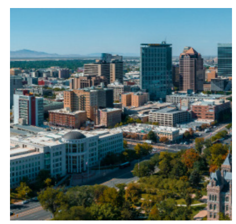
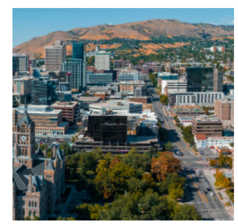
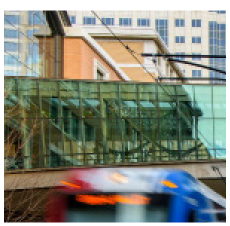
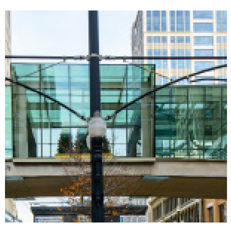
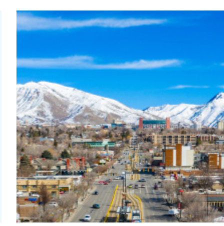
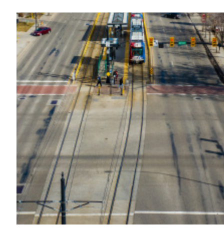
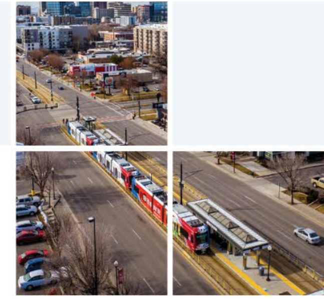


APPENDIX F: ENVIRONMENTAL RESOURCES SCREENING REPORT





TechLink TRAX Study

Environmental Resources Screening Report
October 2024

Prepared for

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List of Acronyms

ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
CBO	Community-Based Organization
CGP	Construction General Permit
D&RGW	Denver and Rio Grande Western Railroad
EO	Executive Order
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
FUD	Formerly Used Defense Site
HAZMAT	Hazardous Material
IPaC	Information for Planning and Consultation
LOS	Level of Service
LRT	Light Rail Transit
LWCF	Land and Water Conservation Fund

MMRP	Military Munitions Response Program
MOVES	Motor Vehicle Emission Simulator
NEPA	National Environmental Protection Agency
NHPA	National Historic Preservation Act
RDA	Redevelopment Agency of Salt Lake City
ROW	Right-of-Way
SHPO	State Historic Preservation Office
SLC	Salt Lake City
SWPPP	Stormwater Pollution Prevention Plan
TAC	Technical Advisory Committee
TCP	Traditional Cultural Property
UDOT	Utah Department of Transportation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTA	Utah Transit Authority
WFRC	Wasatch Front Regional Council

1 Introduction

1.1 Overview

The Utah Transit Authority (UTA) in collaboration with the Redevelopment Agency of Salt Lake City (RDA), Salt Lake City, the University of Utah, Wasatch Front Regional Council (WFRC), and the Utah Department of Transportation (UDOT) has initiated the TechLink TRAX Study to analyze additional light rail (TRAX) service between the Salt Lake City International Airport and the University of Utah, including a potential new service into Research Park and into the Granary District south of downtown Salt Lake City connecting into the Ballpark Station. The analysis will also include potential operational changes with the existing Blue and Green TRAX Lines termini.

1.1.1 Study Goals

The goals of the TechLink TRAX Study are to:

- Develop and evaluate transit improvements that provide connections between key areas of growth and development and support partner agencies to meet their transit, land use, and economic development goals.
- Recommend strategies that improve connections and capacity in response to future growth.
- Select a Locally Preferred Alternative that can seamlessly transition to a National Environmental Policy Act (NEPA) study.
- Provide a transparent and collaborative process between study partners and stakeholders.
- Thoughtfully incorporate equity and sustainability in the planning and public engagement process and develop recommendations that enhance transportation accessibility and equity.

The purpose of this study is to determine a Locally Preferred Alternative to advance into the next phase of project development, which includes environmental study and preliminary engineering.

1.2 Study Area

The TechLink study area extends from the Salt Lake City International Airport on the west side of Salt Lake City through the downtown area and east to the University of Utah (Figure 1). This study will focus on the implementation of additional light rail transit (LRT) service utilizing existing infrastructure, providing a more direct connection between these two destinations. The study will also evaluate new light rail infrastructure along

400 South, a new rail extension south into the Granary District neighborhood and eventually connecting to the existing Ballpark TRAX Station, and a new spur into Research Park.

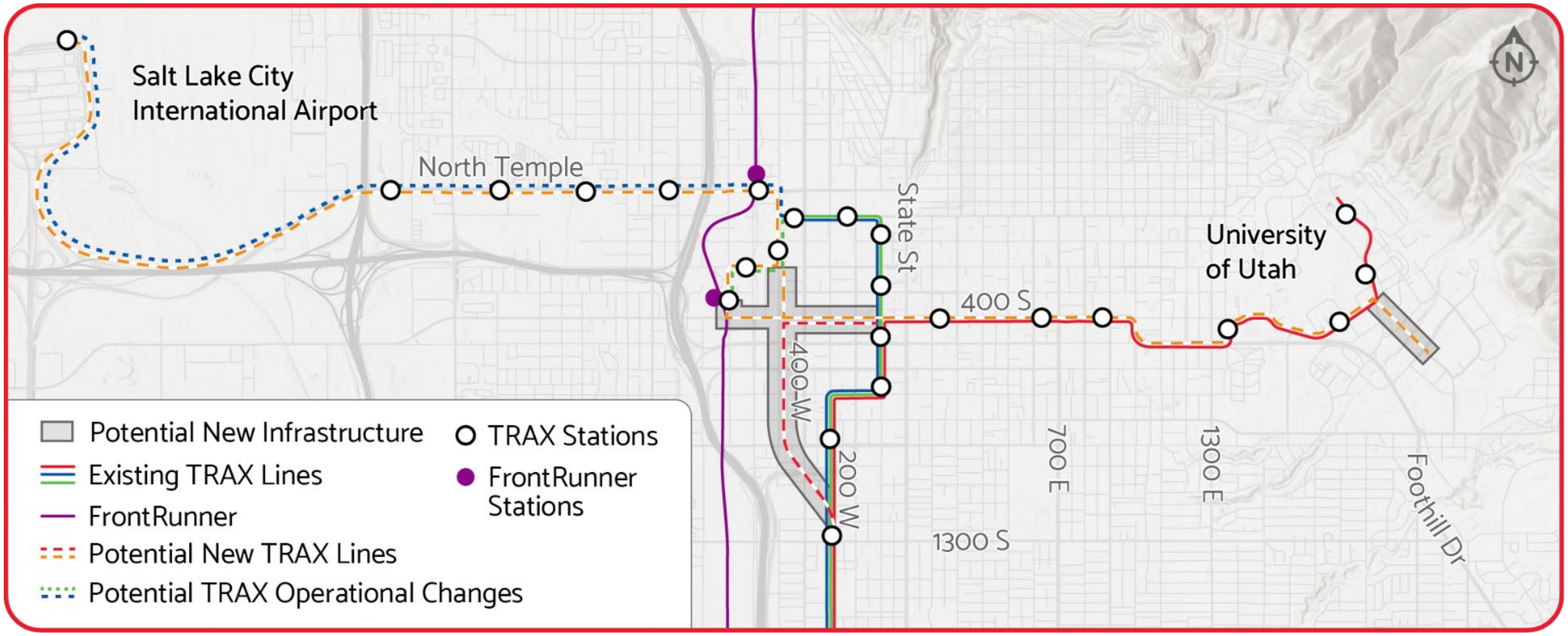


Figure 1. TechLink TRAX Study Area

1.3 Report Purpose

The purpose of this Environmental Resource Screening Report is to document potential environmental impacts to inform future phases of work, particularly National Environmental Policy Act (NEPA) environmental review. This report describes:

- Resources that will likely not be impacted
- Resources likely to be impacted, including a description of 1) affected environment/corridor conditions, 2) anticipated environmental impacts, and 3) next steps for NEPA for each resource

1.4 Alternatives Analyzed

This report includes analysis of anticipated environmental impacts for the four alternatives that were evaluated during the alternatives evaluation process. Figure 2 through Figure 5 below depict these alternatives and key features of each. The TechLink TRAX Alternatives Development Report describes these alternatives in greater detail.

