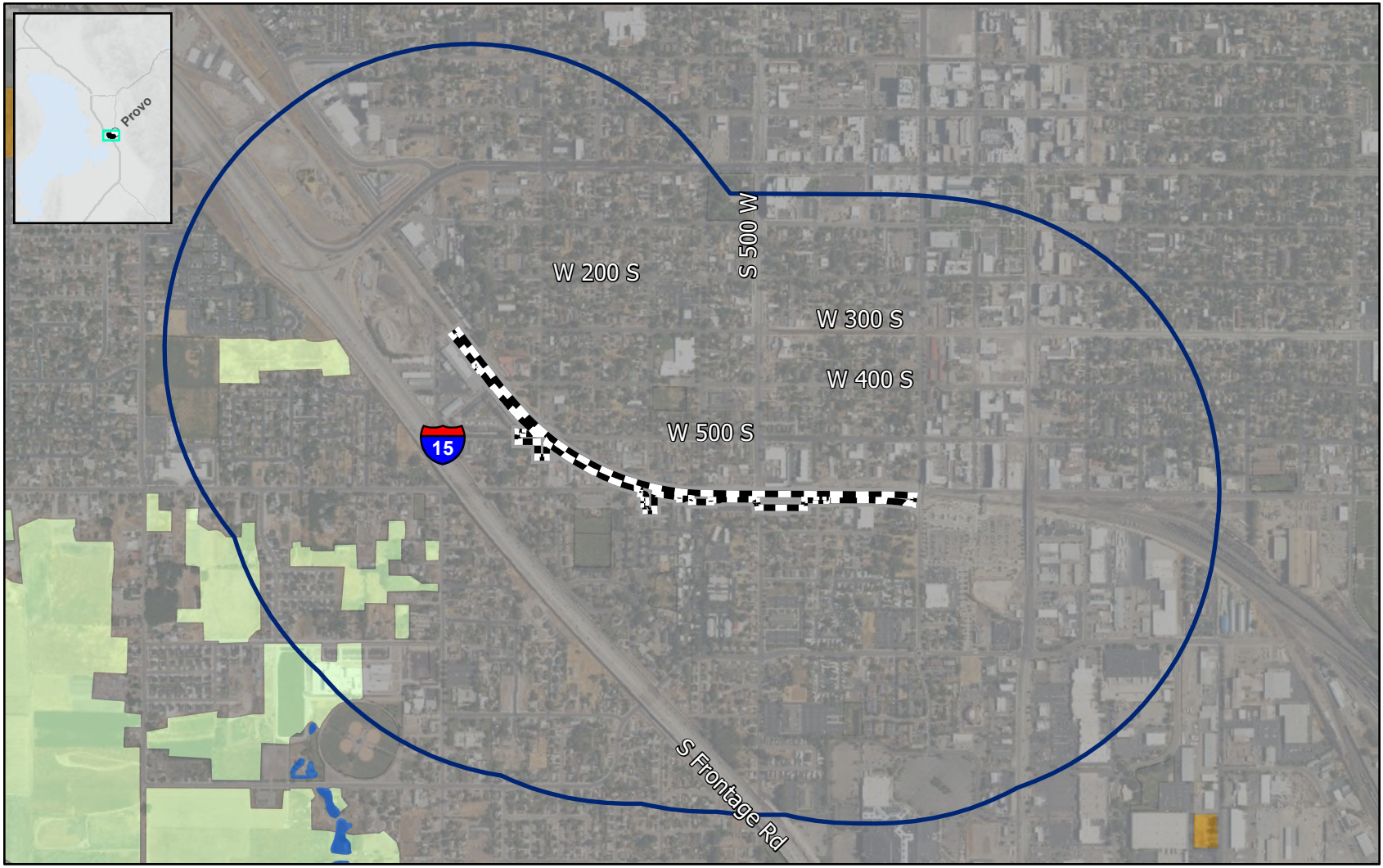
SHEET NO. PV_RR-04

PV_RR-04.dgn
2/11/2025

ATTACHMENT B
Resource Reports and Memos

The numbering in Attachment B refers to the resource number in Part C, Environmental Evaluation, of the CE worksheet.

ATTACHMENT B.1
Land Use and Zoning



UTA FrontRunner Forward

UDOT Keeping Utah Moving

Legend

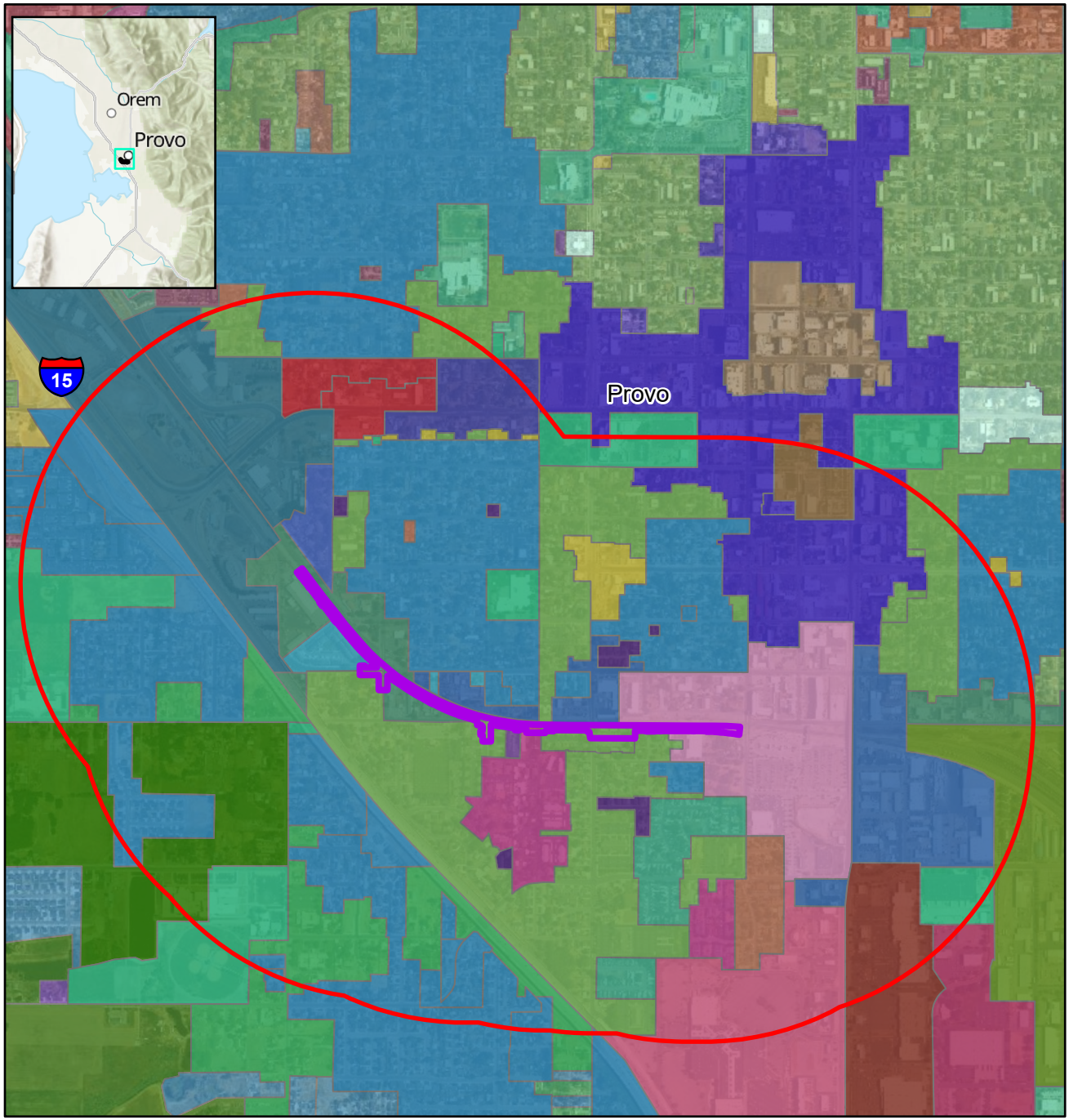
- Project Extent
- Land Use and Zoning Evaluation Area

Current Land Use Type

- Agricultural
- Other
- Urban
- Water

N

0 620 1,240 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

Legend

- Project Extent
- Land Use and Zoning Evaluation Area

Provo Zoning

- Agricultural
- Commercial - General
- Commercial - Heavy
- Commercial - Planned Industrial
- Downtown - Core
- Downtown - General
- Downtown Gateway
- Freeway Commercial
- Interim Transit Oriented Development
- Manufacturing - Heavy
- Manufacturing - Light
- Medium Density Residential
- Project Redevelopment Option
- Public Facilities
- Regional Shopping Center
- Residential - Agricultural
- Residential - Conservation
- Residential - Low Density
- Residential - Medium Multiple
- Residential - Mobile Home
- Residential - Multiple Family
- Residential - Single Family
- Residential - Two Family
- Shopping Center - Regional
- West Gateway

N

0 440 880

US Feet

*Legend displays zones intersecting with Evaluation Area only

ATTACHMENT B.2
Land/Property Acquisition, Relocation, Leases, and Easements

FrontRunner Forward Technical Memorandum

To: Project File

From: HDR

Date: April 1, 2025

Subject: Land and Property Acquisition, Relocation, and Easements for the North of Provo Double Track Project

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Methodology

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 0.7 mile of track north of the existing Provo Central Station in Utah County, Utah. The North of Provo Double Track Project (Project) would be implemented along the existing FrontRunner commuter rail line.

This memorandum describes the property acquisition, relocation, and easement requirements to build and operate the Project. Property acquisition for the Project is subject to specific legal requirements and obligations. If property acquisitions are necessary, UDOT would acquire the property and transfer the property to UTA.

UDOT's acquisition guidelines and policies are consistent with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 United States Code [USC] Chapter 61, amended 1989) and the State of Utah Relocation Program (part of the Utah Relocation Assistance Act, Utah Code, Title 57, Chapter 12). These federal and state guidelines provide for uniform and equitable treatment of all persons displaced from their homes, businesses, and farms without discrimination on any basis. Preliminary acquisition types were determined for each parcel using satellite images, county parcel data, and the Project's proposed right-of-way limits.

Project Description

The double track would be constructed north of the existing Provo Central Station and extend along the FrontRunner corridor until merging with the existing double track just north of 900 West in Provo. This section of double track would extend from UTA milepost S 43.2 south to UTA milepost S 43.9, a distance of about 0.7 mile.

The anticipated track work would consist of constructing a new UTA mainline (ML) track number (No.) 2 south of the existing UTA ML No. 1, shifting approximately 700 linear feet of UTA ML No. 1 track, constructing an approximately 1,200-linear-foot retaining wall, extending one storm drain culvert to accommodate the widened track bed, removing existing turnouts at both ends of the section, relocating utilities (including three signal houses), and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

The Project is one of several projects included in the first phase of long-term improvements under the FrontRunner Forward program (the first phase is also known as the FrontRunner 2X project); however, the Project has independent utility and can be constructed with or without the other projects. Further details about investments associated with the FrontRunner Forward Program are included in a separate report, *FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL)* (UTA 2025).

Property Acquisitions Evaluation Area

The property acquisitions evaluation area is the Project's proposed right-of-way limits.

Expected Property Acquisitions

The Project would require about 2.68 acres of permanent right-of-way, which would consist of UTA-owned property in or adjacent to the track area, and city, residential, and commercial properties that back to the tracks. Of the 2.68 acres of permanent right-of-way required, UTA owns 0.22 acre, which would not need to be purchased for the Project. The locations of the UTA-owned property are shown in blue in Figures 1 through 3 but are not included in Table 1, *Right-of-way Required for the North of Provo Double Track Project*, because the property is already owned by UTA. The remaining 2.46 acres of permanent right-of-way needed for the Project would need to be acquired from Provo City and from owners of residential and commercial properties adjacent to the rail corridor, as shown in Table 1 and Figures 1 through 3.

The Project would directly impact and require full acquisition of five residential buildings on the west side of the rail corridor. Each building has four housing units, for a total of 20 residential relocations. All other acquisitions of city, residential, and commercial parcels would be in the form of small slivers of land. These acquisitions would not affect access to or functionality of the home, commercial property, or other buildings on the parcel.

At this preliminary level of design, UTA and UDOT do not know exactly where temporary construction easements (TCEs) would be needed; however, the design footprint used to assess right-of-way impacts includes the anticipated limits of physical disturbance, including space for potential temporary construction workspaces, and the limits of any anticipated right-of-way and temporary easement acquisition. The actual sizes and locations of all TCEs would be determined during the final design of the Project.

For this analysis, the number of parcel acquisitions was determined based on the Utah County property data records as of March 18, 2025.

Mitigation

UTA and UDOT will conduct acquisitions in accordance with the provisions in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC Section 61 and the implementing regulation 49 Code of Federal Regulations Part 24). Following these provisions will ensure just compensation for all properties and will minimize any impacts on the current owners.

Table 1. Right-of-way Required for the North of Provo Double Track Project

Parcel ID	Owner	Parcel Address[a]	Acres Impacted[b]	Relocation?	Figure Number(s)[c]
210460157	RELIANT-UTAH LLC	750 S 650 WEST, PROVO, UT 84601	0.25	No	2
210480032	JACOBSON, CARL A	APPROX. 625 S 400 W	<0.01	No	3
210490028	TORRES, DANIEL STEPHEN	650 S 200 WEST, PROVO, UT 84601	0.02	No	3
210490032	CAMMAN LLC	84601	0.01	No	3
210490034	CAMMAN LLC	84601	0.01	No	3
210490037	CAMMAN LLC	84601	0.01	No	3
462080008	MCCORD, KJELL	608 S 500 WEST Unit#4, PROVO, UT 84601	<0.01[d]	No	2
462080023	NELSON, DOUGLAS E	628 S 500 WEST Unit#1, PROVO, UT 84601	0.01	No	2
462080024	TREJO, RAUL	628 S 500 WEST Unit#2, PROVO, UT 84601	0.01	No	2
462080025	SARU LLC	624 S 500 WEST Unit#1, PROVO, UT 84601	<0.01	No	2
462080026	WHEELER, BRANDAN E	624 S 500 WEST Unit#2, PROVO, UT 84601	<0.01	No	2
462080027	SOLOMON, B DANIEL & KATRINA D	624 S 500 WEST Unit#3, PROVO, UT 84601	<0.01	No	2
462080028	QIAN, LIN	624 S 500 WEST Unit#4, PROVO, UT 84601	<0.01	No	2
462080080	MADISON PARK CONDOMINIUMS	624 S 500 WEST, PROVO, UT 84601	0.32	No	2
463860017	MARCIAGA, MARIA DEL CARMEN	623 S 500 WEST Unit#17, PROVO, UT 84601	0.03	Yes	3
463860018	WOLSEY, THOMAS LANDON	623 S 500 WEST Unit#18, PROVO, UT 84601	0.03	Yes	3
463860019	BOWEN, QUINTON & KATELYN	623 S 500 WEST Unit#19, PROVO, UT 84601	0.03	Yes	3
463860020	LINFORD, EMMA F & MATTHEW R (ET AL)	623 S 500 WEST Unit#20, PROVO, UT 84601	0.03	Yes	3
463930021	SCHUMACHER, LESSA ASHLEY	617 S 500 WEST Unit#21, PROVO, UT 84601	0.03	Yes	3
463930022	BURNETT, KIMBERLEE A (ET AL)	617 S 500 WEST Unit#22, PROVO, UT 84601	0.03	Yes	3
463930023	MYLER, CRYSTAL	617 S 500 WEST Unit#23, PROVO, UT 84601	0.03	Yes	3

Parcel ID	Owner	Parcel Address[a]	Acres Impacted[b]	Relocation?	Figure Number(s)[c]
463930024	KINCAID, DAVID	617 S 500 WEST Unit#24, PROVO, UT 84601	0.03	Yes	3
463940025	LARSEN, ALICIA	611 S 500 WEST Unit#25, PROVO, UT 84601	0.03	Yes	3
463940026	BROWN, ETHAN COUGAR & JOSIE DANNIELLE	611 S 500 WEST Unit#26, PROVO, UT 84601	0.03	Yes	3
463940027	STUBBS, ZOLA	611 S 500 WEST Unit#27, PROVO, UT 84601	0.03	Yes	3
463940028	RUIZ-RIOS, PEDRO (ET AL)	611 S 500 WEST Unit#28, PROVO, UT 84601	0.03	Yes	3
463950029	GUYMON, ASHLEY	605 S 500 WEST Unit#29, PROVO, UT 84601	0.03	Yes	3
463950030	DAILEY, JOSHUA J	605 S 500 WEST Unit#30, PROVO, UT 84601	0.03	Yes	3
463950031	ERASO, MIGUEL & PATT	605 S 500 WEST Unit#31, PROVO, UT 84601	0.03	Yes	3
463950032	WILLIAMS, KIMBERLY	605 S 500 WEST Unit#32, PROVO, UT 84601	0.03	Yes	3
469400004[e]	QUIST, DOUGLAS B	674 W MEADOW DR UNIT D, PROVO, UT	0.04	Yes	2
469400005	VERTICAL DEVELOPMENT, LLC	PROVO, UT	0.15	No	2
470430006	PACE, SHAUN U & DENISE V	643 S 700 WEST, PROVO, UT 84601	0.04	No	2
470430010	PACE, SHAUN U & DENISE V	623 S 700 WEST, PROVO, UT 84601	0.05	No	2
520490020	SANPITCH HOLDINGS LLC	616 S 400 WEST, PROVO, UT 84601	0.08	No	3
520490021	CAMMAN LLC	609 S 400 WEST, PROVO, UT 84601	0.10	No	3
520490024	CAMMAN LLC	700 S 300 WEST, PROVO, UT 84601	0.06	No	3
520490049	CAMMAN LLC	PROVO, UT 84601	<0.01	No	3
520490057	CAMMAN LLC	84601	0.04	No	3
520490062	CAMMAN LLC	84601	0.08	No	3
520490500	PROVO CITY	84601	0.03	No	3
528670002	RUIZ, GRACIELA (ET AL)	644 S 700 WEST, PROVO, UT 84601	0.02	No	2
535580023	GEORGETOWN DEVELOPMENT, INC.	PROVO, UT	0.02	No	1

Parcel ID	Owner	Parcel Address[a]	Acres Impacted[b]	Relocation?	Figure Number(s)[c]
—	PROVO CITY	84061	0.01	No	3
—	MOUNTAIN VIEW CONDOMINIUM (COMMON SPACE)	611 S 500 WEST, PROVO, UT 84601	0.55	No	3
		Total	2.46		

[a] Parcels with a ZIP Code address are based on the most recent county property records accessed on March 18, 2025.

[b] Right-of-way parcel impacts to properties owned by Provo City and adjacent commercial or residential property owners are shown in the table. UTA owns an additional 0.22 acre of property that would be required by the Project but is not shown in the table. These parcels are shown in blue on Figures 1 through 3.

[c] Some parcel acquisitions are shown on multiple pages in Figures 1 through 3, but the parcel identification and impact acreage are called out only on the page shown in this column.

[d] Acreage impacts that are equal to "<0.01" were rounded up to 0.01 for the total of the "Acres Impacted" column.

[e] According to the most recent county property records, parcel 469400004 has only one parcel owner; it is a fourplex that would have a total of 4 relocations.

Figure 1. Right-of-way for the North of Provo Double Track Project (1 of 3)

Figure 2. Right-of-way for the North of Provo Double Track Project (2 of 3)

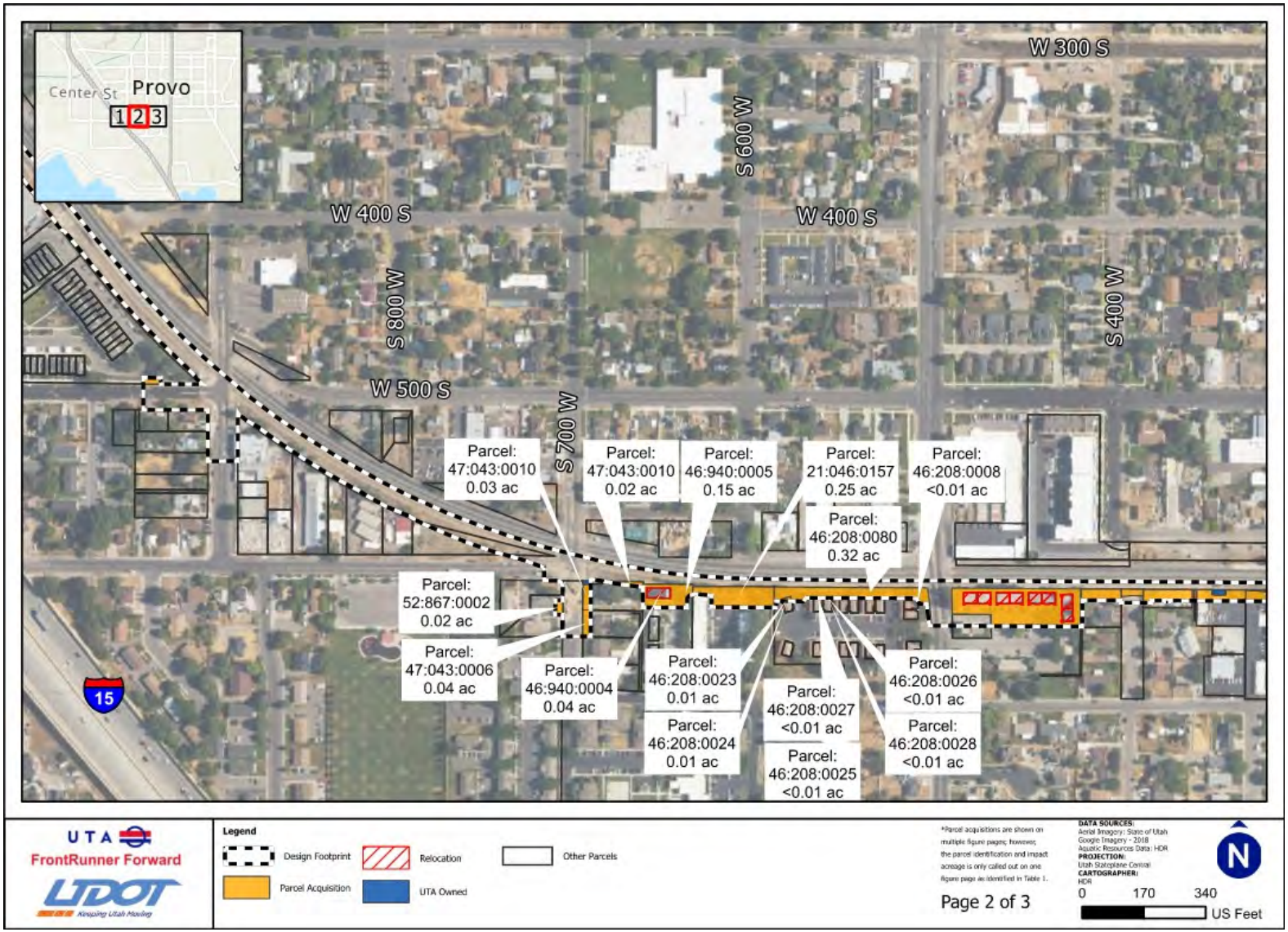
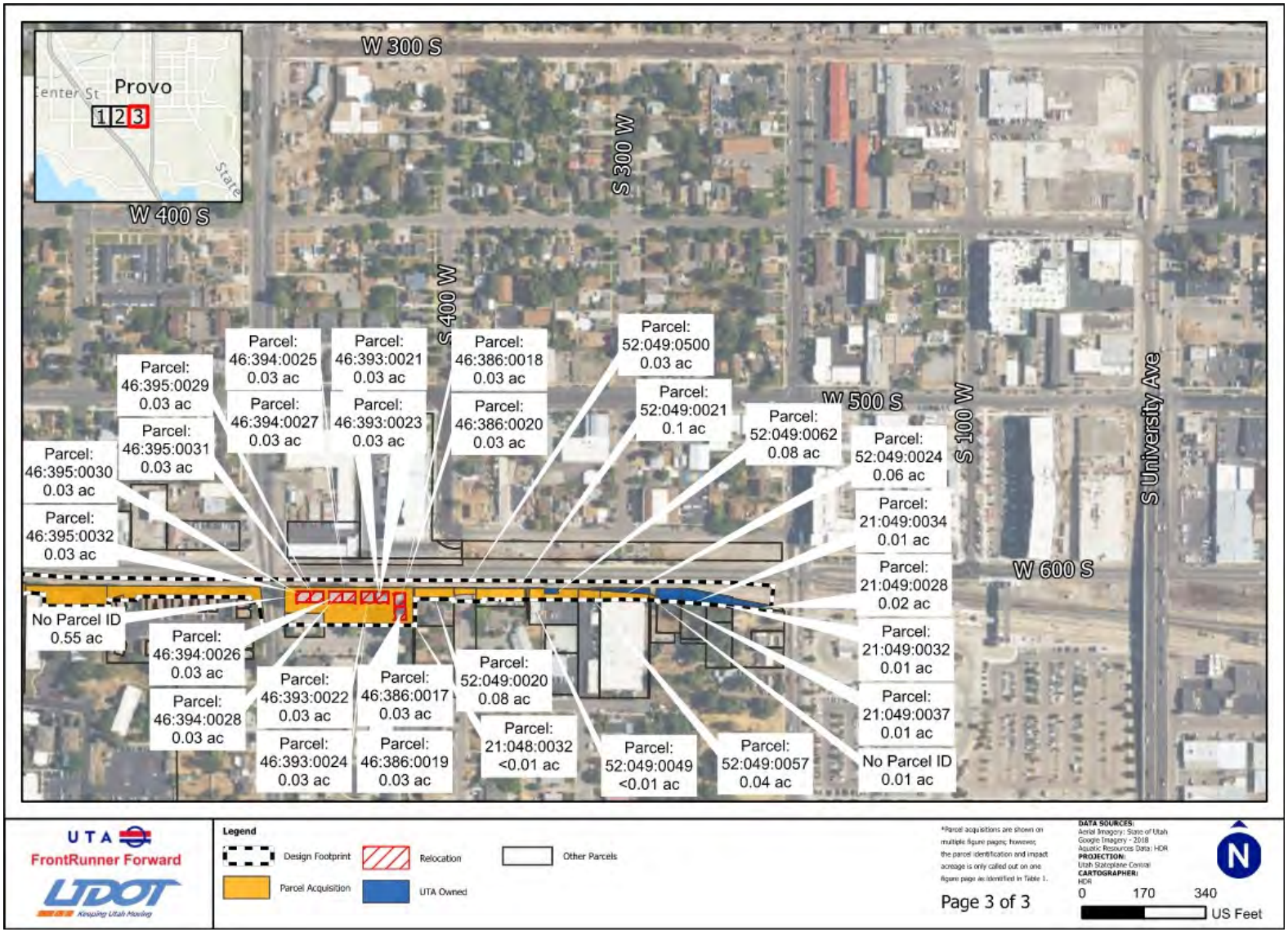


