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)

July 23, 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 Orem Double Track Project**

Dear Mr. Braceras:

Thank you for providing the environmental documentation for the **FrontRunner Forward Program – North of Orem Double Track** project. The project is planning to utilize Federal Transit Administration (FTA) Capital Investment Grants (CIG) Program funding to add 1.7 miles of new double track to the existing FrontRunner commuter rail system from Vineyard Station to Orem Central Station in the Cities of Vineyard and Orem, Utah County, Utah.

FTA funding is requested for new double track along the existing commuter rail system. The anticipated track work would consist of constructing approximately 1.7 miles of a new UTA mainline (ML) track number (No.) 2, shifting about 6,800 linear feet of track, reprofiling about 940 linear feet of track, removing about 200 linear feet of track, constructing about 4,900 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, installing two emergency crossovers, and widening the existing track bed.

In addition to the work along the UTA tracks, both existing Union Pacific Railroad (UP) mainline tracks would be shifted east to accommodate the additional UTA ML No. 2 under the existing Geneva Road grade-separated crossing. The proposed UP track work would involve shifting about 4,000 linear feet of track, removing an existing crossover, removing 5,700 linear feet of track, removing the UP signal bridge south of Geneva Road, installing a new crossover, and constructing about 4,800 linear feet of track.

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).
- 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 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.
- 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 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) will be obtained as required. If required, groundwater 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.
- 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.
- 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(c)(9). 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 additional 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 Orem Double Track Project – FrontRunner Forward Program*	
Project Description *The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to lengthen and shift the existing North of Orem double track section of the FrontRunner commuter rail system in the cities of Orem and Vineyard 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 Orem Double Track Project.*	

The North of Orem Double Track Project (Project) is one the 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 Orem Central Station in the southern part of Vineyard and the northern part of Orem. This section would extend from UTA milepost S 36.8 south to UTA milepost S 38.5, a distance of about 1.7 miles.

Constructing this section would complete double track from Vineyard Station to Orem Central Station. The anticipated track work would consist of constructing a new UTA mainline (ML) track number (No.) 2, shifting about 6,800 linear feet of track, reprofiling about 940 linear feet of track, removing about 200 linear feet of track, constructing about 4,900 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, installing two emergency crossovers, and widening the existing track bed. Preliminary track design modeling shows that the estimated depth of excavation from the top of the existing ground to the bottom of the proposed subballast for proposed trackwork construction ranges from 5 to 6 feet. However, the existing ground conditions could require additional excavation below the bottom of the proposed subballast; clean materials would fill in the difference. The estimated depth of excavation for utilities ranges from 5 to 8 feet.

UTA ML No. 2 would be constructed with 15-foot track spacing west from UTA ML No. 1. Currently, the existing UTA ML No. 1 is designed for 79 miles per hour (mph) throughout the entire section. The curves and spirals for the proposed UTA ML No. 2 throughout this section would also be designed for a 79-mph design speed.

In addition to the work along the UTA tracks, both existing Union Pacific Railroad (UP) mainline tracks would be shifted east to accommodate the additional UTA ML No. 2 under the existing Geneva Road grade-separated crossing. The anticipated UP track work would involve shifting about 4,000 linear feet of track, removing an existing crossover, removing 5,700 linear feet of track, removing the UP signal bridge south of Geneva Road, installing a new crossover, and constructing about 4,800 linear feet of track. The new UP ML No. 1 would be constructed with 20-foot track center spacing from the existing UP track, except where it conforms to the existing UP ML No. 1. The curves and spirals for the proposed UP ML No. 1 are designed for 60mph passenger trains and 40mph freight trains throughout the entire section, consistent with existing conditions. The curves and spirals for the proposed UP ML No. 2 are designed for 75mph passenger trains and 60mph freight trains throughout the entire section, consistent with existing conditions. Communications and signal modifications, including new signal houses, in the existing and proposed UTA right-of-way would be required. All required utility relocations would be determined during final design. The concept design is based on the 30% design plans that were prepared in February 2025.

For the conceptual plans, see Attachment A.2, Conceptual Design Plans for the North of Orem 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 **i**mpacts 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 36.8 south to UTA milepost S 38.5 in Vineyard and Orem, in Utah County, Utah.

See the Vicinity Map in Attachment A.1, Vicinity Map for the North of Orem 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 Orem 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 C-9: Assembly or construction of facilities that is consistent with existing land use and zoning requirements (including floodplain regulations) and uses primarily land disturbed for transportation use, such as: Buildings and associated structures; bus transfer stations or intermodal centers; busways and streetcar lines or other transit investments within areas of the right-of-way occupied by the physical footprint of the existing facility or otherwise maintained or used for transportation operations; and parking facilities.*

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 Orem and Vineyard in Utah County in a developed area that generally consists of urban and agricultural land uses with a mix of residential, manufacturing, public facilities, and commercial zoning types near 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 4.34 acres of urban land use to transportation use. The zoning types along the project extent that would be converted to a transportation use would consist of residential, manufacturing, commercial, and regional mixed use, which is zoning intended to promote pedestrian access and integrates residential, commercial, and other uses, with a focus on walkable connections and transit access.

While the majority of the proposed Project facilities (track and related infrastructure) would be constructed within the existing rail corridor, the land use changes needed to accommodate the Project would be compatible with local and state land use and transportation plans for the area, as well as compatible with the existing and active adjacent railroad corridor.

See Attachment B.1, Land Use and Zoning, for maps showing the land use and zoning that are adjacent to the project extent.

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 constructing retaining walls, grading, and access. The Project would require about 8.08 acres of right-of-way. Of the approximately 8.08 acres, UTA and UDOT own 1.90 acres, which would not need to be purchased for the Project. Of the remaining 6.18 acres, 4.15 acres would be partial acquisitions from Vineyard city (2.42 acres) and adjacent residential properties (1.73). About 2.03 acres would be needed from UP. No relocations would be required.

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 resources 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 would 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 would 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 Section 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 right-of-way acquisition memorandum in Attachment B.2.

3. Community Impacts

☒ NO

☐ YES

Because the FrontRunner commuter rail and freight tracks 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 affect neighborhoods or communities because the communities were built around UP's railroad corridor (constructed in 1883), which still operates freight service today and is adjacent to the FrontRunner track.

Much of the urban development in the community grew up around the freight and commuter rail corridor, meaning that the Project would not impact the physical or social fabric of the 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 areas were built on both sides of and adjacent to the rail corridor. There would be no changes in access to services 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 area. There would be no major changes to traffic patterns at existing at-grade intersections.

The Project would improve transportation access for residents of the surrounding neighborhoods by improving FrontRunner transit service capacity and operational reliability. In the short term, there would be temporary construction-related traffic, noise, and air quality impacts from the Project, but these temporary impacts of constructing the double-track section would be mitigated as described below 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 spring of 2024. [redacted]

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

☐ NO
☒ YES – Provide Section 106 Consultation Documentation

*FTA finds that the Project would result in **no adverse effect** to [redacted] under Section 106. The Project would shift approximately 4,000 linear feet of the existing UP track to allow for the construction of FrontRunner UTA ML No. 2. [redacted] The Utah State Historic Preservation Office concurred with this finding on June 19, 2024.*

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

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

*Based on the finding of **no adverse effect** for the one archaeological site under Section 106, a corresponding finding of use has been made under Section 4(f). Specifically, FTA finds that the Project would result in **use with de minimis impact** under Section 4(f) for [redacted]*

Additional information regarding Section 106 consultation and the Section 4(f) finding notification is included in Attachment B.4, Cultural, Historic, and Archaeological Resources.

In addition, a corridor-wide cultural resources surveys were conducted to evaluate the potential cumulative impacts along the FrontRunner corridor. The corridor-wide surveys are documented in two 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 the 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 is oriented north to south throughout this section of track. The visual backdrop from the project extent consists of the Wasatch Mountains to the east and the Lake Mountains across Utah Lake to the west.

As part of the Project, some crossing gates would be moved back to accommodate the wider track footprint at at-grade crossings (such as at 400 South and 800 South), and retaining walls would be constructed along some segments of the corridor to minimize property impacts. However, these project elements would not change the aesthetics along the project extent. 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. Views to and from the project extent are not anticipated to change as a result of the Project. The Project is not anticipated to degrade the existing visual or aesthetic character or quality of the site, its surroundings, 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 is one public park near the project extent (Rendezvous Park in Vineyard). This park would not be impacted by the Project; therefore, there would be no Section 4(f) use. Additionally, this park was not constructed with Land and Water Conservation Fund (LWCF) funds. For this reason, Section 6(f) does not apply.

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 and one Category 3 receptor (Trailside Elementary) 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 analysis are provided in Attachment B.7.

There would be 13 noise impacts to Category 2 single-family residences as listed below. There would be no noise impact to the one Category 3 school near the project extent.

- *One moderate noise impact caused by wayside noise from UTA FrontRunner trains at the south end of the project extent. Wayside noise includes wheel-rail noise and propulsion system noise from locomotives.*
- *Four moderate noise impacts and one severe noise impact due to two proposed crossovers (special trackwork) of UTA FrontRunner tracks.*
- *Seven moderate noise impacts due to a proposed crossover of Union Pacific Railroad (UP) freight tracks*

In addition, a corridor level noise and vibration analysis has been conducted to evaluate potential impacts of the future anticipated service increase 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 general noise assessment for service increase from 30-minute to 15-minute determined that one residential receiver (a single-family residence, R184) would experience moderate noise impacts from

wayside noise. This receiver was also identified with moderate impact under the previous scenario (infrastructure change at current 30-minute service).

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 one category 3 land use is outside the vibration screening distance. The vibration 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 general vibration assessment predicts 67 vibration impacts to single family residences, as listed below.

- *18 vibration impacts near the north end of the project extent due to two UTA FrontRunner track crossovers—the same crossovers that would cause the noise impacts.*
- *49 vibration impacts at the south end of the project extent assuming no mitigation measures are implemented. Note that the existing tracks in this area were constructed with ballast mats as a mitigation measure to reduce vibration.*

Because ballast mats were constructed with the existing FrontRunner track in the southern portion of the project extents, the general vibration assessment also considered a scenario with ballast mats installed under the proposed FrontRunner track for the same extents as where the existing ballast mats are installed. This analysis found that the number of vibration impacts at the south end of the project extent would be reduced from 49 to 1 (at R184, which is the same single-family residence with moderate noise impact, as discussed above).

In addition, the corridor level general vibration assessment for service increase from 30-minute to 15-minute concluded that because of the high frequency and length of Union Pacific 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 (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 would 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 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.

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 Orem 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 EPA's interim conformity guidelines. The North of Orem Double Track Project is also included in MAG's 2025–2029 TIP (MAG 2025).*

A PM hot-spot analysis is required only for specific types of projects located in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas. Projects requiring a PM hot-spot analysis are listed in the transportation conformity regulations at 40 CFR Section 93.123(b)(1). Because the Project does not meet any of the criteria to be considered a project of air quality concern, hot-spot analyses are not required for particulate matter. Because the improvements associated with the Project would be in a CO attainment area, a CO hot-spot analysis is not required. The Project is not a project of air quality concern, and the project team does 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.

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. 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 screening described in this worksheet, several sites with known or suspected contamination are close to the project extent.

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

- *The site of contamination at the Geneva Works property located at 10 S. Geneva Road, in Vineyard, Utah, is 350 feet east of the project extent. No right-of-way acquisition from this parcel is expected. Five leaking underground storage tank (LUST) incidents have also been documented at this site. Two LUSTs were closed in 1999, and three additional LUSTs were closed in 2014. UDEQ considers the LUST incidents currently closed, although further action could be required if new evidence suggests potential contamination risks. A total of 11 petroleum storage tanks (PSTs) were previously in service on this property but are all currently no longer in service. These tanks stored various materials including gasoline, diesel, and hazardous substances. Based on the available information, and because the site is near the project extent, this site presents a **moderate risk** that residual contamination in soil, groundwater, or soil vapor could be encountered during construction.*
- *The Maverick (517) site located at 24 S. Geneva Road, in Vineyard, Utah, is 700 feet east of the project extent. Five federally regulated PSTs are documented at the site. Three tanks have a capacity of 12,000 gallons each and currently store gasoline. The remaining two tanks store diesel fuel; one tank has a capacity of 12,000 gallons, and the other has a capacity of 30,000 gallons. Based on the available information, and because the site is near the project extent, this site presents a **moderate risk** that contamination could be in the soil, groundwater, or soil vapor and would be encountered during construction.*

I*n 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 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 would describe the necessary soil, groundwater, and/or soil vapor 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 and UDOT better identify construction-related impacts. *See Attachment B.9, Hazardous Waste, for a map showing the sites of moderate risks.*
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 (map 49049C340F, effective 6/19/2020) 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.*
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 *The Lake Bottom Canal is the only surface water in or near the project extent. The canal is located near the northern end of the project extent on the east side of UP's tracks. The Lake Bottom Canal would not be impacted by constructing the Project.* 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 stormwater permit would not be required. The existing FrontRunner system already has the 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.*

	Constructing the Project would disturb more than 1 acre of ground surface, and this disturbance would require coverage under the Utah Pollutant Discharge Elimination System's (UPDES) Construction General Permit UTRC00000 (CGP). Coverage under the CGP will be obtained before 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 *Field reconnaissance-surveys were conducted on June 2 and October 30, 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 Report.*
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 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. 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 would modify two existing public at-grade crossings to accommodate UTA ML No. 2. The crossings are located at the following locations:

- *400 South in Orem*
- *800 South in Orem*

Minor modifications include new concrete crossings, moving gates, new and relocated pedestrian gates, roadway and sidewalk profile adjustments, 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 the traffic at the existing at-grade crossings.

There is an existing parking facility near the project extent at the existing Orem Central Station. Slight modifications to the parking area, within the existing parking facility footprint, would be required to maintain the existing number of stalls. The Project would not permanently impact either traffic or parking and would not include major changes to any existing roadways.

A corridor-wide traffic and safety analysis was conducted to evaluate the 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 *(UTA 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:

Enbridge Gas. *Multiple subsurface utilities owned and maintained by Enbridge Gas would need to be relocated to accommodate constructing the Project. These utilities include approximately 300 feet of a 6-inch, high-pressure gas line, a manhole, and approximately 250 feet of an 8-inch sewer line. The 300-foot-long gas line parallels UTA ML No. 1 and would be relocated outside the rail alignment to the west. The manhole and sewer line are perpendicular crossings and would be relocated to avoid conflict with the proposed UTA ML No. 2.*

Orem City. *Multiple surface and subsurface utilities owned and maintained by Orem City would be relocated to accommodate constructing the Project. These utilities include approximately 500 feet of a 10-inch sewer line, two segments of fiber optic line that total approximately 225 feet, approximately 300 feet of overhead power lines, and approximately 75 feet of underground power line. The 10-inch sewer line conflict likely extends beyond 500 feet. The exact limits of relocating this sewer line would be determined during the final design of the Project. These conflicts parallel UTA ML No. 1 and would need to be relocated outside the rail alignment to the west. Additionally, a*

12-inch water line located at 600 South would potentially need to be relocated or have the casing extended, and a sewer line located at Geneva Road would potentially need to be relocated.

Rocky Mountain Power. *Multiple surface and subsurface utilities owned and maintained by Rocky Mountain Power would need to be relocated to accommodate constructing the Project. These utilities include approximately 1,075 feet of overhead power lines, approximately 100 feet of buried power lines, three segments of buried fiber optic line that total approximately 2,725 feet, and approximately 1,200 feet of overhead power lines. These conflicts parallel the UTA ML No. 1 and would need to be relocated outside the rail alignment to the west. A utility pole would potentially be relocated because of the proximity of the proposed UTA ML No. 2.*

UTA Fiber Optic Line. *One subsurface segment of fiber optic line owned and maintained by UTA would be relocated to accommodate constructing the Project. This line totals approximately 175 feet and parallels UTA ML No. 1. This line would need to be relocated outside the rail alignment to the west.*

Unknown Fiber Optic Line. *One subsurface segment of the fiber optic line that totals approximately 1,200 feet would be relocated to accommodate constructing the Project. Further details about ownership and exact limits of the fiber line would be determined during the final design of the Project. This line parallels UTA ML No. 1 and would need to be relocated outside the rail alignment to the west.*

All utility relocations will be coordinated with the utility owner during the final design of the Project to ensure the safety and minimum disruption of 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, the Project would result in 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 would 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 would be coordinated with the utility provider and customers that could be affected.

Installing switches would require a 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 to maintain 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.

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).

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. UTA and UDOT have coordinated with MAG, Utah County, Vineyard, and Orem City. 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 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 the safety of those users. The Project would not impact the security of the FrontRunner facilities and would not have 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. 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.

A corridor-wide traffic and safety analysis was conducted to evaluate the potential impacts of the future anticipated service increase in 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 *(UTA 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 would 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) would apply for coverage under Utah's CGP (UTRC00000). In compliance with this permit, an SWPPP would be developed for the construction phase of the Project.*

- *UTA and UDOT (or the construction contractor) may 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). If required, groundwater 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 the construction contractor) will submit a Fugitive Dust Control Plan to the Utah Division of Air Quality.*

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

Autumn Hu *NEPA Project Administrator* *Utah Transit Authority*	*04/16/25*

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

North of Orem Double Track
Project FrontRunner Forward
Program

Attachments

Attachment A Vicinity Map and Conceptual Design Plans

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

Attachment A.2 Conceptual Design Plans for the North of Orem 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

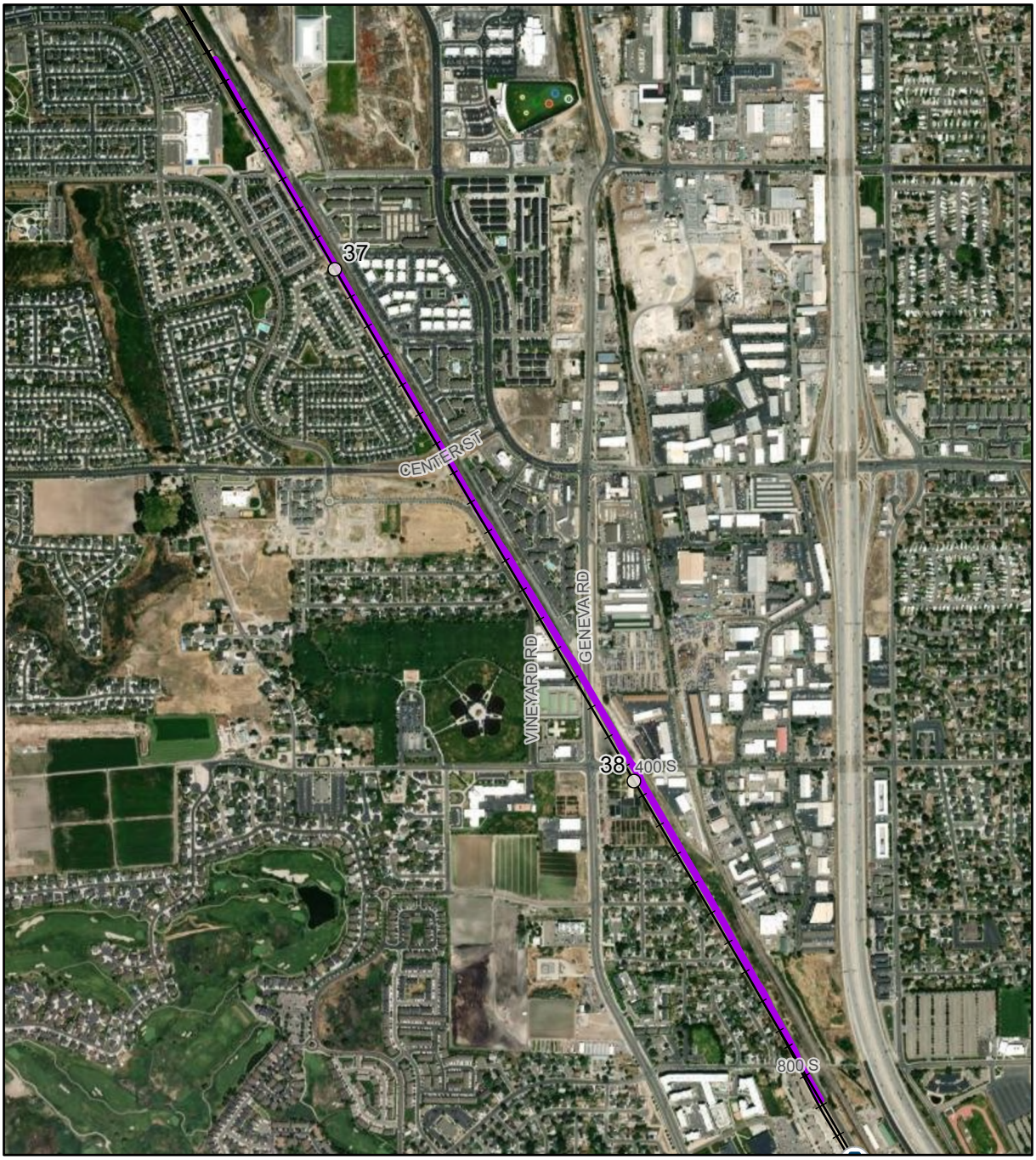
ATTACHMENT A.1
Vicinity Map for the North of Orem Double Track Project

Legend

Project Extent

N

0 4 8 12 Miles



UTA

UDOT Keeping Utah Moving

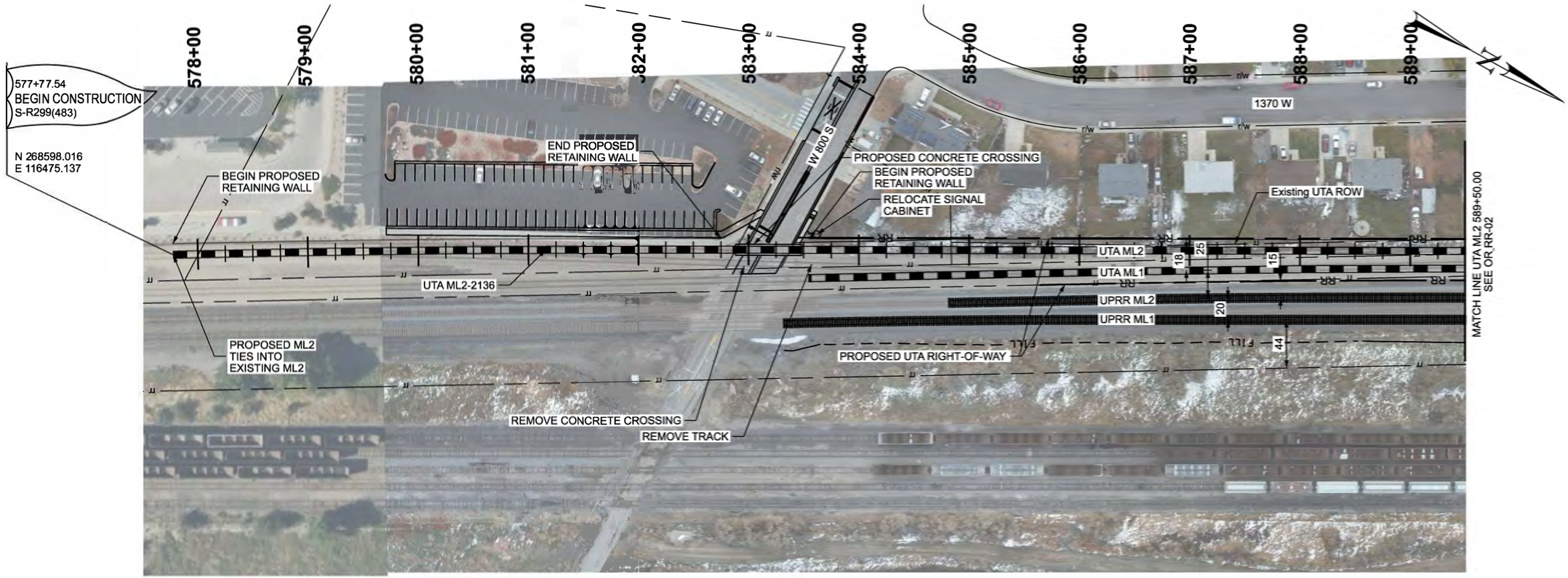
Legend

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

N

0 1,000 US Feet

ATTACHMENT A.2
Conceptual Design Plans for the North of Orem Double Track Project