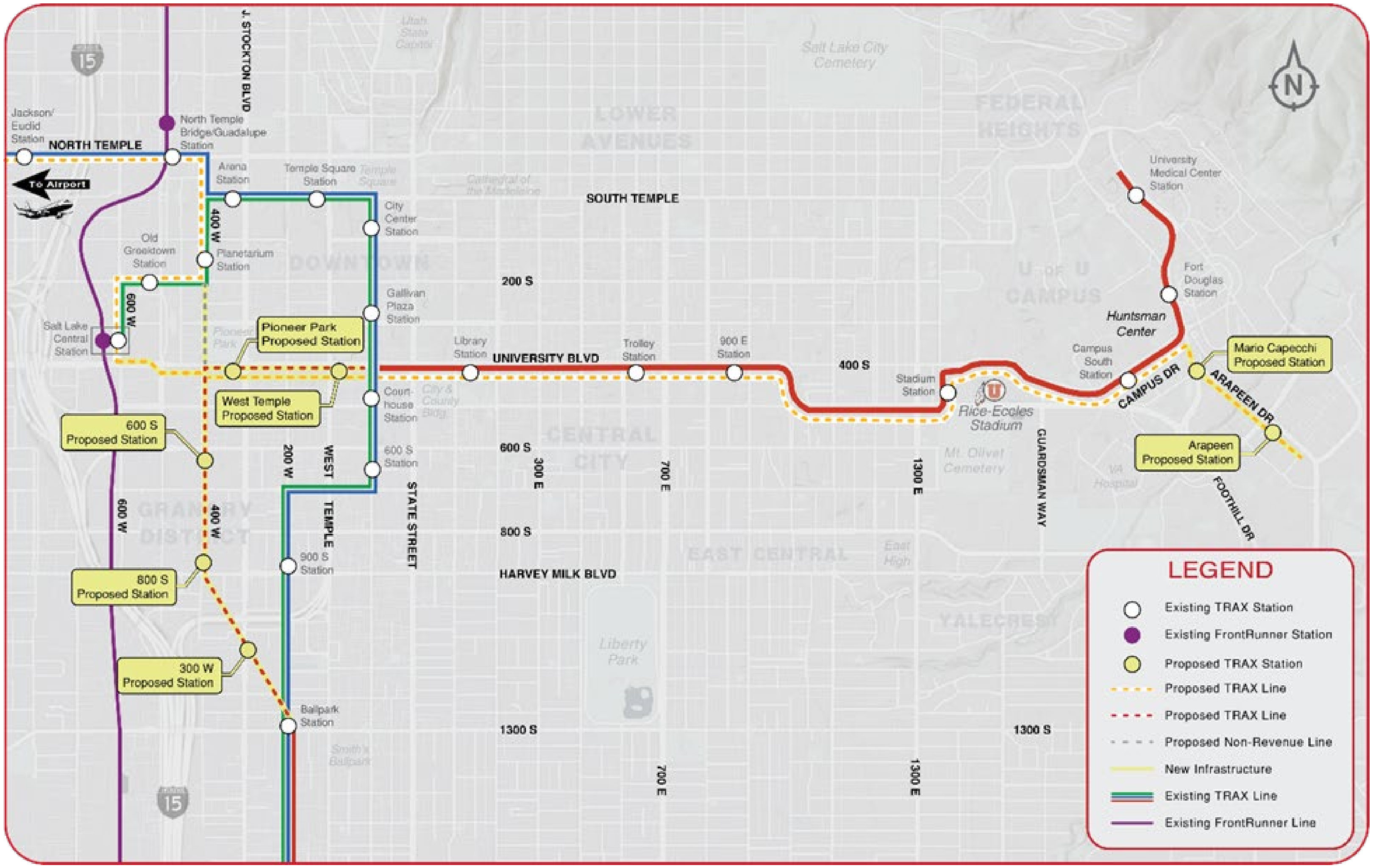


Figure 2. Alternative 1 – Future of Light Rail Baseline

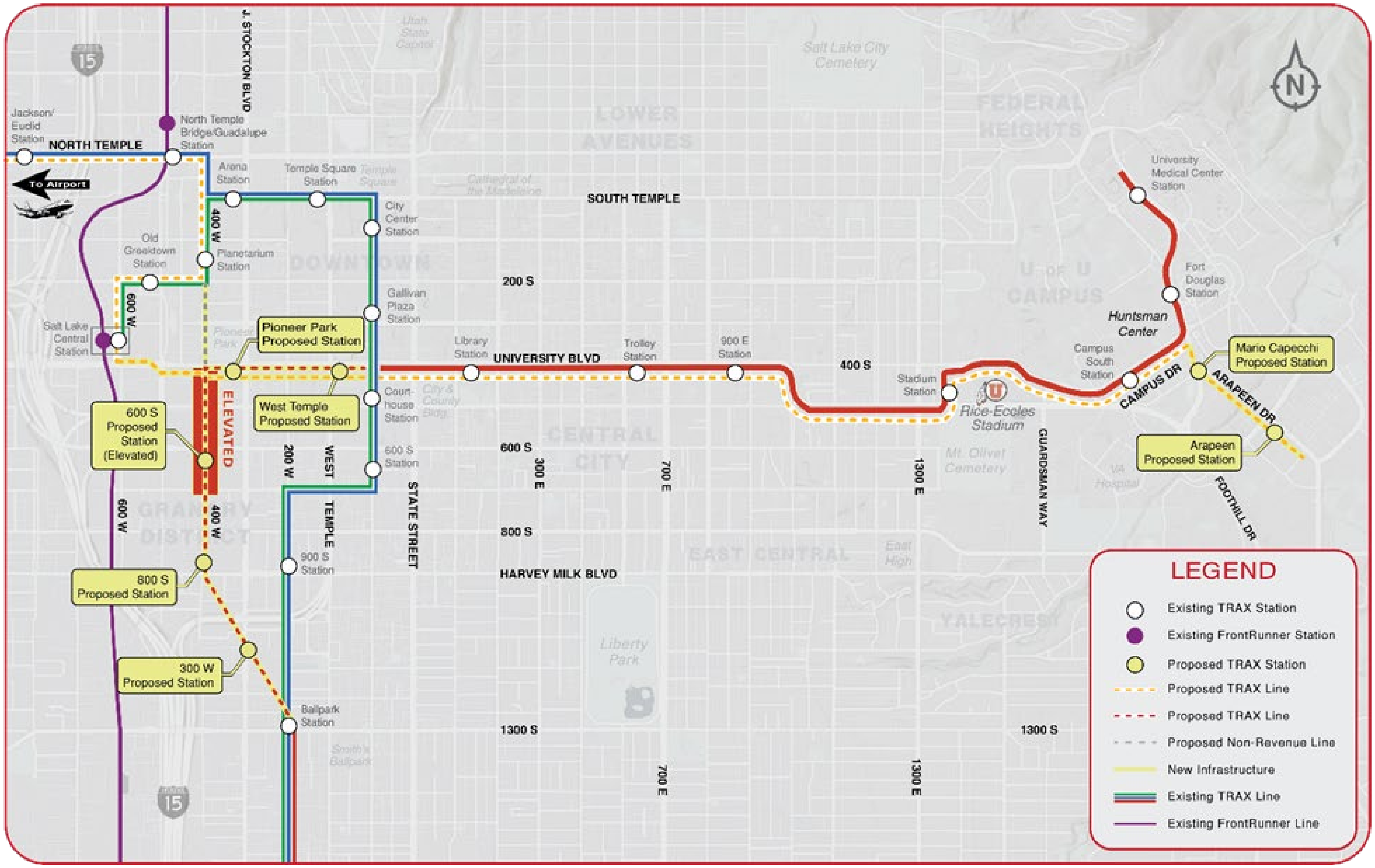


Figure 3. Alternative 2 – Elevated on 400 West

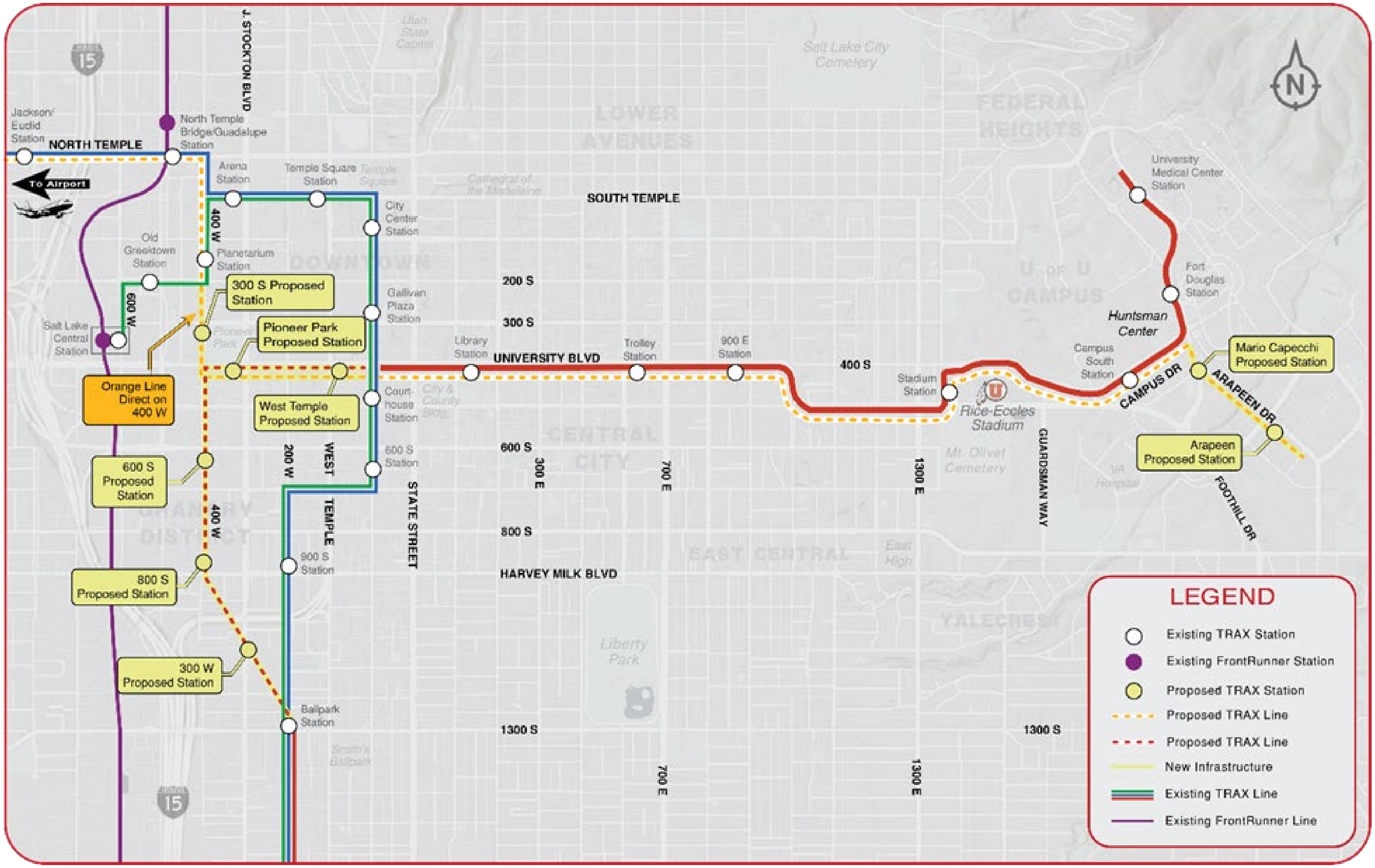


Figure 4. Alternative 3 – Direct on 400 West

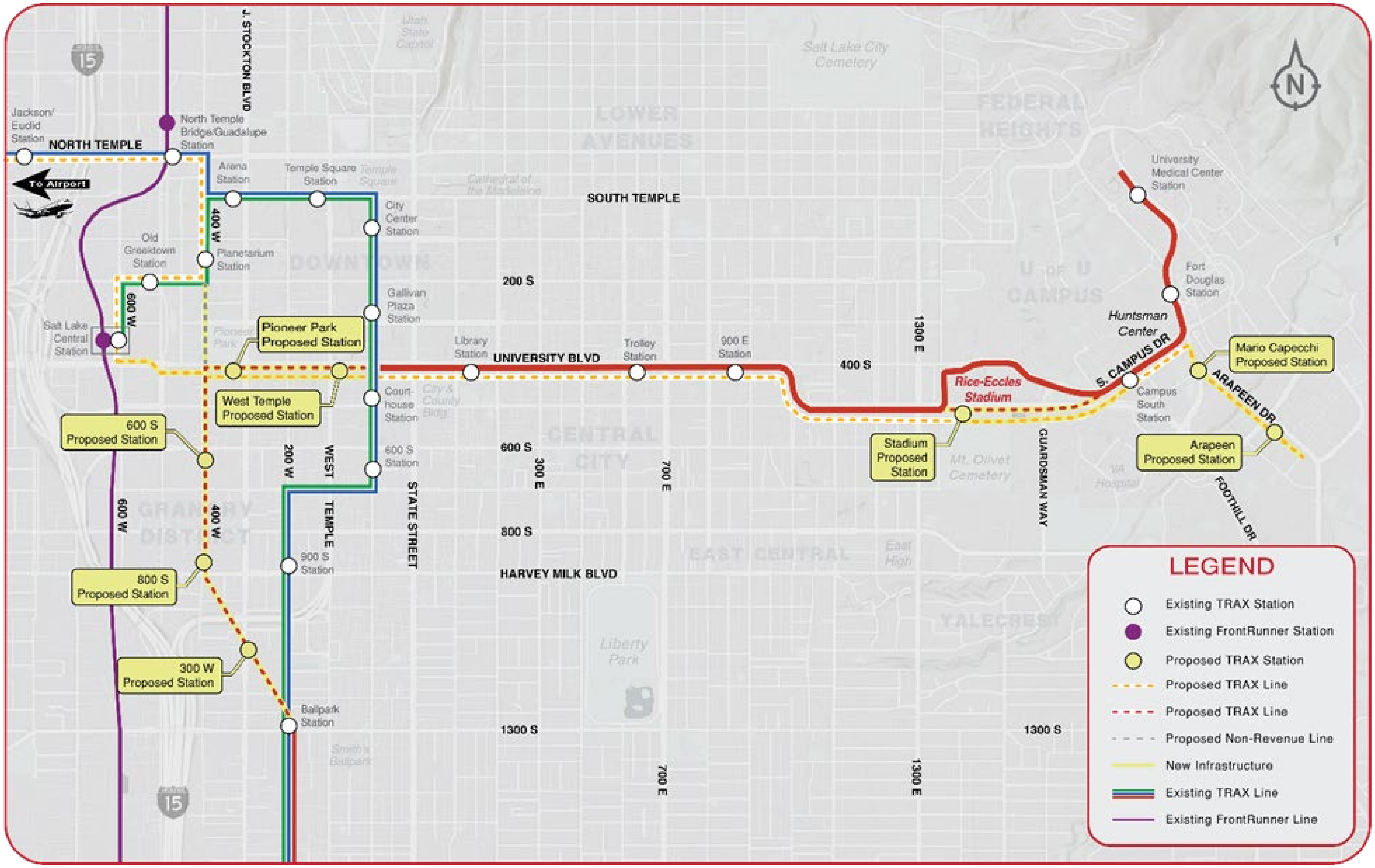


Figure 5. Alternative 4 – University of Utah Realignment

2 Affected Environment and Preliminary Impacts

Environmental resources were preliminarily evaluated to determine existing resources present in the study area that may be affected by, or are relevant to, selecting an alternative to advance as the Locally Preferred Alternative. Potential impacts to resources were analyzed and summarized in the sections below. The impacts in the sections below represent the worst-case scenarios for each alternative. A summary of likely next steps for the NEPA phase is provided for resources where impacts are anticipated. **A series of maps depicting notable affected environment and potential impacts follows this document.**

2.1 Resources that will Likely not be Impacted

2.1.1 Prime and Unique Farmland

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Under the Farmland Protection Policy Act (FPPA) (7 CFR §658.2a), the definition of prime, unique, or statewide important farmland excludes land already in or committed to urban development or water storage. Farmland already in urban development also includes lands identified as "urbanized area" on the census Bureau Map, an urban area on the U.S. Geological Survey (USGS) Topographical Maps, or as "urban-built-up" on U.S. Department of Agriculture (USDA) Important Farmland Maps.

Since the study area is within the Salt Lake City urbanized area, there is no prime farmland in the study area. Therefore, Alternatives 1, 2, 3, and 4 would result in no impact to prime and unique farmland.

2.1.2 Section 6(f) Resources

Section 6(f) resources are properties (often parks) acquired or developed with funds from the Land and Water Conservation Fund (LWCF).

A review of the LWCF Map shows that there are no properties in the study area that were acquired or developed with LWCF funds. Therefore, Alternatives 1, 2, 3, and 4 would result in no impact to section 6(f) resources.

2.2 Resources that will Likely be Impacted

2.2.1 Land Use and Zoning

2.2.1.1 Affected Environment/Corridor Conditions

2.2.1.1.1 Existing Land Use

Salt Lake City is the largest and densest city in Utah, with a diversity of land use. The downtown area is zoned with a mix of general commercial, gateway mixed-use, form-based codes in the Granary District, and a few residential and other mixed-use zones throughout. Residential zoning surrounds the downtown core, in particular to the east towards the University of Utah. However, a variety of land use other than residential can be found along the major corridors such as North Temple, 400 South, and 200 West. These corridors follow the TRAX lines and are bordered by mixed-use and transit-oriented development zones. The University of Utah is zoned as institutional, while Research Park has its own district designation focused on high-technology research and development, with an emphasis on creating employment centers. Greenspace can be found in all parts of the city but is more common east of I-15.

2.2.1.1.2 Future Land Use

Future land use in the study area includes a densification of mixed-use housing along the two interstate alignments, also mirroring the TRAX rail alignments: east of the I-15 corridor in the downtown Granary and Ballpark neighborhoods, and north of the I-80 corridor extending east-west along North Temple between the airport and downtown. While some of these land uses exist today, as the local population continues to increase and the need for housing increases, these patterns would likely be intensified. For more detailed information regarding future land use in the Granary District, the University of Utah and Research Park, and the 400 South Corridor, see the TechLink TRAX Study Existing and Future Conditions Memorandum.

2.2.1.2 Anticipated Environmental Impact

2.2.1.2.1 Alternatives 1, 2, 3, and 4

The increased service and additional light rail locations provided by all alternatives would likely drive higher density development and can spur land use changes within and around the study area.

2.2.1.3 Next Steps for NEPA Study

During the NEPA phase, additional analysis may be necessary to determine the amount and type of land use to be converted to transit facilities.

2.2.2 Acquisitions and Relocations

2.2.2.1 Affected Environment/Corridor Conditions

The public right-of-way (ROW) in the study area mostly consists of roadways and sidewalks. Private and publicly owned land such as businesses, parks, and apartments border the existing ROW.

2.2.2.2 Anticipated Environmental Impact

2.2.2.2.1 Alternatives 1, 2, 3, and 4

All alternatives could require ROW acquisition along 400 South, the Ballpark Spur line, and within Research Park, which could impact private landowners and public land managers. The acquisitions would likely be minor strip acquisitions, with one potential building demolition on the Ballpark Spur Line. All potential ROW acquisitions identified at this stage are subject to change as the project progresses.

2.2.2.2.2 Alternative 3

Alternative 3 would likely require fewer ROW acquisitions than the other alternatives, as no ROW acquisition is anticipated west of 400 West on 400 South.

2.2.2.2.3 Alternative 4

Alternative 4 would likely require additional ROW acquisition south of Rice-Eccles Stadium along 500 South.

2.2.2.3 Next Steps for NEPA Study

During the NEPA phase, all acquisitions, leases, and easements will be identified and disclosed for the Locally Preferred Alternative, and coordination with land owners will need to occur. Compliance with the Uniform Relocation Act will be required for all acquisitions.

2.2.3 Environmental Justice Populations

2.2.3.1 Affected Environment/Corridor Conditions

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse effects from federal projects on the health or environment of minority and low-income populations to the greatest extent possible and permitted by law. According to available data, there are higher percentages of minority populations in the study area located around:

- North Temple, west of I-15
- 400 South, east of downtown
- South Temple, west of 200 West
- Between the Granary District and the Ballpark neighborhoods
- The University of Utah campus, likely due to diverse student populations

According to available data, low-income populations in the study area are located in a geographically similar manner as minority populations. Often, minority populations also have other socioeconomic indicators that indicate disadvantages, including low income. However, it is important to note that the University of Utah area houses many student populations that are racially and culturally diverse and can fall under low-income categories in Census reporting. Data are available at the Census Block Group and indicate there are high concentrations of low-income populations located around:

- North Temple corridor, west of I-15
- University of Utah campus and student housing
- Some of the southern Granary District and the Ballpark neighborhoods

2.2.3.2 Anticipated Environmental Impact

2.2.3.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would be constructed within or near environmental justice neighborhoods. However, the alternatives are expected to benefit environmental justice populations by providing additional transportation options and greater overall mobility through the study area; however, input from community members from environmental justice neighborhoods is needed to determine whether this would be perceived as an impact or a benefit. Impacts to other resources such as air quality, noise and vibration, visual resources, and pedestrian/bicycle facilities may also impact environmental justice neighborhoods.

2.2.3.3 Next Steps for NEPA Study

Additional project-specific studies may be required for the NEPA phase, which will likely include outreach to members of environmental justice communities in the study area. Impacts to other resources such as air quality, noise and vibration, visual resources, etc., would likely impact environmental justice neighborhoods, so cumulative impacts will also need to be analyzed.

2.2.4 Economics

2.2.4.1 Affected Environment/Corridor Conditions

There are multiple businesses and/or offices buildings in the study area, including hotels, restaurants, stores, dentist and health care offices, courthouses, etc.

Additionally, roads in the study area are used as main commuter routes, such as 400 South, 500 South, 400 West, Mario Capecchi Drive, and Foothill Drive.

2.2.4.2 Anticipated Environmental Impact

2.2.4.2.1 Alternatives 1, 2, 3, and 4

The construction of Alternatives 1, 2, 3, and 4 would create additional transit options for commuters to access businesses in the study area, which could create opportunities for additional revenue for businesses. Business growth from the increased access would likely result in increased property values for parcels in the study area.

Access to businesses may be temporarily inhibited during construction of any alternative. Commuter routes may be impacted as well.

2.2.4.3 Next Steps for NEPA Study

During the NEPA phase, the study team will conduct a more detailed analysis to identify impacts to economic conditions in the study area, including permanent and temporary impacts to business access and commuter routes.

2.2.5 Cultural, Historic, and Archaeological Resources

2.2.5.1 Affected Environment/Corridor Conditions

Cultural resources include archaeological resources (both prehistoric and historic), architectural or historic resources (buildings and structures), and traditional cultural properties (TCPs). The Advisory Council on Historic Preservation (ACHP) defines a historic resource as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) (i.e., historic properties built 50 years ago or later).” The National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations (36 CFR 800) establish the national policy and procedures regarding cultural resources. Section 106 of the NHPA requires consideration of the effects of federal projects and policies on cultural resources.

Cultural, historic, and archaeological resources in the study area eligible for the NRHP include Pioneer Park (Site 42SL600), the Denver and Rio Grande Western (D&RGW) Railroad (Site 42SL293), the Oregon Short Line Railroad (Site 42SL532), buried trolley tracks (Site 42SL727), the Mount Olivet Cemetery, the Salt Lake City (SLC) Warehouse District, the Exchange Place Historic District, Fort Douglas, and the Fort Douglas Archaeological Site.

2.2.5.2 Anticipated Environmental Impact

2.2.5.2.1 Alternative 1 – Future of Light Rail Baseline

<u>400 South from Salt Lake Central to Main Street</u>

- D&RGW Railroad (Site 42SL293) – Alternative 1 would require minor impacts to the D&RGW Railroad to make the connection of the new Orange line at Salt Lake Central Station. This minor impact would likely be a **No Adverse Effect**.
- SLC Warehouse District – Alternative 1 would have no impacts to contributing or non-contributing features; therefore, the impact would likely be a **No Adverse Effect**.
- Pioneer Park (Site 42SL600) – If mature trees along the southern edge of Pioneer Park are removed, there is the potential for Alternative 1 to have an **Adverse Effect**. Coordination with the Utah State Historic Preservation Office (SHPO) would be required to determine if the trees are part of the historic features of the park. It is anticipated that these impacts would be avoided in future phases of design. There is also the potential for archaeological discoveries during construction.
- Exchange Place Historic District – There are no contributing features of the Exchange Place Historic District within the potential impact area; therefore, the impact would be **No Adverse Effect**.

<u>400 West from 400 South to 200 South</u>

- SLC Warehouse District – Alternative 1 would have no impacts to contributing or non-contributing features; therefore, the impact would likely be a **No Adverse Effect**.
- Buried Trolley Tracks (Site 42SL727) – Alternative 1 would cross Site 42SL727; however, there is no evidence that the tracks remain intact where they would be crossed (at the 400 West and 300 South intersection). The crossing would likely result in either a **No Adverse Effect** or a **No Historic Properties Affected** determination.

<u>400 West from 400 South down the Ballpark Spur to Ballpark Station</u>

- D&RGW Railroad (Site 42SL293) – If Alternative 1 requires upgrading or replacing the tracks, the impact may be an **Adverse Effect**.

- SLC Warehouse District – Impacts to the D&RGW Railroad would affect integrity of setting for the SLC Warehouse District; however, the replacement of the historic D&RGW Railroad with a TRAX rail line would visually mitigate the impact. These impacts would likely constitute a **No Adverse Effect**.
- Oregon Short Line Railroad (Site 42SL532) – The removal or replacement of the historic track would likely constitute an **Adverse Effect**.

Research Park

- Fort Douglas – Alternative 1 would have no impact to historic structures; therefore, the effect determination would likely be **No Historic Properties Affected**.
- Fort Douglas Archaeological Site (Site 42SL277) – There is the potential for archaeological discoveries during construction. The effect determination would likely be **No Adverse Effect** until discoveries are made.
- Rifle Range Access Road (Site 42SL905) – This site is ineligible for the NRHP; therefore, the effect determination would be **No Historic Properties Affected**.
- Historic Trash Deposit (Site 42SL948) – This site is ineligible for the NRHP; therefore, the effect determination would be **No Historic Properties Affected**.

2.2.5.2.2 Alternative 2

Same impacts/effects as Alternative 1. The grade separation of the TRAX line on 400 West from 400 South to 700 South should not introduce any additional impacts (primarily visual) that would rise to a level of effect different than what is discussed above for Alternative 1.

2.2.5.2.3 Alternative 3

Same impacts as Alternative 1 except under Alternative 3 there would be no impact to the D&RGW Railroad near Salt Lake Central and fewer impacts to the SLC Warehouse District (the new TRAX line would not extend west of 400 West). The impact would still be a **No Adverse Effect** to the SLC Warehouse District.

2.2.5.2.4 Alternative 4

Same impacts as Alternative 1, except Alternative 4 would include fill encroachment into the Mount Olivet Cemetery, south of 500 South at Rice-Eccles Stadium. The cemetery has not yet been documented as an archaeological/cultural site but would qualify as such if fieldwork were conducted. The encroachment would likely result in **No Adverse Effect**.

2.2.5.3 Next Steps for NEPA Study

During the NEPA phase, field surveys will be required to investigate and document cultural, historic, and archaeological resources. Impacts to these resources will need to be identified and coordinated with the Utah SHPO.

2.2.6 Section 4(f) Resources

2.2.6.1 Affected Environment/Corridor Conditions

Section 4(f) of the USDOT Act of 1966 protects public parks, recreation areas, historic properties, and wildlife or waterfowl refuges from use in a transportation facility. Section 4(f) resources in the study area include Pioneer Park (as both a public park and a historic site), the SLC Warehouse District, the Exchange Place Historic District, Fort Douglas, and the Mount Olivet Cemetery. According to Section 11502 of the Fixing America's Surface Transportation Act (23 U.S.C. 138(f) and 49 U.S.C. 303(h)), railroads and rail transit lines that are in use or that were historically used for transportation of goods or passengers are exempt from Section 4(f) review, regardless of whether the rail line is listed on or is eligible for listing on the NRHP.

2.2.6.2 Anticipated Environmental Impact

2.2.6.2.1 Alternative 1

Alternative 1 may result in a greater than *de minimis* impact to Pioneer Park if mature trees are removed along the southern edge of the park; however, it is anticipated that this impact would be avoided in future phases of design. Alternative 1 would also result in potential *de minimis* impacts to the SLC Warehouse District, Exchange Place Historic District, and Fort Douglas. For additional information, see anticipated impacts to cultural, historic, and archaeological resources under Alternative 1 in section 2.2.5.2.1.

2.2.6.2.2 Alternative 2

Same impacts as Alternative 1.

2.2.6.2.3 Alternative 3

Anticipated impacts to Section 4(f) resources under Alternative 3 would be similar to those mentioned for Alternative 1. The only difference is that fewer impacts to the SLC Warehouse District are anticipated under Alternative 3. The Section 4(f) use would still likely be considered a *de minimis* impact. For additional information, see anticipated impacts to cultural, historic, and archaeological resources under Alternative 3 in section 2.2.5.2.3.

2.2.6.2.4 Alternative 4

Anticipated impacts to Section 4(f) resources under Alternative 4 would be similar to those mentioned for Alternative 1. The only difference is that a potential *de minimis* impact to the Mt. Olivet Cemetery is anticipated as a result of realigning the rail south of Rice-Eccles Stadium along 500 South. For additional information, see anticipated impacts to cultural, historic, and archaeological resources under Alternative 4 in section 2.2.5.2.4.

2.2.6.3 Next Steps for NEPA Study

Additional surveys will be required to identify Section 4(f) resources in the study area. Impacts to Section 4(f) resources will need to be identified and coordinated with the officials that have jurisdiction over the resources.

2.2.7 Visual and Aesthetic Resources

2.2.7.1 Affected Environment/Corridor Conditions

The visual setting of the study area consists of an urban area with commercial, industrial, and residential development, along with roads and light rail corridors. There are parks and other greenspaces spread throughout the study area. Red Butte Creek, along with its riparian corridor, flow through the study area in the University of Utah Research Park area. The Wasatch Mountain Range to the east, the Oquirrh Mountain Range to the west, and the Great Salt Lake to the west also contribute to the visual setting of the study area.

2.2.7.2 Anticipated Environmental Impact

2.2.7.2.1 Alternatives 1, 2, 3, and 4

Impacts to visual resources in the natural and built environments would likely be minimal, as there are currently existing light rail lines throughout the study area and the majority of the elements of Alternatives 1, 2, 3, and 4 would be constructed in urbanized, developed areas in various portions of Salt Lake City. The largest potential for impacts to visual and aesthetic resources in the natural environment would be the portion of rail over Red Butte Creek, which is included in all alternative designs.

2.2.7.2.2 Alternative 2

Alternative 2 has the highest potential to impact visual and aesthetic resources in the built environment, as the portion of line from 400 South to 700 South would be elevated above 400 West. The construction of an elevated line over existing roads would cause a noticeable change in the visual character of 400 West. Otherwise, impacts to visual resources under Alternative 2 would be the same as the other alternative designs.

2.2.7.3 Next Steps for NEPA Study

A visual resource impacts memo or other inventory of visual resources in the study area may be required during the NEPA phase.