Figure 3. Right-of-way for the North of Provo Double Track Project (3 of 3)



References

[UTA] Utah Transit Authority

2025 FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL).

ATTACHMENT B.4
Cultural, Historic, and Archaeological Resources

Per the Archaeological Resources Protection Act (ARPA) and guidance from the Utah State Historic Preservation Office (SHPO), archaeological site information has been redacted to protect sensitive cultural resources.

ATTACHMENT B.7
Noise and Vibration

FrontRunner Forward Technical Memorandum

To: File

From: HDR

Date: July 22, 2025

Subject: Noise and Vibration Analysis for the North of Provo Double Track Project

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Summary

The purpose of this memorandum is to summarize the noise and vibration impact assessment for the Utah Transit Authority's (UTA) and the Utah Department of Transportation's (UDOT) North of Provo Double Track Project. The proposed double track would be constructed north of Provo Central Station and extend along the FrontRunner corridor until it merges with the existing double track just north of 900 West in Provo. This section would extend from UTA milepost S 43.2 south to UTA milepost S 43.9, a distance of about 0.7 miles. Constructing this section would complete the double track from Orem Central Station to Provo Central Station.

The anticipated track work would consist of constructing a new UTA mainline (ML) number (No.) 2 south of the existing UTA ML No. 1, shifting approximately 700 linear feet of track, constructing an approximately 1,200 linear-foot retaining wall, extending one culvert (which would function as a storm drain) to accommodate the widened track bed, removing existing turnouts at both ends of the section, relocating utilities including three signal houses, and widening the existing track bed. A universal crossover, consisting of two back-to-back crossovers, is proposed between the 500 West and South Freedom Boulevard/200 West grade crossings.

The general noise and vibration assessments predict that there would be 12 noise impacts of varying severity (3 severe and 9 moderate) and 14 vibration impacts at single- and multi-family residences (a multi-family structure is considered one impacted receiver). Several multi-family residences in the project vicinity are anticipated to be acquired, demolished, and residents relocated as the project advances due to right-of-way needs; these acquisitions would eliminate 5 out of 12 noise impacts, leaving 7 moderate noise impacts (all 3 severe impacts would be eliminated). The acquisitions would also eliminate 5 out of 14 vibration impacts, leaving 9 vibration impacts remaining.

The existing noise levels for the remaining noise-impacted receivers exceed the threshold for which UTA policy suggests considering noise-mitigation practices. Potential mitigation measures to consider include enhancing doors and windows to increase noise attenuation at building facades. Noise walls will also be considered, at feasible locations. Furthermore, the project team recommends conducting a more detailed vibration analysis in subsequent phases of the project to consider and appropriately design vibration mitigation, where warranted, to mitigate project vibration impacts. This detailed assessment

for noise and vibration will consider both infrastructure changes and service increase to determine reasonable and feasible mitigation.

Construction noise and vibration are unavoidable in most cases. Based on the expected duration of construction and the proximity of receivers to the project corridor, noise and vibration from construction is expected to affect the nearest residential structures. Consequently, after final engineering design is complete and construction means and methods are known, the contractor shall perform detailed analyses of construction activities and prepare a construction noise and vibration control plan for affected structures. Construction will comply with UDOT's Standard Specification Section 02498 (Vibration Monitoring during Construction) that will direct monitoring vibration at susceptible facilities adjacent to construction areas where construction activities are generating high-intensity vibrations (pile driving, heavy compaction equipment, or demolition).

The noise and vibration assessments are based on a 30% engineering design and have been performed in accordance with the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA manual; FTA 2018).

Noise Assessment

This section describes the evaluation of project-related noise compared to applicable noise criteria; presents methodology used to perform this evaluation, results, and impacts; and discusses mitigation of project noise.

Noise Assessment Criteria

Thresholds for noise impacts are based on the purpose of the noise-sensitive receiver (referred to as the "land use," which is divided into three categories) and the existing noise levels. The three land use categories are:

- Category 1: High sensitivity land use, such as outdoor concert areas and recording studios.
- Category 2: Land where people sleep, such as residential neighborhoods, hospitals, and hotels.
- Category 3: Institutional land use, such as Schools, libraries, theaters, places of worship, cemeteries, monuments, museums, certain historical sites, parks, and recreation facilities.

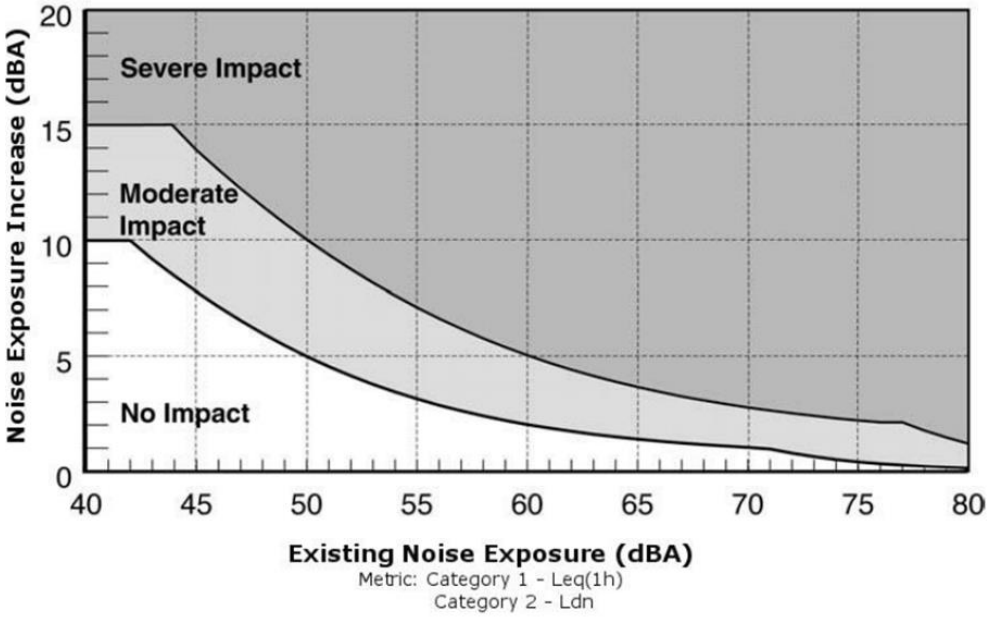
FTA manual uses two primary noise measurement descriptors to assess the impact of noise for transit projects. These descriptors are the 1-hour continuous equivalent sound level (L_{eq}) and the day-night average sound level (L_{dn}). The L_{dn} is a 24-hour cumulative A-weighted noise level that includes all noise that occurs throughout a 24-hour period with an added 10 dBA (A-weighted decibel) increase adjustment during nighttime hours (between 10 PM and 7 AM) to represent increased nighttime noise sensitivity and potential interference with sleep. This makes the L_{dn} useful when assessing noise in residential areas or other land uses where overnight sleep occurs. The L_{eq} is used primarily to assess noise impacts at locations that are used primarily in the daytime and/or evening (land use Categories 1 or 3), while the L_{dn} is used to assess noise in residential areas and land uses where people typically sleep overnight (land use Category 2).

The FTA noise impact criteria are defined by two curves that allow a varying amount of project noise based on the existing noise level. For projects for which there is existing rail activity in a corridor that the project would either improve or be built within, a cumulative assessment may be used. The criteria limits for cumulative impact assessment are shown in Figure 1 (Category 1 and 2 land uses) and Figure 2 (Category 3 land uses).

The two degrees of noise impact defined by the FTA criteria are:

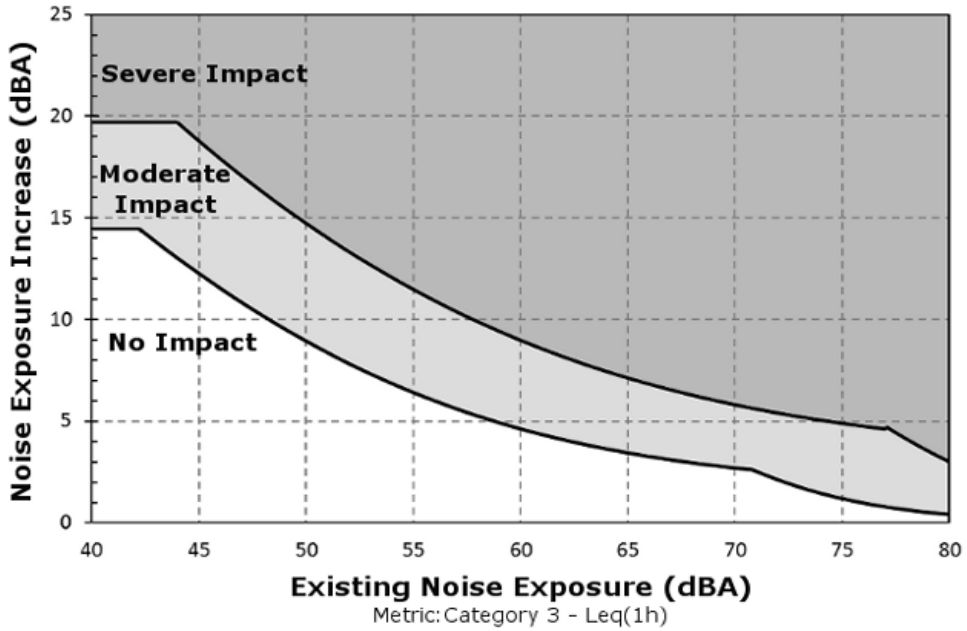
- *Severe Impact:* a large percentage of people would be highly annoyed by the project-generated noise. Noise mitigation will normally be specified for severe impact areas unless it is not feasible or reasonable.
- *Moderate Impact:* changes due to the project-generated cumulative noise level are noticeable but might not be sufficient to cause strong, adverse reactions from the community. In this range, other project-specific factors such as predicted increase in noise level, number and type of noise-sensitive land uses, and cost-effectiveness of mitigation procedures need to be considered to determine the potential impact and need for mitigation.

Figure 1. Cumulative FTA Noise Criteria for Category 1 and Category 2 Land Uses



Source: FTA manual, Figure 4-3

Figure 2. Cumulative FTA Noise Criteria for Category 3 Land Uses



Source: FTA manual, Figure 4-4

Noise Assessment Methodology

In accordance with the FTA manual, the project team evaluated project-related noise levels at receivers in the vicinity and their associated impacts.

This noise assessment accounted for both existing transit activity on existing trackwork (UTA) and existing freight train activity operated primarily by Union Pacific Railroad (UP). Because the noise from the existing rail corridor is considered the dominant noise source along the rail corridor in this area, the existing noise levels were calculated based on the current rail operation conditions. This method is considered a conservative (that is, protective) method over field environmental noise monitoring and measurements because it assumes lower existing ambient noise levels at receivers farther from the project rail corridor; lower existing levels result in a lower impact threshold and potentially overestimate project-related noise increases.

The lists below summarize the operational information used to model transit and freight rail activity.

Existing UTA FrontRunner (transit) operational information[1]:

- Daily train volume of 56 trains comprising 46 daytime trains and 10 nighttime trains (30-minute headway)
- Trains consist of 1 locomotive and 4 railcars (Crowther 2022)
- Train speeds of 30 miles per hour (mph)[2] for wayside travel
- Train speeds of 45 mph[3] over crossovers

Anticipated UTA FrontRunner (transit) operational information[4]:

- Daily train volume of 56 trains comprising 46 daytime trains and 10 nighttime trains (30-minute headway)
- Trains consist of 1 locomotive and 4 railcars (Crowther 2022)
- Train speeds of 30 mph for wayside travel
- Train speeds of 45 mph over crossovers

Existing and anticipated UP (freight) operational information[5]:

- Daily train volume of 9 trains comprising 5 daytime trains and 4 nighttime trains
- Trains consist of 5 freight locomotives and 120 freight railcars (Meister 2023)
- Train speeds of 40 mph (Meister 2023)

Note that, in both the existing and proposed cases, no horns were modeled in the project vicinity.

Noise Impacts

The land uses on both sides of the rail corridor throughout the project extent are mainly single- and multi-family residences (which the FTA manual designates as Category 2 receivers). In addition to these Category 2 receivers, the project team identified one Category 3 receiver (The Hive Collaborative, a performing arts theater) on the north side of the project corridor within the noise screening distance of 375 feet.

In accordance with the FTA manual, the noise assessment was conducted in two approaches: a contour-based evaluation was conducted for Category 2 receivers; and a discrete-receiver-based evaluation was conducted for Category 3 receivers.

---

[1] Existing FrontRunner operational information was cited from FrontRunner train schedule, accessed online at the following address, January 2025: https://www.rideuta.com/Rider-Tools/Schedules-and-Maps/750-FrontRunner.

[2] Speeds throughout the Provo segment vary between 45 mph and 30 mph. The project team performed calculations with both these speeds and selected the more conservative (impact contours are larger) of the two. In this situation, this was 30 mph for regular trackwork and 45 mph for special trackwork. Noise impact buffers from these speeds are discussed in the *Noise Impacts* section.

[3] Speeds throughout the Provo segment vary between 30 and 45 mph. The project team performed calculations with both these speeds and selected the more conservative (impact contours are larger) of the two. In this situation, this was 30 mph for regular trackwork and 45 mph for special trackwork. Noise impact buffers from these speeds over regular trackwork and special trackwork are discussed in the *Noise Impacts* section.

[4] See footnote 1.

[5] Freight train–related speeds and traffic volumes were referenced from the corridor-wide noise assessment performed by Cross-Spectrum Acoustics in 2023. Further information included in *References* section.

In the contour-based evaluation, the project team calculated impact distances using the Category 2 L_{dn} metric. Receivers that were within these buffers were then identified as being impacted. For the contour-based evaluation for Category 2 receivers, the project team calculated existing and expected noise exposure using the above methodology at increasing distances—from the existing UTA ML No. 1 for transit noise and from the existing UP ML No. 1 for freight train noise—to determine the distance to the moderate and severe impact contours shown in Figure 1 above. In the discrete-receiver-based evaluation for the Category 3 receive (The Hive Collaborative), the project team performed the general noise assessment at discrete receiver points. Note that since this is a Category 3 receiver, this assessment was performed with the Leq metric. At these receiver points, existing and proposed noise were calculated, and then the relative increase was compared to the cumulative FTA impact criteria thresholds.

The noise assessment results are discussed below.

For the Category 2 receivers, the project team contoured the calculated noise impact distances in geographic information systems (GIS) software (to create annotated buffer zones) around the existing UTA ML No. 1 to estimate the distances at which moderate and severe impacts are anticipated to occur. For special trackwork (that is, switches, turnouts, and crossovers), the impact distances were delineated in a circle around the center point of the special trackwork to represent a point source with hemispherical spreading of noise. For all other areas, the distance was contoured parallel to the centerline of a datum track (proposed UTA ML No. 1 for transit noise and existing UP ML No. 1 for freight train noise) in each direction to represent a line source with cylindrical spreading of noise. These contours are illustrated in Appendix 1.

With the Project, severe noise impacts are predicted to occur:

- Within 23 feet of regular trackwork
- Within 25 feet of special trackwork

With the Project, moderate noise impacts are predicted to occur:

- Between 23 and 42 feet from regular trackwork
- Between 25 and 56 feet from special trackwork

Noise impacts for Category 2 land uses were evaluated at building envelopes; that is, if the impact buffers overlapped with the envelope of a building, the receiver is considered impacted. The basis for evaluating impacts at the building envelope is that nighttime sleep is the most noise-sensitive activity at Category 2 land uses, and this sleep is expected to occur indoors.

Using the noise impact buffers, 12 total noise impacts (3 severe and 9 moderate) are expected to occur at several residences due to the Project. Note that 5 out of these 12 identified residences with impacts are proposed to be acquired for the Project right-of way and the residents would be relocated; these acquisitions would effectively eliminate these 5 impacts. The 3 severe impacted receivers would be among the 5 to be acquired. After these residences are acquired, 7 moderate impacts would remain. All 12 of the noise impacts, including those that will be acquired, are shown in the figures in Appendix 1.Results of these evaluations are included in Appendix 2.

Noise Mitigation

For the remaining 7 noise impacts, UTA's noise mitigation policy states that noise mitigation will be explored if existing L_{dn} noise levels at the location of a receiver exceed 65 dBA. Calculations indicate that both existing and proposed conditions within the impact contour represent levels greater than 65 dBA. Therefore, all 7 remaining impacts would experience L_{dn} from project-related noise greater than 65 dBA, and UTA and UDOT will explore mitigation for these 7 receivers.

The figure for receiver R44 in Appendix 1 shows a moderate impact caused by special trackwork. At this location, UTA and UDOT will explore special trackwork–related mitigation such as spring-rail frogs.

UTA and UDOT will explore mitigation in more detail during the final engineering design of the Project. Mitigation will be designed to mitigate the cumulative impacts from the infrastructure changes presented in this memorandum and impacts from expected traffic increases identified in a concurrent corridor level noise and vibration assessment.

This detailed assessment will consider both infrastructure changes and service increase to determine reasonable and feasible mitigation. For noise, mitigation measures could include noise walls, replacing windows and doors of residences in the vicinity to higher sound attenuating windows/doors, relocating switches/special track work, and using spring rail frogs for the special track work, and ballast mats.

Vibration Assessment

This section describes the evaluation of project-related vibration compared to the applicable vibration criteria; presents methodology used to perform this evaluation, results, and impacts; and discusses potential mitigation measures.

Vibration Impact Criteria

Tables 6-2 and 6-3 in the FTA manual set forth criteria for vibration impact assessments, organized by land use category and frequency of vibration events.

Table 6-3 of the manual states that for a Category 2 receiver (any receiver where overnight sleep could occur, such as a residential land use), where the project proposes to have an occasional frequency of service (defined as between 30 and 70 events per day, in Table 6-2), the appropriate criteria against which vibration assessment results should be compared to evaluate an impact or

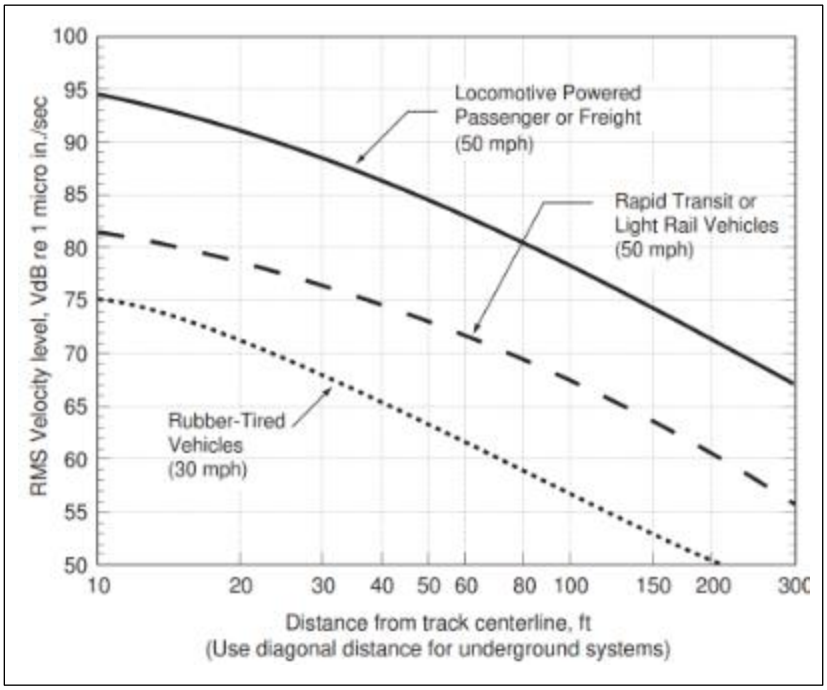
otherwise is 75 VdB. This level of service frequency and receiver land use category accurately reflects this project, and thus 75 VdB is the appropriate criteria.

That said, note that this project is being proposed within a corridor where existing rail activity exists. The FTA manual outlines a more detailed procedure for projects where existing rail activity exists. This methodology is described in the subsequent part of this memorandum.

Vibration Assessment Methodology

FTA manual provides generalized predictive ground surface vibration curves for a variety of transit modes, which is shown on Figure 3.

Figure 3. Generalized Ground Surface Vibration Curves



Source: FTA manual, Figure 6-4

The Locomotive-Powered Passenger or Freight Curve is the appropriate selection for the transit trains in the project corridor; these trains are operated by conventional diesel-electric locomotives. This curve gives the vibration level in vibration decibels (VdB) at a specified distance for a train moving at 50 mph (the reference speed).

The FTA Manual provides project-specific adjustment factors that can be applied to the standard vibration curve above. The vibration assessment included the following assumptions for adjustment factors:

- Train Speed
    - Adjustment applied using Equation 6-4 from the FTA manual.