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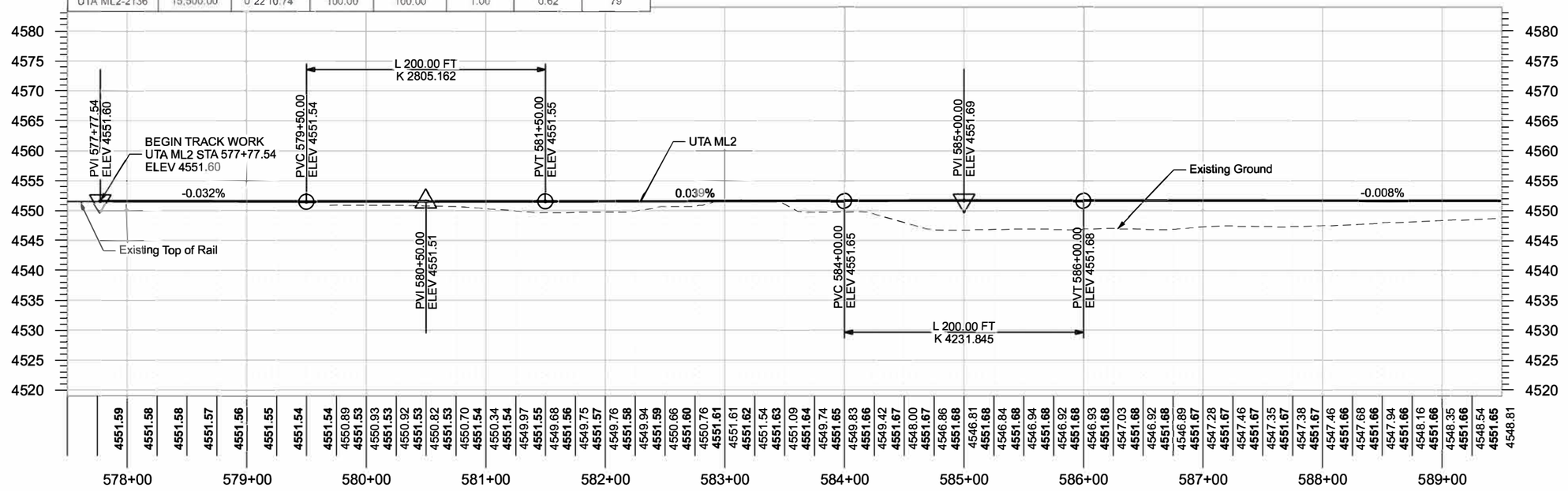

UTA ML TRACK 2

REVISIONS

NO.	DATE	APPROVED BY	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
HDR

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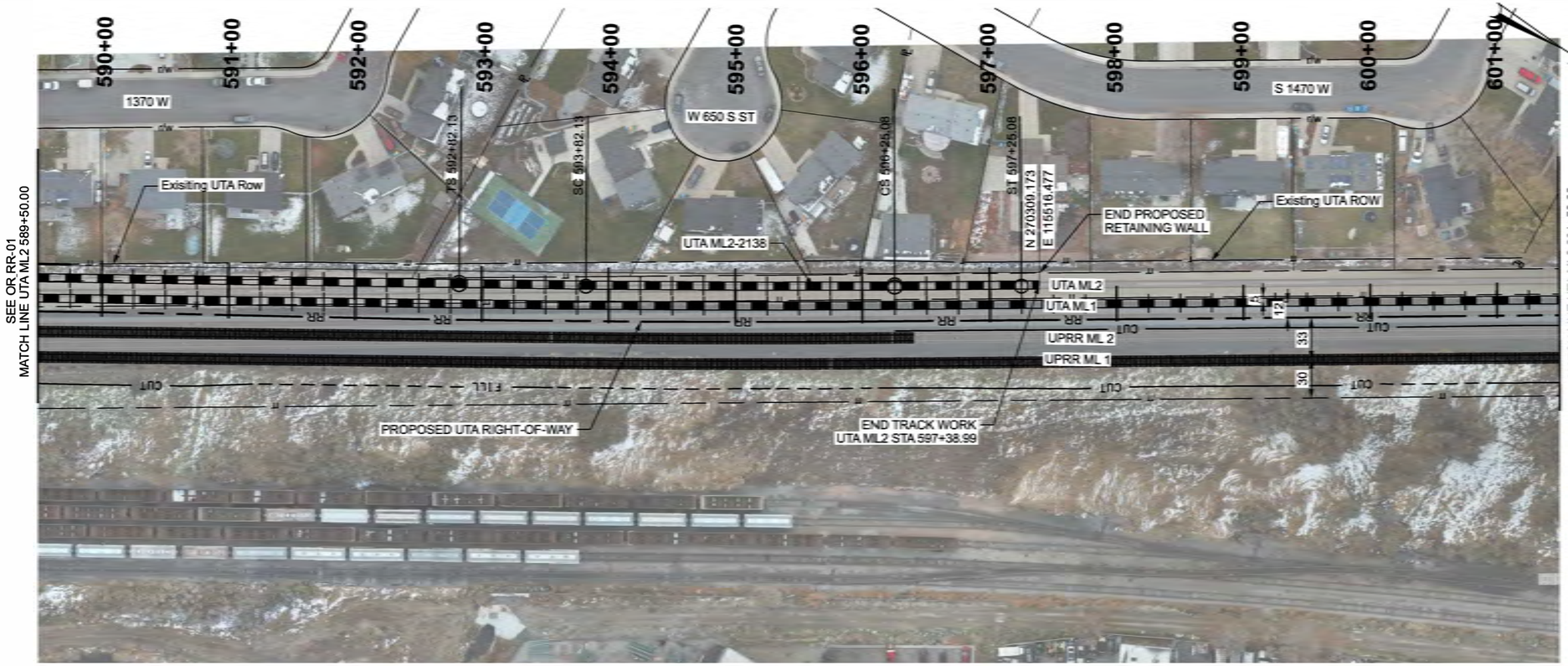
QC CHECKED BY JS
DATE

APPROVED
PROFESSIONAL ENGINEER

PROJECT: FRONTRUNNER OREM
PROJECT NUMBER: S-R299(483) PIN 21213
TRACK PLAN AND PROFILE
SHEET NO. OR_RR-01

DR_RR-01.dgn
2/11/2025



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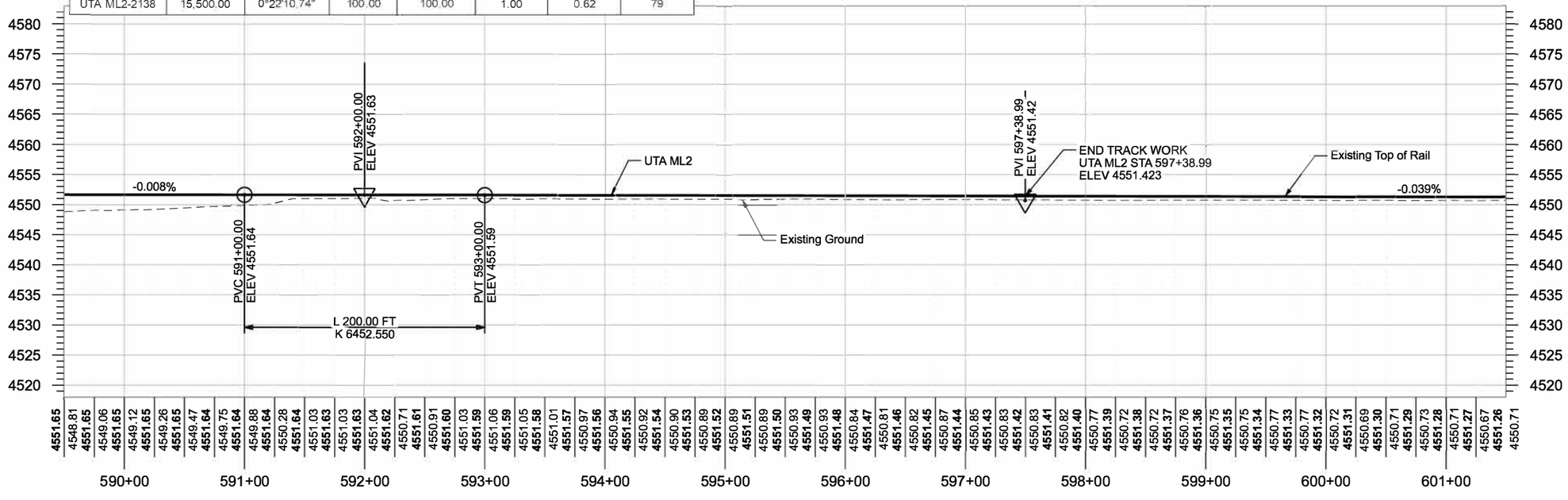

UTA ML TRACK 2

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TRACK PLAN AND PROFILE

SHEET NO. OR_RR-02

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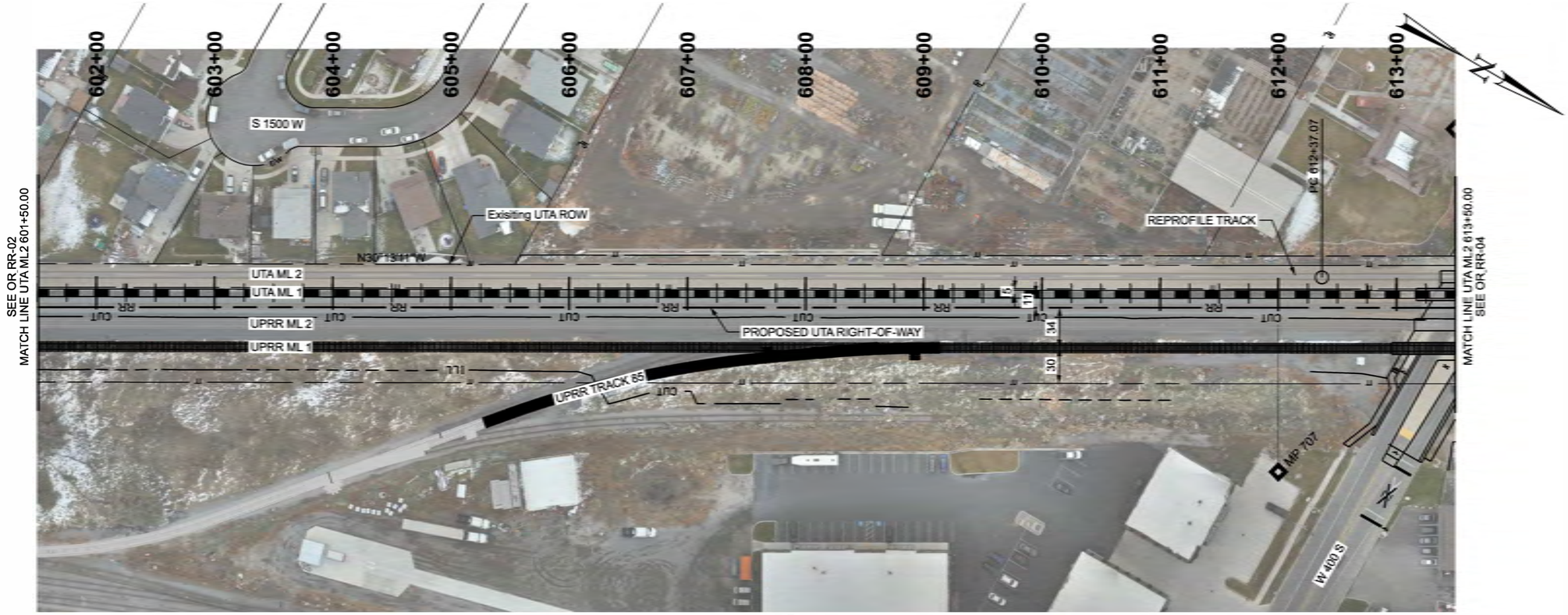

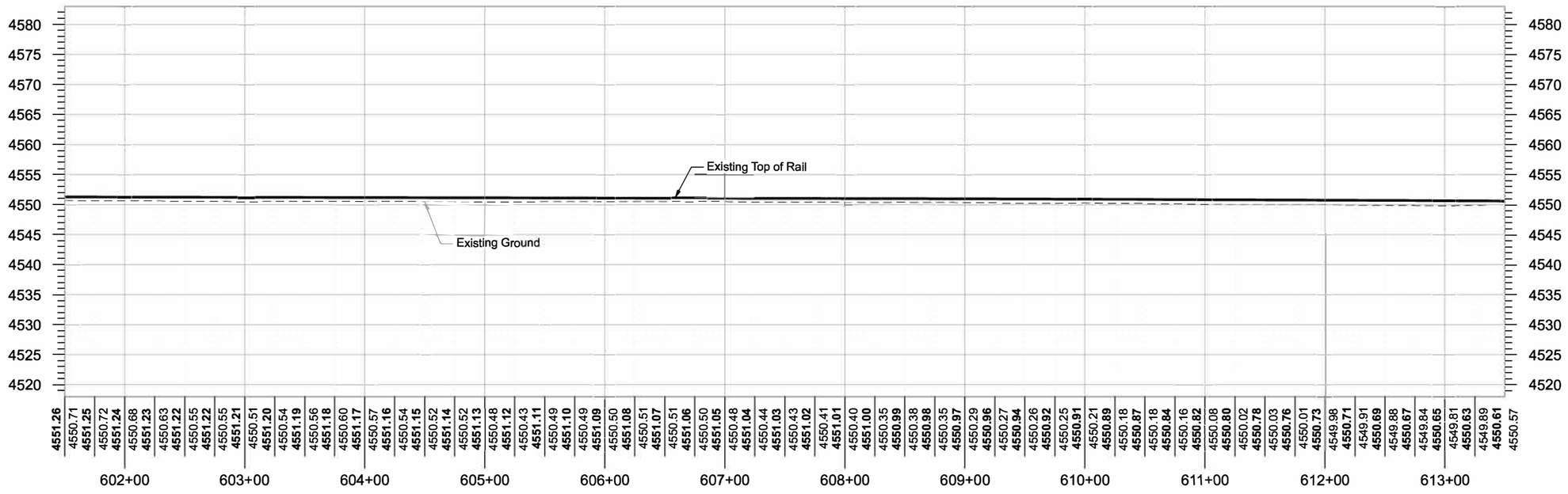

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PIN: 21213

TRACK PLAN AND PROFILE

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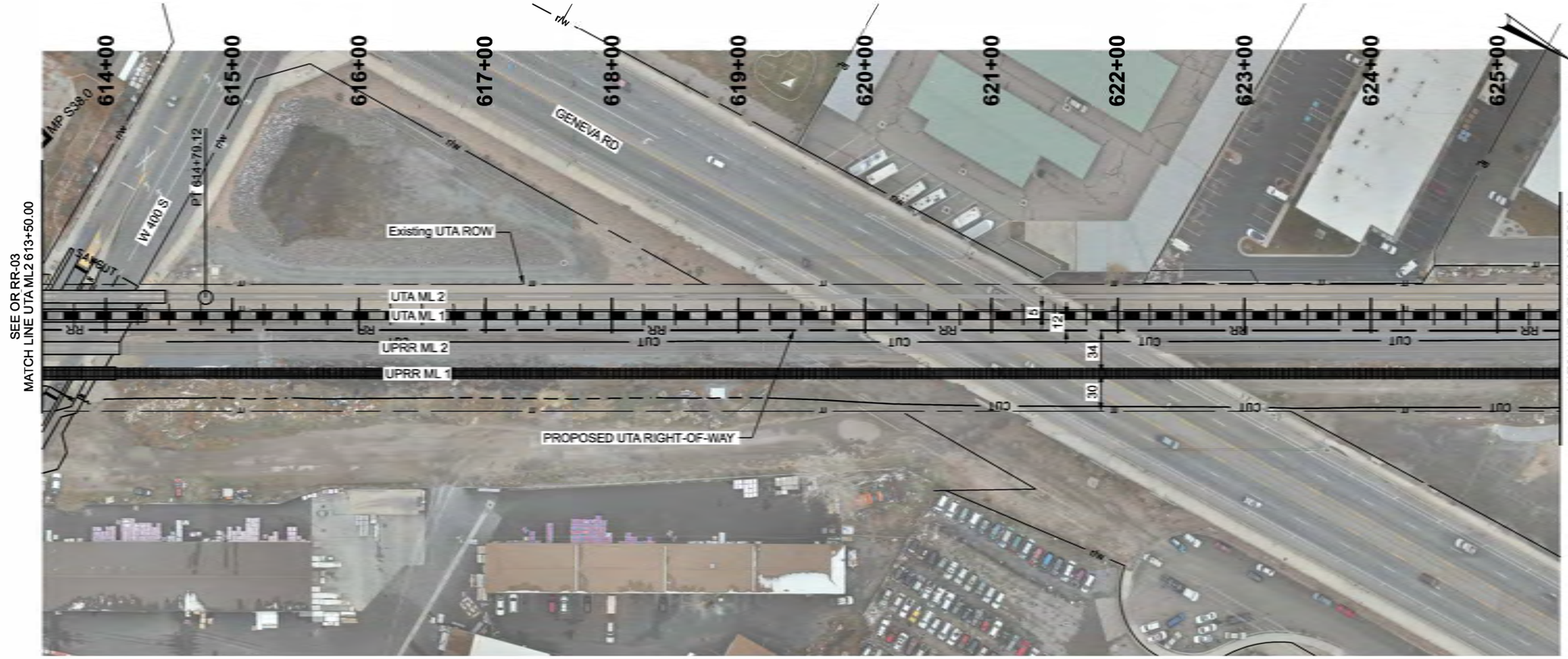
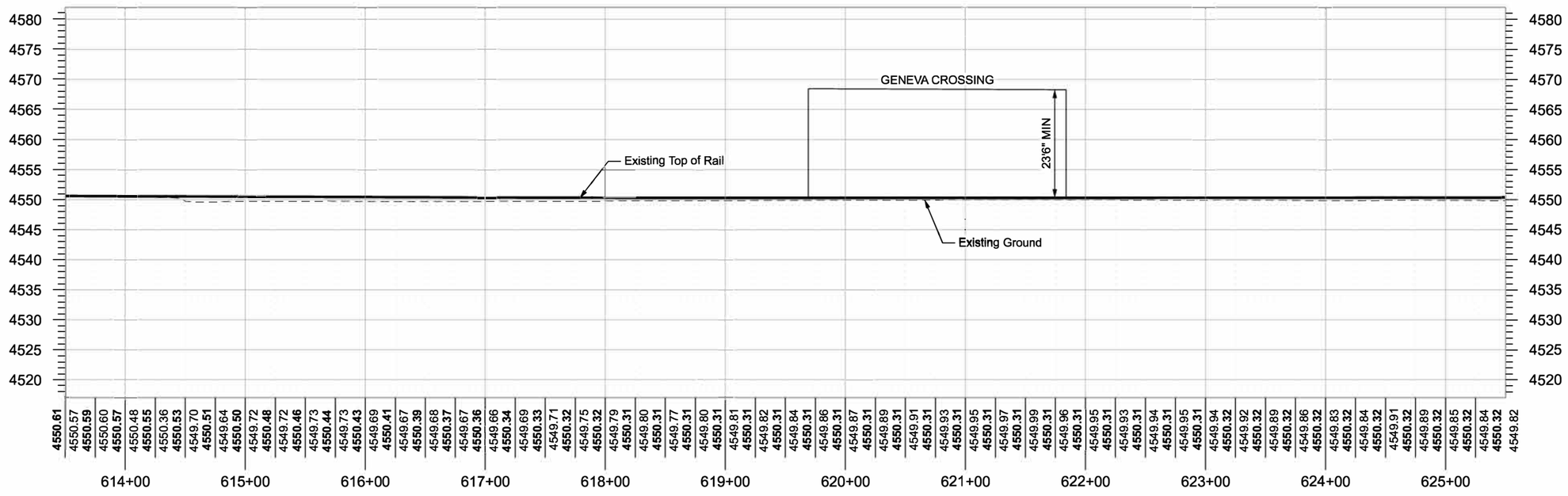
2/11/2025





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PIN: 21213

TRACK PLAN AND PROFILE

SHEET NO. OR_RR-04

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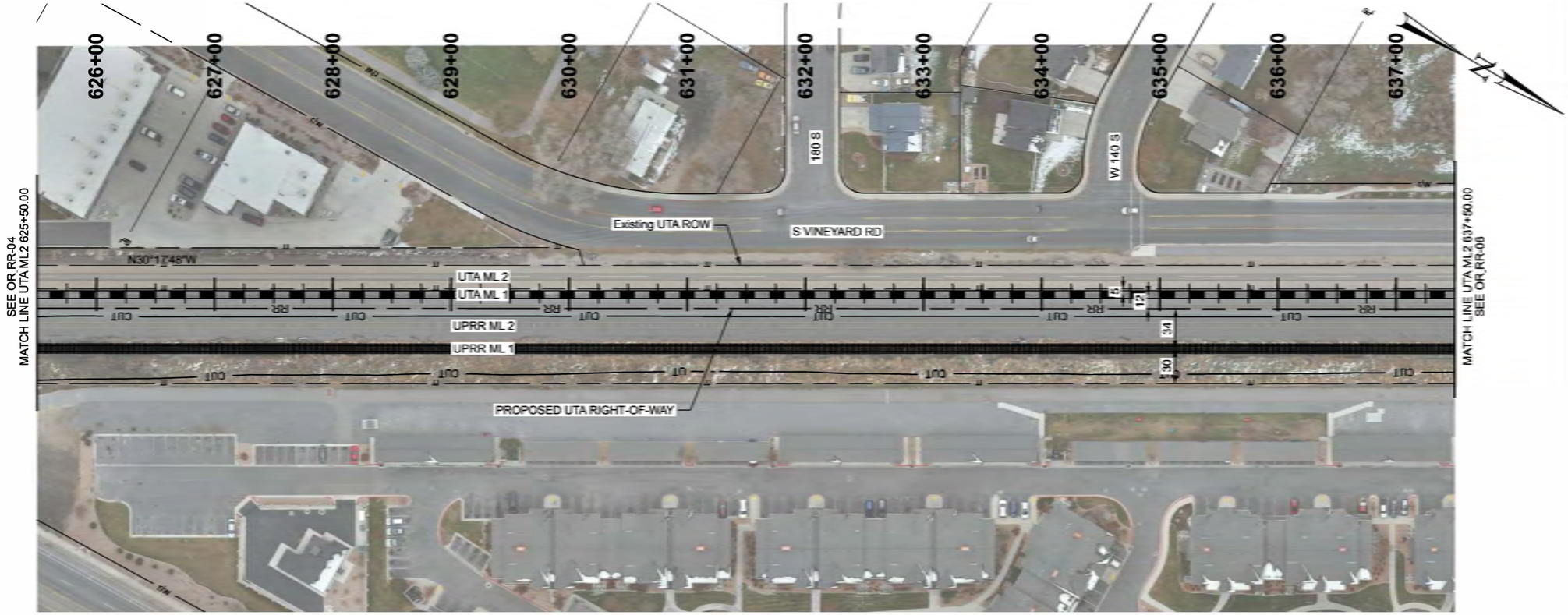