2.2.8 Parks and Recreation Resources

2.2.8.1 Affected Environment/Corridor Conditions

Existing parks and recreation resources in the study area consist of Pioneer Park and the Tennis Courts at Research Park. According to the 2015 Salt Lake City Pedestrian and Bicycle Master Plan Update, there are four street segments in the study area where future multi-use paths are recommended.

2.2.8.2 Anticipated Environmental Impacts

2.2.8.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 could require a strip acquisition of ROW at Pioneer Park; however, it is anticipated that this impact would be avoided in future phases of design. All alternatives may impact a planned multi-use path proposed to be constructed along the south side of 400 South from 500 West to 200 West.

2.2.8.3 Next Steps for NEPA Study

Additional coordination with Salt Lake City will be required to identify potential impacts to Pioneer Park. As plans progress for any of the recommended multi-use paths, additional coordination would be required to ensure that the Locally Preferred Alternative and any planned multi-use paths can both be constructed.

2.2.9 Noise and Vibration

2.2.9.1 Affected Environment/Corridor Conditions

An inventory was conducted to identify noise and vibration-sensitive land uses near the study area. The noise-sensitive land use analysis area consists of a 350-foot buffer distance from Alternatives 1, 2, 3, and 4. The vibration-sensitive land use analysis area consists of three buffer distances based on three land use categories. Table 1 defines each of these land use categories and their respective buffer distances.

Table 1. Vibration-sensitive Land Use Categories

Vibration-sensitive Land Use Category	Definition	Examples	Buffer Distance
Category 1	Buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building.	Vibration-sensitive manufacturing facilities, hospitals with vibration-sensitive equipment, universities conducting physical research operations, etc.	450 feet
Category 2	Residential land use and buildings where people normally sleep.	Homes, hotels, hospitals, etc.	150 feet
Category 3	Institutions and offices that have vibration-sensitive equipment and have the potential for activity interference.	Schools, churches, doctors' offices, etc.	100 feet

For the vibration screening procedure, special buildings were assigned to one of the three vibration-sensitive land use categories as described in Table 1.

The results of the inventory indicate that there are 70 noise-sensitive land uses within the 350-foot buffer, one Category 1 vibration-sensitive land use within the 450-foot buffer, 18 Category 2 vibration-sensitive land uses within the 150-foot buffer, and 7 Category 3 vibration-sensitive land uses within the 100-foot buffer.

2.2.9.2 Anticipated Environmental Impacts

2.2.9.2.1 Alternatives 1, 2, 3, and 4

The construction of Alternatives 1, 2, 3, and 4 would likely result in increased noise and vibration levels in the study area (see Table 2), including one Category 1 receiver (Noorda Oral Health Sciences building on the University of Utah campus), approximately 420 feet from the proposed alignment. Additionally, there would likely be temporary noise and vibration impacts during construction. Please see Attachment F1, Noise and Vibration Screening Memorandum, for additional information.

Table 2. Potential Noise and Vibration impacts by Alternative

Alternative	Potential Impacts to Noise and/or Vibration Sensitive Land Uses
Alternative 1	• 69 potential noise impacts • 26 potential vibration impacts
Alternative 2	• 69 potential noise impacts • 26 potential vibration impacts
Alternative 3	• 67 potential noise impacts • 24 potential vibration impacts
Alternative 4	• 70 potential noise impacts • 26 potential vibration impacts

2.2.9.3 Next Steps for NEPA Study

During the NEPA phase, a study will need to be conducted to identify noise and vibration impacts and mitigation.

2.2.10 Air Quality

2.2.10.1 Affected Environment/Corridor Conditions

Salt Lake City is in a valley that is subject to periodic temperature inversion and high pressure that causes a buildup of pollutants in the atmosphere. A main source of air pollution in Salt Lake City is fossil fuel combustion from vehicle travel and heating homes/buildings.

According to the U.S. Environmental Protection Agency (EPA) Green Book, Salt Lake County was designated a maintenance area for PM_{10} (particulate matter with a diameter of 10 microns or less) in 2020, a nonattainment area for SO_2 (sulfur dioxide) in 1971, a moderate nonattainment area for 8-hour ozone in 2015, and a serious nonattainment area for $PM_{2.5}$ (particulate matter with a diameter of 2.5 microns or less) in 2006.

2.2.10.2 Anticipated Environmental Impacts

2.2.10.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would likely have an overall beneficial impact to air quality, as all alternatives would provide travel options through the study area other than combustion engine vehicles. There may be localized air quality impacts (fugitive dust emissions) during construction activities.

2.2.10.3 Next Steps for NEPA Study

Additional analysis, including an assessment of greenhouse gas emissions, will occur during NEPA. A fugitive dust control plan will be required during construction.

2.2.11 Hazardous Materials Sites

2.2.11.1 Affected Environment/Corridor Conditions

Hazardous material (HAZMAT) sites are located throughout the vicinity of the study area. The majority of the HAZMAT sites are petroleum storage tank facilities that are highly concentrated near downtown Salt Lake City. Two National Priority List sites exist within 1 mile of the study area, and 34 superfund sites have been identified. Fort Douglas, located near the University of Utah, is also registered as a Formerly Used Defense Site (FUD) and is part of the Military Munitions Response Program (MMRP), which is responsible for addressing munitions-related concerns on non-operational military installations. There is a potential for lead and arsenic in the ballast in the area of the historic railroad corridor.

2.2.11.2 Anticipated Environmental Impacts

2.2.11.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 may have the potential to encounter HAZMAT during construction, as portions of each alternative are located in downtown Salt Lake City near sites with petroleum storage tanks or used oil/hazardous waste facilities.

2.2.11.3 Next Steps for NEPA Study

Additional research regarding HAZMAT sites in and around the study area will be required during the NEPA stage to determine the likelihood of encountering HAZMAT during Locally Preferred Alternative construction. Research may include a review of HAZMAT site public records from the Utah Department of Environmental Quality, a Phase 1 Environmental Site Assessment, and a windshield survey of HAZMAT sites in the corridor.

2.2.12 Floodplains

2.2.12.1 Affected Environment/Corridor Conditions

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels 0164G, 0144H, and 0282H, the study area crosses through three mapped floodplains. Table 3 summarizes the designations of mapped floodplains in the study area.

Table 3. Summary of Floodplain Zones Present in the Study Area

Floodplain Zone	Description
AH	Area where the 100-year flood would result in water ponding at depths of 1 to 3 feet and base flood elevations determined.
AE	Area where base flood elevations of the 100-year flood have been determined.
X	Area between the 100-year and 500-year floodplain.

2.2.12.2 Anticipated Environmental Impact

2.2.12.2.1 Alternatives 1, 2, 3, and 4

The Ballpark Spur and the Research Park lines of each alternative would likely impact mapped floodplains. The Ballpark Spur line crosses through a zone X floodplain and a zone AH floodplain with base elevations of 4,230 feet, and the Research Park line crosses a zone AE floodplain associated with Red Butte Creek.

2.2.12.3 Next Steps for NEPA Study

Coordination with the local floodplain administrator will be required for the Ballpark Spur line. As the design progresses, the base flood of the zone AE floodplain in the vicinity of this line will need to be considered to make sure critical elements of the facilities remain outside of the ponded water elevation. Coordination with the local floodplain administrator will also be required for the Research Park Line. The zone AE floodplain associated with Red Butte Creek may need to be updated.

2.2.13 Water Resources and Water Quality

2.2.13.1 Affected Environment/Corridor Conditions

Red Butte Creek is the only surface water that intersects the alternative designs. There are several storm drains located throughout the study area as well. No irrigation canals intersect the alternative designs. Four wells; the Mount Olivet Reservoir; and a large, covered water storage reservoir are located near the Rice-Eccles Stadium along 500 South.

A review of the Utah points of diversion GIS layer indicates that there are 55 wells within a 500-foot buffer of the study area.

2.2.13.2 Anticipated Environmental Impact

2.2.13.2.1 Alternatives 1, 2, 3, and 4

Every alternative alignment has a portion that runs above Red Butte Creek. Construction activities near the creek or storm drains could increase the risk of sedimentation or other pollution.

2.2.13.2.2 Alternative 4

In addition to the potential impacts mentioned for all Alternatives, Alternative 4 also has the potential to impact the wells and covered water storage reservoir along 500 South. The University Medical Center realignment associated with Alternative 4 would re-route the line south of Rice-Eccles Stadium along 500 South near the reservoir and wells.

2.2.13.3 Next Steps for NEPA Study

Regardless of which alternative design is selected as the Locally Preferred Alternative, the project will require a Stormwater Pollution Prevention Plan (SWPPP) and a Stormwater Construction General Permit (CGP) to avoid sedimentation or other pollution to water resources. If Alternative 4 is selected, impacts to the wells and reservoir along 500 South will need to be coordinated with Salt Lake City.

2.2.14 Wetlands and Waters of the U.S.

2.2.14.1 Affected Environment/Corridor Conditions

According to data from the National Wetland Inventory and the National Hydrography Dataset, there are two potential waters of the U.S. in the study area. Red Butte Creek, which would likely be considered jurisdictional due to the direct downstream connection with the Jordan River, flows in a westerly direction through the University of Utah Research Park portion of the study area. Additionally, Mount Olivet Reservoir is located south of Rice-Eccles Stadium. This reservoir would likely be considered non-jurisdictional due to lack of relatively permanent surface water connection to a waters of the U.S. (as per 33 CFR 328.3); however, the U.S. Army Corps of Engineers (USACE) is the only agency that is authorized to make the final determination of the jurisdictional status of aquatic resources.

2.2.14.2 Anticipated Environmental Impact

2.2.14.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 cross Red Butte Creek. The existing crossing of Red Butte Creek may need to be improved, or a new crossing may be required.

2.2.14.2.2 Alternative 4

In addition to impacts to Red Butte Creek, the re-routing of the University Medical Center line on 500 South of Rice-Eccles Stadium associated with Alternative 4 may also result in impacts to Mount Olivet Reservoir.

2.2.14.3 Next Steps for NEPA Study

The following permits and/or actions related to wetlands and waters of the U.S. may be required:

- Aquatic resources delineation
- Jurisdictional Determination from the USACE
- Section 404 Permit through the USACE
- State Stream Alteration Permit
- Waters of the U.S. mitigation plan

2.2.15 Traffic and Transportation

2.2.15.1 Affected Environment/Corridor Conditions

A travel demand based modeling analysis was conducted to determine whether existing (2023) peak hour traffic volumes are within capacity for roadway corridors in the study area. Results of the analysis indicate the following:

- Existing (2023) Peak Hour Traffic Volumes
    - 500 South from I-15 to 400 West is over capacity, and the segment from 400 West to Main Street is nearing capacity.
    - 600 South from I-15 to 400 West is almost at capacity.
    - South Campus Drive from 1300 East to Guardsman Way is over capacity.
- Future (2050) Peak Hour Traffic Volumes
    - 400 South from I-15 to 400 West is anticipated to approach capacity.
    - 500 South from I-15 to 400 West is anticipated to exceed capacity, and the segment from 400 West to Main Street is anticipated to approach capacity.
    - 600 South from I-15 to 400 West is anticipated to exceed capacity, and the segment from 400 West to Main Street is anticipated to approach capacity.
    - South Campus Drive from 1300 East to Guardsman Way is anticipated to exceed capacity.

Additionally, limited traffic operations analysis utilizing Vissim modeling was conducted to determine existing level of service (LOS) at key intersections, with LOS A representing free-flowing traffic conditions with no delays, LOS D representing peak hour traffic conditions, and LOS E and LOS F representing significant traffic congestion. Please see Attachment F2, Traffic Analysis Memorandum, for additional information on the traffic operations analysis.

2.2.15.2 Anticipated Environmental Impact

2.2.15.2.1 Alternatives 1, 2, 3, and 4

Alternatives 1, 2, 3, and 4 would provide transit facilities through the study area, which would help meet future travel demand. Additionally, new transit facilities from all alternatives would provide the public with additional alternative transportation modes to automobile travel, which could reduce automobile traffic in the study area. However, all alternatives may require coordination with UDOT and potential signal timing modifications along 400 South to accommodate new and/or expanded light rail service. The modifications of 400 South could result in congestion in this area that may cause changes in traffic patterns.

The results of the Vissim modeling indicate that the LOS at the Main Street and 400 South intersection would improve as a result of all alternatives, while the following intersections would degrade to LOS E or D:

- South Campus Drive and Mario Capecchi Drive (LOS E)

- 700 East and 400 South (LOS E)
- 1300 East and 500 South (LOS E)
- South Campus Drive and Guardsman Drive (LOS D)

2.2.15.3 Next Steps for NEPA Study

The study team conducted a high-level analysis of forecasted travel demand in the study area and limited intersection operations analysis (Attachment F2). More detailed traffic analyses and transportation studies will need to be completed during the NEPA phase.

2.2.16 Public Services and Utilities

2.2.16.1 Affected Environment/Corridor Conditions

Given the urban location of the study area, there are likely many public utility lines in the study area, including, but not limited to, sewer lines, fiber optic lines, electric lines, and gas lines.

2.2.16.2 Anticipated Environmental Impact

2.2.16.2.1 Alternatives 1, 2, 3, and 4

The construction of Alternatives 1, 2, 3, and 4 would likely require the replacement or relocation of utilities. No alternative would result in a permanent loss of service.

2.2.16.3 Next Steps for NEPA Study

During the NEPA phase, additional studies would need to be conducted such as formal mapping of utilities and assessment of utility replacements or relocations.

2.2.17 Safety and Security

2.2.17.1 Affected Environment/Corridor Conditions

Safety features within the study area include curbing and other barriers between the light rail line and vehicle travel lanes, fencing and pedestrian access restrictions, signalized intersections, and pedestrian crosswalks to access rail stations.

2.2.17.2 Anticipated Environmental Impacts

2.2.17.2.1 Alternatives 1, 2, 3, and 4

New safety and security features would need to be constructed for the new light rail, which may include lighting, ramps that comply with the American with Disabilities Act (ADA), pedestrian facilities, intersection improvements, and wind screens. For Alternatives 1, 2, 3, and 4, UTA standard design criteria would be followed to ensure that the alternatives meet safety and security requirements. This includes the Supplemental Safety Measures and/or Alternative Safety Measures at each affected grade crossing. Also, the UTA activation process would be followed, which includes several safety and security reviews and a potential hazard analysis to ensure the design includes typical and site-specific safety and security measures.

2.2.17.3 Next Steps for NEPA Study

Safety measures needed for the new light rail segments will be identified during the NEPA phase.

2.2.18 Soils and Geology

2.2.18.1 Affected Environment/Corridor Conditions

The study area is not located within sensitive or unique geology. Soils in the study area have been previously disturbed by urban and transportation development. There is a potential for lead and arsenic in the ballast in the area of the historic railroad corridor.

2.2.18.2 Anticipated Environmental Impacts

2.2.18.2.1 Alternatives 1, 2, 3, and 4

Excavation within the existing ROW and proposed construction limits may be required. Soils in the majority of the study area have already been disturbed for transportation uses. Impacts to soils may occur near the Red Butte Creek crossing. The temporary soil erosion during construction would be minimized by use of best management practices such as soil wetting and soil erosion blankets.

2.2.18.3 Next Steps for NEPA Study

Further study may be required for soils or geology during the NEPA phase for work in the historic rail corridors.

2.2.19 Threatened and Endangered Species

2.2.19.1 Affected Environment/Corridor Conditions

The Endangered Species Act of 1973 is designed to regulate and protect endangered or threatened wildlife and plant species, as well as their associated habitat. The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database is a tool to identify the potential presence of federally listed species in or around various projects. The IPaC database indicates that one threatened species, yellow-billed cuckoo, (*Coccyzus americanus*) and one candidate species, the monarch butterfly (*Danaus plexippus*), have the potential to occur in the study area.

2.2.19.2 Anticipated Environmental Impacts

2.2.19.2.1 Alternatives 1, 2, 3, and 4

All alternatives occur in highly developed portions of downtown Salt Lake City, the Granary District, and Research Park. Due to the high level of disturbance and frequent human activity in these areas, Alternatives 1, 2, 3, and 4 would likely result in no impact to threatened and endangered species.

2.2.19.3 Next Steps for NEPA Study

During the NEPA phase, a review of habitat in the study area would likely be necessary. The results of the habitat review would be summarized in a memo. It is anticipated that all Threatened and Endangered species with the potential to occur in the study area would likely be dismissed from further analysis prior to the approval of the habitat review and associated memo, and formal consultation with the USFWS would likely not be necessary.

2.2.20 Energy

2.2.20.1 Affected Environment/Corridor Conditions

Energy use associated with the transportation facilities in the study area includes fuel consumption for automobiles and electricity required to power light rail via overhead catenary wires.

2.2.20.2 Anticipated Environmental Impact

2.2.20.2.1 Alternatives 1, 2, 3, and 4

All alternatives would potentially decrease automobile fuel consumption in the study area, as the new TRAX facilities and increased connectivity provided by all alternatives would create alternative transportation options for people traveling through the study area. All alternatives would require additional electricity to power the new TRAX lines. Additionally, all alternatives would require additional energy consumption during construction (e.g., fuel to power construction equipment).

2.2.20.3 Next Steps for NEPA Study

During the NEPA phase, additional quantitative and qualitative analysis would likely be required to compare operational energy consumption between the Locally Preferred Alternative and the No Action Alternative.

2.2.21 Community and Social

2.2.21.1 Affected Environment/Corridor Conditions

The study area mainly consists of developed lands with a few open space areas. Developed lands in the study area are mostly commercial and institutional, with some mixed use, downtown, and business district areas. Community resources within or adjacent to the study area include Pioneer Park, restaurants, medical clinics, apartment buildings, Rice-Eccles Stadium, and several buildings on the University of Utah campus.

2.2.21.2 Anticipated Environmental Impact

2.2.21.2.1 Alternatives 1, 2, 3, and 4

All alternatives are anticipated to result in little to no overall impact to the community and social character of the study area. Access to all community resources would be maintained, and all alternatives would provide greater connectivity to community resources throughout the study area; however, input from community members (e.g. residents, property owners, and business owners) is needed to determine whether this would be perceived as an impact or benefit. Impacts to other resources such as air quality, noise and vibration, visual resources, and pedestrian/bicycle facilities may also impact the community and social character of the study area.

2.2.21.3 Next Steps for NEPA Study

Additional project-specific studies may be required for the NEPA phase, which will likely include outreach to members of the community members in the study area.

2.3 Public Outreach and Agency Coordination

At this point in the study, the TechLink TRAX study team has coordinated with the following agencies:

1. Salt Lake City
2. Redevelopment Agency of Salt Lake City
3. Wasatch Front Regional Council
4. Utah Department of Transportation
5. University of Utah

Outreach and engagement with these agencies were conducted through the following methods:

- Technical Advisory Committee (TAC)/Steering Committee Meetings
- Bi-weekly partner meetings

Broader public outreach methods designed to gather input included:

- Local community council presentations
- On-site events at TRAX stations
- On-board signage (TRAX and buses)
- Geo-targeted social media ads across the study area
- Organic social media posts via agency partner channels
- News media at milestones
- Community-Based Organization (CBO) partnerships and events

2.3.1 Next Steps for NEPA Study

It is anticipated that similar tactics will be implemented during the NEPA phase, in addition to federally required tactics like public hearings and corresponding formal comment periods. Other coordination with applicable federal and state agencies will also occur during the NEPA phase, as necessary, for environmental clearance and permitting purposes.