- Vehicle Parameters
    - Vehicles were assumed to have normal, not stiff, primary suspension; wheels in good condition; and no resilient wheels: no adjustments.
- Track Conditions and Treatments
    - Track was assumed to be continuously welded rail (CWR) with good-condition running surfaces.
    - All other tracks, both UTA FrontRunner and UP freight, were assumed to have no special vibration-reducing track treatments: no adjustments.
    - Adjustments were applied within 200 feet of special trackwork: +10 VdB within 100 feet and +5 VdB between 100 feet and 200 feet.
- Ties and Track Structure
    - Assumed at-grade tie and ballast with no resilient ties and no transit structures: no adjustments.
- Ground-borne Propagation Effects
    - No evidence of efficient propagation in soil, and no shallow rock layer: no adjustments.

Assumptions for train traffic volumes for determining vibration impact criteria were the same as the assumptions for noise modeling presented above.

Assessment Methodology for Existing Vibration

The Project would be implemented in a train corridor with existing train traffic, and some receivers might already experience vibration effects. This assessment evaluates locations where existing vibration already exceeds vibration criteria at the first row of receivers and the Project would increase vibration over existing vibration by more than 3 VdB which roughly corresponds to a doubling of vibration energy and is considered a threshold for vibration impact. Using these criteria, the expected vibration from the Project might exceed the 75 VdB criterion (, like described in the vibration impact criteria section above, from the Table 6-3 of the FTA manual; for occasional events for Category 2 [residential] land uses) at certain receivers; however, consistent with the FTA manual, if the increase over the existing vibration is less than 3 VdB, the project finding would be no vibration impact.

Vibration Impacts

Vibration impacts were identified at 14 Category 2 (residential) receivers. The outputs of this modeling are included in Appendix 2. As shown on the figures, receivers R84, R22, and R23 would be impacted by wayside vibration. The remaining 11 vibration impacts are due to the receivers' proximity to the proposed special trackwork.

Note that receiver R64 would be impacted by special trackwork–related vibration. This receiver is located 203 feet from the closest existing switch point and 174 feet from the closest proposed switch point. Per FTA manual, special trackwork–related vibration adjustments apply only when a receiver is located within 200 feet of a switch point. Therefore, the vibration calculations for the existing condition did not include this adjustment, but it did under the anticipated condition. On this basis, the vibration assessment predicts that there would be more than a 3-VdB increase in vibration

levels at this receiver. However, the increase in distance is 29 feet, and the corresponding 3 VdB increase is unlikely. Receiver R64 is still considered an impact on the basis of these calculations.

Vibration Mitigation

As mentioned in the *Noise Mitigation* section above, 5 multi-family residential buildings in the project vicinity would be acquired and demolished and the residents relocated; and they were identified as potentially impacted by project vibration . These acquisitions would thus reduce the calculated project-generated vibration impacts from 14 to 9 receivers. These impacts are illustrated in the vibration impact figures in Appendix 2.

The remaining 9 impacts (all Category 2 residential receivers) would be based on their proximity to the project corridor. These impacts would result from both wayside and special trackwork–related vibration. Various measures are recommended in the FTA manual to reduce these vibration impacts, including using ballast masts (about a 10 VdB reduction), floating slabs (about 15 VdB reduction), or high-resilience fasteners (5 to 10 VdB reduction) for regular trackwork. Note that the wayside vibration impacts that would remain post-acquisition would exceed the 3 VdB increase impact criterion by fractions of a VdB (between 0 and 0.5 VdB, like shown in Appendix 4). On this basis, more-straightforward mitigation measures such as resilient fasteners may be viable options for mitigation.

Special trackwork–related vibration can be mitigated by implementing spring-rail frogs or movable-point frogs. These types of special components in railroad switches can minimize the gap in the track (discontinuity) for one side of the switch and reduce vibration.

Mitigation for vibration impacts will be evaluated in more detail during the final engineering design of the Project and will consider the cumulative impacts from the infrastructure changes presented in this report and impacts from the increase in commuter train service identified in a concurrent corridor level noise and vibration assessment.

Similar to the detailed assessment proposed in the noise mitigation section above, the detailed vibration assessment will consider both infrastructure changes and service increase to determine reasonable and feasible mitigation. For vibration, mitigation measures could include implementation of ballast mats to reduce wayside vibration,and relocating switches/special track work and using spring rail frogs to mitigate special trackwork related vibration.

Construction Noise and Vibration

Construction activities for rail projects can include brush clearing, demolition, excavation, construction of retaining walls, and tracks. At this preliminary design stage, the Project construction means and methods, the exact equipment that would be used by the construction contractor and the locations of equipment use have not been determined. However, construction is expected to last months, and there are several residential structures within 50 feet or less from the railroad right-of-way. The project team anticipates that construction noise and vibration could affect residences in close proximity.

Although construction noise and vibration effects are unavoidable, steps can be taken to minimize the impacts. Given the prolonged duration of construction and the proximity of residences, the contractor would prepare a construction noise and vibration control plan before beginning construction. This plan

would include detailed predictions of construction noise and vibration, requirements for conducting construction noise or vibration monitoring, and, if necessary, detailed approaches that would mitigate potential construction-period noise or vibration impacts.

Construction will comply with UDOT's Standard Specification Section 02498 (Vibration Monitoring during Construction) that will direct monitoring vibration at susceptible facilities adjacent to construction areas where construction activities are generating high-intensity vibrations (pile driving, heavy compaction equipment, or demolition). UDOT and UTA do not have construction-related noise criteria. Utah State law (Utah code Title 72, Chapter 6, Part 1, Section 112.5) exempts commuter rail construction project from local noise ordinances.

The following is a list of measures that the contractor could use to reduce construction noise levels at nearby noise-sensitive receivers:

- Use quiet, properly functioning equipment maintained in good repair and fitted with silencers or mufflers that provide the same or better noise reduction than original equipment manufacturer (OEM) equipment.
- To the extent possible, provide temporary construction noise barriers that block the line of sight from noisy activities to noise-sensitive receivers.
- Plan truck routes and loading activities away from noise-sensitive receivers.
- As feasible, provide walled enclosures or mass-loaded wrap curtains around noisy equipment or activities.
- As feasible, wrap noisy equipment with mass-loaded vinyl.
- Stage noisy equipment away from noise-sensitive receivers.
- Perform noisy activities during daytime hours.
- Instead of using audible back-up alarms for vehicles, use flagpersons to control construction vehicle movements.
- Minimize unnecessary idling of heavy equipment and machinery, especially diesel engines and generators, when they are not in use.
- Consider alternative (quieter) construction processes.

References

Crowther, Brent
2022 Email correspondence from Brent Crowther, Kimley-Horn, to Heidi Spoor, HDR, Inc., regarding the typical FrontRunner trainset configuration. April 8.

[FTA] Federal Transit Administration
2018 Transit Noise and Vibration Impact Assessment.

Meister, L.
2023 FrontRunner Forward Corridor Level Noise and Vibration Analysis Technical Memorandum. Cross-Spectrum Acoustics, Inc.

Appendix 1

Noise Impact Figures

UTA FrontRunner Forward

UDOT Keeping Utah Moving

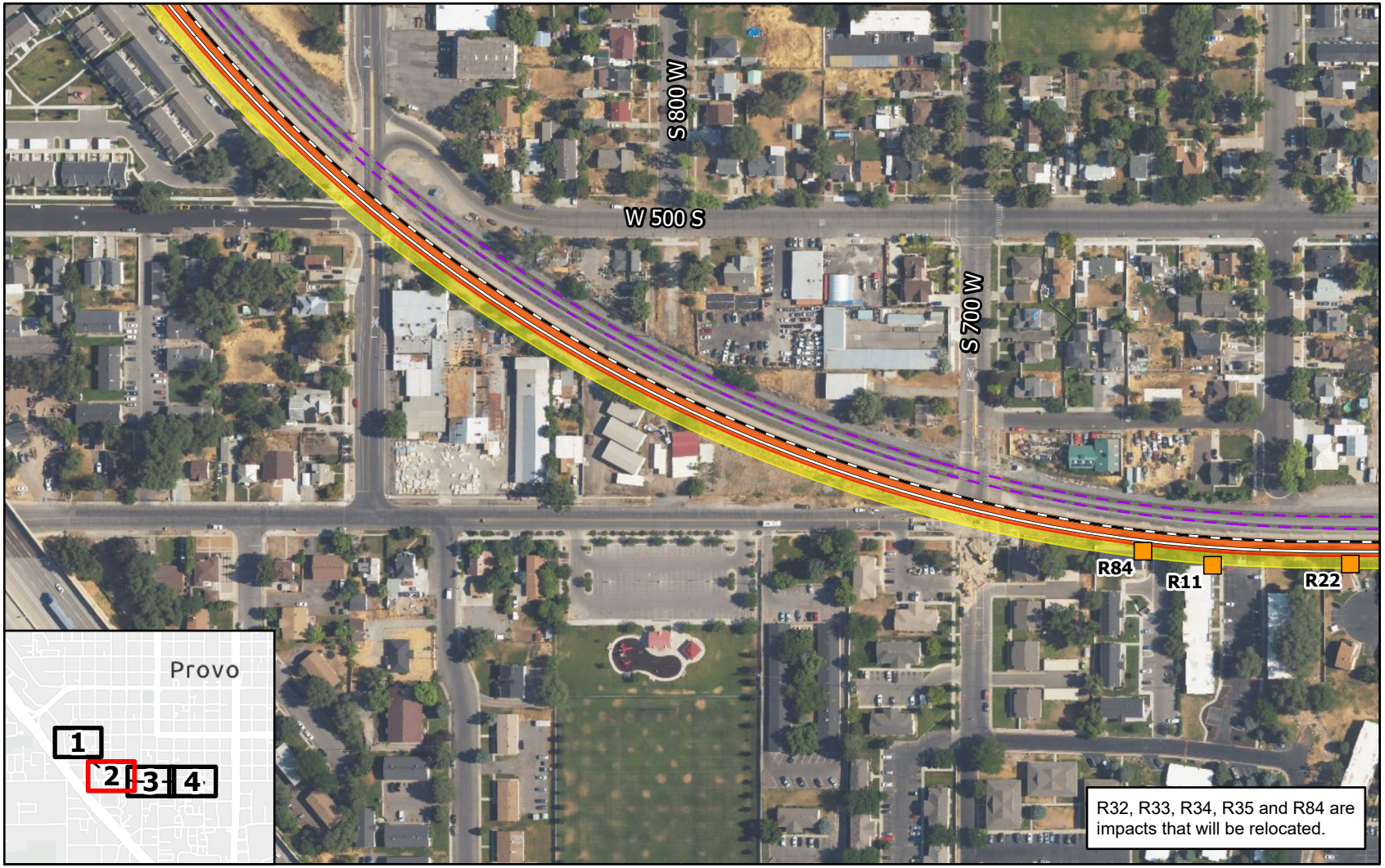
PROVO DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

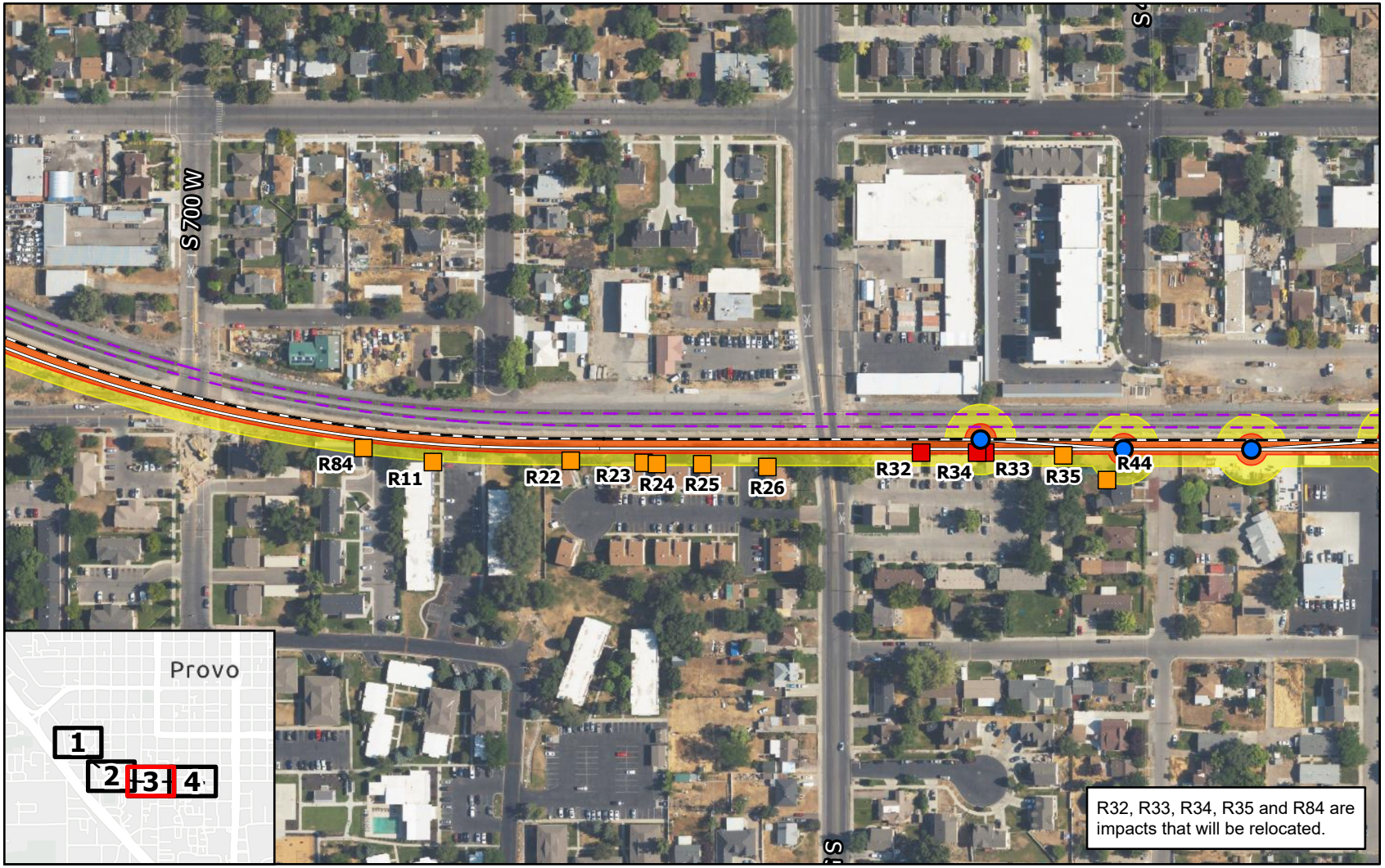
PROVO DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour
- Moderate Impact

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

PROVO DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour
- Moderate Impact
- Severe Impact
- Proposed Special Track Work

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

0 110 220 US Feet

N

UTA FrontRunner Forward

UDOT Keeping Utah Moving

PROVO DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour
- Moderate Impact
- Proposed Special Track Work

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet

Appendix 2

Noise Impact Calculation Tables

Summary of Noise Analysis Results - Contour Calculations

Segment Name	Wayside Noise		Special Trackwork Noise	
	Distance for Severe Impact (ft)	Distance for Moderate Impact (ft)	Distance for Severe Impact (ft)	Distance for Moderate Impact (ft)
Provo West (30 MPH)	23	42	24	48
Provo West (45 MPH)	22	39	25	56
Provo Station (30 MPH + throttle)	No Severe Impacts	44	44	51
Provo Station (45 MPH + throttle)	No Severe Impacts	42	42	62

Summary of Noise Analysis Results - Receiver Calculations

Receptor ID	Dictating Land Use	Total Existing Noise (dBA)	Total Project Noise (dBA)	Increase (dBA)	Increase (dBA) until Moderate Impact	Increase (dBA) until Severe Impact	Impact Type
The Hive Collaborative	3	65.9	65.9	0.0	3.3	6.9	NO IMPACT

Appendix A-1

North of Provo Double Track Project
Noise Impact Maps

Appendix 3

Vibration Impact Figures

UTA FrontRunner Forward

UDOT Keeping Utah Moving

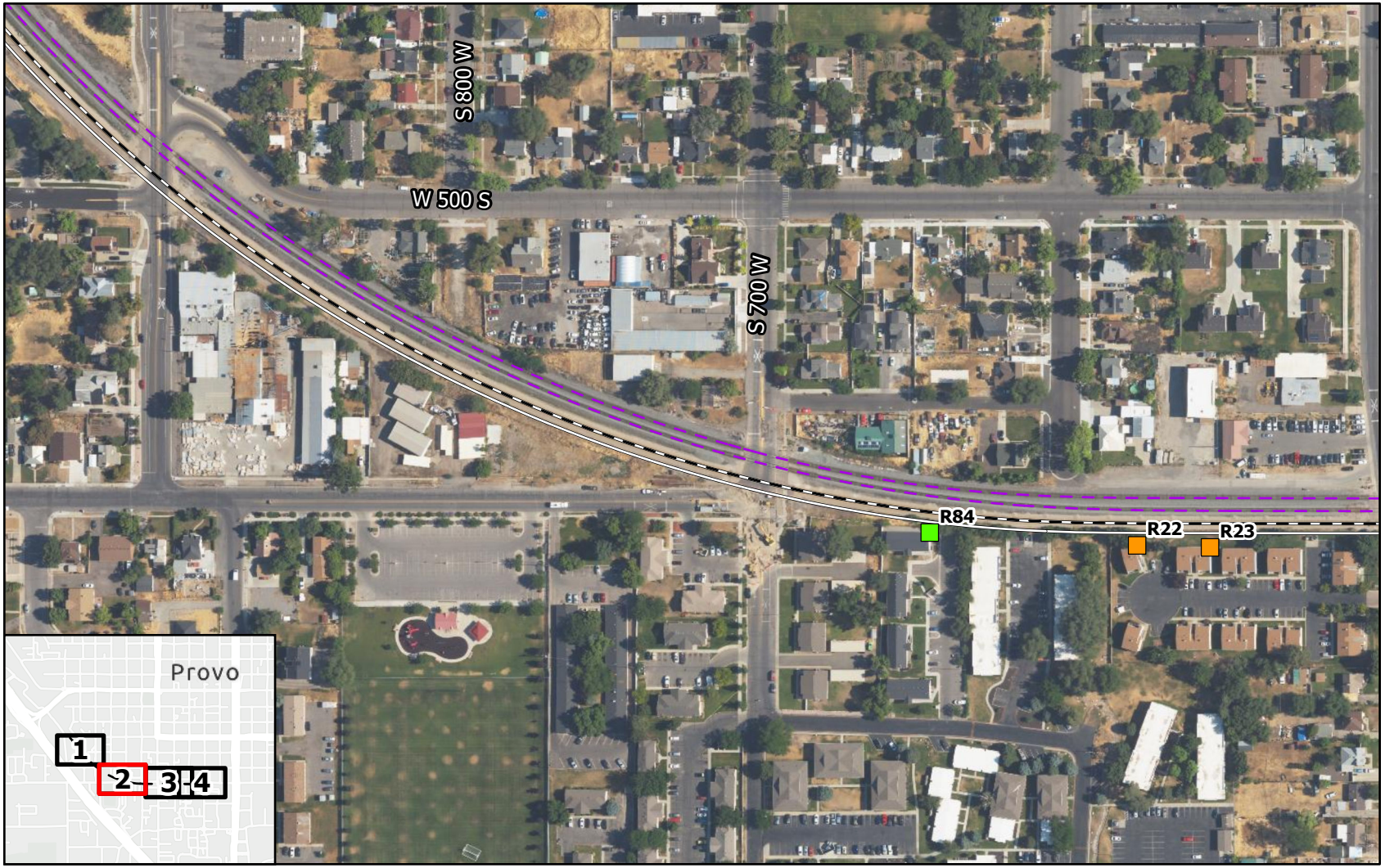
PROVO DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

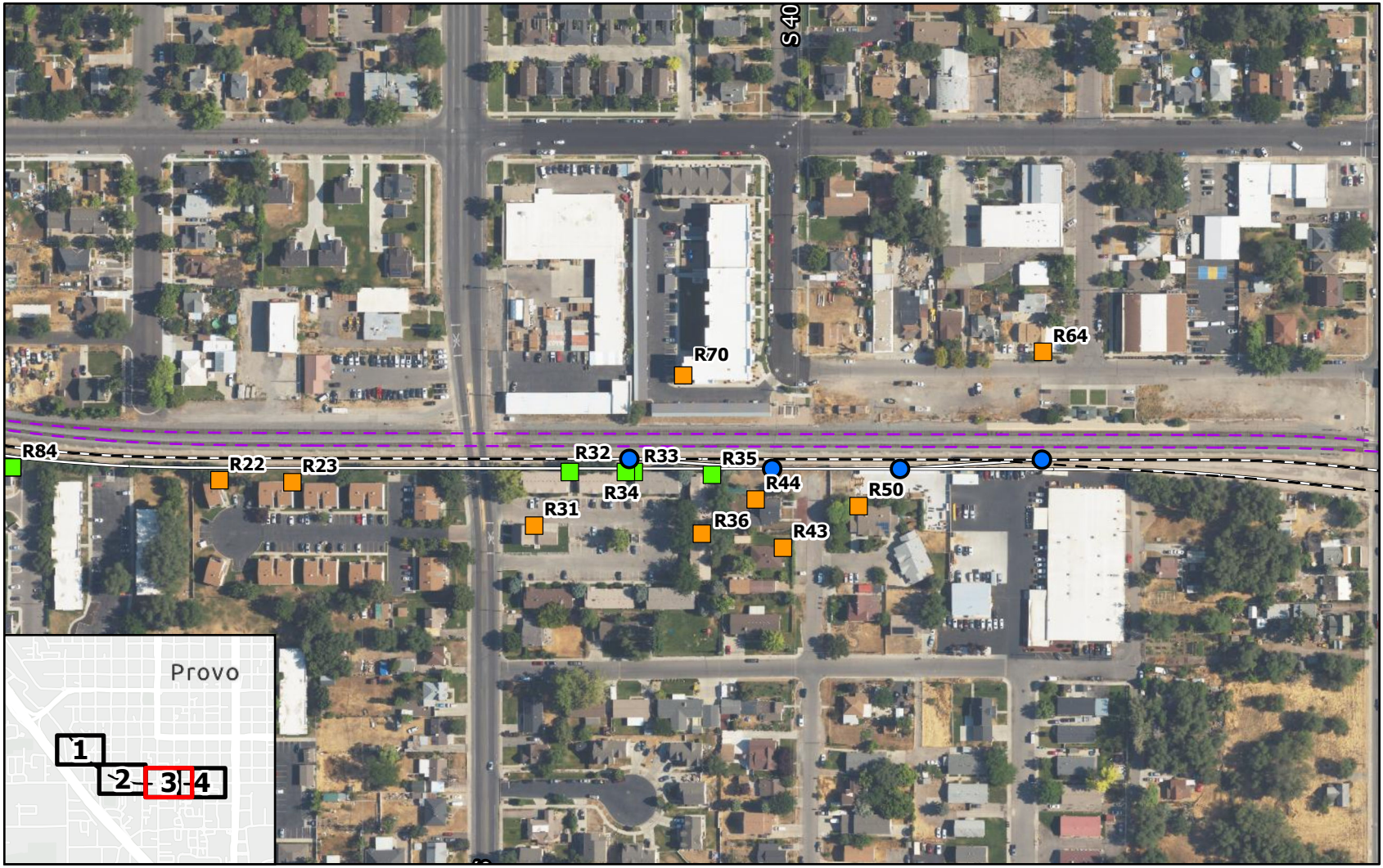
PROVO DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Impacts
- Impacts to be Relocated

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

PROVO DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Impacts
- Impacts to be Relocated
- Proposed Special Track Work