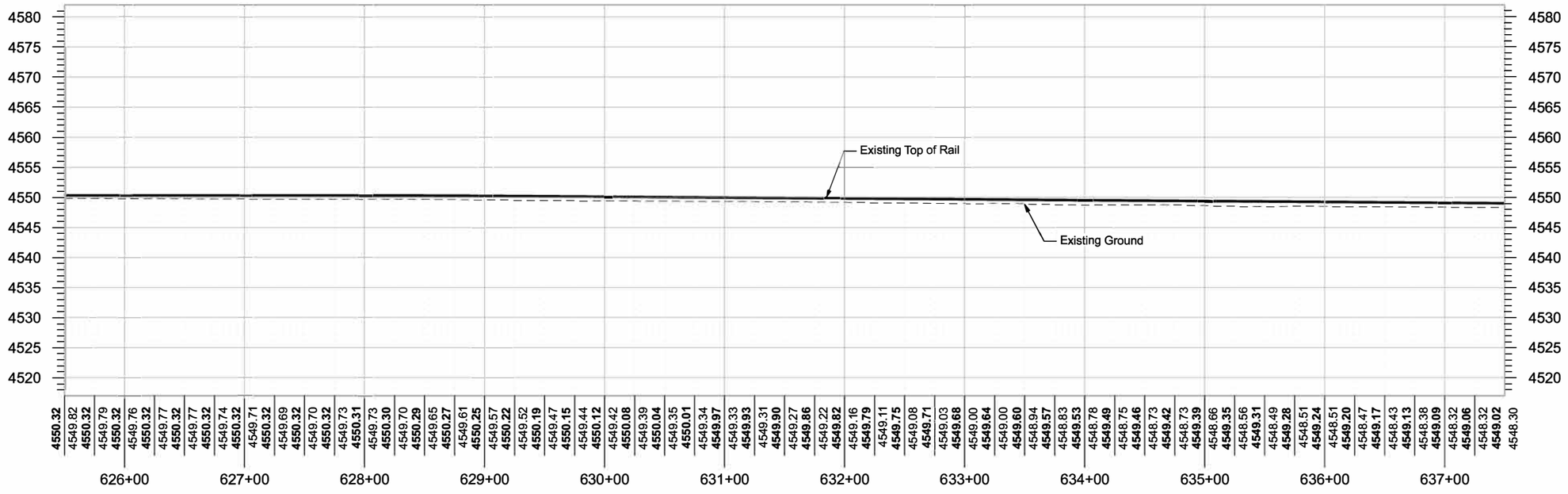

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TRACK PLAN AND PROFILE

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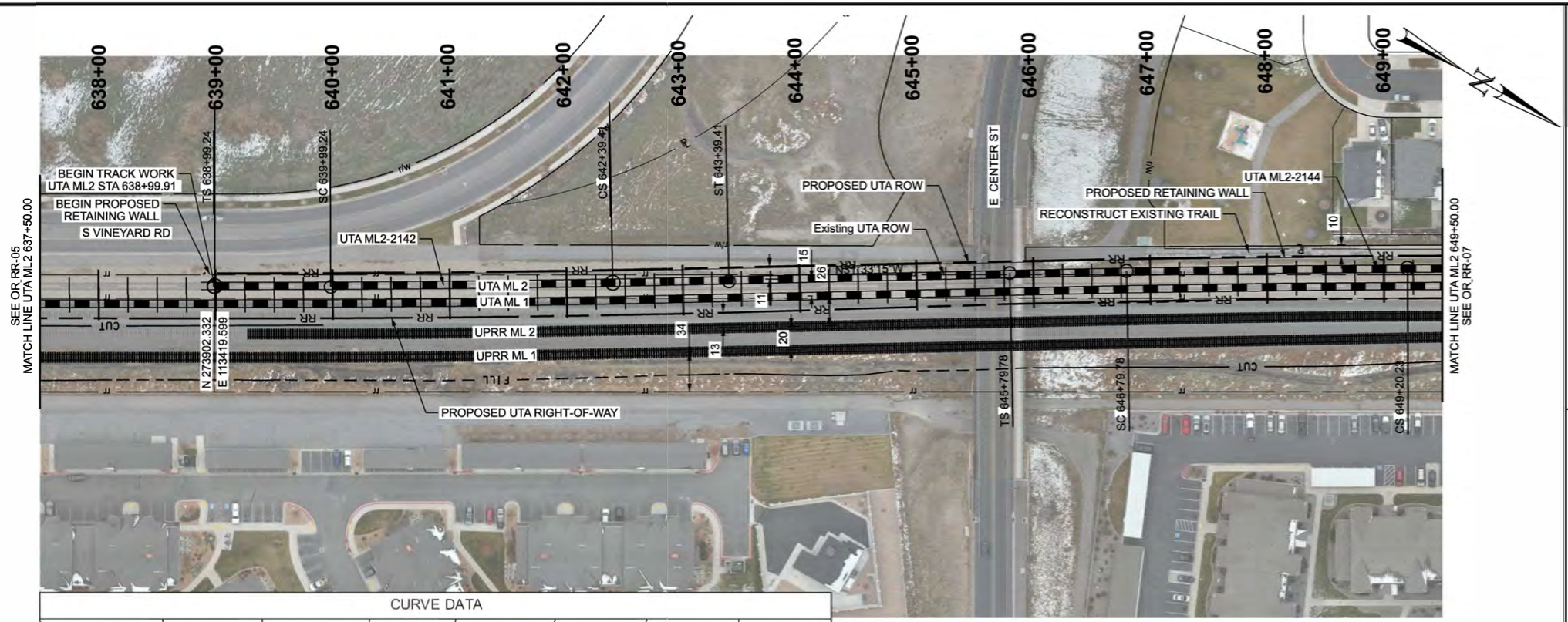
2/11/2025



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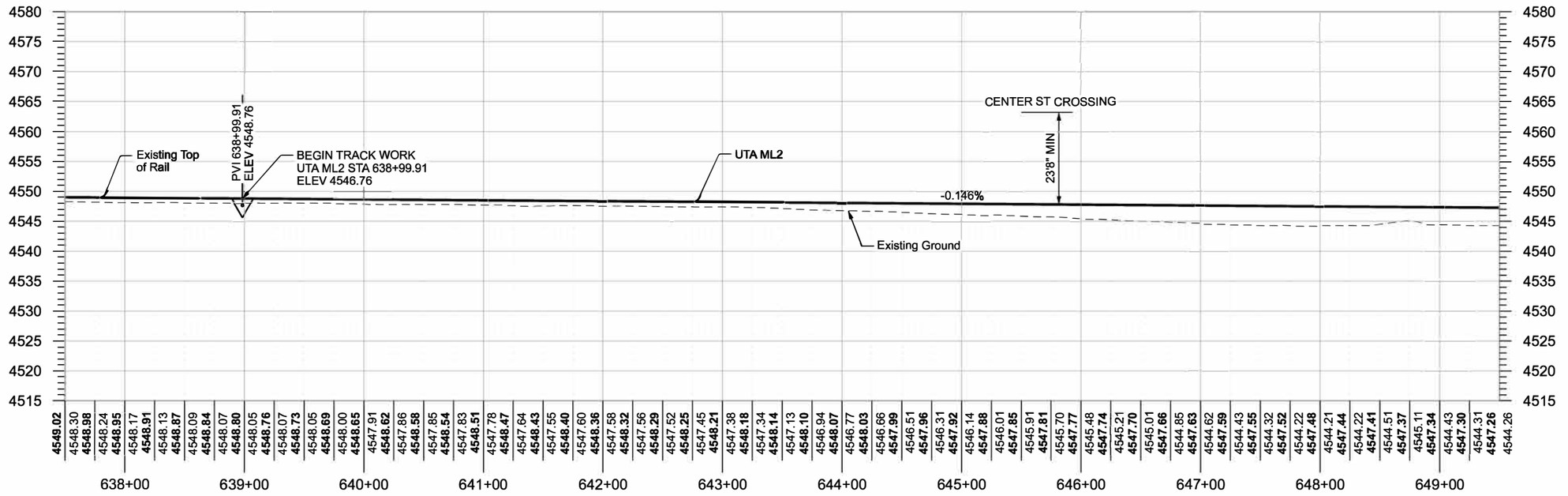

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TRACK PLAN AND PROFILE

SHEET NO. OR_RR-06

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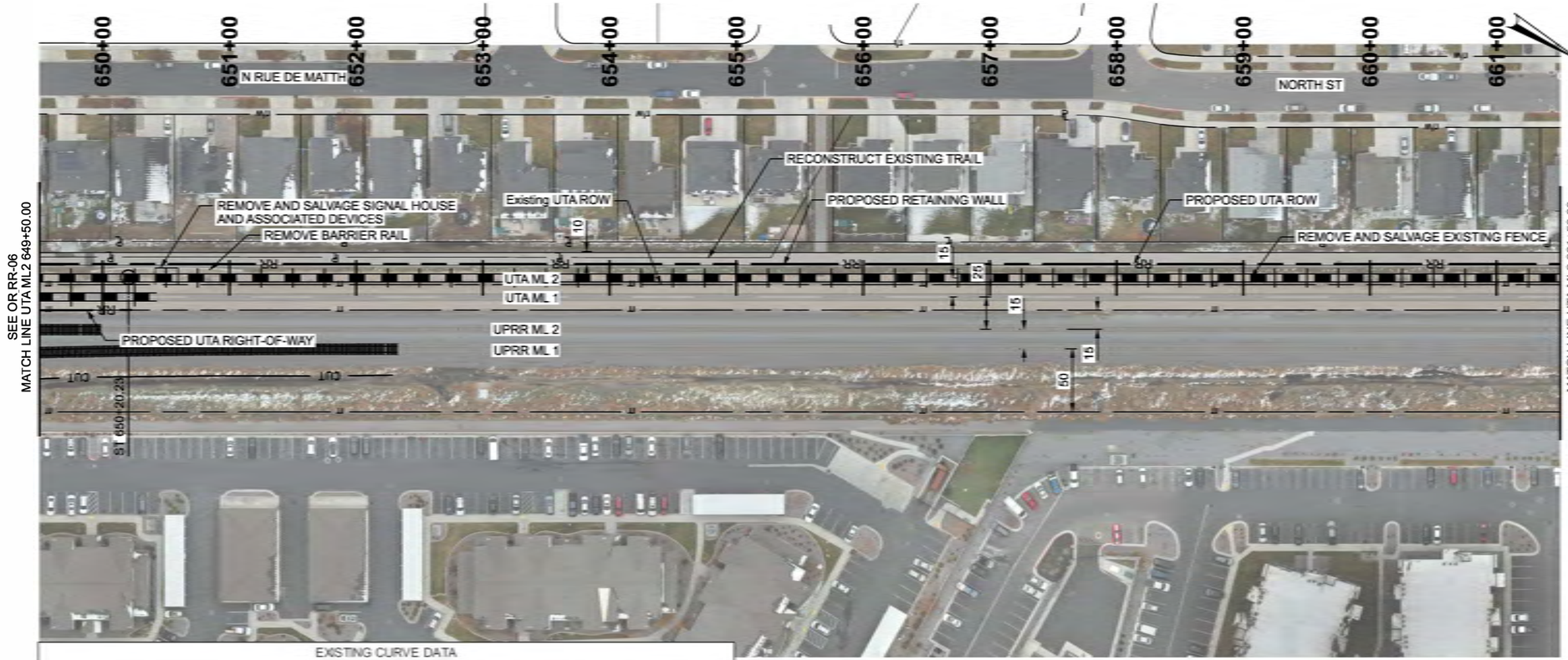

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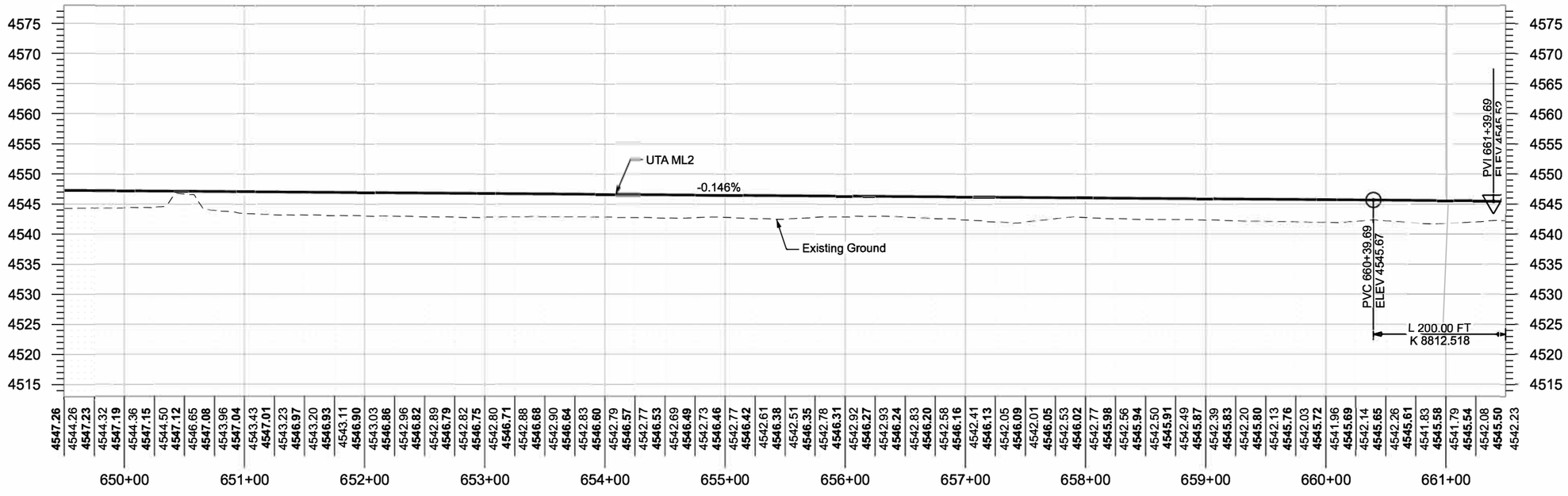

UTA ML TRACK 2

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UTAH DEPARTMENT OF TRANSPORTATION
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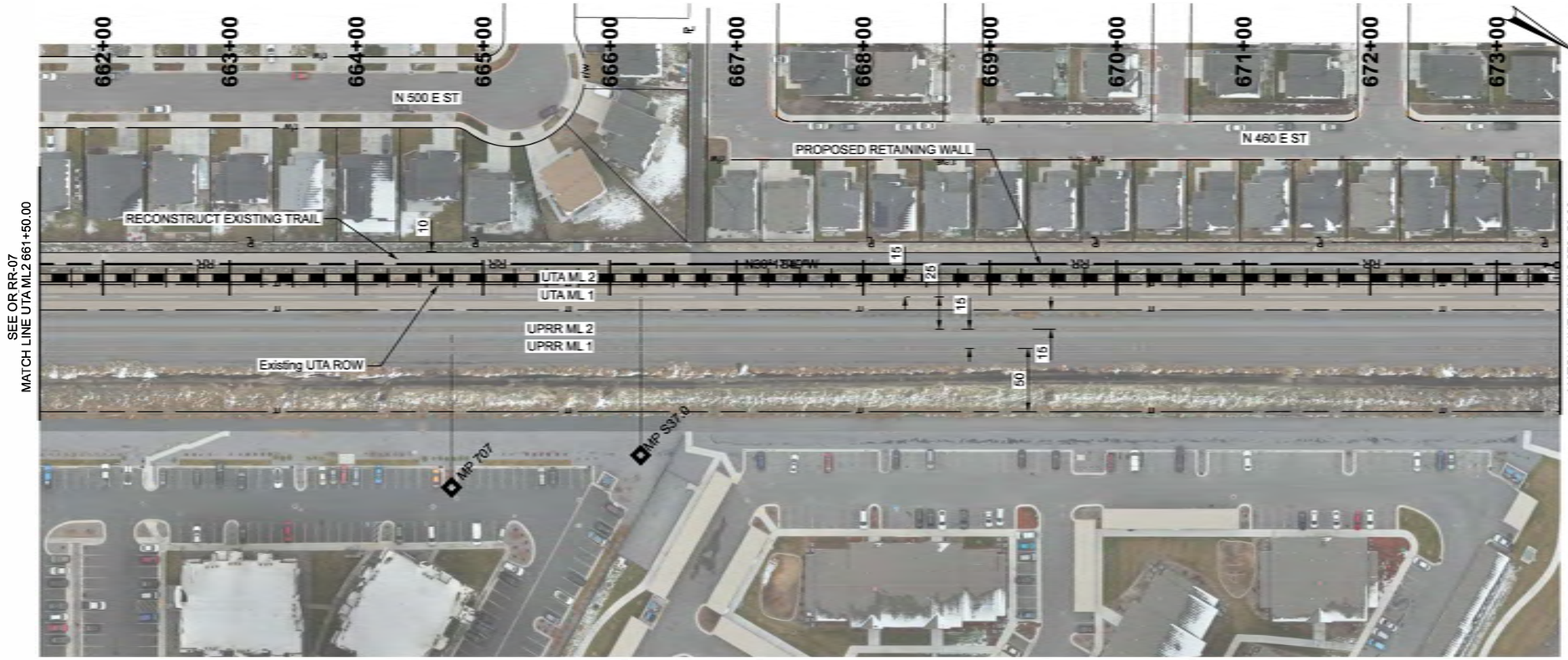
PROFESSIONAL ENGINEER

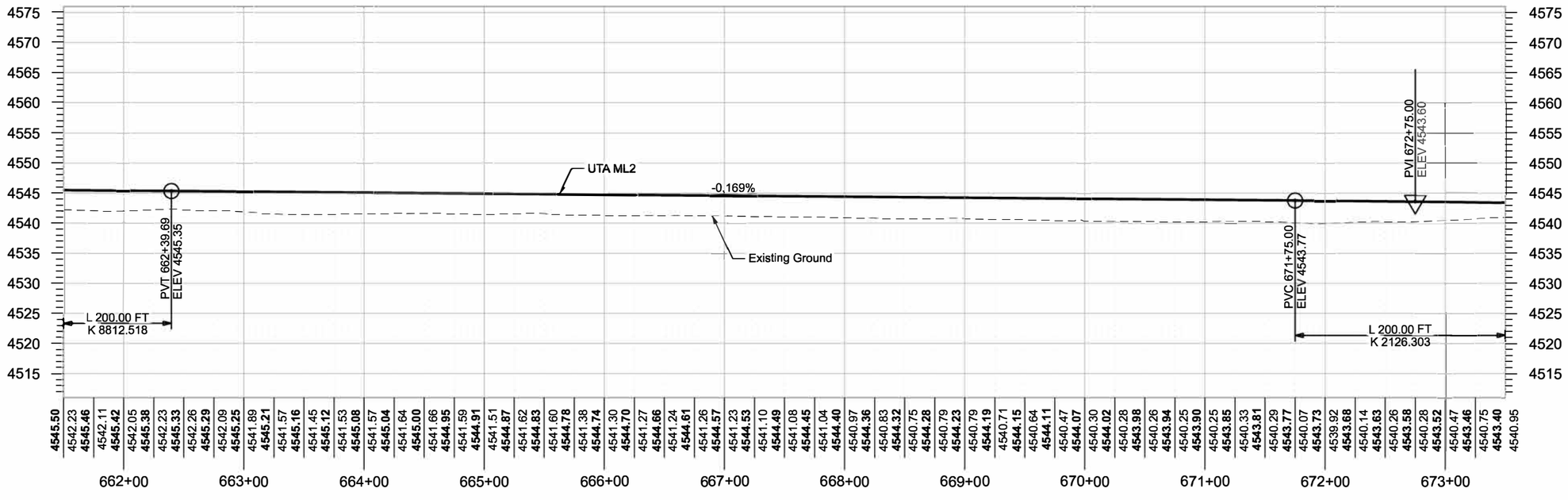
PROJECT: FRONTRUNNER OREM
PROJECT NUMBER: S-R299(483)
PIN: 21213

TRACK PLAN AND PROFILE

SHEET NO. OR_RR-07

OR_RR-07.dgn
2/11/2025





UTA ML TRACK 2

REVISIONS

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PROFESSIONAL ENGINEER

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PROJECT NUMBER: S-R299(483)
PIN: 21213

TRACK PLAN AND PROFILE

SHEET NO. OR_RR-08

DR_RR-08.dgn
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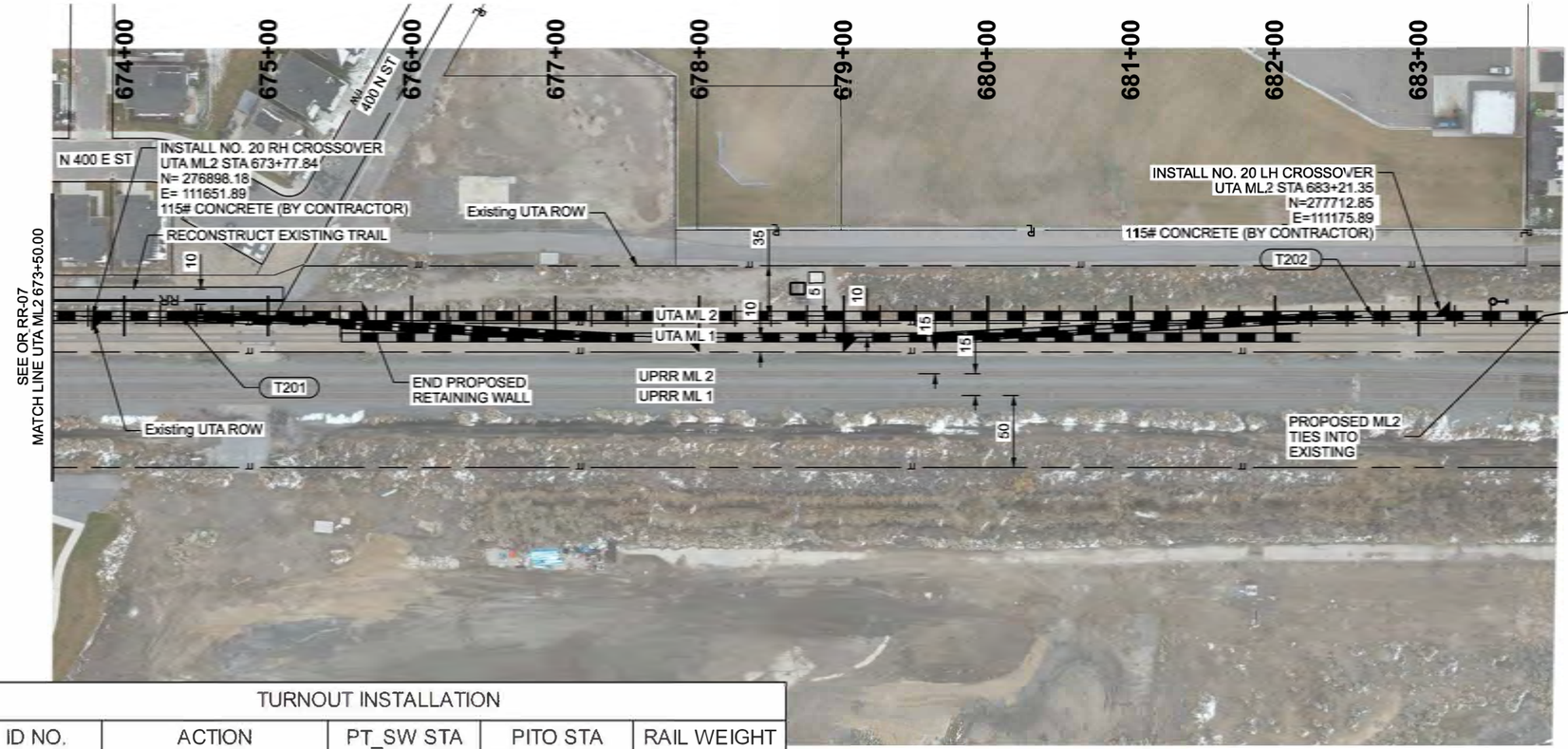

TURNOUT INSTALLATION				
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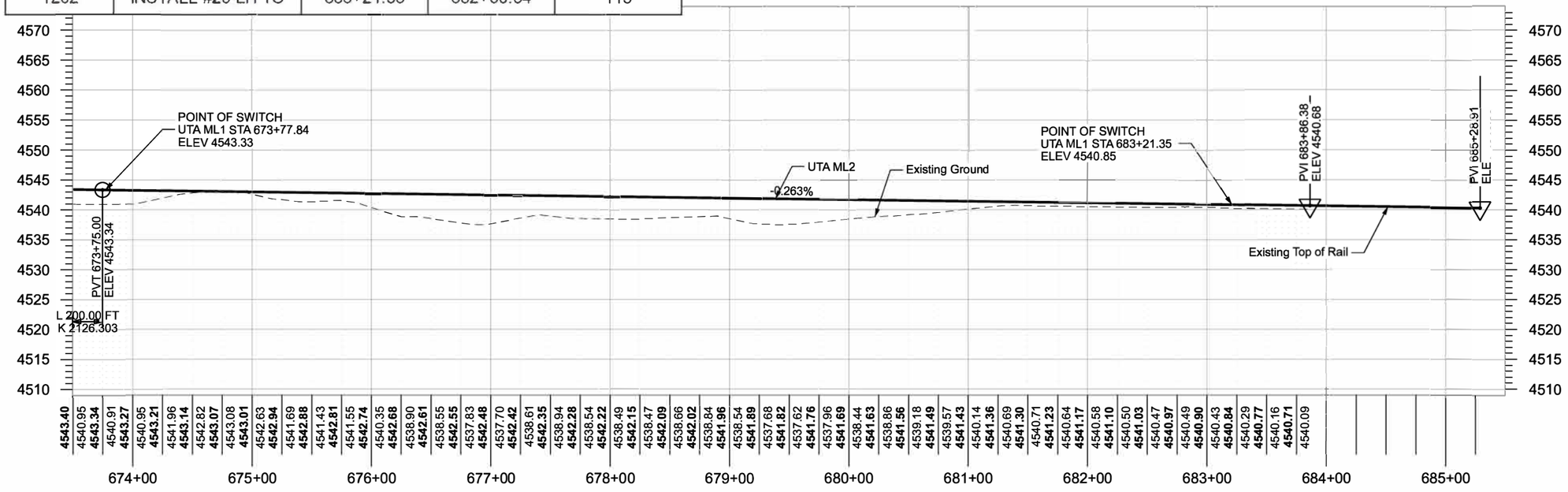
T202	INSTALL #20 LH TO	683+21.35	682+60.34	115