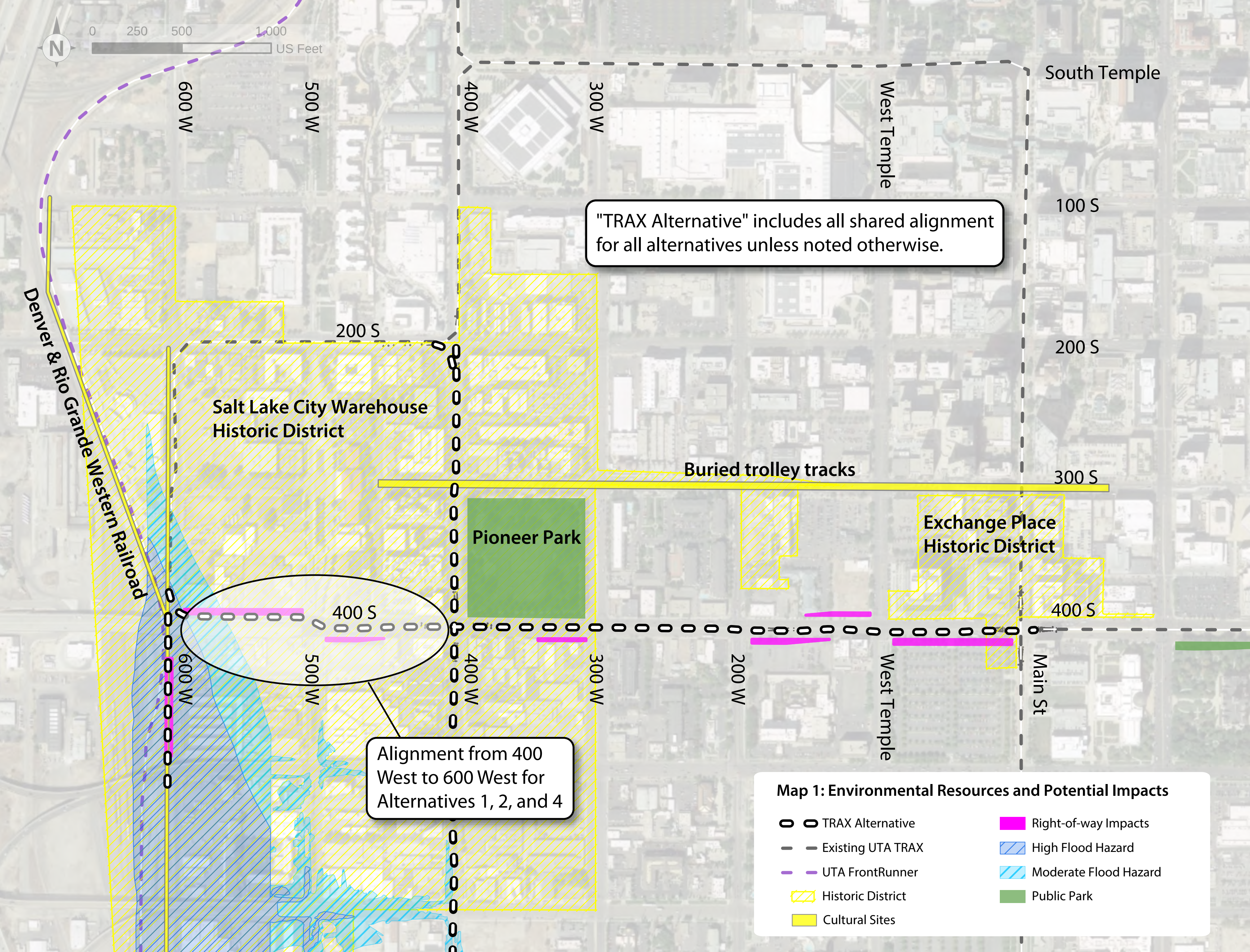
3 Summary

The anticipated environmental impacts are similar for all alternatives with slight variations. Table 4 summarizes the differences in anticipated impacts to key environmental resources.

Table 4. Summary of Differences in Environmental Impacts between Alternatives

<table>
<tr><th>Environmental Resource</th><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 4</th></tr>
<tr><td rowspan="2">Acquisitions and Relocations</td><td colspan="4">• Potential ROW acquisition along 400 South, Ballpark Spur line, and within Research Park
• One potential building demolition on the Ballpark Spur line</td></tr>
<tr><td colspan="2"></td><td>• Fewer ROW acquisitions (no ROW acquisitions on 400 South west of 400 West)</td><td>• Potential additional ROW acquisition south of Rice-Eccles Stadium along 500 South</td></tr>
<tr><td rowspan="2">Cultural, Historic, and Archaeological Resources</td><td colspan="4">• Potential Adverse Effect to Pioneer Park (if mature trees are removed along southern edge of the park; however, it is anticipated that this impact would be avoided in future phases of design), D&RGW Railroad, and Oregon Short Line Railroad
• Potential No Adverse Effect to SLC Warehouse District, Exchange Place Historic District, buried trolley tracks, and Fort Douglas</td></tr>
<tr><td colspan="2"></td><td>• Fewer impacts to SLC Warehouse District (potential No Adverse Effect)</td><td>• Potential No Adverse Effect to Mt. Olivet Cemetery</td></tr>
<tr><td rowspan="2">Noise and Vibration</td><td colspan="4">• Potential for increased vibration to one Category 1 receiver (Noorda Oral health Sciences building), approximately 420 feet from proposed alignment</td></tr>
<tr><td>• 69 potential noise impacts
• 26 potential vibration impacts</td><td>• 69 potential noise impacts
• 26 potential vibration impacts</td><td>• 67 potential noise impacts
• 24 potential vibration impacts</td><td>• 70 potential noise impacts
• 26 potential vibration impacts</td></tr>
<tr><td>Section 4(f) Resources</td><td colspan="4">• Potential greater than de minimis impact to Pioneer Park (if mature trees are removed along southern edge of the park; however, it is anticipated that this impact would be avoided in future phases of design)
• Potential de minimis impact to SLC Warehouse District, Exchange Place Historic District, and Fort Douglas</td></tr>
</table>

<table>
<tr><th>Environmental Resource</th><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th><th>Alternative 4</th></tr>
<tr><td></td><td colspan="2"></td><td>• Fewer impacts to SLC Warehouse District (potential de minimis impact)</td><td>• Potential de minimis impact to Mt. Olivet Cemetery</td></tr>
<tr><td rowspan="2">Visual and Aesthetic Resources</td><td colspan="4">• Minimal visual impacts to the built environment as there are currently existing light rail lines throughout the study area and the alternatives would be largely constructed in urbanized, developed areas
• Higher potential for visual impacts to natural environment at Red Butte Creek crossing</td></tr>
<tr><td></td><td>• Noticeable change in visual character as a result of elevated line above 400 West</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Water Resources</td><td colspan="4">• Potential to impact Red Butte Creek and pump station west of Red Butte Creek</td></tr>
<tr><td colspan="3"></td><td>• Potential to impact wells, covered water storage reservoir, and Mt. Olivet Reservoir south of Rice-Eccles Stadium along 500 South</td></tr>
<tr><td rowspan="2">Wetlands and Waters of the U.S.</td><td colspan="4">• Potential to impact Red Butte Creek</td></tr>
<tr><td colspan="3"></td><td>• Potential to impact Mt. Olivet Reservoir (likely not jurisdictional)</td></tr>
</table>



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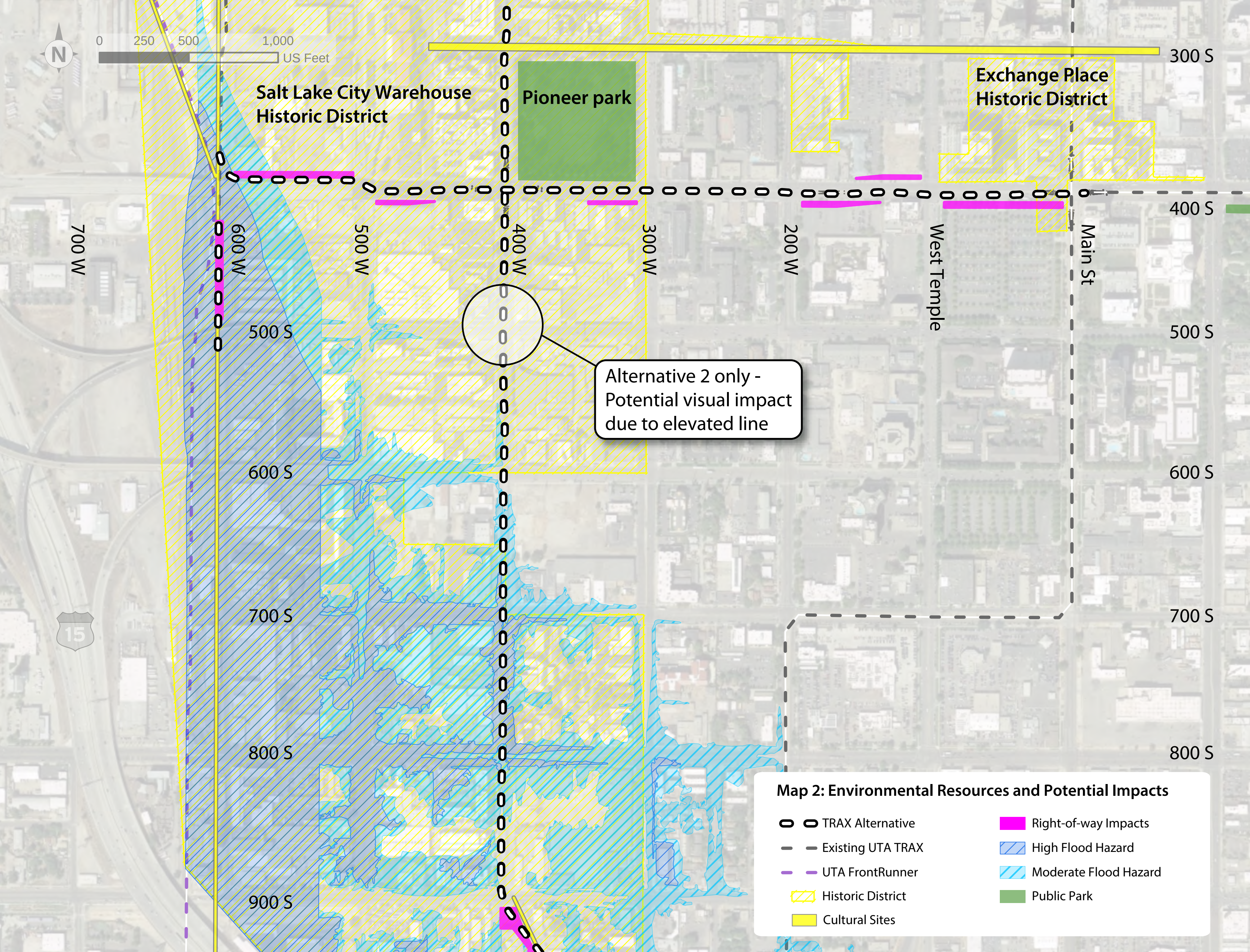
0 250 500 1,000
US Feet
South Temple
600 W
500 W
400 W
300 W
West Temple
100 S
"TRAX Alternative" includes all shared alignment for all alternatives unless noted otherwise.
200 S
200 S
Denver & Rio Grande Western Railroad
Salt Lake City Warehouse Historic District
Buried trolley tracks
300 S
Pioneer Park
Exchange Place Historic District
400 S
400 S
600 W
500 W
400 W
300 W
200 W
West Temple
Main St
Alignment from 400 West to 600 West for Alternatives 1, 2, and 4
Map 1: Environmental Resources and Potential Impacts
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Historic District
Cultural Sites
Right-of-way Impacts
High Flood Hazard
Moderate Flood Hazard
Public Park



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US Feet
Salt Lake City Warehouse Historic District
Pioneer park
Exchange Place Historic District
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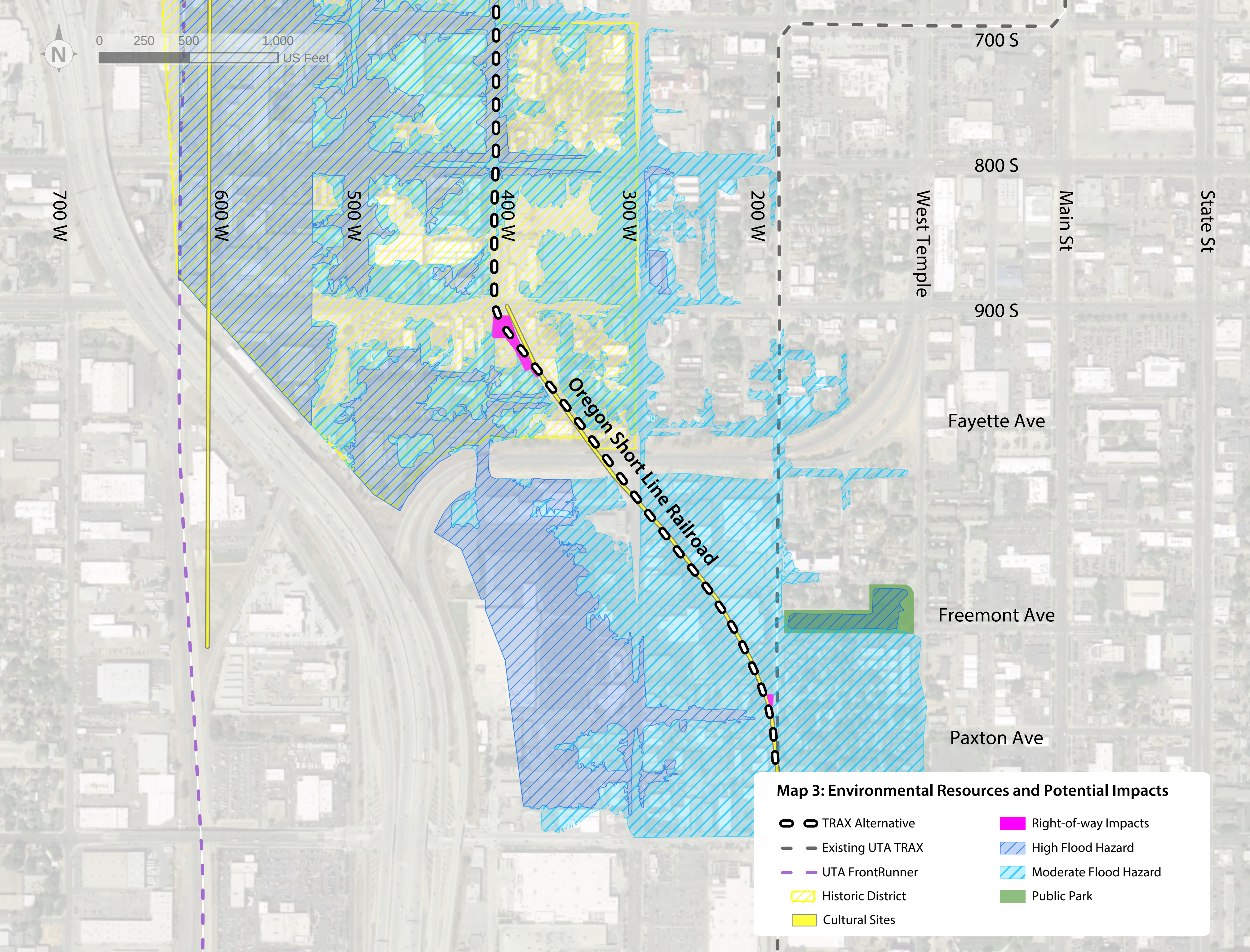
500 S
600 S
700 S
800 S
900 S
700 W
600 W
500 W
400 W
300 W
200 W
West Temple
Main St
15
Alternative 2 only - Potential visual impact due to elevated line
Map 2: Environmental Resources and Potential Impacts
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Historic District
Cultural Sites
Right-of-way Impacts
High Flood Hazard
Moderate Flood Hazard
Public Park



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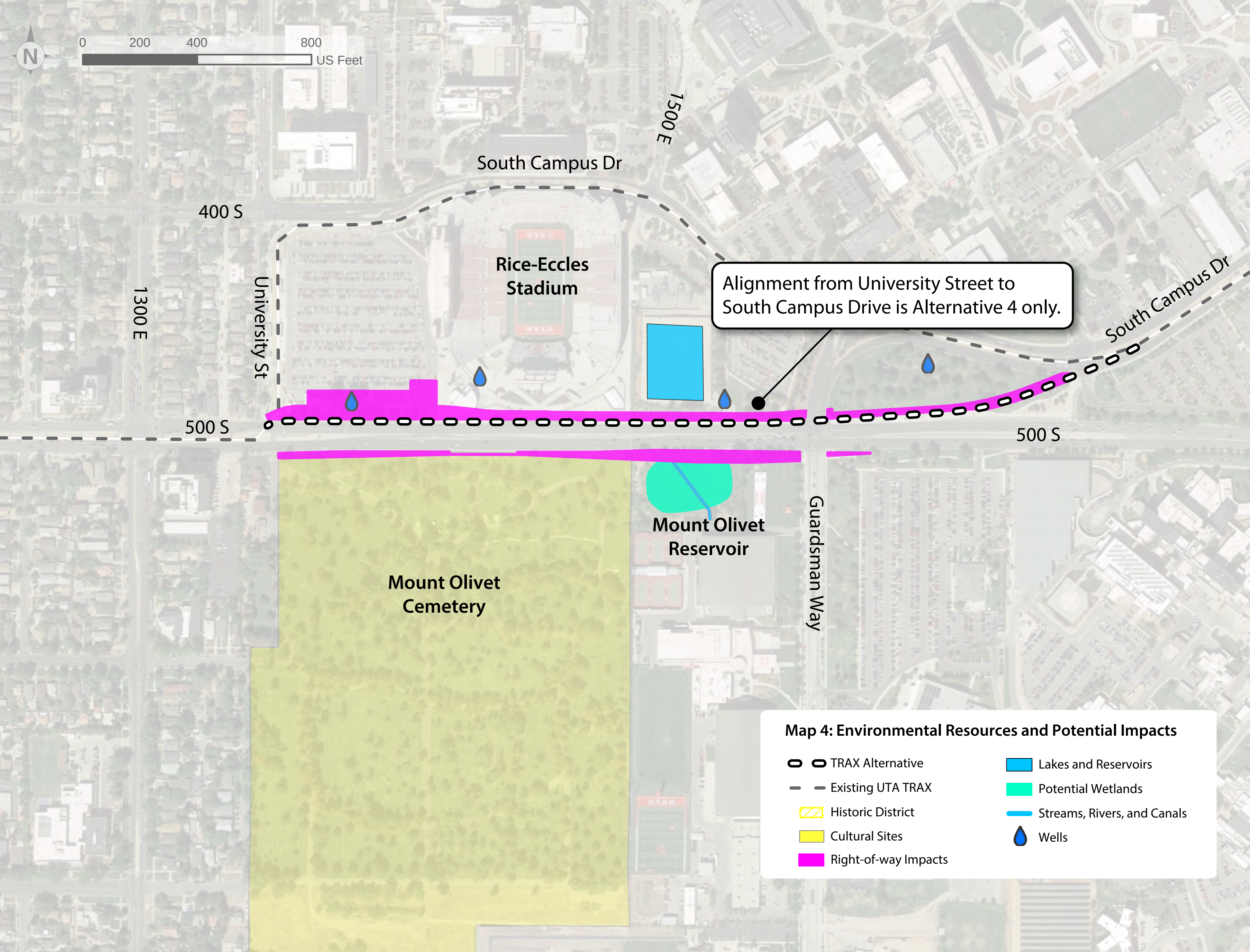
West Temple
Main St
State St
Fayette Ave
Freemont Ave
Paxton Ave
Oregon Short Line Railroad
Map 3: Environmental Resources and Potential Impacts
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Historic District
Cultural Sites
Right-of-way Impacts
High Flood Hazard
Moderate Flood Hazard
Public Park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400
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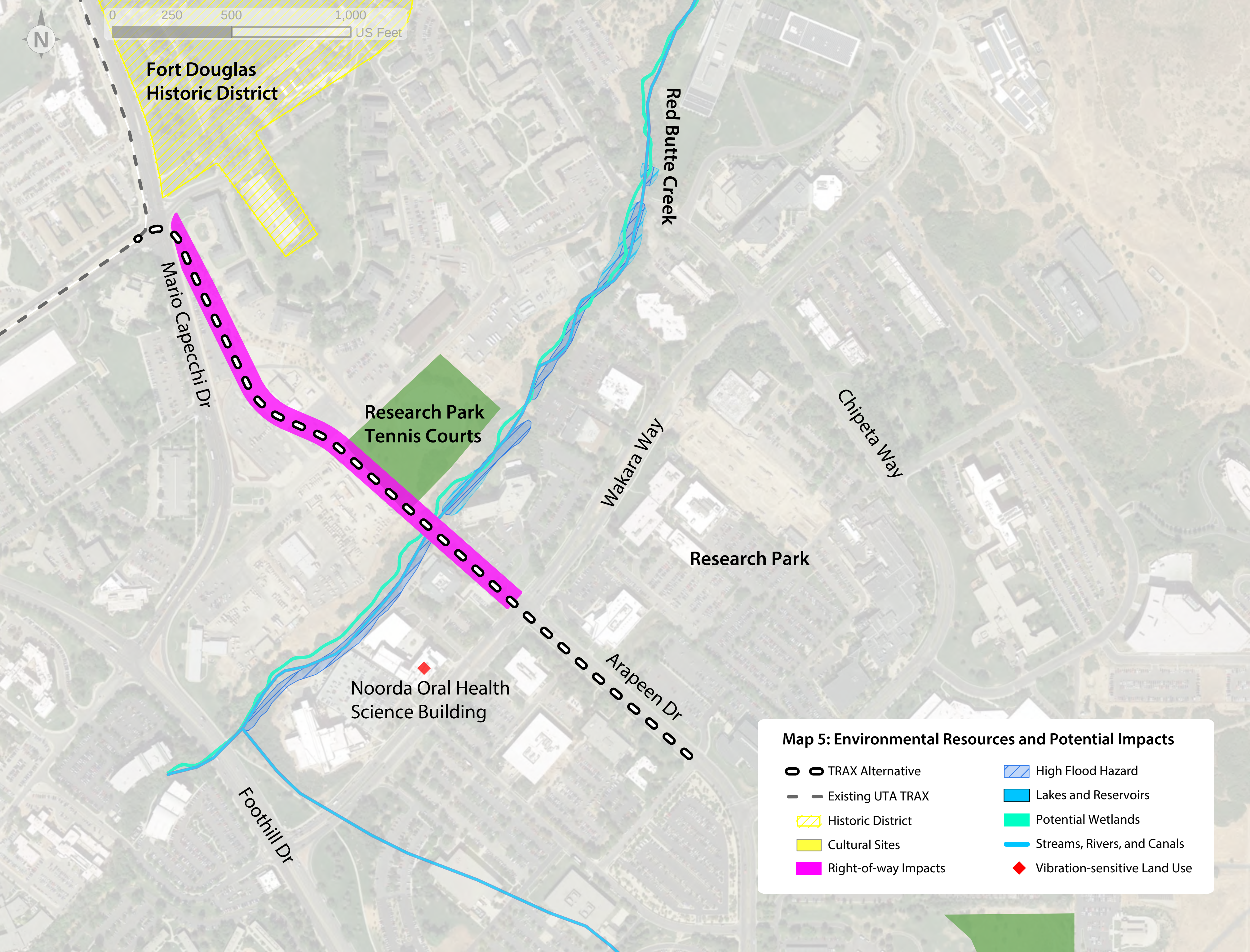
US Feet
South Campus Dr
1500 E
400 S
Rice-Eccles
Stadium
1300 E
University St
Alignment from University Street to South Campus Drive is Alternative 4 only.
South Campus Dr
500 S
500 S
Mount Olivet
Reservoir
Guardsman Way
Mount Olivet
Cemetery
Map 4: Environmental Resources and Potential Impacts
TRAX Alternative
Existing UTA TRAX
Historic District
Cultural Sites
Right-of-way Impacts
Lakes and Reservoirs
Potential Wetlands
Streams, Rivers, and Canals
Wells