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet

UTA FrontRunner Forward

UDOT Keeping Utah Moving

PROVO DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

- Existing UP Track
- Existing UTA Track
- Proposed UTA Track
- Impacts
- Proposed Special Track Work

DATA SOURCES:
Aerial Imagery: State of Utah
Google Imagery - 2018
Aquatic Resources Data: HDR
PROJECTION:
Utah Stateplane Central
CARTOGRAPHER:
HDR

N

0 110 220 US Feet

Appendix 4

Vibration Impact Calculation Tables

Reported Impacts for Provo

Information about Vibration Sensitive Receiver		Receptor Vibration Levels (VdB)			Impact Status	
Receptor ID	Land Use Category	Existing L_v	Project L_v	Increase	Increase over Existing L_v > 3 VdB?	Impact at Receiver?
R22	2	86.5	89.7	3.2	Y	Y
R23	2	85.9	88.9	3.0	Y	Y
R31	2	76.9	83.2	6.3	Y	Y
R32	2	90.0	104.4	14.4	Y	Y
R33	2	90.2	104.5	14.3	Y	Y
R34	2	90.0	104.5	14.4	Y	Y
R35	2	91.5	102.9	11.5	Y	Y
R36	2	76.5	82.0	5.5	Y	Y
R43	2	75.2	80.2	5.0	Y	Y
R44	2	83.6	93.6	10.0	Y	Y
R50	2	85.3	92.0	6.7	Y	Y
R64	2	72.1	77.2	5.1	Y	Y
R70	2	75.0	80.2	5.2	Y	Y
R84	2	87.1	90.6	3.5	Y	Y

APPENDIX A-1
NOISE IMPACT BUFFERS
NORTH OF PROVO DOUBLE TRACK PROJECT

Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

Noise Sensitive Land Use

- Category 2
- Noise Buffer - Severe
- Noise Buffer - Moderate

Impacts

- Moderate
- Moderate (Relocation)
- Severe (Relocation)

0 200 Ft

Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

Noise Sensitive Land Use

- Category 2
- Noise Buffer - Severe
- Noise Buffer - Moderate

Impacts

- Moderate
- Moderate (Relocation)
- Severe (Relocation)

0 200 Ft

\\MSPE-SRV1\MPLSDATA\GISPROJ\UDOT\10386518_FRONTRUNNER\7.2_WIP\APRX\UDOT_FRONTRUNNER_FIGURES\UDOT_FRONTRUNNER_FIGURES_V017.APRX DATE: 4/2/2025

APPENDIX A-1
NOISE IMPACT BUFFERS
NORTH OF PROVO DOUBLE TRACK PROJECT

Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

Noise Sensitive Land Use

- Category 2
- Noise Buffer - Severe
- Noise Buffer - Moderate

Impacts

- Moderate
- Moderate (Relocation)
- Severe (Relocation)

0 200 Ft

Appendix A-2

North of Provo Double Track Project
Vibration Impact Maps

APPENDIX A-2
VIBRATION IMPACT BUFFERS
NORTH OF PROVO DOUBLE TRACK PROJECT

Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

Noise Sensitive Land Use

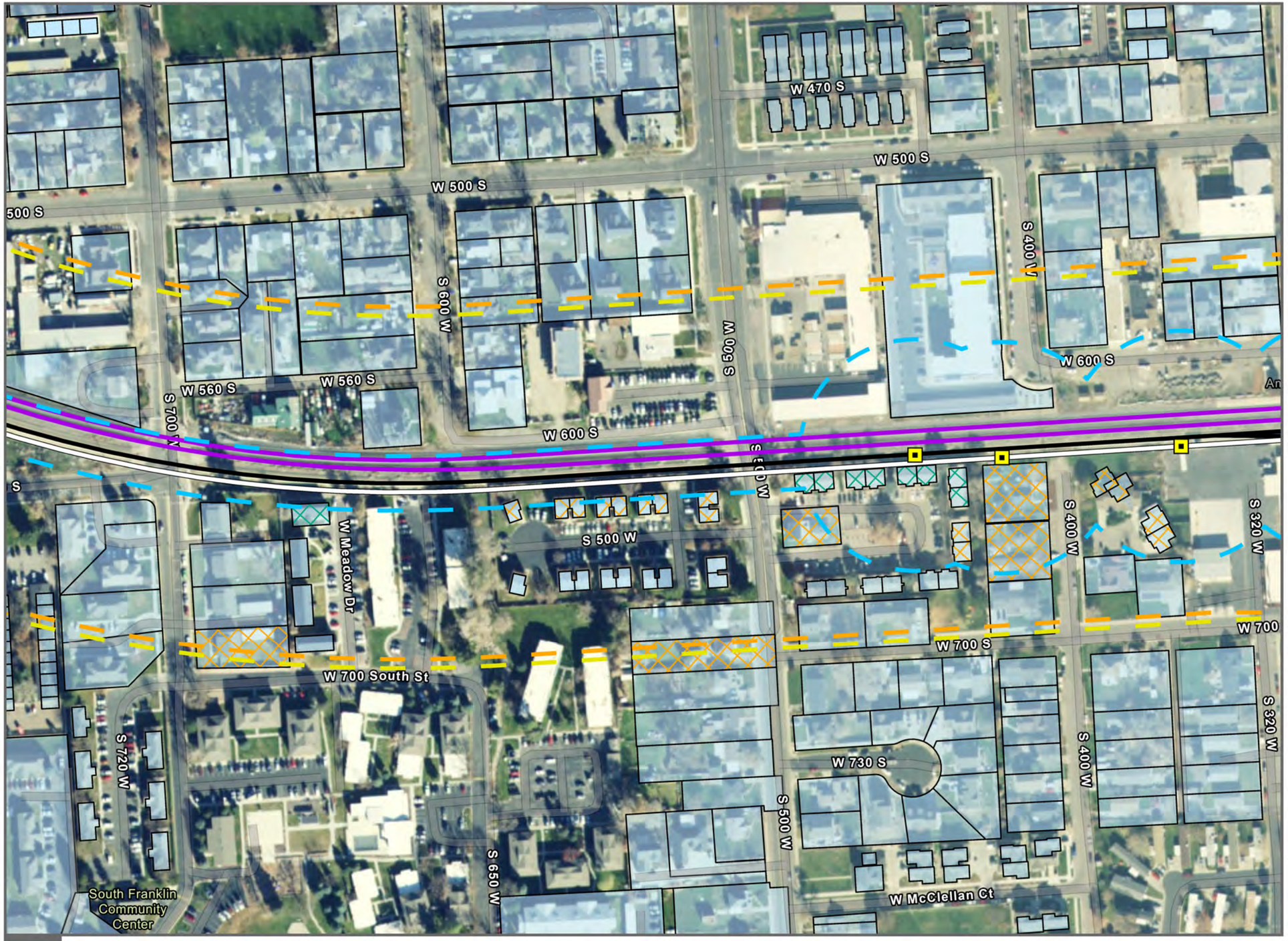
- Category 2

Impacts

- Vibration
- Vibration (Relocation)
- Proposed Vibration at least 3 VdB above Existing Vibration
- Existing Vibration > 75 VdB
- Proposed Vibration > 75 VdB

0 200 Ft

\\MSPE-SRV1\MPLSDATA\GISPROJ\UDOT\10386518_FRONTRUNNER\7.2_WIP\APRX\UDOT_FRONTRUNNER_FIGURES\UDOT_FRONTRUNNER_FIGURES_V017.APRX DATE: 4/2/2025



APPENDIX A-2
VIBRATION IMPACT BUFFERS
NORTH OF PROVO DOUBLE TRACK PROJECT

Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

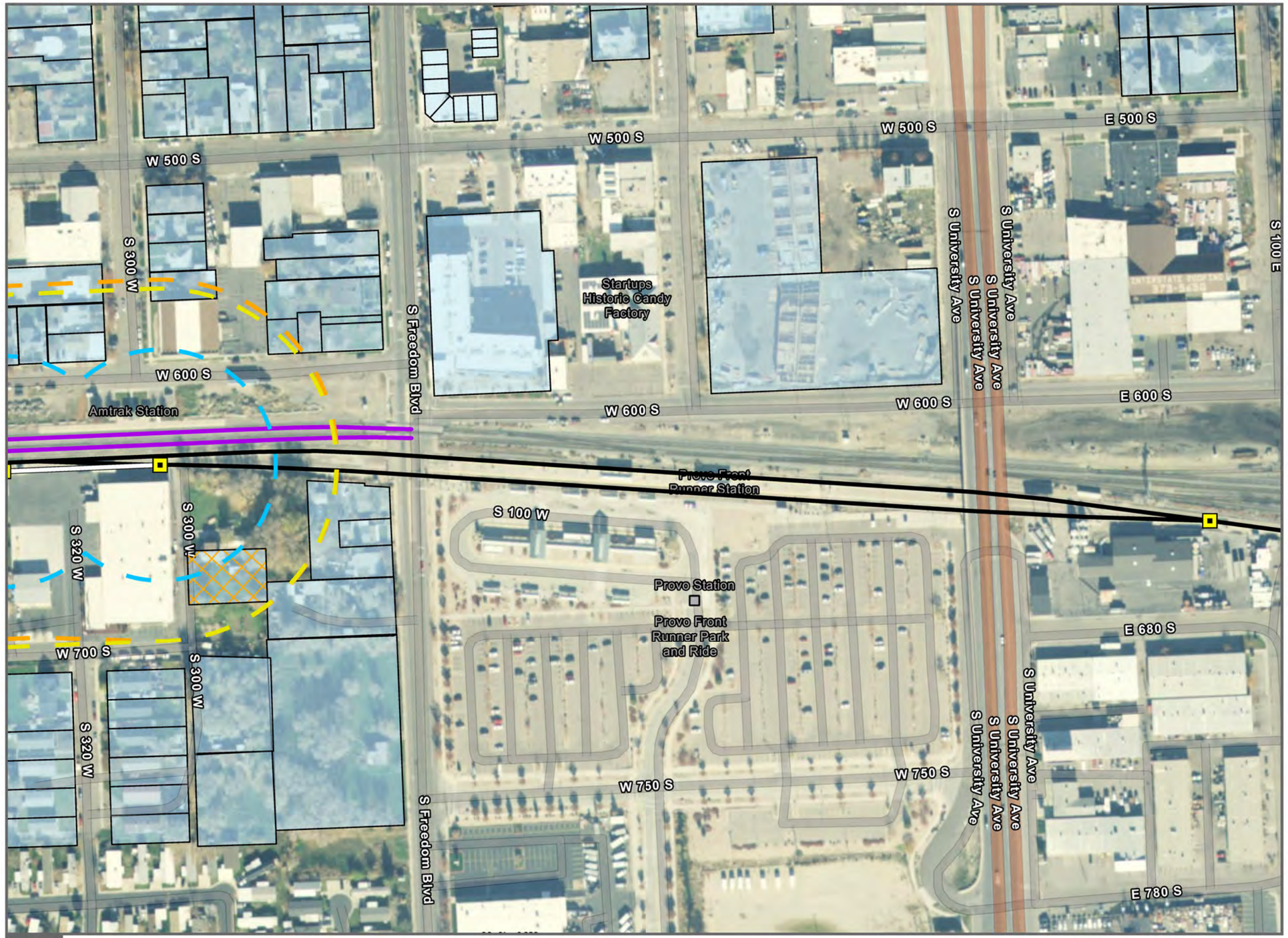
Noise Sensitive Land Use

- Category 2

Impacts

- Vibration
- Vibration (Relocation)
- Proposed Vibration at least 3 VdB above Existing Vibration
- Existing Vibration > 75 VdB
- Proposed Vibration > 75 VdB

0 200 Ft



Legend

- Existing UP
- Existing UTA ML1
- Proposed UTA ML2
- Crossover Points

Noise Sensitive Land Use

- Category 2

Impacts

- Vibration
- Vibration (Relocation)
- Proposed Vibration at least 3 VdB above Existing Vibration
- Existing Vibration > 75 VdB
- Proposed Vibration > 75 VdB

0 200 Ft

Appendix A-3

North of Provo Double Track Project
Noise Impact Analysis

Calculation of Distance to Moderate and Severe impacts (Provo section, Wayside Noise)

Distance (ft)	Calculated Existing L_{dn} (dBA) (Commuter only)	Calculated Existing L_{dn} (dBA) (Freight only)	Total Existing L_{dn} (dBA)	Calculated Proposed L_{dn} (dBA) (2nd Track)	Calculated Proposed L_{dn} (dBA) (1st Track)	Calculated Proposed L_{dn} (dBA) (Freight only)	Total Proposed L_{dn} (dBA)	Increase (dBA) (Prop L_{dn} - Exist L_{dn})	Increase that causes MODERATE Impact	Increase that causes SEVERE Impact	Impact Status
1	91.4	77.4	91.5	-	88.4	77.4	-	-	-	-	-
2	86.8	77.2	87.3	-	83.8	77.2	-	-	-	-	-
3	84.2	77.0	85.0	-	81.2	77.0	-	-	-	-	-
4	82.3	76.8	83.4	-	79.3	76.8	-	-	-	-	-
5	80.9	76.6	82.3	-	77.9	76.6	-	-	0.1	0.7	SEVERE
6	79.7	76.4	81.4	-	76.7	76.4	-	-	0.1	0.9	SEVERE
7	78.7	76.3	80.7	-	75.7	76.3	-	-	0.1	1.0	SEVERE
8	77.8	76.1	80.0	-	74.8	76.1	-	-	0.1	1.2	SEVERE
9	77.0	75.9	79.5	-	74.0	75.9	-	-	0.2	1.3	SEVERE
10	76.4	75.8	79.1	-	73.4	75.8	-	-	0.2	1.4	SEVERE
11	75.7	75.6	78.7	-	72.7	75.6	-	-	0.2	1.5	SEVERE
12	75.2	75.4	78.3	-	72.2	75.4	-	-	0.2	1.7	SEVERE
13	74.6	75.3	78.0	-	71.6	75.3	-	-	0.2	1.8	SEVERE
14	74.2	75.1	77.7	-	71.2	75.1	-	-	0.2	1.9	SEVERE
15	73.7	75.0	77.4	-	70.7	75.0	-	-	0.2	2.0	SEVERE
16	73.3	74.9	77.2	88.4	70.3	74.9	88.6	11.5	0.3	2.0	SEVERE
17	72.9	74.7	76.9	83.8	69.9	74.7	84.5	7.6	0.3	2.0	SEVERE
18	72.5	74.6	76.7	81.2	69.5	74.6	82.3	5.6	0.3	2.1	SEVERE
19	72.2	74.4	76.5	79.3	69.2	74.4	80.9	4.4	0.3	2.1	SEVERE
20	71.8	74.3	76.3	77.9	68.8	74.3	79.8	3.6	0.3	2.1	SEVERE
21	71.5	74.2	76.1	76.7	68.5	74.2	79.0	3.0	0.3	2.1	SEVERE
22	71.2	74.1	75.9	75.7	68.2	74.1	78.4	2.5	0.3	2.1	SEVERE
23	70.9	73.9	75.7	74.8	67.9	73.9	77.9	2.2	0.4	2.1	SEVERE
24	70.7	73.8	75.5	74.0	67.7	73.8	77.4	1.9	0.4	2.2	MODERATE
25	70.4	73.7	75.4	73.4	67.4	73.7	77.0	1.7	0.4	2.2	MODERATE
26	70.1	73.6	75.2	72.7	67.1	73.6	76.7	1.5	0.4	2.2	MODERATE
27	69.9	73.5	75.0	72.2	66.9	73.5	76.4	1.3	0.4	2.2	MODERATE
28	69.6	73.3	74.9	71.6	66.6	73.3	76.1	1.2	0.4	2.2	MODERATE
29	69.4	73.2	74.7	71.2	66.4	73.2	75.9	1.1	0.4	2.2	MODERATE
30	69.2	73.1	74.6	70.7	66.2	73.1	75.6	1.0	0.5	2.2	MODERATE
31	69.0	73.0	74.5	70.3	66.0	73.0	75.4	0.9	0.5	2.2	MODERATE
32	68.8	72.9	74.3	69.9	65.8	72.9	75.2	0.9	0.5	2.3	MODERATE
33	68.6	72.8	74.2	69.5	65.6	72.8	75.0	0.8	0.5	2.3	MODERATE
34	68.4	72.7	74.1	69.2	65.4	72.7	74.8	0.8	0.5	2.3	MODERATE
35	68.2	72.6	73.9	68.8	65.2	72.6	74.6	0.7	0.5	2.3	MODERATE
36	68.0	72.5	73.8	68.5	65.0	72.5	74.5	0.7	0.5	2.3	MODERATE
37	67.8	72.4	73.7	68.2	64.8	72.4	74.3	0.6	0.5	2.3	MODERATE
38	67.7	72.3	73.6	67.9	64.7	72.3	74.2	0.6	0.6	2.3	MODERATE
39	67.5	72.2	73.5	67.7	64.5	72.2	74.0	0.6	0.6	2.3	NO IMPACT
40	67.3	72.1	73.4	67.4	64.3	72.1	73.9	0.5	0.6	2.4	NO IMPACT
41	67.2	72.0	73.3	67.1	64.2	72.0	73.8	0.5	0.6	2.4	NO IMPACT
42	67.0	71.9	73.1	66.9	64.0	71.9	73.6	0.5	0.6	2.4	NO IMPACT
43	66.9	71.8	73.0	66.6	63.9	71.8	73.5	0.5	0.6	2.4	NO IMPACT
44	66.7	71.8	72.9	66.4	63.7	71.8	73.4	0.4	0.7	2.4	NO IMPACT
45	66.6	71.7	72.8	66.2	63.6	71.7	73.2	0.4	0.7	2.4	NO IMPACT
46	66.4	71.6	72.7	66.0	63.4	71.6	73.1	0.4	0.7	2.4	NO IMPACT
47	66.3	71.5	72.6	65.8	63.3	71.5	73.0	0.4	0.7	2.4	NO IMPACT
48	66.1	71.4	72.5	65.6	63.1	71.4	72.9	0.4	0.7	2.5	NO IMPACT
49	66.0	71.3	72.4	65.4	63.0	71.3	72.8	0.3	0.7	2.5	NO IMPACT
50	65.9	71.2	72.4	65.2	62.9	71.2	72.7	0.3	0.7	2.5	NO IMPACT
51	65.7	71.2	72.3	65.0	62.7	71.2	72.6	0.3	0.7	2.5	NO IMPACT
52	65.6	71.1	72.2	64.8	62.6	71.1	72.5	0.3	0.8	2.5	NO IMPACT
53	65.5	71.0	72.1	64.7	62.5	71.0	72.4	0.3	0.8	2.5	NO IMPACT
54	65.4	70.9	72.0	64.5	62.4	70.9	72.3	0.3	0.8	2.5	NO IMPACT
55	65.3	70.9	71.9	64.3	62.3	70.9	72.2	0.3	0.8	2.5	NO IMPACT
56	65.1	70.8	71.8	64.2	62.1	70.8	72.1	0.3	0.8	2.5	NO IMPACT
57	65.0	70.7	71.7	64.0	62.0	70.7	72.0	0.3	0.8	2.5	NO IMPACT
58	64.9	70.6	71.7	63.9	61.9	70.6	71.9	0.3	0.8	2.5	NO IMPACT
59	64.8	70.6	71.6	63.7	61.8	70.6	71.8	0.2	0.9	2.6	NO IMPACT
60	64.7	70.5	71.5	63.6	61.7	70.5	71.7	0.2	0.9	2.6	NO IMPACT
61	64.6	70.4	71.4	63.4	61.6	70.4	71.6	0.2	0.9	2.6	NO IMPACT
62	64.5	70.3	71.3	63.3	61.5	70.3	71.6	0.2	0.9	2.6	NO IMPACT
63	64.4	70.3	71.3	63.1	61.4	70.3	71.5	0.2	0.9	2.6	NO IMPACT
64	64.3	70.2	71.2	63.0	61.3	70.2	71.4	0.2	0.9	2.6	NO IMPACT
65	64.2	70.1	71.1	62.9	61.2	70.1	71.3	0.2	1.0	2.6	NO IMPACT
66	64.1	70.1	71.0	62.7	61.1	70.1	71.2	0.2	1.0	2.6	NO IMPACT
67	64.0	70.0	71.0	62.6	61.0	70.0	71.2	0.2	1.0	2.6	NO IMPACT
68	63.9	69.9	70.9	62.5	60.9	69.9	71.1	0.2	1.0	2.6	NO IMPACT
69	63.8	69.9	70.8	62.4	60.8	69.9	71.0	0.2	1.0	2.7	NO IMPACT
70	63.7	69.8	70.7	62.3	60.7	69.8	70.9	0.2	1.0	2.7	NO IMPACT
71	63.6	69.7	70.7	62.1	60.6	69.7	70.9	0.2	1.0	2.7	NO IMPACT
72	63.5	69.7	70.6	62.0	60.5	69.7	70.8	0.2	1.0	2.7	NO IMPACT
73	63.4	69.6	70.5	61.9	60.4	69.6	70.7	0.2	1.0	2.7	NO IMPACT
74	63.3	69.5	70.5	61.8	60.3	69.5	70.6	0.2	1.0	2.7	NO IMPACT
75	63.2	69.5	70.4	61.7	60.2	69.5	70.6	0.2	1.0	2.7	NO IMPACT
76	63.1	69.4	70.3	61.6	60.1	69.4	70.5	0.2	1.0	2.7	NO IMPACT
77	63.1	69.4	70.3	61.5	60.1	69.4	70.4	0.2	1.0	2.7	NO IMPACT
78	63.0	69.3	70.2	61.4	60.0	69.3	70.4	0.2	1.0	2.7	NO IMPACT
79	62.9	69.2	70.1	61.3	59.9	69.2	70.3	0.2	1.0	2.7	NO IMPACT
80	62.8	69.2	70.1	61.2	59.8	69.2	70.2	0.1	1.0	2.7	NO IMPACT
81	62.7	69.1	70.0	61.1	59.7	69.1	70.2	0.1	1.0	2.8	NO IMPACT
82	62.6	69.1	70.0	61.0	59.6	69.1	70.1	0.1	1.0	2.8	NO IMPACT
83	62.6	69.0	69.9	60.9	59.6	69.0	70.0	0.1	1.1	2.8	NO IMPACT
84	62.5	68.9	69.8	60.8	59.5	68.9	70.0	0.1	1.1	2.8	NO IMPACT

Distance of freight tracks from existing commuter tracks (ft)	Distance of first siding to second siding (ft)
30	15

Calculation of Distance to Moderate and Severe impacts (Provo section, Special Trackwork)