UTA ML TRACK 2

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

TRACK PLAN AND PROFILE

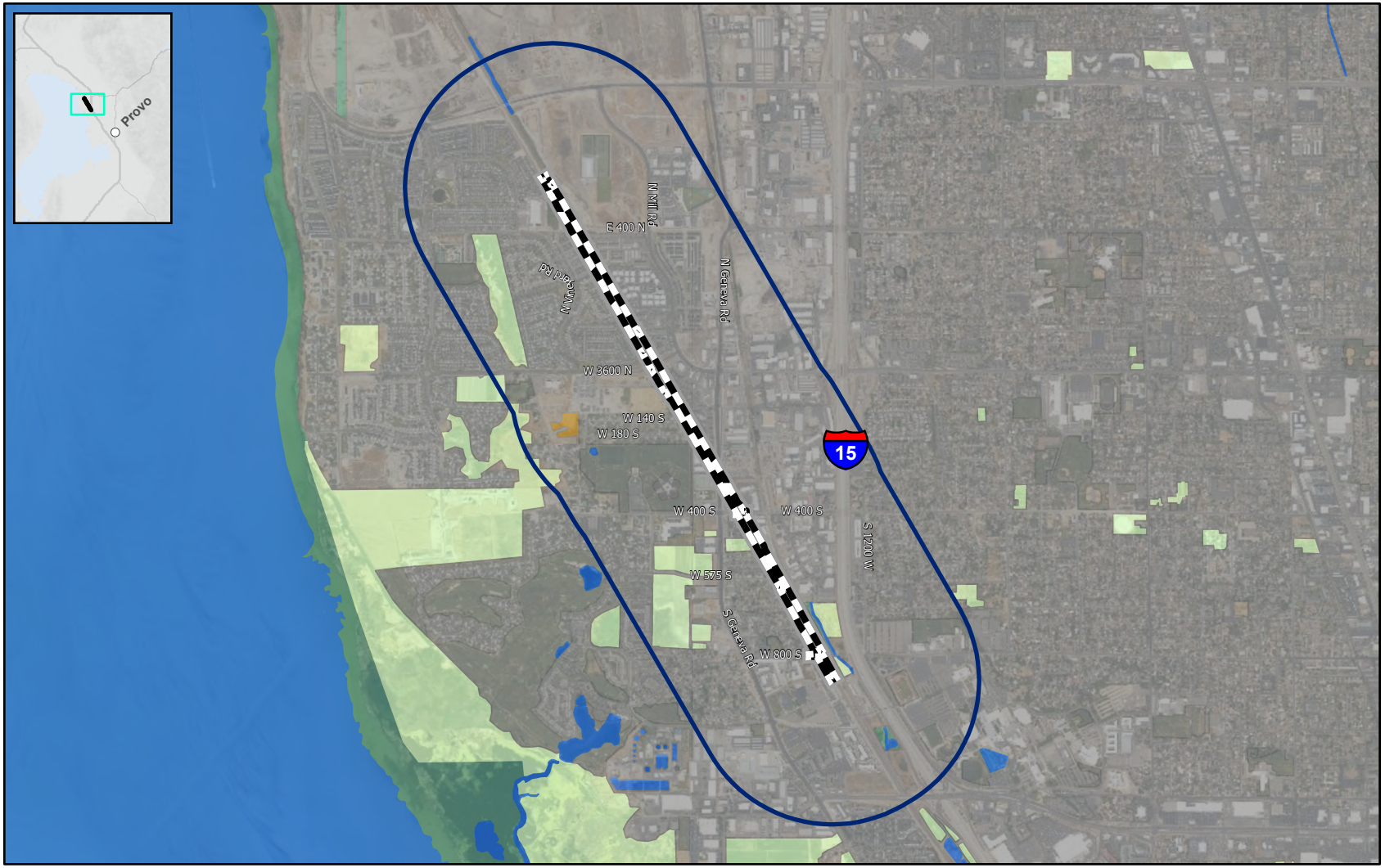
SHEET NO. OR_RR-09

OR_RR-09.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

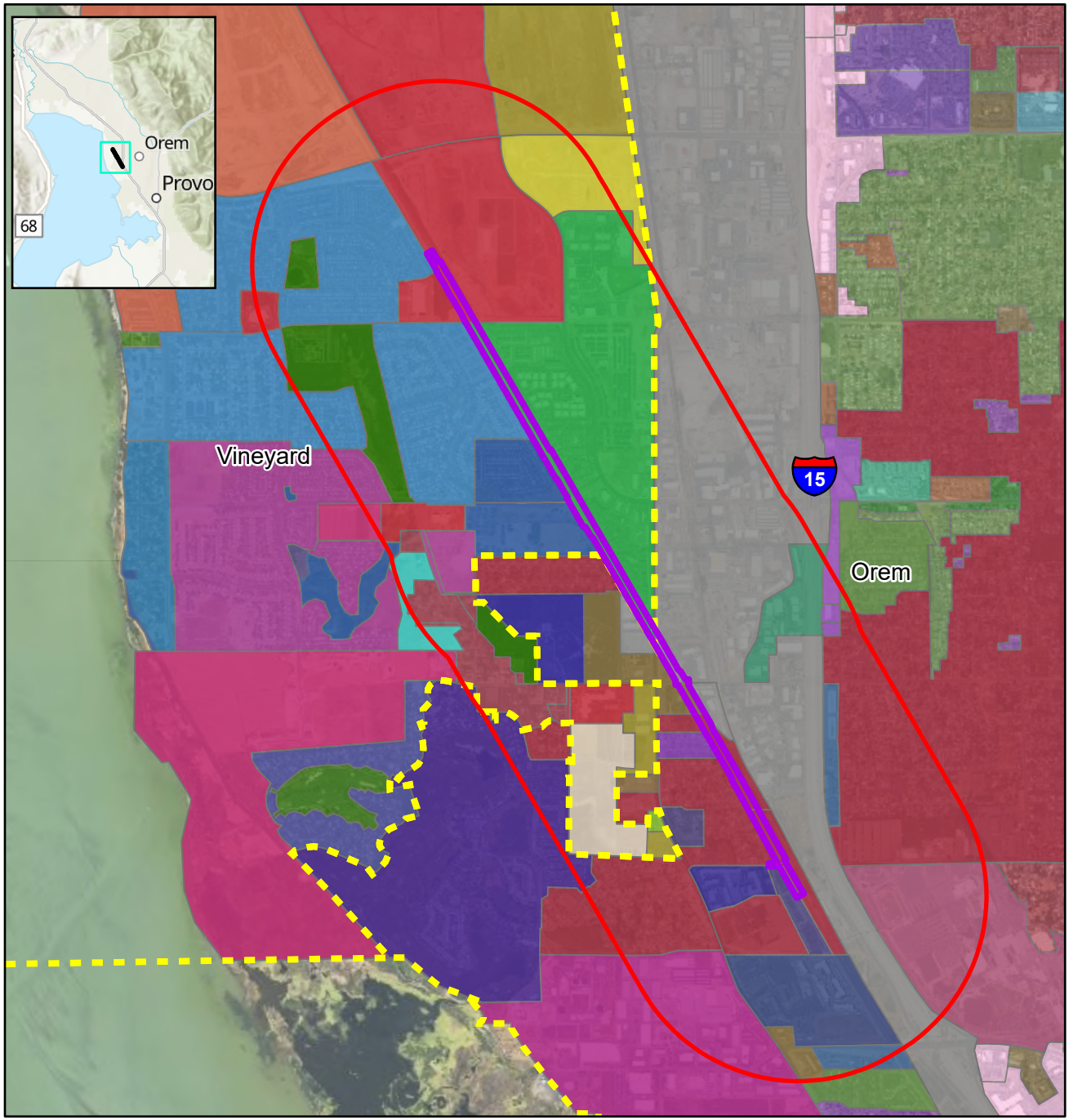
- Project Extent
- Land Use and Zoning Evaluation Area

Current Land Use Type

- Agricultural
- Other
- Riparian/Wetland
- Urban
- Water

N

0 1,000 2,000 US Feet



UTA FrontRunner Forward

UDOT Keeping Utah Moving

Legend

- Project Extent
- Land Use and Zoning Evaluation Area
- Municipal Boundaries

Vineyard Zoning
- Agricultural
- Business Park
- High Density Residential
- Open Space
- Planned Development Overlay
- Public Facility
- Regional Commercial
- Regional Mixed Use
- Residential
- Residential Agricultural
- Residential Estates
- Single Family Residential
- The Forge
- Town Center
- Waters Edge

Orem Zoning
- Business Park
- Commercial - Local
- Controlled Manufacturing
- Heavy Manufacturing
- Highway Service
- Light Manufacturing
- Planned Development
- Residential - Low & Medium Density
- Residential - Low Density
- Residential - Medium Density
- Student Housing District Overlay

*Legend displays zones intersecting with Evaluation Area only

N

0 700 1,400 US Feet

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

FrontRunner Forward Technical Memorandum

To: Project File

From: HDR

Date: April 10, 2025

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

Methodology

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 1.7 miles of track north of Orem Central Station in Utah County, Utah. The North of Orem 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] Section 4601 and subsequent sections, 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 Project would be constructed north of the existing Orem Central Station and extend along the FrontRunner corridor until merging with the existing double track in the southern part of Vineyard. The Project extends from UTA milepost S 36.8 south to UTA milepost S 38.5, a distance of about 1.7 miles.

The anticipated UTA track work would consist of constructing a new UTA mainline (ML) track number (No.) 2, shifting about 6,800 linear feet of track, reprofiling about 940 linear feet of track, removing about 200 linear feet of track, constructing about 4,900 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, installing two emergency crossovers, and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements (TCEs) would be required for the Project.

In addition to the work along the UTA tracks, both existing Union Pacific Railroad (UP) mainline tracks would be shifted east to accommodate the additional UTA ML No. 2 under the existing Geneva Road

grade-separated crossing. The anticipated UP track work would involve shifting about 4,000 linear feet of track east, removing an existing crossover, removing about 5,700 linear feet of track, removing the UP signal bridge south of Geneva Road, installing a new crossover, and constructing about 4,800 linear feet of track.

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 8.08 acres of permanent right-of-way, which would consist of UTA and UDOT-owned property in or adjacent to the track area, and city and residential property that backs to the tracks. Of the 8.08 acres of permanent right-of-way required, UTA and UDOT own a combined 1.90 acres, which would not need to be purchased for the Project. The locations of the UTA and UDOT-owned property are shown in blue and red in Figures 1 through 5 but are not included in Table 1, *Right-of-Way Required for the North of Orem Double Track Project,* since the property does not need to be purchased. Of the remaining 6.18 acres of permanent right-of-way needed for the Project, 2.03 acres would need to be acquired from UP, and 4.15 acres would need to be acquired from Vineyard City (2.42 acres) and from owners of residential properties (1.73 acres) adjacent to the rail corridor, as shown in Table 1 and Figures 1 through 5.

Based on an aerial mapping review, the acquisitions of city and residential parcels would be in the form of small slivers of land. These acquisitions would not affect access to or functionality of the home or other buildings on the parcel. No building relocations would be required with the Project.

At this preliminary level of design, UTA and UDOT do not know exactly where all 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 Orem Double Track Project

Parcel ID	Owner	Parcel Address[a]	Acres Impacted[b,e]	Relocation?	Figure Number(s)[c]
180160054	VINEYARD FLAGSHIP 241 LLC	—	0.41	No	1
180170012	TOWN OF VINEYARD	—	0.03	No	2
180170016	VINEYARD CITY	—	0.07	No	2
180180077	TOWN OF VINEYARD	—	0.12	No	3
365780025	MARTINSEN, JASON & ANILDA	793 S 1370 WEST, OREM, UT 84058	0.01	No	5
365780058	NORTHRUP, KARTER GOLDEN	OREM, UT 84058	<0.01[d]	No	5
365780063	PATTERSON, BENJAMIN A & SANTA	759 S 1370 WEST, OREM, UT 84058	0.03	No	5
365780065	ARMSTRONG, DELSETA PATRINA STEWART & RICARDO ANTHONY	713 S 1370 WEST, OREM, UT 84058	0.02	No	5
365780067	OREJEL, RAMON MORENO (ET AL)	707 S 1370 WEST, OREM, UT 84058	0.02	No	5
365780069	RESENDIZ, BENJAMIN S & OFELIA	769 S 1370 WEST, OREM, UT 84058	0.04	No	5
365780071	PEREZ-GARCIA, KENNY (ET AL)	779 S 1370 WEST, OREM, UT 84058	0.05	No	5
365780073	NORTHRUP, KARTER GOLDEN	743 S 1370 WEST, OREM, UT 84058	0.03	No	5
365780075	LOPEZ, ARMANDO	723 S 1370 WEST, OREM, UT 84058	0.03	No	5
365780077	ROSAS, ELESVAN & ANTONELLA ANA BIANCHETTI	731 S 1370 WEST, OREM, UT 84058	0.03	No	5
365780079	VILLARREAL, ISABEL RICO	701 S 1370 WEST, OREM, UT 84058	0.02	No	5

(*Continued on next page*)

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

Parcel ID	Owner	Parcel Address[a]	Acres Impacted[b,e]	Relocation?	Figure Number(s)[c]
366700027	DAVIS, JONATHAN L & PAULINE	611 S 1470 WEST, OREM, UT 84058	0.01	No	4
366850042	WALGREN, RICHARD G & LESLIE M	623 S 1470 WEST, OREM, UT 84058	0.01	No	5
366880067	LEE, KEVIN & AMBER	1432 W 650 SOUTH, OREM, UT 84058	0.02	No	5
366880069	THIRIOT, ADAM MICHAEL & KATHLEEN	1431 W 650 SOUTH, OREM, UT 84058	0.03	No	5
366880071	SORENSEN, SONNY & LISA	1438 W 650 SOUTH, OREM, UT 84058	0.01	No	5
404690005	MW PALMER PARK LLC	100 S GENEVA RD, VINEYARD, UT	0.73	No	3
455520129	VINEYARD CITY	VINEYARD, UT	0.20	No	2
468440001	CONCORD APARTMENTS AT GENEVA LLC	125 N MILL ROAD, VINEYARD, UT	0.22	No	2
473380001	TOWN OF VINEYARD	VINEYARD, UT	2.00	No	2
—	UNION PACIFIC RAILROAD	—	2.03	No	2–5
		Total	**6.18**		

[a] Parcels with "—" or "VINEYARD, UT" addresses are based on the most recent county property records accessed on March 18, 2025.

[b] Right-of-way parcel impacts to properties owned by Vineyard City and adjacent residential property owners are shown in the table. UTA and UDOT own an additional 1.90 acres of property that would be required by the Project but are not shown in the table. These parcels are shown in blue and red on Figures 1 through 5.

[c] Some parcel acquisitions are shown on multiple pages in Figures 1 through 5, 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.

Figure 1. Right-of-way for the North of Orem Double Track Project (1 of 5)

Figure 2. Right-of-way for the North of Orem Double Track Project (2 of 5)

Figure 3. Right-of-way for the North of Orem Double Track Project (3 of 5)

Figure 4. Right-of-way for the North of Orem Double Track Project (4 of 5)

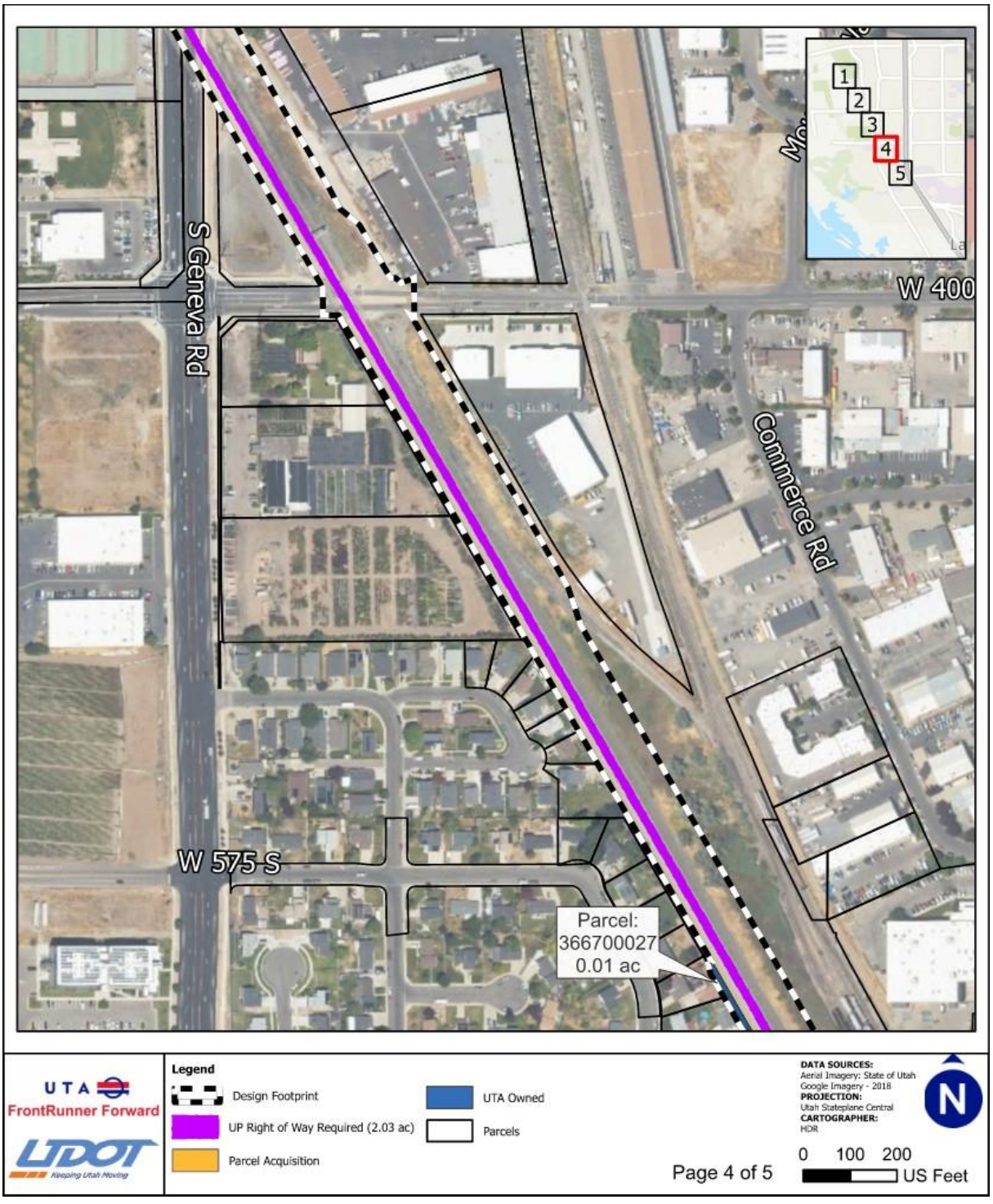


Figure 5. Right-of-way for the North of Orem Double Track Project (5 of 5)

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

North of Orem Double Track Project

Noise and Vibration Analysis

July 2025

Table of Contents

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1 Summary

This report presents noise and vibration impact assessments for the Utah Transit Authority's (UTA) and the Utah Department of Transportation's (UDOT) North of Orem Double Track Project (Project). The proposed double-track section begins north of 400 North and extends southeast to Orem Central Station. This project proposes infrastructure changes including adding a second UTA FrontRunner track and relocating a freight track. 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).

The general noise assessment predicts 13 noise impacts, as follows:

- One moderate noise impact caused by wayside noise from UTA FrontRunner trains at the south end of the project extent. Wayside noise includes wheel-rail noise and propulsion system noise from locomotives.
- Four moderate noise impacts and one severe noise impact due to two proposed crossovers (special trackwork) of UTA FrontRunner tracks.
- Seven moderate noise impacts due to a proposed crossover of Union Pacific Railroad (UP) freight tracks.

The general vibration assessment predicts 67 vibration impacts, as follows:

- Eighteen vibration impacts near the north end of the project extent due to two UTA FrontRunner track crossovers—the same crossovers that would cause the noise impacts.
- Forty-nine vibration impacts at the south end of the project extent assuming no mitigation measures are implemented. Note that the existing tracks in this area were constructed with ballast mats as a mitigation measure to reduce vibration.

The project team will explore potential mitigation measures in more detail during the final engineering design of the Project. Mitigation will be evaluated and designed to minimize the cumulative impacts from the infrastructure changes combined with impacts from the expected increases in train traffic identified in the corridor level noise and vibration assessment (Cross-Spectrum Acoustics 2025). Examples for potential mitigation measures for noise and vibration impacts from special trackwork include relocating the crossovers, if feasible, and installing spring-rail frogs. For the freight crossover with noise impacts only, a noise wall could also be considered. Installing ballast mats under the proposed track for the same extents as where the existing ballast mats are installed could reduce the number of vibration impacts at the south end of the project from 49 to 1 (at 1348 West 800 South in Orem).

Construction noise and vibration are unavoidable in most cases. Based on the expected duration of construction and the proximity of receivers to the rail 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).

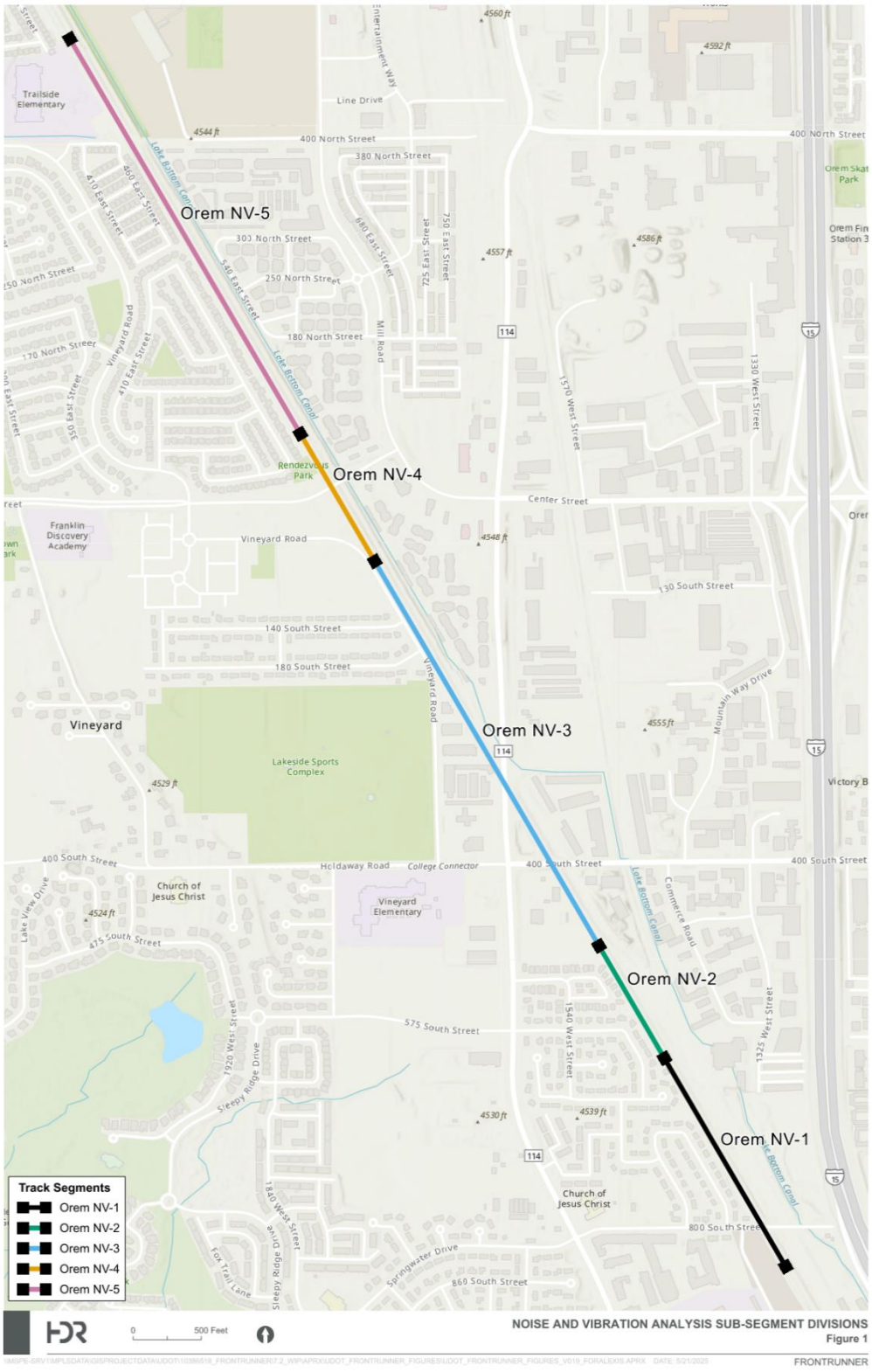
2 Project Description

The Project includes the addition of a second FrontRunner commuter rail track in the existing multi-use rail corridor. There are multiple parameters throughout the project extent that could affect project-related noise and vibration. These parameters include the following:

- Locations of the proposed UTA FrontRunner trackwork relative to potential receivers in the vicinity
- Areas where freight trackwork would be relocated
- Presence of existing ballast mats underneath the existing track infrastructure

Project-related noise and vibration effects would be different wherever the above three factors change, so, for this evaluation, the project team divided the project extent into five subsegments (Figure 1) for analysis. Note that these subsegments are numbered from south to north.