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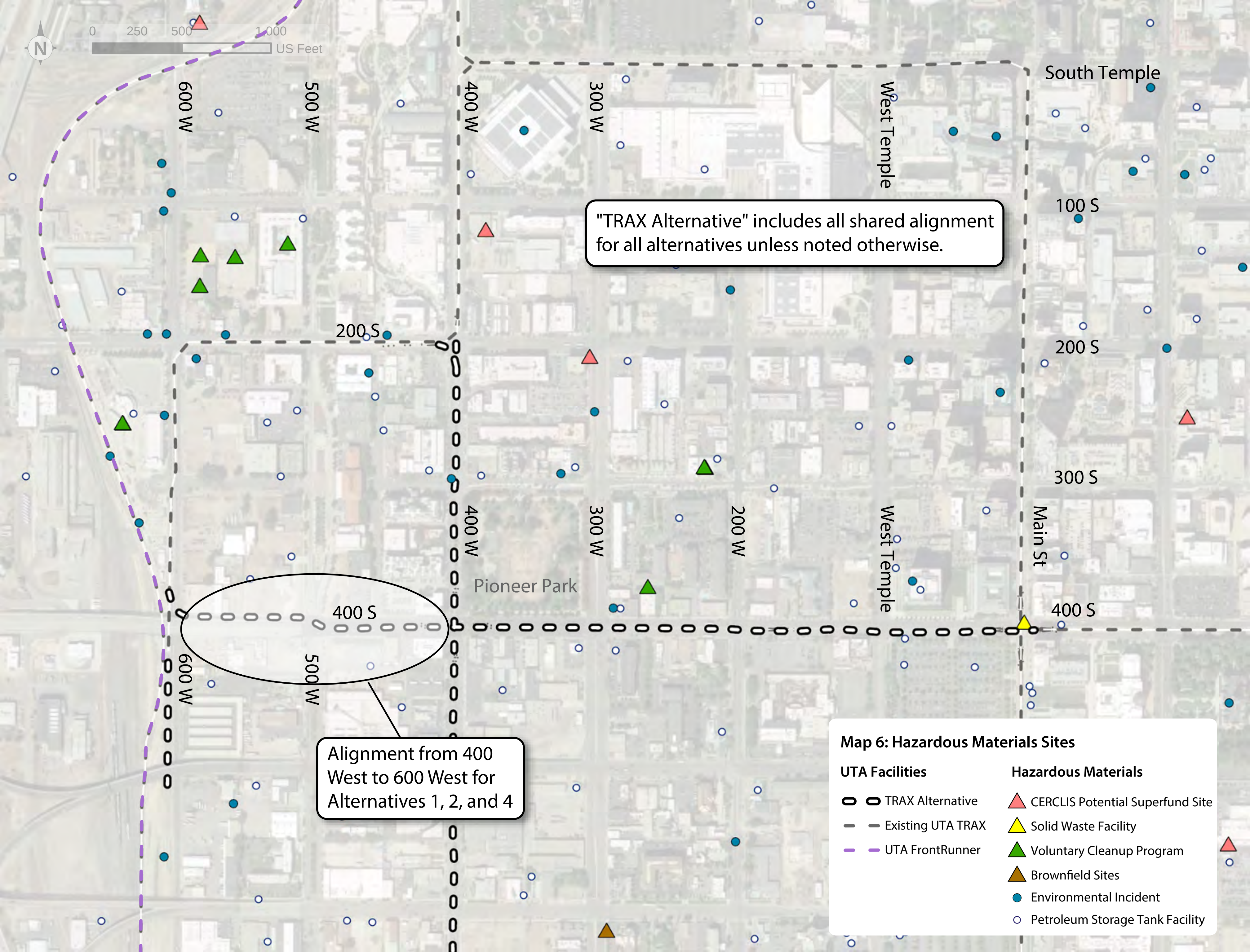
US Feet
Fort Douglas
Historic District
Red Butte Creek
Mario Capecchi Dr
Research Park
Tennis Courts
Wakara Way
Chipeta Way
Research Park
Arapeen Dr
Noorda Oral Health
Science Building
Foothill Dr
Map 5: Environmental Resources and Potential Impacts
TRAX Alternative
Existing UTA TRAX
Historic District
Cultural Sites
Right-of-way Impacts
High Flood Hazard
Lakes and Reservoirs
Potential Wetlands
Streams, Rivers, and Canals
Vibration-sensitive Land Use



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South Temple
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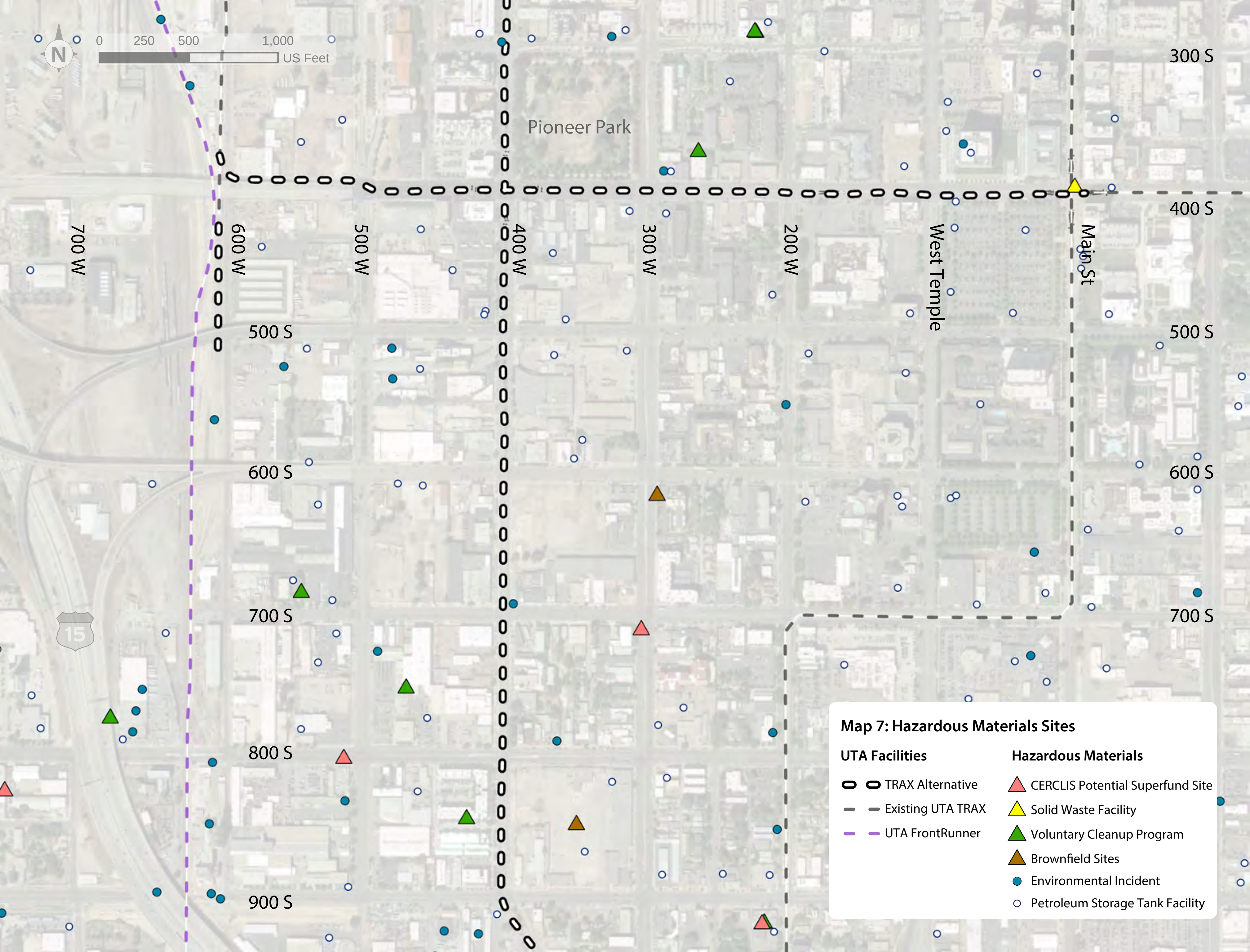
West Temple
Main St
Pioneer Park
"TRAX Alternative" includes all shared alignment for all alternatives unless noted otherwise.
Alignment from 400 West to 600 West for Alternatives 1, 2, and 4
Map 6: Hazardous Materials Sites
UTA Facilities
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Hazardous Materials
CERCLIS Potential Superfund Site
Solid Waste Facility
Voluntary Cleanup Program
Brownfield Sites
Environmental Incident
Petroleum Storage Tank Facility


Map 7: Hazardous Materials Sites
UTA Facilities
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Hazardous Materials
CERCLIS Potential Superfund Site
Solid Waste Facility
Voluntary Cleanup Program
Brownfield Sites
Environmental Incident
Petroleum Storage Tank Facility
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US Feet
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Pioneer Park
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West Temple
Main St
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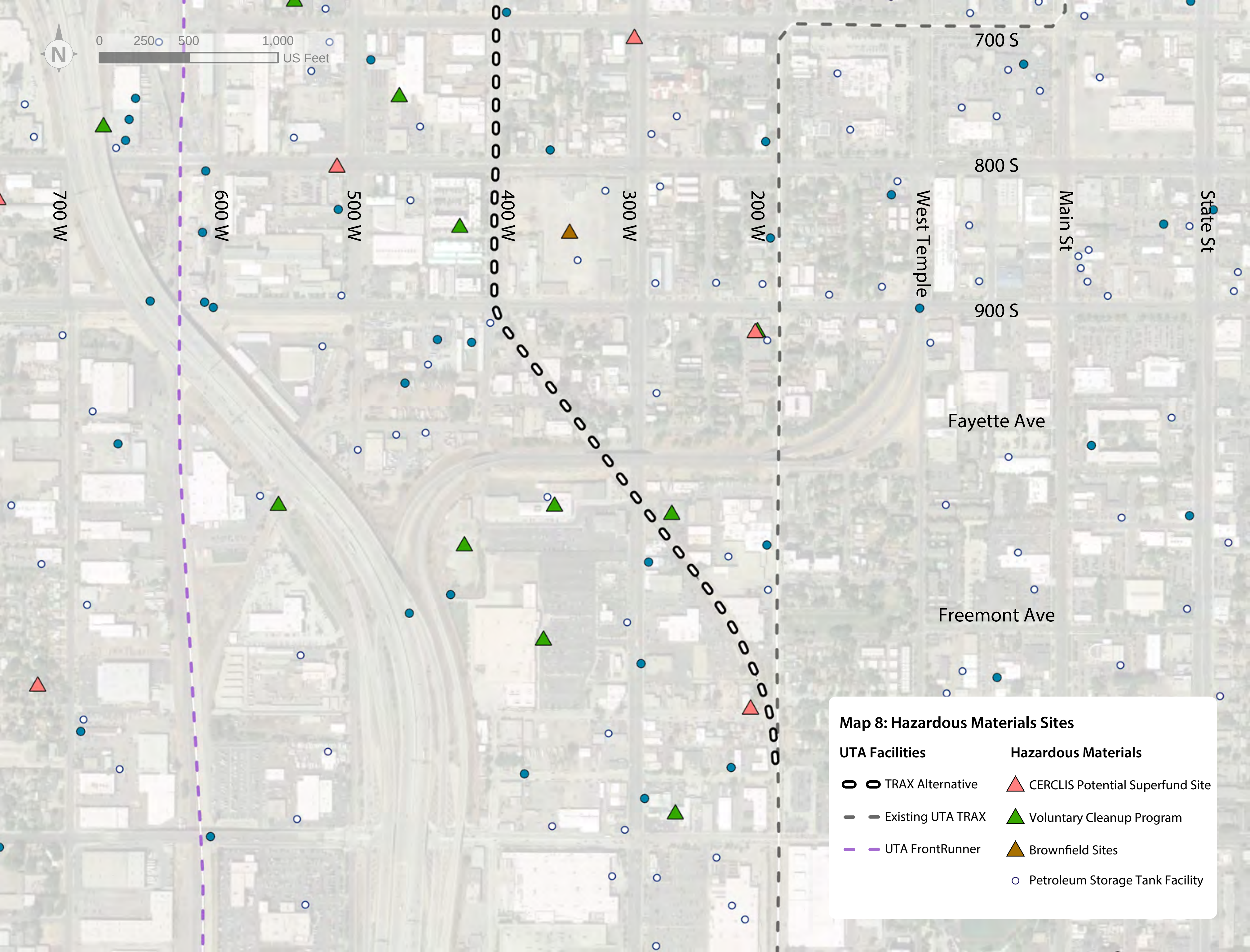

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US Feet
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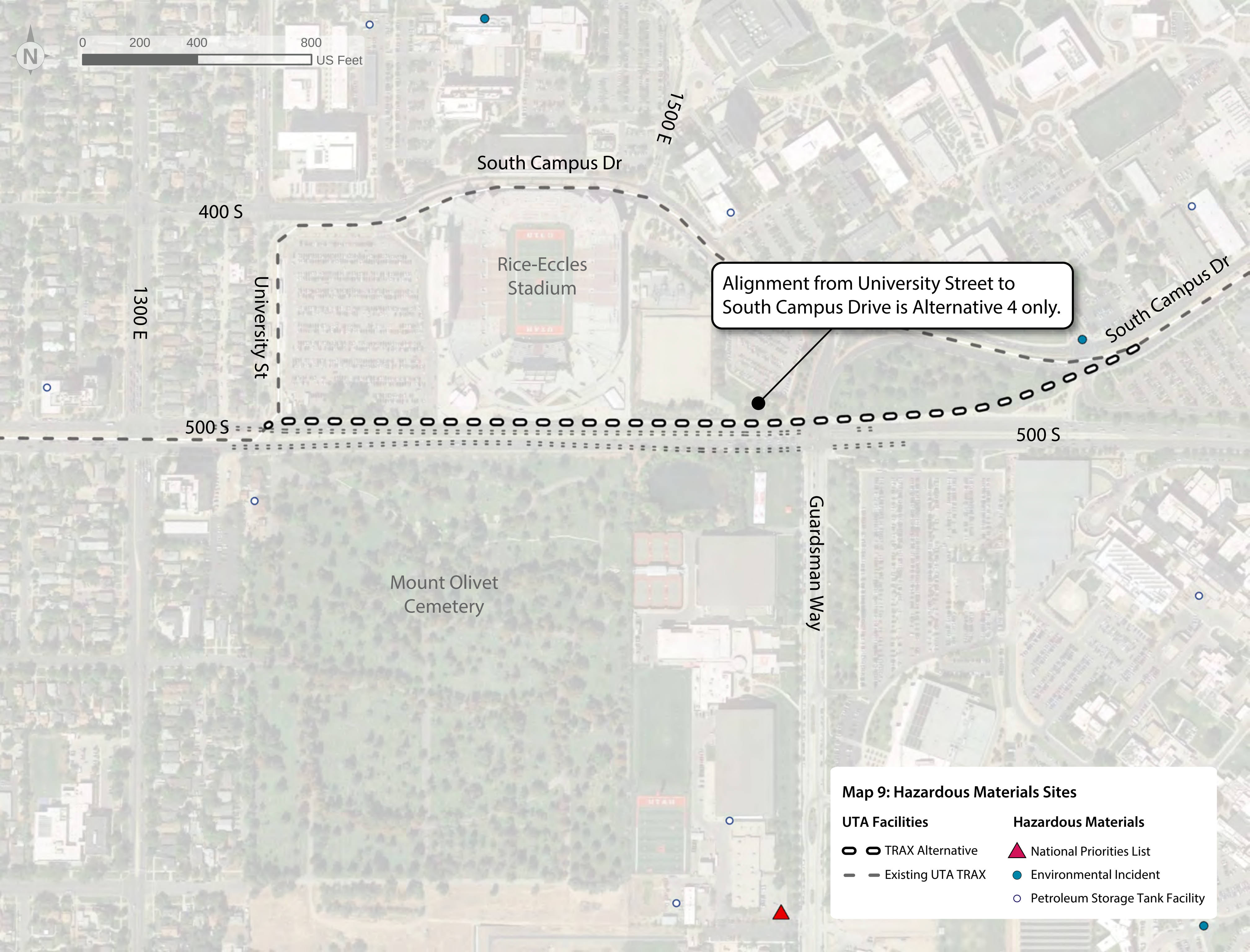
West Temple
Main St
State St
Fayette Ave
Freemont Ave
Map 8: Hazardous Materials Sites
UTA Facilities
TRAX Alternative
Existing UTA TRAX
UTA FrontRunner
Hazardous Materials
CERCLIS Potential Superfund Site
Voluntary Cleanup Program
Brownfield Sites
Petroleum Storage Tank Facility