Distance (ft)	Calculated Existing L_{dn} (dBA) (Commuter only)	Calculated Existing L_{dn} (dBA) (Freight only)	Total Existing L_{dn} (dBA)	Calculated Proposed L_{dn} (dBA) (2nd Track)	Calculated Proposed L_{dn} (dBA) (1st Track)	Calculated Proposed L_{dn} (dBA) (Freight only)	Total Proposed L_{dn} (dBA)	Increase (dBA) (Prop L_{dn} - Exist L_{dn})	Increase that causes MODERATE Impact	Increase that causes SEVERE Impact	Impact Status
1	91.4	77.4	91.5	-	90.1	77.4	-	-	-	-	-
2	86.8	77.2	87.3	-	85.6	77.2	-	-	-	-	-
3	84.2	77.0	85.0	-	82.9	77.0	-	-	-	-	-
4	82.3	76.8	83.4	-	81.1	76.8	-	-	-	-	-
5	80.9	76.6	82.3	-	79.6	76.6	-	-	0.1	0.7	SEVERE
6	79.7	76.4	81.4	-	78.4	76.4	-	-	0.1	0.9	SEVERE
7	78.7	76.3	80.7	-	77.4	76.3	-	-	0.1	1.0	SEVERE
8	77.8	76.1	80.0	-	76.5	76.1	-	-	0.1	1.2	SEVERE
9	77.0	75.9	79.5	-	75.8	75.9	-	-	0.2	1.3	SEVERE
10	76.4	75.8	79.1	-	75.1	75.8	-	-	0.2	1.4	SEVERE
11	75.7	75.6	78.7	-	74.5	75.6	-	-	0.2	1.5	SEVERE
12	75.2	75.4	78.3	-	73.9	75.4	-	-	0.2	1.7	SEVERE
13	74.6	75.3	78.0	-	73.4	75.3	-	-	0.2	1.8	SEVERE
14	74.2	75.1	77.7	-	72.9	75.1	-	-	0.2	1.9	SEVERE
15	73.7	75.0	77.4	-	72.4	75.0	-	-	0.2	2.0	SEVERE
16	73.3	74.9	77.2	90.1	72.0	74.9	90.3	13.1	0.3	2.0	SEVERE
17	72.9	74.7	76.9	85.6	71.6	74.7	86.1	9.2	0.3	2.0	SEVERE
18	72.5	74.6	76.7	82.9	71.3	74.6	83.8	7.1	0.3	2.1	SEVERE
19	72.2	74.4	76.5	81.1	70.9	74.4	82.2	5.8	0.3	2.1	SEVERE
20	71.8	74.3	76.3	79.6	70.6	74.3	81.1	4.9	0.3	2.1	SEVERE
21	71.5	74.2	76.1	78.4	70.2	74.2	80.3	4.2	0.3	2.1	SEVERE
22	71.2	74.1	75.9	77.4	69.9	74.1	79.6	3.7	0.3	2.1	SEVERE
23	70.9	73.9	75.7	76.5	69.7	73.9	79.0	3.3	0.4	2.1	SEVERE
24	70.7	73.8	75.5	75.8	69.4	73.8	78.5	3.0	0.4	2.2	SEVERE
25	70.4	73.7	75.4	75.1	69.1	73.7	78.0	2.7	0.4	2.2	SEVERE
26	70.1	73.6	75.2	74.5	68.9	73.6	77.7	2.5	0.4	2.2	SEVERE
27	69.9	73.5	75.0	73.9	68.6	73.5	77.3	2.3	0.4	2.2	SEVERE
28	69.6	73.3	74.9	73.4	68.4	73.3	77.0	2.1	0.4	2.2	MODERATE
29	69.4	73.2	74.7	72.9	68.1	73.2	76.7	2.0	0.4	2.2	MODERATE
30	69.2	73.1	74.6	72.4	67.9	73.1	76.5	1.9	0.5	2.2	MODERATE
31	69.0	73.0	74.5	72.0	67.7	73.0	76.2	1.8	0.5	2.2	MODERATE
32	68.8	72.9	74.3	71.6	67.5	72.9	76.0	1.7	0.5	2.3	MODERATE
33	68.6	72.8	74.2	71.3	67.3	72.8	75.8	1.6	0.5	2.3	MODERATE
34	68.4	72.7	74.1	70.9	67.1	72.7	75.6	1.5	0.5	2.3	MODERATE
35	68.2	72.6	73.9	70.6	66.9	72.6	75.4	1.4	0.5	2.3	MODERATE
36	68.0	72.5	73.8	70.2	66.7	72.5	75.2	1.4	0.5	2.3	MODERATE
37	67.8	72.4	73.7	69.9	66.6	72.4	75.0	1.3	0.5	2.3	MODERATE
38	67.7	72.3	73.6	69.7	66.4	72.3	74.9	1.3	0.6	2.3	MODERATE
39	67.5	72.2	73.5	69.4	66.2	72.2	74.7	1.2	0.6	2.3	MODERATE
40	67.3	72.1	73.4	69.1	66.1	72.1	74.5	1.2	0.6	2.4	MODERATE
41	67.2	72.0	73.3	68.9	65.9	72.0	74.4	1.1	0.6	2.4	MODERATE
42	67.0	71.9	73.1	68.6	65.7	71.9	74.3	1.1	0.6	2.4	MODERATE
43	66.9	71.8	73.0	68.4	65.6	71.8	74.1	1.1	0.6	2.4	MODERATE
44	66.7	71.8	72.9	68.1	65.4	71.8	74.0	1.0	0.7	2.4	MODERATE
45	66.6	71.7	72.8	67.9	65.3	71.7	73.8	1.0	0.7	2.4	MODERATE
46	66.4	71.6	72.7	67.7	65.1	71.6	73.7	1.0	0.7	2.4	MODERATE
47	66.3	71.5	72.6	67.5	65.0	71.5	73.6	1.0	0.7	2.4	MODERATE
48	66.1	71.4	72.5	67.3	64.9	71.4	73.5	0.9	0.7	2.5	MODERATE
49	66.0	71.3	72.4	67.1	64.7	71.3	73.4	0.9	0.7	2.5	MODERATE
50	65.9	71.2	72.4	66.9	64.6	71.2	73.2	0.9	0.7	2.5	MODERATE
51	65.7	71.2	72.3	66.7	64.5	71.2	73.1	0.9	0.7	2.5	MODERATE
52	65.6	71.1	72.2	66.6	64.3	71.1	73.0	0.9	0.8	2.5	MODERATE
53	65.5	71.0	72.1	66.4	64.2	71.0	72.9	0.8	0.8	2.5	MODERATE
54	65.4	70.9	72.0	66.2	64.1	70.9	72.8	0.8	0.8	2.5	MODERATE
55	65.3	70.9	71.9	66.1	64.0	70.9	72.7	0.8	0.8	2.5	MODERATE
56	65.1	70.8	71.8	65.9	63.9	70.8	72.6	0.8	0.8	2.5	NO IMPACT
57	65.0	70.7	71.7	65.7	63.7	70.7	72.5	0.8	0.8	2.5	NO IMPACT
58	64.9	70.6	71.7	65.6	63.6	70.6	72.4	0.8	0.8	2.5	NO IMPACT
59	64.8	70.6	71.6	65.4	63.5	70.6	72.3	0.8	0.9	2.6	NO IMPACT
60	64.7	70.5	71.5	65.3	63.4	70.5	72.2	0.7	0.9	2.6	NO IMPACT
61	64.6	70.4	71.4	65.1	63.3	70.4	72.1	0.7	0.9	2.6	NO IMPACT
62	64.5	70.3	71.3	65.0	63.2	70.3	72.1	0.7	0.9	2.6	NO IMPACT
63	64.4	70.3	71.3	64.9	63.1	70.3	72.0	0.7	0.9	2.6	NO IMPACT
64	64.3	70.2	71.2	64.7	63.0	70.2	71.9	0.7	0.9	2.6	NO IMPACT
65	64.2	70.1	71.1	64.6	62.9	70.1	71.8	0.7	1.0	2.6	NO IMPACT
66	64.1	70.1	71.0	64.5	62.8	70.1	71.7	0.7	1.0	2.6	NO IMPACT
67	64.0	70.0	71.0	64.3	62.7	70.0	71.6	0.7	1.0	2.6	NO IMPACT
68	63.9	69.9	70.9	64.2	62.6	69.9	71.6	0.7	1.0	2.6	NO IMPACT
69	63.8	69.9	70.8	64.1	62.5	69.9	71.5	0.7	1.0	2.7	NO IMPACT
70	63.7	69.8	70.7	64.0	62.4	69.8	71.4	0.6	1.0	2.7	NO IMPACT
71	63.6	69.7	70.7	63.9	62.3	69.7	71.3	0.6	1.0	2.7	NO IMPACT
72	63.5	69.7	70.6	63.7	62.2	69.7	71.2	0.6	1.0	2.7	NO IMPACT
73	63.4	69.6	70.5	63.6	62.1	69.6	71.2	0.6	1.0	2.7	NO IMPACT
74	63.3	69.5	70.5	63.5	62.0	69.5	71.1	0.6	1.0	2.7	NO IMPACT
75	63.2	69.5	70.4	63.4	62.0	69.5	71.0	0.6	1.0	2.7	NO IMPACT
76	63.1	69.4	70.3	63.3	61.9	69.4	70.9	0.6	1.0	2.7	NO IMPACT
77	63.1	69.4	70.3	63.2	61.8	69.4	70.9	0.6	1.0	2.7	NO IMPACT
78	63.0	69.3	70.2	63.1	61.7	69.3	70.8	0.6	1.0	2.7	NO IMPACT
79	62.9	69.2	70.1	63.0	61.6	69.2	70.7	0.6	1.0	2.7	NO IMPACT
80	62.8	69.2	70.1	62.9	61.5	69.2	70.7	0.6	1.0	2.7	NO IMPACT
81	62.7	69.1	70.0	62.8	61.5	69.1	70.6	0.6	1.0	2.8	NO IMPACT
82	62.6	69.1	70.0	62.7	61.4	69.1	70.5	0.6	1.0	2.8	NO IMPACT
83	62.6	69.0	69.9	62.6	61.3	69.0	70.5	0.6	1.1	2.8	NO IMPACT
84	62.5	68.9	69.8	62.5	61.2	68.9	70.4	0.6	1.1	2.8	NO IMPACT

Distance of freight tracks from existing commuter tracks (ft)	Distance of first siding to second siding (ft)
30	15

Appendix A-4

North of Provo Double Track Project
Vibration Impact Analysis

Calculation of distance (feet) from existing and proposed trackwork where project vibration attenuates to the 75 V dB criteria limit

					Adjustments to Generalized Ground Surface Vibration Curve																	
					Source Adjustments				Path Adjustments								Receiver Adjustments					
Address	Land Use Category	Dist (ft.)	Lv (VdB) at 50 mph (RRT) Curve)	Train Segment Speed (mph)	Speed (VdB)	Vehicle Parameters (VdB)	Track Conditions (VdB)	Track Treatments (VdB)	Resilient Ties or Ballast Mats(VdB)	Track Structure (VdB)	Propagation Geology Adjustment (VdB)	Wood Frame Houses Structure (VdB)	1-2 Story Masonry Structure (VdB)	3-4 Story Masonry Structure (VdB)	Large masonry on Spread Footings Structure (VdB)	Foundation in Rock Structure (VdB)	1-5 Floors Above Grade (VdB)	5-10 Floor Above Grade (VdB)	Floor Amplification (VdB)	Total Adjustments (VdB)	Total Lv (VdB)	FTA Impact Threshold (VdB)
45 MPH PROVO (Existing); NO Ballast Mat	**1**	**305**	66.9	45	-0.9	NA	NA	NA	0	0	10	-5	NA	NA	NA	NA	-2	NA	6	8.1	75.0	75
45 MPH PROVO (Proposed); NO Ballast Mat	**1**	**305**	66.9	45	-0.9	NA	NA	NA	0	0	10	-5	NA	NA	NA	NA	-2	NA	6	8.1	75.0	75

Calculation of distance (feet) within which project vibration is greater than 3 VdB and greater

Address	Land Use Category	Dist (ft.)	Lv (VdB) at 50 mph (RRT) Curve)	Train Segment Speed (mph)	Speed (VdB)	Vehicle Parameters (VdB)	Track Conditions (VdB)	Track Treatments (VdB)	Resilient Ties or Ballast Mats(VdB)	Track Structure (VdB)	Propagation Geology Adjustment (VdB)	Wood Frame Houses Structure (VdB)	1-2 Story Masonry Structure (VdB)	3-4 Story Masonry Structure (VdB)	Large masonry on Spread Footings Structure (VdB)	Foundation in Rock Structure (VdB)	1-5 Floors Above Grade (VdB)	5-10 Floor Above Grade (VdB)	Floor Amplification (VdB)	Total Adjustments (VdB)	Total Lv (VdB)	FTA Impact Threshold (VdB)	**Delta (V dB)**
45 MPH (existing); NO Ballast Mat	**1**	**47**	85.1	45	-0.9	NA	NA	NA	0	0	10	-5	NA	NA	NA	NA	-2	NA	6	8.1	93.2	75	
45 MPH - (proposed); NO Ballast Mat	**1**	**32**	88.1	45	-0.9	NA	NA	NA	0	0	10	-5	NA	NA	NA	NA	-2	NA	6	8.1	96.2	75	**3.0**

ATTACHMENT B.8
Air Quality

FrontRunner Forward

North of Provo Double Track Project

Air Quality Review

April 2025

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Introduction

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 0.7 mile of track north of the existing Provo Central Station in Utah County, Utah. The North of Provo Double Track Project (Project) would be implemented along the existing FrontRunner commuter rail line.

This report describes the existing air quality conditions that could be affected by the Project.

Project Description

The double track would be constructed north of the existing Provo Central Station and extend along the FrontRunner corridor until merging with the existing double track just north of 900 West in Provo. This section of double track would extend from UTA milepost S 43.2 south to UTA milepost S 43.9, a distance of about 0.7 mile.

The anticipated track work would consist of constructing a new UTA mainline (ML) track number (No.) 2 south of the existing UTA ML No. 1, shifting approximately 700 linear feet of UTA ML No. 1 track, constructing an approximately 1,200-linear-foot retaining wall, extending one storm drain culvert to accommodate the widened track bed, removing existing turnouts at both ends of the section, relocating utilities (including three signal houses), and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

The Project is one of several projects included in the first phase of long-term improvements under the FrontRunner Forward program (the first phase is also known as the FrontRunner 2X project); however, the Project has independent utility and can be constructed with or without the other projects. Further details about investments associated with the FrontRunner Forward Program are included in a separate report, *FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL)* (UTA 2025).

Figure 1, *Air Quality Evaluation Area,* provides an overview map showing the anticipated design footprint for the Project.

Figure 1. Air Quality Evaluation Area

Regulatory Setting

National Ambient Air Quality Standards (NAAQS)

The U.S. Environmental Protection Agency (EPA), under the authority of the Clean Air Act (42 United States Code [USC] Section 7401 and subsequent sections), established National Ambient Air Quality Standards (NAAQS) for ubiquitous pollutants considered harmful to public health and the environment (40 Code of Federal Regulations [CFR] Part 50). These standards include both primary and secondary standards. Primary standards protect public health, and secondary standards protect public welfare (such as protecting property and vegetation from the effects of air pollution). These standards have been adopted by the Utah Division of Air Quality as the official ambient air quality standards for Utah.

EPA has set NAAQS for six principal pollutants known as criteria pollutants. The current NAAQS are listed in Table 1. According to EPA, transportation sources currently contribute to four of the six criteria pollutants: carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), and nitrogen dioxide (NO_2).

If an area meets the NAAQS for a given air pollutant, the area is called an *attainment area* for that pollutant (because the NAAQS have been attained). If an area does not meet the NAAQS for a given air pollutant, the area is called a *nonattainment area*. A *maintenance area* is an area previously designated as a nonattainment area that has been redesignated as an attainment area and is required by Section 175A of the Clean Air Act, as amended, to have a maintenance plan for 20 years following its redesignation to attainment or maintenance status.

Attainment Status of Air Quality Evaluation Area

The air quality evaluation area is in Utah County. Utah County is an attainment area for NO_2, sulfur dioxide (SO_2), and lead (Pb); a moderate nonattainment area for O_3; a serious nonattainment area for $PM_{2.5}$; and a maintenance area for PM_{10}. Utah county is also an attainment area for CO, with the exception of Provo, which is a maintenance area. Table 1 shows the attainment status for Utah County for each criteria pollutant.

SO_2 and Pb are not considered transportation-related criteria pollutants and are not discussed further.

The Utah Division of Air Quality maintains a network of air quality monitoring stations throughout the state. In general, these monitoring stations are located where there are known air quality problems, so they are usually in or near urban areas or close to specific emission sources. Other stations are located in suburban or remote areas to indicate regional air pollution levels.

The Lindon monitoring station (490494001), which is located at 50 N. Main Street in Lindon, is the closest monitoring station to the air quality evaluation area, and it provides data for all of the transportation-related criteria pollutants (PM_{10}, $PM_{2.5}$, O_3, CO, and NO_2). Air quality data from 2019 to 2023 for transportation-related criteria pollutants from this monitoring station is compiled in Appendix A, *Air Quality Monitoring Data*. These data are provided as a reference of the recent air quality conditions in the evaluation area.

Table 1. National and Utah Ambient Air Quality Standards for Criteria Pollutants and Attainment Status for Utah County

Pollutant	Standard	Averaging Time	Level	Form	Attainment Status
Carbon monoxide (CO)	Primary	8 hours	9 ppm	Not to be exceeded more than once per year	Provo is a maintenance area (maintenance designation began on 1/3/2006); the rest of Utah County is an attainment area
		1 hour	35 ppm	Not to be exceeded more than once per year	
Ozone (O_3)	Primary and secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration averaged over 3 years	Moderate nonattainment area[a]
Particulate matter ($PM_{2.5}$)	Primary	1 year	9.0 µg/m^3	Annual mean averaged over 3 years	Serious nonattainment area[b]
	Secondary	1 year	15.0 µg/m^3	Annual mean averaged over 3 years	
	Primary and secondary	24 hours	35 µg/m^3	98th percentile averaged over 3 years	
Particulate matter (PM_{10})	Primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years	Maintenance area (maintenance designation began on 3/27/2020)
Nitrogen dioxide (NO_2)	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations averaged over 3 years	Attainment area
	Primary and secondary	1 year	53 ppb	Annual mean	Attainment areas
Sulfur dioxide (SO_2)	Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations averaged over 3 years	Attainment area
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year	Attainment area
Lead (Pb)	Primary and secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded	Attainment areas

Sources: 49 CFR Part 50 (NAAQS) and 40 CFR Part 81 (attainment status)

Definitions: µg/m^3 = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; PM_{10} = particulate matter 10 microns in diameter or less

[a] A "moderate" nonattainment area is one where the O_3 level has a value of 0.081 ppm up to but not including 0.093 ppm.

[b] A "serious" nonattainment area is one that failed to meet the 2006 24-hour $PM_{2.5}$ NAAQS within a timeframe required by EPA.

Transportation Conformity Requirements

Transportation conformity is a process required by Clean Air Act Section 176(c), which establishes the framework for improving air quality to protect public health and the environment. All state governments are required to develop a state implementation plan (SIP) for each pollutant for which an area is in nonattainment or maintenance status. The SIP explains how the State will comply with the requirements of the Clean Air Act.

Section 176(c) of the Clean Air Act, and its related amendments, require that transportation plans, programs, and projects developed, funded, or approved by the Federal Highway Administration and/or the Federal Transit Administration and metropolitan planning organizations must demonstrate that such activities conform to the SIP. Transportation conformity requirements apply to any transportation-related criteria pollutants for which the project area is designated a nonattainment or maintenance area.

Unless the project is exempt from conformity requirements, federal agencies are required to make a conformity determination before adopting, accepting, approving, or funding an activity or project located in a nonattainment or maintenance area. A conformity determination is a finding that the activity or project conforms to the SIP's purpose of "eliminating or reducing the severity and number of violations" of the NAAQS and "achieving expeditious attainment of the NAAQS" [42 USC Section 7506(c)] and that the project or activity will not:

- Cause or contribute to new air quality violations of the NAAQS,
- Worsen existing violations of the NAAQS, or
- Delay timely attainment of the NAAQS or required interim milestones.

To demonstrate project-level conformity, a project must come from a conforming regional transportation plan (RTP) and transportation improvement program (TIP).[1] The project design concept and scope must not have changed significantly from those in the RTP and TIP, and the analysis must have used the latest planning assumptions and latest estimates of emissions. Additional analysis might be necessary in CO, PM_{10}, and $PM_{2.5}$ nonattainment or maintenance areas to determine whether a project would have local air quality impacts. This analysis is referred to as a "hot-spot" analysis. A hot-spot analysis is defined in 40 CFR Section 93.101 as an estimation of likely future local pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. A hot-spot analysis assesses air quality impacts on a smaller scale than an entire nonattainment or maintenance area. A project that requires a hot-spot analysis is referred to as a *project of air quality concern*.

Exempt Projects

Projects consistent with 40 CFR Section 93.126 or 40 CFR Section 93.128 are exempt from transportation conformity requirements. Exempt projects include safety projects, such as railroad crossings, guard rails, and bridge reconstruction (with no additional travel lanes); mass transit projects, such as rehabilitation of transit vehicles; air quality projects, such as pedestrian and bicyclist facilities; and other projects, such as noise attenuation. The North of Provo Double Track Project is not exempt under either 40 CFR Section 93.126 or 40 CFR Section 93.128.

[1] A conforming RTP or TIP is one that has been analyzed for emissions of controlled air pollutants and found to be within emission limits established in the state implementation plan (SIP) or within guidelines established by EPA until such time that a SIP is approved.

Transportation Conformity Compliance

To demonstrate project-level conformity, a project must come from a conforming RTP and TIP, the project design concept and scope must not have changed significantly from that in the RTP and TIP, and the analysis must have used the latest planning assumptions and latest emissions estimates.

The Mountainland Association of Governments (MAG) is the metropolitan planning organization for Utah County and develops the RTP for urban Utah County. Amendment 1 of *TransPlan50*, MAG's 2023–2050 RTP (MAG 2023), includes the air quality evaluation area for the North of Provo Double Track Project (RTP project: T15). MAG's approved *Conformity Determination Report* (MAG 2024), which used the latest planning assumptions and emissions estimates, confirms that MAG's 2023–2050 RTP and Amendment 1 are consistent with and conform to the SIP or the EPA interim conformity guidelines. In addition, the North of Provo Double Track Project is included MAG's 2025–2029 TIP (MAG 2025).

Projects of Air Quality Concern

$PM_{2.5}$ and PM_{10} Project-level Analysis Requirements

A PM hot-spot analysis is required only for specific types of projects, which are listed in the transportation conformity regulations at 40 CFR Sections 93.123(b)(1)(i–v). The primary considerations for determining whether a project is potentially one of air quality concern are the number of diesel-fueled vehicles that would result from the project or the number of diesel-fueled vehicles at poorly operating intersections.

EPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA 2021) provides guidance for reviewing transportation projects in the context of CFR Title 40 and clarification regarding the criteria for determining whether a project is a project of air quality concern. Appendix B, *Examples of Projects of Local Air Quality Concern*, of EPA's hot-spot guidance provides examples of projects of local air quality concern that would be covered by 40 CFR Sections 93.123(b)(1)(i) and (ii).

EPA's hot-spot guidance also provides examples of projects that are not projects of local air quality concern under 40 CFR Section 93.123(b)(1).

CO Project-level Analysis Requirements

A CO hot-spot analysis is required only for specific types of projects, which are listed in the transportation conformity regulations at 40 CFR Sections 93.123(a)(1)(i–iv).

Project of Air Quality Concern Evaluation

This section reviews the characteristics of the Project in comparison to the types of projects that require quantitative hot-spot analyses listed in the transportation conformity regulations at 40 CFR Section 93.123.

$PM_{2.5}$ and PM_{10} Evaluations

New or Expanded Highway with Significant Volume of Diesel Bus or Truck Traffic

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(b)(1)(i)]. New highway projects that have a significant number of diesel vehicles and expanded highway projects that will have a significant increase in the number of diesel vehicles.

Example Project of Local Air Quality Concern. EPA's hot-spot guidance (EPA 2021) notes that a project on a new highway or expressway that serves a significant volume of diesel vehicle traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT), and where 8% or more of such AADT is diesel truck traffic would be considered projects of local air quality concern. This guidance also specifies that new exit ramps and other highway facility improvements designed to connect a highway or expressway to a major freight, bus, or intermodal terminal would be considered projects of local air quality concern.

Evaluation. The Project is not a new or expanded highway project that would significantly increase the number of diesel vehicles.

Projects Affecting Congested Intersections

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(b)(1)(ii)]. Projects affecting intersections that are operating at level of service (LOS) D, E, or F with a significant number of diesel vehicles or those that will change an intersection to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.

Example Project of Local Air Quality Concern. Expansion of an existing highway or other facility that affects a congested intersection (operated at LOS D, E, or F) that has a significant increase in the number of diesel trucks (EPA 2021).