Figure 1. Project Area and Noise and Vibration Analysis Subsegments



Source: HDR

Each subsegment shown on Figure 1 above was selected to represent a combination of track configuration changes from the existing track conditions to the conditions after the Project is completed. These subsegments are listed in Table 1 below, together with station markers indicating the bounds of the subsegments.

Table 1. Noise and Vibration Analysis Subsegments

Analysis Subsegment	UTA FrontRunner Infrastructure Changes	Existing UTA FrontRunner Track Treatments	UP Freight Infrastructure Changes	Subsegment Bounds	
Orem NV-1	Shift one existing track east; add one track west of existing track	Ballast mats	Shift two existing tracks east	Southern terminus	Sta. 597+25
Orem NV-2	Add one track east of existing track	Ballast mats	Shift one existing track east	Sta. 597+25	Sta. 607+00
Orem NV-3	Add one track east of existing track	No treatment	Shift one existing track east; new special trackwork	Sta. 607+00	Sta. 639+20
Orem NV-4	Shift one existing track east; add one track west of existing track	No treatment	Shift two existing tracks east	Sta. 639+20	Sta. 650+20
Orem NV-5	Add one track west of existing track; add new special trackwork	No treatment	No infrastructure changes	Sta. 650+20	Northern terminus

Definitions: Sta. = station

The Project would add about 2.0 miles of new UTA FrontRunner track alongside the existing FrontRunner track and add or modify existing special trackwork (such as crossovers), as noted above in Table 1. As-built drawings for the existing UTA FrontRunner tracks indicate that there is ballast mat installed under the existing tracks from the southern terminus of the project extent to Station 607+00, also noted in Table 1. The Project would also relocate UP freight tracks in part of the same corridor, noted in Table 1 as well. The FTA manual (p. 115) provides the following guidance for such conditions:

> If the project results in changes to the freight path, operations, frequency, etc. (e.g., relocating freight tracks within the ROW [right-of-way] to make room for the transit tracks) then those potential impacts and mitigation should be evaluated as part of the proposed project.

On this basis, where freight tracks are relocated, freight-related noise and vibration are also considered project-related noise and vibration sources.

This assessment considers noise and vibration effects from infrastructure changes associated with this FrontRunner project. This assessment does not consider potential train traffic changes, which are addressed in the corridor level noise and vibration assessment (Cross-Spectrum Acoustics 2025).

2.1 Orem NV-1 Infrastructure Changes

In subsegment Orem NV-1, one proposed UTA FrontRunner track would be added on the west side of the existing UTA FrontRunner track. In addition, the existing UTA FrontRunner track and two existing UP freight tracks would be shifted to the east, transitioning from the existing track configuration in the south to the new track configuration in subsegment Orem NV-2. There is no proposed special trackwork in this subsegment; there is existing special trackwork to be removed.

Note that the existing UTA trackwork in this subsegment has existing ballast mats, which is a vibration mitigation measure.

The infrastructure changes associated with this project would result in some UTA FrontRunner trains running on tracks closer to residences on the west side of the rail corridor. The changes would also result in UP freight trains running on tracks that are east of the existing tracks, but there are no receivers east of the rail corridor in this subsegment. Because the project actions would encompass both UTA and UP trackwork, both UTA and UP traffic is considered a project noise and vibration source.

2.2 Orem NV-2 Infrastructure Changes

In subsegment Orem NV-2, one proposed UTA FrontRunner track would be added on the east of existing FrontRunner track. To create space for this action, one freight track would need to be relocated. The proposed new freight track would be laid east of the existing freight track. There is no existing or proposed special trackwork in this subsegment.

Similar to the Orem NV-1 subsegment, this subsegment also includes ballast mats.

The infrastructure changes associated with this project would result in some UTA FrontRunner trains running on tracks farther from residences on the west side of the rail corridor. The changes would also result in UP freight trains running on tracks that are east of existing tracks, but there are no receivers east of the rail corridor in this subsegment.

2.3 Orem NV-3 Infrastructure Changes

The proposed project actions in subsegment Orem NV-3 are a continuation of those in subsegment Orem NV-2. The proposed FrontRunner track would be placed east of existing FrontRunner track, and freight track would be shifted east to make space for FrontRunner track. There are no ballast mats underneath any existing track in subsegment Orem NV-3.

These infrastructure changes would result in some UTA FrontRunner trains running on tracks farther from residences on the west side of the rail corridor and UP freight trains running on tracks that are closer to residences on the east side of the rail corridor. The proposed special trackwork (crossover) on the UP freight tracks could affect receivers on the west side of the rail corridor.

2.4 Orem NV-4 Infrastructure Changes

In subsegment Orem NV-4, one proposed UTA FrontRunner track would be added on the west side of the existing UTA FrontRunner track. In addition, the existing UTA FrontRunner track and two existing UP freight tracks would be shifted to the east, transitioning from the new track configuration in subsegment Orem NV-3 to the proposed FrontRunner trackwork and the existing freight trackwork in subsegment Orem NV-5 to the north. Because all tracks would change, they are all considered project noise and vibration sources. There is no existing or proposed special trackwork in this subsegment.

The infrastructure changes associated with this project would result in some UTA FrontRunner trains running on tracks closer to residences on the west side of the rail corridor. The changes would also result in UP freight trains running on tracks that are east of the existing tracks, closer to multifamily residences on the east side of the rail corridor. Because the project actions would encompass both UTA and UP trackwork, both UTA and UP traffic is considered a project noise and vibration source.

2.5 Orem NV-5 Infrastructure Changes

In subsegment Orem NV-5, the proposed project actions include building UTA ML No. 2 on the west side of the existing alignment and installing special trackwork (crossovers) at four locations toward the northern end of the project extent. These crossovers could affect receivers on the west side of the rail corridor. No infrastructure changes would affect freight trains in this subsegment. On this basis, the only project-related noise source would be UTA ML No. 2 and the proposed special trackwork. The infrastructure changes associated with this project would result in some UTA FrontRunner trains running on tracks closer to residences on the west side of the rail corridor.

3 Noise Assessment

This section presents criteria for evaluating project-related noise, methodology to estimate noise levels, findings from impact evaluation, and potential to mitigate project noise.

There are two existing at-grade railroad crossings in the rail corridor: where both the UTA FrontRunner tracks and the UP freight tracks cross 400 South and 800 South. The two at-grade crossings are within designated quiet zones where locomotives do not sound their horns. Several other safety measures are instituted to make up for locomotive horns, measures including physical barriers and a stationary bell on a crossing signal post. These bell sounds are an existing noise source, and the Project would not move any crossing signal more than 20 feet closer to any potential receiver. For these reasons, the Project is not expected to change the existing noise environment with respect to these bells, so the bells are not considered in the noise assessment.

3.1 Quantifying Noise

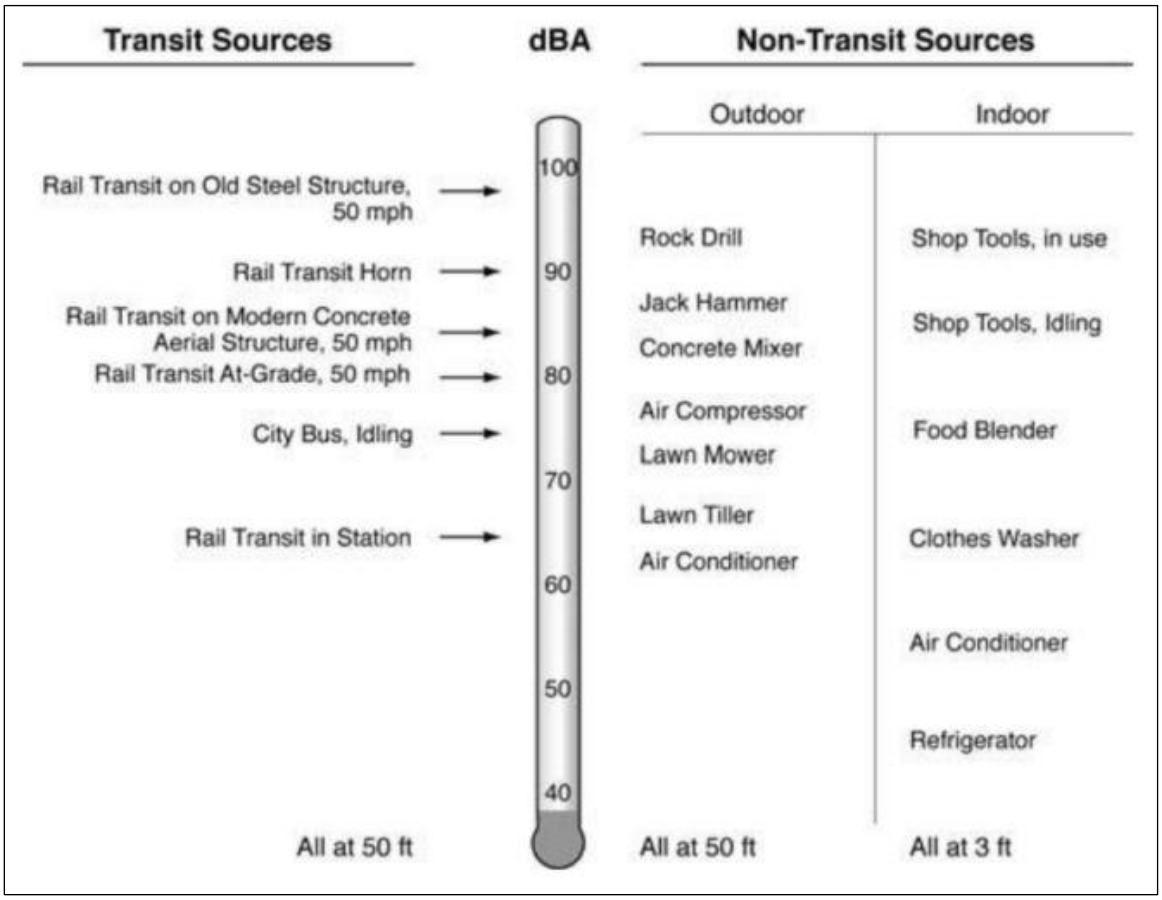
Noise is usually defined as an undesirable sound because it interferes with speech and hearing. Under certain conditions, noise can cause hearing loss, interfere with human activities, and, in various ways, affect people's health and well-being. Noise along a railroad corridor typically consists of noise from locomotives, steel wheels operating over rails, and train horns.

Sound travels through the air as waves of tiny air pressure fluctuations caused by vibration. The intensity or loudness of a sound is an effect of how much the sound pressure fluctuates. The magnitude of fluctuation above and below the static atmospheric pressure is the amplitude of the sound wave. Sound is quantified on the logarithmic decibel (dB) scale for convenience. Because of the logarithmic nature of the decibel unit, when two identical noise sources are added together, the resulting increase is 3 dB (not the arithmetic sum of the two noise levels).

The dB is the accepted standard unit for measuring sound amplitude because it accounts for the large variations in sound pressure amplitude. When describing sound and its effect on a human population, A-weighted (dBA) sound pressure levels are typically used to account for the human ear's response to different frequencies. The term "A-weighted" refers to filtering the noise signal according to how the human ear perceives sound. The A-weighted noise level has been found to correlate well with people's

judgments of the noisiness of different sounds and has been used for many years as a measure of community noise. Figure 2 illustrates typical A-weighted noise levels for various noise sources.

Figure 2. Typical A-Weighted Noise Levels



Source: FTA manual, Figure B-5

Community noise levels usually change continuously during the day. The equivalent continuous A-weighted sound pressure level (L_{eq}) is typically used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound pressure level containing the same acoustic energy as the time-varying A-weighted sound pressure level during the same time interval. The maximum sound pressure level (L_{max}) is the greatest instantaneous sound pressure level observed during a single noise measurement interval.

Another descriptor, the day-night average sound pressure level (L_{dn}), was developed to evaluate the total daily community noise environment. The L_{dn} is a 24-hour sound exposure level with a 10 dB time-of-day weighting added to sound pressure levels that occur during the nine nighttime hours from 10:00 p.m. to 7:00 a.m. This nighttime 10 dB adjustment is an effort to account for the increased sensitivity to nighttime noise events. FTA uses L_{dn} and L_{eq} to evaluate train noise effects in surrounding communities (FTA 2018).

Sound exposure level (SEL) is an acoustic descriptor that represents all acoustical energy associated with a single event, such as the pass-by of a train. SEL values are used as the noise emissions terms in the train noise models; they are expressed in units of dBA.

3.2 Noise Assessment Criteria

According to FTA, noise-sensitive land uses are divided into three categories (Table 2).

Table 2. Land Use Categories for Transit Noise Impact Criteria

Land Use Category	Land Use Type	Description	Examples
Category 1	High Sensitivity	Land where serenity or quiet is an essential element.	Outdoor amphitheaters, concert pavilions, recording studios, concert halls, and National Historic Landmarks with significant outdoor use.
Category 2	Residences	Land where people sleep and a nighttime sensitivity to noise is assumed to be of utmost importance.	Homes, hospitals, and hotels.
Category 3	Institutional	Land with primarily daytime or evening use and where it is important to avoid interference with speech, meditation, study, or concentration on reading material.	Schools, libraries, theaters, places of worship, cemeteries, monuments, museums, certain historical sites, parks, and recreation facilities.

Source: Modified from FTA manual, Table 4-3

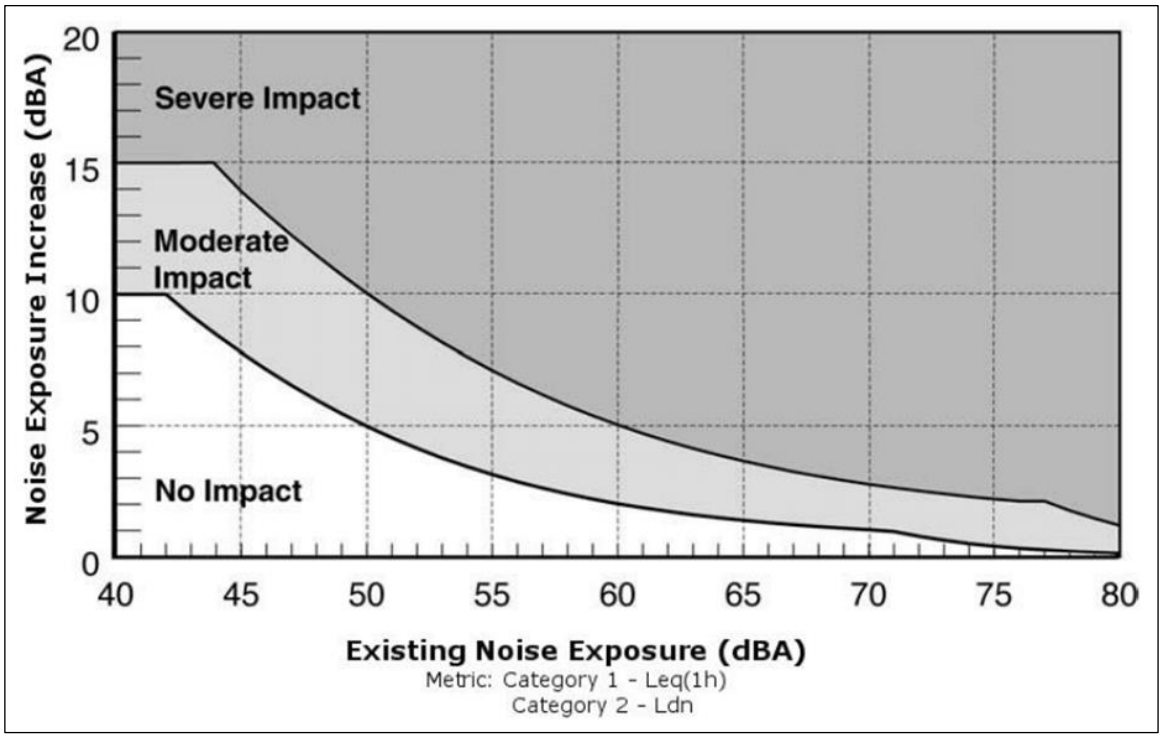
Category 1 and 3 receivers are evaluated using the equivalent-average sound level (L_{eq}) from the noisiest hour of train-related activity during hours of noise sensitivity because nighttime sensitivity is generally not a factor. Category 2 receivers are evaluated using the day-night sound level (L_{dn}) because generally people sleep overnight at Category 2 receivers.

The FTA noise impact criteria are defined by two curves that allow a varying amount of project noise relative to the existing noise level. For projects where there is existing rail activity in a corridor that the project will either improve or be built within, a cumulative assessment can be used. The criteria for cumulative impact assessment are shown on Figure 3 (for land use Categories 1 and 2) and Figure 4 (for land use Category 3).

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

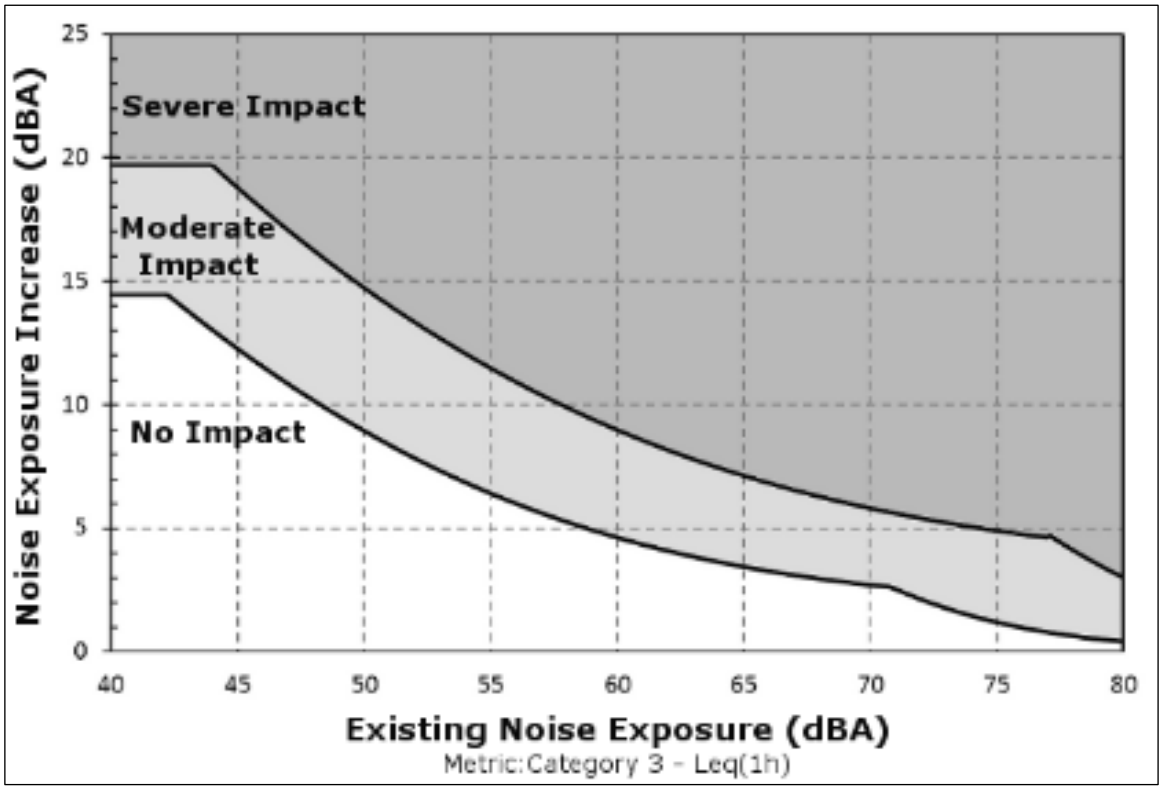
- *Severe Impact:* In the severe impact range, project-generated noise is likely to cause a high level of community annoyance. The project team should evaluate alternative locations and/or alignments to determine whether it is feasible to avoid severe impacts altogether. If it is not practical to avoid severe impacts by changing location of the project, mitigation measures should be strongly considered. Section 2.3 of the FTA manual states that a variety of factors must be considered when designing noise mitigation, factors such as the feasibility and reasonableness of the mitigation measure.
- *Moderate Impact:* In the moderate impact range, project-generated noise is considered to cause an impact at the threshold of measurable annoyance. These impacts serve as an alert for potential complaints from the community. Mitigation should be considered at this level of impact based on project specifics and details concerning the affected properties.

Figure 3. Cumulative FTA Noise Criteria for Category 1 and Category 2 Land Uses



Source: FTA manual, Figure 4-3

Figure 4. Cumulative FTA Noise Criteria for Category 3 Land Uses



Source: FTA manual, Figure 4-4

3.3 Noise Assessment Methodology

In accordance with the FTA manual, the project team used noise impact contours to determine the impacts from the proposed infrastructure changes. Noise impact contours show the distance to the impact threshold measured from the noise sources.

The noise impact threshold is based on the existing noise level. Project noise was then assessed based on the increase to the existing noise levels resulting from the proposed infrastructure changes as described previously. Because the noise from the existing rail corridor is considered the dominant noise source in this area, the existing noise levels were calculated based on the existing 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 along the 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 in modeling for both transit and freight rail activities. As previously stated, this assessment evaluates the train traffic on the proposed new and reconfigured infrastructure and does not evaluate changes to train traffic, which are addressed in the corridor level noise and vibration assessment (Cross-Spectrum Acoustics 2025).

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

- Daily train volume of 60 trains comprising 46 daytime trains and 14 nighttime trains (30-minute headway during peak hours)
- Trains consist of 1 locomotive and 4 railcars (Crowther 2022)
- Maximum train speeds of 79 miles per hour (mph) (track design speed)

Anticipated UTA FrontRunner (transit) operational information:

- Daily train volume of 60 trains comprising 46 daytime trains and 14 nighttime trains (30-minute headway during peak hours)
- Trains consist of 1 locomotive and 4 railcars
- Maximum train speeds of 79 mph
- Train traffic divided evenly (split 50/50) between the two UTA FrontRunner tracks

Existing and anticipated UP (freight) operational information[2]:

- Daily train volume of 9 trains comprising 6 daytime trains and 3 nighttime trains
- Trains consist of 5 freight locomotives and 120 freight railcars
- Maximum train speeds of 40 mph

The reference SELs for both existing and anticipated trains were as prescribed by the FTA manual in Table 4-9 for diesel-electric locomotives at 92 dBA, and railcars on ballast track at 82 dBA, with continuously welded rail, consistent with the proposed project design. The SEL represents the total energy of a single noise event such as a train pass-by. It serves as the foundational metric for

[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] Freight train-related operational information was referenced from the corridor level noise assessment performed by Cross-Spectrum Acoustics in 2023, and no changes to these conditions were made in Cross-Spectrum Acoustics' 2025 corridor level noise and vibration assessment addendum.

characterizing the noise sources in this analysis and allows consistent comparison of discrete events from diesel-electric locomotives and railcars.

In addition to the above operational assumptions, for the subsegments in which freight track would be relocated (Orem NV-1 through Orem NV-4), the project team also assumed that freight traffic was divided evenly (split 50/50) between the two UP tracks for both the existing condition and after the proposed track shifts.

3.4 Noise Impacts

The land uses on both sides of the rail corridor throughout the project extent are mainly single-and multifamily residences (Category 2 land use). Three Category 3 receivers were also identified near the rail corridor, of which two are dual-use (that is, activities consistent with Category 3 land uses were being conducted within homes [Category 2 land use]). These two dual-use receivers are Aspire Academy and Little Lakeside Preschool. Based on publicly available information, Aspire Academy attendees stay on the property overnight, and the Little Lakeside Preschool offers only daytime services, but, because the preschool is located in a private home, presumably a family sleeps at this receiver overnight. As a conservative (that is, protective) approach, these two dual-use receivers are evaluated as Category 2 receivers.

One remaining Category 3 receiver, Trailside Elementary School, located toward the northern end of the project extent, was treated as a Category 3 receiver because no overnight occupancy is anticipated.

A discrete-receiver-based general noise assessment was completed for certain receivers listed below. At these receiver points, existing and anticipated noise levels were calculated, and then the relative increase was compared to the corresponding cumulative FTA impact criteria thresholds (see Figure 3 and Figure 4 above).