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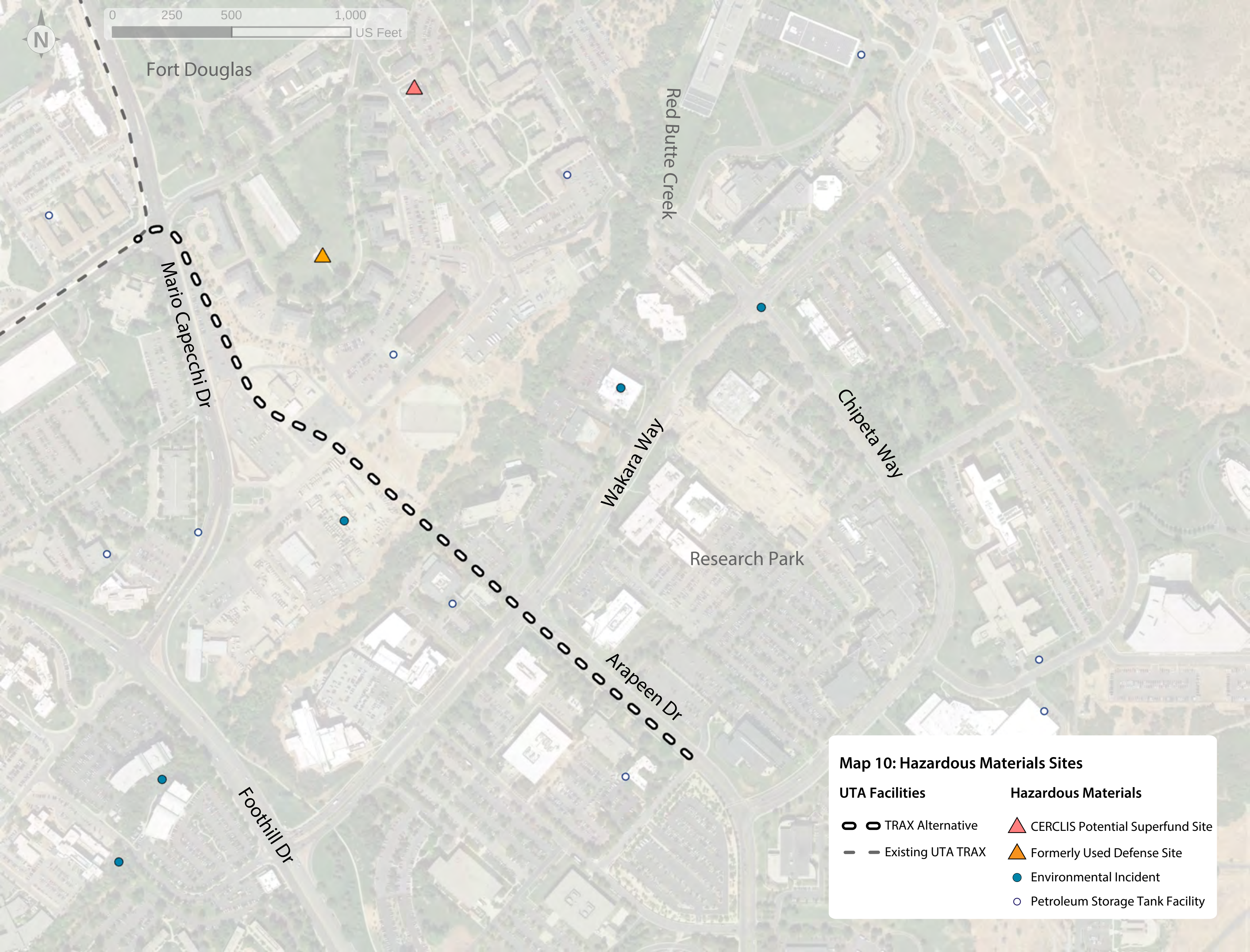
US Feet
South Campus Dr
1500 E
400 S
Rice-Eccles
Stadium
Alignment from University Street to
South Campus Drive is Alternative 4 only.
South Campus Dr
1300 E
University St
500 S
500 S
Guardsman Way
Mount Olivet
Cemetery
Map 9: Hazardous Materials Sites
UTA Facilities
TRAX Alternative
Existing UTA TRAX
Hazardous Materials
National Priorities List
Environmental Incident
Petroleum Storage Tank Facility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US Feet
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Fort Douglas
Red Butte Creek
Mario Capecchi Dr
Wakara Way
Chipeta Way
Research Park
Arapeen Dr
Foothill Dr
Map 10: Hazardous Materials Sites
UTA Facilities
TRAX Alternative
Existing UTA TRAX
Hazardous Materials
CERCLIS Potential Superfund Site
Formerly Used Defense Site
Environmental Incident
Petroleum Storage Tank Facility

Attachment F1: Noise and Vibration Screening Memorandum

TechLink TRAX Study

Noise and Vibration Screening Memorandum

Purpose

The purpose of this memorandum is to summarize the noise and vibration screening procedure for the Utah Transit Authority (UTA) TechLink TRAX Study. The UTA TechLink TRAX Study will evaluate potential alignments for transit connections in Salt Lake City, including the University of Utah Research Park Extension and rail extensions and realignments in downtown Salt Lake City including the Granary District. The study will identify a preferred transit corridor that will improve transit access to growing neighborhoods on the west and east sides of Salt Lake City and improve regional connectivity and accessibility via the TRAX system. The noise and vibration screening procedure qualitatively describes the potential noise- and vibration-sensitive receivers in the project study area using the methods described in the Federal Transit Administration (FTA) Guidance Manual (2018)[1].

Summary

The screening procedure identified potential noise- and vibration-sensitive receivers along the proposed alternatives where new service will be introduced. There are 70 noise-sensitive receivers within the 350-foot screening distance on either side of all the alternatives. There is one Category 1 vibration-sensitive land use within 450 feet; 18 Category 2 vibration-sensitive receivers within 150 feet; and seven Category 3 vibration-sensitive receivers within 100 feet on either side of the proposed alternatives.

The locations identified in this report are not considered noise and vibration impacts. The locations identified are buildings that should be included in the next phase of the environmental assessment to determine the potential for noise or vibration impacts. Locations identified as part of this memorandum can be made available upon request.

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123, September 2018.

Details regarding the FTA noise and vibration screening procedure and the locations of the buildings identified in the screening procedure are described below, along with a summary of the identified buildings by alternative.

FTA Noise and Vibration Screening Procedure

The noise and vibration screening procedure is a simplified method of identifying study area receivers or locations where a project may have the potential for noise or vibration impacts from a proposed transit project. The screening procedure is intended to be conservative to broadly capture the potential for all noise and vibration impacts. The procedure accounts for impact criteria, the type of project, and the types of sensitive receivers. If no noise- or vibration-sensitive receivers are present in the screening procedure analysis area, then no further assessment is needed. If sensitive receivers are identified, then a more detailed assessment will need to be conducted during subsequent phases of the project.

Noise

The noise screening distance is determined by the type of transit project (i.e. bus rapid transit, light rail, commuter rail, etc.) and simplified operational characteristics. From this information, the noise screening distance for the project type can be identified in Table 4-7 in the FTA Guidance Manual (2018). The noise screening distance for an LRT project is 350 feet. The FTA noise screening procedure does not differentiate between different types of noise-sensitive land uses, such as residences, apartments, churches, schools, and other noise-sensitive locations.

Vibration

The vibration screening distance is determined by the type of transit project (i.e. bus rapid transit, light rail, commuter rail) and land use category. Table 6-8 in the FTA Guidance Manual (2018) identifies the vibration screening distances for different types of transit projects. The vibration screening distances for an LRT project are:

- Category 1 - 450 feet
- Category 2 - 150 feet
- Category 3 - 100 feet

FTA Vibration Land Use Categories

The screening procedure identifies the vibration-sensitive land use within the screening distance based on the FTA land use category. The criteria for assessing vibration-sensitive receivers vary according to land use categories adjacent to the track. Table 1 summarizes the four land use categories. For the vibration screening procedure, special buildings are evaluated as follows: Category 1 – concert halls and TV studios, Category 2 – theaters and auditoriums, and Category 3 – vibration-sensitive equipment.

Table 1. Vibration Land Use Categories for Transit Projects

Land Use Category	Land Use Type	Description of Land Use Category
--	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 (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include 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. Examples include buildings where vibration-sensitive research and manufacturing is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. 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 microscopes with vibration isolation systems are included in this category. For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted.
2	Residential	This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are considered to have a similar effect on receivers.
3	Institutional	This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, and doctors' offices. 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.

Source: FTA, 2018

FTA Screening Procedure

The land use survey for the TechLink Corridor Project was conducted via windshield survey and aerial photography. The noise and vibration-sensitive land use was identified within the distances described above in locations where the project would introduce new service. In locations where light rail service already exists, the realignment of service would not introduce any changes to the noise or vibration levels, and no screening procedure was conducted at those locations.

Noise

Table 2 summarizes the noise-sensitive receivers within the 350-foot screening distance relative to the alignment for each of the locations with new service. Table 3 summarizes the noise-sensitive receivers by alternative for both the University area and Downtown. The locations of the noise-sensitive receivers are shown in Figures 1 through 4.

Table 2. Summary of Noise-Sensitive Land Use within the Screening Distance

Segment	Count
University of Utah Campus: Mario Capecchi Drive to Arapeen Drive	11
Downtown: Main Street to 600 W along 400 South	23
Downtown: 400 South to Ballpark Station along 400 West and Existing Tracks	36

Table 3. Summary of Noise-Sensitive Land Use by Alternative

Segment	University	Downtown
Alternative 1 – Future of Light Rail Baseline	10	59
Alternative 2 – Elevated on 400 West	10	59
Alternative 3 – Direct on 400 West	10	57
Alternative 4 – University of Utah Realignment	11	59

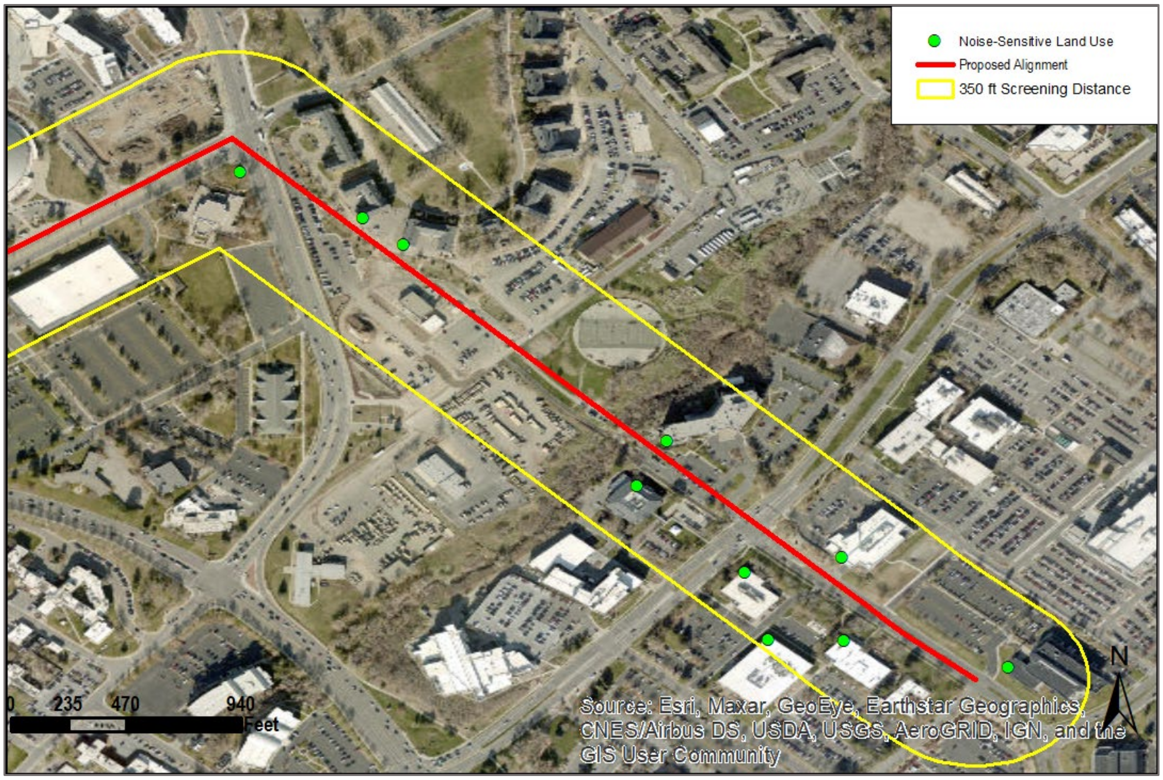

Figure 1. Noise-Sensitive Receivers on the University of Utah Campus

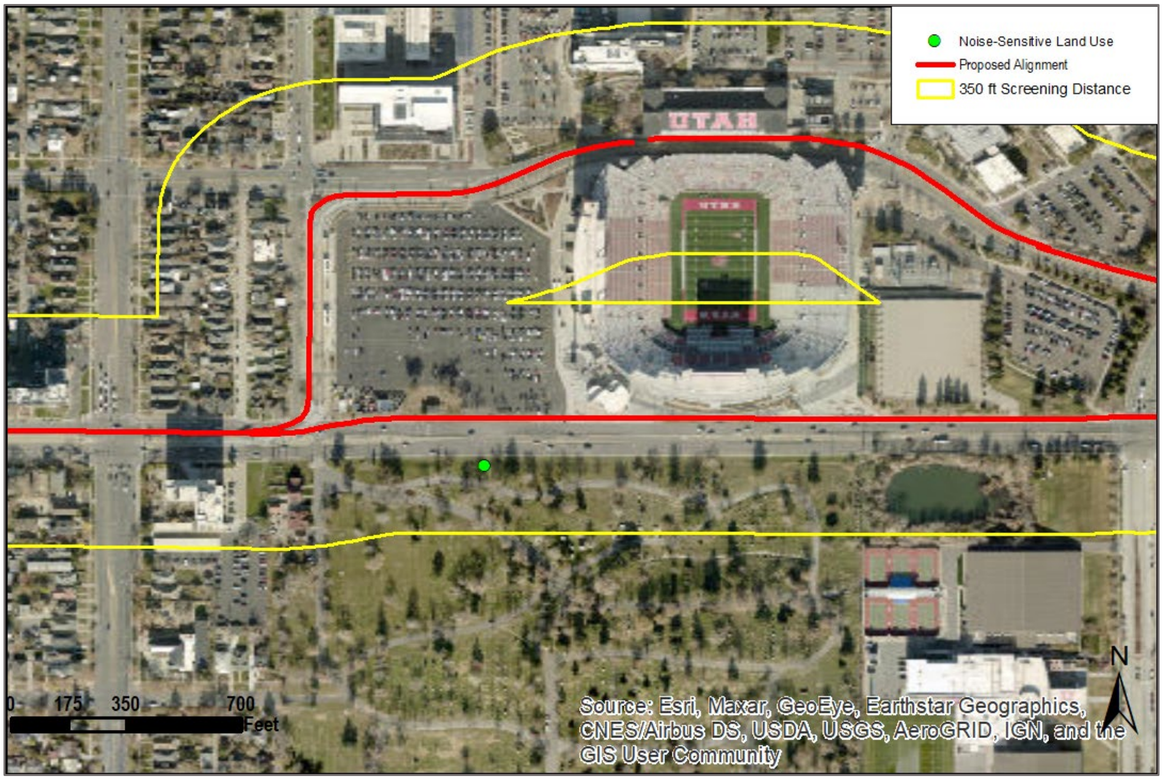

Figure 2. Noise-Sensitive Receivers close to Rice Eccles Stadium

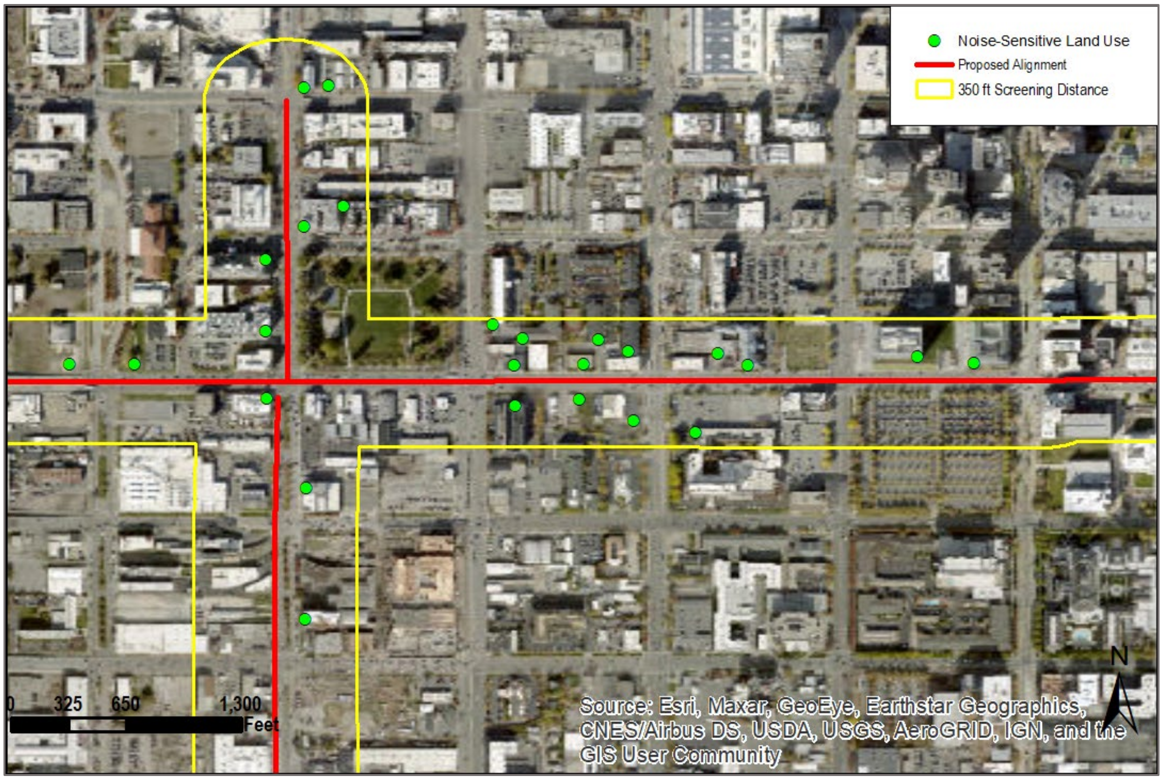

Figure 3. Noise-Sensitive Receivers in Downtown Salt Lake City along 400 South

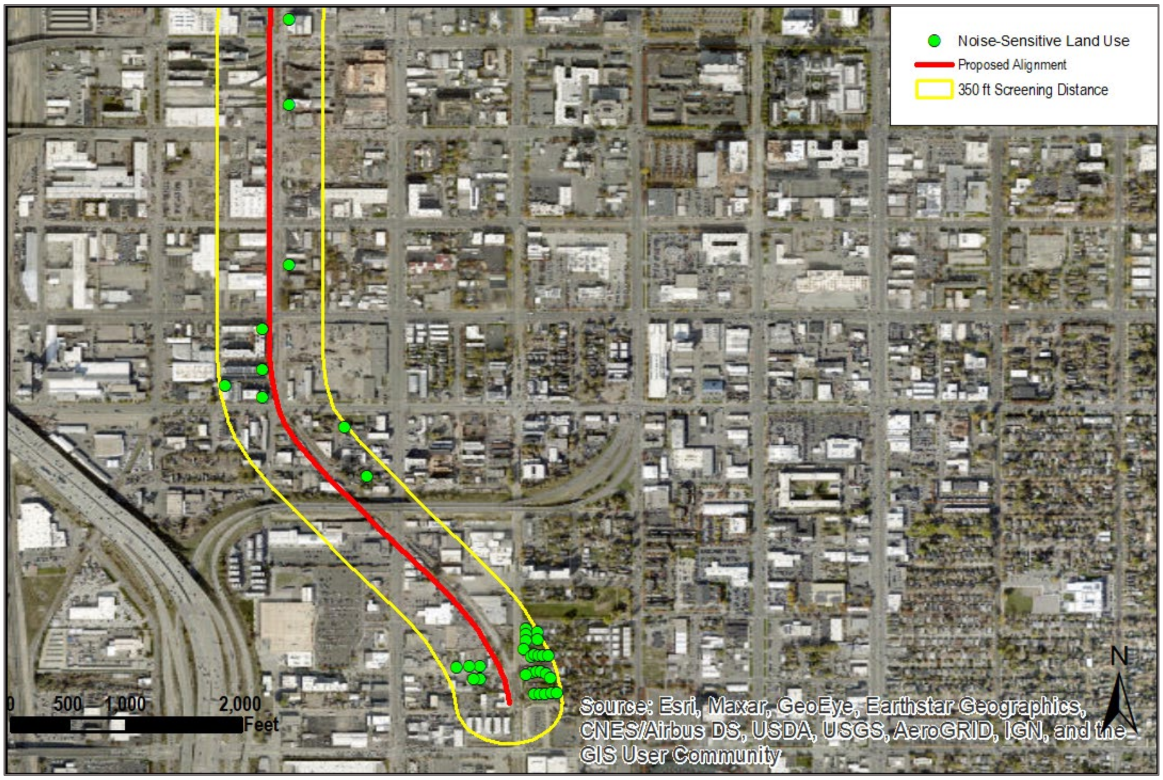

Figure 4. Noise-Sensitive Receivers in Downtown along 300 West to Ballpark Station

Vibration

Table 4 summarizes the vibration-sensitive receivers within the screening distances relative to the alignment for each of the locations with new service. The table includes the number of vibration-sensitive receivers by land-use category. Table 5 summarizes the vibration-sensitive receivers by alternative for both the University area and Downtown. The locations of the vibration-sensitive receivers are shown in Figures 5 through 7.