Evaluation. There are three at-grade crossings in the air quality evaluation area for the North of Provo Double Track Project: one at 900 West, one at 700 West, and one at 500 West. All of these crossings currently operate at LOS A and are projected to continue operating at LOS A in 2050 with the proposed double tracking (UTA and UDOT 2024). Therefore, the Project would not affect intersections that are operating at LOS D, E, or F with a significant number of diesel vehicles or that would change to LOS D, E, or F because of increased traffic from diesel vehicles related to the Project.

New Bus and Rail Terminals

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(b)(1)(iii)]. New bus and rail terminals and transfer points that will have a significant number of diesel vehicles congregating at a single location.

Example Project of Local Air Quality Concern. A major new bus or intermodal terminal that is considered to be a "regionally significant project" under 40 CFR Section 93.1012 (EPA 2021).

Evaluation. The Project is not a new bus or rail terminal or transfer point that would have a significant number of diesel vehicles congregating at a single location.

Expanded Bus and Rail Terminals

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(b)(1)(iv)]. Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location.

Example Project of Local Air Quality Concern. An existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses increases by 50% or more, as measured by bus arrivals.

Evaluation. The Project is not an expanded bus or rail terminal or transfer point that would significantly increase the number of diesel vehicles congregating at a single location.

Projects in or Affecting PM_{10} or $PM_{2.5}$ Sites of Violation or Possible Violation

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(b)(1)(v)]. Projects in or affecting locations, areas, or categories of sites that are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

Evaluation. The Project would not affect locations, areas, or categories of sites identified as sites of possible $PM_{2.5}$ or PM_{10} violation in Utah's State Implementation Plan (UDEQ 2025).

$PM_{2.5}$ and PM_{10} Project of Air Quality Concern Determination

The Project does not meet any of the criteria listed in 40 CFR Sections 93.123(b)(1)(i–v) to be considered a project of air quality concern; therefore, hot-spot analyses are not required for particulate matter.

CO Evaluation

Projects in or Affecting CO Sites of Violation or Possible Violation

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(a)(1)(i)]. Projects in or affecting locations, areas, or categories of sites that are identified in the applicable implementation plan as sites of violation or possible violation.

Evaluation. The Project would not affect locations, areas, or categories of sites identified as sites of possible CO violations.

Projects Affecting Congested Intersections

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(a)(1)(ii)]. Projects affecting intersections that are at LOS D, E, or F or those that will change to LOS D, E, or F because of increased traffic volumes related to the project.

Evaluation. There are three at-grade crossings in the air quality evaluation area for the North of Provo Double Track Project: one at 900 West, one at 700 West, and one at 500 West. All of these crossings currently operate at LOS A and are projected to continue operating at LOS A in 2050 with the proposed double tracking (UTA and UDOT 2024). Therefore, the Project would not affect intersections that are operating at LOS D, E, or F or those that would change to LOS D, E, or F because of increased traffic volumes related to the Project.

Project Affecting Top Three Intersections with High Volume

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(a)(1)(iii)]. Projects affecting one or more of the top three intersections in the nonattainment or maintenance area with the highest traffic volumes, as identified in the applicable implementation plan.

Evaluation. The Project would not affect one or more of the top three intersections with the highest traffic volumes.

Projects Affecting Top Three Intersections with Worst Level of Service

Description of Project Requiring Hot-spot Analysis [40 CFR Section 93.123(a)(1)(iv)]. Projects affecting one or more of the top three intersections in the nonattainment or maintenance area with the worst level of service, as identified in the applicable implementation plan.

Evaluation. The Project would not affect one or more of the top three intersections with the worst level of service.

CO Project of Air Quality Concern Determination

The Project does not meet any of the criteria listed in 40 CFR Sections 93.123(a)(1)(i–iv) to be considered a project of air quality concern; therefore, hot-spot analyses are not required for CO.

Air Quality Assessment

Of FrontRunner's 82-mile alignment, about 22 miles (26%) are double tracked. Much of the double track consists of short sections in and near stations that are used primarily to allow trains traveling in opposite directions to pass each other. The extensive single-track areas limit opportunities for northbound and southbound trains to pass, creating pinch points and system inefficiencies with idling trains waiting for one another to pass. It also limits the scheduled FrontRunner service to a 30-minute maximum frequency today, and this frequency puts a cap on passenger capacity. In addition, any schedule disturbance causes significant delays and slows service throughout the entire system.

The Project would allow opposing train traffic to pass, thereby decreasing the number of idling trains, increasing service reliability, and allowing more efficient operation of the rail line. Air quality would likely be improved with the Project because train flow would be improved, and trains would spend less time idling compared to existing conditions.

In 1998, EPA promulgated final exhaust emission standards for newly manufactured and remanufactured locomotives and locomotive engines (Federal Register Volume 63, Number 73, page 18978, April 16, 1998). In June 2008, EPA finalized a three-part program that, when fully implemented, will substantially reduce emissions from diesel locomotives of all types. The standards are based on the application of high-efficiency catalytic aftertreatment technology (EPA 2024). By requiring overall reductions in emissions from new and remanufactured locomotives, commuter rail operation is cleaner and will continue to improve in the future.

Summary

As described in the *Project of Air Quality Concern Evaluation* section, the Project would not affect any roadway intersections and is not a project of air quality concern pursuant to the criteria in 40 CFR Section 93.123. The project team does not expect the Project to adversely affect local compliance with the NAAQS.

In addition, atmospheric carbon dioxide (CO_2) emissions are projected to increase in 2050 due to the greater number of vehicles and increased vehicle-miles traveled (VMT). This increase would occur with or without the Project. The amounts of all other pollutants are projected to decrease in future years because of more stringent emissions standards for diesel locomotives and improved emissions control technology.

No mitigation for air quality impacts is proposed. Best management practices should be used in all construction phases to minimize fugitive dust.

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2025 FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL).

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2024 Traffic Analysis Report for the FrontRunner Point Improvements Project. Prepared by HDR, Inc. August 23.

Appendix A

Air Quality Monitoring Data

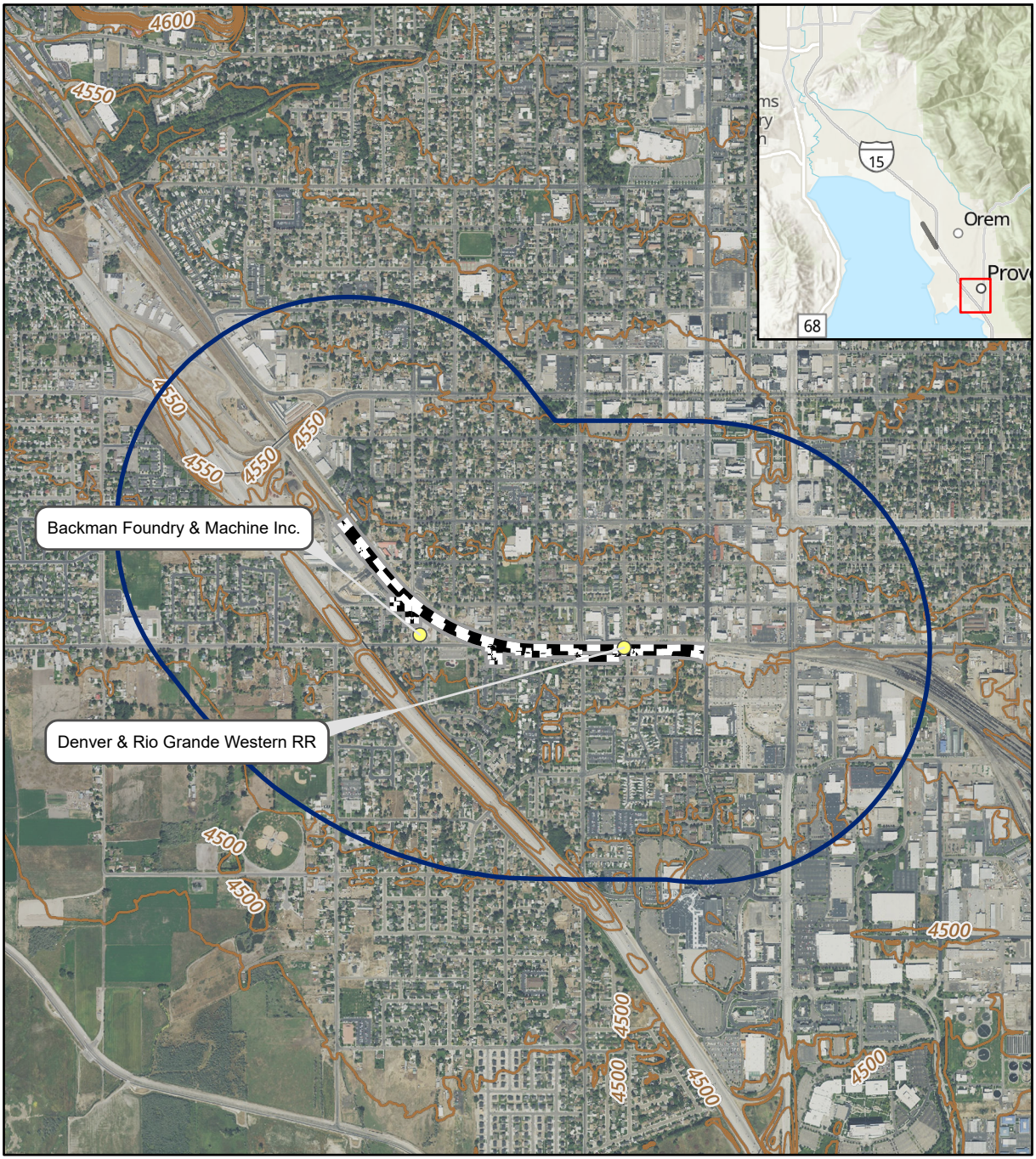
Table A-1. Air Quality Monitoring Data from the Lindon Monitoring Station in Utah County

Pollutant	Standard	Value	Monitoring Station	Monitoring Year and Data[a]				
				2019	2020	2021	2022	2023
Particulate matter (PM_{10})	24-hour standard[b]	150 µg/m^3	Lindon	69	143	112	121	73
Particulate matter ($PM_{2.5}$)	24-hour standard[c]	35 µg/m^3	Lindon	20.8	26.4	32.0	22.7	20.5
	Annual standard[d]	9 µg/m^3	Lindon	5.90	9.07	7.58	6.98	5.82
Ozone (O_3)	8-hour standard[e]	0.070 ppm	Lindon	0.062	0.068	0.077	0.074	0.066
Carbon monoxide (CO)	8-hour standard[f]	9 ppm	Lindon	1.1	0.8	1.3	0.8	1.0
	1-hour standard[g]	35 ppm	Lindon	1.3	1.3	1.6	1.7	1.2
Nitrogen dioxide (NO_2)	Annual standard[h]	53 ppb	Lindon	18.6	19.4	18.7	18.7	17.5
	1-hour standard[i]	100 ppb	Lindon	40.8	43.1	42.2	40.7	38.6

Source: UDEQ, Utah Data Archive, http://www.airmonitoring.utah.gov/dataarchive/index.htm, accessed March 27, 2024.
Definitions: µg/m^3 = micrograms per cubic meter, NA = data not available, ppb = parts per billion, ppm = parts per million

[a] The values listed for each pollutant and standard are the first maximum for each year.
[b] The PM_{10} 24-hour standard is exceeded when the peak 24-hour value exceeds 150 µg/m^3. One exceedance of the NAAQS is allowed per year.
[c] The $PM_{2.5}$ 24-hour standard is exceeded when the 3-year average of the 98th-percentile value (rounded to the nearest whole number) exceeds 35 µg/m^3.
[d] The $PM_{2.5}$ annual standard is exceeded when the 3-year average of the weighted arithmetic mean exceeds 9.0 µg/m^3.
[e] The O_3 8-hour standard is exceeded when the annual fourth-highest daily maximum 8-hour concentration averaged over 3 years exceeds 0.070 ppm.
[f] The CO 8-hour standard is exceeded when the 8-hour concentration exceeds 9 ppm more than once per year.
[g] The CO 1-hour standard is exceeded when the 1-hour concentration exceeds 35 ppm more than once per year.
[h] The NO_2 annual standard is exceeded when the annual average exceeds 53 ppb.
i The NO_2 1-hour standard is exceeded when the 3-year average of the 98th-percentile of 1-hour daily maximum concentrations exceeds 100 ppb.

ATTACHMENT B.9
Hazardous Waste



UTA

UDOT Keeping Utah Moving

Legend

- Petroleum Storage Tank
- Hazardous Materials Evaluation Area
- Project Extent

N

0 0.25 Miles

ATTACHMENT B.14
Biological Resources

FrontRunner Forward

North of Provo Double Track Project

Biological Resources Report

April 2025

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Introduction

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 0.7 mile of track north of the existing Provo Central Station in Utah County, Utah. The North of Provo Double Track Project (Project) would be implemented along the existing FrontRunner commuter rail line.

This report summarizes existing biological resources that could be affected by the Project.

Project Description

The double track would be constructed north of the existing Provo Central Station and extend along the FrontRunner corridor until merging with the existing double track just north of 900 West in Provo. This section of double track would extend from UTA milepost S 43.2 south to UTA milepost S 43.9, a distance of about 0.7 mile.

The anticipated track work would consist of constructing a new UTA mainline (ML) track number (No.) 2 south of the existing UTA ML No. 1, shifting approximately 700 linear feet of UTA ML No. 1 track, constructing an approximately 1,200-linear-foot retaining wall, extending one storm drain culvert to accommodate the widened track bed, removing existing turnouts at both ends of the section, relocating utilities (including three signal houses), and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

The Project is one of several projects included in the first phase of long-term improvements under the FrontRunner Forward program (the first phase is also known as the FrontRunner 2X project); however, the Project has independent utility and can be constructed with or without the other projects. Further details about investments associated with the FrontRunner Forward Program are included in a separate report, *FrontRunner Forward Strategic Double Track Recommended Service Alternative Overview – A Planning and Environmental Linkage Study (PEL)* (UTA 2025).

Regulatory Setting

Threatened and Endangered Species

The Endangered Species Act (ESA; 16 United States Code [USC] Sections 1531–1544) establishes a framework to protect and conserve species listed as threatened or endangered and their habitats.

The ESA prohibits the "take" of endangered species except when the take is incidental to, and not the purpose of, carrying out an otherwise lawful activity, or when the take is for scientific purposes, or to enhance the propagation or survival of the species.

What is take of a listed species?

The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect an individual of a species listed as threatened or endangered (16 USC Section 1532).

Under Section 7 of the ESA, federal agencies must consult with the U.S. Fish and Wildlife Service (USFWS) before taking any action that will likely affect a federally listed threatened or endangered species or designated critical habitat for an endangered species. In addition, federal agencies must ensure that their actions are not likely to jeopardize the continued existence of any listed species or to destroy or adversely modify any designated critical habitat.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 USC Sections 703–712) makes it unlawful to pursue, hunt, take, capture, kill, possess, sell, barter, purchase, transport, export, or import any migratory bird or their parts, nests, or eggs of any such bird, with the exception of taking game birds during established hunting seasons. Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (January 10, 2001), directs federal agencies taking actions likely to affect migratory birds to support the implementation of the Migratory Bird Treaty Act.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC Sections 668–668d) makes it unlawful to take, import, export, sell, purchase, transport, or barter any bald or golden eagle or their parts, products, nests, or eggs. "Take" includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing eagles.

Candidate Conservation Agreements

USFWS considers candidate species to be plants and animals that are candidates for listing under the ESA. With candidate species, there is enough information regarding their biological status and threats to propose them as threatened or endangered. However, higher-priority listing activities currently prevent these species from being listed under the ESA. Candidate species are not subject to the legal protections of the ESA.

A Candidate Conservation Agreement (CCA) is a formal, voluntary agreement between USFWS and one or more parties to address the conservation needs of candidate species or species that could become candidates in the near future. Participants voluntarily commit to implement specific actions designed to remove or reduce threats to the species covered by the CCA. Developing a CCA is one of the primary ways of identifying appropriate conservation efforts. Proactive conservation efforts for candidate species can, in some cases, eliminate the need to list them under the ESA.

Methodology

Evaluation Area

The North of Provo Double Track Project biological resources evaluation area is in Utah County. The evaluation area is about 26.3 acres and ranges in elevation from about 4,525 to 4,555 feet above mean sea level. Figure 1 provides an overview of the evaluation area.

The evaluation area is part of the Moist Wasatch Front Footslopes subregion of the Central Basin and Range Ecoregion (Woods and others 2001). The subregion supports most of Utah's population and commercial activity and is fed by perennial streams and aqueducts that originate in the Wasatch Range. The evaluation area is in the Utah Lake watershed, hydrologic unit code 16020201 (USGS 2024).

The evaluation area consists primarily of existing UTA FrontRunner and UP tracks, disturbed upland areas, and commercial and residential development.

Figure 1. North of Provo Double Track Project Biological Resources Evaluation Area

Data Collection

Biologists used several methods to collect data regarding the biological resources in the biological resources evaluation area. These methods included conducting literature reviews; interpreting aerial photographs; and conducting reconnaissance-level field surveys for wildlife, vegetation, and rare, threatened, and endangered species.

USFWS's IPaC website was used to obtain a list of federally threatened, endangered, or candidate species that might occur in the evaluation area and/or might be affected by the Project (USFWS 2025a). The USFWS's Environmental Conservation Online System (ECOS) was also consulted for a list of species under conservation agreement that are known to occur in Utah County (USFWS 2025b). Additionally, biologists obtained a species list from the Utah Division of Wildlife Resources' (UDWR) Wildlife Habitat Analysis Tool to determine whether there are records of occurrence for any of the federally listed threatened, endangered, and candidate species or species under conservation agreement in the vicinity of the evaluation area (UDWR 2025). Reports from IPaC and the Wildlife Habitat Analysis Tool are provided in Appendix A, *Species Lists*.

The Utah Species Field Guide (UDWR, no date), NatureServe (no date), Audubon (no date), the Utah Native Plant Society (no date), Cornell Lab's All About Birds website (Cornell Lab of Ornithology 2019), and species-specific recovery plans in USFWS's ECOS (USFWS 2025b, 2025c) were referenced for species preferred habitat descriptions.

Results

Threatened, Endangered, and Candidate Species

The IPaC report identified one federally listed bird species that might occur in the biological resources evaluation area and/or might be affected by the Project: yellow-billed cuckoo (*Coccyzus americanus*). The IPaC report also identified two insect species that are proposed to be listed under the ESA: monarch butterfly (*Danaus plexippus*) and Suckley's cuckoo bumble bee (*Bombus suckleyi*). The evaluation area does not include designated or proposed critical habitat for any of these species.

Table 1 describes the preferred habitat for each species. There is no suitable habitat in the evaluation area for any of these species.

Table 1. Federally Listed Species that Might Occur in the Biological Resources Evaluation Area and/or Might be Affected by the Project

Common Name[a] (*Scientific Name*)	Federal Status	Preferred Habitat[b]	Critical Habitat Present?[c]	Potentially Suitable Habitat Present?
Birds				
Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened	Yellow-billed cuckoos prefer to nest in tall cottonwood and willow riparian woodland with dense understory foliage. They prefer patches of at least 25 acres of dense riparian forest with a canopy cover of at least 50% in both the understory and overstory. USFWS's suitable habitat guidelines for this species for Utah require patches of multilayered vegetation that are at least 12 acres in extent and at least 100 meters (328 feet) wide by 100 meters long (USFWS 2017).	Final critical habitat has been designated for this species. The evaluation area is outside the critical habitat.	There is no suitable habitat in the evaluation area or within a ½-mile radius of the evaluation area. There is no riparian vegetation in the evaluation area.
Insects				
Monarch butterfly (*Danaus plexippus*)	Proposed[d] Threatened	In the spring, summer, and early fall, monarch butterflies can be found wherever there are milkweeds in fields, meadows, and parks. They overwinter in the cool, high mountains of central Mexico and woodlands in central and southern California. Milkweed (*Asclepias* spp.) is an essential feature of quality monarch habitat. Female monarch butterflies lay their eggs on the underside of young leaves or flower buds of milkweed. Common places milkweed occurs include short- and tall-grass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, and gardens. In addition to milkweed, other nectar sources, trees for roosting, and close proximity to water are key components of monarch habitat (Western Association of Fish and Wildlife Agencies 2019).	There is proposed critical habitat for this species. The evaluation area is outside the critical habitat.	There is no suitable habitat in the evaluation area; no milkweed plants were observed during the field survey. There are records of individuals within a 2-mile radius of the evaluation area (UDWR 2025).

(*Continued on next page*)

Table 1. Federally Listed Species that Might Occur in the Biological Resources Evaluation Area and/or Might be Affected by the Project

Common Name[a] (*Scientific Name*)	Federal Status	Preferred Habitat[b]	Critical Habitat Present?[c]	Potentially Suitable Habitat Present?
Suckley's Cuckoo Bumble Bee (*Bombus suckleyi)*	Proposed[d] Endangered	Suckley's cuckoo bumble bee is an obligate parasitic species that is entirely dependent on the workers of host colonies to raise their young. Suckley's cuckoo bumble bee has two confirmed hosts, the western bumble bee (*Bombus occidentalis*) and the Nevada bumble bee (*Bombus nevadensis*); the western bumble bee being is the most widely known host. Western bumble bees are known to nest primarily in underground cavities and abandoned animal burrows more often than they do in aboveground structures. Suckley's cuckoo bumble bee has a broad distribution across North America, primarily in the western half of the United States and the Yukon of Canada., It and has been found between 6 and 10,500 feet in elevation in various habitat types including, prairies, grasslands, meadows, woodlands, forests, croplands, and urban areas from between 6 to 10,500 feet in elevation. Suckley's cuckoo bumble bees require a diversity of native floral resources (pollen and nectar) for nutrition (USFWS 2024).	Critical habitat has not been designated for this species.	There is no suitable habitat in the evaluation area. The evaluation area consists primarily of existing UTA FrontRunner and UP tracks, disturbed uplands, and commercial and residential development; it does not provide a diversity of native floral resources for foraging.

[a] Source: Species list from USFWS 2025a

[b] Sources: Audubon, no date; Cornell Lab of Ornithology 2019; NatureServe, no date; UDWR, no date; and species-specific recovery plans in USFWS's ECOS (USFWS 2025c)

[c] "Critical habitat" is a term defined in the ESA (ESA Section 3(5)(A)); it refers to specific areas that contain physical or biological features that are essential to the conservation of a species and that might need special management or protection.

[d] "Proposed" species are any species that USFWS has determined is likely to become endangered within the foreseeable future throughout all or a significant portion of its range or is in danger of extinction throughout all or a significant portion of its range, and USFWS has proposed a draft rule to list the species as threatened or endangered. Proposed species are not protected by the take prohibitions of Section 9 of the ESA until the rule to list is finalized. Under Section 7(a)(4) of the ESA, "Federal agencies must confer with the [USFWS] if their action will jeopardize the continued existence of a proposed species" (USFWS 2025d).

Species under Conservation Agreement

USFWS's ECOS was consulted for a list of species under conservation agreement that are known to occur in Utah County. One amphibian species, Columbia spotted frog (*Rana luteiventris*); one bird species, greater sage-grouse *(Centrocercus urophasianus*); and three fish species, Bonneville cutthroat trout (*Oncorhynchus clarkii utah*), Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*), and least chub (*Lotichthys phlegethontis*), were identified.

Table 2 describes the preferred habitat for each species. There is no suitable habitat in the biological resources evaluation area for any of these species.