- The only Category 3 receiver: Trailside Elementary School (Orem NV-5; see Figure A-4 in Appendix A)
- Seven Category 2 receivers located within 300 feet of the proposed relocated UP freight crossover in subsegment Orem NV-3 (receivers are located adjacent to subsegment Orem NV-2; see Figure A-2 in Appendix A) where the FTA manual prescribes an adjustment within 300 feet of a special trackwork to account for increased noise

For the rest of the receivers (all Category 2 land use), a contour-based evaluation was completed. The impact distances were calculated using the L_{dn} metric, as discussed previously. The existing and anticipated noise exposure at receiver locations at increasing distances were calculated—from the proposed UTA ML No. 1 for transit noise and from the existing UP ML No. 1 track for freight train noise—to determine the distance to the moderate and severe impact contours. Receivers within these contours were considered to be impacted. Noise impact contours are illustrated on the figures in Appendix A, and the results of the noise calculations and the anticipated impacts are listed in Appendix B.

For proposed or relocated special trackwork (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.

Noise impacts for Category 2 land uses were evaluated at building envelopes; points were placed for each receiver at the building envelope closest to the rail corridor. The receiver was considered impacted if the corresponding point was within an impact buffer. 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 nighttime sleep occurs only indoors.

As shown on Figure 1 and in Table 1 above, the project assessment area was divided into five subsegments per project parameters that would affect the anticipated project-related noise impacts. The following sections present the noise assessment results in each subsegment.

3.4.1 Orem NV-1 (refer to Figure A-1 in Appendix A)

One moderate noise impact would occur (at a single-family residence) in this subsegment because the receiver is located very close to (about 22 feet from) the proposed UTA track to be installed west of the existing track and closer to this receiver and within the 44-foot moderate noise impact contour (per Table B-2 in Appendix B).

3.4.2 Orem NV-2 (refer to Figures A-1 and A-2 in Appendix A)

Because the proposed UTA track would be installed east of the existing track, noise is anticipated to increase only east of the rail corridor, and the impact contours show only at the east side of the rail corridor. No wayside noise impacts were identified in this subsegment from the contour-based evaluation because no receivers are within the 58-foot severe noise impact contour or within the 117-foot moderate noise impact contour. However, the discrete-receiver-based evaluation showed that seven single-family residences located at the northern tip of this subsegment would experience moderate noise impacts because they are within 300 feet of the proposed freight track switch to be installed at the southern end of subsegment Orem NV-3. Distances for noise impact contours are taken from Table B-2 in Appendix B.

3.4.3 Orem NV-3 (refer to Figures A-2 and A-3 in Appendix A)

Similar to subsegment Orem NV-2, because the proposed UTA track would be installed east of the existing track in subsegment Orem NV-3, noise is anticipated to increase only east of the rail corridor, and the impact contours show only at the east side of the rail corridor. No noise impacts were identified in this subsegment because no receivers are within the 58-foot severe noise impact contour or within the 117-foot moderate noise impact contour, although the proposed special trackwork at the south end of this subsegment would cause impacts to residences in subsegment Orem NV-2, as discussed above. Distances for noise impact contours are taken from Table B-2 in Appendix B.

3.4.4 Orem NV-4 (refer to Figure A-3 in Appendix A)

No noise impacts are identified within this subsegment because no receivers are within the noise impact contours to the east (117-foot moderate impact contour, 58-foot severe impact contour) or within the noise impact contours to the west (44-foot moderate impact contour, 25-foot severe contour). Distances for noise impact contours are taken from Table B-2 in Appendix B.

3.4.5 Orem NV-5 (refer to Figures A-3 and A-4 in Appendix A)

In this subsegment, three moderate impacts and one severe impact would occur to single-family residences, all on the west side of the rail corridor and resulting from proximity to the proposed special trackwork. No wayside noise impacts would occur in this subsegment because no receivers are within

the 25-foot severe noise impact contour or within the 44-foot moderate noise impact contour. Distances for noise impact contours are taken from Table B-2 in Appendix B.

The discrete-receiver-based assessment shows that Trailside Elementary School (Category 3 land use) would not experience noise impacts.

3.4.6 Noise Impact Summary

In total, there would be 12 moderate noise impacts and one severe noise impact to single-family residences west of the rail corridor. Table 4 summarizes these impacts for each analysis subsegment.

Table 3. Noise Impacts by Analysis Subsegments

Analysis Subsegment	Category 1 Impacts		Category 2 Impacts		Category 3 Impacts		Total Impacts	
	Moderate	Severe	Moderate	Severe	Moderate	Severe	Moderate	Severe
Orem NV-1	NA	NA	1 w	0	NA	NA	1	0
Orem NV-2	NA	NA	7 c	0	NA	NA	0	0
Orem NV-3	NA	NA	0	0	NA	NA	7	0
Orem NV-4	NA	NA	0	0	NA	NA	0	0
Orem NV-5	NA	NA	4 c	1 c	0	0	4	1
Project Total	**NA**	**NA**	**12**	**1**	**0**	**0**	**12**	**1**

Definitions: c = impact due to special trackwork (crossover); NA = not applicable because lack of receivers under the corresponding land use category; w = impact due to wayside vibration

3.5 Noise Mitigation

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. The general noise assessment conducted for this project identified 12 moderate noise impacts and one severe noise impact at single-family residences. As estimated, both the existing and expected noise levels are greater than 65 dBA in the project area along the rail corridor. Additionally, the individual receiver calculations shown in Appendix B predict project-related noise levels greater than 65 dBA. Furthermore, FTA guidance suggests that mitigation should be strongly considered for any severe impacts. Therefore, UTA and UDOT will explore mitigation for all of these impacted receivers.

The simplest mitigation for impacts from special trackwork is to relocate the special trackwork. If that is not feasible, other mitigation such as noise walls or spring-rail frogs could be considered during final engineering design.

The only wayside moderate impact was identified at a residence on 800 South (receiver R184, as shown on Figure A-1 in Appendix A). This residence is close to an at-grade crossing, and a noise wall in this location is not feasible because it would stop short of the at-grade crossing. Furthermore, the residence is already exposed to noise from stationary bells at the at-grade crossing. This noise from the bells was not considered in the calculation of the existing noise environment, and it is reasonable to expect that the existing noise level of the bells is greater than the wayside noise.

Mitigation for noise 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.

4 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.

4.1 Quantifying Vibration

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. In the case of a vibrating floor, displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is normally described using velocity or acceleration (FTA 2018). Velocity will be used in this report to describe ground-borne vibration.

According to the FTA manual (FTA 2018), ground-borne vibration (GBV) can be a serious concern for residents. The effects of GBV include perceptible movement of building floors, rattling of windows, and shaking of items on shelves or hanging on walls. Additionally, GBV can cause the vibration of room surfaces resulting in ground-borne noise (GBN). GBN is typically perceived as a low-frequency rumbling sound.

FTA further notes that rapid transit and light rail activity typically results in vibration levels of 70 vibration decibels (VdB) or more near tracks, although heavy locomotives on diesel trains can cause vibration levels up to 10 VdB higher. The vibration level depends on additional factors such as wheel and track conditions, train speed, geological factors, and distance from the tracks. Commuter trains typically cause vibration events that last for about 10 seconds, whereas freight trains can cause events that last 2 minutes or more due to the length of the pass-by.

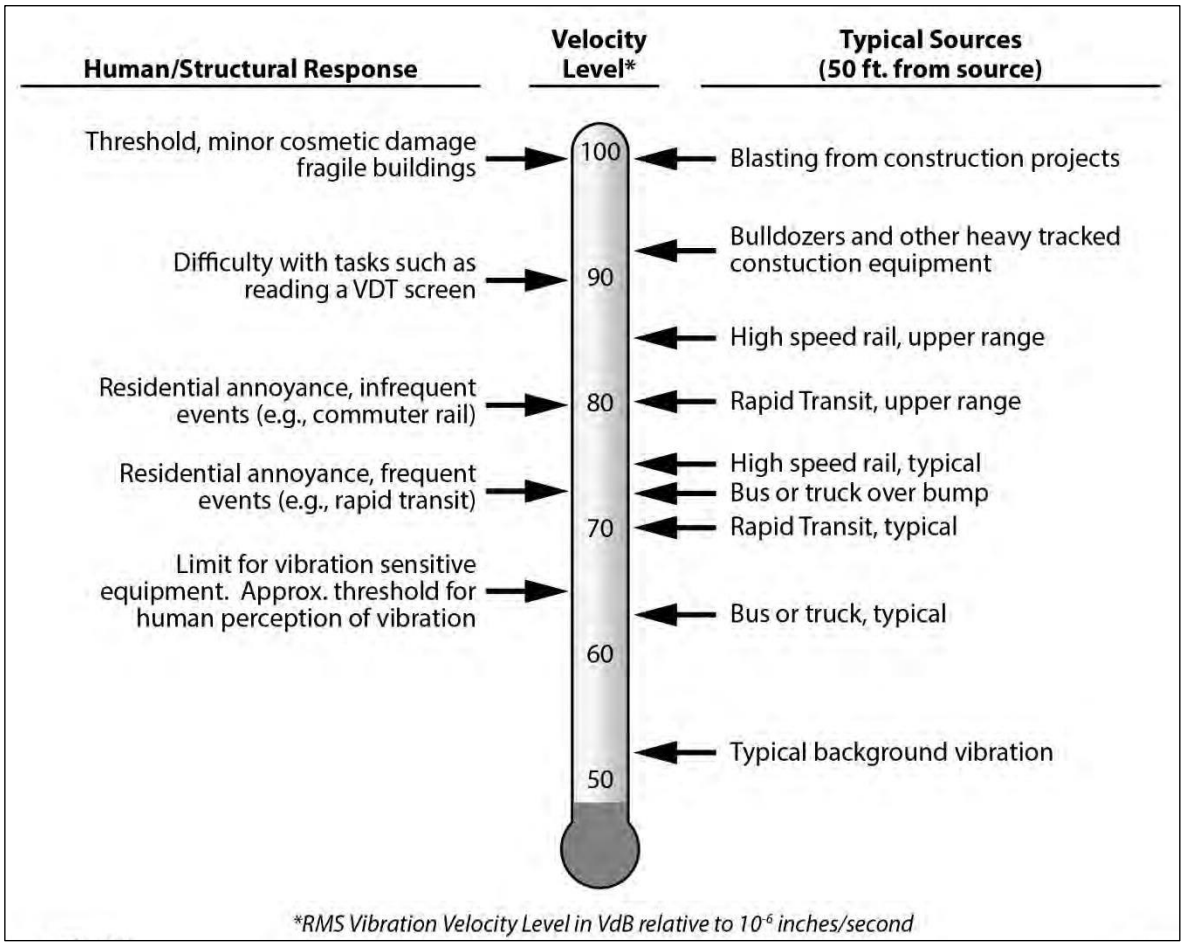
Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or root mean square (RMS) velocity. PPV is used to evaluate the potential for building damage, although it is considered rare for vibration from train operations to cause “substantial or even minor cosmetic building damage” except potentially in the case of fragile historic buildings located near the right-of-way (FTA 2018). PPV is defined as the maximum instantaneous peak of the vibration signal. However, PPV is not considered the appropriate measurement for evaluating the human response to vibration. RMS is used to evaluate human response because it takes some time for the human body to respond to vibration signals; the RMS amplitude conveys the magnitude of the vibration signal experienced by the human body (FTA 2018). The RMS of a signal is the square root of the average of the squared amplitude of the signal.

For sources such as trucks or motor vehicles, PPV levels are typically 6 VdB to 14 VdB higher than RMS levels; the ratio of the PPV to the maximum RMS amplitudes is called the crest factor. For GBV induced by trains, the crest factor is generally on the order of 4 to 5 (FTA 2018). To reduce the potential for confusion with sound decibels (dB), the Federal Railroad Administration (FRA) and FTA use the abbreviation “VdB” referenced to 1 micro-inch per second (µin/s) to represent “vibration decibels” related to RMS and PPV amplitudes (FTA 2018). Decibel notation compresses the range of numbers required to quantify vibration levels.

Figure 5 presents common vibration sources and the human and structural responses to ground-borne vibration. As shown on Figure 5, the threshold of perception for human response is about 65 VdB; however, human response to vibration is not usually significant unless the vibration exceeds 70 VdB (FTA 2018).

FTA provides further helpful information related to ground-borne noise and vibration (FTA 2018). In contrast to airborne noise, neither GBV nor GBN is an everyday experience for most people. The background vibration level in residential areas is usually 50 VdB or lower, which is well below the threshold of perception for humans. Most perceptible indoor vibration is caused by sources within a building, such as the operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible GBV are construction equipment, steel-wheeled trains, and traffic on rough roads.

Figure 5. Typical Levels of Ground-borne Vibration



Source: FTA manual, Figure 5-4

4.2 Vibration Assessment Criteria

According to FTA, vibration-sensitive land uses are divided into four categories, as shown in Table 4.

Table 4. Land Use Categories for General Vibration Assessment Impact Criteria

Land Use Category	Land Use Type	Description of Land Use Category	Examples
—	Special Buildings	This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (for example, the train) is operating, there is no need to evaluate for impact.	Concert halls, TV and recording studios, and theaters
1	High Sensitivity	This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category.[a] For equipment that is more sensitive, a detailed vibration analysis must be conducted.	Buildings where vibration-sensitive research and manufacturing is conducted,[b] hospitals with vibration-sensitive equipment, and universities conducting physical research operations
2	Residential	This category includes all residential land use and buildings where people normally sleep. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.[c]	Homes, hotels, and hospitals
3	Institutional	This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity.	Schools, places of worship, and doctors' offices

Source: Modified from FTA 2018, Table 6-1

[a] Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.

[b] Manufacturing computer chips is an example of a vibration-sensitive process.

[c] Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

FTA has separate criteria for GBV and GBN. GBN is a rumble sound created by GBV and is often masked by airborne noise; therefore, GBN criteria are applied primarily to subway operations where airborne noise is negligible. The Project does not include tunnels; therefore, GBN was not evaluated.

The basis for evaluating rail vibration impact thresholds is the highest expected RMS vibration levels for repeated vibration events from the same source, expressed in units of VdB. Table 5 below shows the FTA vibration thresholds according to receiver land use categories and according to the frequency of the events. An event could be a train pass-by, a pile driver impact, or a jackhammer strike. FTA defines event frequency as follows:

- Frequent events are more than 70 vibration events of the same kind per day.
- Occasional events are between 30 and 70 vibration events of the same kind per day.
- Infrequent events are fewer than 30 vibration events of the same kind per day.

Table 5 presents the impact criteria for RMS vibration for repeated vibration events from the same source based on land use categories and the frequency of the events.

Table 5. Ground-borne Vibration (GBV) and Ground-borne Noise (GBN) Impact Criteria

Land Use Category	GBV Impact Levels (VdB re: 1 µin/s)			GBN Impact Levels (dBA re: 20 µPa)		
	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
Category 1	65 VdB[a]	65 VdB[a]	65 VdB[a]	NA[b]	NA[b]	NA[b]
Category 2	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: FTA manual, Table 6-3

Definitions: µin/s = micro-inch per second; µPa = micropascals; dBA = A-weighted decibels; GBN = ground-borne noise; GBV = ground-borne vibration; NA = not applicable; re: = referenced to; VdB = vibration decibels

[a] This criterion limit is based on acceptable levels for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air conditioning (HVAC) systems and stiffened floors.

[b] Vibration-sensitive equipment is not sensitive to GBN.

The Category 1 vibration impact threshold is acceptable for most moderately sensitive equipment; other highly sensitive equipment requires a detailed analysis to determine acceptable vibration levels and project vibration effects. There are no GBN impact thresholds for Category 1 land uses because equipment that is sensitive to GBV is generally not sensitive to GBN.

4.3 Vibration Assessment Methodology

FTA provides screening distances for various types of transit projects, including those that include steel-wheeled or steel-rail vehicles. If there are vibration-sensitive land uses within the screening distance, these receivers require vibration assessment. The screening distances are determined according to the type of project and the land use. The project team used the FTA default noise screening distance for conventional commuter railroads and used the same screening distances for freight railroads, consistent with the CREATE methodology (Illinois DOT 2013). Conventional commuter railroads use the distances shown in Table 6 by the land use.

Table 6. Vibration Screening Distances for Conventional Commuter Rail Projects

Land Use	Distance from Right-of-way or Property Line, feet
Category 1: High Sensitivity	600
Category 2: Residential	200
Category 3: Institutional	120
Special Buildings: Concert halls, TV and recording studios	600
Special Buildings: Theaters and auditoria	200

Source: Modified from FTA 2018, Table 6-8

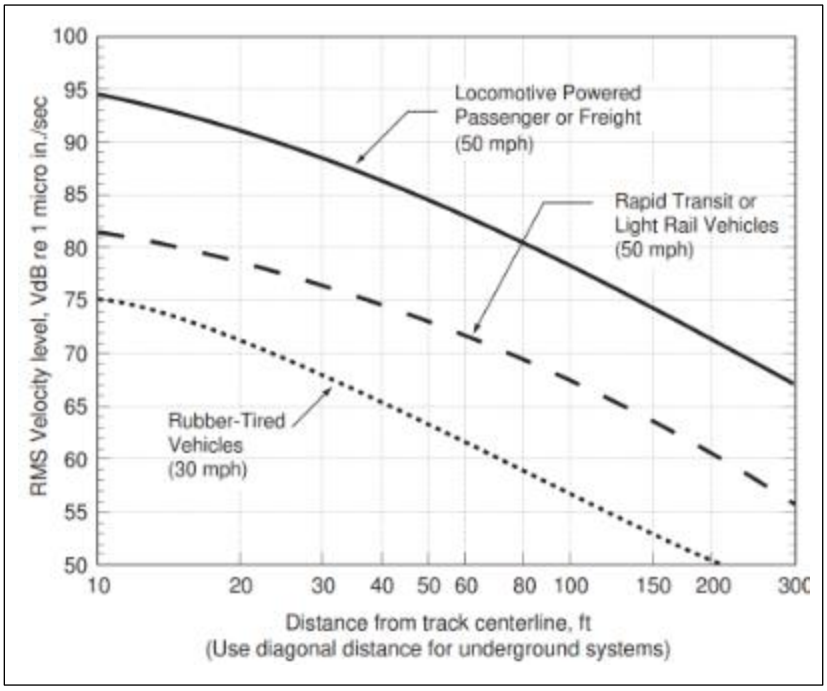
The screening procedure described above found Category 2 vibration-sensitive receivers within the respective screening distances, which then requires a general vibration assessment according to the FTA manual. A general vibration assessment is a simplified method to identify vibration effects at the vibration-sensitive land uses identified in the vibration screening procedure. The method uses an estimated vibration as a function of distance from the centerline of each track, modified by adjustment factors such as vehicle attributes, track systems, and ground features.

4.3.1 Assumptions for Estimating Project Vibration

Assumptions for UTA FrontRunner train traffic volumes were the same as the assumptions for noise modeling presented above. Based on the frequency of train traffic volumes, the vibration impact criteria are based on "Occasional Events" for UTA FrontRunner trains.

FTA provides generalized predictive ground surface vibration curves for a variety of transit modes. Figure 6 shows the default generalized ground surface vibration curves.

Figure 6. 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 rail corridor, which are operated by conventional diesel-electric locomotives. This curve gives the vibration level in VdB at a specified distance for a train moving at 50 mph (the reference speed).

FTA 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.
  - UTA FrontRunner tracks in some subsegments were built with ballast mats, as noted above for the specific subsegments: –10 VdB adjustment.
  - 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.

4.3.2 Assessment Methodology for Existing Vibration

The Project would be implemented in a rail corridor with existing train traffic, and some receivers might already experience vibration effects. This assessment evaluates 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 the threshold for vibration impact. Using these criteria, the expected vibration from the Project might exceed the criteria in Table 5 above at some receivers, but, if the increase over existing vibration is less than 3 VdB, the project finding would be no vibration impact.

4.3.3 Assessment Methodology for Freight Trains

Some analysis subsegments include infrastructure changes to the freight tracks in the shared rail corridor, so this assessment considers the vibration effects from freight trains in those subsegments. The FTA manual provides guidance to evaluate freight trains in shared-use corridors:

> When assessing vibration from freight train operations, consider the locomotive and rail car vibration separately. Since locomotive vibration lasts for a very short time, it can be characterized by the infrequent events category… Rail car vibration from a typical line-haul freight train usually lasts for several minutes and can be characterized by the frequent events category …

Based on this guidance, the freight train evaluations included the following assumptions, and each freight train source was considered separately from the transit vibration effects:

- Existing and proposed noise from freight locomotives were compared to the criteria for Infrequent Events and used the generalized ground surface vibration curve for Locomotive Powered Passenger or Freight.
- Existing and proposed noise from freight cars were compared to the criteria for Frequent Events and used the generalized ground surface vibration curve for Rapid Transit or Light Rail Vehicles, consistent with guidance from the CREATE freight rail assessment methodology (Illinois DOT 2013).

4.4 Vibration Impacts

This section describes the results for the vibration analysis in each subsegment (Orem NV-1 through Orem NV-5). See the description of this project for the applicable infrastructure changes in each subsection. Vibration impacts are illustrated and summarized on the figures and in the tables in Appendix C through Appendix E. On the figures in Appendix C, green color indicates receivers with anticipated vibration impacts without mitigation measures. Tables in Appendix D summarize vibration impact calculations without considering mitigation measures (Table D-1).

4.4.1 Orem NV-1 (refer to Figures C-1 and C-2 in Appendix C)

This subsegment would have 28 vibration impacts at single-family residences on the west side of the rail corridor. There are no vibration-sensitive receivers on the east side of the rail corridor. These impacts would be caused by wayside vibration; the large increase in vibration would be associated with the existing UTA FrontRunner track, which was constructed with ballast mats, and moving half the train traffic to the proposed UTA FrontRunner track, which was assumed to be unmitigated for the standard analysis.

See Section 4.5, *Vibration Mitigation*, for discussion of vibration mitigation options.

4.4.2 Orem NV-2 (refer to Figure C-2 in Appendix C)

This subsegment would have 21 vibration impacts at single-family residences on the west side of the rail corridor. There are no vibration-sensitive receivers on the east side of the rail corridor. Similar to subsegment Orem NV-1, these impacts would be caused by wayside vibration; a large increase in vibration would be associated with moving half the train traffic from the existing UTA FrontRunner track with ballast mats to the proposed unmitigated UTA FrontRunner track.

See Section 4.5, *Vibration Mitigation*, for discussion of vibration mitigation options.

4.4.3 Orem NV-3

Category 2 residential receivers on the east and west sides of the rail corridor would not experience a 3 VdB increase in single-event vibration, so no vibration impacts are anticipated in this subsegment. The calculation adjustment for special trackwork is applied within 200 feet of the special trackwork, and the closest vibration-sensitive receiver is 203 feet from the UP freight special trackwork.

4.4.4 Orem NV-4

Category 2 residential receivers on the west side of the rail corridor would not experience a 3 VdB increase in single-event vibration, so no vibration impacts are anticipated in this subsegment.

4.4.5 Orem NV-5 (refer to Figure C-3 in Appendix C)

Eighteen vibration impacts would occur at single-family residences in this subsegment west of the rail corridor: 14 residences on either side of 460 East from 340 North to 400 North and 4 residences on the west side of 290 East. These impacts would be due to the proximity of these residences to the two proposed crossovers.

See Section 4.5, *Vibration Mitigation*, for discussion of vibration mitigation options.

4.4.6 Vibration Impact Summary

Cumulatively, there would be 67 vibration impacts at single-family residences west of the rail corridor. Appendix D provides more information regarding the calculations performed for the vibration assessments in the unmitigated condition.

Table 7. Vibration Impacts by Analysis Subsegments

Analysis Subsegment	Special Buildings	Category 1 Impacts	Category 2 Impacts	Category 3 Impacts	Total Impacts
Orem NV-1	NA	NA	28 w	NA	28
Orem NV-2	NA	NA	21 w	NA	21
Orem NV-3	NA	NA	0	NA	0
Orem NV-4	NA	NA	0	NA	0
Orem NV-5	NA	NA	18 c	NA	18
Project Total	**NA**	**NA**	**67**	**NA**	**67**

Source: HDR

Definitions: c = impact due to special trackwork (crossover); NA = not applicable because lack of receivers under the corresponding land use category; w = impact due to wayside vibration

4.5 Vibration Mitigation

4.5.1 Mitigation in Subsegments Orem NV-1 and NV-2

A total of 49 receivers would be impacted at the south end of the project extent from the proposed UTA FrontRunner track that was modeled without ballast mats and where the existing UTA FrontRunner track includes ballast mats. One mitigation strategy is to provide ballast mats under the proposed UTA FrontRunner track parallel to the existing track ballast mats. The project team estimated that adding these ballast mats would reduce the number of vibration impacts from 49 to 1. The one remaining impact would occur because the receiver is located very close to the proposed UTA track where half the trains would be moved closer to the receivers. The remaining vibration-impacted receiver is in subsegment Orem NV-1 and is shown on Figure C-1 in Appendix C; this is the same receiver that would experience a moderate noise impact (see Figure A-1 in Appendix A).