The one Category 1 receiver is the Noorda Oral Health Sciences building on the University of Utah campus. The building is approximately 420 feet from the proposed alignment. Once the alignment has been determined, more information would be needed to determine if there are any highly vibration-sensitive equipment in the building to determine the sensitivity.

Table 4. Summary of Vibration-Sensitive Land Use within the Screening Distances

Segment	Category 1 (<= 450 feet)	Category 2 (<= 150 feet)	Category 3 (<=100 feet)
University of Utah Campus: Mario Capecchi Drive to Arapeen Drive	1	2	3
Downtown: Main Street to 600 W along 400 South	0	8	4
Downtown: 400 South to Ballpark Station along 400 West and Existing Tracks	0	8	0

Table 5. Summary of Vibration-Sensitive Land Use by Alternative

Segment	University	Downtown
Alternative 1 – Future of Light Rail Baseline	6	20
Alternative 2 – Elevated on 400 West	6	20
Alternative 3 – Direct on 400 West	6	18
Alternative 4 – University of Utah Realignment	6	20

Figure 5. Vibration-Sensitive Receivers on the University of Utah Campus

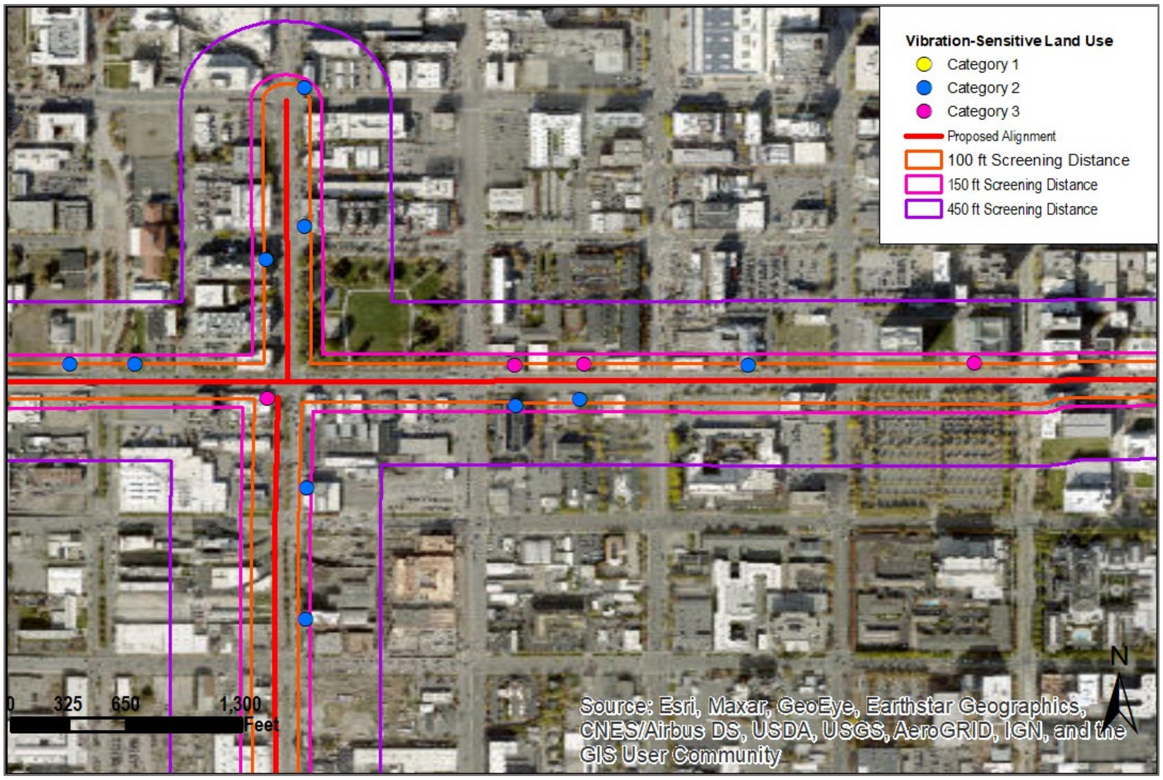

Figure 6. Vibration-Sensitive Receivers in Downtown Salt Lake City along 400 South

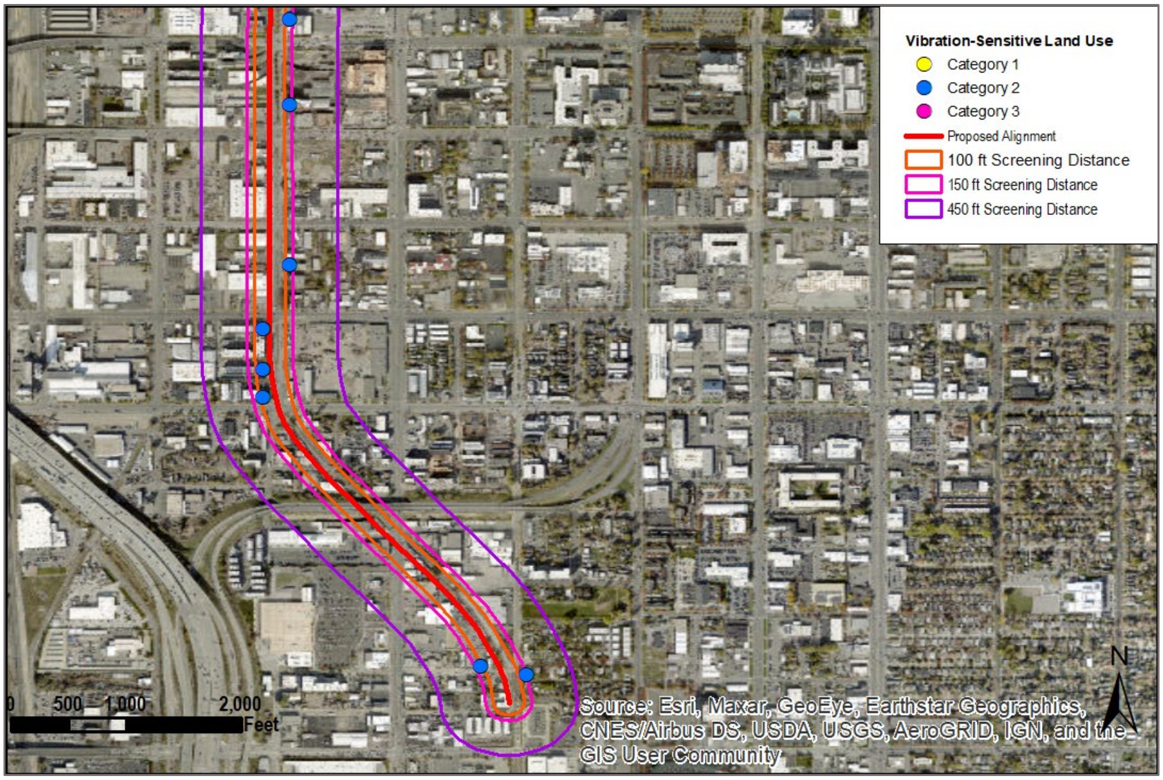

Figure 7. Vibration-Sensitive Receivers in Downtown along 300 West to Ballpark Station

Attachment F2: Traffic Analysis Memorandum

TechLink TRAX Study

Traffic Analysis Memorandum

Introduction

Horrocks performed a traffic analysis to aid in the understanding of potential operational impacts as a result of implementing the TechLink TRAX project. The purpose of this analysis was to:

- Provide an initial high-level understanding of conditions
- Identify potential challenging intersections
- Inform further analysis to be performed during the National Environmental Policy Act (NEPA) and preliminary design phase of work

The Horrocks team held a meeting on December 21, 2023, with Utah Transit Authority (UTA), Utah Department of Transportation (UDOT) Region Two, and Salt Lake City[1] to discuss the team's approach and intersections to be analyzed. The initial intersections of concern were: 400 West/500 South, 400 West/600 South, South Campus Drive/Guardsman Way roundabout, and South Campus Drive/Mario Capecchi Drive. An additional 12 intersections were analyzed to give a representative sample along the key project corridors.

[1] Recorded attendance for this meeting includes the following: Alex Beim, Patti Garver, Jon Larsen, Julianne Sabula, Chip Mason-Hill, Geoff Dupaix, Claire Woodman, and Alexis Verson.

Traffic Analysis Methodology

The following provides an overview of the traffic analysis methodology:

- Collected AM and PM turning movement counts at major corridor intersections in two phases:

10/17/2023	2/14/2024
400 W, 900 S to 400 S 400 S and Main St 400 S and State St 400 S and 700 E North Temple St and Redwood Rd	400 S, 1300 E to Guardsman Way Campus Dr, Guardsman Way to Mario Capecchi Dr

- Reviewed UTA TRAX Line schedules (assumed 15-minute train frequency per line, approximate 30 second stop time)
- Obtained existing signal timing from UDOT (assumed 30 second early/extend green time for transit priority)
- Developed Vissim base models for existing AM and PM peak hours ***(no future year modeling was performed)***
- Calibrated existing models using ClearGuide data
- Developed Vissim models for extended TechLink TRAX Alternative 1, including:
    - Red Line realigned to serve Granary District via 400 W
    - Orange Line added from the Salt Lake City International Airport to the University of Utah, serving Salt Lake Central
    - Optimized signal timing and protected-only left turn phasing for movements conflicting with new/relocated TRAX Lines

Summary of Results

Delay and Level of Service (LOS) are summarized in Table 1. Additional detailed information on delay and LOS are provided for each intersection and all movements at the conclusion of this memo.

Table 1. Intersection Delay and LOS Summary

Intersection	**AM Peak**				**PM Peak**			
	Existing		**Proposed (TechLink Alternative 1)**		**Existing**		**Proposed (TechLink Alternative 1)**	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Redwood Rd & North Temple St	26.9	C	26.9	C	34.0	C	34.0	C
900 S & 400 W	2.6	A	25.1	C	1.5	A	7.3	A
800 S & 400 W	1.5	A	28.8	C	1.2	A	25.6	C
600 S & 400 W	5.3	A	7.2	A	10.5	B	11.1	B
500 S & 400 W	19.1	B	19.0	B	26.3	C	30.1	C
400 W & 400 S	26.4	C	30.3	C	23.3	C	35.0	D
Main St & 400 S	23.9	C	19.7	B	20.5	C	18.4	B
State St & 400 S	39.2	D	42.8	D	41.3	D	52.2	D
700 E & 400 S	41.0	D	41.1	D	48.6	D	**65.8**	**E**
1300 E & 500 S	40.8	D	43.3	D	51.6	D	**66.2**	**E**
Campus Center Dr & 500 E	35.5	D	35.3	D	42.1	D	41.9	D
S Campus Dr & Pedestrian Crossing	0.7	A	0.7	A	13.4	B	17.6	B
S Campus Dr & Guardsman Dr	4.3	A	4.8	A	29.4	C	44.9	D
S Campus Dr & 1725 E	18.9	B	19.1	B	24.3	C	29.3	C
S Campus Dr & Mario Capecchi Dr	30.9	C	38.5	D	44.0	D	**74.8**	**E**

Notable degradation of traffic operations (to LOS E) was found at several intersections along 400 South and South Campus Drive.

At a high level, the degradations along 400 South are primarily a result of the introduction of new TRAX lines and increased frequencies of TRAX on existing lines and the associated impacts are primarily on cross street traffic. The long pedestrian crossing times limit the flexibility to allocate more green time to the northbound/southbound movements within the existing 120-second cycle length. Increasing the cycle length and/or restricting one or more left-turn movements may improve operations.

The degradations at the South Campus Drive/Mario Capecchi Drive intersection are a result of the new tracks crossing to the east side of the intersection, which requires its own phasing. Additional geometric improvements, including a westbound left-turn lane, may improve operations. There may also be some phasing adjustments related to the southbound right turn that could improve things, but it may add some nominal delay to the existing TRAX Red Line.

Next Steps

Additional traffic work will be performed as part of the next phase of work, which includes preparation of a National Environmental Policy Act (NEPA) document. Future work would likely include additional coordination with project partners (UDOT Region 2 and Salt Lake City) on methodology, analysis of potential mitigation strategies at key intersections, and performing a traffic operations analysis for a forecasted year (in addition to existing year conditions).

Table 2. Vissim Signalized Intersection Volume, Queue, and Delay Results (60-minute peak hour simulation averages) 5/15/2024

		Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
Intersection	Mvmt	95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
Redwood Rd & North Temple	**INT**	-	**26.9**	**C**			-	**26.9**	**C**			-	**34.0**	**C**			-	**34.0**	**C**		
	EBL	75	50.5	D	26.6	C	75	50.5	D	26.6	C	175	68.2	E	41.6	D	175	68.2	E	41.6	D
	EBT	75	50.1	D			75	50.1	D			150	54.4	D			150	54.4	D		
	EBR	125	8.8	A			125	8.8	A			250	18.4	B			250	18.4	B		
	NBL	175	53.1	D	26.5	C	175	53.1	D	26.5	C	150	49.4	D	24.7	C	150	49.4	D	24.7	C
	NBT	125	14.5	B			125	14.5	B			350	22.2	C			350	22.2	C		
	NBR	75	4.3	A			75	4.3	A			75	5.5	A			75	5.5	A		
	WBL	100	51.2	D	43.0	D	100	51.2	D	43.0	D	225	64.2	E	47.3	D	225	64.2	E	47.3	D
	WBT	75	43.8	D			75	43.8	D			100	51.1	D			100	51.1	D		
	WBR	75	5.8	A			75	5.8	A			100	11.6	B			100	11.6	B		
	SBL	100	55.1	E	21.8	C	100	55.1	E	21.8	C	125	59.9	E	29.9	C	125	59.9	E	29.9	C

Intersection	Mvmt	Existing - AM Peak 95th % Queue (ft)	Existing - AM Peak Mvmt Del/LOS (sec)		Existing - AM Peak App Del/LOS (sec)		Proposed - AM Peak 95th % Queue (ft)	Proposed - AM Peak Mvmt Del/LOS (sec)		Proposed - AM Peak App Del/LOS (sec)		Existing - PM Peak 95th % Queue (ft)	Existing - PM Peak Mvmt Del/LOS (sec)		Existing - PM Peak App Del/LOS (sec)		Proposed - PM Peak 95th % Queue (ft)	Proposed - PM Peak Mvmt Del/LOS (sec)		Proposed - PM Peak App Del/LOS (sec)	
	SBT	150	19.5	B			150	19.5	B			150	26.8	C			150	26.8	C		
	SBR	150	10.2	B			150	10.2	B			150	14.5	B			150	14.5	B		
	EXT	150	27.4	C	27.4	C	150	27.4	C	27.4	C	150	40.6	D	40.6	D	150	40.6	D	40.6	D
	WXT	150	62.9	E	62.9	E	150	62.9	E	62.9	E	150	52.7	D	52.7	D	150	52.7	D	52.7	D
900 S & 400 W	**INT**	-	**2.6**	**A**			-	**25.1**	**C**			-	**1.5**	**A**			-	**7.3**	**A**		
	EBL	25	0.4	A	0.2	A	25	45.7	D	37.2	D	25	2.9	A	0.5	A	25	6.2	A	4.0	A
	EBT	0	0.1	A			100	36.4	D			0	0.5	A			125	4.0	A		
	EBR	25	0.4	A			100	29.6	C			0	0.8	A			125	2.6	A		
	NBL	50	7.8	A	7.3	A	25	4.2	A	3.4	A	50	9.6	A	9.3	A	50	39.8	D	39.0	D
	NBT	50	8.0	A			25	3.1	A			75	9.9	A			50	38.5	D		
	NBR	50	6.2	A			25	3.0	A			75	8.5	A			50	39.3	D		
	WBL	0	0.4	A	0.2	A	25	30.5	C	37.6	D	25	4.4	A	0.7	A	25	7.7	A	4.4	A
	WBT	0	0.1	A			100	38.5	D			0	0.5	A			150	4.2	A		
	WBR	25	0.6	A			100	35.9	D			25	0.9	A			150	5.0	A		
	SBL	75	7.2	A	7.3	A	25	2.0	A	1.9	A	75	9.0	A	8.7	A	75	25.1	C	27.4	C
	SBT	75	8.6	A			25	2.2	A			75	9.6	A			75	27.9	C		

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	SBR	100	6.4	A			25	1.7	A			75	8.0	A			75	28.3	C		
800 S & 400 W	**INT**	-	**1.5**	**A**			-	**28.8**	**C**			-	**1.2**	**A**			-	**25.6**	**C**		
	EBL	25	1.1	A	0.1	A	50	39.5	D	39.3	D	25	1.4	A	0.1	A	50	37.7	D	28.4	C
	EBT	0	0.0	A			150	39.5	D			0	0.0	A			150	28.2	C		
	EBR	0	0.5	A			150	29.7	C			25	0.8	A			150	14.7	B		
	NBL	50	9.7	A	7.4	A	25	1.0	A	1.2	A	75	8.2	A	8.5	A	50	1.2	A	4.8	A
	NBT	50	8.0	A			25	0.9	A			75	9.6	A			50	5.3	A		
	NBR	75	6.1	A	7.4	A	25	1.9	A	1.2	A	75	5.9	A	8.5	A	50	4.6	A	4.8	A
	WBL	25	1.5	A	0.1	A	50	41.1	D	37.0	D	25	1.4	A	0.2	A	50	35.8	D	30.3	C
	WBT	0	0.0	A			125	37.0	D			25	0.1	A			175	30.1	C		
	WBR	25	0.6	A			125	35.6	D			25	0.8	A			175	29.5	C		
	SBL	25	1.9	A	4.7	A	75	3.5	A	5.3	A	50	3.5	A	4.8	A	50	6.9	A	7.0	A
	SBT	25	1.9	A			75	2.7	A			50	1.9	A			50	6.1	A		
	SBR	75	7.4	A			100	7.4	A			75	7.0	A			75	7.5	A		
600 S & 400 W	**INT**	-	**5.3**	**A**			-	**7.2**	**A**			-	**10.5**	**B**			-	**11.1**	**B**		
	EBL	225	5.5	A	4.6	A	225	6.9	A	6.1	A	150	6.3	A	5.8	A	150	7.5	A	6.9	A