Table 2. Species under Conservation Agreement That Are Known to Occur in Utah County

Common Name[a] (*Scientific Name*)	Preferred Habitat[b]	Potentially Suitable Habitat Present?
Amphibians		
Columbia spotted frog (*Rana luteiventris*)	Columbia spotted frogs are highly aquatic and are rarely found far from permanent quiet water. They usually live at the grassy/sedgy margins of streams, lakes, ponds, springs, and marshes and use stream-side small-mammal burrows as shelter. Breeding typically occurs in small pools or ponds with little or no current surrounded by dense aquatic vegetation.	There is no suitable habitat in the evaluation area; there are no aquatic features present. There are records of individuals within a 2-mile radius of the evaluation area (UDWR 2025).
Birds		
Greater sage-grouse (*Centrocercus urophasianus)*	Greater sage-grouse are found throughout Utah in sagebrush steppe communities. Sagebrush is an essential part of sage-grouse habitat with associated wet meadow areas and a good understory of grasses and forbs signifying quality habitat.	There is no suitable habitat in the evaluation area, and the evaluation area is not in a sage-grouse management area.
Fish		
Bonneville cutthroat trout (*Oncorhynchus clarkii utah*)	Habitat for Bonneville cutthroat trout ranges from high-elevation streams with coniferous and deciduous riparian trees, to low-elevation streams in sage-steppe grasslands containing herbaceous riparian zones, to lakes.	There is no suitable habitat in the evaluation area; there are no streams present.
Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*)	Colorado River cutthroat trout require cool, well-oxygenated water and vegetated streambanks for cover and bank stability. Deep pools, boulders, and logs are also important for cover. Colorado River cutthroat trout are native to the Colorado River basin and are currently limited to a few small headwater streams of the Green and upper Colorado Rivers in Colorado, Utah, and Wyoming.	There is no suitable habitat in the evaluation area; there are no streams present.
Least chub (*Lotichthys phlegethontis*)	Least chubs are endemic to the Bonneville Basin of Utah. There are only five wild populations, three in the Snake Valley in Utah's West Desert and two in the Sevier River drainage. A refuge population has been established at the Utah State Wahweap Fish Hatchery in Kane County. Least chubs inhabit spring-fed marshes and wetlands.	There is no suitable habitat in the evaluation area; there are no streams present.

[a] Source: Species list from USFWS 2025b

[b] Sources: Audubon, no date; Cornell Lab of Ornithology 2019; NatureServe, no date; UDWR, no date; and species-specific recovery plans in WS's ECOS (USFWS 2025b)

Migratory Birds

The biological resources evaluation area includes upland trees and shrubs growing in the residential and commercial areas. Suitable foraging and/or potential nesting habitat for migratory birds is present in and adjacent to the evaluation area.

Summary

The IPaC report identified one federally listed bird species (yellow-billed cuckoo) and two insect species proposed for ESA listing (monarch butterfly and Suckley's cuckoo bumble bee) that might occur in the North of Provo Double Track biological resources evaluation area and/or might be affected by the Project. In addition, five species under conservation agreement are known to occur in Utah County. No suitable habitat was identified in the biological resources evaluation area for any of these species. Potentially suitable habitat was identified in the evaluation area for migratory birds.

Potentially suitable nesting and foraging habitat is available in the upland trees and shrubs growing in the residential and commercial areas. Removing trees or shrubs would eliminate these areas as potential nesting and foraging habitat, and construction work would temporarily disturb the nesting, hunting, and browsing activities of avian species.

Mitigation

Any shrub, tree, or tree limb removal should occur outside the general bird nesting season between April 15 and July 31. If removal must occur during this period, preconstruction nesting surveys will be performed by a qualified biologist in the area that will be disturbed. The surveys will determine whether active bird nests are present. If nests are found, all nesting birds will need to be confirmed by a biologist as fledged before vegetation removal. If these measures are followed, the Project will not result in a direct or incidental take under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act.

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NatureServe

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2025a List of threatened and endangered species for the North of Orem Double Track Project. Species list provided by the Utah Ecological Services Field Office. January 20.

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2025c Environmental Conservation Online System. FWS-Listed U.S. Species by Taxonomic Group. https://ecos.fws.gov/ecp/report/species-listings-by-tax-group-totals.

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Western Association of Fish and Wildlife Agencies

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Appendix A

Species Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, UT 84119-7603
Phone: (801) 975-3330 Fax: (801) 975-3331

In Reply Refer To: 01/20/2025 18:43:43 UTC
Project Code: 2025-0044490
Project Name: North of Provo Double Track Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Utah Ecological Services Field Office
2369 West Orton Circle, Suite 50
West Valley City, UT 84119-7603
(801) 975-3330

PROJECT SUMMARY

Project Code: 2025-0044490
Project Name: North of Provo Double Track Project
Project Type: Railroad - New Construction
Project Description: North of Provo Double Track Project
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.22723465,-111.67474219212579,14z

Counties: Utah County, Utah

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley"s Cuckoo Bumble Bee *Bombus suckleyi* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency:	Utah Department of Transportation
Name:	Evan Blanford
Address:	2825 East Cottonwood Parkway
Address Line 2:	Suite 200
City:	Salt Lake City
State:	UT
Zip:	84121
Email	evan.blanford@hdrinc.com
Phone:	3853784941

Utah Division of Wildlife Resources
1594 W. North Temple
Salt Lake City, UT 84116
(801) 538-4700, wildlife.utah.gov

Report Number: erb_16651

Report Date: 2025-01-20 11:39:12

North of Provo Double Track Project

Location: North of Provo
Description: North of Provo Double Track Project

Project Area of Interest with a half-mile and two-mile radius.

Half-Mile Radius

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Osprey	*Pandion haliaetus*	None	None	2004-06-07	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Winged Floater	*Anodonta nuttalliana*	None	None	1891	
Uinta Willowfly	*Taenionema uinta*	None	None	1938-04-04	
Tadpole Physa	*Physa gyrina*	None	None	1917	
	Bombus insularis	None	None	2023-08-11	
Northern Hoary Bat	*Lasiurus cinereus*	None	None	2012-09-04	

Two-Mile Radius

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Osprey	*Pandion haliaetus*	None	None	2006-07-15	
Great Basin Snaketail	*Ophiogomphus morrisoni*	None	None	1930-06-29	
Western bumble bee	*Bombus occidentalis*	None	None	2007-08-14	
Utah Wood-Nymph	*Cercyonis pegala utahensis*	None	None	2003-07-08	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Monarch butterfly	*Danaus plexippus*	None	None	2021-07-29	 Full View
Bear Lake Springsnail	*Pyrgulopsis pilsbryana*	SGCN	None	2020-04-22	
Winged Floater	*Anodonta nuttalliana*	None	None	2015	
Morrison's Bumble Bee	*Bombus morrisoni*	None	None	2021-08-06	
Hoary Skimmer	*Libellula nodisticta*	None	None	1964-05-29	
Ash Gyro	*Gyraulus parvus*	None	None	2012-06-20	
Uinta Willowfly	*Taenionema uinta*	None	None	1938-04-04	
Quick Gloss	*Zonitoides arboreus*	None	None	1916	
Toquerville Springsnail	*Pyrgulopsis kolobensis*	None	None	2002-07-25	
Tadpole Physa	*Physa gyrina*	None	None	1917	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Rocky Mountainsnail	*Oreohelix strigosa*	None	None	1885	
	Pyropyga nigricans	None	None	2023-08-16	
Silver-spotted Skipper	*Epargyreus clarus*	None	None	1985-05-19	
Viceroy	*Limenitis archippus*	None	None	1994-06-01	
Alkali Indian-paintbrush	*Castilleja exilis*	None	None	2022-09-05 19:12:03	
Large-bract Vervain	*Verbena bracteata*	None	None	2022-09-05 19:12:03	
Showy Milkweed	*Asclepias speciosa*	None	None	2022-09-05 19:12:03	
Rice Cutgrass	*Leersia oryzoides*	None	None	2016-08-16 00:00:00	
Ute Ladies' Tresses	*Spiranthes diluvialis*	None	LT	2007-08-16 00:00:00	
Harrison's rockcress	*Boechera harrisonii*	None	None	1924-05-03	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Black Rosy-finch	*Leucosticte atrata*	SGCN	None	1934-12-30	 Full View
Utah Sucker	*Catostomus ardens*	None	None	2006-06-21	
Columbia Spotted Frog	*Rana luteiventris*	SGCN	None	1965-03-29	
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	SGCN	LT	1941-06-20	
Bald Eagle	*Haliaeetus leucocephalus*	SGCN	None	1987-01-22	
White-faced Ibis	*Plegadis chihi*	SGCN	None	2021-05-22	
Long-eared Myotis	*Myotis evotis*	SGCN	None	1986-09-17	
Townsend's Big-eared Bat	*Corynorhinus townsendii*	SGCN	None	1955-11-16	
Little Brown Myotis	*Myotis lucifugus*	SGCN	None	1990-07-11	
Ferruginous Hawk	*Buteo regalis*	SGCN	None	1940-04-29	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Northern River Otter	*Lontra canadensis*	None	None	2017-10-11	
Northern Goshawk	*Accipiter atricapillus*	None	None	1980-05-15	
Spotted Bat	*Euderma maculatum*	SGCN	None	1959-07-15	
Northern Hoary Bat	*Lasiurus cinereus*	None	None	2012-09-04	

Definitions

State Status	
SGCN	Species of greatest conservation need listed in the Utah Wildlife Action Plan (UWAP) and also included in the Utah Field Guide
U.S. Endangered Species Act	
LE	A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction
LT	A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered
LE;XN	An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and nonessential" in its designated use areas in Utah
C	A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened
PT/PE	A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service

Species Distribution and Habitat Suitability Models

Species distribution and habitat suitability models (SDHMs) can inform wildlife management decisions such as habitat protection, enhancement, and restoration. They may also help assess environmental impacts by identifying species' habitats. When reevaluating SDHMs with new information, they can help identify or track changes or trends in habitat

quality. SDHMs assess habitats' spatial arrangement and connectivity, identify crucial habitats, or describe the environmental conditions a species selects. SDHMs provide an understanding of the impacts of invasive species spread and identify suitable areas for species translocations/re-introductions.

SDHMs show a predicted suitable habitat for a species based on various biotic and abiotic environmental factors. These models may be useful for statewide evaluation but should not be considered verified species presence or absence. Field survey information should be utilized to verify the presence or absence of taxa when making species-specific decisions. Models produced by the Utah Division of Wildlife Resources (DWR) were conducted using a blend of Generalized Linear Models, Generalized Additive Models, Random Forest Models, Boosted Regression Tree Models, and Maximum Entropy Models.

Mitigation Strategies

Typical recommendations to consider and help guide project activities to avoid, minimize or mitigate impacts on wildlife and their habitats from project disturbances are displayed below for some wildlife species found within/near your project area.

Common Name	Strategy
Bald Eagle	Avoid disturbance within disturbance buffer (determined by activity; either 330 ft or 660 ft) from nest Jan. 1 - Aug. 15

The DWR understands that mitigation strategies might conflict. Please reach out to DWR staff to develop strategies to minimize impacts on wildlife while still achieving project goals. Your project is located in the following UDWR region(s):

DWR Region Full Name	Regional Phone	Impact Analysis Biologist	Email	Phone
Central Region	801-491-5678	Josee Seamons	jseamons@utah.gov	385-421-1277

Wildlife Action Plan

The Utah Wildlife Action Plan (UWAP) is Utah's guiding document for native species conservation. The DWR encourages parties to use the UWAP in their environmental planning, as it provides a conservation framework to prevent future listings under the ESA.

Disclaimer

The information provided in this report is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, any given response is only appropriate for its respective request.

The Utah DWR provides no warranty nor accepts any liability occurring from any incorrect, incomplete, or misleading data or from any incorrect, incomplete, or misleading use of these data.

The results include a query of species tracked by the Utah Natural Heritage Program and Utah Division of Wildlife Resources, which includes all species listed under the U.S. Endangered Species Act, species in the Utah Wildlife Action Plan, and other species. Other significant wildlife values might also be present on the designated site.

For additional information about species listed under the Endangered Species Act and their Critical Habitats that may be affected by activities in this area or for information about Section 7 consultation under the Endangered Species Act,

please visit https://ecos.fws.gov/ipac/ or contact the U.S. Fish and Wildlife Service Utah Ecological Services Field Office at (801) 975-3330 or utahfieldoffice_esa@fws.gov.

The "Not For Consultation" watermark is meant to inform users that this tool is not a substitute for the U.S. Fish and Wildlife Service (USFWS) environmental review process. While this tool provides courtesy information on ESA species for context, the U.S. Fish and Wildlife Service is the authority on Information for Planning and Consultation Endangered Species Act Reviews. Additionally, the Wildlife Habitat Analysis Tool provides information to assist in analysis but does not replace coordination and consultation with Utah Division of Wildlife Resource biologists who can often serve as an expert resource for site-specific information.

Supplemental Data

Unmapped Corridors

Unmodeled Corridors: Absent

Wildlife Habitat Information

Species	Season	Value	Comments
California Quail	year-long	crucial	
Ring-Necked Pheasant	year-long	substantial	

Report Generated For

Name: Evan Blanford
Organization: HDR
Email: evan.blanford@hdrinc.com
Phone: (385)-378-4941

End of Report

Thank you for using the Utah Wildlife Habitat Analysis tool. Feel free to reach out to the department for additional information or assistance.

FrontRunner Forward Technical Memorandum

To	Utah Department of Transportation and Utah Transit Authority
From	Lance Meister, Cross-Spectrum Acoustics, Inc.
Date	November 25, 2025
Re	North of Provo Double Track Project Noise and Vibration Mitigation Assessment

Summary

The purpose of this memorandum is to summarize the noise and vibration mitigation assessment for the North of Provo Double Track Project. The project consists of double tracking approximately 0.7 miles of the FrontRunner Commuter Rail system from just north of the Provo Central Station until it merges with the existing double track just north of 900 West in Provo.

A noise and vibration assessment was completed for this project in 2025[1] to determine impacts from infrastructure changes (adding the double track and associated trackwork). In addition, corridor-level noise and vibration assessments were completed in 2023 and 2025[2] for the entire FrontRunner corridor to determine impacts from service increase (15-min at peak, 30-min off-peak). Noise and vibration impacts were identified, and mitigations were recommended. This mitigation assessment is a detailed review of reasonable and feasible mitigation measures that would be implemented as part of the project.

The results of the mitigation assessment indicate that spring-rail frogs would need to be installed on the double crossovers near Station 304+00 and Station 309+00, on the FrontRunner tracks, between 500 West and 200 West for both noise and vibration mitigation. In addition, a 670-foot long ballast mat would need to be installed under the new FrontRunner track from Station 310+90 to 317+60 on top of an HMA concrete slab for vibration mitigation. A 831-foot long, 12-foot tall noise barrier (above top of rail) would need to be installed on the south side of the tracks west 500 West from approximately Station 312+19 to 320+50 and a 425-foot long 13-foot tall noise barrier (above top of rail) would need to be installed on the south side of the tracks east of 500 West from approximately Station 306+50 to 310+75. With the recommended mitigation measures, all identified noise and vibration impacts would be mitigated.

[1] UTA, Noise and Vibration Analysis for the North of Provo Double Track Project, July 21, 2025.
[2] UTA, FrontRunner Forward Corridor Level Noise and Vibration Analysis, May 18, 2023; and UTA, FrontRunner Forward Corridor Level Noise and Vibration Analysis Addendum, May 20, 2025.

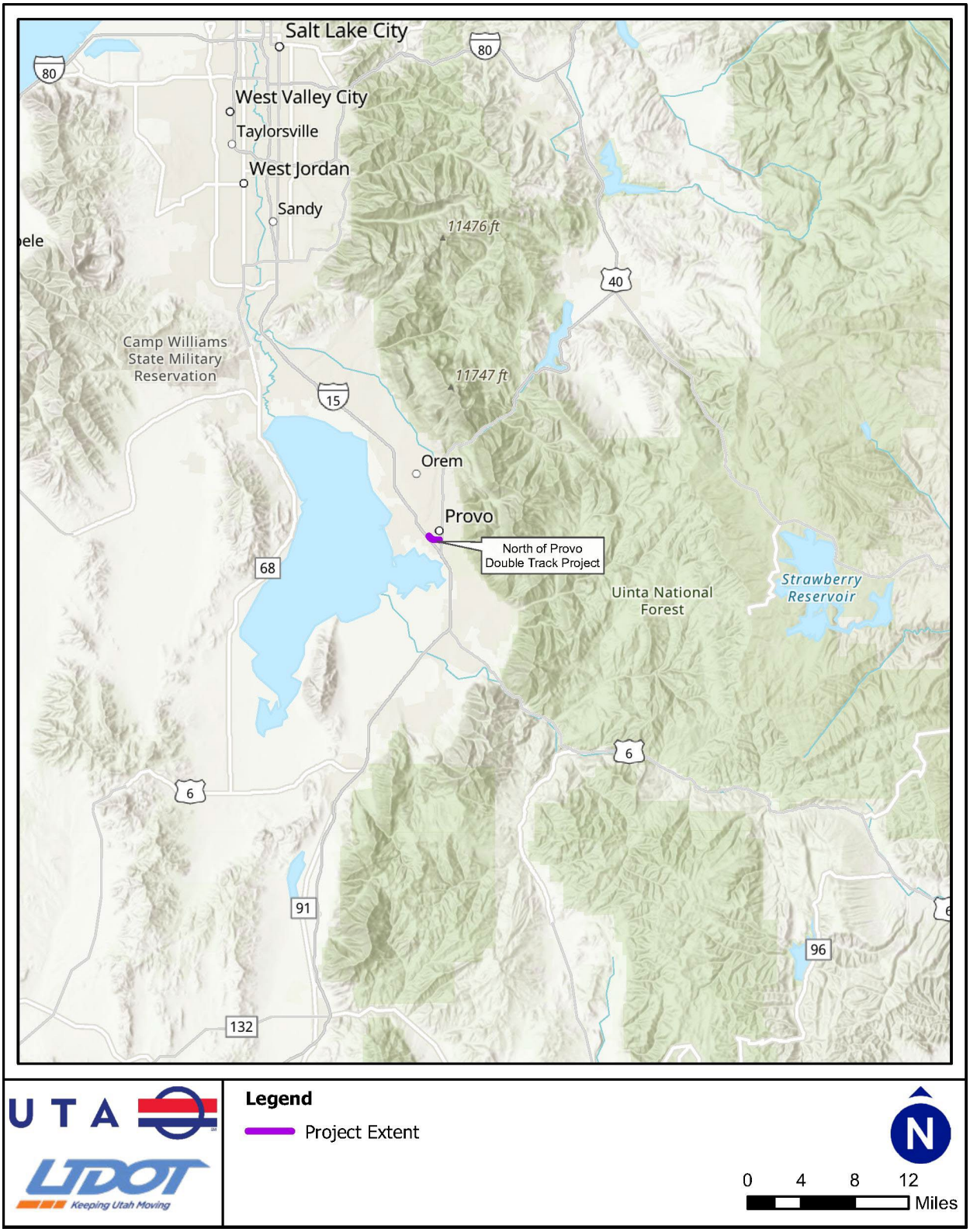

Figure 1. North of Provo Double Track Project Overview

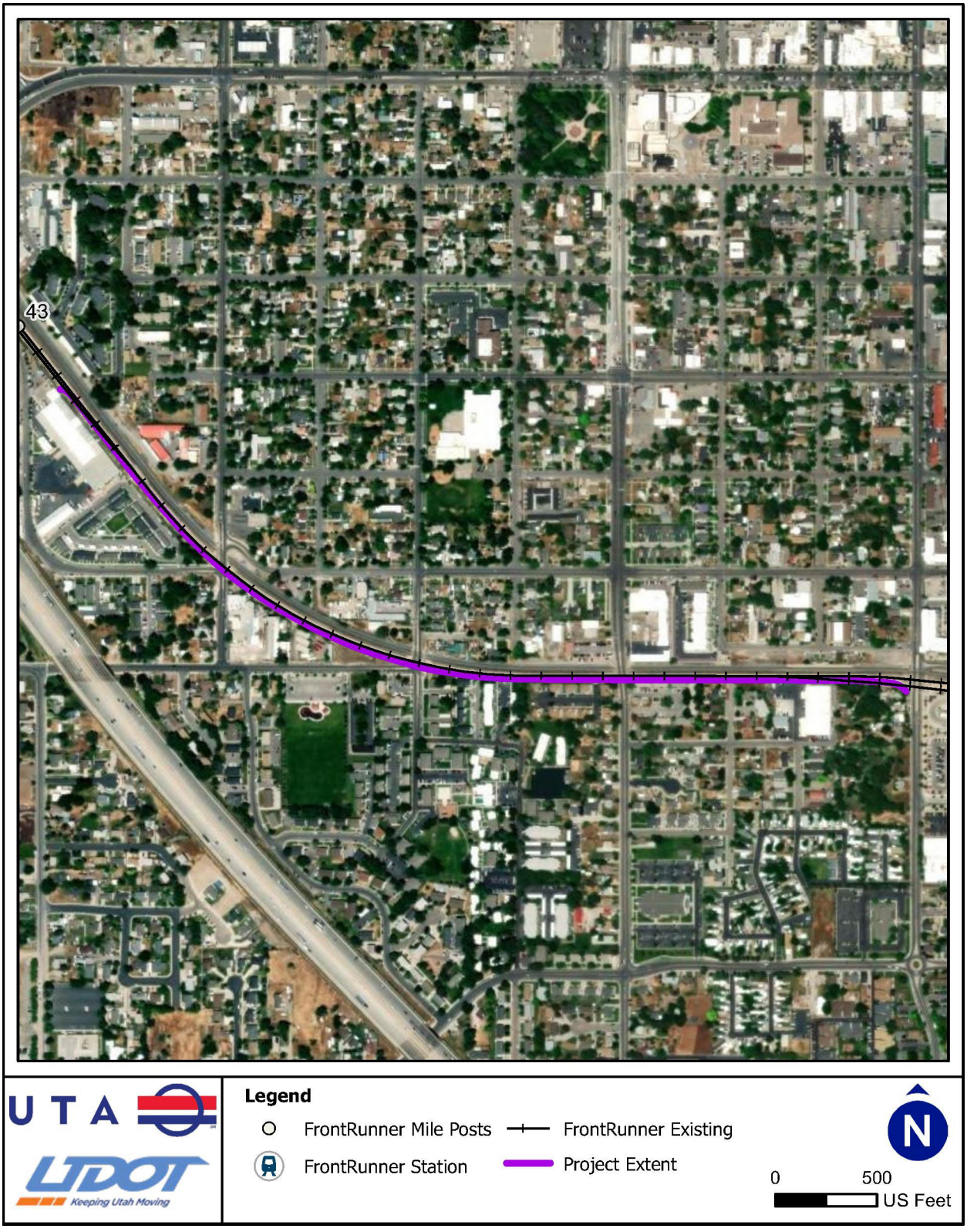

Figure 2. North of Provo Double Track Project Area

Noise

The Federal Transit Administration (FTA) noise and vibration guidance manual[3] was used in the assessment of impacts and the design of the noise mitigation. There were 13 buildings with 36 residences facing the track identified as moderate noise impacts in the North of Provo Double Track Project at 2 single-family homes, 10 4-unit buildings and one apartment complex. The impacts are due to the combined effects of the double track project and the service increase, including noise impacts due to the increase in noise for second row buildings from the removal of front-row buildings for the project. The locations of the noise impacts are shown in Figure 3 and Figure 4.

The moderate noise impacts are due to the presence of special trackwork, i.e. crossovers, at the eastern end of the project area for the FrontRunner trains and the proximity of the new track to receivers on the south side of the tracks on either side of 500 West. Crossovers and turnouts have a gap in the rail for the wheel, and this gap creates additional noise as the wheel impacts the gap. The design team evaluated the location of the proposed crossovers and determined that they are required at this location and cannot be relocated elsewhere[4]. Because of the close proximity, the combined effects of the new double track closer to the homes and the additional service would cause moderate impacts at 11 multi-family buildings and 2 single-family homes (36 residences total) in the neighborhood.