4.5.2 Mitigation in Subsegment Orem NV-5

A total of 14 receivers on either side of 460 East and the 4 receivers on the west side of 290 East would be impacted by newly proposed switches for crossovers between UTA ML No. 1 and UTA ML No. 2. One possible mitigation measure for such vibration impacts is to relocate the crossover to a location where it would not cause impacts. This approach is feasible only if the relocation does not interfere with track engineering requirements. Alternatively, UTA and UDOT could consider using spring-rail 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.

5 Construction Noise and Vibration

Construction activities for rail projects can include brush clearing, demolition, excavation, and construction of retaining walls and tracks. At this preliminary project 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 would 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 projects 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.

6 References

Cross-Spectrum Acoustics, Inc.

2023 FrontRunner Forward Corridor Level Noise and Vibration Analysis.

2025 FrontRunner Forward Corridor Level Noise and Vibration Analysis Addendum.

Crowther, Brent

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

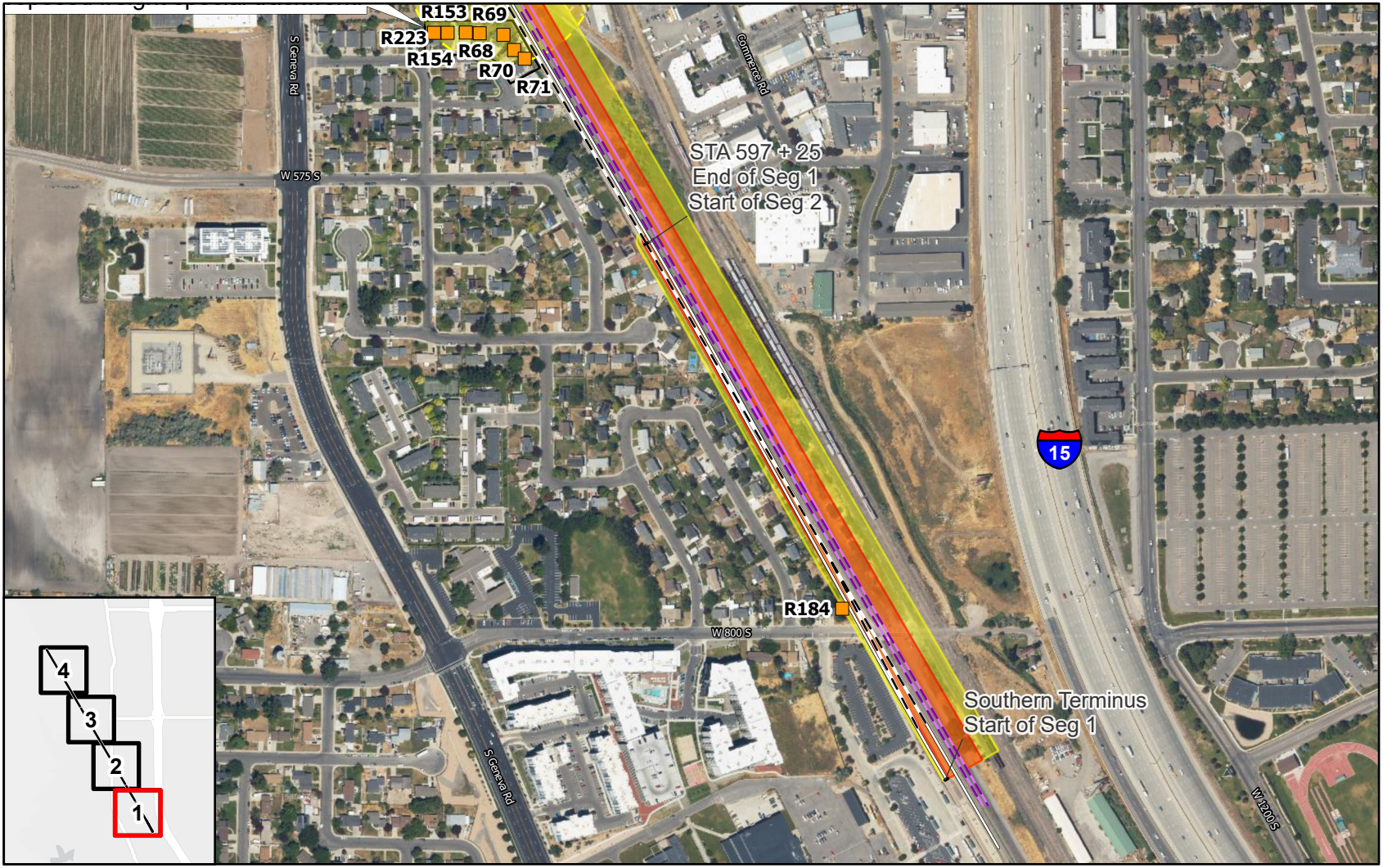
[FTA] Federal Transit Administration

2018 Transit Noise and Vibration Impact Assessment Manual. September.

[Illinois DOT] Illinois Department of Transportation

2013 CREATE Noise and Vibration Assessment Methodology.

Appendix A – Noise Impact Figures



UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Proposed 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

0 220 440
US Feet

Figure A-1

UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - NOISE ASSESSMENT

- Existing UP Track
- Proposed UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour
- 300' Special Trackwork Buffer
- Moderate Impact
- Freight Special Track Work

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

N

0 220 440 US Feet

Figure A-2

UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - NOISE ASSESSMENT

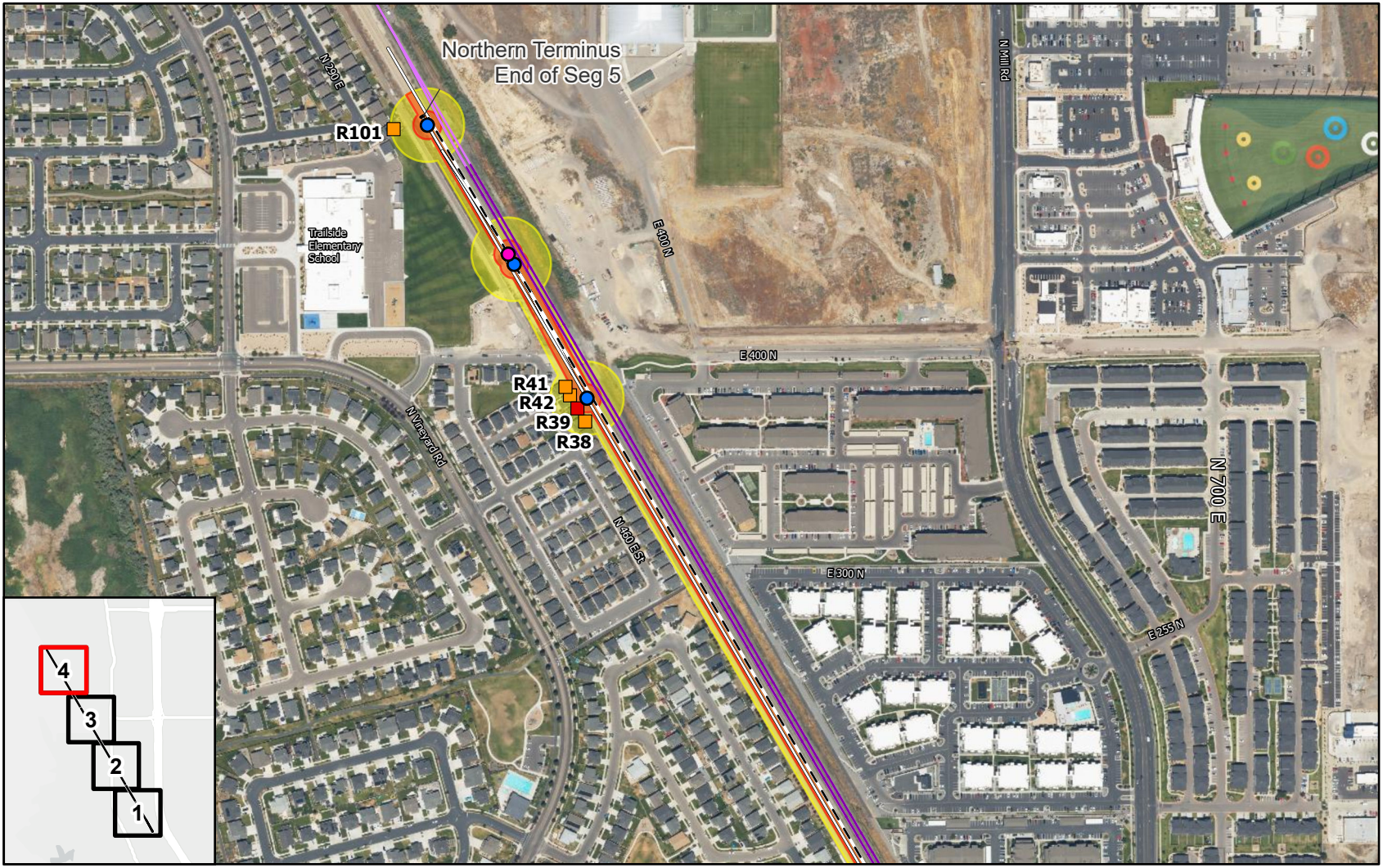
- Existing UP Track
- Proposed UP Track
- Existing UTA Track
- Proposed UTA Track
- Moderate Impact Contour
- Severe Impact Contour

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

N

0 220 440 US Feet

Figure A-3



UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - NOISE ASSESSMENT

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

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

N

0 220 440 US Feet

Figure A-4

Appendix B – Noise Impact Calculation Tables

Table B-1. Receiver-based Noise Impact Calculations

Receiver ID	Subsegment	Land Use Category	Criteria					
			Total Existing Noise (dBA)	Total Project Noise (dBA)	L_{prop} - L_{exist} (dBA)	Increase (dBA) until Moderate Impact	Increase (dBA) until Severe Impact	Impact Type
Trailside Elementary School	5	3	61	61	0	4	9	NO IMPACT
R223	2	2	65	67	3	1	4	MODERATE
R154	2	2	65	68	3	1	4	MODERATE
R153	2	2	67	70	3	1	3	MODERATE
R68	2	2	69	71	2	1	3	MODERATE
R69	2	2	74	76	1	0	2	MODERATE
R70	2	2	74	75	2	1	2	MODERATE
R71	2	2	74	76	1	1	2	MODERATE

Table B-2. Distances for Contour-based Noise Impact Calculations

Analysis Subsegment	West Side of corridor [a]		East Side of Corridor [b]		From Special Trackwork [c]	
	Moderate	Severe	Moderate	Severe	Moderate	Severe
Orem NV-1	44 feet	25 feet	117 feet	58 feet	NA	NA
Orem NV-2	NA [d]	NA [d]	117 feet	58 feet	NA	NA
Orem NV-3	NA [d]	NA [d]	117 feet	58 feet	NA [e]	NA [e]
Orem NV-4	44 feet	25 feet	117 feet	58 feet	NA	NA
Orem NV-5	44 feet	25 feet	NA [d]	NA [d]	117	45

Definitions: NA = not applicable

[a] Measured from the future UTA ML 1 centerline (east track of future UTA double-track).

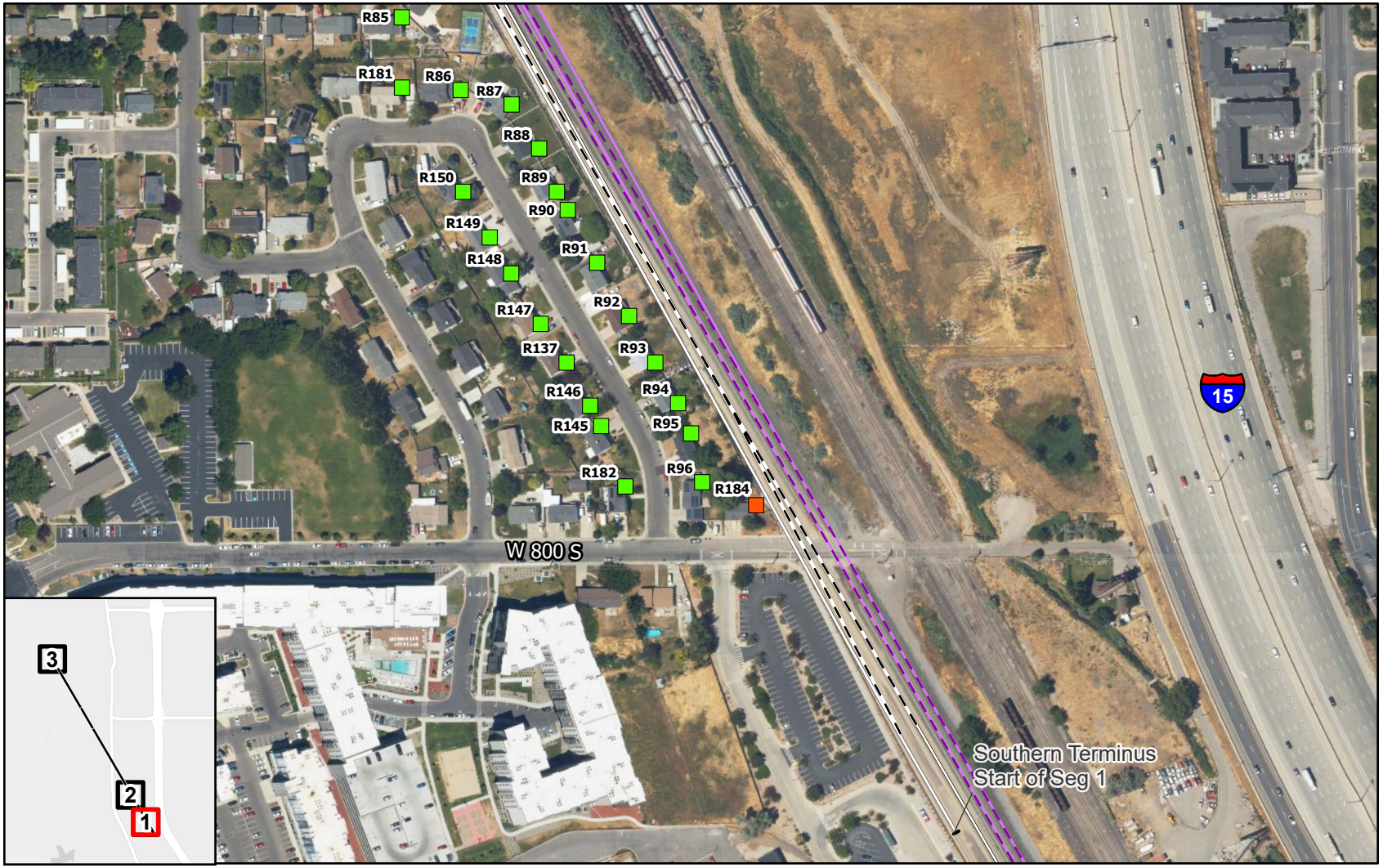
[b] Measured from the existing UP ML 1 centerline (east track of existing UP double-track).

[c] Special trackwork on UTA FrontRunner tracks, measured radially from center of the switch point.

[d] Project is not expected to increase noise in this direction, no impact contours.

[e] Freight special trackwork calculated for individual affected receivers, see calculation table above.

Appendix C – Vibration Impact Figures



UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

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

Vibration Receiver Impacts

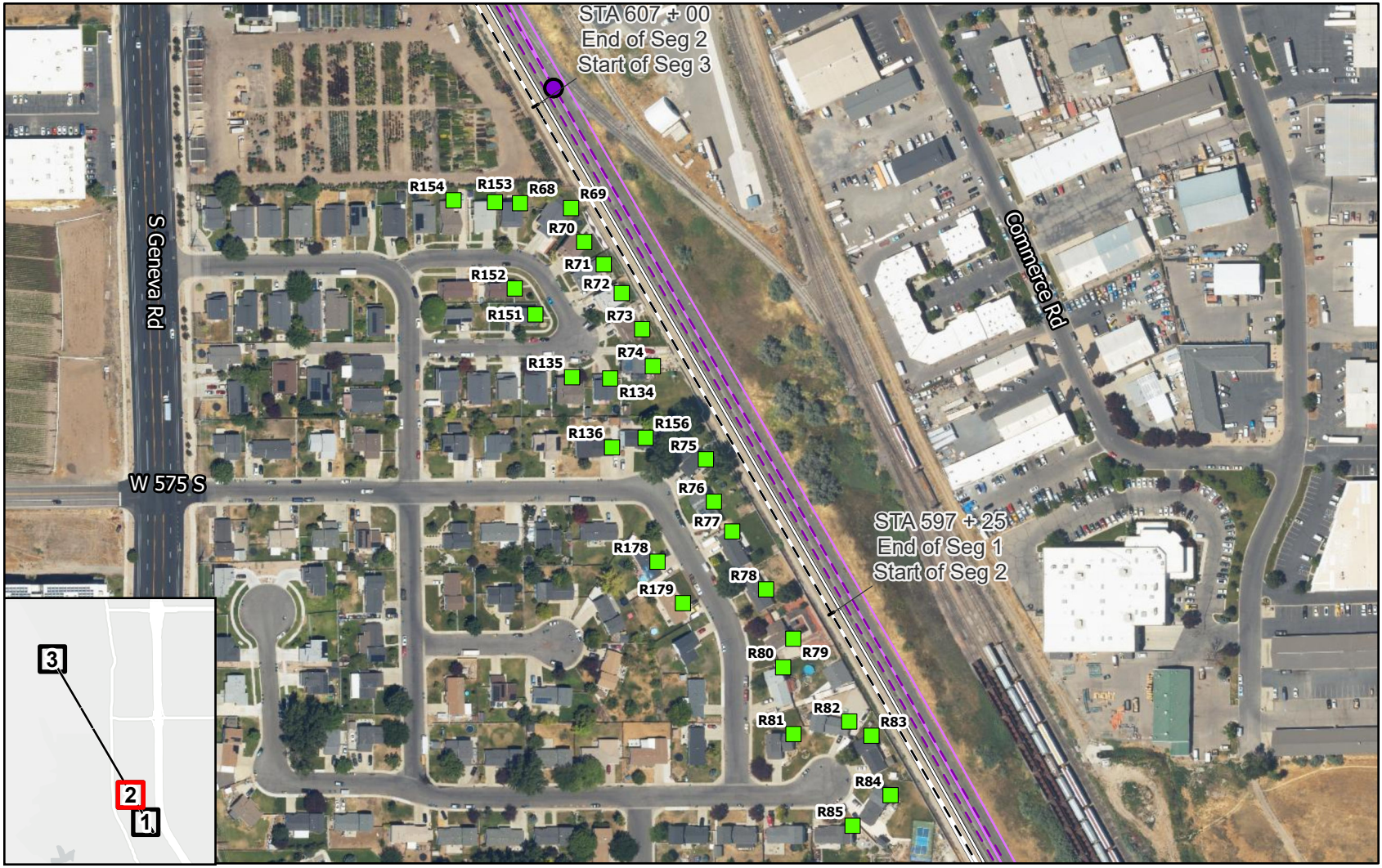
- Impacted with Mitigation (ballast mats)
- Impact before Mitigation

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

Figure C-1



UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

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

Vibration Receiver Impacts

- Impact before Mitigation
- Freight 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

Figure C-2

UTA FrontRunner Forward

UDOT Keeping Utah Moving

NORTH OF OREM DOUBLE TRACK PROJECT - VIBRATION ASSESSMENT

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

Vibration Receiver Impacts

- Impact before Mitigation

- Proposed Special Track Work
- Existing Special Track Work 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

Figure C-3

Appendix D – Vibration Impact Calculation Tables

Table D-1. Summary of Vibration Impact Calculations – Without Mitigation

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R35	5	Passenger	88	95	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R36	5	Passenger	87	94	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R37	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R38	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R39	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R40	5	Passenger	80	87	Y	Y	Y
		Freight Loco	73	73	N	N	
		Freight Cars	62	62	N	N	
R41	5	Passenger	88	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R42	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R68	2	Passenger	72	82	Y	Y	Y
		Freight Loco	74	73	N	N	
		Freight Cars	63	62	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R69	2	Passenger	82	91	Y	Y	Y
		Freight Loco	81	79	N	N	
		Freight Cars	70	68	N	N	
R70	2	Passenger	80	90	Y	Y	Y
		Freight Loco	80	78	N	N	
		Freight Cars	68	67	N	N	
R71	2	Passenger	81	91	Y	Y	Y
		Freight Loco	81	79	N	N	
		Freight Cars	70	68	N	N	
R72	2	Passenger	82	92	Y	Y	Y
		Freight Loco	81	79	N	N	
		Freight Cars	70	68	N	N	
R73	2	Passenger	82	92	Y	Y	Y
		Freight Loco	81	79	N	N	
		Freight Cars	70	68	N	N	
R74	2	Passenger	79	89	Y	Y	Y
		Freight Loco	79	77	N	N	
		Freight Cars	68	67	N	N	
R75	2	Passenger	78	88	Y	Y	Y
		Freight Loco	79	77	N	N	
		Freight Cars	68	66	N	N	
R76	2	Passenger	75	85	Y	Y	Y
		Freight Loco	76	75	N	N	
		Freight Cars	65	64	N	N	
R77	2	Passenger	75	85	Y	Y	Y
		Freight Loco	76	75	N	N	
		Freight Cars	66	64	N	N	
R78	2	Passenger	75	85	Y	Y	Y
		Freight Loco	76	75	N	N	
		Freight Cars	66	64	N	N	
R79	1	Passenger	75	85	Y	Y	Y
		Freight Loco	76	75	N	N	
		Freight Cars	65	64	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R80	1	Passenger	71	81	Y	Y	Y
		Freight Loco	73	72	N	N	
		Freight Cars	62	61	N	N	
R81	1	Passenger	68	78	Y	Y	Y
		Freight Loco	71	70	N	N	
		Freight Cars	60	59	N	N	
R82	1	Passenger	76	86	Y	Y	Y
		Freight Loco	77	76	N	N	
		Freight Cars	66	65	N	N	
R83	1	Passenger	80	90	Y	Y	Y
		Freight Loco	80	78	N	N	
		Freight Cars	69	67	N	N	
R84	1	Passenger	76	86	Y	Y	Y
		Freight Loco	77	76	N	N	
		Freight Cars	66	65	N	N	
R85	1	Passenger	69	79	Y	Y	Y
		Freight Loco	71	70	N	N	
		Freight Cars	60	59	N	N	
R86	1	Passenger	70	81	Y	Y	Y
		Freight Loco	73	72	N	N	
		Freight Cars	62	61	N	N	
R87	1	Passenger	77	88	Y	Y	Y
		Freight Loco	78	77	N	N	
		Freight Cars	67	66	N	N	
R88	1	Passenger	77	88	Y	Y	Y
		Freight Loco	78	77	N	N	
		Freight Cars	67	66	N	N	
R89	1	Passenger	76	87	Y	Y	Y
		Freight Loco	77	76	N	N	
		Freight Cars	66	65	N	N	
R90	1	Passenger	76	87	Y	Y	Y
		Freight Loco	77	76	N	N	
		Freight Cars	66	66	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R91	1	Passenger	75	87	Y	Y	Y
		Freight Loco	77	76	N	N	
		Freight Cars	66	66	N	N	
R92	1	Passenger	76	88	Y	Y	Y
		Freight Loco	77	77	N	N	
		Freight Cars	66	66	N	N	
R93	1	Passenger	75	88	Y	Y	Y
		Freight Loco	77	77	N	N	
		Freight Cars	66	66	N	N	
R94	1	Passenger	75	88	Y	Y	Y
		Freight Loco	77	77	N	N	
		Freight Cars	66	66	N	N	
R95	1	Passenger	75	87	Y	Y	Y
		Freight Loco	76	76	N	N	
		Freight Cars	65	65	N	N	
R96	1	Passenger	72	84	Y	Y	Y
		Freight Loco	74	74	N	N	
		Freight Cars	63	63	N	N	
R97	5	Passenger	77	87	Y	Y	Y
		Freight Loco	63	73	Y	Y	
		Freight Cars	52	62	Y	Y	
R99	5	Passenger	79	87	Y	Y	Y
		Freight Loco	65	73	Y	Y	
		Freight Cars	53	62	Y	Y	
R100	5	Passenger	80	87	Y	Y	Y
		Freight Loco	66	73	Y	Y	
		Freight Cars	55	62	Y	Y	
R101	5	Passenger	81	93	Y	Y	Y
		Freight Loco	67	73	Y	Y	
		Freight Cars	56	63	Y	Y	
R104	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R105	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	60	60	N	N	
R106	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	59	59	N	N	
R107	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R108	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R109	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	59	59	N	N	
R134	2	Passenger	71	81	Y	Y	Y
		Freight Loco	73	72	N	N	
		Freight Cars	62	61	N	N	
R135	2	Passenger	67	77	Y	Y	Y
		Freight Loco	69	69	N	N	
		Freight Cars	59	58	N	N	
R136	2	Passenger	67	77	Y	Y	Y
		Freight Loco	69	69	N	N	
		Freight Cars	58	58	N	N	
R137	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R145	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R146	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R147	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R148	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R149	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R150	1	Passenger	65	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R151	2	Passenger	67	77	Y	Y	Y
		Freight Loco	69	69	N	N	
		Freight Cars	59	58	N	N	
R152	2	Passenger	66	76	Y	Y	Y
		Freight Loco	69	68	N	N	
		Freight Cars	58	57	N	N	
R153	2	Passenger	69	79	Y	Y	Y
		Freight Loco	71	71	N	N	
		Freight Cars	61	60	N	N	
R154	2	Passenger	66	76	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R156	2	Passenger	71	81	Y	Y	Y
		Freight Loco	73	72	N	N	
		Freight Cars	62	61	N	N	
R178	2	Passenger	65	75	Y	Y	Y
		Freight Loco	68	67	N	N	
		Freight Cars	57	56	N	N	
R179	2	Passenger	65	75	Y	Y	Y
		Freight Loco	68	67	N	N	
		Freight Cars	57	56	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R181	1	Passenger	65	75	Y	Y	Y
		Freight Loco	68	67	N	N	
		Freight Cars	57	56	N	N	
R182	1	Passenger	65	76	Y	Y	Y
		Freight Loco	67	67	N	N	
		Freight Cars	56	56	N	N	
R184	1	Passenger	81	95	Y	Y	Y
		Freight Loco	80	80	N	N	
		Freight Cars	68	68	N	N	