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EBT	225	4.5	A			225	6.1	A			150	5.8	A			150	6.9	A		
	EBR	75	3.3	A			75	3.3	A			75	2.5	A			75	2.9	A		
	NBT	75	53.6	D	38.2	D	75	52.5	D	38.3	D	150	57.6	E	52.8	D	150	51.8	D	46.8	D
	NBR	50	13.0	B			75	14.9	B			50	27.6	C			50	21.1	C		
	SBL	75	19.9	B	16.6	B	100	58.2	E	37.0	D	100	67.3	E	67.5	E	100	64.9	E	62.3	E
	SBT	50	12.6	B			50	9.8	A			75	68.0	E			75	57.1	E		
500 S & 400 W	**INT**	-	**19.1**	**B**			-	**19.0**	**B**			-	**26.3**	**C**			-	**30.1**	**C**		
	NBL	175	44.8	D	46.2	D	150	44.5	D	45.5	D	225	58.8	E	56.9	E	225	54.1	D	53.1	D
	NBT	275	46.5	D			300	45.8	D			275	56.2	E			225	52.7	D		
	WBL	175	6.9	A	8.1	A	150	8.5	A	8.4	A	375	10.0	A	9.7	A	475	11.4	B	12.0	B
	WBT	175	8.3	A			150	8.6	A			375	9.7	A			475	12.1	B		
	WBR	25	3.4	A			25	3.4	A			25	7.8	A			25	8.9	A		
	SBT	75	45.8	D	20.9	C	75	38.1	D	19.2	B	500	91.6	F	105.3	F	425	125.5	F	130.4	F
	SBR	175	11.6	B			175	12.1	B			650	108.0	F			700	131.4	F		

Intersection	Mvmt	Existing - AM Peak 95th % Queue (ft)	Existing - AM Peak Mvmt Del/LOS (sec)		Existing - AM Peak App Del/LOS (sec)		Proposed - AM Peak 95th % Queue (ft)	Proposed - AM Peak Mvmt Del/LOS (sec)		Proposed - AM Peak App Del/LOS (sec)		Existing - PM Peak 95th % Queue (ft)	Existing - PM Peak Mvmt Del/LOS (sec)		Existing - PM Peak App Del/LOS (sec)		Proposed - PM Peak 95th % Queue (ft)	Proposed - PM Peak Mvmt Del/LOS (sec)		Proposed - PM Peak App Del/LOS (sec)	
400 W & 400 S	**INT**	-	**26.4**	**C**			-	**30.3**	**C**			-	**23.3**	**C**			-	**35.0**	**D**		
	EBL	75	14.9	B	19.5	B	75	12.2	B	19.2	B	75	26.6	C	15.9	B	50	19.1	B	18.7	B
	EBT	375	19.7	B			375	19.6	B			225	15.2	B			200	18.5	B		
	EBR	400	17.9	B			400	18.1	B			225	14.9	B			225	23.7	C		
	NBL	100	35.0	C	43.6	D	225	81.1	F	65.3	E	150	53.3	D	53.7	D	375	237.0	F	115.4	F
	NBT	275	45.6	D			350	63.8	E			200	55.8	E			325	77.0	E		
	NBR	300	43.0	D			350	57.8	E			250	43.3	D			300	61.9	E		
	WBL	50	32.7	C	25.9	C	75	53.7	D	24.2	C	75	19.3	B	14.1	B	150	75.5	E	16.8	B
	WBT	150	26.0	C			150	22.7	C			425	13.9	B			450	13.5	B		
	WBR	175	17.3	B			150	16.8	B			425	12.9	B			400	13.7	B		
	SBL	100	69.9	E	41.7	D	75	58.0	E	46.0	D	125	64.6	E	41.2	D	150	82.4	F	52.6	D
	SBT	100	38.1	D			100	48.8	D			200	43.0	D			250	55.0	D		
	SBR	100	11.4	B			100	10.1	B			200	10.5	B			250	14.0	B		
Main St & 400 S	**INT**	-	**23.9**	**C**			-	**19.7**	**B**			-	**20.5**	**C**			-	**18.4**	**B**		
	EBL	100	76.6	E	27.1	C	100	79.7	E	20.2	C	75	67.1	E	13.4	B	75	77.7	E	8.7	A
	EBT	500	25.9	C			450	18.6	B			250	11.5	B			150	6.1	A		

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EBR	525	22.6	C			475	18.1	B			275	10.4	B			175	5.9	A		
	NBL	50	48.4	D	40.6	D	25	64.7	E	46.0	D	50	62.3	E	49.1	D	50	69.9	E	53.1	D
	NBT	200	46.9	D			175	53.6	D			175	55.9	E			200	59.4	E		
	NBR	225	34.1	C			225	37.2	D			225	36.1	D			225	39.5	D		
	WBT	100	6.6	A	6.5	A	125	8.3	A	8.2	A	325	9.9	A	10.0	A	375	10.7	B	10.7	B
	WBR	100	4.2	A			125	6.0	A			325	11.1	B			375	10.2	B		
	SBL	50	56.8	E	41.5	D	50	57.9	E	41.6	D	375	143.7	F	93.7	F	375	123.1	F	79.2	E
	SBT	75	46.0	D			75	47.2	D			400	73.4	E			325	65.0	E		
	SBR	75	16.7	B			75	13.7	B			400	67.3	E			325	49.6	D		
	NXT	150	37.0	D	37.9	D	100	33.8	C	33.8	C	150	43.0	D	41.3	D	150	42.1	D	42.1	D
	NXR	150	40.0	D			0	-	-			150	37.6	D			0	-	-		
	WXL	150	34.0	C	34.0	C	0	-	-	8.8	A	150	15.0	B	15.0	B	0	-	-	9.1	A
	WXT	0	-	-			75	8.8	A			0	-	-			100	9.1	A		
	SXT	150	46.7	D	46.7	D	150	51.1	D	51.1	D	150	44.5	D	44.5	D	150	39.8	D	39.8	D
	EXT	0	-	-	-		150	25.7	C	25.7	C	0	-	-	-		100	20.7	C	20.7	C
State St & 400 S	**INT**	-	**39.2**	**D**			-	**42.8**	**D**			-	**41.3**	**D**			-	**52.2**	**D**		

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EBL	500	108.6	F	39.2	D	550	129.6	F	35.1	D	200	82.4	F	33.8	C	200	94.8	F	33.4	C
	EBT	650	35.6	D			625	29.6	C			300	34.0	C			250	32.0	C		
	EBR	225	20.3	C			100	15.7	B			150	12.9	B			125	11.9	B		
	NBL	125	30.5	C	45.2	D	150	40.1	D	61.6	E	200	63.0	E	46.4	D	300	109.5	F	64.3	E
	NBT	425	46.8	D			650	63.9	E			275	43.4	D			400	54.6	D		
	NBR	450	45.7	D			675	61.9	E			300	35.6	D			375	49.6	D		
	WBL	125	62.6	E	29.4	C	125	61.3	E	27.7	C	225	64.5	E	35.0	C	225	65.5	E	32.6	C
	WBT	125	27.1	C			125	25.2	C			400	32.9	C			400	30.0	C		
	WBR	75	5.7	A			75	5.3	A			75	11.2	B			75	10.1	B		
	SBL	75	34.7	C	32.3	C	100	39.4	D	36.4	D	100	40.0	D	52.6	D	100	76.2	E	87.5	F
	SBT	125	32.7	C			150	36.8	D			425	53.8	D			550	89.0	F		
	SBR	125	24.1	C			150	26.0	C			425	52.5	D			550	84.4	F		
	EXT	50	9.6	A	9.6	A	75	14.9	B	14.9	B	150	13.7	B	13.7	B	150	27.5	C	27.5	C
	WXT	50	23.0	C	23.0	C	100	21.0	C	21.0	C	100	39.9	D	39.9	D	100	24.8	C	24.8	C
	INT	-	**41.0**	**D**			-	**41.1**	**D**			-	**48.6**	**D**			-	65.8	E		
700 E & 400 S	EBL	400	220.3	F	57.7	E	400	223.3	F	56.9	E	275	119.3	F	44.9	D	425	223.4	F	58.3	E

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EBT	450	44.0	D			400	43.9	D			250	37.4	D			300	34.5	C		
	EBR	75	21.0	C			75	15.0	B			150	13.9	B			125	12.0	B		
	NBL	125	64.1	E	36.2	D	125	64.4	E	38.0	D	200	112.3	F	47.5	D	200	111.5	F	53.2	D
	NBT	475	35.6	D			525	37.6	D			300	35.9	D			350	43.5	D		
	NBR	100	17.0	B			100	18.2	B			50	7.6	A			75	8.0	A		
	WBL	125	66.5	E	36.9	D	125	66.2	E	36.3	D	450	130.1	F	51.6	D	425	111.1	F	45.8	D
	WBT	125	36.9	D			125	36.2	D			250	34.9	C			250	32.1	C		
	WBR	75	8.5	A			75	9.1	A			75	6.7	A			50	6.6	A		
	SBL	100	58.9	E	30.4	C	100	59.8	E	30.7	C	75	69.3	E	47.8	D	100	114.6	F	96.8	F
	SBT	225	27.6	C			200	27.9	C			550	48.3	D			925	97.8	F		
	SBR	25	5.2	A			25	5.1	A			50	23.0	C			150	68.4	E		
	EXT	100	32.7	C	32.7	C	100	27.9	C	27.9	C	150	63.0	E	63.0	E	175	54.0	D	54.0	D
	WXT	50	24.1	C	24.1	C	75	18.7	B	18.7	B	75	34.2	C	34.2	C	100	24.1	C	24.1	C

Intersection	Mvmt	Existing - AM Peak			Proposed - AM Peak			Existing - PM Peak			Proposed - PM Peak		
		95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)
	INT	-	**40.8 D**		-	**43.3 D**		-	**51.6 D**		-	**66.2 E**	
1300 E & 500 S	EBL	375	103.5 F	33.5 C	375	144.3 F	36.6 D	250	98.1 F	38.7 D	300	130.4 F	41.4 D
	EBT	350	25.6 C		375	24.8 C		175	25.3 C		150	23.2 C	
	EBR	350	34.3 C		375	26.0 C		175	33.9 C		150	23.3 C	
	NBL	100	80.8 F	44.7 D	100	73.6 E	47.0 D	100	73.2 E	47.2 D	100	76.4 E	49.5 D
	NBT	250	56.9 E		275	59.9 E		150	54.1 D		175	56.9 E	
	NBR	125	14.6 B	44.7 D	175	18.4 B	47.0 D	75	6.6 A	47.2 D	75	6.8 A	49.5 D
	WBL	100	87.3 F	29.6 C	100	91.7 F	37.7 D	200	103.2 F	45.0 D	200	116.3 F	72.0 E
	WBT	150	26.7 C	29.6 C	175	36.2 D	37.7 D	650	41.4 D	45.0 D	900	69.1 E	72.0 E
	WBR	175	21.0 C		150	26.4 C		200	35.2 D		350	64.8 E	
	SBL	300	91.8 F	70.2 E	275	79.8 E	64.5 E	175	80.1 F	78.2 E	200	89.1 F	87.4 F
	SBT	150	51.0 D		150	50.5 D		425	59.3 E		450	67.4 E	
	SBR	75	61.5 E		75	61.7 E		300	161.6 F		375	177.5 F	
	EXT	50	2.3 A	2.3 A	150	11.1 B	11.1 B	75	7.3 A	7.3 A	150	9.8 A	9.8 A
	WXT	75	27.1 C	27.1 C	75	8.3 A	8.3 A	75	17.5 B	17.5 B	100	18.6 B	18.6 B
	INT	-	**35.5 D**		-	**35.3 D**		-	**42.1 D**		-	**41.9 D**	

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
Campus Center Dr & 500 E	EBL	250	62.6	E	34.1	C	275	63.1	E	33.5	C	150	68.8	E	38.9	D	150	70.7	E	39.1	D
	EBT	375	24.9	C			400	24.2	C			225	30.1	C			225	31.2	C		
	EBR	375	26.7	C			375	24.3	C			225	31.9	C			225	26.4	C		
	NBL	125	72.6	E	67.8	E	125	73.2	E	69.4	E	250	118.9	F	85.2	F	250	118.9	F	85.2	F
	NBT	325	65.7	E			325	67.5	E			150	51.3	D			150	51.1	D		
	NBR	50	77.1	E			50	80.0	F			50	61.5	E			50	62.3	E		
	WBL	50	72.2	E	24.0	C	50	70.4	E	24.3	C	275	90.6	F	31.7	C	275	88.6	F	31.4	C
	WBT	200	22.5	C			225	22.7	C			375	26.1	C			375	26.0	C		
	WBR	200	23.7	C			225	24.1	C			375	28.2	C			375	28.1	C		
	SBL	50	71.0	E	38.7	D	50	72.3	E	38.9	D	100	67.4	E	52.1	D	100	71.6	E	51.1	D
	SBT	125	47.2	D			100	46.3	D			500	70.9	E			500	66.9	E		
	SBR	50	4.7	A			50	4.5	A			75	9.9	A			75	10.2	B		
S Campus Dr & Ped Crossing	**INT**	-	**0.7**	**A**			-	**0.7**	**A**			-	**13.4**	**B**			-	**17.6**	**B**		
	EBT	25	0.8	A	0.8	A	25	0.8	A	0.8	A	200	28.9	C	28.9	C	275	39.2	D	39.2	D
	WBT	75	0.7	A	0.7	A	50	0.7	A	0.7	A	75	0.7	A	0.7	A	50	0.5	A	0.5	A

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EXT	0	5.7	A	5.7	A	0	3.0	A	3.0	A	0	5.7	A	5.7	A	0	3.0	A	3.0	A
	WXT	0	0.0	A	0.0	A	0	0.0	A	0.0	A	0	0.0	A	0.0	A	0	0.0	A	0.0	A
S Campus Dr & Guardsman Dr	**INT**	-	**4.3**	**A**			-	**4.8**	**A**			-	**29.4**	**C**			-	**44.9**	**D**		
	EBU	100	-	-	4.2	A	100	-	-	5.0	A	375	-	-	55.6	E	400	-	-	65.0	E
	EBT	100	4.2	A			100	5.0	A			375	54.9	D			400	66.9	E		
	EBR	100	4.4	A			100	5.2	A			375	56.1	E			400	63.8	E		
	NBU	225	-	-	3.9	A	175	-	-	4.2	A	100	-	-	2.9	A	75	-	-	3.9	A
	NBL	225	9.8	A			175	10.8	B			100	6.8	A			75	8.9	A		
	NBR	0	0.6	A			0	0.6	A			0	0.3	A			0	0.3	A		
	WBU	100	-	-	11.0	B	125	-	-	12.9	B	525	-	-	39.8	D	700	-	-	73.5	E
	WBL	100	10.8	B			125	12.7	B			525	40.3	D			700	74.8	E		
	WBT	100	11.2	B			125	13.1	B			525	39.1	D			700	71.5	E		
	EXT	0	0.0	A	0.0	A	0	0.0	A	0.0	A	0	0.0	A	0.0	A	0	0.0	A	0.0	A
	WXT	0	0.7	A	0.7	A	0	0.2	A	0.2	A	0	0.3	A	0.3	A	0	0.4	A	0.4	A
S Campus Dr & 1725 E	**INT**	-	**18.9**	**B**			-	**19.1**	**B**			-	**24.3**	**C**			-	**29.3**	**C**		
	EBL	300	41.9	D	17.8	B	275	40.5	D	17.4	B	150	43.2	D	20.2	C	150	44.3	D	21.2	C

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	EBT	125	4.9	A			125	5.2	A			100	9.7	A			100	10.8	B		
	EBR	125	5.5	A			125	5.6	A			100	9.6	A			100	9.4	A		
	NBL	25	58.1	E	40.2	D	25	58.1	E	40.3	D	50	31.4	C	30.1	C	50	32.3	C	30.2	C
	NBT	50	36.8	D			50	36.9	D			25	16.2	B			25	16.4	B		
	NBR	50	26.6	C			50	26.5	C			25	35.0	D			25	31.8	C		
	WBL	50	42.5	D	15.0	B	50	43.5	D	17.4	B	100	46.8	D	20.7	C	100	47.4	D	29.8	C
	WBT	100	13.0	B			100	15.6	B			225	17.5	B			250	28.1	C		
	WBR	100	11.9	B			100	15.3	B			225	15.4	B			250	21.3	C		
	SBL	75	51.7	D	41.2	D	75	51.7	D	41.5	D	225	39.3	D	38.3	D	250	40.8	D	41.5	D
	SBT	75	39.3	D			75	39.3	D			225	35.6	D			250	38.4	D		
	SBR	75	40.5	D			75	41.0	D			225	38.7	D			250	42.4	D		
	EXT	100	27.3	C	27.3	C	150	25.6	C	25.6	C	150	19.1	B	19.1	B	150	25.9	C	25.9	C
	WXT	125	40.6	D	40.6	D	75	18.2	B	18.2	B	150	25.7	C	25.7	C	125	22.5	C	22.5	C

Intersection	Mvmt	Existing - AM Peak			Proposed - AM Peak			Existing - PM Peak			Proposed - PM Peak		
		95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)	95th % Queue (ft)	Mvmt Del/LOS (sec)	App Del/LOS (sec)
S Campus Dr & Mario Capecchi Dr	**INT**	-	**30.9 C**		-	**38.5 D**		-	**44.0 D**		-	**74.8 E**	
	EBL	200	56.4 E	54.4 D	250	61.3 E	57.5 E	150	63.4 E	49.7 D	175	69.4 E	55.9 E
	EBT	200	60.9 E		250	59.5 E		150	61.1 E		175	75.5 E	
	EBR	25	6.0 A		25	6.1 A		50	12.4 B		75	11.3 B	
	NBL	100	73.3 E	23.0 C	100	81.9 F	32.8 C	125	76.9 E	30.0 C	125	85.4 F	34.8 C
	NBT	425	20.8 C		550	30.6 C		175	22.8 C		200	27.2 C	
	NBR	425	20.8 C		550	32.0 C		175	27.0 C		200	29.7 C	
	WBL	175	69.3 E	47.2 D	200	97.4 F	69.7 E	350	69.5 E	60.8 E	675	141.4 F	143.3 F
	WBT	175	66.6 E		200	96.2 F		350	67.4 E		675	154.9 F	
	WBR	150	12.2 B		175	22.6 C		325	39.0 D		675	115.2 F	
	SBL	100	75.8 E	28.2 C	100	72.6 E	29.9 C	175	88.6 F	44.8 D	475	127.5 F	79.8 E
	SBT	150	17.1 B		175	21.0 C		650	32.7 C		925	64.3 E	
	SBR	125	76.5 E		100	68.0 E		625	84.1 F		900	132.4 F	
	EXL	125	30.7 C	30.7 C	150	11.0 B	49.2 D	125	43.8 D	43.8 D	150	17.1 B	40.1 D
	EXR	0	- -		175	79.7 E		0	- -		150	58.5 E	
	SXR	150	59.4 E	59.4 E	150	37.6 D	37.6 D	150	70.0 E	70.0 E	150	42.7 D	42.7 D

Intersection	Mvmt	Existing - AM Peak					Proposed - AM Peak					Existing - PM Peak					Proposed - PM Peak				
		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)		95th % Queue (ft)	Mvmt Del/LOS (sec)		App Del/LOS (sec)	
	NXL	0	-	-	-		150	81.7	F	81.7	F	0	-	-	-		150	46.0	D	46.0	D