The moderate noise impacts meet the mitigation threshold established in the UTA noise policy[5] because the existing noise levels are above 65 dBA Ldn. The mitigation for noise from the special trackwork is to install spring-rail frogs on the double crossovers near Station 304+00 and Station 309+00 on the FrontRunner tracks to eliminate the gap in the main direction of travel and the associated increase in noise. Installation of spring-rail frogs at the crossovers would reduce the FrontRunner noise levels by approximately 5 dB at some of the receivers near the crossovers but would not fully mitigate the impacts. Additional noise mitigation, in the form of noise barriers, would need to be considered at this location. Where feasible and cost effective, noise barriers can be considered for noise mitigation. If noise barriers are not effective, feasible or cost effective, sound insulation would be considered. Two noise barriers were assessed for the Project.

The noise barrier calculation is based on the equations in Table 4-28 of the FTA guidance manual. A noise barrier works by blocking the line of sight from the source of the noise to the receiver. The barrier calculations determine how effective a barrier is by calculating the path length difference and the protrusion of the barrier above the line of sight. The process for calculating the effectiveness of a noise barrier involves the following steps:

- Determining the appropriate barrier type and equation (see Table 4-28 in the FTA guidance manual).
- Determining the ground elevations of the track, barrier and receivers.
- Calculating the distance from each source of noise to the barrier and the distance from the barrier to each receiver.
- Determining the heights of the sources of noise and the height of the receivers.
- Estimating a barrier height for the calculations.
- Calculating the path length difference for each source/barrier/receiver set and then determining the insertion loss (reduction in noise level) of the barrier.
- Refining the barrier height until the desired insertion loss is achieved.

[3] FTA, Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, September 2018.
[4] Provo design memo, TBA
[5] UTA Office of Capital Services SOP, No. OCS.01.01, Noise assessment and Mitigation, May 1, 202.

- Calculating the cost effectiveness of the barrier. The UTA noise policy sets the maximum cost of a barrier at $30,000 per benefited receiver. The UDOT noise barrier unit cost is estimated at $20/square foot.[6]

For the barrier calculations, four sources of FrontRunner noise were used. For locomotives, the main source of noise is the engine and exhaust. For cars, the main source of noise is the wheel on the rail. All heights are referenced to height above top of rail:

- Northbound locomotives – 12-foot source height
- Southbound locomotives – 12-foot source height
- Northbound cars – 2-foot source height
- Southbound cars – 2-foot source height

All of the receivers were assumed to be two stories with a receiver heigh of 14 feet for the second story, with the exception of one single-family one-story home on the east side of 500 West, with a receiver height of five feet (these are the heights above ground level of the windows on the second floor or first floor for the single-family home). The ground elevation of the residences and barriers was approximately three feet below the top of rail elevation.

Barrier West of 500 West

The results of the barrier assessment for the FrontRunner trains are shown in Table 1 for the noise barrier proposed on the west side of 500 West. The barrier would have a height of 12 feet above the top of rail and be 831 feet long (as shown in Figure 3). At this height, all of the noise impacts would be mitigated. Additionally, the UTA noise assessment and mitigation policy requires that at least 50% of the receivers have at least a 5 dB reduction in noise for the barrier to be considered reasonable. All of the residences would have a noise reduction greater than 5 dB, so this would be considered a reasonable barrier.

For the cost effectiveness calculation, the barrier height is from ground level to required height above top of rail minus any retaining wall that was already planned prior to mitigation. For this barrier, 408 feet of the noise barrier would be on a 3-foot-tall retaining wall, for a barrier height of 12 feet, and the remaining 423 feet would not have a retaining wall under it resulting in a barrier height of 15 feet. The barrier would be located from Station 312+19 to Station 320+50. The total area of the barrier would be 11,241 square feet (408 feet * 12 feet + 423 feet * 15 feet). At $20/square foot (per UDOT barrier cost data), the barrier would have a cost of $224,820. The barrier would benefit 22 residences in this impacted neighborhood, for a cost effectiveness calculation of $10,219 per benefited receiver. This is below the $30,000 cost per benefited receptor, so the barrier would be cost effective.

[6] UDOT Noise Abatement Report, 08A2-01, May 28, 2020.

Table 1. Noise Barrier Insertion Loss for FrontRunner Trains – West of S 500 West

Receiver	Story	Dwelling Units Facing the Tracks	Insertion Loss* Northbound Locomotive Noise, dB	Insertion Loss Southbound Locomotive Noise, dB	Insertion Loss Northbound Wheel-Rail Noise, dB	Insertion Loss Southbound Wheel-Rail Noise, dB	Total Insertion Loss, dB
607	First	1	9.2	10.9	10.9	11.1	10.7
607	Second	1	6.3	9.5	10.8	11.0	9.5
R11	First	1	14.0	14.4	14.0	14.4	14.2
R11	Second	1	7.9	11.9	14.0	14.4	12.3
608**	First	1	11.4	12.8	12.7	12.9	12.6
608**	Second	1	7.7	11.4	12.6	12.8	11.3
R22	First	1	14.6	15.2	14.6	15.2	15.0
R22	Second	1	7.6	11.7	14.6	15.2	12.6
R23	First	2	14.2	14.7	14.2	14.6	14.5
R23	Second	2	4.0	8.2	13.5	14.7	9.8
R24	First	2	14.0	14.4	14.0	14.4	14.2
R24	Second	2	3.6	6.9	12.9	14.4	9.1
R25	First	2	13.8	14.3	13.8	14.3	14.1
R25	Second	2	2.8	5.5	11.4	14.3	8.1
R26	First	1	13.3	13.8	13.3	13.8	13.6
R26	Second	1	5.5	7.6	11.8	13.8	9.9

* Insertion loss is the reduction in noise level provided by the barrier. Generally, first story receivers have a greater reduction than second story receivers.
**This building was not identified as an impact but would benefit from the barrier.

Noise Impact Location – West of 500 West

Figure 3. North of Provo Double Track Project

Barrier East of 500 West

The results of the barrier assessment for the FrontRunner trains are shown in Table 2 for the noise barrier proposed on the east side of 500 West. The barrier would have a height of 13 feet above the top of rail and 425 feet long (as shown in Figure 4). The barrier at this location is slightly higher than the other barrier due to the greater distance from the barrier to the receivers. At this height, all of the noise impacts would be mitigated. Additionally, the UTA noise assessment and mitigation policy requires that at least 50% of the receivers have at least a 5 dB reduction in noise for the barrier to be considered reasonable. Eleven of the 16 residences would have a noise reduction greater than 5 dB, so this would be considered a reasonable barrier.

For the cost effectiveness calculation of this barrier, 135 feet of the noise barrier would be on a 3-foot-tall retaining wall, for a barrier height of 13 feet, and the remaining 290 feet would not have a retaining wall under it resulting in a height of 16 feet. The barrier would be located from Station 306+50 to Station 210+75. The total area of the barrier would be 6,395 square feet (135 feet * 13 feet + 290 feet * 16 feet). At $20/square foot (per UDOT barrier cost data), the barrier would have a cost of $127,900. The barrier would benefit 11 residences in this impacted neighborhood (residences with a noise reduction greater than 5 dB), for a cost effectiveness calculation of $11,627. This is below the $30,000 cost per benefited receptor, so the barrier would be cost effective.

Table 2. Noise Barrier Insertion Loss for FrontRunner Trains – East of 500 West

Receiver	Story	Dwelling Units Facing the Tracks	Insertion Loss** Northbound Locomotive Noise, dB	Insertion Loss Southbound Locomotive Noise, dB	Insertion Loss Northbound Wheel-Rail Noise, dB	Insertion Loss Southbound Wheel-Rail Noise, dB	Total Insertion Loss, dB
615	--*	1	1.2	2.3	6.2	6.8	4.2
616	First	2	3.1	3.7	5.8	5.9	4.8
616	Second	2	1.6	2.7	5.7	5.8	4.0
617	First	2	5.0	5.9	8.2	8.3	7.0
617	Second	2	3.1	4.6	8.1	8.2	6.0
618	First	2	5.8	8.8	9.1	9.2	8.3
618	Second	2	3.8	8.2	9.0	9.1	7.4
R36***	First	1	9.9	10.8	11.8	12.0	11.3
R36	Second	1	5.9	7.9	11.7	11.9	9.4
R44	--*	1	11.7	13.0	13.3	13.6	13.1

*Receivers 615 and R44 are single family homes. The barrier performance was calculated based on the height of the highest story.
** Insertion loss is the reduction in noise level provided by the barrier. Generally, first story receivers have a greater reduction than second story receivers.
*** This building was not identified as an impact but would benefit from the barrier.

Noise Impact Location – East of 500 West

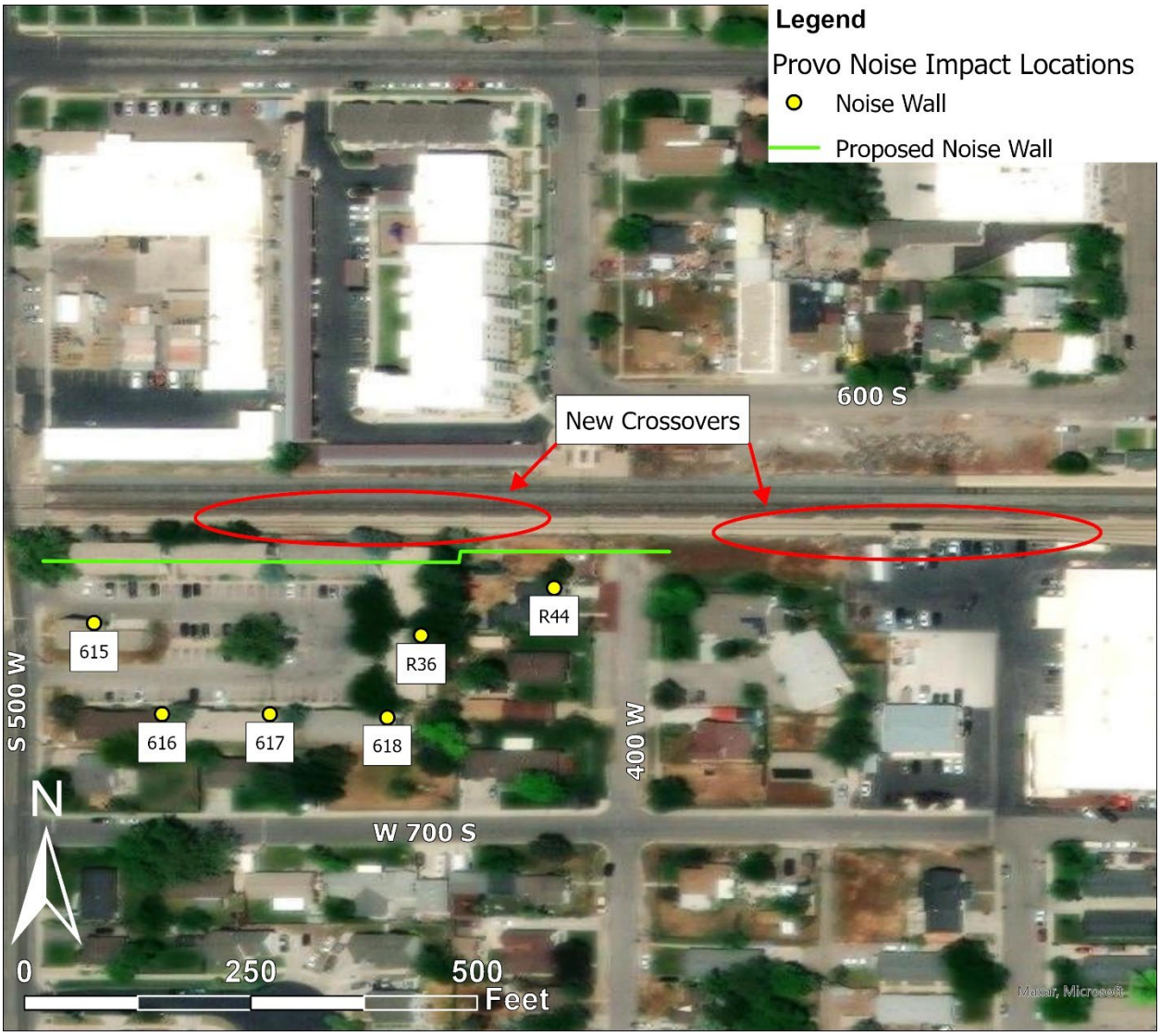

Figure 4. North of Provo Double Track Project

Noise Mitigation

The noise mitigation recommendation is to install spring-rail frogs at the double crossovers, near Station 304+00 and Station 309+00, on the new FrontRunner tracks to eliminate the gap in the main direction of travel and the associated increase in noise, to construct a 12-foot tall noise barrier (above top of rail) to the west of 500 West from approximately Station 312+19 to 320+50 for a length of 831 feet and a 13-foot tall noise barrier (above top of rail) to the east of 500 West from approximately Station 306+50 to 310+75 for a length of 425 feet. The spring-rail frogs would reduce noise levels by approximately 5 dB but would not fully mitigate the impacts. However, with the inclusion of the spring-rail frogs and the noise barriers, all the noise impacts would be mitigated.

Vibration

The FTA noise and vibration guidance manual was used in the assessment of impacts and the design of the vibration mitigation. At most locations, the change in vibration levels due to the proposed track would not be above the impact threshold for an increase of 3 VdB, due to the small change in distance to sensitive receivers. However, there are two locations on the North of Provo Double Track Section where there would be increases of 3 VdB or more.

Crossovers and turnouts have a gap in the rail for the wheel, and this gap creates additional vibration as the wheel impacts the gap. There are five residential buildings at the eastern end of the segment east of 500 West with vibration impacts near a set of proposed double crossovers on the FrontRunner tracks, as shown in Figure 5. With the installation of spring-rail frogs at this location, the vibration levels for these five residential buildings would be below the impact threshold of a 3 VdB increase.

To the west of 500 West, there are three residential buildings with vibration impacts due to the change in vibration levels from the new track being greater than 3 VdB, as shown in Figure 6. At this location, the existing track is 50 feet from the residences and the new track is 30 feet from the residences, resulting in an increase in vibration of 3.9 VdB. At this location, a ballast mat on top of an HMA concrete slab would be recommended to mitigate the vibration impacts.

In order to determine the existing vibration levels and the potential effectiveness of a ballast mat for this Project, a set of vibration measurements of FrontRunner trains were conducted on July 28, 2025, at the end of 400 West, south of the FrontRunner tracks in Provo, as shown in Figure 7. The vibration measurements followed the procedures outlined in Section 6.5 of the FTA guidance manual. Accelerometers were mounted on paving bricks set on the ground 35 feet from the FrontRunner tracks and a series of passbys of FrontRunner trains were measured, in both the northbound and southbound directions. The measurements included:

- 5 trains in the northbound direction
- 4 trains in the southbound direction

The data was analyzed to determine the maximum overall vibration levels and the vibration levels at each frequency band between 6.3 Hz and 250 Hz (the frequency data is summed to get the overall vibration level). The result of the measurements is shown by the orange line in Figure 9 and the first row in Table 3. The vibration consists of generally middle frequency vibration (between 31.5 Hz and 80 Hz).

To document the field performance of existing Frontrunner ballast mats, vibration measurements of existing FrontRunner trains were conducted in July 2025 in the North of American Fork Project area. The ballast mat in this area was installed as a part of the FrontRunner South project (2008-2012) to mitigate vibration impacts for that project. Measurements collected in American Fork included those from an area near the track where ballast mat is present and a nearby area without ballast. The vibration measurements followed the procedures outlined in Section 6.5 of the FTA guidance manual. Details regarding the measurements can be found in the North of American Fork Double Track Project Noise and Vibration Mitigation Assessment[7], and the results are shown in Figure 8 and in second row of Table 3.

[7] UTA, North of American Fork Double Track Project Noise and Vibration Mitigation Assessment, November 2025.

The data shown in Figure 9 and Table 3 represent the average of the FrontRunner passbys, including the overall level and each frequency. The ballast mat performance measured in American Fork was applied

to this measurement by frequency to calculate the effect a ballast mat would have on the overall vibration levels. The third row in Table 3 and the blue line in Figure 9 represent the vibration levels with the ballast mat. Due to the vibration in the middle frequencies (between 31.5 Hz and 80 Hz), installing a ballast mat at this location would reduce the overall vibration from the FrontRunner trains by 2.5 VdB, which would reduce the vibration levels from the new track to below the impact threshold of an increase of 3 VdB.

With the application of spring-rail frogs at the two double crossovers near Station 304+00 and Station 309+00 and a 670-foot long ballast mat installed under the new track from Station 310+90 to 317+60, all of the vibration impacts would be mitigated.

Table 3. Vibration Measurement Results by Frequency

			Vibration Level (VdB)															
Vibration Results	**Train Speed (mph)**	**Overall Vibration Level**	**6.3 Hz**	**8 Hz**	**10 Hz**	**12.5 Hz**	**16 Hz**	**20 Hz**	**25 Hz**	**31.5 Hz**	**40 Hz**	**50 Hz**	**63 Hz**	**80 Hz**	**100 Hz**	**125 Hz**	**160 Hz**	**200 Hz**	**250 Hz**
Measured Vibration Level***	25	77.1	43.0	42.9	48.0	53.2	55.0	59.5	58.2	69.2	71.0	67.2	69.9	70.0	63.8	58.7	55.1	49.5	39.1
Ballast Mat Performance****	--	--	0.0*	0.0*	0.0*	1.6	2.6	0.7	1.6	-0.5	2.6	1.2	2.5	9.8	12.5	9.5	15.0**	15.0**	13.5
Mitigated Vibration Level	25	74.6	43.0	42.9	48.0	51.6	52.4	58.8	56.6	69.7	68.5	66.0	67.4	60.2	51.2	49.2	40.1	34.5	25.6

*The data at 6.3 Hz, 8 Hz and 10 Hz was excluded from the ballast mat performance calculation and set at 0. At very low frequencies, the data at close distances can have unusual results which are not valid. In this case, the on ballast mat measurements in American Fork at 75 mph are showing a significant reduction in the vibration levels at these frequencies, which is not possible with a ballast mat. The data was excluded at these frequencies, and the performance was set to zero. Because the vibration levels are much lower at these frequencies, there is no effect on the overall vibration level.
**For the purposes of ballast mat performance for other locations, a maximum reduction of 15 VdB was applied at each frequency. Reductions greater than 15 VdB at any frequency are not typical for ballast mats.
*** Data gathered in Provo, July 2025.
**** Data gathered in American Fork, July 2025.

Vibration Impact Location – East of 500 West

Figure 5. North of Provo Double Track Project

Vibration Impact Location – West of 500 West

Figure 6. North of Provo Double Track Project

Figure 7. Provo Vibration Measurement Location

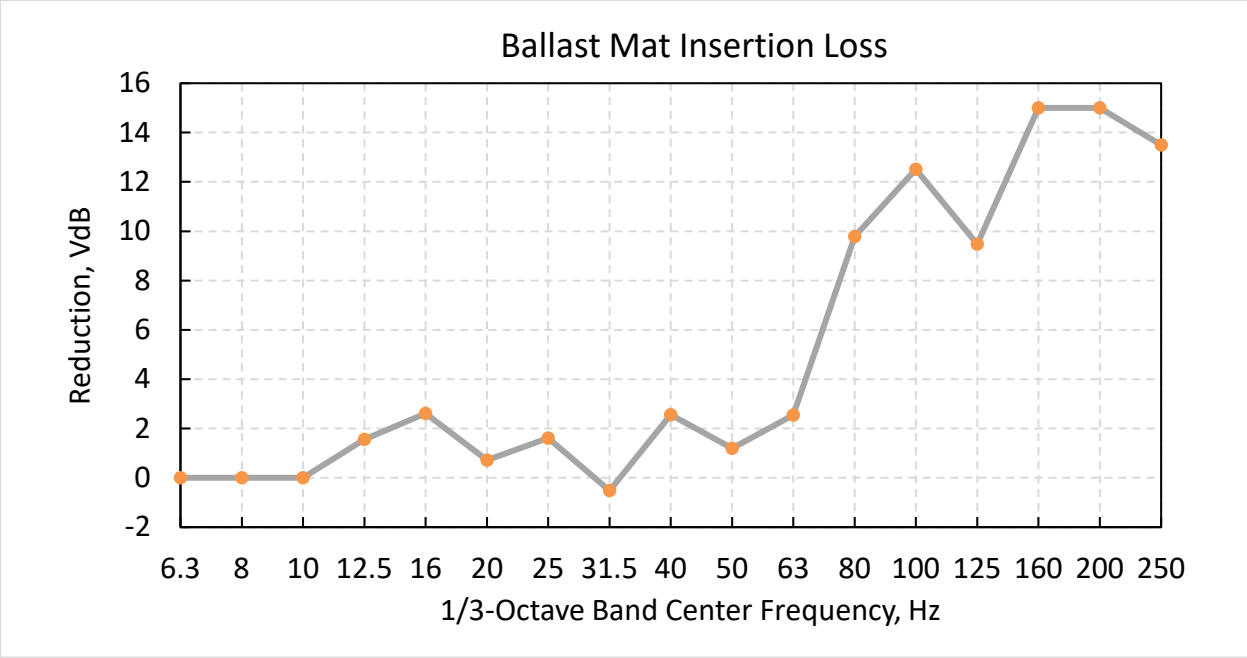

Figure 8. Existing Ballast Mat Performance

(From field data collected in American Fork, July 2025)

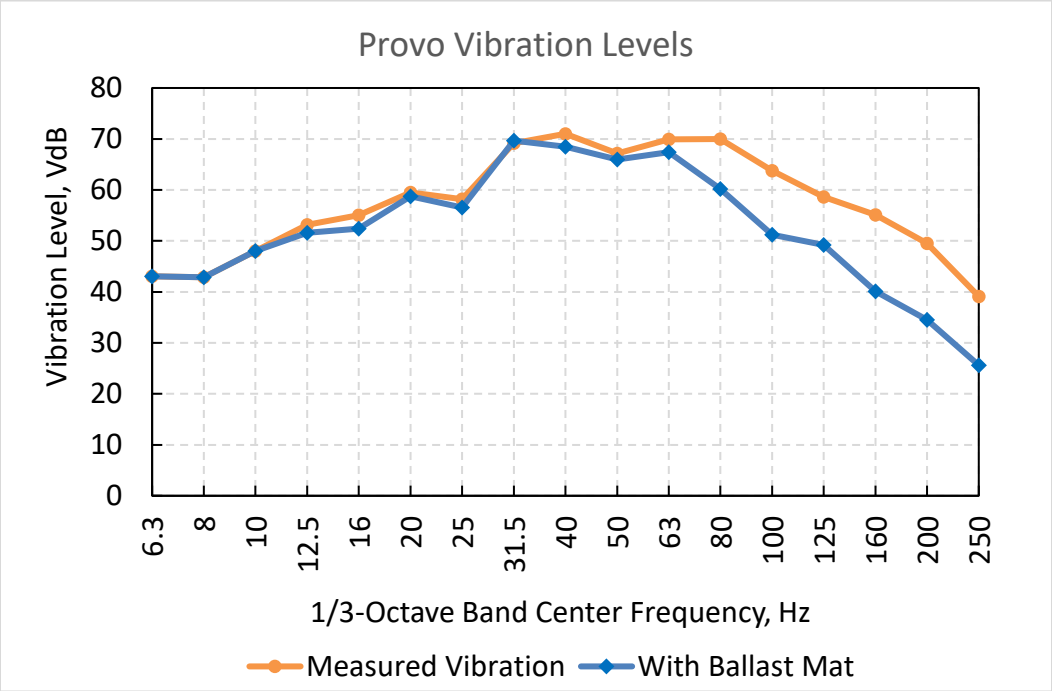

Figure 9. Projected Ballast Mat Vibration Reduction – Provo

(From field data collected in Provo and American Fork, July 2025)