Table D-2. Summary of Vibration Impact Calculations – With Mitigation

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R35	5	Passenger	88	95	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R36	5	Passenger	87	94	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R37	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R38	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R39	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R40	5	Passenger	80	87	Y	Y	Y

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
		Freight Loco	73	73	N	N	
		Freight Cars	62	62	N	N	
R41	5	Passenger	88	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R42	5	Passenger	87	100	Y	Y	Y
		Freight Loco	78	78	N	N	
		Freight Cars	67	67	N	N	
R97	5	Passenger	77	87	Y	Y	Y
		Freight Loco	63	73	Y	Y	
		Freight Cars	52	62	Y	Y	
R99	5	Passenger	79	87	Y	Y	Y
		Freight Loco	65	73	Y	Y	
		Freight Cars	53	62	Y	Y	
R100	5	Passenger	80	87	Y	Y	Y
		Freight Loco	66	73	Y	Y	
		Freight Cars	55	62	Y	Y	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
R101	5	Passenger	81	93	Y	Y	Y
		Freight Loco	67	73	Y	Y	
		Freight Cars	56	63	Y	Y	
R104	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R105	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	60	60	N	N	
R106	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	59	59	N	N	
R107	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	
		Freight Cars	57	57	N	N	
R108	5	Passenger	75	81	Y	Y	Y
		Freight Loco	68	68	N	N	

Receiver ID	Subsegment	Calculation					
		Source Type	Existing Lv (VdB)	Project Lv (VdB)	Increase over Existing Lv > 3 VdB?	Impact due to Source?	Impact at Receiver?
		Freight Cars	57	57	N	N	
R109	5	Passenger	78	84	Y	Y	Y
		Freight Loco	70	70	N	N	
		Freight Cars	59	59	N	N	
R184	1	Passenger	81	85	Y	Y	Y
		Freight Loco	80	80	N	N	
		Freight Cars	68	68	N	N	

ATTACHMENT B.8
Air Quality

FrontRunner Forward

North of Orem Double Track Project

Air Quality Review

April 2025

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Appendices

Introduction

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 1.7 miles of track north of Orem Central Station in Utah County, Utah. The North of Orem 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 Orem Central Station and extend along the FrontRunner corridor until merging with the existing double track in the southern part of Vineyard. This section of double track would extend from UTA milepost S 36.8 south to UTA milepost S 38.5, a distance of about 1.7 miles.

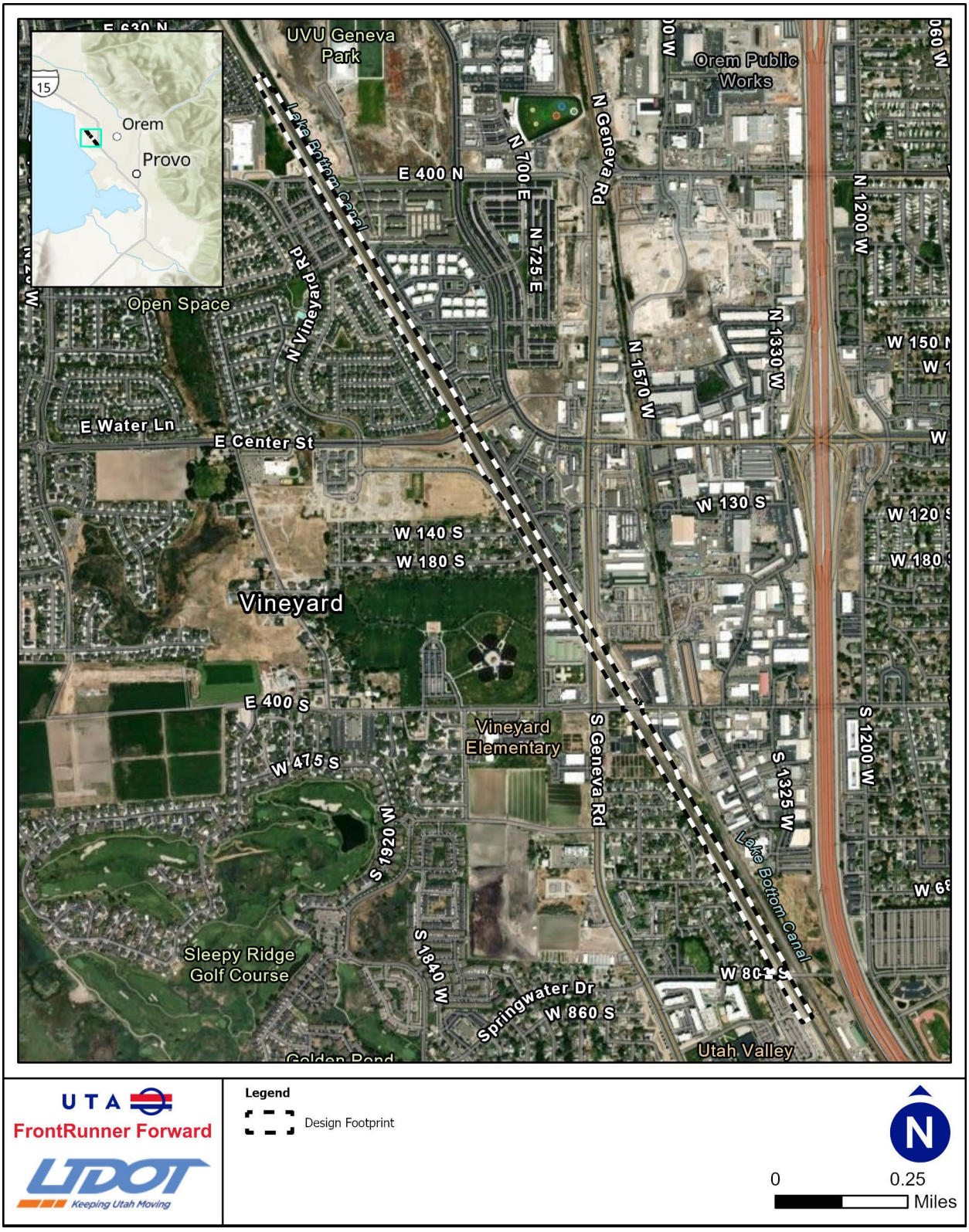
The anticipated UTA track work would consist of constructing a new UTA mainline (ML) track number (No.) 2, shifting about 6,800 linear feet of track, reprofiling about 940 linear feet of track, removing about 200 linear feet of track, constructing about 4,900 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, installing two emergency crossovers, and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

In addition to the work along the UTA tracks, both existing Union Pacific Railroad (UP) mainline tracks would be shifted east to accommodate the additional UTA ML No. 2 under the existing Geneva Road grade-separated crossing. The anticipated UP track work would involve shifting about 4,000 linear feet of track, removing an existing crossover, removing about 5,700 linear feet of track, removing the UP signal bridge south of Geneva Road, installing a new crossover, and constructing about 4,800 linear feet of track.

The Project would improve reliability and reduce delays of the FrontRunner service. The North of Orem Double Track Project is one the many 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 the 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 [b]	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*.

Because the improvements associated with the Project would be in a CO attainment area, a CO hot-spot analysis is not required.

[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.

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 Orem Double Track Project is not exempt under either 40 CFR Section 93.126 or 40 CFR Section 93.128.

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 Orem 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, North of Orem 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–iv).

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).

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(b)(1).

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 two at-grade crossings in the air quality evaluation area for the North of Orem Double Track Project: one at 400 South and one at 800 South. Both of these crossings currently operate at LOS A and are projected to operate at LOS B or better in 2050 with the proposed double tracking (UTA and UDOT 2024). Therefore, the project would not affect intersections that are 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).

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.

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 due to 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.

References

[EPA] U.S. Environmental Protection Agency

2021 Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas. EPA-420-B-15-084. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013C6A.pdf. October.

2024 Regulations for Emissions from Locomotives. https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-locomotives. Accessed September 20, 2024.

[MAG] Mountainland Association of Governments

2023 TransPlan50: Mountainland Association of Governments' 2023–2050 Regional Transportation Plan for Urban Utah County. https://mountainland.org/rtp.

2024 Conformity Determination Report. https://magutah.gov/rtp-amendment-1/. June 6.

2025 Transportation Improvement Program 2025–2029. https://mountainland.org/tip.

[UDEQ] Utah Department of Environmental Quality

2025 State Implementation Plan. https://deq.utah.gov/air-quality/state-implementation-plan-sip. Accessed on March 28, 2025.

[UTA] Utah Transit Authority

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

[UTA and UDOT] Utah Transit Authority and Utah Department of Transportation

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

Appendix A

Air Quality Monitoring Data

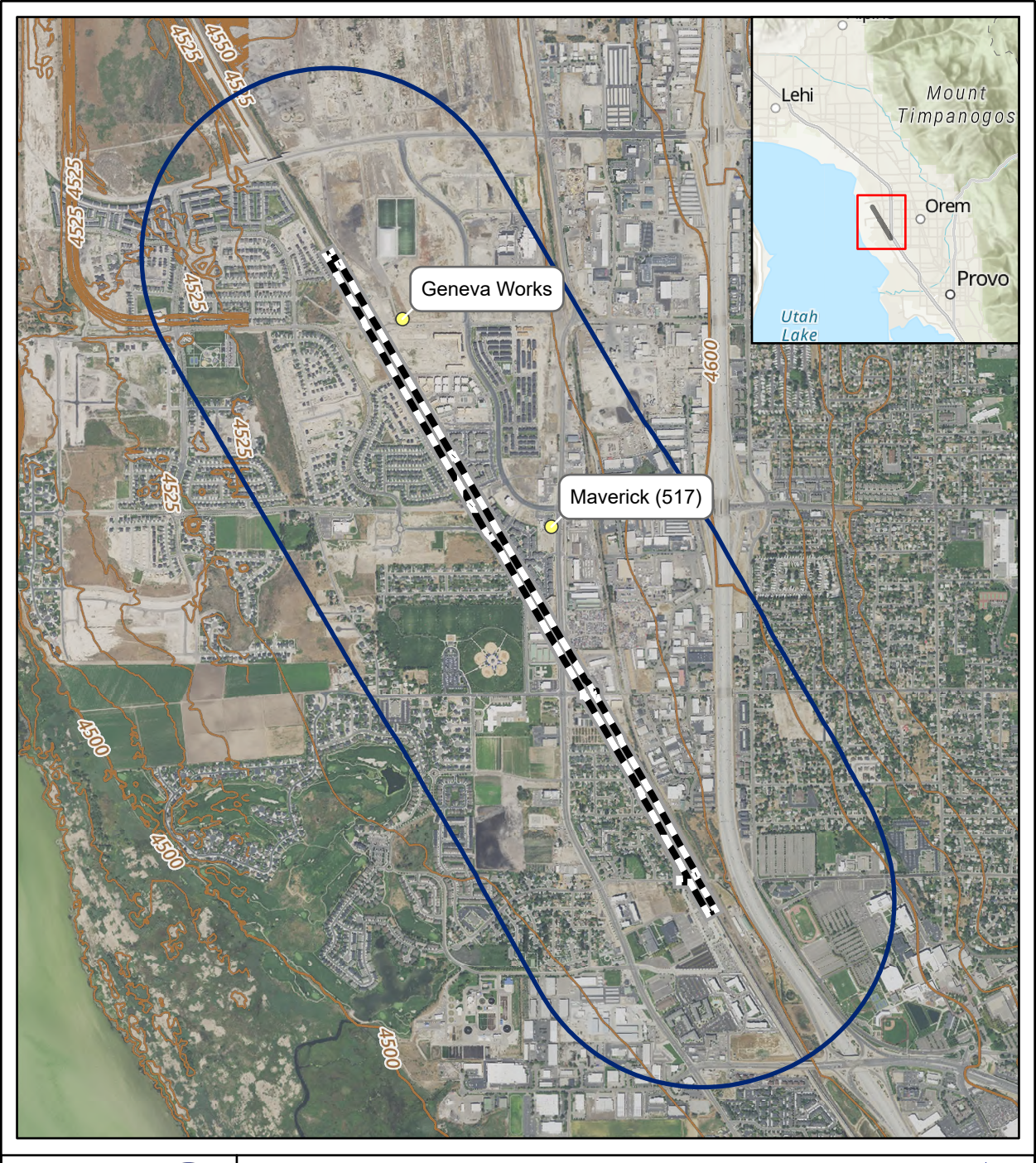
Table A-1. Air Quality Monitoring Data from the Lindon Monitoring Station in Utah County

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 0.5 Miles

ATTACHMENT B.14
Biological Resources

FrontRunner Forward

North of Orem Double Track Project

Biological Resources Report

April 2025

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Appendices

Introduction

The Utah Transit Authority (UTA) and the Utah Department of Transportation (UDOT) are proposing to double track approximately 1.7 miles of track north of Orem Central Station in Utah County, Utah. The North of Orem 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 Orem Central Station and extend along the FrontRunner corridor until merging with the existing double track in the southern part of Vineyard. This section of double track would extend from UTA milepost S 36.8 south to UTA milepost S 38.5, a distance of about 1.7 miles.

The anticipated UTA track work would consist of constructing a new UTA mainline (ML) track number (No.) 2, shifting about 6,800 linear feet of track, reprofiling about 940 linear feet of track, removing about 200 linear feet of track, removing existing turnouts at both ends of the section and south of Geneva Road, removing crossing panels, removing signals north of Geneva Road, installing two emergency crossovers, and widening the existing track bed. Both permanent right-of-way acquisition and temporary construction easements would be required for the Project.

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The Project would improve reliability and reduce delays of the FrontRunner service. The North of Orem Double Track 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, enough information is known 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 Orem Double Track Project biological resources evaluation area is in Utah County. The evaluation area is about 41.9 acres and ranges in elevation from about 4,535 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 Lake Bottom Canal runs adjacent to the east side of the UP tracks in an underground pipe through the Vineyard section of the evaluation area.

The evaluation area consists primarily of existing UTA FrontRunner and UP tracks, disturbed upland areas, and commercial and residential development. Common plant species observed in the upland areas include narrowleaf willow (*Salix exigua*), Russian olive *(Elaeagnus angustifolia*), rubber rabbitbrush (*Ericameria nauseosa*), common reed (*Phragmites australis*), prickly Russian thistle (*Salsola tragus*), and sweetclover (*Melilotus officinalis*).

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

U.S. Fish and Wildlife Service Botanical Clearance Survey Area

USFWS's Utah Ecological Services Field Office has established guidelines for the minimum standards for conducting botanical surveys for plant species listed under the ESA in Utah (USFWS 2011). Clearance surveys, which are used to document compliance with the provisions of Section 7 of the ESA, are one type of survey described in these guidelines.

Clearance surveys cover 100% of a project area to determine whether a target species is present. "Project area" is the area in which a target species might be impacted by a proposed activity. Clearance surveys also determine species distribution and abundance before ground-disturbing activities begin. Clearance surveys must include an assessment of all potential habitat in the project area plus a buffer. The standard buffer for clearance surveys is 300 feet from the project area.

In accordance with the *U.S. Fish and Wildlife Service (USFWS) Utah Field Office Guidelines for Conducting and Reporting Botanical Inventories and Monitoring of Federally Listed, Proposed, and Candidate Plants* (USFWS 2011), a 300-foot buffer was applied to the evaluation area and assessed for potentially suitable habitat for federally listed plant species included in USFWS's Information, Planning, and Conservation System (IPaC) list. Figure 1 above shows USFWS's clearance survey buffer area in relation to the 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.

Ute Ladies'-tresses Habitat Evaluation

All areas where the USFWS Ute ladies'-tresses (*Spiranthes diluvialis*) range map and the biological resources evaluation area plus the 300-foot buffer for USFWS botanical surveys overlap were visually inspected to confirm whether these areas displayed characteristics consistent with the Ute ladies'-tresses suitable habitat criteria described in the revised version of the 1992 *Interim Survey Requirements for Ute Ladies'-tresses Orchid (Spiranthes diluvialis)* (USFWS 2017a). See Figure 1 above for an overview of the USFWS Ute ladies'-tresses habitat range in relation to the evaluation area and buffer area.

Results

Threatened, Endangered, and Candidate Species

The IPaC report identified two federally listed species that might occur in the biological resources evaluation area and/or might be affected by the Project: one bird species, yellow-billed cuckoo (*Coccyzus americanus*), and one plant species, Ute ladies'-tresses. 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 2017b).	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).
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 to provide 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.

(*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?
Plants				
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	This white-flowered orchid is found below 7,000 feet in elevation in moist to very wet meadows, along streams, in abandoned stream meanders, and near springs, seeps, and lake shores where competition for light, space, water, and other resources is normally kept low by periodic or recent disturbance. Ute ladies'-tresses are also known to occur in seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lake shores. Populations have also been observed along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands (Fertig and others 2005).	Critical habitat has not been designated for this species.	There is no suitable habitat in the evaluation area or within a 300-foot buffer. The portion of the evaluation area that overlaps with USFWS's range map for Ute ladies'-tresses consists of residential and commercial development, dry uplands, and rail tracks. There are records of individuals within a 2-mile radius of the evaluation area (UDWR 2025).

[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 USFWS's ECOS (USFWS 2025b)

Migratory Birds

The biological resources evaluation area includes upland trees and shrubs, with patches of rabbitbrush, Russian olive, and narrowleaf willow growing adjacent to the tracks. 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), one federally listed plant species (Ute ladies'-tresses), and two insect species proposed for ESA listing (monarch butterfly and Suckley's cuckoo bumble bee) that might occur in the North of Orem 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 evaluation area for any of these species. Potentially suitable habitat was identified in the evaluation area for migratory birds.

Migratory Birds. Potentially suitable nesting and foraging habitat is available in the upland trees and shrubs growing adjacent to the railway tracks. 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.

References

Audubon

No date Guide to North American Birds. https://www.audubon.org/bird-guide.

Cornell Lab of Ornithology

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[UDWR] Utah Division of Wildlife Resources

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2011 U.S. Fish and Wildlife Service (USFWS) Utah Field Office Guidelines for Conducting and Reporting Botanical Inventories and Monitoring of Federally Listed, Proposed and Candidate Plants. https://www.fws.gov/sites/default/files/documents/general-plant-survey-guidelines-2011_0.pdf. August 31.

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2017b Guidelines for the Identification and Evaluation of Suitable Habitat for Western Yellow-billed Cuckoo in Utah. https://www.fws.gov/sites/default/files/documents/Guidelines-for-Identification-and-Evaluation-of-Suitable-Habitat-for-Western-Yellow-Billed-Cuckoo-in-Utah-2017.pdf.

2024 Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*) Species Status Assessment. Version 1.0. https://iris.fws.gov/APPS/ServCat/DownloadFile/263505. August.

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 29.

2025b Environmental Conservation Online System. Conservation Plans Region Summary CCA [Candidate Conservation Agreements]. https://ecos.fws.gov/ecp/report/conservation-plans-region-summary-cca?region=6&type=CCA.

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2025d IPaC Information for Planning and Consultation. Listing Status. https://ipac.ecosphere.fws.gov/status/list.

[USGS] United States Geological Survey

2024 Science in Your Watershed. USGS Links for HUC 16020201 - Utah Lake Jordan. Accessed August 29, 2024.

[UTA] Utah Transit Authority

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

Utah Native Plant Society

No date Utah Rare Plant Guide. https://water.usgs.gov/wsc/map_index.html.

Western Association of Fish and Wildlife Agencies
2019 Western Monarch Butterfly Conservation Plan, 2019–2069. Version 1.0.

Woods, A.J., D.A. Lammers, S.A. Bryce, J.M. Omernik, R.L. Denton, M. Domeier, and J.A. Comstock
2001 Ecoregions of Utah (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,175,000). https://store.usgs.gov/assets/MOD/StoreFiles/Ecoregion/112579_ut_front.pdf.

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: 01/29/2025 18:24:15 UTC
Project Code: 2025-0049038
Project Name: North of Orem 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: 2025-0049038
Project Name: North of Orem Double Track Project
Project Type: Railroad - New Construction
Project Description: North of Orem Double Track Project
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@40.29387905,-111.73576281554722,14z

Counties: Utah County, Utah

ENDANGERED SPECIES ACT SPECIES

There is a total of 4 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

FLOWERING PLANTS

NAME	STATUS
Ute Ladies'-tresses *Spiranthes diluvialis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2159	Threatened

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: Joshua McMillin
Address: 2825 E Cottonwood Pkwy Suite 200
City: Salt Lake City
State: UT
Zip: 84121
Email joshua.mcmillin@hdrinc.com
Phone: 8015098143

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

Report Number: jmc_16699

Report Date: 2025-01-29 11:36:51

North of Orem Double Track Project

Location: Orem, Utah County, Utah
Description: North of Orem Double Track Project

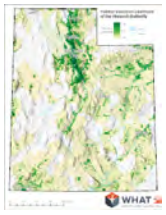
Project Area of Interest with a half-mile and two-mile radius.

Half-Mile Radius

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Osprey	*Pandion haliaetus*	None	None	2006-07-15	
Winged Floater	*Anodonta nuttalliana*	None	None	2016	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Hoary Skimmer	*Libellula nodisticta*	None	None	1918-06-27	
West Coast Lady Butterfly	*Vanessa annabella*	None	None	1993-09-13	
	Bombus huntii	None	None	2020-06-21	

Two-Mile Radius

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Ferruginous Hawk	*Buteo regalis*	SGCN	None	1940-04-29	
Osprey	*Pandion haliaetus*	None	None	2006-07-15	
Utah Wood-Nymph	*Cercyonis pegala utahensis*	None	None	1999-08-02	
Monarch butterfly	*Danaus plexippus*	None	None	2022-09-29	 Full View
Large Marble Butterfly	*Euchloe ausonides*	None	None	1998-06-29	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Winged Floater	*Anodonta nuttalliana*	None	None	2016	
Morrison's Bumble Bee	*Bombus morrisoni*	None	None	2022-07-06	
Hoary Skimmer	*Libellula nodisticta*	None	None	1918-06-27	
West Coast Lady Butterfly	*Vanessa annabella*	None	None	2004-07-12	
Silver-spotted Skipper	*Epargyreus clarus*	None	None	2001-06-30	
	Bombus huntii	None	None	2023-09-08	
Ute Ladies' Tresses	*Spiranthes diluvialis*	None	LT	2009-12-31 00:00:00	
June Sucker	*Chasmistes liorus*	SGCN	LT	2007-05-10	
Columbia Spotted Frog	*Rana luteiventris*	SGCN	None	1939-09	
American Avocet	*Recurvirostra americana*	None	None	1992-06-22	
American White Pelican	*Pelecanus erythrorhynchos*	SGCN	None	1992-06-22	

Species Name	Scientific Name	UWAP Status	ESA Status	Last Reported Date	SDHM
Black-necked Stilt	*Himantopus mexicanus*	None	None	1992-06-22	

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
June Sucker	Instream work should take place outside of the June sucker spawn from April 1-July 31.

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	

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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.